



**2019 ANNUAL REPORT
AND FORM 10-K**

FuelCell Energy, Inc. (NASDAQ: FCEL) is a global leader in fuel cell technology, with our purpose being to utilize our proprietary, state-of-the-art fuel cell power plants to enable a world empowered by clean energy. FuelCell's technology has the direct impact of reducing the global environmental footprint of always-on baseload power generation. We accomplish this by providing environmentally responsible and sustainable solutions for always-on electrical power, hot water, steam, chilling, hydrogen, microgrid applications, and carbon capture without combusting fuel. Our systems answer the needs of diverse customers across several markets, including utility companies, municipalities, universities, hospitals, government entities, and a variety of industrial and commercial enterprises. We develop turn-key distributed power generation solutions, operate and maintain the platforms, and provide comprehensive services for the life of the power plant. With SureSource™ installations on three continents and millions of megawatt hours of power produced, FuelCell Energy is a global leader in delivering localized, always-on, and sustainable clean energy solutions.



FuelCell Energy Employees at the Torrington, CT Manufacturing Facility

Dear Stockholders, Customers, Suppliers and Employees:

When I reflect on the past year, I'm proud of our progress, and how we continue to face our challenges head on. Last year, our company faced a significant set of challenges and we have been managing through them. We have persevered, becoming stronger and more focused on executing for the future. During this time of challenge, we strove to support our customers and suppliers, and we never lost sight of our purpose to enable the world to live a life empowered by clean energy.

I feel extraordinarily privileged to work for this great company with such talented people. Our management team and colleagues do impactful and important work every single day—sometimes under enormous pressure—while dealing with a number of highly complex business, technical and policy issues. The way we have been able to address our challenges head-on and admit our mistakes, while continuing to grow our business and support our customers, fills me with pride. It's why I joined, why I come to work each and every day, and why I believe passionately in our future and our ability to positively impact the world.

In the latter half of 2019, we laid the foundation for FuelCell Energy's turnaround. **Our focus:** organizing for success, setting a new strategic direction and achieving operational excellence. In terms of what we have achieved, we secured funding to provide immediate liquidity to execute inflight projects that will generate recurring cashflow upon completion, expanded strategic relationships to enhance the development of carbon capture technologies and secure growth opportunities in the European market, and made significant progress on the on-time and within budget delivery of key projects. As a result of these achievements, and the successful rightsizing of the business, implementation of cost control measures, and the reduction and re-laddering of our corporate level debt, we concluded our engagement with Huron Consulting.

Earlier this year, we launched a new strategy called **Powerhouse**, which outlined how we have transformed, strengthened and plan to grow our company, including geographic market expansion.

**Our focus: organizing
for success, setting
a new strategic
direction and
achieving operational
excellence.**

As a multinational organization, we have both a substantial opportunity and a deep responsibility to ensure that the benefits of our technology reach people more broadly across our global society. It is our privilege to contribute to local communities in positive ways—helping them to live lives empowered by clean energy.

Looking forward, we have an opportunity to become the leader in the next era of power generation driven by a combination of our technology leadership and the need for clean, resilient baseload power generation.

When I joined the Board of Directors, I was immediately impressed with the manufacturing and engineering expertise that is rooted in 50 years of research, bold innovation, development and delivery of platforms and tools that have transformed our industry. This technology leadership is in our collective DNA and can be seen across our extensive intellectual property portfolio and in the work of our Advanced Technology Programs across three strategic growth areas for the Company—carbon capture, distributed hydrogen production and long duration energy storage.

To serve the needs of our customers well into the future, we will continue to transform and commercialize these strategic growth assets into new and better technologies that we believe will be among the most innovative and impactful globally relative to clean energy.

A new paradigm is emerging, with a global “grid of the future” re-configured to support always-on and reliable distributed baseload power generation. This shift is being driven by the global demand for clean energy, the intermittency of wind and solar power that negatively impacts reliability, an aging and unreliable infrastructure and natural disasters that impact people’s ability to rely on the current grid for their most basic needs.

As the “grid of the future” evolves, FuelCell Energy’s global, broad and deep portfolio of solutions are uniquely suited to compete, win and provide the reliability that the always-on grid of the future must deliver in our neighborhoods, our schools and for our collective future. We believe that our solution will allow the grid to be there for our customers and communities in good times—and more importantly, in bad times; because the work we do matters and has the potential to significantly impact the global community in a positive way.

Thank you for your continued support and investment in FuelCell Energy. We’re proud of the progress we have made and are eager to continue our efforts in the year ahead to execute on the next leg of our Powerhouse Strategy.

A handwritten signature in black ink, appearing to read "Jason Few". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jason Few
President, Chief Executive Officer and Chief Commercial Officer of FuelCell Energy, Inc.

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549**

FORM 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended **October 31, 2019**
OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____
Commission file number: **1-14204**

FUELCELL ENERGY, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

06-0853042
(I.R.S. Employer
Identification No.)

**3 Great Pasture Road
Danbury, Connecticut**
(Address of principal executive offices)

06810
(Zip Code)

Registrant's telephone number, including area code: **(203) 825-6000**
Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol (s)	Name of each exchange on which registered
Common Stock, \$0.0001 par value per share	FCEL	The Nasdaq Stock Market LLC (Nasdaq Global Market)

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

As of April 30, 2019, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was \$42,440,268 based on the closing sale price of \$3.12 as reported on the NASDAQ Global Market.

Indicate the number of shares outstanding of each of the registrant's classes of common stock, as of the latest practicable date.

Class	Outstanding at January 14, 2020
Common Stock, \$0.0001 par value per share	210,965,999

DOCUMENT INCORPORATED BY REFERENCE

Document	Parts Into Which Incorporated
Definitive Proxy Statement for the 2020 Annual Meeting of Stockholders	Part III

FUELCELL ENERGY, INC.
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PART I

Item 1. BUSINESS

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Forward-Looking Statement Disclaimer

This Annual Report on Form 10-K contains statements that the Company believes to be “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. All statements other than statements of historical fact included in this Form 10-K, including statements regarding the Company’s future financial condition, results of operations, business operations and business prospects, are forward-looking statements. Words such as “expects,” “anticipates,” “estimates,” “projects,” “intends,” “plans,” “believes,” “predicts,” “should,” “will,” “could,” “would,” “may,” “forecast,” and similar expressions and variations of such words are intended to identify forward-looking statements. Such statements relate to, among other things, the following:

- the development and commercialization by FuelCell Energy, Inc. and its subsidiaries (“FuelCell Energy,” “Company,” “we,” “us” and “our”) of fuel cell technology and products and the market for such products,
- expected operating results such as revenue growth and earnings,
- our belief that we have sufficient liquidity to fund our business operations for the next 12 months,
- future funding under Advanced Technologies contracts,
- future financing for projects, including publicly issued bonds, equity and debt investments by investors and commercial bank financing,
- the expected cost competitiveness of our technology, and
- our ability to achieve our sales plans, market access and market expansion goals, and cost reduction targets.

The forward-looking statements contained in this report are subject to risks and uncertainties, known and unknown, that could cause actual results to differ materially from those forward-looking statements, including, without limitation, the risks contained under Item 1A - Risk Factors of this report and the following:

- general risks associated with product development and manufacturing,
- general economic conditions,
- changes in the utility regulatory environment,
- changes in the utility industry and the markets for distributed generation, distributed hydrogen, and carbon capture configured fuel cell power plants,
- potential volatility of energy prices,
- availability of government subsidies and economic incentives for alternative energy technologies,
- our ability to remain in compliance with U.S. federal and state and foreign government laws and regulations and the listing rules of The Nasdaq Stock Market (“Nasdaq”),
- rapid technological change,
- competition,
- our dependence on strategic relationships,
- market acceptance of our products,
- changes in accounting policies or practices adopted voluntarily or as required by accounting principles generally accepted in the United States,
- factors affecting our liquidity position and financial condition,
- government appropriations,
- the ability of the government to terminate its development contracts at any time,
- the ability of the government to exercise “march-in” rights with respect to certain of our patents,

- the situation with POSCO Energy has limited and continues to limit our efforts to access the South Korean and Asian markets and could expose us to costs of arbitration or litigation proceedings,
- our ability to implement our strategy,
- our ability to reduce our levelized cost of energy and our cost reduction strategy generally,
- our ability to protect our intellectual property,
- litigation and other proceedings,
- the risk that commercialization of our products will not occur when anticipated,
- our need for and the availability of additional financing,
- our ability to generate positive cash flow from operations,
- our ability to service our long-term debt,
- our ability to increase the output and longevity of our power plants, and
- our ability to expand our customer base and maintain relationships with our largest customers and strategic business allies.

We cannot assure you that:

- we will be able to meet any of our development or commercialization schedules,
- we will be able to remain in compliance with the minimum bid price requirement of the Nasdaq listing rules,
- any of our new products or technology, once developed, will be commercially successful,
- our existing SureSource power plants will remain commercially successful,
- the government will appropriate the funds anticipated by us under our government contracts,
- the government will not exercise its right to terminate any or all of our government contracts, or
- we will be able to achieve any other result anticipated in any other forward-looking statement contained herein.

The forward-looking statements contained herein speak only as of the date of this report and readers are cautioned not to place undue reliance on these forward-looking statements. Except for ongoing obligations to disclose material information under the federal securities laws, we expressly disclaim any obligation or undertaking to release publicly any updates or revisions to any such statement to reflect any change in our expectations or any change in events, conditions or circumstances on which any such statement is based.

Background

Information contained in this report concerning the electric power supply industry and the distributed generation market, our general expectations concerning this industry and this market, and our position within this industry are based on market research, industry publications, other publicly available information and assumptions made by us based on this information and our knowledge of this industry and this market, which we believe to be reasonable. Although we believe that the market research, industry publications and other publicly available information, including the sources that we cite in this report, are reliable, they have not been independently verified by us and, accordingly, we cannot assure you that such information is accurate in all material respects. Our estimates, particularly as they relate to our general expectations concerning the electric power supply industry and the distributed generation market, involve risks and uncertainties and are subject to change based on various factors, including those discussed under Item 1A - Risk Factors of this report.

As used in this report, all degrees refer to Fahrenheit (“F”); kilowatt (“kW”) and megawatt (“MW”) numbers designate nominal or rated capacity of the referenced power plant; “efficiency” or “electrical efficiency” means the ratio of the electrical energy generated in the conversion of a fuel to the total energy contained in the fuel (lower heating value, the standard for power plant generation, assumes the water in the product is in vapor form; as opposed to higher heating value, which assumes the water in the product is in liquid form, net of parasitic load); kW means 1,000 watts; MW means 1,000,000 watts; “kilowatt hour” (“kWh”) is equal to 1kW of power supplied to or taken from an electric circuit steadily for one hour; and one British Thermal Unit (“Btu”) is equal to the amount of heat necessary to raise one pound of pure water from 59°F to 60°F at a specified constant pressure.

All dollar amounts are in U.S. dollars unless otherwise noted.

Additional Technical Terms and Definitions

Advanced Technologies - Advanced Technologies projects involve the development of new products or applications based on existing carbonate or solid oxide technologies or new electrochemical technologies. Examples are carbon capture, distributed hydrogen, solid oxide fuel cells and solid oxide electrolysis cell technologies. Advanced Technologies projects are typically externally funded by government or private sources and executed by our Advanced Technologies Group.

Availability - A measure of the amount of time a system is available to operate, as a fraction of total calendar time. For power generation equipment, an industry standard (IEEE (The Institute of Electrical and Electronics Engineers) 762, “Definitions for Use in Reporting Electric Generating Unit Reliability, Availability and Productivity”) is used to compute availability. “Availability percentage” is calculated as total period hours since Commercial Operations Date less hours not producing electricity due to planned and unplanned maintenance divided by total period hours. Grid disturbances, force majeure events and site specific issues such as a lack of available fuel supply or customer infrastructure repair do not penalize the calculation of availability according to this standard.

Carbonate Fuel Cell (“CFC”) - Carbonate fuel cells, such as the fuel cell power plants produced and sold by FuelCell Energy, are high-temperature fuel cells that use an electrolyte composed of a carbonate salt mixture suspended in a porous, chemically inert ceramic-based matrix. CFCs operate at high temperatures, enabling the use of a nickel-based catalyst, a lower cost alternative to precious metal catalysts used in some other fuel cell technologies.

Combined Heat & Power (“CHP”) - A power plant configuration or mode of operation featuring simultaneous on-site generation from the same unit of fuel of both electricity and heat with the heat used to produce steam, hot water or heated air for both heating and cooling applications.

Commercial Operations Date (“COD”) - The date that testing and commissioning of a fuel cell project is completed and the fuel cell power plant is operational with power being generated and sold to the end-user.

Distributed Generation - Electric power that is generated where it is needed (distributed throughout the power grid) rather than from a central location. Centrally generated power requires extensive transmission networks that require maintenance and experience efficiency losses during transmission while distributed generation does not. Distributed generation is typically classified as small to mid-size power plants, typically generating 75 MW or less. Central generation is typically classified as large power plants generating hundreds or even thousands of MW.

Microgrids - Microgrids are localized electric grids that can disconnect from the traditional electric grid to operate autonomously and strengthen grid resiliency. Microgrids can be composed only of SureSource power plants due to their continual power output or combine a variety of power generation types such as fuel cells and solar arrays.

Nitrogen Oxides (“NOx”) - Generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the NOx are colorless and odorless; however, they are a major precursor to smog production and acid rain. One common pollutant, Nitrogen Dioxide, along with particles in the air, can often be seen as a reddish-brown layer over an urban area. NOx form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, traditional fossil fuel fired electric utility generation, and other industrial, commercial and residential sources that burn fuels.

Particulate Matter (“PM”) - Solid or liquid particles emitted into the air that are generally caused by the combustion of materials or dust generating activities. Particulate matter caused by combustion can be harmful to humans as the fine particles of chemicals, acids and metals may get lodged in lung tissue.

Power Purchase Agreement (“PPA”) - A Power Purchase Agreement is a contract that enables a power user to purchase energy under a long-term contract where the user agrees to pay a predetermined rate for the kilowatt-hours delivered from a power generating asset while avoiding the need to own the equipment and pay the upfront capital cost. The PPA rate is typically fixed (with an escalation clause tied to a consumer price index or similar index), or pegged to a floating index that is on par with or below the current electricity rate being charged by the local utility company. A PPA is typically for a term of 10 to 20 years.

Renewable Biogas or Biogas - Renewable Biogas is fuel produced by biological breakdown of organic material. Biogas is commonly produced in biomass digesters employing bacteria in a heated and controlled oxygen environment. These digesters are typically used at wastewater treatment facilities or food processors to break down solid waste and the biogas produced is a byproduct of the waste digestion. Biogas can be used as a renewable fuel source for SureSource fuel cell plants located on site where the biogas is produced with gas cleanup, or it can be processed further to meet pipeline fuel standards and injected into a gas pipeline network, which is termed Directed Biogas. Directed Biogas requires additional processing to increase the Btu content of the gas, which increases cost and consumes power. Use of Biogas at the point of production (on-site) is more efficient and more economical.

Solid Oxide Electrolysis Cell (“SOEC”) - Solid Oxide Electrolysis Cells are electrochemical cells with the same cell and stack structure as Solid Oxide Fuel Cells, but are operated in reverse – instead of producing power from fuel and oxygen, SOEC cells produce hydrogen and oxygen from steam when supplied with power.

Solid Oxide Fuel Cell (“SOFC”) - Solid Oxide Fuel Cells are electrochemical cells with a non-porous ceramic material as the electrolyte. SOFCs operate at high temperatures (slightly higher than carbonate fuel cells) eliminating the need for costly precious-metal catalysts, thereby reducing cost. Like carbonate fuel cells, the high operating temperature enables internal reforming of the hydrogen rich fuel source. The Solid Oxide Fuel Cell platform can be operated in fuel cell mode (producing power from fuel) or electrolysis mode (producing hydrogen from power) and can alternate between the two.

Sulfur Oxide (“SOx”) - Sulfur oxide refers to any one of the following: sulfur monoxide, sulfur dioxide (“SO₂”) and sulfur trioxide. SO₂ is a byproduct of various industrial processes. Coal and petroleum contain sulfur compounds, and generate SO₂ when burned. SOx compounds are particulate and acid rain precursors.

Overview

FuelCell Energy, based in Connecticut, was founded in 1969 as a New York corporation to provide applied research and development services on a contract basis. We completed our initial public offering in 1992 and reincorporated in Delaware in 1999. We began selling stationary fuel cell power plants commercially in 2003.

With more than 9.5 million megawatt hours of clean electricity produced, FuelCell Energy is now a global leader in delivering environmentally-responsible distributed baseload power solutions through our proprietary, molten-carbonate fuel cell technology. Today, we develop turn-key distributed power generation solutions and operate and provide comprehensive service for the life of the power plant. We are working to expand the proprietary technologies that we have developed over the past five decades into new products, markets and geographies.

Fiscal year 2019 was one of transformation for FuelCell Energy. We restructured our management team and our operations in ways that are intended to support our growth and achieve our profitability and sustainability goals. We raised capital under our at-the-market sales plan, which allowed us to pay down our accounts payable and stay current on our forbearance agreements. We repaid a substantial portion of our short-term debt, retired our Series C and Series D Convertible Preferred Stock obligations, and refocused on our core competencies in an effort to drive top-line revenue. We believe we have emerged from a difficult fiscal 2019 as a stronger company, better positioned to execute on our business plan. Our recent achievements, accomplished during one of the most stressful times in the Company’s history, include: (a) closing on a new \$200 million credit facility with Orion Energy Partners Investment Agent, LLC and certain of its affiliated lenders (“Orion Energy Partners”), (b) executing a new Joint Development Agreement with ExxonMobil Research and Engineering Company (“EMRE”), with anticipated revenues of up to \$60 million, (c)

restructuring our business to realize annualized operating savings of approximately \$15 million, (d) making progress in constructing certain projects in our backlog, including the Connecticut Municipal Electric Energy Cooperative (“CMEEC”) project at the U.S. Navy base in Groton, Connecticut and the commissioning and startup of the 2.8 MW Tulare BioMAT project in California, (e) relaunching our sub-megawatt product in Europe, (f) executing a strategic relationship with E.On Business Solutions, an affiliate of one of the largest utilities in the world, to market and distribute our products beyond the two FuelCell operating plants E.On already owns, (g) extending the maturity of the Class A Cumulative Redeemable Exchangeable Preferred Shares issued by FCE FuelCell Energy Ltd. (the “Series 1 Preferred Shares”) by one year, and (h) concluding our engagement with Huron Consulting Services, LLC (“Huron Consulting”) after successful restructuring and payoff of our prior senior secured credit facility.

We will use this new focus coming out of our restructuring to advance our core goals of:

- Executing on our backlog and new project awards;
- Growing our generation portfolio;
- Competing for and winning new business around the world; and
- Developing and commercializing our Advanced Technologies platform of products.

In order to achieve our core goals, we will focus in 2020 on implementing our new “Powerhouse” business strategy to strengthen our business, maximize operational efficiencies and position us for future growth. The “Powerhouse” business strategy is focused on three fundamental pillars – Transform, Strengthen, Grow – which are described in further detail below.

Transform

We spent the latter half of fiscal 2019 working on and achieving the following:

- *Restructured our management team:* We appointed a new President, Chief Executive Officer and Chief Commercial Officer, Jason Few, to lead our organization, and promoted Michael Lisowski to the positions of Executive Vice President and Chief Operating Officer and Anthony Leo to the positions of Executive Vice President and Chief Technology Officer. Together with our Executive Vice President and Chief Financial Officer, Michael Bishop, and our Executive Vice President, General Counsel, Chief Administrative Officer and Corporate Secretary, Jennifer Arasimowicz, we believe that this executive management team is well positioned to execute on our new “Powerhouse” business strategy.
- *Secured funding:* Closed on a \$200 million senior secured credit facility with Orion Energy Partners to support execution of our current projects and provide balance sheet strength and liquidity.
- *Restructured organization:* Concluded our engagement with Huron Consulting after successful restructuring and payoff of our prior senior secured credit facility.
- *Delivered cost savings:* Realized annualized operating savings of approximately \$15 million through the restructuring of our business.
- *Refinanced debt:* Repaid a substantial portion of our short-term debt with funds from a combination of sales of our common stock under our at-the-market sales plan and our long-term credit facility with Orion Energy Partners.

Strengthen

- *Capital deployment:* Continue to focus on disciplined capital deployment and obtaining lower-cost, long-term financing for completed generation projects.
- *Commercial excellence:* Strengthen customer relationships and build a customer-centric reputation.
- *Operational excellence:* Implement a rigorous approach to executing and delivering our backlog on-time and on-budget.
- *Cost reductions:* Focus on continued lean resource management and cost reduction opportunities.

- *Focused Execution:* Continue to develop and define a clear strategic roadmap for the Company.

Grow

- *Sales growth:* Increase product sales to key strategic customers, and grow service revenue through pricing strategy, reducing the cost of ownership for our customers and enhancing service solutions, including long duration energy storage.
- *Innovation:* Increase length of product life and product reliability, and expand commercialization of new technologies such as carbon capture, hydrogen, biofuels, and solid oxide systems.
- *Segment leadership:* Capitalize on our expertise in the key addressable markets of biofuels, microgrid development, and hydrogen economy expansion for industry, transportation and electric power generation.
- *Geographic and market expansion:* Continue to develop new clean and renewable energy partnerships to advance carbon capture, hydrogen and multi-fuel/biofuel technology, and pursue growth in global markets.

Our mission and purpose remains to utilize our proprietary, state-of-the-art fuel cell power plants to reduce the global environmental footprint of baseload power generation by providing environmentally responsible solutions for reliable electrical power, hot water, steam, chilling, hydrogen, microgrid applications, and carbon capture and, in so doing, drive demand for our products and services, thus realizing positive stockholder returns.

Our fuel cell solution is a clean, efficient alternative to traditional combustion-based power generation and is complementary to an energy mix consisting of intermittent sources of energy, such as solar and wind turbines. Our systems answer the needs of diverse customers across several markets, including utility companies, municipalities, universities, hospitals, government entities and a variety of industrial and commercial enterprises. We provide solutions for various applications, including utility-scale distributed generation, on-site power generation and combined heat and power, with the differentiating ability to do so utilizing multiple sources of fuel including natural gas, Renewable Biogas (i.e., landfill gas, anaerobic digester gas), propane and various blends of such fuels. Our multi-fuel source capability is significantly enhanced by our proprietary gas-clean-up skid.

Products

Our core fuel cell products offer clean, highly efficient and affordable power generation for customers, including the sub-megawatt SureSource 250™ and SureSource 400™ in Europe, and the 1.4 MW SureSource 1500™, the 2.8 MW SureSource 3000™, and the 3.7 MW SureSource 4000™ globally. The plants are scalable for multi-megawatt utility applications, microgrid applications, distributed hydrogen, or on-site CHP generation for a broad range of applications.

The global SureSource product line is uniformly based on the same carbonate fuel cell technology. Using a standard design globally enables supply chain volume-based cost reduction, optimal resource utilization and long-life product enhancements. Our power plants utilize a variety of available fuels to produce electricity electrochemically, in a process that is highly efficient, quiet, and produces virtually none of the particulate pollutants associated with traditional combustion-based power generation solutions. In addition to electricity, our standard fuel cell configuration produces high quality thermal energy (approximately 700° F), suitable for heating facilities or water, or steam for industrial processes or for absorption cooling. When configured for CHP, our system efficiencies can potentially reach up to 90%, depending on the application. When configured for distributed hydrogen our plants produce hydrogen in addition to power, with an effective efficiency (counting the fuel that would have been used to produce hydrogen conventionally) of up to 80% before considering waste heat utilization, which can raise the total efficiency even higher.

Our proprietary carbonate fuel cell technology generates electricity directly from a fuel, such as natural gas or Renewable Biogas, by reforming the fuel inside the fuel cell to produce hydrogen. This internal, proprietary “one-step” reforming process results in a simpler, more efficient, and cost-effective energy conversion system compared with external reforming fuel cells. Additionally, natural gas has an established infrastructure and is readily available in our existing and target markets compared to some types of fuel cells that can only operate on high purity hydrogen, and Biogas is rapidly growing in production around the world. Our products are fuel flexible, and mainly utilize clean natural gas and Renewable Biogas generated by the customer on-site or directed Biogas generated at a distant location and transported via the existing common carrier gas pipeline networks. The unique chemistry of our Carbonate Fuel Cells allows them to directly use low Btu on-site Biogas with no reduction in output or efficiency compared to

operation on natural gas. We have developed proprietary Biogas cleanup and contaminant monitoring equipment which, combined with the inherent suitability of the Carbonate Fuel Cell chemistry, gives us an advantage in on-site Biogas applications. Our SureSource 1500 and SureSource 3000 power plants are the only systems certified to California Air Resource Board (“CARB”) emissions standards under the Distributed Generation Certification Program for operation with on-site Biogas. In addition, we have demonstrated operation of our carbonate fuel cell technology with other fuel sources including coal syngas and propane.

Our fuel cells operate at approximately 1,100° F. A key advantage of high temperature fuel cells is that they do not require the use of precious metal electrodes required by lower temperature fuel cells, such as proton-exchange membrane (“PEM”) fuel cells. As a result, we are able to use less expensive and readily available industrial metals, primarily nickel and stainless steel, as catalysts for our fuel cell components. Another key advantage of our fuel cell design is that they are easily sited with a relatively small footprint given the amount of power produced. There is minimal noise produced by the mechanical balance of plant (“BOP”) and a clean emissions profile, making our fuel cells ideally suited for urban and in building suburban applications at or near the point of energy consumption.

We market different configurations and applications of our SureSource plants to meet specific market needs, including:

- ***On-Site Power (Behind the Meter):*** Customers benefit from improved power reliability and energy security from on-site power that reduces reliance on the electric grid in an environmentally responsible manner. Utilization of the high quality thermal energy produced by the fuel cell in a CHP configuration supports economic and sustainability goals by lessening or even avoiding the need for combustion-based boilers for heat and its associated cost, pollutants and carbon emissions. Heat can be used to produce hot water or steam or to drive high efficiency absorption chillers for cooling applications.
- ***Utility Grid Support:*** Our SureSource power plants are scalable, which enables siting multiple fuel cell power plants together in a fuel cell park. Fuel cell parks enable utilities to add clean and continuous multi-megawatt power generation on a very small footprint when and where needed and enhance the resiliency of the electric grid by reducing reliance on large central generation plants and the associated transmission system. Consolidating certain equipment for multiple plants, such as fuel processing, reduces the cost per megawatt hour for fuel cell parks compared to individual fuel cell power plants. Deploying our SureSource power plants throughout a utility service territory can also help utilities comply with government-mandated clean energy regulations, meet air quality standards, maintain continuous power output and improve grid reliability. Our fuel cells can firm-up the total utility power generation solution when combined with intermittent power generation, such as solar or wind, or less efficient combustion-based equipment that provides peaking or load following power.
- ***Higher Electrical Efficiency - Multi-Megawatt Applications:*** The SureSource 4000 is designed to extract more electrical power from each unit of fuel with electrical efficiency of approximately 60% and targets applications with large load requirements and limited thermal utilization such as utility/grid support or data centers.
- ***Microgrid Applications:*** SureSource plants can also be configured as a microgrid, either independently or with other forms of power generation, to provide continuous power and a seamless transition during times of grid outages. We have multiple installations serving as examples of our solutions operating within microgrids, some individually and some with other forms of power generation.

In summary, our solutions offer many advantages:

- ***Distributed generation:*** Generating power near or at the point of use improves power reliability and energy security and lessens the need for costly and difficult-to-site generation and long distance high voltage and distributed transmission infrastructure susceptible to disruption, thus enhancing the resiliency of the grid.
- ***Clean:*** Our SureSource solutions produce electricity electrochemically – without combustion – directly from readily available fuels such as natural gas and Renewable Biogas in a highly efficient process,

delivering clean baseload energy. The virtual absence of pollutants facilitates siting the power plants in regions with clean air permitting regulations and is an important public health benefit.

- **Highly efficient:** Fuel cells are the most efficient power generation option in their size class, providing the most power from a given unit of fuel, reducing fuel costs. This high electrical efficiency also reduces carbon emissions compared to less efficient combustion-based power generation.
- **Combined heat and power:** Our power plants provide both electricity and usable high quality heat/steam from the same unit of fuel. The heat can be used for facility heating and cooling or further enhancing the electrical efficiency of the power plant in a combined cycle configuration. When configured for CHP, our system efficiencies can potentially reach up to 90%, depending on the application.
- **Reliability / continuous operation:** Our SureSource power plants improve power reliability and energy security by lessening reliance on the transmission and distribution infrastructure of the electric grid. Unlike solar and wind power, fuel cells are able to operate continuously regardless of weather, time of day, or geographic location.
- **Fuel flexibility:** Our SureSource power plants can operate on a variety of existing and readily available fuels, including natural gas, on-site Renewable Biogas, directed Biogas, flare gas and propane.
- **Scalability:** Our solutions are scalable, providing a cost-effective solution to adding power incrementally as demand grows, such as multi-megawatt fuel cell parks supporting the electric grid and large scale commercial and industrial operations.
- **Quiet operation:** Our SureSource solutions operate quietly and without vibrations because they produce power without combustion and contain very few moving parts, which also enhances reliability.
- **Easy to site:** Our SureSource power plants are relatively easy to site by virtue of their ultra-clean emissions profile, modest space requirements and quiet operation. These characteristics facilitate the installation of the power plants in urban locations with scarce and expensive land. A 10 MW fuel cell park only requires about one acre of land whereas an equivalent size solar array requires up to seven-to-ten times as much land, illustrating how fuel cell parks have a much lower environmental impact on land use, and are easy to site in high density areas with constrained land resources and adjacent to the demand source, thereby avoiding costly transmission construction.

Advanced Technologies Programs

Our Advanced Technologies programs, including our carbon capture, local hydrogen production and solid oxide fuel cells and electrolysis for energy storage represent future market, product and revenue opportunities for the Company beyond our current product line. We undertake both privately-funded and public research and development to develop these opportunities, reduce costs, and expand our technology portfolio.

Our multi-featured power plant platforms can be configured to provide a number of value streams, including clean electricity, high quality usable heat, and hydrogen suitable for vehicle fueling, industrial purposes or power generation, and to concentrate CO₂ from coal, biomass and natural gas fired power plants and industrial applications.

We have historically worked on technology development with various U.S. government departments and agencies, including the Department of Energy (“DOE”), the Department of Defense (“DOD”), the Environmental Protection Agency (“EPA”), the Defense Advanced Research Projects Agency (“DARPA”), the Office of Naval Research (“ONR”), and the National Aeronautics and Space Administration (“NASA”). Government funding, principally from the DOE, provided 6%, 8% and 9% of our revenue for the fiscal years ended October 31, 2019, 2018, and 2017, respectively.

Our Advanced Technologies programs are currently focused on commercializing solutions within three strategic areas:

- 1) Carbon capture for emissions reduction in traditional fossil fuel fired generation and industrial applications combined with power generation;
- 2) Distributed hydrogen production, compression, and recovery; and
- 3) SOFC/SOEC for stationary power generation, electrolysis and long duration energy storage.

Carbon Capture – Power generation and industrial applications are the source of two-thirds of the world’s carbon emissions. Coal and natural gas are abundant, low-cost resources that are widely used to generate electricity in developed and developing countries, but burning these fuels, as well as burning biomass, results in the emission of criteria pollutants and CO₂. Cost effective and efficient carbon capture from power generation and industrial applications globally represents a large market because it could enable clean use of all available fuels. The SureSource Capture™ system separates and concentrates CO₂ from the flue gases of natural gas, biomass or coal-fired power plants or industrial facilities as a side reaction that extracts and purifies the CO₂ in the flue gas during the power generation process and destroys approximately 70% of NOx emissions. The production of additional power during the capture process, as opposed to consuming power, differentiates the SureSource Capture system from all other forms of carbon capture. This could make the SureSource Capture system more cost effective than other systems which are being considered for carbon capture. SureSource Capture systems can be implemented in increments, managing capital outlay to match decarbonization objectives and regulatory requirements. Since our solution generates a return on capital resulting from the fuel cell’s production of electricity rather than an increase in operating expense required by other carbon capture technologies, it can extend the life of existing power plants. We have a joint development agreement with EMRE to develop and commercialize this application of our core technology. See additional discussion concerning our relationship with EMRE under the section below entitled “*License Agreements and Royalty Income*”. We are also working on a carbon capture project with Drax Power Station, the largest single-site renewable power generator in the United Kingdom.

Distributed Hydrogen Production, Compression, and Recovery - On-site or distributed hydrogen generation, produced cleanly, represents an attractive and expansive market. Our high temperature fuel cells generate electricity directly from a fuel by reforming the fuel inside the fuel cell to supply hydrogen for the electrical generation process. We have developed a process by which gas separation technology can be added to our core fuel cell to capture hydrogen that is not used by the electrical generation process, and we refer to this configuration as SureSource Hydrogen. The SureSource Hydrogen product has the potential to be a compelling solution for industrial users of hydrogen and in transportation fueling applications. The 2.3 MW SureSource Hydrogen plant has a hydrogen output of approximately 1,200 kg per day, in addition to the electricity, thermal energy and water generated by the fuel cell. Hydrogen is typically made from natural gas in large central steam methane reforming (“SMR”) plants. The conventional reforming process involves burning fossil fuel to produce steam and to heat a fuel/steam mixture to a high temperature, which is then passed over a catalyst that converts the methane/water mixture to carbon dioxide and hydrogen. The need to burn fossil fuel to provide thermal energy produces additional carbon dioxide criteria pollutant emissions, and SMRs are significant water consumers. A similar, but environmentally sustainable, process happens in SureSource internal reforming: methane (from natural gas or Biogas) reacts with water to produce hydrogen, but, in the internal reforming process, the water and the heat are byproducts of the fuel cell reaction. There is no need to burn fuel to supply heat, and there is no need to supply water. In fact, a SureSource Hydrogen plant is a net water producer, not a water consumer. When operated on Biogas, SureSource Hydrogen systems produce renewable hydrogen, but, even when fueled with natural gas, they produce hydrogen with a lower carbon impact than conventional SMR because of the use of internal heat instead of burning fuel.

SOFC/SOEC and Energy Storage – We are developing a solution for long duration energy storage using our proprietary solid oxide technology. Our solid oxide stacks are capable of alternating between electrolysis and power generation mode. Instead of producing power from fuel and air, a solid oxide fuel cell stack in electrolysis mode splits water into hydrogen and oxygen using supplied electricity. A storage system based on SOFC/SOEC technology will start with stored water, which will be converted to hydrogen during charging by electrolysis in the solid oxide stacks. The hydrogen is stored as compressed gas in cylinders or underground, creating the ability to produce a virtually limitless supply. When discharge power is needed, the stored hydrogen is sent back to the solid oxide stacks, which react it with air to produce power and to regenerate the water, which is stored for the next cycle.

The key aspect of this approach is that the reactant (water) is inexpensive and plentiful. Long duration storage can be achieved by adding water and hydrogen storage capacity, without the need to add excessive amounts of conventional battery reactants (e.g. Lithium, Cobalt, etc.), which have supply constraints for broad adoption and which present disposal challenges. Long duration energy storage is going to be required at large scale during time periods ranging from hourly to seasonal in order to manage high penetration of intermittent renewable resources, and this

water/hydrogen based approach of our SOFC/SOEC technology has the potential to be the key enabler of long duration storage.

SOFC power plant design and manufacturing is complementary to our carbonate-based megawatt-scale product line and affords us the opportunity to leverage our field operating history, our existing expertise in power plant design, fuel processing and high volume manufacturing capabilities, and our existing installation and service infrastructure. Additionally, the target market for storage applications is electric utilities, which is a market in which we are already active.

We perform SOFC/SOEC research and development at our Danbury, Connecticut headquarters, as well as at our dedicated SOFC/SOEC facility in Calgary, Alberta, Canada. We are working under a variety of awards from the DOE for development and commercialization of both SOFC and SOEC, and, during fiscal year 2019, we advanced our solid oxide power generation, electrolysis and energy storage applications by executing on our existing DOE contracts. Our solid oxide development activities are focused on three applications: power generation, electrolysis, and energy storage (which is a combination of the first two). During fiscal year 2019, we conducted our first prototype field test of a 250kW natural gas fueled SOFC power plant at the Clearway Energy Center in downtown Pittsburgh, Pennsylvania. We are currently fabricating an advanced electrolysis system for testing in our Danbury, Connecticut headquarters, and we were recently awarded funding from the DOE to convert the electrolysis system to a reversible storage facility after the electrolysis testing is complete in late 2020. We believe that energy storage based on reversible solid oxide stacks can be a game changer for long duration energy storage.

We believe there are significant market opportunities for distributed hydrogen production, carbon capture, solid oxide fuel cell solutions and energy storage that represent potential future revenue opportunities for the Company. The projects described above allow us to leverage third-party resources and funding to accelerate the commercialization and realize the market potential of each of these solutions and virtually eliminate the need to rely on and use rare earth minerals.

SureSource Emissions Profile

Fuel cells are non-combustion devices that directly convert chemical energy (fuel) into electricity, heat and water. Because fuel cells generate power electrochemically rather than by combusting (burning) fuels, they are more efficient in extracting energy from fuels and produce less CO₂ and only trace levels of pollutants compared to combustion-type power generation or traditional power sources used to firm-up intermittent power sources, such as wind and solar. The following table illustrates the favorable emission profile of our SureSource power plants:

	Emissions (Lbs. Per MWh)				CO ₂ with CHP
	NO _x	SO ₂	PM	CO ₂	
Average U.S. Fossil Fuel Plant ⁽¹⁾	0.48	2.6	0.08	1,533	NA
Microturbine (60kW) ⁽²⁾	0.44	0.008	0.09	1,596	520 - 680
Small Natural Gas Turbine ⁽³⁾	1.15	0.008	0.08	1,494	520 - 680
SureSource - natural gas ⁽⁴⁾	0.01	0.0001	0.00002	940	520 - 680
SureSource 4000 High Efficiency Plant	0.01	0.0001	0.00002	740	520 - 680
SureSource - utility scale carbon capture	0.01	0.0001	0.00002	80	<i>n/a</i>
SureSource - renewable biogas	0.01	0.0001	0.00002	< 0	< 0

The high efficiency of our products results in significantly less CO₂ per unit of power production compared to the average U.S. fossil fuel power plant, and the carbon emissions are reduced even further when configured for CHP applications or biofuels. When our power plants are operating on Renewable Biogas, government agencies and regulatory bodies generally classify them as carbon neutral due to the renewable nature of the fuel source. The low CO₂ emissions and low criteria pollutants from SureSource power plants have a significant impact on sustainability and air quality because they avoid emissions 24 hours a day. The high capacity factor of baseload SureSource systems maximizes the impact of their environmental benefits. The following table shows how the low emissions combined with high capacity factor result in emissions avoidance comparable to or better than intermittent renewable power sources. While wind and solar renewable power sources may completely avoid these emissions while operating, given their low capacity factors, they avoid fewer emissions than fuel cells only because they operate for fewer hours per day. When wind and solar renewable power sources are not operating, higher emission resources are required to operate, thus diluting the benefits. Additionally, all renewable power sources have life cycle emissions associated with manufacture and disposal.

	Capacity Factor, %	Emissions, lb/MWh			Avoided Emissions, Tons/y per MW		
		NO _x	PM10	CO ₂	NO _x	PM10	CO ₂
Average US Grid ⁽⁵⁾		1.10	0.05	1501	—	—	—
SureSource 3000 with CHP ⁽⁶⁾	90%	0.01	0.00	738	4.3	0.19	3,008
SureSource 4000	90%	0.01	0.00	778	4.3	0.19	2,848
SureSource Biogas fuel	90%	0.01	0.00	0	4.3	0.19	5,917
Rooftop Solar ⁽⁷⁾	23%	—	—	—	1.1	0.05	1,479
Utility Scale Solar PV ⁽⁷⁾	29%	—	—	—	1.4	0.06	1,874
Wind ⁽⁷⁾	47%	—	—	—	2.2	0.10	3,057

(1) Updated Greenhouse Gas and Criteria Air Pollutant Emission Factors of the US Electric Generating Units in 2010; Argon National Laboratory September 2013.

(2) The Regulatory Assistance Project, "Model Regulations for the Output of Specified Air Emissions from Smaller Scale Electric Generation Resources."

(3) The Regulatory Assistance Project, "Model Regulations for the Output of Specified Air Emissions from Smaller Scale Electric Generation Resources."

(4) SureSource estimates based on Company specifications.

(5) Grid emissions rates for NO_x and CO₂. From EPA eGrid 2016, US Average non-baseload rates. Grid emissions rate for PM10 from ANL report "Updated Greenhouse Gas and Criteria Air Pollutant Emission Factors of the US Electric Generating Units in 2010", 2019 Projection.

(6) SureSource estimates based on Company specifications.

(7) Solar and Wind capacity factors are average of range from Lazard LCOE Analysis version 12, November 2018.

Business Strategy

Our business model is based on multiple revenue streams, including power plant and component sales; recurring service revenue, mainly through long-term service agreements; recurring electricity, capacity and renewable attribute sales under PPAs and tariffs for projects we retain in our generation portfolio; and revenue from public and private industry research contracts under Advanced Technologies.

We are a complete solutions provider, controlling the design, manufacturing, sales, installation, operations and maintenance of our patented fuel cell technology under long-term power purchase and service agreements. When principally utilizing long-term PPAs, the end-user of the power or utility hosts the installation and only pays for power as it is delivered, avoiding up-front capital investment. We also develop projects and sell equipment directly to customers, providing a complete solution of engineering, installing and servicing the fuel cell power plant under an engineering, procurement and construction ("EPC") agreement and a long-term maintenance and service agreement. In all cases, FuelCell Energy maintains the long-term recurring service obligation and associated revenues running conterminous with the life of the project.

We target large-scale power users with our megawatt-class installations globally, and currently offer sub-megawatt solutions for smaller power consumers in Europe. To provide a frame of reference, one megawatt is adequate to continually power approximately 1,000 average sized U.S. homes. Our customer base includes utility companies, municipalities, universities, hospitals, government entities and a variety of industrial and commercial enterprises. Our leading geographic market is currently the United States, and we are pursuing opportunities in other countries around the world.

Our power plants provide electricity priced competitively to grid-delivered electricity in certain regions, and our strategy is to continue to reduce costs, which we believe will lead to wider adoption. Our business model involves full life-cycle management of our projects and fuel cell solutions, from design through operation and maintenance, including removal and recycling. By weight, approximately 93% of the entire power plant can be re-used or recycled at the end of its useful life.

Our extensive intellectual property portfolio consists of patents, trade secrets and collective experience, which acts as a foundation for expanding and maximizing our solutions portfolio.

Market Adoption

We target vertical markets and geographic regions that:

- 1) Benefit from and value clean distributed generation;
- 2) Are located where there are high energy costs, poor grid reliability, and/or challenged transmission distribution lines;
- 3) Have a need for distributed hydrogen for transportation or industry; and
- 4) Are aligned with regulatory frameworks that harmonize energy, economic and environmental policies.

Our business model focuses on providing these vertical markets and geographic regions with highly efficient and affordable distributed generation that delivers de-centralized power in a low-carbon, virtually pollutant-free manner. Geographic markets that meet these criteria and where we are already well established include the Northeastern United States and California. We have also installed and are operating plants in Europe and Asia, mainly South Korea, in addition to North America.

The Company has made significant progress with reducing costs and creating markets since the commercialization of our products in 2003, with more than 255 MW of our SureSource technology currently installed and operating. We believe that we can accelerate and expand the adoption of our distributed power generation solutions through (1) further reductions in the total cost of ownership, (2) continued education regarding the value that our solutions provide, (3) geographic and segment expansion, (4) growing demand for onsite generation, (5) microgrid expansion, and (6) product expansion across biofuels, carbon capture and local hydrogen.

Fuel Cell Power Plant Ownership Structures

Historically, in the United States, customers or developers typically purchased our fuel cell power plants outright. As the size of our fuel cell projects has grown and the availability of project capital has improved, project structures in the U.S. have transitioned to predominantly PPAs. Under a PPA, the utility or end-user of the power commits to purchase power as it is produced for an extended period of time, typically 10-to-20 years. Examples of customers that have previously entered into PPAs include universities, a pharmaceutical company, hospitals and utilities. A primary advantage for the customer is that it does not need to commit its own capital or own a power generating asset, yet it enjoys the benefits of fuel cell power generation.

Once the PPA is executed and project financing is committed, construction of the fuel cell project can begin. At or around the Commercial Operation Date, the project may be sold to a project investor or retained by the Company. If the project is sold, revenue from the product sale is recognized, and the Company recognizes revenue separately for the long-term maintenance and service agreement over the term of that agreement. If the project is retained, electricity, capacity and/or renewable energy credits are recognized monthly over the term of the PPA. We report the financial performance of retained projects as generation revenue and income.

Our decision to retain certain projects is based in part on the recurring, predictable cash flows these projects can offer us, the proliferation of PPAs in the industry and the potential access to capital. Retaining PPAs affords the Company the full benefit of future cash flows under the PPAs, which are higher than if we sell the projects, although it requires more upfront capital investment and financing. As of October 31, 2019, our operating portfolio of retained projects totaled 26.1 MW with an additional 79.5 MW under development or construction. The Company plans to continue to grow this portfolio in a balanced manner, while also selling projects to investors when selling presents the best value and opportunity for the Company's capital or meets the customer's desired ownership structure.

Levelized Cost of Energy

Our fuel cell projects deliver power at a rate comparable to pricing from the grid in our targeted markets. Policy programs that help to support adoption of clean distributed power generation often lead to below-grid pricing. We measure power costs by calculating the Levelized Cost of Energy ("LCOE") over the life of the project.

There are several primary elements to LCOE for our fuel cell projects, including:

- 1) Capital cost;
- 2) Operations and maintenance cost; and
- 3) Fuel expense.

Given the level of integration in our business model of manufacturing, installing and operating fuel cell power plants, there are multiple areas and opportunities for cost reductions. We are actively managing and reducing costs in all three LCOE areas as follows:

- **Capital Cost** - Capital costs of our projects include costs to source material, manufacture, install, interconnect, finance and complete any on-site application requirements such as configuring for a microgrid and/or heating and cooling applications. We have reduced the product cost of our megawatt-class power plants by more than 60% from the first commercial installation in 2003. Further cost reductions will primarily be obtained from higher production volumes and engineering efficiency, which are expected to lead to reductions in the per-unit cost of materials purchased, supported by continued engineering, supply chain and manufacturing cost reductions. Our supply chain organization is actively engaged in strategic initiatives with suppliers to optimize production efficiencies and reduce waste while increasing quality and platform uptime, and lowering overall product/platform costs. Strategic sourcing initiatives are established to ensure adequate production capacity is qualified in advance of production volume scale up. Our industrial engineering, manufacturing and quality operations continue to embrace Lean Six Sigma principles throughout, focusing on continuous improvement, elimination of waste and increases in yields and quality while reducing cost. Larger projects offer scale and the opportunity to consolidate systems and reduce costs. In addition to these cost reduction efforts, our technology roadmap includes plans to increase the output of our power plants, which will add further value for our customers and reduce LCOE. We are always working to obtain the lowest cost financing for our generation projects.
- **Operations and Maintenance Cost** – Through secure connections, we remotely monitor, operate, and maintain our fuel cell power plants to optimize performance and meet or exceed expected operating parameters throughout the operational lives of the plants. Operations and maintenance (“O&M”) is a key driver for power plants to deliver on projected electrical output and revenue. Each model of our SureSource power plants has a design life of 25 to 30 years. The fuel cell modules, currently manufactured with a 7-year cell design life, go through periodic replacement, while the BOP systems, which consist of conventional mechanical and electrical equipment, are maintained over the plant life. The price for planned periodic fuel cell stack replacements is included in our long-term service agreements or in the per kWh price of the PPA. We expect to continually drive down the cost of O&M with an expanding fleet, which will leverage our investments in this area. Additionally, we are continuing to develop fuel cells that have longer useful lives, which is intended to reduce O&M costs by increasing our scheduled module replacement period to in excess of seven years.
- **Fuel Expense** - Our fuel cells directly convert chemical energy (fuel) into electricity, heat, water, and, in certain configurations, other value streams such as high purity hydrogen. Our power plants can operate on a variety of existing and readily available fuels, including natural gas, Renewable Biogas, directed Biogas and propane. Our SureSource power plants deliver electrical efficiencies of 47% for systems targeting CHP applications and 60% for systems targeting electric-only applications, such as grid support and data centers. In a CHP configuration, our plants can deliver even higher system efficiency, depending on the application. Considering utilized waste heat in CHP applications, total efficiency of systems using our power plants is typically 60% to 80% and can be as high as 90%. These efficiencies compare to average U.S. fossil fuel plant generation efficiency of about 40% with grid line losses. Increasing electrical efficiency and reducing fuel costs is a key element of our operating cost reduction efforts and a competitive advantage against traditional combustion-based technologies.

An important and differentiating factor that benefits fuel cells when comparing LCOE to other forms of power generation is that our solutions provide delivered electricity that minimizes or even avoids the costs of high voltage and distributed transmission. Energy can be produced right at the point of use. When comparing LCOE across different forms of power generation, transmission should be considered. Power generation far from where the power is used requires transmission, which is a cost to ratepayers, creates risk of system outages, increases cyber attack risk, and is inefficient due to line losses of power in the transmission process. Recent events, including hurricanes along the Gulf

coast and Puerto Rico, wildfires in California, and significant snow and ice storms in the Northeastern U.S., prove that transmission systems are more vulnerable to storm-related and other interruptions than locally-generated energy.

Recently, California was affected by the utility policy of Public Safety Power Shutoffs (“PSPS”), a preemptive effort by the utility companies to prevent wildfires from being started by electrical equipment during strong and dry wind conditions. Two plants manufactured and operated by FuelCell Energy remained operational as part of their respective microgrids in areas impacted by PSPS and provided steady, reliable power to the University of California, San Diego and the Santa Rita Jail during a time when over 3 million people were generally affected by PSPS.

Producing power near the point of use also facilitates the development of CHP applications, since it is easier to find a user for fuel cell waste heat in distributed applications. Using waste heat to avoid burning fuel for thermal applications reduces LCOE (by avoiding fuel cost) and avoids additional carbon emissions and criteria pollutants.

Markets

Vertical Markets

Access to clean, affordable and reliable power has transformed how most of the world lives today. The ability to provide power cleanly and efficiently is taking on greater importance and urgency in many regions of the world. FuelCell Energy’s products and services are specifically designed to deliver such clean, efficient power globally.

Central generation and its associated transmission requirements and distribution grid are difficult to site, costly, prone to interruption and generally take many years to permit and build. Some types of power generation that were widely adopted in the past, such as nuclear and coal power, are no longer welcome in certain regions of the world. The cost and impact to public health and the environment of pollutants and greenhouse gas emissions impact the siting of new power generation. The attributes of SureSource power plants address these challenges by providing virtually particulate-free baseload power and, where desired, thermal energy at the point of use in a highly-efficient process that is affordable to consumers.

We target distinct markets, including:

- Utilities and independent power producers;
- Industrial and process applications;
- Education and health care;
- Data centers and communication;
- Wastewater treatment;
- Government;
- Commercial and hospitality; and
- Microgrids.

The utilities and independent power producers market is our largest vertical market with customers that include utilities on the East and West coasts of the United States, such as Avangrid Holdings, Long Island Power & Light, Southern California Edison and Pacific Gas & Electric. In Europe, utility customers include E.ON Connecting Energies, one of the largest utilities in the world, and Switzerland-based ewz. In South Korea, we are contracted to operate and maintain a 20 MW plant for Korea Southern Power Company (“KOSPO”).

Our SureSource power plants are producing power for a variety of industrial, commercial, municipal and government customers, including manufacturing facilities, pharmaceutical processing facilities, universities, healthcare facilities and wastewater treatment facilities. These institutions desire efficient, clean and continuous power to reduce operating expenses, reduce greenhouse gas emissions and avoid pollutant emissions to meet their sustainability goals, while boosting resiliency and limiting dependence on the distribution grid. CHP applications further support economic and sustainability initiatives by minimizing or avoiding the use of combustion-based boilers for heat. Our SureSource power plants are unique in their ability to run on biofuels. With the growing market for anaerobic digestion (the production of Biogas from the breakdown of biodegradable materials in the absence of oxygen) and increasingly stringent regulations regarding air quality, we see a growing market opportunity that is perfectly suited for our fuel

cell design. SureSource power plants operating on Renewable Biogas are an especially compelling value proposition as they convert a waste product into clean electricity and heat, while eliminating flaring, which addresses certain economic and sustainability challenges faced by our customers. Biogas is generated by the decay of organic material (i.e., biomass). This decaying organic material releases methane, or Biogas. As a harmful greenhouse gas, Biogas cannot be released directly into the atmosphere. Flaring creates pollutants and wastes this potential fuel source. Capturing and using Biogas as a fuel addresses these challenges and provides a carbon-neutral renewable fuel source. Our patented, proprietary clean-up skid, SureSource Treatment™, provides an economical and reliable system for treating Biogas for use on-site at the Biogas production facility.

Wastewater treatment facilities, food and beverage processors and agricultural operations produce Biogas as a byproduct of their operations. Disposing of this greenhouse gas can be harmful to the environment if released into the atmosphere or flared. Our SureSource power plants convert this Biogas into electricity and heat efficiently and economically. Wastewater facilities with anaerobic digesters are an attractive market for our SureSource solution including the power plant as well as treatment of the Biogas. Many wastewater treatment plants currently flare Biogas produced in the anaerobic digestion process, emitting NO_x, SO_x and particulates into the atmosphere, which does not meet many air quality regulations. Since our fuel cells operate on the Renewable Biogas produced by the wastewater treatment process and the heat is used to support daily operations at the wastewater treatment facility, the overall thermal efficiency of these installations is high, supporting economics and sustainability. In addition, the fuel cell does not emit the harmful NO_x, SO_x and particulates that come out of a flare. On-site Biogas projects are more efficient and more economical than Directed Biogas projects because less gas processing is required compared to the processing needed to get the on-site gas to pipeline quality. The unique chemistry of carbonate fuel cells allows them to use low Btu on-site Biogas with no reduction in output or efficiency compared to operation on natural gas. We have developed proprietary Biogas cleanup and contaminant monitoring equipment which, combined with the inherent suitability of the carbonate fuel cell chemistry, gives us an advantage in on-site Biogas applications. Our SureSource 1500 and SureSource 3000 power plants are the only systems certified to CARB emissions standards under the Distributed Generation Certification Program for operation with on-site Biogas.

Our fuel cell solutions are also well suited for microgrid applications, either as the sole source of power generation or integrated with other forms of power generation. We have fuel cells operating as microgrids at universities and municipalities, including one university microgrid owned by Clearway Energy and a municipal-based microgrid owned by Avangrid. For the municipal-based system, under normal operation, the fuel cell supplies power to the grid. If the grid is disrupted, the fuel cell plant will automatically disconnect from the grid and power a number of critical municipal buildings. Heat from this municipal-based fuel cell plant is used by the local high school. As mentioned above, our fuel cell-based microgrids have continued operating during PSPS events in California.

Manufacturing and Service Facilities

We operate a 167,000 square-foot manufacturing facility in Torrington, Connecticut where we produce the individual cell packages and assemble the fuel cell modules. This facility also houses our global service center. Our completed modules are conditioned in Torrington and shipped directly to customer sites. Annual capacity (module manufacturing, final assembly, testing and conditioning) is 100 MW per year under the Torrington facility's current configuration when being fully utilized. The Torrington facility is sized to accommodate eventual annual production capacity of 200 MW per year.

The expansion of the Torrington facility has enabled the consolidation of warehousing and service facilities, which has resulted in reduced leasing expenses. The additional space is also expected to lead to additional manufacturing efficiencies by providing the needed space to re-configure the manufacturing lines without interrupting production. As demand supports, a second phase will be undertaken to add manufacturing equipment to increase annual capacity to 200 MW.

We design and manufacture the core SureSource fuel cell components that are stacked on top of each other to build a fuel cell stack. For megawatt-scale power plants, four fuel cell stacks are combined to build a fuel cell module. To complete the power plant, the fuel cell module or modules are combined with the BOP. The mechanical BOP processes the incoming fuel such as natural gas or Renewable Biogas and includes various fuel handling and processing equipment such as pipes and blowers. The electrical BOP processes the power generated for use by the customer and includes electrical interface equipment such as an inverter. The BOP components are either purchased directly from suppliers or the manufacturing is outsourced based on our designs and specifications. This strategy allows us to

leverage our manufacturing capacity, focusing on the critical aspects of the power plant where we have specialized knowledge and expertise and possess extensive intellectual property. BOP components are shipped directly to a project site and are then assembled with the fuel cell module into a complete power plant.

The Torrington production and service facility and the Danbury corporate headquarters and research and development facility are ISO 9001:2015 and ISO 14001:2015 certified and our Field Service operation (which maintains the installed fleet of our plants) is ISO 9001:2015 certified, reinforcing the tenets of FuelCell Energy's quality management system and our core values of continual improvement and commitment to quality, environmental stewardship, and customer satisfaction. Sustainability is promoted throughout our organization. We manufacture SureSource Products and manage them through end-of-life using environmentally friendly business processes and practices, certified to ISO 14001:2015. We continually improve how we plan and execute across the entire product life cycle. We strive for "cradle-to-cradle" sustainable business practices, incorporating sustainability in our corporate culture. We utilize "Design for Environment" principles in the design, manufacture, installation and servicing of our power plants. "Design for Environment" principles aim to reduce the overall human health and environmental impact of a product, process or service, when such impacts are considered across the product's lifecycle. We maintain a chain of custody and responsibility of our SureSource products throughout the product life cycle. When our plants reach the end of their useful lives, we can refurbish and re-use certain parts and then recycle most of what we cannot re-use. By weight, approximately 93% of the entire power plant can be re-used or recycled at the end of its useful life.

We have a manufacturing and service facility in Taufkirchen, Germany that has the capability to perform final module assembly for up to 20 MW per year of sub-megawatt fuel cell power plants to service the fuel cell power plant demand in the European market. Our European service activities are also operated out of this location. Our operations in Europe are certified under both ISO 9001:2015 and ISO 14001:2015.

We have a research and development facility in Calgary, Alberta, Canada that is focused on the engineering and development of the Company's SOFC and SOEC technology.

Raw Materials and Supplier Relationships

We use various commercially available raw materials and components to construct a fuel cell module, including nickel and stainless steel, which are key inputs in our manufacturing process. Our fuel cell stack raw materials are sourced from multiple vendors and are not considered precious metals. We have a global integrated supply chain. While we manufacture the fuel cell module in our Torrington facility, the electrical and mechanical BOPs are assembled by and procured from several suppliers. All of our suppliers must undergo a stringent and rigorous qualification process. We continually evaluate and qualify new suppliers as we diversify our supplier base in our pursuit of lower costs and consistent quality. We purchase mechanical and electrical BOP components from third party vendors, based on our own proprietary designs.

Engineering, Procurement and Construction ("EPC")

We provide customers with complete turn-key solutions, including development, engineering, procurement, construction, interconnection and operations for our fuel cell projects. From an EPC standpoint, we have an extensive history of safe and timely delivery of turn-key projects. We have developed relationships with many design firms and licensed general contractors and have a repeatable, safe, and efficient execution philosophy that has been successfully demonstrated in numerous jurisdictions, both domestically and abroad, all with an exemplary safety record. The ability to rapidly and safely execute installations minimizes high-cost construction period financing and can assist customers in certain situations when the Commercial Operations Date is time sensitive.

Services and Warranty Agreements

We offer a comprehensive portfolio of services, including engineering, project management and installation, and long-term operating and maintenance programs, including trained technicians that remotely monitor and operate our plants around the world, 24 hours a day and 365 days a year. We directly employ field technicians to service the power plants and maintain service centers near our customers to support the high Availability of our plants.

For all operating fuel cell plants not under a PPA, customers purchase long-term service agreements, some of which have terms of up to 20 years. Pricing for service contracts is based upon the value of service assurance and the markets in which we compete and includes all future maintenance and fuel cell module exchanges. Each model of our SureSource power plants has a design life of 25-to-30 years. The fuel cell modules, with legacy modules having a 5-year cell design life and current production modules having a 7-year cell design life, go through periodic replacement, while the BOP systems, which consist of conventional mechanical and electrical equipment, are maintained over the life of the plant.

Under the typical provisions of both our service agreements and PPAs, we provide services to monitor, operate and maintain power plants to meet specified performance levels. Operations and maintenance is a key driver for power plants to deliver their projected revenue and cash flows. The service aspects of our business model provide a recurring and predictable revenue stream for the Company. We have committed future production for scheduled fuel cell module exchanges under service agreements and PPAs through the year 2038. The pricing structure of the service agreements incorporates these scheduled fuel cell module exchanges and the committed nature of this production facilitates our production planning. Many of our PPAs and service agreements include guarantees for system performance, including electrical output and heat rate. Should the power plant not meet the minimum performance levels, we may be required to replace the fuel cell module with a new or used replacement module and/or pay performance penalties. Our goal is to optimize the power plants to meet expected operating parameters throughout their contracted service term.

In addition to our service agreements, we provide a warranty for our products against manufacturing or performance defects for a specific period of time. The warranty term in the U.S. is typically 15 months after shipment or 12 months after acceptance of our products. We accrue for estimated future warranty costs based on historical experience.

License Agreements and Royalty Income; Relationship with POSCO Energy

License Agreement with ExxonMobil Research and Engineering Company

EMRE and FuelCell Energy began working together in 2016 under an initial Joint Development Agreement with a focus on better understanding the fundamental science behind carbonate fuel cells for use in advanced applications and specifically how to increase efficiency in separating and concentrating carbon dioxide from the exhaust of natural gas-fueled power generation.

In June 2019, we entered into a license agreement with EMRE, a wholly-owned subsidiary of ExxonMobil Corporation, to facilitate the further development of our SureSource Capture™ product (the “EMRE License Agreement”). Pursuant to the EMRE License Agreement, the Company granted EMRE and its affiliates a non-exclusive, worldwide, fully-paid, perpetual, irrevocable, non-transferable license and right to use our patents, data, know-how, improvements, equipment designs, methods, processes and the like to the extent it is useful to research, develop and commercially exploit carbonate fuel cells in applications in which the fuel cells concentrate carbon dioxide from industrial and power sources and for any other purpose attendant thereto or associated therewith, in exchange for a \$10 million payment. Such right and license is sublicenseable to third parties performing work for or with EMRE or its affiliates, but shall not otherwise be sublicenseable.

The EMRE License Agreement facilitated the execution of a new joint development agreement with EMRE, effective October 31, 2019 and executed in fiscal year 2020, pursuant to which we will continue exclusive research and development efforts with EMRE to evaluate and develop new and/or improved carbonate fuel cells to reduce carbon dioxide emissions from industrial and power sources, in exchange for (a) payment of (i) an exclusivity and technology access fee of \$5.0 million, (ii) up to \$45.0 million for research and development efforts, and (iii) milestone-based payments of up to \$10.0 million after certain technological milestones are met, and (b) certain licenses. As a result of the execution of the EMRE License Agreement in fiscal year 2020, the associated revenue and backlog will be accounted for in fiscal year 2020.

License Agreements with POSCO Energy

From approximately 2007 through 2015, we relied on POSCO Energy Co., Ltd. (“POSCO Energy”) to develop and grow the South Korean and Asian markets for our products and services.

We record license fees and are entitled to receive royalty income from POSCO Energy related to manufacturing and technology transfer agreements entered into in 2007, 2009 and 2012. The Cell Technology Transfer Agreement (“CTTA”), executed in October 2012, provides POSCO Energy with the technology rights to manufacture, sell, distribute and service our SureSource 300, SureSource 1500 and SureSource 3000 fuel cell technology in Asia. POSCO Energy built a cell manufacturing facility in Pohang, South Korea which became operational in late 2015.

In October 2016, the Company and POSCO Energy extended the terms of the 2007 and 2009 manufacturing and technology transfer agreements to be consistent with the term of the CTTA, which expires on October 31, 2027. The CTTA requires POSCO Energy to pay us a 3.0% royalty on POSCO Energy net product sales, as well as a royalty on scheduled fuel cell module replacements under service agreements for modules that were built by POSCO Energy and installed at plants in Asia under the terms of long-term service agreements between POSCO Energy and its customers. While the aforementioned manufacturing and technology transfer agreements entered into in 2007, 2009 and 2012 remain in effect, due to certain actions and inactions of POSCO Energy, the Company has not realized any material revenues, royalties or new projects developed by POSCO Energy since 2016.

In March 2017, we entered into a memorandum of understanding (“MOU”) with POSCO Energy to permit us to directly develop the Asian fuel cell business, including the right for us to sell SureSource solutions in South Korea and the broader Asian market. In June 2018, POSCO Energy advised us in writing that it was terminating the MOU effective July 15, 2018. Pursuant to the terms of the MOU, notwithstanding its termination, we will continue to execute on sales commitments in Asia secured in writing prior to July 15, 2018, including the 20 MW power plant installed for KOSPO.

On or about November 2, 2018, POSCO Energy served FuelCell Energy with an arbitration demand, initiating a proceeding to resolve various outstanding amounts between the companies. The parties amicably resolved the arbitration proceeding in July 2019. Since that date, we have made numerous attempts to engage with POSCO Energy to address the need for deployment of carbonate fuel cell technology in the Asian market in accordance with the requirements of the manufacturing and technology transfer agreements, our understanding of the desire of the South Korean government to advance fuel cell and hydrogen technology, and the needs of the Asian market, but have made little progress to date.

In November 2019, POSCO Energy spun-off its fuel cell business into a new entity, Korea Fuel Cell, Ltd. (“KFC”). As part of the spin-off, POSCO Energy transferred manufacturing and service rights under the aforementioned manufacturing and technology transfer agreements to KFC, but retained distribution rights, including trademarks, and severed its own liability under the aforementioned manufacturing and technology transfer agreements. We believe that these actions are all in material breach of the terms of the CTTA and other manufacturing and technology transfer agreements and are effectively a misappropriation of the Company’s intellectual property. We have formally objected to POSCO Energy’s spin-off, and POSCO Energy has posted a bond to secure any liabilities to FuelCell Energy arising out of the spin-off. In light of the situation with POSCO Energy, we are evaluating all of our options with respect to our relationship and agreements with POSCO Energy, including trade related matters, POSCO Energy’s material breach of its obligations under the CTTA and the manufacturing and technology transfer agreements, and the misappropriation of our intellectual property.

Company Funded Research and Development

In addition to research and development performed under research contracts, including as described in Advanced Technology Programs, we also fund our own research and development activities to support the commercial fleet with product enhancements and improvements. During fiscal year 2018, we launched our seven-year life stacks, which extended our stack life from five years to seven years. Greater power output and improved longevity are expected to lead to improved gross margin profitability on a per-unit basis for each power plant sold and improved profitability of service contracts, which are expected to support expanding gross margins for the Company.

In addition to output and life enhancements, we designed and introduced the 3.7 MW SureSource 4000 configuration with increased electrical efficiency, and we continually invest in cost reduction and improving the performance, quality and serviceability of our plants. These efforts are intended to improve our value proposition.

Company-funded research and development is included in Research and development expenses (operating expenses) in our consolidated financial statements. The total research and development expenditures in the consolidated statement of operations, including third party and Company-funded expenditures, are as follows:

(dollars in thousands)	Years Ended October 31,		
	2019	2018	2017
Cost of Advanced Technologies contract revenues	\$ 12,884	\$ 10,360	\$ 12,728
Research and development expenses	13,786	22,817	20,398
Total research and development	\$ 26,670	\$ 33,177	\$ 33,126

Backlog

Backlog represents definitive agreements executed by the Company and our customers.

Contract backlog as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Commercial:		
Product	\$ —	\$ 1
Service (a)	169,371	251,650
Generation	1,114,366	839,483
License (b)	22,931	—
Total Commercial	\$ 1,306,668	\$ 1,091,134
Advanced Technologies		
Funded	\$ 11,758	\$ 15,934
Unfunded	220	16,449
Total Advanced Technologies	\$ 11,978	\$ 32,383
Total Contract Backlog	\$ 1,318,646	\$ 1,123,517

- (a) In July 2018, we contracted to operate and maintain a 20 MW plant for Korea Southern Power Company (“KOSPO”). This contract was originally included in backlog as a twenty year contract, which reflected the total potential term of the contract. Under the terms of the contract, KOSPO has a renewal option in year ten. Thus, in conjunction with the adoption of Accounting Standards Codification Topic 606, “Revenue from Contracts with Customers,” which was adopted and implemented by the Company on November 1, 2018, service backlog was reduced by \$64.3 million in fiscal year 2018 and fiscal year 2019 compared to the amounts previously disclosed. Should KOSPO exercise its renewal option, service backlog will be adjusted accordingly.
- (b) License backlog was not included prior to the adoption of Accounting Standards Update (“ASU”) 2014-09, “Revenue from Contracts with Customers,” which was implemented by the Company on November 1, 2018.

Service and generation backlog as of October 31, 2019 had a weighted average term of approximately 18 years, with weighting based on dollar backlog and utility service contracts of up to 20 years in duration at inception. Generally, our government research and development contracts are subject to the risk of termination at the convenience of the contracting agency.

Our backlog amount outstanding is not indicative of amounts to be earned in the upcoming fiscal year. The specific elements of backlog may vary in terms of timing and revenue recognition from less than one year to up to 20 years.

The Company may choose to sell or retain operating power plants on the balance sheet, thus creating variability in timing of revenue recognition. Accordingly, the timing and the nature of our business makes it difficult to predict what portion of our backlog will be filled in the next fiscal year.

Fuel Cell Technologies

Fuel cell technologies are classified according to the electrolyte used by each fuel cell type. Our SureSource technology utilizes a carbonate electrolyte. Carbonate-based fuel cells are well-suited for megawatt-class applications, offering a number of advantages over other types of fuel cells in our target markets.

These advantages include:

- The ability of Carbonate Fuel Cells to generate electricity directly from readily available fuels such as natural gas or Renewable Biogas;
- Lower raw material costs as the high temperature of the fuel cell enables the use of commodity metals rather than precious metals;
- Scalability to leverage on-site components to reduce cost;
- High-quality heat suitable for CHP applications; and
- The ability to perform advanced applications, including carbon capture and hydrogen production to provide fuel for fuel cell vehicles.

We are also actively developing SOFC technology, as discussed in the prior “Advanced Technologies Programs” section. Other fuel cell types that may be used for commercial applications include phosphoric acid and PEM.

The following table illustrates the four principal types of fuel cells, highlighting typical market applications, industry estimates of the electrical efficiency, expected capacity range, and versatility for applications in addition to power generation:

System Size Range	MW- Class	Sub-MW- Class			Micro CHP	Mobile
	Carbonate (CFC)	Carbonate (CFC)	Solid Oxide (SOFC)	Phosphoric Acid (PAFC)	PEM / SOFC	Polymer Electrolyte Membrane (PEM)
Plant size	1.4 MW - 3.7 MW Plus	250 kW – 400 kW	up to 300 kW	up to 440 kW	< 10 kW	5 - 100 kW
Typical Application	Utilities, Universities, Commercial & Industrial	Universities, Commercial & Industrial	Commercial Buildings & “Big-Box” Retail Stores	Commercial Buildings & Grocery Stores	Residential and Small Commercial	Transportation
Fuel	Natural gas, On-site or Directed Biogas, Others	Natural gas, On-Site or Directed Biogas, Others	Natural Gas	Natural Gas	Natural Gas	Hydrogen
Advantages	High Efficiency, Scalable, Fuel Flexible & CHP	High Efficiency, Fuel Flexible & CHP	High Efficiency	CHP	Load Following & CHP	Load Following & Low Temperature
Electrical efficiency	43%-47% to 60%	43% - 47%	41% - 65%	40% - 42%	25% - 35%	25% - 35%
Combined Heat & Power (CHP)	Yes, Steam & Chilling	Yes, Hot Water	Depends on Technology Used	Limited: Hot Water, Chilling	Suitable for Facility Heating	<i>No</i>
Carbon Capture	Yes	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>No</i>
Distributed Hydrogen	Yes	<i>No</i>	Yes	<i>No</i>	<i>No</i>	<i>No</i>
Reversible for Storage	<i>No</i>	<i>No</i>	Yes	<i>No</i>	<i>No</i>	<i>No</i>

Competition

Our SureSource power plants compete in the marketplace for stationary distributed generation. In addition to different types of stationary fuel cells, some other technologies that compete in this marketplace include micro-turbines and reciprocating gas engines.

Several companies in the U.S. are engaged in fuel cell development, although we are the only domestic company engaged in manufacturing and deployment of stationary Carbonate Fuel Cells. Other fuel cell technologies (and the companies developing them) include small or portable PEM fuel cells (Ballard Power Systems, Plug Power, and increasing activity by numerous automotive companies including Toyota, Hyundai, Honda and GM), stationary phosphoric acid fuel cells (Doosan), stationary solid oxide fuel cells (Bloom Energy), and small residential solid oxide fuel cells (Ceres Power Holdings and Ceramic Fuel Cells Ltd.). Each of these competitors with stationary fuel cell applications has the potential to capture market share in our target markets.

Other than fuel cell developers, we may compete with companies such as Caterpillar, Cummins, Wartsila, MTU Friedrichshafen GmbH (MTU), and Detroit Diesel, which manufacture combustion-based distributed power

generation equipment, including various engines and turbines, and have established manufacturing and distribution operations along with product operating and cost features. Competition on larger MW projects may also come from gas turbine companies like General Electric, Caterpillar Solar Turbines and Kawasaki.

We also compete against the electric grid, which is readily available to prospective customers. The electric grid is supplied by traditional centralized power plants, including coal, gas and nuclear, with transmission lines used to transport the electricity to the point of use.

Our stationary fuel cell power plants also compete against large scale solar and wind technologies, although we complement the unreliable intermittent nature of solar and wind with the continuous, reliable power output of the fuel cells. Solar and wind require specific geographies and weather profiles, require transmission for utility-scale applications, an energy storage solution to provide continuous power output, and a significant amount of land compared to our fuel cell power plants, making it difficult to site megawatt-class solar and wind projects in urban areas, unlike our solutions. Solar and wind applications are typically favored in markets which have a preference for zero-carbon resources. While fuel cells emit negligible amounts of NO_x, SO_x and particulates, fuel cells do emit a small amount of carbon dioxide. The carbon dioxide emissions of a fuel cell are only a fraction of the carbon dioxide emissions of traditional combustion generators. We are working to educate policy makers in our target markets of the clean profile of our technology and the benefits of baseload power to complement zero carbon intermittent resources.

Our distributed hydrogen solution competes against traditional centralized hydrogen generation as well as electrolyzers used for distributed applications. Hydrogen is typically generated at a central location in large quantities by combustion-based steam reforming and then distributed to end users by diesel truck. Besides utilizing tri-generation SureSource plants for distributed hydrogen, electrolyzers can be used that are in essence, reverse fuel cells. Electrolyzers take electricity and convert it to hydrogen. The hydrogen can be used as it is generated, compressed and stored, or injected into the natural gas pipeline. Companies using fuel cell-based electrolyzer technology for transportation applications include NEL and Hydrogenics Corporation.

Hydrogen is an energy carrier and energy storage utilizing hydrogen is a growing market opportunity that we are pursuing with our SOFC/SOEC technology. Companies using PEM-based fuel cell electrolyzer technology for storage include Hydrogenics Corporation and ITM Power PLC.

Regulatory and Legislative Environment

Distributed generation addresses certain power generation issues that central generation does not and legal, government and regulatory policy can impact deployment of distributed generation. The policies that affect our products are not always the same as those imposed on our competitors, and while some policies can make our products less competitive, others may provide an advantage. Certain utility policies may also pose barriers to our installation or interconnection with the utility grid, such as backup, standby or departing load charges that make installation of our products not economically attractive for our customers. Regulatory and legislative support encompasses policy, incentive programs, and defined sustainability initiatives such as Renewable Portfolio Standards (“RPS”).

Various states and municipalities in the U.S. have adopted programs for which our products qualify, including programs supporting self-generation, clean air power generation, combined heat and power applications, carbon reduction, grid resiliency / microgrids and utility ownership of fuel cell projects.

The majority of states in the U.S. have enacted legislation adopting Clean Energy Standards (“CES”) or RPS mechanisms. Under these standards, regulated utilities and other load serving entities are required to procure a specified percentage of their total electricity sales to end-user customers from eligible resources. CES and RPS legislation and implementing regulations vary significantly from state to state, particularly with respect to the percentage of renewable energy required to achieve the state’s mandate, the definition of eligible clean and renewable energy resources, and the extent to which renewable energy credits (certificates representing the generation of renewable energy) qualify for CES or RPS compliance. Fuel cells using Biogas qualify as renewable power generation technology in all of the CES and RPS states in the U.S., and some states specify that fuel cells operating on natural gas are also eligible for these initiatives in recognition of the high efficiency and low pollutants of fuel cells. Other states are moving away from generation utilizing fossil fuels in favor of zero carbon resources.

In February 2018, the U.S. Congress reinstated the 30% Investment Tax Credit (“ITC”) for fuel cells and also extended and significantly expanded the existing Carbon Oxide Sequestration Credit. The ITC phases down to 26% in 2020 and

22% by 2022 and is set to expire in 2023. The reinstatement of the ITC for fuel cells provided equal access to tax incentives for U.S. fuel cell manufacturers when compared with other clean energy solutions.

Internationally, South Korea has an RPS to promote clean energy, reduce carbon emissions, and develop local manufacturing of clean energy generation products to accelerate economic growth. The RPS is designed to increase new and renewable power generation to 10% of total power generation by 2024 from 2% when the RPS began in 2012. Eighteen of the largest power generators are obligated to achieve the RPS requirements in their generation or purchase offsetting renewable energy certificates. Financial penalties are levied by the government for non-compliance. European governments are supportive of hydrogen-based generation and efficient CHP applications, and some European governments such as Germany, the UK and the Netherlands, provide incentives in the form of tax incentives, grants and waivers of regulatory fees for such installations.

Government Regulation

Our Company and its products are subject to various federal, provincial, state and local laws and regulations relating to, among other things, land use, safe working conditions, handling and disposal of hazardous and potentially hazardous substances and emissions of pollutants into the atmosphere. Negligible emissions of SO_x and NO_x from our power plants are substantially lower than conventional combustion-based generating stations, and are far below existing and proposed regulatory limits. The primary emissions from our power plants, assuming no cogeneration application, are humid flue gas that is discharged at temperatures of 700-800° F, water that is discharged at temperatures of 10-20° F above ambient air temperatures, and CO₂ in per kW hour amounts that are much less than conventional fossil fuel central generation power plants due to the high efficiency of fuel cells. The discharge of water from our power plants requires permits that depend on whether the water is to be discharged into a storm drain or into the local wastewater system.

We are also subject to federal, state, provincial and/or local regulation with respect to, among other things, siting. In addition, utility companies and several states in the U.S. have created and adopted, or are in the process of creating and adopting, interconnection regulations covering both technical and financial requirements for interconnection of fuel cell power plants to utility grids. Our power plants are designed to meet all applicable laws, regulations and industry standards for use in international markets in which we operate. Our SureSource solutions are CARB 2007 certified, and our SureSource 1500 and SureSource 3000, when operating on Biogas, are certified for the CARB 2013 biogas standard.

We are committed to providing a safe and healthy environment for our employees, and we are dedicated to seeing that safety and health hazards are adequately addressed through appropriate work practices, training and procedures. All of our employees must observe the proper safety rules and environmental practices in work situations, consistent with our work practices, training and procedures, and consistent with all applicable health, safety and environmental laws and regulations.

Proprietary Rights and Licensed Technology

Our intellectual property consists of patents, trade secrets and institutional knowledge and know how that we believe is a competitive advantage and represents a significant barrier to entry for potential competitors. Our Company was founded in 1969 as an applied research company and began focusing on Carbonate Fuel Cells in the 1980s, with our first fully-commercialized SureSource power plant sold in 2003. Over this time, we have gained extensive experience in designing, manufacturing, operating and maintaining fuel cell power plants. This experience cannot be easily or quickly replicated and, combined with our trade secrets, proprietary processes and patents, safeguards our intellectual property rights.

As of October 31, 2019, our Company, excluding its subsidiaries, had 95 patents in the U.S. and 153 patents in other jurisdictions covering our fuel cell technology (in certain cases covering the same technology in multiple jurisdictions), with patents directed to various aspects of our SureSource technology, SOFC technology, PEM fuel cell technology, and applications thereof. As of October 31, 2019, we also had 62 patent applications pending in the U.S. and 112 pending in other jurisdictions. Our U.S. patents will expire between 2020 and 2037, and the current average remaining life of our U.S. patents is approximately 8.4 years.

Our subsidiary, Versa Power Systems, Ltd., as of October 31, 2019, had 33 U.S. patents and 96 international patents covering the SOFC technology (in certain cases covering the same technology in multiple jurisdictions), with an average remaining U.S. patent life of approximately 5.5 years. As of October 31, 2019, Versa Power Systems, Ltd. also had 1 pending U.S. patent application and 11 patent applications pending in other jurisdictions. In addition, as of

October 31, 2019, our subsidiary, FuelCell Energy Solutions, GmbH, had license rights to 2 U.S. patents and 7 patents outside the U.S. for carbonate fuel cell technology licensed from Fraunhofer IKTS.

Five patents expired in 2019, but none of these expirations, individually or in the aggregate, is expected to have any material impact on our current or anticipated operations. As has historically been the case, we are continually innovating and have a significant number of invention disclosures that we are reviewing that may result in additional patent applications.

Certain of our U.S. patents are the result of government-funded research and development programs, including our DOE programs. U.S. patents we own that resulted from government-funded research are subject to the government potentially exercising “march-in” rights. We believe that the likelihood of the U.S. government exercising these rights is remote and would only occur if we ceased our commercialization efforts and there was a compelling national need to use the patents.

Significant Customers and Information about Geographic Areas

We contract with a concentrated number of customers for the sale of our products and for research and development. For the years ended October 31, 2019, 2018 and 2017, our top customers, EMRE, Dominion Bridgeport Fuel Cell, LLC, Connecticut Power and Light, the DOE, Pfizer Inc., POSCO Energy, Hanyang Industrial Development Co., Ltd, Clearway Energy (formerly NRG Yield, Inc.), and AEP Onsite Partners, LLC, accounted for an aggregate of 80%, 86% and 79%, respectively, of our total annual consolidated revenue. Revenue percentage by major customer for the last three fiscal years is as follows:

	Years Ended October 31,		
	2019	2018	2017
ExxonMobil Research and Engineering Company (EMRE)	40%	6%	9%
Dominion Bridgeport Fuel Cell, LLC (a)	13%	3%	11%
Connecticut Light and Power (a)	11%	—%	—%
U.S. Department of Energy (DOE)	6%	8%	9%
Pfizer, Inc.	6%	4%	4%
POSCO Energy	3%	5%	6%
Clearway Energy (formerly NRG Yield, Inc.)	1%	15%	—%
Hanyang Industrial Development Co., Ltd.	—%	35%	40%
AEP Onsite Partners, LLC	—%	10%	—%
Total	80%	86%	79%

- (a) Dominion Bridgeport Fuel Cell, LLC was acquired by the Company on May 9, 2019. As a result of this acquisition, revenue is now (subsequent to the acquisition) recognized under the related PPA for electricity sales to Connecticut Light and Power.

See Item 7 – “Management's Discussion and Analysis of Financial Condition and Results of Operations” and Item 8 – “Consolidated Financial Statements and Supplementary Data” for further information regarding our revenue and revenue recognition policies.

We have marketing and manufacturing operations both within and outside the United States. We source raw materials and BOP components from a diverse global supply chain. In 2019, the foreign country with the greatest concentration risk was South Korea, accounting for 4% of our consolidated net sales. The Company is entitled to receive royalties from POSCO Energy on the sale of power plants and module replacements related to service of fuel cell power plants in Asia, and the Company received approximately \$0.4 million in such royalties during the fiscal year ended October 31, 2019 as part of a net settlement of the arbitration brought by POSCO Energy. As part of our strategic plan, we are in the process of diversifying our sales mix from both a customer specific and geographic perspective. See Item 1A: Risk Factors - *“We are substantially dependent on a concentrated number of customers and the loss of any one of these customers could adversely affect our business, financial condition and results of operations;” “We depend on strategic relationships with third parties, and the terms and enforceability of many of these relationships are not certain;” and “The situation with POSCO Energy has limited and continues to limit our efforts to access the South Korean and Asian markets and could expose us to costs of arbitration or litigation proceedings.”*

The international nature of our operations subjects us to a number of risks, including fluctuations in exchange rates, adverse changes in foreign laws or regulatory requirements and tariffs, taxes, and other trade restrictions. See Item 1A: Risk Factors – “*We are subject to risks inherent in international operations.*” See also Note 16. “Segment Information,” to the consolidated financial statements in Part II, Item 8, “Consolidated Financial Statements and Supplementary Data” of this Annual Report on Form 10-K for information about our net sales by geographic region for the years ended October 31, 2019, 2018, and 2017. See also Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” for other information about our operations and activities in various geographic regions.

Sustainability

FuelCell Energy’s ultra-clean, efficient and reliable fuel cell power plants help our customers achieve their sustainability goals. These highly efficient and environmentally friendly products support the “Triple Bottom Line” concept of sustainability, consisting of environmental, social and economic considerations. In October 2018, we were certified ISO 14001:2015 compliant, having demonstrated the establishment of and adherence to an environmental management system standard. FuelCell Energy is the only fuel cell manufacturer to have received this certification.

Product efficiency

The electrical efficiency of our carbonate fuel cell solutions ranges from approximately 47% to 60% depending on the configuration. When configured for CHP, our system efficiencies can potentially reach up to 90%, depending on the application. This compares favorably to the average efficiency of the U.S. electrical grid of about 40%. Our solutions deliver this high electrical efficiency where the power is used, avoiding transmission. Transmission line losses average about 5% for the U.S. grid, which represents inefficiency and is a hidden cost to ratepayers.

Product end-of-life management

We continue to incorporate sustainability best practices into our corporate culture, as well as into the design, manufacture, installation and servicing of our fuel cell power plants. For example, when our plants reach the end of their useful lives, we can refurbish and re-use certain parts and then recycle most of what we cannot re-use. Some of the parts in the fuel cell module can be re-furbished, such as end plates, while the individual fuel cell components are sent to a smelter for recycling. The BOP has an operating life of 20-to-25 years, at which time metals such as steel and copper are reclaimed for scrap value. By weight, approximately 93% of the entire power plant can be re-used or recycled at the end of its useful life.

Our manufacturing process has a very low carbon footprint, utilizing an assembly oriented production strategy. While we continue to enhance and adopt sustainable business practices, we recognize this is an ongoing effort with more to be accomplished, such as further reducing the direct and indirect aspects of our carbon footprint.

Workforce Health & Safety

We work to continually improve what we feel is a robust safety program. This is demonstrated by an improving safety trend over each of the past 5 years. We have never had a workplace fatality at any of our facilities or power plant installations.

Sustainability also incorporates social risks and human rights, and we will not knowingly support or do business with suppliers that treat workers improperly or unlawfully, including, without limitation, those that engage in child labor, human trafficking, slavery or other unlawful or morally reprehensible employment practices. We are continuing to implement comprehensive monitoring of our global supply chain to eliminate social risks and ensure respect for human rights. We contractually ensure that all qualified domestic suppliers in our supply chain comply with the Fair Labor Standards Act of 1938, as amended.

Materials sourcing

Assuring the absence of conflict minerals in our power plants is a continuing initiative. Our fuel cells, including the fuel cell components and completed fuel cell module, do not utilize any 3TG minerals (i.e., tin, tungsten, tantalum and gold) that are classified as conflict minerals. We do utilize componentry in the BOP such as computer circuit boards that utilize trace amounts of 3TG minerals. For perspective, total shipments in fiscal year 2018 weighed approximately 2.8 million pounds, of which 8.0 pounds, or 0.000291%, represented 3TG minerals, so the presence of these minerals is minimal. Our conflict mineral disclosure filed with the Securities and Exchange Commission (“SEC”) on Form SD contains specific information on the actions we are taking to avoid the use of conflict minerals.

Associates

As of October 31, 2019, we had 301 full-time associates, of whom 119 were located at the Torrington manufacturing plant, 145 were located at the Danbury, Connecticut facility or other field offices within the U.S., and 37 were located abroad. We did not have any part-time associates. None of our U.S. associates are represented by a labor union or covered by a collective bargaining agreement. We believe our relations with our associates are good.

Available Information

Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports are made available free of charge through the Investor Relations section of the Company’s website (<http://www.fuelcellenergy.com>) as soon as practicable after such material is electronically filed with, or furnished to, the SEC. Material contained on our website is not incorporated by reference in this report. Our executive offices are located at 3 Great Pasture Road, Danbury, CT 06810. The public may also read and copy any materials that we file with the SEC at the SEC’s Public Reference Room at 100 F Street, NE, Washington, D.C. 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet website that contains reports and other information regarding issuers that file electronically with the SEC located at <http://www.sec.gov>.

Information about our Executive Officers

NAME	AGE	PRINCIPAL OCCUPATION
Jason B. Few President, Chief Executive Officer and Chief Commercial Officer	53	<p>Mr. Few was appointed President and Chief Executive Officer in August 2019 and Chief Commercial Officer in September 2019 and has served as a director since 2018. Mr. Few chairs the Executive Committee of the Board of Directors (the “Board”). Prior to joining FuelCell Energy, Mr. Few served as President of Sustayn Analytics LLC, a cloud-based software waste and recycling optimization company, since 2018, and as the Founder and Senior Managing Partner of BJB Partners LLC, a privately held strategic consulting firm, since 2016. Mr. Few has over 30 years of experience increasing enterprise value for Global Fortune 500 and privately-held technology, telecommunications, technology and energy firms. He has overseen transformational opportunities across the technology and industrial energy sectors, in roles including Founder and Senior Managing Partner of BJB Partners, LLC; President and Chief Executive Officer of Continuum Energy, an energy products and services company, from 2013-2016; various roles including Executive Vice President and Chief Customer Officer of NRG Energy, Inc., an integrated energy company, from 2011 to 2012; and from 2008 to 2009, Vice President, Smart Energy and from 2009 to 2012, President of Reliant Energy, a retail electricity provider. Mr. Few also has served as a Senior Advisor to Verve Industrial Protection, an industrial cybersecurity software company, since 2016.</p> <p>Mr. Few was elected to the board of Marathon Oil (NYSE: MRO) effective April 1, 2019, and is a member of Marathon Oil’s Audit and Finance and Corporate Governance and Nominating Committees.</p> <p>Mr. Few received his Bachelor’s Degree in Computer Systems in Business from Ohio University, and a MBA from Northwestern University’s J.L. Kellogg Graduate School of Management.</p>
Michael S. Bishop Executive Vice President, Chief Financial Officer and Treasurer	51	<p>Mr. Bishop was appointed Executive Vice President in June 2019 and has served as the Company’s Chief Financial Officer and Treasurer since June 2011. Mr. Bishop previously served as Senior Vice President of the Company from June 2011 to June 2019. He has more than 20 years of experience in financial operations and management with public high growth technology companies with a focus on capital raising, project finance, debt/treasury management, investor relations, strategic planning, internal controls, and organizational development. Since joining the Company in 2003, Mr. Bishop has held a succession of financial leadership roles, including Assistant Controller, Corporate Controller and Vice President and Controller. Prior to joining the Company, Mr. Bishop held finance and accounting positions at TranSwitch Corporation, Cyberian Outpost, Inc. and United Technologies, Inc. He is a certified public accountant and began his professional career at McGladrey and Pullen, LLP (now RSM US LLP). Mr. Bishop also served four years in the United States Marine Corps.</p> <p>Mr. Bishop received a Bachelor of Science in Accounting from Boston University and a MBA from the University of Connecticut.</p>

<u>NAME</u>	<u>AGE</u>	<u>PRINCIPAL OCCUPATION</u>
Jennifer D. Arasimowicz, Esq. Executive Vice President, General Counsel, Chief Administrative Officer and Corporate Secretary	47	<p>Ms. Arasimowicz was appointed Chief Administrative Officer in September 2019 and has served as Executive Vice President since June 2019, General Counsel since April 2017 and Corporate Secretary since April 2017. In her current position (and in her prior positions), Ms. Arasimowicz, a licensed attorney in Connecticut, New York and Massachusetts, is (and was) the chief legal, compliance and administrative officer of the Company, having responsibility for oversight of all of the Company’s legal and government affairs, and providing leadership in all aspects of the Company’s business, including compliance, corporate governance and board activities. Ms. Arasimowicz joined the Company in 2012 as Associate Counsel and was promoted to Vice President in 2014, to General Counsel and Corporate Secretary in 2017 and to Senior Vice President also in 2017. Ms. Arasimowicz also previously served as Interim President from June 2019 to August 2019 and as Chief Commercial Officer from June 2019 to September 2019. Prior to joining the Company, Ms. Arasimowicz served as General Counsel of Total Energy Corporation, a New York based diversified energy products and service company providing a broad range of specialized services to utilities and industrial companies. Previously, Ms. Arasimowicz was a partner at Shipman & Goodwin in Hartford, Connecticut, chairing the Utility Law Practice Group and began her legal career as an associate at Murtha Cullina, LLP.</p> <p>Ms. Arasimowicz earned her Juris Doctor at Boston University School of Law and holds a Bachelor’s degree in English from Boston University.</p>
Michael Lisowski Executive Vice President, Chief Operating Officer	49	<p>Mr. Lisowski was appointed Executive Vice President and Chief Operating Officer in June 2019. Mr. Lisowski has served as the Company’s Vice President of Global Operations since 2018, and, from 2001 to 2018, held various other positions within the Company, including Vice President of Supply Chain from 2010 to 2018. Mr. Lisowski is a senior global operations leader with 26 years of progressive operations experience in technology-driven businesses. In his position as the Company’s Chief Operating Officer (and in his prior position as the Company’s Vice President of Global Operations), Mr. Lisowski is (and was) responsible for the Supply Chain, Manufacturing, Quality, Project Management, Environmental Health and Safety, and Plant Engineering functions of the Company. Additionally, Mr. Lisowski and his team are responsible for the development and qualification of strategic suppliers for critical direct materials, as well as procurement of capital equipment in support of operations.</p> <p>Mr. Lisowski earned his Bachelor’s Degree in Communications and Business Administration at Western New England University and a Master’s Degree in Management, Global Supply Chain Integrations from Rensselaer Polytechnic Institute.</p>

<u>NAME</u>	<u>AGE</u>	<u>PRINCIPAL OCCUPATION</u>
Anthony Leo Executive Vice President, Chief Technology Officer	62	Mr. Leo was appointed Executive Vice President and Chief Technology Officer in June 2019 and, prior to that, served as Vice President of Applications and Advanced Technologies since 2014. From 1978 to 2014, Mr. Leo has held various other positions with the Company, including Vice President of Application Engineering and Advanced Technology Development, Vice President of Applications and OEM Engineering, and Vice President of Product Engineering. Mr. Leo has held key leadership roles in the Company's research, development, and commercialization of stationary fuel cell power plants for more than 30 years. In his current position and in his position as the Company's Vice President of Applications and Advanced Technologies, Mr. Leo is and has been responsible for Applications and Advanced Technology Development. In Mr. Leo's other positions with the Company, he has been responsible for managing advanced research and development of rechargeable batteries and fuel cells, managing the first large-scale demonstration stationary fuel cell project, and establishing the Product Engineering Group. Mr. Leo earned his Bachelor of Science Degree in Chemical Engineering from Rensselaer Polytechnic Institute and is currently serving on the U.S. Department of Energy Hydrogen and Fuel Cell Technical Advisory Committee.

ITEM 1A. RISK FACTORS

You should carefully consider the following risk factors before making an investment decision. If any of the following risks actually occur, our business, financial condition, or results of operations could be materially and adversely affected. In such cases, the trading price of our common stock could decline, and you may lose all or part of your investment.

If we do not meet the continued listing standards of The Nasdaq Global Market, our common stock could be delisted from trading, which could limit investors' ability to make transactions in our common stock, subject us to additional trading restrictions, and trigger repurchase rights under the Amended Certificate of Designation for our 5% Series B Cumulative Convertible Perpetual Preferred Stock.

Our common stock is listed on The Nasdaq Global Market (FCEL), which imposes continued listing requirements with respect to listed securities. The Company has previously received notices from The Nasdaq Stock Market ("Nasdaq"), most recently on July 18, 2019, stating that we were not in compliance with Nasdaq Listing Rule 5450(a)(1) because the closing bid price of our common stock was below the required minimum of \$1.00 per share for the previous 30 consecutive business days. In accordance with Nasdaq Listing Rules, we had a period of 180 calendar days, or until January 14, 2020, to regain compliance with the minimum bid price requirement. On January 13, 2020, we received a notice from Nasdaq confirming that we had regained compliance with the minimum bid price requirement as the closing bid price of our common stock was above the required minimum of \$1.00 per share for at least ten consecutive business days from December 26, 2019 to January 10, 2020. However, if we are not able to demonstrate compliance with the minimum bid price requirement in the future, if we fail to meet other continued listing requirements, or if we are otherwise not eligible for continued listing on Nasdaq, we may receive additional notices, and, if we are unable to regain compliance within the prescribed timeframe, our common stock will be subject to delisting. Such delisting could adversely affect the market price and liquidity of our common stock and reduce our ability to raise additional capital.

Additionally, if the Company's common stock is delisted from trading on Nasdaq and is not approved for trading or quoted on any other U.S. securities exchange or other established over-the-counter trading market in the United States (a "Fundamental Change"), then, pursuant to the Amended Certificate of Designation for the 5% Series B Cumulative Convertible Perpetual Preferred Stock ("Series B Preferred Stock") dated March 14, 2005, each holder of the Series B Preferred Stock has the right, at its option, to require us to purchase all or a portion of such holder's shares of Series B Preferred Stock on the date that is 45 days after the date of the Company's notice of such Fundamental Change for

an amount equal to the sum of 100% of the liquidation preference (which is \$1,000 per share) of the shares of Series B Preferred Stock to be repurchased, plus any accrued and unpaid dividends to, but excluding the Fundamental Change purchase date. Under Delaware law, we may repurchase shares of the Series B Preferred Stock only if our total assets would be greater than the sum of our total liabilities plus, unless our Certificate of Incorporation, as amended, permits otherwise, the amount needed, if we were to be dissolved at the time of the repurchase, to satisfy the preferential rights, upon dissolution, of stockholders whose preferential rights on dissolution are superior to the holders of shares of the Series B Preferred Stock.

We have a limited number of shares of common stock available for issuance, which limits our ability to raise capital.

We have historically relied on the equity markets to raise capital to fund our business and operations. As of October 31, 2019, we had only 31,391,316 shares of common stock available for issuance, of which 30,274,072 shares were reserved for issuance under various convertible securities, options, and warrants, under our stock purchase and incentive plans, and under our at-the-market sales plan. As of January 14, 2020, we had 14,034,001 shares of common stock available for issuance, of which 10,290,934 shares were reserved for issuance under various convertible securities, options, and warrants, under our stock purchase and incentive plans, and under our at-the-market sales plan. At the April 4, 2019 annual meeting of stockholders, our stockholders did not approve our request to increase the number of shares of common stock that we are authorized to issue from 225,000,000 shares to 335,000,000 shares. The limited number of shares available for issuance limits our ability to raise capital in the equity markets and satisfy obligations with shares instead of cash, which could adversely impact our ability to fund our business and operations.

We have incurred losses and anticipate continued losses and negative cash flow.

We have transitioned from a research and development company to a commercial products manufacturer, services provider and developer. We have not been profitable since our year ended October 31, 1997. We expect to continue to incur net losses and generate negative cash flows until we can produce sufficient revenues and margins to cover our costs. We may never become profitable. Even if we do achieve profitability, we may be unable to sustain or increase our profitability in the future. For the reasons discussed in more detail below, there are uncertainties associated with our achieving and sustaining profitability. We have, from time to time, sought financing in the public markets in order to fund operations and will continue to do so. Our future ability to obtain such financing could be impaired by a variety of factors, including, but not limited to, the price of our common stock, our lack of authorized, unreserved and unissued shares, and general market conditions.

Our cost reduction strategy may not succeed or may be significantly delayed, which may result in our inability to deliver improved margins.

Our cost reduction strategy is based on the assumption that increases in production will result in economies of scale. In addition, our cost reduction strategy relies on advancements in our manufacturing process, global competitive sourcing, engineering design, reducing the cost of capital and technology improvements (including stack life and projected power output). Failure to achieve our cost reduction targets could have a material adverse effect on our results of operations and financial condition.

Our workforce reduction may cause undesirable consequences and our results of operations may be harmed.

On April 12, 2019, we undertook a reorganization, which included a workforce reduction of 30%, or 135 employees. This workforce reduction may yield unintended consequences, such as attrition beyond our intended reduction in workforce and reduced employee morale, which may cause our employees who were not affected by the reduction in workforce to seek alternate employment. Additional attrition could impede our ability to meet our operational goals, which could have a material adverse effect on our financial performance. In addition, as a result of the reductions in our workforce, we may face an increased risk of employment litigation. Furthermore, employees whose positions were eliminated or those who determine to seek alternate employment may seek employment with our competitors. Although all our employees are required to sign a confidentiality agreement with us at the time of hire, we cannot assure you that the confidential nature of our proprietary information will be maintained in the course of such future employment. We cannot assure you that we will not undertake additional workforce reduction activities, that any of our efforts will be successful, or that we will be able to realize the cost savings and other anticipated benefits from our previous or any future workforce reduction plans. In addition, if we continue to reduce our workforce, it may adversely impact our ability to respond rapidly to any new product, growth or revenue opportunities and to execute on our backlog and business plans. Additionally, our recent reduction in workforce may make it more difficult to recruit and retain new hires as our business grows.

We have debt outstanding and may incur additional debt in the future, which may adversely affect our financial condition and future financial results.

Our total consolidated indebtedness was \$106.3 million as of October 31, 2019. This includes approximately \$81.2 million of debt at our project finance subsidiaries and \$25.1 million of debt at the corporate level. The majority of our debt is long-term with \$21.9 million due within twelve months of October 31, 2019.

On October 31, 2019, we (and certain of our subsidiaries as guarantors) entered into a Credit Agreement (the “Orion Credit Agreement”) with Orion Energy Partners Investment Agent, LLC, as Administrative Agent and Collateral Agent (the “Agent”), and its affiliates, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., and Orion Energy Credit Opportunities Fund II PV, L.P., as lenders, regarding a \$200.0 million senior secured credit facility (the “Orion Facility”), structured as a delayed draw term loan, to be provided by the lenders. In conjunction with the closing of the Orion Facility, on October 31, 2019, we drew down \$14.5 million (the “Initial Funding”) to fully repay debt outstanding to NRG Energy, Inc. (“NRG”) and Generate Lending, LLC (“Generate”) and to fund dividends paid to the holders of the Company’s 5% Series B Cumulative Convertible Perpetual Preferred Stock (“Series B Preferred Stock”) on or before November 15, 2019. The balance of the Initial Funding was used primarily to pay third party costs and expenses associated with closing on the Orion Facility.

As provided for in the Orion Credit Agreement, on November 22, 2019, we made a second draw (the “Second Funding”) of \$65.5 million funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P. (collectively, the “Orion Lenders”), such that the total fundings under the Orion Facility as of November 22, 2019 were equal to \$80.0 million. Proceeds from the Second Funding were used to repay outstanding third party debt with respect to certain Company projects, including the construction loan from Fifth Third Bank on the Groton Project and the loan from Webster Bank on the CCSU Project, as well as to fund remaining going forward construction costs and anticipated capital expenditures relating to certain projects, including the Groton Project, a 7.4 MW project for the CMEEC located on the U.S. Navy submarine base in Groton, Connecticut, the Long Island Power Authority (“LIPA”) Yaphank Solid Waste Management Project (a 7.4 MW project), and the Tulare BioMAT project (a 2.8 MW project).

Our ability to make scheduled payments of principal and interest and other required repayments depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. In addition, the Agent and the lenders under the Orion Credit Agreement have broad approval rights over our ability to draw and allocate funds from the Orion Facility. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring operations, restructuring debt or obtaining additional equity capital on terms that may be onerous or dilutive.

It is also possible that we may incur additional indebtedness in the future in the ordinary course of business. If new debt is added to current debt levels, the risks described above could intensify. Our debt agreements contain representations and warranties, affirmative and negative covenants, and events of default that entitle the lenders to cause our indebtedness under such debt agreements to become immediately due and payable.

We are required to maintain effective internal control over financial reporting. Our management previously identified a material weakness in our internal control over financial reporting. If we are unable to remediate the material weakness or other control deficiencies are identified in the future, we may not be able to report our financial results accurately, prevent fraud or file our periodic reports in a timely manner, which may adversely affect investor confidence in our company and, as a result, the value of our common stock.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting. Complying with Section 404 requires a rigorous compliance program as well as adequate time and resources. We may not be able to complete our internal control evaluation, testing and any required remediation in a timely fashion. Additionally, if we identify one or more material weaknesses in our internal control over financial reporting, we will not be able to assert that our internal controls are effective. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

We previously disclosed in our Form 10-Qs for the quarters ended April 30, 2019 and July 31, 2019 that we did not have resources to sufficiently address asset impairments on a timely basis or the accounting considerations and disclosures related to our amended credit facilities. As a result, we concluded that there was a material weakness in internal control over financial reporting, as we did not maintain effective controls over the accounting for and disclosures in the consolidated financial statements related to asset impairments and credit facilities. This control deficiency has not been remediated as of October 31, 2019 and we further identified that we did not have resources to sufficiently address certain other non-routine transactions and disclosures. This material weakness resulted in material misstatements that were corrected in the consolidated financial statements prior to issuance.

Subsequent to the evaluation made in connection with filing our Form 10-Q for the quarter ended April 30, 2019, our management, with the oversight of the Audit and Finance Committee of our Board of Directors, began the process of remediating the material weakness. Progress to date includes engagement of a third party resource to help evaluate the accounting and disclosure for significant matters each quarter. Management also plans to add additional experienced accounting staff. In addition, under the oversight of the Audit and Finance Committee, management will continue to review and make necessary changes to the overall design of our internal control environment to improve the overall effectiveness of internal control over financial reporting.

We have made progress in accordance with our remediation plan and our goal is to remediate this material weakness in fiscal year 2020. However, the material weakness will not be considered remediated until the applicable controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. We are committed to continuing to improve our internal control processes and will continue to review, optimize and enhance our financial reporting controls and procedures, however, there can be no assurance that this will occur within 2020.

We cannot be certain that these measures will successfully remediate the material weakness or that other material weaknesses and control deficiencies will not be discovered in the future. If our efforts are not successful or other material weaknesses are identified in the future, or if we are not able to comply with the requirements of Section 404 in a timely manner, our reported financial results could be materially misstated and we could be subject to investigations or sanctions by regulatory authorities, which would require additional financial and management resources, and the value of our common stock could decline.

To the extent we identify future weaknesses or deficiencies, there could be material misstatements in our consolidated financial statements and we could fail to meet our financial reporting obligations. As a result, our ability to obtain additional financing, or obtain additional financing on favorable terms, could be materially and adversely affected which, in turn, could materially and adversely affect our business, our financial condition and the value of our common stock. If we are unable to assert that our internal control over financial reporting is effective in the future, investor confidence in the accuracy and completeness of our financial reports could be further eroded, which would have a material adverse effect on the price of our common stock.

Our products compete with products using other energy sources, and if the prices of the alternative sources are lower than energy sources used by our products or attributes of other energy sources are favored over our products, sales of our products will be adversely affected.

Our power plants can operate on a variety of fuels including natural gas, Renewable Biogas, directed Biogas and propane. If these fuels are not readily available or if their prices increase such that electricity produced by our products costs more than electricity provided by other generation sources, our products would be less economically attractive to potential customers. In addition, we have no control over the prices of several types of competitive energy sources such as solar, wind, oil, gas or coal or local utility electricity costs. Significant decreases (or short term increases) in the price of these technologies or fuels or prices for grid delivered electricity could also have a material adverse effect on our business because other generation sources could be more economically attractive to consumers than our products. Additionally, in certain markets, consumers and regulators have expressed a preference for zero-carbon resources over fueled resources. Sales of our products could be adversely affected in these markets.

Financial markets worldwide have experienced heightened volatility and instability which may have a material adverse impact on our Company, our customers and our suppliers.

Financial market volatility can affect the debt, equity and project finance markets. This may impact the amount of financing available to all companies, including companies with substantially greater resources, better credit ratings and more successful operating histories than ours. It is impossible to predict future financial market volatility and instability and the impact on our Company, and it may have a materially adverse effect on us for a number of reasons, such as:

- The long term nature of our sales cycle can require long lead times between application design, order booking and product fulfillment. For such sales, we often require substantial cash down payments in advance of delivery. For our generation business, we must invest substantial amounts in application design, manufacture, installation, commissioning and operation, which amounts are returned through energy sales over long periods of time. Our growth strategy assumes that financing will be available for us to finance working capital or for our customers to provide down payments and to pay for our products. Financial market issues may delay, cancel or restrict the construction budgets and funds available to us or our customers for the deployment of our products and services.
- Projects using our products are, in part, financed by equity investors interested in tax benefits, as well as by the commercial and governmental debt markets. The significant volatility in the U.S. and international stock markets causes significant uncertainty and may result in an increase in the return required by investors in relation to the risk of such projects.
- If we, our customers or our suppliers cannot obtain financing under favorable terms, our business may be negatively impacted.

Our contracted projects may not convert to revenue, and our project pipeline may not convert to contracts, which may have a material adverse effect on our revenue and cash flow.

Some of the project awards we receive and orders we accept from customers require certain conditions or contingencies (such as permitting, interconnection or financing) to be satisfied, some of which are outside of our control. The time periods from receipt of an award to execution of a contract, or receipt of a contract to installation may vary widely and are determined by a number of factors, including the terms of the award, the terms of the customer contract and the customer's site requirements. These same or similar conditions and contingencies may be required by financiers in order to draw on financing to complete a project. If these conditions or contingencies are not satisfied, or changes in laws affecting project awards occur, project awards may not convert to contracts, and installations may be delayed or canceled. This could have an adverse impact on our revenue and cash flow and our ability to complete construction of a project.

We have signed product sales contracts, engineering, procurement and construction contracts (EPC), power purchase agreements (PPAs) and long-term service agreements with customers subject to contractual, technology and operating risks as well as market conditions that may affect our operating results.

We apply the transfer of control over time revenue recognition method under Accounting Standards Codification Topic 606: *Revenue from Contracts with Customer* to certain product sales contracts which are subject to estimates. On a quarterly basis, we perform a review process to help ensure that total estimated contract costs include estimates of costs to complete that are based on the most recent available information. The amount of costs incurred on a cumulative to date basis as a function of estimated costs at completion is applied to contract consideration to determine the cumulative revenue that should be recognized to date.

In certain instances, we have executed PPAs with the end-user of the power or site host of the fuel cell power plant. We may then sell the PPA to a project investor or retain the project and collect revenue from the sale of power over the term of the PPA, recognizing electricity revenue as power is generated and sold.

We have contracted under long-term service agreements with certain customers to provide service on our products over terms up to 20 years. Under the provisions of these contracts, we provide services to maintain, monitor, and repair customer power plants to meet minimum operating levels. Pricing for service contracts is based upon estimates of future costs including future module replacements. While we have conducted tests to determine the overall life of our products, we have not run certain of our products over their projected useful life prior to large scale commercialization. As a result, we cannot be sure that these products will last to their expected useful life, which could result in warranty claims, performance penalties, maintenance and module replacement costs in excess of our estimates and losses on service contracts.

Our ability to proceed with projects under development and complete construction of projects on schedule and within budget may be adversely affected by escalating costs for materials, tariffs, labor and regulatory compliance, inability to obtain necessary permits, interconnections or other approvals on acceptable terms or on schedule and by other factors. If any development project or construction is not completed, is delayed or is subject to cost overruns, we could become obligated to make delay or termination payments or become obligated for other damages under contracts, experience diminished returns or write off all or a portion of our capitalized costs in the project. Each of these events could have an adverse effect on our business, financial condition, results of operations and prospects.

Our growing portfolio of project assets exposes us to operational risks and commodity market volatility.

We have a growing portfolio of project assets used to generate and sell power under PPAs and utility tariff programs that exposes us to operational risks and uncertainties, including, among other things, lost revenues due to prolonged outages, replacement equipment costs, risks associated with facility start-up operations, failures in the availability or acquisition of fuel, the impact of severe adverse weather conditions, natural disasters, terrorist attacks, risks of property damage or injury from energized equipment, availability of adequate water resources and ability to intake and discharge water, use of new or unproven technology, fuel commodity price risk and fluctuating market prices, and lack of alternative available fuel sources.

We extend product warranties, which could affect our operating results.

We provide for a warranty of our products for a specific period of time against manufacturing or performance defects. We accrue for warranty costs based on historical warranty claim experience; however, actual future warranty expenses may be greater than we have assumed in our estimates. As a result, operating results could be negatively impacted should there be product manufacturing or performance defects in excess of our estimates.

Our products are complex and could contain defects and may not operate at expected performance levels which could impact sales and market adoption of our products or result in claims against us.

We develop complex and evolving products and we continue to advance the capabilities of our fuel cell stacks and are now producing stacks in the United States with a net rated power output of 350 kilowatts and an expected seven-year life.

We are still gaining field operating experience with respect to our products, and despite experience gained from our growing installed base and testing performed by us, our customers and our suppliers, issues may be found in existing or new products. This could result in a delay in recognition or loss of revenues, loss of market share or failure to achieve broad market acceptance. The occurrence of defects could also cause us to incur significant warranty, support and repair costs, could divert the attention of our engineering personnel from our product development efforts, and could harm our relationships with our customers. The occurrence of these problems could result in the delay or loss of market acceptance of our products and would likely harm our business. Defects or performance problems with our products could result in financial or other damages to our customers. From time to time, we have been involved in disputes regarding product warranty issues. Although we seek to limit our liability, a product liability claim brought against us, even if unsuccessful, would likely be time consuming, could be costly to defend, and may hurt our reputation in the marketplace. Our customers could also seek and obtain damages from us for their losses. We have accrued liabilities for potential damages related to performance problems; however, actual results may be different than the assumptions used in our accrual calculations.

We currently face and will continue to face significant competition.

We compete on the basis of our products' reliability, efficiency, environmental considerations and cost. Technological advances in alternative energy products or improvements in the electric grid or other sources of power generation, or other fuel cell technologies may negatively affect the development or sale of some or all of our products or make our products non-competitive or obsolete prior to or after commercialization. Other companies, some of which have substantially greater resources than ours, are currently engaged in the development of products and technologies that are similar to, or may be competitive with, our products and technologies.

Several companies in the U.S. are engaged in fuel cell development, although we are the only domestic company engaged in manufacturing and deployment of stationary carbonate fuel cells. Other emerging fuel cell technologies (and the companies developing them) include small or portable proton-exchange membrane ("PEM") fuel cells (Ballard Power Systems, Plug Power, and increasing activity by numerous automotive companies including Toyota, Hyundai, Honda and GM), stationary phosphoric acid fuel cells (Doosan), stationary solid oxide fuel cells (Bloom Energy), and small residential solid oxide fuel cells (Ceres Power Holdings and Ceramic Fuel Cells Ltd.). Each of these competitors has the potential to capture market share in our target markets. There are also other potential fuel cell competitors internationally that could capture market share.

Other than fuel cell developers, we must also compete with companies that manufacture combustion-based distributed power equipment, including various engines and turbines, and have well-established manufacturing, distribution, operating and cost features. Electrical efficiency of these products can be competitive with our SureSource power plants in certain applications. Significant competition may also come from gas turbine companies and large scale solar and wind technologies.

We derive significant revenue from contracts awarded through competitive bidding processes involving substantial costs and risks. Due to this competitive pressure, we may be unable to grow revenue and achieve profitability.

We expect a significant portion of the business that we will seek in the foreseeable future will be awarded through competitive bidding against other fuel cell technologies and other forms of power generation. The competitive bidding process involves substantial costs and a number of risks, including the significant cost and managerial time to prepare bids and proposals for contracts that may not be awarded to us and our failure to accurately estimate the resources and costs that will be required to fulfill any contract we win. In addition, following a contract award, we may encounter significant expense, delay or contract modifications as a result of our competitors protesting or challenging contracts awarded to us in competitive bidding. In addition, multi-award contracts require that we make sustained post-award efforts to obtain task orders under the contract. We may not be able to obtain task orders or recognize revenue under these multi-award contracts. Our failure to compete effectively in this procurement environment could adversely affect our revenue and/or profitability.

Unanticipated increases or decreases in business growth may result in adverse financial consequences for us.

If our business grows more quickly than we anticipate, our existing and planned manufacturing facilities may become inadequate and we may need to seek out new or additional space, at considerable cost to us. If our business does not grow as quickly as we expect, our existing and planned manufacturing facilities would, in part, represent excess capacity for which we may not recover the cost. In that circumstance, our revenues may be inadequate to support our committed costs and our planned growth, and our gross margins and business strategy would be adversely affected.

Our plans are dependent on market acceptance of our products.

Our plans are dependent upon market acceptance of, as well as enhancements to, our products. Fuel cell systems represent an emerging market, and we cannot be sure that potential customers will accept fuel cells as a replacement for traditional power sources or non-fuel based power sources. As is typical in a rapidly evolving industry, demand and market acceptance for recently introduced products and services are subject to a high level of uncertainty and risk. Since the distributed generation market is still evolving, it is difficult to predict with certainty the size of the market and its growth rate. The development of a market for our products may be affected by many factors that are out of our control, including:

- the cost competitiveness of our fuel cell products including availability and output expectations and total cost of ownership;
- the future costs of natural gas and other fuels used by our fuel cell products;
- customer reluctance to try a new product;
- the market for distributed generation and government policies that affect that market;
- local permitting and environmental requirements;
- customer preference for non-fuel based technologies; and
- the emergence of newer, more competitive technologies and products.

If a sufficient market fails to develop or develops more slowly than we anticipate, we may be unable to recover the losses we will have incurred in the development of our products and may never achieve profitability.

As we continue to expand markets for our products, we intend to continue offering power production guarantees and other terms and conditions relating to our products that will be acceptable to the marketplace, and continue to develop a service organization that will aid in servicing our products and obtain self-regulatory certifications, if available, with respect to our products. Failure to achieve any of these objectives may also slow the development of a sufficient market for our products and, therefore, have a material adverse effect on our results of operations and financial condition.

We are substantially dependent on a concentrated number of customers and the loss of any one of these customers could adversely affect our business, financial condition and results of operations.

We contract with a concentrated number of customers for the sale of products and for research and development contracts. There can be no assurance that we will continue to achieve the current level of sales of our products to our largest customers. Even though our customer base is expected to increase and our revenue streams to diversify, a substantial portion of net revenues could continue to depend on sales to a limited number of customers. Our agreements with these customers may be canceled if we fail to meet certain product specifications or research and development milestones or materially breach the agreements, or if our customers materially breach the agreements, and our customers may seek to renegotiate the terms of current agreements or renewals. The loss of, or a reduction in sales to, one or more of our larger customers could have a material adverse effect on our business, financial condition and results of operations.

If our goodwill and other intangible assets, long-lived assets, inventory or project assets become impaired, we may be required to record a significant charge to earnings.

We may be required to record a significant charge to operations in our financial statements should we determine that our goodwill, other intangible assets (i.e., in process research and development (“IPR&D”)), other long-lived assets (i.e., property, plant and equipment and definite-lived intangible assets), inventory, or project assets are impaired. Such a charge might have a significant impact on our reported financial condition and results of operations. We recorded a charge during the year ended October 31, 2019 for a specific construction in process asset related to automation equipment for use in manufacturing with a carrying value of \$2.8 million, which was impaired due to uncertainty as to whether the asset will be completed as a result of our liquidity position and continued low level of production rates.

As required by accounting rules, we review our goodwill for impairment at least annually as of July 31 or more frequently if facts and circumstances indicate that it is more likely than not that the fair value of a reporting unit that has goodwill is less than its carrying value. Factors that may be considered a change in circumstances indicating that the carrying value of our goodwill might not be recoverable include a significant decline in projections of future cash flows and lower future growth rates in our industry. We review IPR&D for impairment on an annual basis as of July 31 or more frequently if facts and circumstances indicate the fair value is less than the carrying value. If the technology has been determined to be abandoned or not recoverable, we would be required to impair the asset. We review inventory, long-lived assets and project assets for impairment whenever events or changes in circumstances indicate the carrying amount may not be recoverable. We consider a project commercially viable and recoverable if it is anticipated to be sellable for a profit, or generates positive cash flows, once it is either fully developed or fully constructed. If our projects are not considered commercially viable, we would be required to impair the respective project assets.

We have risks associated with high levels of inventory.

The amount of total inventory as of October 31, 2019 and October 31, 2018 was \$56.7 million (\$2.2 million of which was classified as long-term inventory) and \$54.5 million (none of which was classified as long-term inventory), respectively, which includes work in process inventory totaling \$31.2 million and \$29.1 million, respectively. We reduced our production rate and have been operating at a lower level for a period of time in order to deploy inventory to new projects and mitigate future increases in inventory. In addition, there are risks that our inventory could lose some or all of its value due to technological obsolescence, shifts in market demand or other unexpected changes in industry conditions and circumstances. If we are unable to deploy our current inventory or new inventory consistent with our business plan, we may be required to sell it at a loss, abandon it or recycle it into different products. These actions would result in a significant charge to earnings. Such a charge might have a significant impact on our financial condition and results of operations.

Our advanced technologies contracts are subject to the risk of termination by the contracting party and we may not realize the full amounts allocated under some contracts due to the lack of Congressional appropriations.

A portion of our fuel cell revenues has been derived from long-term cooperative agreements and other contracts with the U.S. Department of Energy and other U.S. government agencies. These agreements are important to the continued development of our technology and our products. We also contract with private sector companies under certain advanced technologies contracts to develop strategically important and complementary offerings.

Generally, our government research and development contracts are subject to the risk of termination at the convenience of the contracting agency. Furthermore, these contracts, irrespective of the amounts allocated by the contracting agency, are subject to annual Congressional appropriations and the results of government or agency sponsored reviews and audits of our cost reduction projections and efforts. We can only receive funds under these contracts ultimately made available to us annually by Congress as a result of the appropriations process. Accordingly, we cannot be sure whether we will receive the full amounts awarded under our government research and development or other contracts. Failure to receive the full amounts under any of our government research and development contracts could materially and adversely affect our business prospects, results of operations and financial condition.

Our privately funded advanced technologies contracts are subject to termination at the convenience of the contracting party and contain certain milestones and deliverables. Accordingly, we cannot be sure whether we will receive the full amounts contracted for under privately funded advanced technologies contracts. Termination of these contracts or failure to receive the full amounts under any of these contracts could materially and adversely affect our business prospects, results of operations and financial condition.

A negative government audit could result in an adverse adjustment of our revenue and costs and could result in civil and criminal penalties.

Government agencies, such as the Defense Contract Audit Agency, routinely audit and investigate government contractors. These agencies review a contractor's performance under its contracts, cost structure, and compliance with applicable laws, regulations, and standards. If the agencies determine through these audits or reviews that we improperly allocated costs to specific contracts, they will not reimburse us for these costs. Therefore, an audit could result in adjustments to our revenue and costs.

Further, although we have internal controls in place to oversee our government contracts, no assurance can be given that these controls are sufficient to prevent isolated violations of applicable laws, regulations and standards. If the agencies determine that we or one of our subcontractors engaged in improper conduct, we may be subject to civil or criminal penalties and administrative sanctions, payments, fines, and suspension or prohibition from doing business with the government, any of which could materially affect our results of operations and financial condition.

The U.S. government has certain rights relating to our intellectual property, including the right to restrict or take title to certain patents.

Multiple U.S. patents that we own have resulted from government-funded research and are subject to the risk of exercise of “march-in” rights by the government. March-in rights refer to the right of the U.S. government or a government agency to exercise its non-exclusive, royalty-free, irrevocable worldwide license to any technology developed under contracts funded by the government if the contractor fails to continue to develop the technology. These “march-in” rights permit the U.S. government to take title to these patents and license the patented technology to third parties if the contractor fails to utilize the patents.

Our future success and growth is dependent on our market strategy.

We cannot assure you that we will enter into business relationships that are consistent with, or sufficient to support, our commercialization plans and our growth strategy or that these relationships will be on terms favorable to us. Even if we enter into these types of relationships, we cannot assure you that the business associates with whom we form relationships will focus adequate resources on selling our products or will be successful in selling them. Some of these arrangements have required or will require that we grant exclusive rights to certain companies in defined territories. These exclusive arrangements could result in our being unable to enter into other arrangements at a time when the business associate with whom we form a relationship is not successful in selling our products or has reduced its commitment to marketing our products. In addition, future arrangements may also include the issuance of equity and/or warrants to purchase our equity, which may have an adverse effect on our stock price and would dilute our existing stockholders. To the extent we enter into partnerships or other business relationships, the failure of these partners or other business associates to assist us with the deployment of our products may adversely affect our results of operations and financial condition.

We depend on third party suppliers for the development and supply of key raw materials and components for our products.

We use various raw materials and components to construct a fuel cell module, including nickel and stainless steel which are critical to our manufacturing process. We also rely on third-party suppliers for the balance-of-plant components in our products. Suppliers must undergo a qualification process, which takes four to twelve months. We continually evaluate new suppliers, and we are currently qualifying several new suppliers. There are a limited number of suppliers for some of the key components of our products. A supplier’s failure to develop and supply components in a timely manner or to supply components that meet our quality, quantity or cost requirements or our technical specifications, or our inability to obtain alternative sources of these components on a timely basis or on terms acceptable to us, could each harm our ability to manufacture our SureSource products. In addition, to the extent the processes that our suppliers use to manufacture components are proprietary, we may be unable to obtain comparable components from alternative suppliers.

Due to our prior constrained liquidity, we previously delayed certain payments to third parties, including our suppliers, to conserve cash. Management entered into forbearance agreements and payment arrangements with certain suppliers. However, suppliers whose payments were delayed may take action against us, including, but not limited to, filing litigation, arbitration or other proceedings against us.

We do not know whether we will be able to maintain long-term supply relationships with our critical suppliers, or secure new long-term supply relationships, or whether such relationships will be on terms that will allow us to achieve our objectives. Our business prospects, results of operations and financial condition could be harmed if we fail to secure long-term relationships with entities that will supply the required components for our SureSource products.

We depend on our intellectual property, and our failure to protect that intellectual property could adversely affect our future growth and success.

Failure to protect our existing intellectual property rights may result in the loss of our exclusivity or the right to use our technologies. If we do not adequately ensure our freedom to use certain technology, we may have to pay others for rights to use their intellectual property, pay damages for infringement or misappropriation, or be enjoined from using such intellectual property. We rely on patent, trade secret, trademark and copyright law to protect our intellectual property.

We have licensed our carbonate fuel cell manufacturing intellectual property to POSCO Energy through a series of manufacturing and technology transfer agreements entered into in 2007, 2009 and 2012, which agreements expire on October 31, 2027, and have provided POSCO Energy with the exclusive right to manufacture, sell, distribute and service our SureSource 300, SureSource 1500 and SureSource 3000 fuel cell technology in Asia. In addition, effective as of June 11, 2019, we entered into the EMRE License Agreement, pursuant to which we agreed, subject to the terms of the EMRE License Agreement, to grant EMRE and its affiliates a non-exclusive, worldwide, fully paid, perpetual, irrevocable, non-transferrable license and right to use our patents, data, know-how, improvements, equipment designs, methods, processes and the like to the extent it is useful to research, develop, and commercially exploit carbonate fuel cells in applications in which the fuel cells concentrate carbon dioxide from industrial and power sources and for any other purpose attendant thereto or associated therewith. Such right and license is sublicensable to third parties performing work for or with EMRE or its affiliates, but shall not otherwise be sublicensable. We depend on POSCO Energy and EMRE to also protect our intellectual property rights as licensed.

As of October 31, 2019, we, excluding our subsidiaries, had 95 U.S. patents and 153 patents in other jurisdictions covering our fuel cell technology (in certain cases covering the same technology in multiple jurisdictions), with patents directed to various aspects of our SureSource technology, solid oxide fuel cell (“SOFC”) technology, PEM fuel cell technology and applications thereof. As of October 31, 2019, we also had 62 patent applications pending in the U.S. and 112 patent applications pending in other jurisdictions. Our U.S. patents will expire between 2020 and 2037, and the current average remaining life of our U.S. patents is approximately 8.4 years. Our subsidiary, Versa Power Systems, Ltd., as of October 31, 2019, had 33 U.S. patents and 96 international patents covering the SOFC technology (in certain cases covering the same technology in multiple jurisdictions), with an average remaining U.S. patent life of approximately 5.5 years. As of October 31, 2019, Versa Power Systems, Ltd. also had 1 pending U.S. patent application and 11 patent applications pending in other jurisdictions. In addition, as of October 31, 2019, our subsidiary, FuelCell Energy Solutions, GmbH, had license rights to 2 U.S. patents and 7 patents outside the U.S. for carbonate fuel cell technology licensed from Fraunhofer IKTS.

Some of our intellectual property is not covered by any patent or patent application and includes trade secrets and other know-how that is not able to be patented, particularly as it relates to our manufacturing processes and engineering design. In addition, some of our intellectual property includes technologies and processes that may be similar to the patented technologies and processes of third parties. If we are found to be infringing third-party patents, we do not know whether we will be able to obtain licenses to use such patents on acceptable terms, if at all. Our patent position is subject to complex factual and legal issues that may give rise to uncertainty as to the validity, scope, and enforceability of a particular patent.

We cannot assure you that any of the U.S. or international patents owned by us or other patents that third parties license to us will not be invalidated, circumvented, challenged, rendered unenforceable or licensed to others, or that any of our pending or future patent applications will be issued with the breadth of claim coverage sought by us, if issued at all. In addition, effective patent, trademark, copyright and trade secret protection may be unavailable, limited or not applied for in certain foreign countries.

We also seek to protect our proprietary intellectual property, including intellectual property that may not be patented or able to be patented, in part by confidentiality agreements and, if applicable, inventors’ rights agreements with our subcontractors, vendors, suppliers, consultants, strategic business associates and employees. We cannot assure you that these agreements will not be breached, that we will have adequate remedies for any breach or that such persons or institutions will not assert rights to intellectual property arising out of these relationships. Certain of our intellectual property has been licensed to us on a non-exclusive basis from third parties that may also license such intellectual property to others, including our competitors. If our licensors are found to be infringing third-party patents, we do not know whether we will be able to obtain licenses to use the intellectual property licensed to us on acceptable terms, if at all.

If necessary or desirable, we may seek extensions of existing licenses or further licenses under the patents or other intellectual property rights of others. However, we can give no assurances that we will obtain such extensions or further licenses or that the terms of any offered licenses will be acceptable to us. The failure to obtain a license from a third party for intellectual property that we use at present could cause us to incur substantial liabilities, and to suspend the manufacture or shipment of products or our use of processes requiring the use of that intellectual property.

While we are not currently engaged in any intellectual property litigation, we could become subject to lawsuits in which it is alleged that we have infringed the intellectual property rights of others or commence lawsuits against others who we believe are infringing our rights or violating their agreements to protect our intellectual property. Our involvement in intellectual property litigation could result in significant expense to us, adversely affecting the development of sales of the challenged product or intellectual property and diverting the efforts of our technical and management personnel, whether or not that litigation is resolved in our favor.

Our future success will depend on our ability to attract and retain qualified management, technical, and other personnel.

Our future success is substantially dependent on the services and performance of our executive officers and other key management, engineering, scientific, manufacturing and operating personnel. The loss of the services of key management, engineering, scientific, manufacturing and operating personnel could materially adversely affect our business. Our ability to achieve our commercialization plans and to increase production at our manufacturing facility in the future will also depend on our ability to attract and retain additional qualified management, technical, manufacturing and operating personnel. Recruiting personnel for the fuel cell industry is competitive. We do not know whether we will be able to attract or retain additional qualified management, technical, manufacturing and operating personnel. Our inability to attract and retain additional qualified management, technical, manufacturing and operating personnel, or the departure of key employees, could materially and adversely affect our development, commercialization and manufacturing plans and, therefore, our business prospects, results of operations and financial condition. In addition, our inability to attract and retain sufficient management, technical, manufacturing and operating personnel to quickly increase production at our manufacturing facility when and if needed to meet increased demand may adversely impact our ability to respond rapidly to any new product, growth or revenue opportunities. Our inability to attract and retain sufficient qualified management, technical, engineering, research, and manufacturing personnel to staff our third party research contracts may result in our inability to complete such contracts or terminations of such contracts, which may adversely impact financial conditions and results of operations.

We may be affected by environmental and other governmental regulation.

We are subject to various federal, state and local laws and regulations relating to, among other things, land use, safe working conditions, handling and disposal of hazardous and potentially hazardous substances and emissions of carbon dioxide and pollutants into the atmosphere. In addition, it is possible that industry-specific laws and regulations will be adopted covering matters such as transmission scheduling, distribution, emissions, and the characteristics and quality of our products, including installation and servicing. These regulations could limit the growth in the use of carbonate fuel cell products, decrease the acceptance of fuel cells as a commercial product and increase our costs and, therefore, the price of our products. Accordingly, compliance with existing or future laws and regulations could have a material adverse effect on our business prospects, results of operations and financial condition.

Utility companies may resist the adoption of distributed generation and could impose customer fees or interconnection requirements on our customers that could make our products less desirable.

Investor-owned utilities may resist adoption of distributed generation fuel cell plants as such plants are disruptive to the utility business model that primarily utilizes large central generation power plants and associated transmission and distribution. On-site distributed generation that is on the customer-side of the electric meter competes with the utility. Distributed generation on the utility-side of the meter generally has power output that is significantly less than central generation power plants and may be perceived by the utility as too small to materially impact its business, limiting its interest. Additionally, perceived technology risk may limit utility interest in stationary fuel cell power plants.

Utility companies commonly charge fees to larger, industrial customers for disconnecting from the electric grid or for having the capacity to use power from the electric grid for back up purposes. These fees could increase the cost to our customers of using our SureSource products and could make our products less desirable, thereby harming our business prospects, results of operations and financial condition.

We could be liable for environmental damages resulting from our research, development or manufacturing operations.

Our business exposes us to the risk of harmful substances escaping into the environment, resulting in personal injury or loss of life, damage to or destruction of property, and natural resource damage. Depending on the nature of the claim, our current insurance policies may not adequately reimburse us for costs incurred in settling environmental damage claims, and in some instances, we may not be reimbursed at all. Our business is subject to numerous federal, state, and local laws and regulations that govern environmental protection and human health and safety. We believe that our businesses are operating in compliance in all material respects with applicable environmental laws; however, these laws and regulations have changed frequently in the past and it is reasonable to expect additional and more stringent changes in the future.

Our operations may not comply with future laws and regulations and we may be required to make significant unanticipated capital and operating expenditures. If we fail to comply with applicable environmental laws and regulations, governmental authorities may seek to impose fines and penalties on us or to revoke or deny the issuance or renewal of operating permits and private parties may seek damages from us. Under those circumstances, we might be required to curtail or cease operations, conduct site remediation or other corrective action, or pay substantial damage claims.

Our products use inherently dangerous, flammable fuels, operate at high temperatures and use corrosive carbonate material, each of which could subject our business to product liability claims.

Our business exposes us to potential product liability claims that are inherent in products that use hydrogen. Our products utilize fuels such as natural gas and convert these fuels internally to hydrogen that is used by our products to generate electricity. The fuels we use are combustible and may be toxic. In addition, our SureSource products operate at high temperatures and use corrosive carbonate material, which could expose us to potential liability claims. Although we have incorporated a robust design and redundant safety features in our power plants, have established comprehensive safety, maintenance, and training programs, follow third-party certification protocols, codes and standards, and do not store natural gas or hydrogen at our power plants, we cannot guarantee that there will not be accidents. Any accidents involving our products or other hydrogen-using products could materially impede widespread market acceptance and demand for our products. In addition, we might be held responsible for damages beyond the scope of our insurance coverage. We also cannot predict whether we will be able to maintain adequate insurance coverage on acceptable terms.

We are subject to risks inherent in international operations.

Since we market our products both inside and outside the U.S., our success depends in part on our ability to secure international customers and our ability to manufacture products that meet foreign regulatory and commercial requirements in target markets. Sales to customers located outside the U.S. accounts for a significant portion of our consolidated revenue. Sales to customers in South Korea represent the majority of our international sales. We have limited experience developing and manufacturing our products to comply with the commercial and legal requirements of international markets. In addition, we are subject to tariff regulations and requirements for export licenses, particularly with respect to the export of some of our technologies. We face numerous challenges in our international expansion, including unexpected changes in regulatory requirements and other geopolitical risks, fluctuations in currency exchange rates, longer accounts receivable requirements and collections, greater bonding and security requirements, difficulties in managing international operations, potentially adverse tax consequences, restrictions on repatriation of earnings and the burdens of complying with a wide variety of international laws. Any of these factors could adversely affect our results of operations and financial condition.

We source raw materials and parts for our products on a global basis, which subjects us to a number of potential risks, including the impact of export duties and quotas, trade protection measures imposed by the U.S. and other countries including tariffs, potential for labor unrest, changing global and regional economic conditions and current and changing regulatory environments. Changes to these factors may have an adverse effect on our ability to source raw materials and parts in line with our current cost structure.

Although our reporting currency is the U.S. dollar, we conduct our business and incur costs in the local currency of most countries in which we operate. As a result, we are subject to currency translation and transaction risk. Changes in exchange rates between foreign currencies and the U.S. dollar could affect our net sales and cost of sales and could result in exchange gains or losses. We cannot accurately predict the impact of future exchange rate fluctuations on our results of operations.

We could also expand our business into new and emerging markets, many of which have an uncertain regulatory environment relating to currency policy. Conducting business in such markets could cause our exposure to changes in exchange rates to increase, due to the relatively high volatility associated with emerging market currencies and potentially longer payment terms for our proceeds. Our ability to hedge foreign currency exposure is dependent on our credit profile with financial institutions that are willing and able to do business with us. Deterioration in our credit position or a significant tightening of the credit market conditions could limit our ability to hedge our foreign currency exposure and, therefore, result in exchange gains or losses.

Exports of certain of our products are subject to various export control regulations and may require a license or permission from the U.S. Department of State, the U.S. Department of Energy or other agencies.

As an exporter, we must comply with various laws and regulations relating to the export of products, services and technology from the U.S. and other countries having jurisdiction over our operations. We are subject to export control laws and regulations, including the International Traffic in Arms Regulation, the Export Administration Regulation, and the Specially Designated Nationals and Blocked Persons List, which generally prohibit U.S. companies and their intermediaries from exporting certain products, importing materials or supplies, or otherwise doing business with restricted countries, businesses or individuals, and require companies to maintain certain policies and procedures to ensure compliance. We are also subject to the Foreign Corrupt Practices Act which prohibits improper payments to foreign governments and their officials by U.S. and other business entities. Under these laws and regulations, U.S. companies may be held liable for their actions and actions taken by their strategic or local partners or representatives. If we, or our intermediaries, fail to comply with the requirements of these laws and regulations, or similar laws of other countries, governmental authorities in the United States or elsewhere, as applicable, could seek to impose civil and/or criminal penalties, which could damage our reputation and have a material adverse effect on our business, financial condition and results of operations.

We are also subject to registration under the U.S. State Department's Directorate of Defense Trade Controls ("DDTC"). Due to the nature of certain of our products and technology, we must obtain licenses or authorizations from various U.S. government agencies such as DDTC or the U.S. Department of Energy, before we are permitted to sell such products or license such technology outside of the U.S. We can give no assurance that we will continue to be successful in obtaining the necessary licenses or authorizations or that certain sales will not be prevented or delayed. Any significant impairment of our ability to sell products or license technology outside of the U.S. could negatively impact our results of operations, financial condition or liquidity.

We depend on strategic relationships with third parties, and the terms and enforceability of many of these relationships are not certain.

We have entered into strategic relationships with third parties for the design, product development, sale and service of our existing products and products under development, some of which may not have been documented by a definitive agreement and others of which may require renewal. The terms and conditions of many of these relationships allow for termination by the third parties. Termination or expiration of any of these relationships could adversely affect our ability to design, develop and distribute these products to the marketplace. We cannot assure you that we will be able to successfully negotiate and execute definitive agreements or renewals with any of these third parties, and failure to do so may effectively terminate the relevant relationship.

We are increasingly dependent on information technology, and disruptions, failures or security breaches of our information technology infrastructure could have a material adverse effect on our operations. In addition, increased information technology security threats and more sophisticated computer crime pose a risk to our systems, networks, products and services.

We rely on information technology networks and systems, including the Internet, to process, transmit and store electronic and financial information and to manage a variety of business processes and activities, including communication with power plants owned by us or our customers and production, manufacturing, financial, logistics, sales, marketing and administrative functions. Additionally, we collect and store data that is sensitive to us and to third parties. Operating these information technology networks and systems and processing and maintaining this data, in a secure manner, are critical to our business operations and strategy. We depend on our information technology infrastructure to communicate internally and externally with employees, customers, suppliers and others. We also use information technology networks and systems to comply with regulatory, legal and tax requirements and to operate our fuel cell power plants. These information technology systems, many of which are managed by third parties or used in connection with shared service centers, may be susceptible to damage, disruptions or shutdowns due to failures during the process of upgrading or replacing software, databases or components thereof, power outages, hardware failures, computer viruses, attacks by computer hackers or other cybersecurity risks, telecommunication failures, user errors, natural disasters, terrorist attacks or other catastrophic events. If any of our significant information technology systems suffer severe damage, disruption or shutdown, and our disaster recovery and business continuity plans do not effectively resolve the issues in a timely manner, our product sales, financial condition and results of operations may be materially and adversely affected, and we could experience delays in reporting our financial results, or our fuel cell power plant operations may be disrupted, exposing us to performance penalties under our contracts with customers.

In addition, information technology security threats — from user error to cybersecurity attacks designed to gain unauthorized access to our systems, networks and data — are increasing in frequency and sophistication. Cybersecurity attacks may range from random attempts to coordinated and targeted attacks, including sophisticated computer crime and advanced persistent threats. These threats pose a risk to the security of our systems and networks and the confidentiality, availability and integrity of our data. Cybersecurity attacks could also include attacks targeting customer data or the security, integrity and/or reliability of the hardware and software installed in our products. We have experienced, and may continue to experience in the future, cybersecurity attacks that have resulted in unauthorized parties gaining access to our information technology systems and networks and, in one instance, gaining control of the information technology system at one of our power plants. However, to date, no cybersecurity attack has resulted in any material loss of data, interrupted our day-to-day operations or had a material impact on our financial condition, results of operations or liquidity. While we actively manage information technology security risks within our control, there can be no assurance that such actions will be sufficient to mitigate all potential risks to our systems, networks and data. In addition to the direct potential financial risk as we continue to build, own and operate generation assets, other potential consequences of a material cybersecurity attack include reputational damage, litigation with third parties, disruption to systems, unauthorized release of confidential or otherwise protected information, corruption of data, diminution in the value of our investment in research, development and engineering, and increased cybersecurity protection and remediation costs, which in turn could adversely affect our competitiveness, results of operations and financial condition. The amount of insurance coverage we maintain may be inadequate to cover claims or liabilities relating to a cybersecurity attack.

Litigation could expose us to significant costs and adversely affect our business, financial condition, and results of operations.

We are, or may become, party to various lawsuits and claims arising in the ordinary course of business, which may include lawsuits or claims relating to commercial liability, product recalls, product liability, product claims, employment matters, environmental matters, breach of contract, or other aspects of our business. Litigation is inherently unpredictable, and although we may believe we have meaningful defenses in these matters, we may incur judgments or enter into settlements of claims that could have a material adverse effect on our business, financial condition, and results of operations. The costs of responding to or defending litigation may be significant and may divert the attention of management away from our strategic objectives. There may also be adverse publicity associated with litigation that may decrease customer confidence in our business, regardless of whether the allegations are valid or whether we are ultimately found liable. As a result, litigation may have a material adverse effect on our business, financial condition, and results of operations.

Our results of operations could vary as a result of changes to our accounting policies or the methods, estimates and judgments we use in applying our accounting policies.

The methods, estimates and judgments we use in applying our accounting policies have a significant impact on our results of operations. Such methods, estimates and judgments are, by their nature, subject to substantial risks, uncertainties and assumptions, and factors may arise over time that could lead us to reevaluate our methods, estimates and judgments.

In future periods, management will continue to reevaluate its estimates for contract margins, service agreements, loss accruals, warranty, performance guarantees, liquidated damages and inventory valuation allowances. Changes in those estimates and judgments could significantly affect our results of operations and financial condition. We will also adopt changes required by the Financial Accounting Standards Board and the SEC.

Our stock price has been and could remain volatile.

The market price for our common stock has been and may continue to be volatile and subject to extreme price and volume fluctuations in response to market and other factors, including the following, some of which are beyond our control:

- failure to meet commercialization milestones;
- failure to win contracts through competitive bidding processes;
- the loss of a major customer or a contract;
- variations in our quarterly operating results from the expectations of securities analysts or investors;
- downward revisions in securities analysts' estimates or changes in general market conditions;
- changes in the securities analysts that cover us or failure to regularly publish reports;
- announcements of technological innovations or new products or services by us or our competitors;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures or capital commitments;
- additions or departures of key personnel;
- investor perception of our industry or our prospects;
- insider selling or buying;
- demand for our common stock;
- dilution from issuances of common stock;
- general market trends or preferences for non-fueled resources;
- general technological or economic trends; and
- changes in United States or foreign political environment and the passage of laws, including, tax, environmental or other laws, affecting the product development business.

In the past, following periods of volatility in the market price of their stock, many companies have been the subject of securities class action litigation. If we became involved in securities class action litigation in the future, it could result in substantial costs and diversion of management's attention and resources and could harm our stock price, business prospects, results of operations and financial condition.

Provisions of Delaware and Connecticut law and of our certificate of incorporation and by-laws and our outstanding securities may make a takeover more difficult.

Provisions in our Certificate of Incorporation, as amended (“Certificate of Incorporation”), and Amended and Restated By-Laws (“By-Laws”) and in Delaware and Connecticut corporate law may make it difficult and expensive for a third-party to pursue a tender offer, change in control or takeover attempt that is opposed by our management and board of directors. In addition, certain provisions of the Class A Cumulative Redeemable Exchangeable Preferred Shares issued by FCE FuelCell Energy Ltd. (the “Series 1 Preferred Shares”) and our Series B Preferred Shares could make it more difficult or more expensive for a third party to acquire us. Public stockholders who might desire to participate in such a transaction may not have an opportunity to do so. These anti-takeover provisions could substantially impede the ability of public stockholders to benefit from a change in control or change in our management and board of directors.

Our By-Laws provide that the Court of Chancery of the State of Delaware is the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders’ ability to obtain a judicial forum deemed favorable by the stockholder for disputes with us or our directors, officers or employees.

Our By-Laws provide that the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty, any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our Certificate of Incorporation or our By-Laws, any action to interpret, apply, enforce, or determine the validity of our Certificate of Incorporation or By-Laws, or any action asserting a claim against us that is governed by the internal affairs doctrine. The choice of forum provision may limit a stockholder’s ability to bring a claim in a judicial forum that the stockholder finds favorable for disputes against us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our By-Laws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

The implementation of our business plan and strategy will require additional capital.

The implementation of our business plan and strategy requires additional capital to fund operations as well as investment by us in project assets. If we are unable to raise additional capital in the amounts required, or at all, we will not be able to successfully implement our business plan and strategy. There can be no guarantee that we will be able to raise such additional capital at the times required or in the amounts required for the implementation of our business plan and strategy. In addition, the recent change to a more capital-intensive business model increases the risks of our being able to successfully implement our plans, if we do not raise additional capital in the amounts required. If we are unable to raise additional capital, our business, operations and prospects could be materially and adversely affected.

We will need to raise additional capital, and such capital may not be available on acceptable terms, if at all. If we do raise additional capital utilizing equity, existing stockholders will suffer dilution. If we do not raise additional capital, our business could fail or be materially and adversely affected.

We will need to raise additional funds in debt and equity financings, and these funds may not be available to us when we need them or on acceptable terms, if at all. Such additional financings could be significant. If we raise additional funds through further issuances of our common stock, or securities convertible or exchangeable into shares of our common stock, into the public market, including shares of our common stock issued upon exercise of options or warrants, holders of our common stock could suffer significant dilution, and any new equity securities we issue could have rights, preferences and privileges superior to those of our then-existing capital stock. Any debt financing secured by us in the future could involve restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities. If we cannot raise additional funds when we need them, our business and prospects could fail or be materially and adversely affected. In addition, if additional funds are not secured in the future, we will have to modify, reduce, defer or eliminate parts of our present and anticipated future projects.

Future sales of substantial amounts of our common stock could affect the market price of our common stock.

Future sales of substantial amounts of our common stock, or securities convertible or exchangeable into shares of our common stock, into the public market, including shares of our common stock issued upon exercise of options or warrants, or perceptions that those sales could occur, could adversely affect the prevailing market price of our common stock and our ability to raise capital in the future.

We may be subject to actions for rescission or damages or other penalties in connection with certain sales of shares of our common stock in the open market.

Between August 2005 and April 2017, we sold shares of our common stock pursuant to a series of “at-the-market” sales plans. The shares sold pursuant to these sales plans represented a portion of the shares registered by us pursuant to shelf registration statements we filed with the SEC during this time period. While we reported the actual shares sold and proceeds, net of fees, of sales made during each fiscal quarter pursuant to the sales plans in our annual and quarterly reports on Forms 10-K and 10-Q, we did not file or deliver prospectus supplements at the time of or prior to making these sales. Accordingly, these sales may not have been in compliance with applicable federal and/or state securities laws, and the purchasers of such shares may have rescission rights or claims for damages. In addition, to the extent that these sales were not in compliance with applicable federal and/or state securities laws, we may be subject to penalties imposed by the SEC and/or state securities agencies. We have reported these sales to the SEC, and in response to our report, the SEC has opened an informal investigation of these sales. If purchasers successfully seek rescission and/or damages, and/or the SEC and/or state securities agencies impose financial penalties on us which are not covered by insurance, we may not have sufficient resources to make the necessary payments, and any such claims, damages or penalties could have a material adverse effect on our stock price, business prospects, results of operations, and financial condition. Although we believe we would have defenses to such claims or actions if brought, we are unable to predict the amount of any damages or financial penalties which could be sought against us, or the extent to which any such financial exposure would be covered by insurance. However, we believe the likelihood of any claims or actions being brought against us is remote.

The situation with POSCO Energy has limited and continues to limit our efforts to access the South Korean and Asian markets and could expose us to costs of arbitration or litigation proceedings.

From approximately 2007 through 2015, we relied on POSCO Energy to develop and grow the South Korean and Asian markets for our products and services. We entered into manufacturing and technology transfer agreements with POSCO Energy in 2007, 2009 and 2012, each of which expires on October 31, 2027. The Cell Technology Transfer Agreement (“CTTA”) provides POSCO Energy with the technology rights to manufacture, sell, distribute and service our SureSource 300, SureSource 1500 and SureSource 3000 fuel cell technology in Asia. The CTTA requires POSCO Energy to pay to us a 3.0% royalty on POSCO Energy net product sales, as well as a royalty on scheduled fuel cell module replacements under service agreements for modules that were built by POSCO Energy and installed at plants in Asia under the terms of long-term service agreements between POSCO Energy and its customers. While the aforementioned manufacturing and technology transfer agreements entered into in 2007, 2009 and 2012 remain in effect, due to certain action and inactions of POSCO Energy, we have not realized any material revenues, royalties or new projects developed by POSCO Energy since 2016.

In March 2017, we entered into a memorandum of understanding (“MOU”) with POSCO Energy to permit us to directly develop the Asian fuel cell business, including the right for us to sell SureSource solutions in South Korea and the broader Asian market. In June 2018, POSCO Energy advised us in writing that it was terminating the MOU effective July 15, 2018. Pursuant to the terms of the MOU, notwithstanding its termination, we will continue to execute on sales commitments in Asia secured in writing prior to July 15, 2018, including the 20 MW power plant installed for KOSPO.

On or about November 2, 2018, POSCO Energy served FuelCell Energy with an arbitration demand, initiating a proceeding to resolve various outstanding amounts between the companies. The parties amicably resolved the arbitration proceeding in July 2019. Since that date, we have made numerous attempts to engage with POSCO Energy to address the need for deployment of carbonate fuel cell technology in the Asian market in accordance with the requirements of the manufacturing and technology transfer agreements, our understanding of the desire of the South Korean government to advance fuel cell and hydrogen technology, and the needs of the Asian market, but have made little progress to date.

In November 2019, POSCO Energy spun-off its fuel cell business into a new entity, Korea Fuel Cell, Ltd. (“KFC”). As part of the spin-off, POSCO Energy transferred manufacturing and service rights under the aforementioned manufacturing and technology transfer agreements to KFC, but retained distribution rights, including trademarks, and severed its own liability under the aforementioned manufacturing and technology transfer agreements. We believe that these actions are all in material breach of the terms of the CTTA and other manufacturing and technology transfer agreements and are effectively a misappropriation of the Company’s intellectual property. We have formally objected to POSCO Energy’s spin-off, and POSCO Energy has posted a bond to secure any liabilities to FuelCell Energy arising out of the spin-off. In light of the situation with POSCO Energy, we are evaluating all of our options with respect to our relationship and agreements with POSCO Energy, including trade related matters, POSCO Energy’s material breach of its obligations under the CTTA and the manufacturing and technology transfer agreements, and the misappropriation of our intellectual property.

We cannot predict the outcome of any future discussions with, or actions or legal proceedings against, POSCO Energy or KFC, if they occur, the future status or scope of our relationship with POSCO Energy or KFC, whether our relationship with POSCO Energy or KFC will continue in the future, whether we will become involved in additional mediations, arbitrations, litigation or other proceedings with POSCO Energy or KFC, what the costs of any such proceedings will be or the effect of such proceedings on the market. Any such proceedings could result in significant expense to us and adversely affect our business and financial condition and reputation in the market, whether or not such proceedings are resolved in our favor. If our relationship with POSCO Energy or KFC ends, or continues on terms that are less favorable to us, or remains unresolved, our efforts to access the South Korean and Asian markets, which are complex markets, may not be successful or may be limited, hindered or delayed.

The rights of the Series 1 Preferred Shares and our Series B Preferred Stock could negatively impact our cash flows and the rights of our Series B Preferred Stock could dilute the ownership interest of our stockholders.

The terms of the Series 1 Preferred Shares issued by FCE FuelCell Energy Ltd. (“FCE Ltd.”) provide rights to the holder, Enbridge Inc. (“Enbridge”), which could negatively impact us.

The provisions of the Series 1 Preferred Shares, as such will be amended pursuant to a letter agreement entered into by the Company, FCE Ltd. and Enbridge on January 20, 2020, require that FCE Ltd. make annual payments totaling Cdn. \$1,250,000, including (i) annual dividend payments of Cdn. \$500,000 and (ii) annual return of capital payments of Cdn. \$750,000, with such payments to be made on a quarterly basis through December 31, 2021. Commencing on January 1, 2020, dividends accrue at an annual rate of 15% on the principal redemption price with respect to the Series 1 Preferred Shares and any accrued and unpaid dividends on the Series 1 Preferred Shares. The aggregate amount of all accrued and unpaid dividends to be paid on the Series 1 Preferred Shares on or before December 31, 2021 is expected to be Cdn. \$26.5 million and the balance of the principal redemption price to be paid on or before December 31, 2021 with respect to all of the Series 1 Preferred Shares is expected to be Cdn. \$3.5 million. In connection with the letter agreement, the Company entered into the Second Amendment to the Orion Credit Agreement (the “Second Orion Amendment”), which adds a new affirmative covenant to the Orion Credit Agreement that obligates the Company to, and to cause FCE Ltd. to, on or prior to November 1, 2021, either (i) pay and satisfy in full all of their respective obligations in respect of, and fully redeem and cancel, all of the Series 1 Preferred Shares of FCE Ltd., or (ii) deposit in a newly created account of FCE Ltd. or the Company cash in an amount sufficient to pay and satisfy in full all of their respective obligations in respect of, and to effect a redemption and cancellation in full of, all of the Series 1 Preferred Shares of FCE Ltd. The Second Orion Amendment also provides that the articles of FCE Ltd. setting forth the modified terms of the Series 1 Preferred Shares will be considered a “Material Agreement” under the Orion Credit Agreement. Under the Second Orion Amendment, a failure to satisfy this new affirmative covenant or to otherwise comply with the terms of the Series 1 Preferred Shares will constitute an event of default under the Orion Credit Agreement, which could result in the acceleration of any amounts outstanding under the Orion Credit Agreement.

The terms of our Series B Preferred Stock also provide rights to their holders that could negatively impact us. Holders of the Series B Preferred Stock are entitled to receive cumulative dividends at the rate of \$50 per share per year, payable either in cash or in shares of our common stock. To the extent the dividend is paid in shares, additional issuances could be dilutive to our existing stockholders and the sale of those shares could have a negative impact on the price of our common stock. A share of our Series B Preferred Stock may be converted at any time, at the option of the holder, into 0.5910 shares of our common stock (which is equivalent to an initial conversion price of \$1,692 per

share), plus cash in lieu of fractional shares. Furthermore, the conversion rate applicable to the Series B Preferred Stock is subject to additional adjustment upon the occurrence of certain events.

The Series B Preferred Stock ranks senior to our common stock with respect to payments upon liquidation, dividends, and distributions.

The rights of the holders of our Series B Preferred Stock rank senior to our obligations to our common stockholders. Upon our liquidation, the holders of Series B Preferred Stock are entitled to receive \$1,000.00 per share plus all accumulated and unpaid dividends (the “Liquidation Preference”). Until the holders of Series B Preferred Stock receive their Liquidation Preference in full, no payment will be made on any junior shares, including shares of our common stock. The existence of senior securities such as the Series B Preferred Stock could have an adverse effect on the value of our common stock.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

The following is a summary of our offices and locations:

Location	Business Use	Square Footage	Lease Expiration Dates
Danbury, Connecticut	Corporate Headquarters, Research and Development, Sales, Marketing, Service, Purchasing and Administration	72,000	Company owned
Torrington, Connecticut	Manufacturing and Administrative	167,000	December 2030 ⁽¹⁾
Taufkirchen, Germany	Manufacturing and Administrative	20,000	June 2023
Calgary, Alberta, Canada	Research and Development	32,220	January 2020 ⁽²⁾

- (1) In November 2015, this lease was extended until December 2030, with the option to extend for three additional five-year periods thereafter.
- (2) The Company has negotiated and is in the process of executing a lease extension, pursuant to which the lease will expire in January 2023.

Item 3. LEGAL PROCEEDINGS

We are involved in legal proceedings, claims and litigation arising out of the ordinary conduct of our business. Although we cannot assure the outcome, management presently believes that the result of such legal proceedings, either individually, or in the aggregate, will not have a material adverse effect on our consolidated financial statements, and no material amounts have been accrued in our consolidated financial statements with respect to these matters.

Item 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

FuelCell Common Stock

Our common stock has been publicly traded since June 25, 1992. Our common stock trades under the symbol "FCEL" on the Nasdaq Global Market.

On January 14, 2020, the closing price of our common stock on the Nasdaq Global Market was \$2.08 per share. As of January 14, 2020, there were 110 holders of record of our common stock. This does not include the number of persons whose stock is in nominee or "street" name accounts through brokers.

We have never paid a cash dividend on our common stock and do not anticipate paying any cash dividends on our common stock in the foreseeable future. In addition, the terms of our Series B Preferred Stock prohibit the payment of dividends on our common stock unless all dividends on the Series B Preferred Stock have been paid in full.

In April 2017, the number of authorized shares of the Company's common stock was increased from 75 million to 125 million by vote of the holders of a majority of the outstanding shares of the Company's common stock.

In December 2017, the number of authorized shares of the Company's common stock was increased from 125 million shares to 225 million shares by a vote of the holders of a majority of the outstanding shares of the Company's common stock.

On May 8, 2019, the Company effected a 1-for-12 reverse stock split, reducing the number of our common shares outstanding on that date from 183,411,230 shares to 15,284,269 shares. The number of authorized shares of common stock remained (and remains) unchanged at 225,000,000 shares and the number of authorized shares of preferred stock remained (and remains) unchanged at 250,000 shares. Additionally, the conversion rate of our Series B Preferred Stock, the conversion price of our then outstanding Series C Convertible Preferred Stock and Series D Convertible Preferred Stock, the exchange price of our Series 1 Preferred Shares, the exercise price of all then outstanding options and warrants, and the number of shares reserved for future issuance pursuant to our equity compensation plans were all adjusted proportionately in connection with the reverse stock split. All share and per share amounts and conversion prices presented herein have been adjusted retroactively to reflect these changes.

FuelCell Preferred Stock

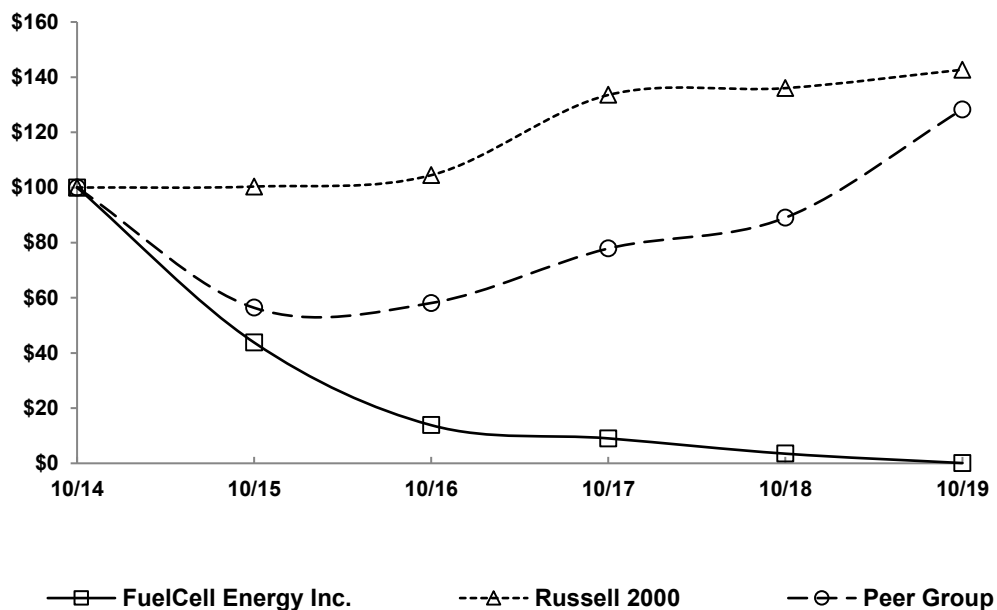
Information concerning the Company's Series B Preferred Stock and the Series 1 Preferred Shares issued by FCE Ltd. is incorporated herein by reference from Note 15. "Redeemable Preferred Stock" and Note 23. "Subsequent Events" of the Notes to the Consolidated Financial Statements.

Performance Graph

The following graph compares the annual change in the Company's cumulative total stockholder return on its common stock for the five fiscal years ended October 31, 2019 with the cumulative stockholder total return on the Russell 2000 Index, a peer group consisting of Standard Industry Classification Group Code 3690 companies listed on the Nasdaq Global Market and New York Stock Exchange and a customized 12 company peer group. It assumes \$100.00 invested on October 31, 2014 with dividends reinvested.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*

Among FuelCell Energy Inc., the Russell 2000 Index,
and a Peer Group



*\$100 invested on 10/31/14 in stock or index, including reinvestment of dividends.
Fiscal year ending October 31.

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Equity Compensation Plan Information

See Part III, Item 12 for information regarding securities authorized for issuance under our equity compensation plans.

Stock Repurchases

There were no repurchases made by us or on our behalf of our common stock during the fourth quarter of the fiscal year ended October 31, 2019.

Item 6. SELECTED FINANCIAL DATA

The selected consolidated financial data presented below as of the end of each of the years in the five-year period ended October 31, 2019 have been derived from our audited consolidated financial statements together with the notes thereto. The data set forth below is qualified by reference to, and should be read in conjunction with our consolidated financial statements and their notes and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included elsewhere in this Annual Report on Form 10-K.

Consolidated Statement of Operations Data:

(Amounts presented in thousands, except for per share amounts)

	2019	2018	2017	2016	2015
Revenues (1):					
Product	\$ 481	\$ 52,490	\$ 43,047	\$ 62,563	\$ 128,595
Service and license	26,618	15,757	27,050	31,491	21,012
Generation	14,034	7,171	7,233	1,267	—
Advanced Technologies	19,619	14,019	18,336	12,931	13,470
Total revenues	60,752	89,437	95,666	108,252	163,077
Cost of revenues:					
Product	18,552	54,504	49,843	63,474	118,530
Service and license	18,943	15,059	25,285	32,592	18,301
Generation	31,642	6,421	5,076	664	—
Advanced Technologies	12,884	10,360	12,728	11,879	13,470
Total cost of revenues	82,021	86,344	92,932	108,609	150,301
Gross (loss) profit	(21,269)	3,093	2,734	(357)	12,776
Operating expenses:					
Administrative and selling expenses	31,874	24,908	25,916	25,150	24,226
Research and development costs	13,786	22,817	20,398	20,846	17,442
Restructuring expense	—	—	1,355	—	—
Total costs and expenses	45,660	47,725	47,669	45,996	41,668
Loss from operations	(66,929)	(44,632)	(44,935)	(46,353)	(28,892)
Interest expense	(10,623)	(9,055)	(9,171)	(4,958)	(2,960)
Other income, net	93	3,338	247	622	2,442
(Provision) benefit for income tax	(109)	3,015	(44)	(519)	(274)
Net loss	(77,568)	(47,334)	(53,903)	(51,208)	(29,684)
Net loss attributable to noncontrolling interest	—	—	—	251	325
Net loss attributable to FuelCell Energy, Inc.	(77,568)	(47,334)	(53,903)	(50,957)	(29,359)
Series A warrant exchange	(3,169)	—	—	—	—
Series B Preferred stock dividends	(3,231)	(3,200)	(3,200)	(3,200)	(3,200)
Series C Preferred stock deemed dividends and redemption value adjustment, net	(6,522)	(9,559)	—	—	—
Series D Preferred deemed dividends and redemption accretion	(9,755)	(2,075)	—	—	—
Net loss attributable to common stockholders	<u>\$(100,245)</u>	<u>\$(62,168)</u>	<u>\$(57,103)</u>	<u>\$(54,157)</u>	<u>\$(32,559)</u>
Net loss attributable to common stockholders					
Basic	\$ (1.82)	\$ (9.01)	\$ (13.73)	\$ (21.83)	\$ (15.94)
Diluted	\$ (1.82)	\$ (9.01)	\$ (13.73)	\$ (21.83)	\$ (15.94)
Weighted average shares outstanding					
Basic	55,081	6,896	4,160	2,481	2,043
Diluted	55,081	6,896	4,160	2,481	2,043

Consolidated Balance Sheet Data:

(Amounts presented in thousands, except for per share amounts)

	2019	2018	2017	2016	2015
Cash and cash equivalents (2)	\$ 39,778	\$ 80,239	\$ 87,448	\$ 118,316	\$ 85,740
Working capital	23,087	70,182	105,432	150,206	129,010
Total current assets	84,319	130,303	203,510	202,204	203,898
Total assets	333,446	340,421	383,786	340,729	277,231
Total current liabilities	62,732	60,121	98,078	51,998	74,888
Total non-current liabilities	135,120	103,377	96,895	114,478	47,732
Redeemable preferred stock	59,857	94,729	87,557	59,857	59,857
Total equity	75,737	82,194	101,256	114,396	94,754
Book value per share (3)	\$ 0.39	\$ 10.31	\$ 17.48	\$ 39.03	\$ 43.79

- (1) Revenues for the fiscal year ended October 31, 2019 reflect the adoption of Accounting Standards Update (ASU) No. 2014-09, "Revenue from Contracts with Customers (Topic 606)". The Company adopted this ASU on November 1, 2018 using the modified retrospective transition method.
- (2) Includes short-term and long-term restricted cash and cash equivalents.
- (3) Calculated as total equity divided by common shares issued and outstanding as of the balance sheet date (after giving effect to the May 8, 2019 1-for-12 reverse stock split).

Item 7. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion should be read in conjunction with information included in Item 8 of this report. Unless otherwise indicated, the terms “Company”, “FuelCell Energy”, “we”, “us”, and “our” refer to FuelCell Energy, Inc. and its subsidiaries. All tabular dollar amounts are in thousands.

In addition to historical information, this discussion and analysis contains forward-looking statements. All forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those projected. Please see “Forward-Looking Statement Disclaimer” for a discussion of the uncertainties, risks and assumptions associated with these statements, as well as other risks set forth in our filings with the SEC including those set forth under Item 1A — Risk Factors in this report.

Overview

FuelCell Energy was founded more than 50 years ago in 1969. We began selling stationary fuel cell power plants commercially in 2003. With more than 9.5 million megawatt hours of clean electricity produced, FuelCell Energy is now a global leader in delivering environmentally-responsible distributed baseload power solutions through our proprietary, molten-carbonate fuel cell technology. Today, we develop turn-key distributed power generation solutions and operate and provide comprehensive service for the life of the power plant. We are working to expand the proprietary technologies that we have developed over the past five decades into new products, markets and geographies.

Fiscal year 2019 was one of transformation for FuelCell Energy. We restructured our management team and our operations in ways that are intended to support our growth and achieve our profitability and sustainability goals. We raised capital under our at-the-market sales plan, which allowed us to pay down our accounts payable and stay current on our forbearance agreements. We repaid a substantial portion of our short-term debt, retired our Series C and Series D Convertible Preferred Stock obligations, and refocused on our core competencies in an effort to drive top-line revenue. We believe we have emerged from a difficult fiscal 2019 as a stronger company, better positioned to execute on our business plan. Our recent achievements, accomplished during one of the most stressful times in the Company’s history, include: (a) closing on a new \$200 million credit facility with Orion Energy Partners, (b) executing a new Joint Development Agreement with EMRE, with anticipated revenues of up to \$60 million, (c) restructuring our business to realize annualized operating savings of approximately \$15 million, (d) making progress in constructing certain projects in our backlog, including the CMEEC project at the U.S. Navy base in Groton, Connecticut and the commissioning and startup of the 2.8 MW Tulare BioMAT project in California, (e) relaunching our sub-megawatt product in Europe, (f) executing a strategic relationship with E.On Business Solutions, an affiliate of one of the largest utilities in the world, to market and distribute our products beyond the two FuelCell operating plants E.On already owns, (g) extending the maturity of our Series 1 Preferred Shares issued by FCE FuelCell Energy Ltd. by one year, and (h) concluding our engagement with Huron Consulting after successful restructuring and payoff of our prior senior secured credit facility.

We will use this new focus coming out of our restructuring to advance our core goals of:

- Executing on our backlog and new project awards;
- Growing our generation portfolio;
- Competing for and winning new business around the world; and
- Developing and commercializing our Advanced Technologies platform of products.

Our mission and purpose remains to utilize our proprietary, state-of-the-art fuel cell power plants to reduce the global environmental footprint of baseload power generation by providing environmentally responsible solutions for reliable electrical power, hot water, steam, chilling, hydrogen, microgrid applications, and carbon capture and, in so doing, drive demand for our products and services, thus realizing positive stockholder returns.

Recent Developments

The events described in this “Recent Developments” section relate, in part, to matters discussed in more detail below in this “Management’s Discussion and Analysis of Financial Condition and Results of Operations” section – particularly those matters discussed under “Liquidity and Capital Resources.” In certain instances, the capitalized terms used in this “Recent Developments” section are defined elsewhere in this Annual Report on Form 10-K.

ExxonMobil Research and Engineering Company Joint Development Agreement

On November 5, 2019, the Company signed a two-year Joint Development Agreement (“JDA”) with EMRE, pursuant to which the Company will continue exclusive research and development efforts with EMRE to evaluate and develop new and/or improved carbonate fuel cells to reduce carbon dioxide emissions from industrial and power sources, in exchange for (a) payment of (i) an exclusivity and technology access fee of \$5.0 million, (ii) up to \$45.0 million for research and development efforts, and (iii) milestone-based payments of up to \$10.0 million after certain technological milestones are met, and (b) certain licenses to patents and patent applications, and copyrightable works resulting from the JDA.

Orion Credit Agreement

As described below and in Note 13. “Debt”, on October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into the Orion Credit Agreement with the Agent and certain of its affiliates as lenders for a \$200.0 million senior secured credit facility, structured as a delayed draw term loan, to be provided by the lenders. On November 22, 2019, the Company made a second draw under the Orion Credit Agreement (the “Second Funding”) of \$65.5 million, which was funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P. (the “Orion Lenders”), such that the total fundings to the Company under the Orion Facility were equal to \$80.0 million. The funds drawn in the Second Funding were reduced by a Loan Discount (described further below and in Note 13. “Debt”) of \$1.6 million, which was retained by the Orion Lenders. Proceeds from the Second Funding were used to repay outstanding third party debt of the Company with respect to certain other Company projects, including the construction loan from Fifth Third Bank on the Groton Project and the loan from Webster Bank on the CCSU Project, as well as to fund remaining going forward construction costs relating to certain projects, including the Groton Project (a 7.4 MW project), the LIPA Yaphank Solid Waste Management Project (a 7.4 MW project), and the Tulare BioMAT project (a 2.8 MW project).

In accordance with the Orion Credit Agreement in connection with the Second Funding, on November 22, 2019, the Company issued to the Orion Lenders warrants to purchase up to a total of 14.0 million shares of the Company’s common stock (the “Second Funding Warrants”), with an initial exercise price with respect to 8.0 million of such shares of \$0.242 per share and with an initial exercise price with respect to 6.0 million of such shares of \$0.620 per share (such \$0.620 per share exercise price being at a premium to the market price at the time of entry into the Orion Credit Agreement).

In conjunction with the Second Funding, the Company and the other loan parties entered into the First Amendment to the Orion Credit Agreement (the “First Orion Amendment”), which required the Company to establish a \$5.0 million debt reserve, with such reserve to be released on the first date following the date of the Second Funding on which all of the following events shall have occurred: (a) each of (x) the commercial operation date for the Tulare BioMAT project shall have occurred and (y) a disposition, refinancing or tax equity investment in the Tulare BioMAT project of at least \$5 million is consummated; (b) each of (x) the Groton Project shall have achieved its business plan in accordance with the Groton Construction Budget (as defined in the Orion Credit Agreement), (y) the commercial operation date for the Groton Project (as defined below) shall have occurred and (z) the Groton Project shall have met its annualized output and heat rate guarantees for three months; and (c) a disposition, refinancing or tax equity investment of at least \$30 million shall have occurred with respect to the Groton Project. The First Orion Amendment further requires the Company (i) to provide, no later than December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing), a biogas sale and purchase agreement through December 31, 2021 for the Tulare BioMAT project, which was obtained as of such date, (ii) to obtain by December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing) a fully executed contract for certain renewable energy credits for the Groton Project, which was obtained as of such date, and (iii) to provide by January 31, 2020 (or such later date as the Agent may, in its sole discretion, agree in writing) certain consents and estoppels from CMEEC related to the Groton Project and an executed, seventh modification to the lease between CMEEC and the United States Government, acting by and through the Department of the Navy. The First Orion Amendment provides that, if the

requirements set forth in clauses (i) and (ii) above are not timely satisfied, the Company will grant the Agent, on behalf of the Orion Lenders, a security interest and lien on all of the Company's intellectual property, with such lien and security interest to be released at such time as the Company has satisfied such requirements.

In addition, in connection with the January 2020 Letter Agreement among the Company, FCE Ltd. and Enbridge described below, on January 20, 2020, in order to obtain the Orion Lenders' consent to the January 2020 Letter Agreement as required under the Orion Credit Agreement, the Company and the other loan parties entered into the Second Amendment to the Orion Credit Agreement (the "Second Orion Amendment"), which adds a new affirmative covenant to the Orion Credit Agreement that obligates the Company to, and to cause FCE Ltd. to, on or prior to November 1, 2021, either (i) pay and satisfy in full all of their respective obligations in respect of, and fully redeem and cancel, all of the Series 1 Preferred Shares of FCE Ltd., or (ii) deposit in a newly created account of FCE Ltd. or the Company cash in an amount sufficient to pay and satisfy in full all of their respective obligations in respect of, and to effect a redemption and cancellation in full of, all of the Series 1 Preferred Shares of FCE Ltd. The Second Orion Amendment also provides that the articles of FCE Ltd. setting forth the modified terms of the Series 1 Preferred Shares will be considered a "Material Agreement" under the Orion Credit Agreement. Under the Second Orion Amendment, a failure to satisfy this new affirmative covenant or to otherwise comply with the terms of the Series 1 Preferred Shares will constitute an event of default under the Orion Credit Agreement, which could result in the acceleration of any amounts outstanding under the Orion Credit Agreement.

Cashless Exercise of Certain Orion Warrants

On January 9, 2020, the Orion Lenders exercised, on a cashless basis, Orion Warrants (as defined below) (with cash exercise prices of \$0.310 per share and \$ 0.242 per share) representing the right to purchase, in the aggregate, 12.0 million shares of the Company's common stock. Because these warrants were exercised on a cashless basis pursuant to the formula set forth in the warrants, the Orion Lenders received, in the aggregate, a "net number" of 9,396,319 shares of the Company's common stock upon the exercise of Initial Funding Warrants (as defined below) representing the right to purchase 6.0 million shares of the Company's common stock and Second Funding Warrants representing the right to purchase 6.0 million shares of the Company's common stock. The other 2,603,681 shares, which were not issued to the Orion Lenders due to the cashless nature of the exercise, are no longer required to be reserved for issuance upon exercise of the Orion Warrants.

Termination of Construction Loan Agreement with Fifth Third Bank

As described below and in Note 13. "Debt", on February 28, 2019, the Company, through its indirect wholly-owned subsidiary, Groton Station Fuel Cell, LLC ("Groton Borrower"), entered into a Construction Loan Agreement (as amended from time to time, the "Groton Agreement") with Fifth Third Bank pursuant to which Fifth Third Bank agreed to make available to Groton Borrower a construction loan facility in an aggregate principal amount of up to \$23.0 million (the "Groton Facility") to fund the manufacture, construction, installation, commissioning and start-up of the 7.4 MW fuel cell power plant for the CMEEC at the United States Navy submarine base in Groton, Connecticut (the "Groton Project"). Groton Borrower made an initial draw under the Groton Facility on the date of closing of the facility of \$9.7 million and made an additional draw of \$1.4 million in April 2019. The total outstanding balance under the Groton Facility as of November 22, 2019 (prior to the payment described below) was \$11.1 million. Groton Borrower and Fifth Third Bank entered into a payoff letter, dated November 22, 2019, pursuant to which, on November 22, 2019, the Agent, on behalf of Groton Borrower, paid off all of Groton Borrower's indebtedness to Fifth Third Bank under the Groton Agreement and thereby terminated the Groton Facility.

Termination of Term Loan Agreements with Webster Bank

On November 22, 2019, the Webster Bank debt was repaid in full and the borrowing arrangement was terminated.

Connecticut Green Bank Loan

As described below and in Note 13. “Debt”, the Company had a long-term loan agreement with the Connecticut Green Bank (as amended from time to time, the “Green Bank Loan Agreement”) for a loan totaling approximately \$5.9 million in support of the 14.9 MW fuel cell park in Bridgeport, Connecticut (the “Bridgeport Fuel Cell Project”). On and effective as of December 19, 2019, the Company and Connecticut Green Bank entered into an amendment to the Green Bank Loan Agreement (the “Green Bank Amendment”). Upon the execution of the Green Bank Amendment on December 19, 2019, Connecticut Green Bank made an additional loan to the Company in the aggregate principal amount of \$3.0 million (the “December 2019 Loan”), which is to be used (i) first, to pay closing fees related to the acquisition of the Bridgeport Fuel Cell Project and the Subordinated Credit Agreement (as defined below), other fees, and accrued interest from May 9, 2019, totaling \$404,000 (“Accrued Fees”), and (ii) thereafter, for general corporate purposes as determined by the Company, including, but not limited to, expenditures in connection with the project being constructed by Groton Station Fuel Cell, LLC (“Groton Fuel Cell”). Pursuant to the terms of the Green Bank Amendment, Connecticut Green Bank will have no further obligation to make loans under the Green Bank Loan Agreement and the Company will have no right to make additional draws under the Green Bank Loan Agreement.

The Green Bank Amendment provides that, until such time as the loan (which includes both the outstanding principal balance of the original loan under the Green Bank Loan Agreement and the outstanding principal amount of the December 2019 Loan) has been repaid in its entirety, interest on the outstanding balance of the loan shall accrue monthly in arrears from the date of the Green Bank Amendment at a rate of 5% per annum until May 8, 2019 and at a rate of 8% per annum thereafter, payable by the Company on a monthly basis in arrears. The Green Bank Amendment further provides that the payment by the Company of the Accrued Fees (as described above) includes any shortfall of interest due but unpaid by the Company through and including November 30, 2019. Interest payments made by the Company after the date of the Green Bank Amendment are to be applied first to interest that has accrued on the outstanding principal balance of the original loan under the Green Bank Loan Agreement and then to interest that has accrued on the December 2019 Loan.

The Green Bank Amendment also modifies the repayment and mandatory prepayment terms and extends the maturity date set forth in the original Green Bank Loan Agreement. Under the Green Bank Amendment, to the extent that excess cash flow reserve funds under the BFC Credit Agreement (as defined below) are eligible for disbursement to Bridgeport Fuel Cell, LLC pursuant to Section 6.23(c) of the BFC Credit Agreement, such funds are to be paid to Connecticut Green Bank, to be applied first to repay the outstanding principal balance of the original loan under the Green Bank Loan Agreement and thereafter to repay the outstanding principal amount of the December 2019 Loan, until repaid in full. The Green Bank Amendment further provides that the entire unpaid balance of the loan and all other obligations due under the Green Bank Loan Agreement will be due and payable on May 9, 2026 if not paid sooner in accordance with the Green Bank Loan Agreement. Finally, with respect to mandatory prepayments, the Green Bank Amendment provides that, when the Company has closed on the subordinated project term loan pursuant to the Commitment Letter, dated February 6, 2019, issued by Connecticut Green Bank to Groton Fuel Cell to provide a subordinated project term loan to Groton Fuel Cell in the amount of \$5.0 million (the “Groton Commitment Letter”), the Company will be required prepay to Connecticut Green Bank the lesser of any then outstanding amount of the December 2019 Loan and the amount of the subordinated project term loan actually advanced by Connecticut Green Bank.

Series B Preferred Stock Dividend

On October 30, 2019, the Company declared dividends on the Series B Preferred Stock, which included the accrued dividends payable under the Amended Certificate of Designation for the Series B Preferred Stock with respect to the May 15, 2019 and August 15, 2019 dividend payment dates and the dividends payable with respect to the November 15, 2019 dividend payment date, which were paid on or about November 15, 2019. The aggregate dividend payment was \$2.4 million.

Series 1 Preferred Stock Return of Capital and Dividend Payment

On November 26, 2019, the Company made the return of capital and dividend payments due as of March 31, 2019, June 30, 2019 and September 30, 2019, in an aggregate amount equal to Cdn. \$0.9 million, on the Series 1 Preferred Stock.

Series 1 Preferred Stock – Letter Agreement

As described in Note 15. “Redeemable Preferred Stock,” as of October 31, 2019, FCE Ltd. or the Company, as the guarantor of FCE Ltd.’s payment obligations with respect to the Series 1 Preferred Shares, was obligated to pay, on or before December 31, 2020, all accrued and unpaid dividends on the Series 1 Preferred Shares and the balance of the principal redemption price with respect to all of the Series 1 Preferred Shares. As of October 31, 2019, the aggregate amount of all accrued and unpaid dividends to be paid on the Series 1 Preferred Shares on December 31, 2020 was expected to be Cdn. \$21.1 million and the balance of the principal redemption price to be paid on December 31, 2020 with respect to all of the Series 1 Preferred Shares was expected to be Cdn. \$4.4 million. Interest under the Series 1 Preferred Shares accrued at annual rate of 5%. In addition, the holder of the Series 1 Preferred Shares had the right to exchange such shares for fully paid and non-assessable shares of common stock of the Company at certain specified prices, and FCE Ltd. had the option of making dividend payments in the form of common stock of the Company or cash.

On January 20, 2020, the Company, FCE Ltd. and Enbridge entered into a letter agreement (the “January 2020 Letter Agreement”), pursuant to which they agreed to amend the articles of FCE Ltd. relating to and setting forth the terms of the Series 1 Preferred Shares to: (i) remove the provisions of the articles permitting or requiring the issuance of shares of the Company’s common stock in exchange for the Series 1 Preferred Shares or as payment of amounts due to the holders of the Series 1 Preferred Shares, (ii) remove certain provisions of the articles relating to the redemption of the Series 1 Preferred Shares, (iii) increase the annual dividend rate, commencing on January 1, 2020, to 15%, (iv) extend the final payment date for all accrued and unpaid dividends and all return of capital payments (i.e., payments of the principal redemption price) from December 31, 2020 to December 31, 2021, (v) clarify when dividend and return of capital payments are to be made in the future and extend the quarterly dividend and return of capital payments through December 31, 2021 (which were previously to be paid each quarter through December 31, 2020), (vi) remove certain terms and provisions of the articles that are no longer applicable, and (vii) make other conforming changes to the articles. In addition, the parties agreed to amend the Company’s guarantee in favor of Enbridge as necessary or as the parties may mutually agree, in either case, in order to be consistent with such amended articles and to maintain the Company’s guarantee of FCE Ltd.’s obligations under the Series 1 Preferred Shares.

After taking into account the amendments to the terms of the Series 1 Preferred Shares described in the January 2020 Letter Agreement, the aggregate amount of all accrued and unpaid dividends to be paid on the Series 1 Preferred Shares on December 31, 2021 is expected to be Cdn. \$26.5 million and the balance of the principal redemption price to be paid on December 31, 2021 with respect to all of the Series 1 Preferred Shares is expected to be Cdn. \$3.5 million.

Sales of Common Stock under At Market Issuance Sales Agreement

During the period beginning on November 7, 2019 and ending on (and including) November 11, 2019, the Company issued and sold a total of approximately 7.9 million shares of its common stock under its At Market Issuance Sales Agreement, dated October 4, 2019 (the “Sales Agreement”), with B. Riley FBR, Inc. (the “Sales Agent”), at prevailing market prices, with an average sale price of \$0.46 per share, and raised aggregate gross proceeds of approximately

\$3.6 million, before deducting expenses and commissions. Commissions of \$0.1 million were paid to the Sales Agent in connection with these sales, resulting in net proceeds to the Company of approximately \$3.5 million.

The Company had sold an aggregate of approximately 17,998,846 shares of common stock under the Sales Agreement as of November 11, 2019.

Results of Operations

Management evaluates our results of operations and cash flows using a variety of key performance indicators, including revenues compared to prior periods and internal forecasts, costs of our products and results of our cost reduction initiatives, and operating cash use. These are discussed throughout the “Results of Operations” and “Liquidity and Capital Resources” sections. Results of Operations are presented in accordance with accounting principles generally accepted in the United States (“GAAP”).

Comparison of the Years Ended October 31, 2019 and 2018

Revenues and Costs of revenues

Our revenues and cost of revenues for the years ended October 31, 2019 and 2018 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2019	2018	\$	%
Total revenues	\$ 60,752	\$ 89,437	\$ (28,685)	(32)%
Total costs of revenues	82,021	86,344	(4,323)	(5)%
Gross (loss) profit	\$ (21,269)	\$ 3,093	\$ (24,362)	(788)%
Gross (loss) profit margin	(35.0)%	3.5%		

Total revenues for the year ended October 31, 2019 decreased \$28.7 million, or 32%, to \$60.8 million from \$89.4 million during the year ended October 31, 2018. Total cost of revenues for the year ended October 31, 2019 decreased by \$4.3 million, or 5%, to \$82.0 million from \$86.3 million during the year ended October 31, 2018. The Company's gross loss margin was 35.0% in fiscal year 2019, as compared to a gross profit margin of 3.5% in fiscal year 2018. A discussion of the changes in product sales, service agreement and license revenues, Advanced Technologies contract revenues, and generation revenues follows. Refer to “Critical Accounting Policies and Estimates” for more information on revenue and cost of revenue classifications.

Product sales

Our product sales, cost of product sales and gross loss from product sales for the years ended October 31, 2019 and 2018 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2019	2018	\$	%
Product sales	\$ 481	\$ 52,490	\$ (52,009)	(99)%
Cost of product sales	18,552	54,504	(35,952)	(66)%
Gross loss from product sales	\$ (18,071)	\$ (2,014)	\$ (16,057)	(797)%
Product sales gross loss margin	(3757.0)%	(3.8)%		

Product sales for the year ended October 31, 2019 consisted of \$0.5 million of power plant revenue compared to \$52.5 million of product revenues for the year ended October 31, 2018, which included \$49.4 million of power plant revenue and \$3.1 million of revenue related to engineering and construction services.

The decline in product sales was primarily a result of our previous strategic decision to focus on utility scale PPA business opportunities to grow our generation portfolio, rather than selling our projects upon completion, and our continuing inability to access the Asian markets as a result of the situation with POSCO Energy.

Product sales for the year ended October 31, 2018 included revenues from the 20 MW order from Hanyang Industrial Development Co., Ltd (“HYD”), pursuant to which we provided equipment to HYD for a fuel cell project with KOSPO. Shipments began in the fourth quarter of fiscal 2017 and were completed in the first quarter of fiscal 2018. During the year ended October 31, 2018, we also recorded product revenues for the sale of a 2.8 MW natural gas fueled fuel cell power plant project located at the waste water treatment facility in Tulare, California to Clearway Energy.

Cost of product sales decreased \$36.0 million for the year ended October 31, 2019 to \$18.6 million, compared to \$54.5 million in the prior year. Overall gross loss from product sales was \$18.1 million for the year ended October 31, 2019 compared to a gross loss of \$2.0 million in the year ended October 31, 2018. Both periods were impacted by the under-absorption of fixed overhead costs due to low production volumes. Manufacturing variances, primarily related to low production volumes and other charges, totaled approximately \$14.5 million for the year ended October 31, 2019 compared to approximately \$11.2 million for the year ended October 31, 2018. Cost of product sales for the year ended October 31, 2019 also includes an impairment charge for a specific construction in process asset related to automation equipment for use in manufacturing with a carrying value of \$2.8 million, which was impaired due to uncertainty as to whether the asset will be completed as a result of the Company’s liquidity position and continued low level of production rates. For the year ended October 31, 2019, we operated at an annualized production rate of approximately 17 MW compared to a 25 MW annualized production rate in the year ended October 31, 2018. The annualized production rate as of October 31, 2019 was 10 MW.

As of October 31, 2018, product sales backlog totaled approximately \$1,000. There was no product sales backlog as of October 31, 2019.

Service and license revenues

Our service and license revenues and associated cost of revenues for the years ended October 31, 2019 and 2018 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2019	2018	\$	%
Service and license revenues	\$ 26,618	\$ 15,757	\$ 10,861	69%
Cost of service and license revenues	18,943	15,059	3,884	26%
Gross profit from service and license revenues	\$ 7,675	\$ 698	\$ 6,977	(1,000)%
Service and license revenues gross margin	28.8%	4.4%		

Revenues for the year ended October 31, 2019 from service agreements and license fees increased \$10.9 million to \$26.6 million from \$15.8 million for the year ended October 31, 2018. Service revenues increased from the year ended October 31, 2018 primarily due to revenues of \$10.0 million recorded in connection with the EMRE License Agreement during the year ended October 31, 2019 and higher revenue from module replacements during the year ended October 31, 2019 (particularly during the first quarter of the year ended October 31, 2019) compared to the prior year. The prior year included revenue recorded in connection with the service agreement associated with the 14.9 MW fuel cell park in Bridgeport, Connecticut (“Bridgeport Fuel Cell Project”) of \$2.3 million, compared to revenue recorded during the year ended October 31, 2019 of \$8.0 million. As a result of the purchase of the Bridgeport Fuel Cell Project on May 9, 2019, revenue under the Bridgeport FuelCell Project service agreement is no longer being recognized.

The increases in revenue were partially offset by a decrease in revenue resulting from the adoption of Accounting Standards Update (“ASU”) 2014-09, “Revenue from Contracts with Customers” (“Topic 606”) as of November 1, 2018, which impacted service and license revenues recognition. Service revenues are now recorded based on a cost-to-cost input method whereas previously service revenues for maintenance and monitoring were recorded ratably over the term of the service agreement and revenue from module exchanges was recognized upon the module replacement event. Performance guarantees, which were previously recorded as a cost of service and license revenues, are now accounted for as variable consideration with a reduction to service and license revenues. License revenues were previously recorded over the contract term on a straight-line basis; however, upon adoption of Topic 606, we assessed the performance obligations within an existing license contract and allocated consideration between performance obligations that are satisfied at a point in time and performance obligations that are recognized over time. Revenue from a license performance obligation that is satisfied over time was \$1.6 million for the year ended October 31, 2019, compared to \$2.2 million for the year ended October 31, 2018.

Cost of service and license revenues increased \$3.9 million to \$18.9 million for the year ended October 31, 2019 from \$15.1 million for the year ended October 31, 2018. Cost of service agreements includes maintenance and operating costs, module exchanges, and, in the fiscal year ended October 31, 2018 (prior to the adoption of Topic 606), also included performance guarantees.

Overall gross profit from service and license revenues was \$7.7 million for the year ended October 31, 2019, which represents an increase of \$7.0 million from gross profit of \$0.7 million for the year ended October 31, 2018. The adoption of Topic 606 resulted in a reduction of service and license margins of \$2.6 million primarily due to a reduction in license revenue and a decrease in the amount of revenue that was recorded under Topic 606. Service and license revenue gross margins were further impacted by a change in our estimates for future module replacements, which resulted in a reduction of revenue of approximately \$1.0 million and an increase in the service loss reserve of \$1.7 million. The overall gross margin percentage of 28.8% for the year ended October 31, 2019 increased compared to 4.4% in the year ended October 31, 2018. This increase was primarily a result of the EMRE License Agreement revenues recorded for the year ended October 31, 2019, which had no corresponding cost of sales.

As of October 31, 2019, service backlog totaled \$169.4 million compared to \$251.7 million as of October 31, 2018. This backlog is for service agreements of up to 20 years at inception and is expected to generate positive margins and cash flows based on current estimates. The decrease in service backlog is primarily due to the acquisition of the Bridgeport Fuel Cell Project, as the service backlog previously associated with such project is now being included within generation backlog. This acquisition has resulted in additional revenue to be recorded under the PPA as compared to the service agreement. Service backlog also includes future license revenue.

Generation revenues

(dollars in thousands)	Years Ended October 31,		Change	
	2019	2018	\$	%
Generation revenues	\$ 14,034	\$ 7,171	\$ 6,863	96%
Cost of generation revenues	31,642	6,421	25,221	393%
Gross (loss) profit from generation revenues	\$ (17,608)	\$ 750	\$ (18,358)	(2,448)%
Generation revenues gross (loss) margin	(125.5)%	10.5%		

Revenues for the year ended October 31, 2019 from generation increased \$6.9 million to \$14.0 million from \$7.2 million for the year ended October 31, 2018. Generation revenues for the years ended October 31, 2019 and 2018 reflect revenue from electricity generated under the Company’s PPAs. Generation revenues increased for the year ended October 31, 2019 compared to the year ended October 31, 2018 due to additional revenue recorded for the Bridgeport Fuel Cell Project, which was acquired on May 9, 2019. Revenue recognized under the related PPA subsequent to the acquisition of the Bridgeport Fuel Cell Project is now included in Generation revenues in an amount equal to \$7.0 million. Cost of generation revenues totaled \$31.6 million in the year ended October 31, 2019, compared to \$6.4 million for the year ended October 31, 2018.

The increase in Cost of generation revenues was primarily a result of: (i) our growing generation fleet, (ii) an impairment charge for the Triangle Street Project and (iii) an impairment charge for the Bolthouse Farms Project, which are further described as follows:

- i. *Growing generation fleet:* The 14.9 MW Bridgeport Fuel Cell Project was acquired by the Company on May 9, 2019. As a result of this acquisition, the Company is now incurring costs related to the fuel for the plant as well as service, administration and depreciation costs and expenses associated with the amortization of the intangible asset related to the acquired PPA. Depreciation and amortization expense recorded during the fiscal year ended October 31, 2019 for the Bridgeport Fuel Cell Project was \$3.1 million and \$0.6 million, respectively.
- ii. *Impairment charge for the Triangle Street Project:* In the fourth quarter of fiscal 2019, management determined that it will not be able to secure a PPA with terms acceptable to the Company for the Triangle Street Project. Therefore, it is management's current intention to operate the project under a merchant model for the next 5 years. The project will sell power through the Connecticut grid under wholesale tariff rates and Renewable Energy Credits (RECs) to market participants. As a result of management's decision to operate the project in this manner, an impairment charge of \$14.4 million was recorded in the fourth quarter of fiscal 2019. The amount of the impairment charge was determined by comparing the estimated discounted cash flows of the project and the expected residual value of the project to its carrying value. Management expects to continue to pursue economic enhancements for this project, but cannot currently assess the probability of closing on a revenue contract for the power above wholesale market rates.
- iii. *Impairment charge for the Bolthouse Farms Project:* An impairment charge for the Bolthouse Farms Project was recorded as management has decided to pursue termination of the PPA given recent regulatory changes impacting the future cost profile for the Company and Bolthouse Farms. Since it is considered probable that the PPA will be terminated, a \$3.1 million impairment charge was recorded, which reflects the difference between the carrying value of the asset and the value of the components that are expected to be redeployed to other projects. This project was removed from the Company's backlog as of October 31, 2019.

Cost of generation revenues included depreciation of approximately \$6.8 million and \$4.1 million for the years ended October 31, 2019 and 2018, respectively, and included amortization of \$0.6 million for the Bridgeport Fuel Cell Project PPA for the year ended October 31, 2019. We had 26.1 MW of operating power plants in our portfolio as of October 31, 2019, compared to 11.2 MW as of October 31, 2018. This increase is a result of the acquisition of the Bridgeport Fuel Cell Project.

As of October 31, 2019, generation backlog totaled \$1.1 billion compared to \$839.5 million as of October 31, 2018.

Advanced Technologies contracts

Advanced Technologies contracts revenue and related costs for the years ended October 31, 2019 and 2018 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2019	2018	\$	%
Advanced Technologies contracts	\$ 19,619	\$ 14,019	\$ 5,600	40%
Cost of Advanced Technologies contracts	12,884	10,360	2,524	24%
Gross profit	\$ 6,735	\$ 3,659	\$ 3,076	84%
Advanced Technologies contracts gross margin	34.3%	26.1%		

Revenues for the year ended October 31, 2019 from Advanced Technologies contracts increased \$5.6 million to \$19.6 million from \$14.0 million for the year ended October 31, 2018. The adoption of Topic 606 had no impact on Advanced Technologies revenue for the year ended October 31, 2019. The increase for the year ended October 31, 2019 was primarily due to the timing of project activity under existing contracts. Cost of Advanced Technologies contract revenues increased \$2.5 million to \$12.9 million for the year ended October 31, 2019, compared to \$10.4 million for the year ended October 31, 2018. Advanced Technologies contracts for the year ended October 31, 2019 generated a gross profit of \$6.7 million compared to a gross profit of \$3.7 million for the year ended October 31, 2018. The increase in Advanced Technologies contract gross margin is related to the timing and mix of contracts being performed during the year ended October 31, 2019, particularly a higher proportion related to private industry contracts.

At October 31, 2019, Advanced Technologies contract backlog totaled \$12.0 million compared to \$32.4 million at October 31, 2018.

Administrative and selling expenses

Administrative and selling expenses were \$31.9 million and \$24.9 million for the years ended October 31, 2019 and 2018, respectively. The increase from the prior year primarily relates to legal and consulting costs related to our restructuring, liquidity and refinancing initiatives. Total legal and professional fees incurred for the year ended October 31, 2019 were \$11.5 million, compared to \$4.1 million in the year ended October 31, 2018.

Research and development expenses

Research and development expenses decreased to \$13.8 million for the year ended October 31, 2019 compared to \$22.8 million during the year ended October 31, 2018. The decrease related to the reduction in spending resulting from the restructuring initiatives and resources being allocated to funded Advanced Technologies projects.

Loss from operations

Loss from operations for the year ended October 31, 2019 was \$66.9 million compared to \$44.6 million for the year ended October 31, 2018. The increase in the loss from operations was primarily a result of the fact that there were no significant product sales, unfavorable margins mainly due to higher manufacturing variances (which were an additional \$3.3 million for the year ended October 31, 2019 compared to the prior year), unfavorable generation margins resulting from the impairment charges of \$20.4 million for the year ended October 31, 2019 and higher administrative and selling expenses of \$7.0 million, partially offset by higher margins for service and license revenues, which were primarily due to the \$10.0 million in revenue recorded for the EMRE License Agreement and lower research and development expenses of \$9.0 million.

Interest expense

Interest expense for the years ended October 31, 2019 and 2018 was \$10.6 million and \$9.1 million, respectively. Interest expense for both periods presented includes interest on the loan and security agreement with Hercules Capital, Inc. (“Hercules”), interest expense related to financing obligations resulting from sale-leaseback transactions and interest for the amortization of the fair value discount of the Series 1 Preferred Stock. The increase in interest expense represents additional interest on the loans made by Fifth Third Bank and Liberty Bank in connection with the acquisition of the Bridgeport Fuel Cell Project and a modification fee of \$0.8 million that was recorded in connection with the amendment of the loan agreement with NRG. The interest expense for the years ended October 31, 2019 and 2018 includes interest for the accretion of the fair value discount for the Series 1 Preferred Stock of \$2.3 million and \$2.2 million, respectively.

Other income, net

Other income, net was \$0.1 million for the year ended October 31, 2019 compared to other income, net of \$3.3 million for the year ended October 31, 2018. The income for each of the years ended October 31, 2019 and 2018 includes income of \$0.6 million for refundable research and development tax credits. The income for fiscal year 2019 was offset by expense of \$0.6 million for the fair value adjustments of an interest rate swap. Other income, net for the prior year also includes a foreign exchange gain related to the remeasurement of the Canadian Dollar denominated preferred stock obligation of our U.S. Dollar functional currency Canadian subsidiary and a foreign exchange gain that was realized on payments and unbilled receivable balances denominated in South Korean Won for the HYD contract.

(Provision) benefit for income taxes

We have not paid federal or state income taxes in several years due to our history of net operating losses, although we have paid foreign income and withholding taxes in South Korea. The Company recorded an income tax provision totaling \$0.1 million for the year ended October 31, 2019 compared to a benefit of \$3.0 million for the year ended October 31, 2018. The income tax benefit in 2018 was primarily related to the Tax Cuts and Jobs Act (the “Act”) that was enacted on December 22, 2017. The Act reduced the U.S. federal corporate tax rate from 34% to 21% effective January 1, 2018, which resulted in a deferred tax benefit of \$1.0 million primarily related to a reduction of the Company’s deferred tax liability for in process research and development (“IPR&D”) for the year ended October 31, 2018. The Act also established an unlimited carryforward period for the net operating loss (“NOL”) the Company generated in fiscal year 2018. This provision of the Act resulted in a reduction of the valuation allowance attributable to deferred tax assets at the enactment date by \$2.0 million based on the indefinite life of the resulting NOL as well as the deferred tax liability for IPR&D.

As of October 31, 2019, we had \$850.0 million of federal NOL carryforwards that expire in the years 2020 through 2039 and \$438.8 million of state NOL carryforwards that expire in the years 2020 through 2039. Additionally, we had \$8.8 million of state tax credits available that expire from tax years 2020 to 2039.

Series A warrant exchange

For the year ended October 31, 2019, we recorded a charge to common stockholders for the difference between the fair value of the Series A Warrant (which was issued by the Company in July 2016) prior to our entry into the February 21, 2019 Exchange Agreement with the Series A Warrant holder (the “Exchange Agreement”) of \$0.3 million and the fair value of the common shares issuable at the date of the Exchange Agreement of \$3.5 million.

Series B preferred stock dividends

Dividends charges for the Series B Preferred Stock were \$3.2 million in each of the years ended October 31, 2019 and 2018.

Series C preferred stock deemed dividends and redemption value adjustment, net

As discussed in more detail in Note 15. “Redeemable Preferred Stock” of the Notes to Consolidated Financial Statements, conversions during the years ended October 31, 2019 and 2018 resulted in a net deemed contribution of \$1.6 million and a deemed dividend of \$9.6 million, respectively. The deemed contributions (dividends) represent the difference between the fair value of the common shares issued to settle the conversion amounts and the carrying value of the shares of the Company’s Series C Convertible Preferred Stock (such shares are referred to herein as the “Series C Preferred Shares” and such stock is referred to herein as the “Series C Preferred Stock”). Additionally, during the year ended October 31, 2019, the net loss to common stockholders was impacted by a \$0.5 million deemed contribution resulting from accounting for the Waiver Agreement, dated February 21, 2019, between the Company and the holder of the Series C Preferred Stock (the “Waiver Agreement”) and a \$8.6 million redemption value adjustment recorded to adjust the carrying value of the Series C Preferred Shares to their redemption value during the quarter ended January 31, 2019 due to the occurrence of equity condition failures (as defined in the Certificate of Designations of the Series C Preferred Stock).

Series D preferred stock deemed dividends and redemption accretion

Conversions where the conversion price was below the initial conversion price (as adjusted for the reverse stock split) of \$16.56 per share resulted in a variable number of shares being issued to settle the conversion amounts and are treated as a partial redemption of the shares of the Company’s Series D Convertible Preferred Stock (such shares are referred to herein as the “Series D Preferred Shares” and such stock is referred to herein as the “Series D Preferred Stock”). Conversions during the years ended October 31, 2019 and 2018 that were settled in a variable number of shares and treated as redemptions resulted in deemed dividends of \$6.0 million and \$2.1 million, respectively. The deemed dividends represent the difference between the fair value of the common shares issued to settle the conversion amounts and the carrying value of the Series D Preferred Shares.

The Series D Preferred Stock redemption accretion of \$3.8 million recorded during the year ended October 31, 2019 reflects the accretion of the difference between the carrying value of the Series D Preferred Stock and the amount that would have been redeemed if stockholder approval had not been obtained for the issuance of common stock equal to 20% or more of our outstanding voting stock prior to the issuance of the Series D Preferred Stock. If we had been unable to obtain such stockholder approval and were therefore prohibited from issuing shares of common stock as a result of this limitation (the “Exchange Cap Shares”) to a holder of Series D Preferred Stock at any time after April 30, 2019, we would have been required to pay cash to such holder in exchange for the redemption of such number of Series D Preferred Shares held by such holder that would not have been convertible into such Exchange Cap Shares. Stockholder approval was obtained at the annual meeting of the Company’s stockholders on April 4, 2019 and no further accretion was required.

Net loss attributable to common stockholders and loss per common share

Net loss attributable to common stockholders represents the net loss for the period less the impact from the Series A Warrant exchange charge, Series B Preferred Stock dividends, Series C Preferred Stock deemed dividends and contributions, Series C redemption value adjustment, and Series D Preferred Stock dividends and redemption accretion. For the years ended October 31, 2019 and 2018, net loss attributable to common stockholders was \$100.2 million and \$62.2 million, respectively, and loss per common share was \$1.82 and \$9.01, respectively.

Comparison of the Years Ended October 31, 2018 and 2017

Revenues and Costs of revenues

Our revenues and cost of revenues for the years ended October 31, 2018 and 2017 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2018	2017	\$	%
Total revenues	\$ 89,437	\$ 95,666	\$ (6,229)	(7)%
Total costs of revenues	86,344	\$ 92,932	(6,588)	(7)%
Gross profit	<u>\$ 3,093</u>	<u>\$ 2,734</u>	<u>\$ 359</u>	13%
Gross margin	3.5%	2.9%		

Total revenues for the year ended October 31, 2018 decreased \$6.2 million, or 7%, to \$89.4 million from \$95.7 million during the year ended October 31, 2017. Total cost of revenues for the year ended October 31, 2018 decreased by \$6.6 million, or 7%, to \$86.3 million from \$92.9 million during the year ended October 31, 2017. The Company's gross margin was 3.5% in fiscal year 2018, as compared to the prior year gross margin of 2.9%. A discussion of the changes in product sales, service agreement and license revenues, Advanced Technologies contract revenues, and generation revenues follows. Refer to "Critical Accounting Policies and Estimates" for more information on revenue and cost of revenue classifications.

Product sales

Our product sales, cost of product sales and gross profit for the years ended October 31, 2018 and 2017 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2018	2017	\$	%
Product sales	\$ 52,490	\$ 43,047	\$ 9,443	22%
Cost of product sales	54,504	49,843	4,661	9%
Gross loss from product sales	<u>\$ (2,014)</u>	<u>\$ (6,796)</u>	<u>\$ 4,782</u>	70%
Product sales gross loss margin	(3.8)%	(15.8)%		

Product sales for the year ended October 31, 2018 included \$49.4 million of power plant revenue and \$3.1 million of revenue related to engineering and construction services. This is compared to product sales for the year ended October 31, 2017, which included \$41.0 million of power plant revenue and \$2.0 million of revenue related to engineering and construction services.

The increase in product sales for the year ended October 31, 2018 when compared to the prior year period was primarily due to the 20 MW order from HYD, pursuant to which we provided equipment to HYD for a fuel cell project with KOSPO. Shipments began in the fourth quarter of fiscal 2017, which resulted in \$38.5 million in revenue recorded in the prior year, and were completed in the first quarter of fiscal 2018, which resulted in \$28.5 million in revenue recorded in fiscal year 2018. The Company completed commissioning the plant in the third quarter of fiscal 2018. The Company also completed the sale of certain project assets, including a 2.8 MW natural gas fueled plant at the City of Tulare and a 1.4 MW plant at Trinity College.

Cost of product sales increased \$4.7 million for the year ended October 31, 2018 to \$54.5 million, compared to \$49.8 million in the same period in the prior year. Overall gross loss from product sales was \$2.0 million for the year ended October 31, 2018 compared to gross loss of \$6.8 million in the prior year comparable period. Gross loss decreased from the prior year period due primarily to the favorable margins realized for the HYD contract and the sale of certain project assets. Both periods were impacted by the under-absorption of fixed overhead costs due to low production volumes of approximately 25 MW in each fiscal year.

As of October 31, 2018, product sales backlog totaled approximately \$1,000 compared to \$31.3 million as of October 31, 2017.

Service and License Revenues

Our service agreements and license revenues and associated cost of revenues for the years ended October 31, 2018 and 2017 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2018	2017	\$	%
Service and license revenues	\$ 15,757	\$ 27,050	\$ (11,293)	(42)%
Cost of service and license revenues	15,059	25,285	(10,226)	(40)%
Gross profit from service and license revenues	\$ 698	\$ 1,765	\$ (1,067)	60%
Service and license revenues gross margin	4.4%	6.5%		

Revenues for the year ended October 31, 2018 from service agreements and license fee and royalty agreements decreased \$11.3 million to \$15.8 million from \$27.1 million for the year ended October 31, 2017. Service agreement revenue decreased from the year ended October 31, 2017 primarily due to lower revenue from fewer module replacements in the year ended October 31, 2018 as compared to the same period in the prior year. Revenue from license, royalty and material management fees decreased to \$2.2 million for the year ended October 31, 2018 from \$2.7 million for the prior year period due to lower royalties recognized.

Cost of service and license revenues decreased \$10.2 million to \$15.1 million for the year ended October 31, 2018 from \$25.3 million for the year ended October 31, 2017. Cost of service agreements includes maintenance and operating costs, module exchanges, and performance guarantees. The decrease over the prior year period relates to lower expenses associated with module replacements and lower operating costs in the year ended October 31, 2018.

Overall gross profit from service and license revenues was \$0.7 million for the year ended October 31, 2018. The overall gross margin percentage of 4.4 percent for the year ended October 31, 2018 compared to 6.5 percent in the prior year period. Service margins were negatively impacted by, among other immaterial factors, costs associated with a terminated legacy service contract during the year ended October 31, 2018.

As of October 31, 2018, service backlog totaled approximately \$251.7 million compared to \$182.3 million as of October 31, 2017. Service backlog does not include future royalties or license revenues for either 2018 or 2017. This backlog is for service agreements of up to 20 years.

Generation revenues

Generation revenue and related costs for the years ended October 31, 2018 and 2017 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2018	2017	\$	%
Generation revenues	\$ 7,171	\$ 7,233	\$ (62)	(1)%
Cost of generation revenues	6,421	5,076	1,345	26%
Generation revenues gross profit	\$ 750	\$ 2,157	\$ (1,407)	(65)%
Generation revenues gross margin	10.5%	29.8%		

Revenues for the year ended October 31, 2018 from generation totaled \$7.2 million, which is generally consistent with revenues for the year ended October 31, 2017. Generation revenues for the years ended October 31, 2018 and 2017 reflects revenue from electricity generated from the Company's PPAs. Cost of generation revenues totaled \$6.4 million in the year ended October 31, 2018, compared to \$5.1 million for the comparable prior year period. The decrease in gross profit from generation revenues was primarily a result of the \$0.5 million impairment of a 1.4 MW project in development that was terminated in fiscal year 2018 and higher maintenance activities at certain installations that occurred in the first half of 2018. Cost of generation revenues included depreciation of approximately \$4.1 million for each of the years ended October 31, 2018 and 2017. The Company had 11.2 MW of operating power plants in its portfolio for both periods.

As of October 31, 2018, generation backlog totaled approximately \$839.5 million compared to \$296.3 million as of October 31, 2017.

Advanced Technologies contracts

Advanced Technologies contracts revenue and related costs for the years ended October 31, 2018 and 2017 were as follows:

(dollars in thousands)	Years Ended October 31,		Change	
	2018	2017	\$	%
Advanced Technologies contracts	\$ 14,019	\$ 18,336	\$ (4,317)	(24)%
Cost of Advanced Technologies contracts	10,360	12,728	(2,368)	(19)%
Advanced Technologies contracts gross profit	<u>\$ 3,659</u>	<u>\$ 5,608</u>	<u>\$ (1,949)</u>	<u>(35)%</u>
Advanced Technologies contracts gross margin	26.1%	30.6%		

Advanced Technologies contract revenue for the year ended October 31, 2018 was \$14.0 million, which reflects a decrease of \$4.3 million when compared to \$18.3 million of revenue for the year ended October 31, 2017. Advanced Technologies contract revenue was lower for the year ended October 31, 2018 primarily due to the timing of project activity under existing contracts. Cost of Advanced Technologies contract revenues decreased \$2.4 million to \$10.4 million for the year ended October 31, 2018, compared to \$12.7 million for the same period in the prior year. Advanced Technologies contracts for the year ended October 31, 2018 generated a gross profit of \$3.7 million compared to a gross profit of \$5.6 million for the year ended October 31, 2017. The decrease in Advanced Technologies contract gross margin is related to the timing and mix of contracts being performed during the year ended October 31, 2018, particularly a lower proportion related to private industry contracts.

At October 31, 2018, Advanced Technologies contract backlog totaled approximately \$32.4 million compared to \$44.3 million at October 31, 2017.

Administrative and selling expenses

Administrative and selling expenses were \$24.9 million and \$25.9 million for the years ended October 31, 2018 and 2017, respectively. The decrease from the prior year period relates to lower compensation expense offset marginally by higher professional related expenditures and business development activities during the year ended October 31, 2018.

Research and development expenses

Research and development expenses increased to \$22.8 million for the year ended October 31, 2018 compared to \$20.4 million during the year ended October 31, 2017. The increase from the prior year period is primarily due to timing of research and development activities related to new products including the SureSource 4000.

Restructuring expense

Restructuring expense of \$1.4 million was recorded for the year ended October 31, 2017, relating to personnel separation costs from the business restructuring that was undertaken to reduce costs and align production levels with the level of production needs at the time. There were no restructuring activities for the year ended October 31, 2018.

Loss from operations

Loss from operations for the year ended October 31, 2018 was \$44.6 million compared to \$44.9 million for the year ended October 31, 2017. The decrease was due to higher gross profit realized for the year ended October 31, 2018, lower administrative and selling expense and the lack of restructuring expense during the year ended October 31, 2018. This was offset by increased research and development expenses.

Interest expense

Interest expense for the years ended October 31, 2018 and 2017 was \$9.1 million and \$9.2 million, respectively. Interest expense for both periods presented includes interest on the loan and security agreement with Hercules and interest expense related to sale-leaseback transactions. The interest expense for the years ended October 31, 2018 and 2017 includes interest for the accretion of the redeemable preferred stock of a subsidiary fair value discount of \$2.2 million and \$2.0 million, respectively.

Other income, net

Other income, net, was \$3.3 million for the year ended October 31, 2018 compared to other income, net of \$0.2 million for the year ended October 31, 2017. The other income, net for both periods presented includes foreign exchange gains (losses) related to the remeasurement of the Canadian Dollar denominated preferred stock obligation of our U.S. Dollar functional currency Canadian subsidiary. For the year ended October 31, 2018, foreign exchange gain was realized on payments and unbilled receivable balances denominated in South Korean Won for the HYD contract. Refundable research and development tax credits for the years ended October 31, 2018 and 2017 were \$0.6 million and \$0.9 million, respectively.

Benefit (provision) for income taxes

We have not paid federal or state income taxes in several years due to our history of net operating losses, although we have paid foreign income and withholding taxes in South Korea. The Company recorded an income tax benefit totaling \$3.0 million for the year ended October 31, 2018 compared to income tax expense of \$0.04 million for the year ended October 31, 2017. The income tax benefit for the year ended October 31, 2018 primarily related to the Act that was enacted on December 22, 2017. The Act reduced the U.S. federal corporate tax rate from 34% to 21% effective January 1, 2018, which resulted in a deferred tax benefit of \$1.0 million primarily related to a reduction of the Company's deferred tax liability for IPR&D. The Act also established an unlimited carryforward period for the NOL the Company generated in fiscal year 2018. This provision of the Act resulted in a reduction of the valuation allowance attributable to deferred tax assets at the enactment date by \$2.0 million based on the indefinite life of the resulting NOL as well as the deferred tax liability for IPR&D.

As of October 31, 2018, we had \$799.9 million of federal NOL carryforwards that expire in the years 2019 through 2037 and \$410.2 million of state NOL carryforwards that expire in the years 2019 through 2037. Additionally, we had \$8.3 million of state tax credits available that expire from tax years 2018 to 2037.

Series B preferred stock dividends

Dividends recorded and paid on the Series B Preferred Stock were \$3.2 million in each of the years ended October 31, 2018 and 2017.

Series C preferred stock deemed dividends and redemption value adjustment, net

Installment conversions occurring prior to August 27, 2018 in which the conversion price was below the initial conversion price of \$1.84 per share and installment conversions occurring between August 27, 2018 and October 31, 2018 in which the conversion price was below the adjusted conversion price of \$1.50 per share resulted in a variable number of shares being issued to settle the installment amount and were treated as a partial redemption of the Series C Preferred Shares. Installment conversions during the year ended October 31, 2018 that were settled in a variable number of shares and treated as redemptions resulted in deemed dividends of \$9.6 million. There were no deemed dividends recorded for the year ended October 31, 2017 since the Series C Preferred Shares were not issued until September 2017 and installment conversions started in October 2017. The deemed dividend represents the difference between the fair value of the common shares issued to settle the installment amounts and the carrying value of the Series C Preferred Shares.

Series D preferred stock redemption accretion and redemption accretion

The Series D Preferred Stock redemption accretion of \$2.1 million for the year ended October 31, 2018 reflects the accretion of the difference between the carrying value and the amount that would be redeemed if stockholder approval had not been obtained for common stock issuance equal to 20% or more of the Company's outstanding voting stock as of the date of issuance of the Series D Preferred Stock. In the event that the Company had been unable to obtain such stockholder approval and was therefore prohibited from issuing shares of common stock as a result of this limitation (the "Exchange Cap Shares") to a holder of Series D Preferred Stock at any time after April 30, 2019, the Company would have been obligated to pay cash to such holder in exchange for the redemption of such number of Series D Preferred Shares held by such holder that are not convertible into such Exchange Cap Shares at a price equal to the product of (i) such number of Exchange Cap Shares and (ii) the closing sale price on the trading day immediately preceding the date such holder delivers the applicable conversion notice with respect to such Exchange Cap Shares to the Company.

Net loss attributable to common stockholders and loss per common share

Net loss attributable to common stockholders represents the net loss for the period less the Series D Preferred Stock redemption accretion, preferred stock deemed dividends on the Series C Preferred Stock and the preferred stock dividends on the Series B Preferred Stock. For the years ended October 31, 2018 and 2017, net loss attributable to common stockholders was \$62.2 million and \$57.1 million, respectively, and loss per common share was \$9.01 and \$13.73, respectively.

LIQUIDITY AND CAPITAL RESOURCES

Cash, cash equivalents and restricted cash totaled \$39.8 million as of October 31, 2019 compared to \$80.2 million as of October 31, 2018, consisting of:

- Unrestricted cash and cash equivalents of \$9.4 million as of October 31, 2019, compared to \$39.3 million as of October 31, 2018.
- Restricted cash and cash equivalents of \$30.3 million, of which \$3.5 million was classified as current and \$26.9 million was classified as non-current, in each case as of October 31, 2019, compared to \$40.9 million of total restricted cash and cash equivalents, of which \$5.8 million was classified as current and \$35.1 million was classified as non-current, in each case as of October 31, 2018.

The Company faced significant liquidity challenges in fiscal 2019, which were addressed through a series of actions late in the fiscal year and subsequent to fiscal year end. In the second and third quarters of fiscal 2019, management concluded that, as a result of the Company's history of negative cash flows from operating and investing activities, negative working capital, aged accounts payable, forbearance agreements with suppliers, and significant short-term debt maturities, there was substantial doubt about the Company's ability to continue as a going concern. To address these issues, we restructured our management team and our operations in ways that are intended to support our growth and achieve our profitability and sustainability goals. We raised capital under our at-the-market sales plan, which allowed us to pay down our accounts payable and stay current on our forbearance agreements. In addition, we repaid a substantial portion of our short-term debt, retired our Series C and Series D Preferred Stock obligations, entered into new or amended financing arrangements and entered into a license arrangement with EMRE, which resulted in \$10.0 million of up-front proceeds. While some of the indicators of substantial doubt still exist, such as historical losses and negative cash flows, as a result of the previous actions taken by the Company in response to the liquidity challenges that arose in the second and third quarters of fiscal 2019, management has concluded that substantial doubt was alleviated and the Company expects to meet its obligations for at least one year from the date of issuance of these financial statements. Key definitive agreements which support the Company's future liquidity position include:

- On October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into a \$200.0 million senior secured credit facility with Orion Energy Partners Investment Agent, LLC, as Administrative Agent and Collateral Agent (the "Agent"), and its affiliates, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., and Orion Energy Credit Opportunities Fund II PV, L.P., as lenders (the "Orion Facility"). The Orion Facility is structured as a delayed draw term loan to be provided by the lenders. In conjunction with the closing of the Orion Facility, on October 31, 2019, the Company drew down \$14.5 million (the "Initial Funding"). The Company drew down an additional \$65.5 million on November 22, 2019 (the "Second Funding"). The Company may draw the remainder of the Orion Facility, \$120.0 million, over the first 18 months following the Initial Funding and subject to the Agent's approval to fund: (i) construction costs, inventory and other capital expenditures of additional fuel cell projects with contracted cash flows (under PPAs with creditworthy counterparties) that meet or exceed a mutually agreed coverage ratio; and (ii) inventory, working capital, and other costs that may be required to be delivered by the Company on purchase orders, service agreements, or other binding customer agreements with creditworthy counterparties.
- On November 5, 2019, the Company signed a two-year Joint Development Agreement ("JDA"), which was effective as of October 31, 2019, with EMRE, pursuant to which the Company will continue exclusive research and development efforts with EMRE to evaluate and develop new and/or improved carbonate fuel cells to reduce carbon dioxide emissions from industrial and power sources, in exchange for (a) payment of (i) an exclusivity and technology access fee of \$5.0 million, (ii) up to \$45.0 million for research and development efforts, and (iii) milestone-based payments of up to \$10.0 million after certain

technological milestones are met, and (b) certain licenses. Since the JDA was signed in fiscal year 2020, the associated revenue recognition and backlog will be accounted for in fiscal years 2020 and 2021.

- As of October 31, 2019, FCE Ltd. or the Company, as the guarantor of FCE Ltd.'s payment obligations with respect to the Series 1 Preferred Shares, was obligated to pay, on or before December 31, 2020, all accrued and unpaid dividends on the Series 1 Preferred Shares and the balance of the principal redemption price with respect to all of the Series 1 Preferred Shares. Interest under the Series 1 Preferred Shares accrued at annual rate of 5%. In addition, the holder of the Series 1 Preferred Shares had the right to exchange such shares for fully paid and non-assessable shares of common stock of the Company at certain specified prices, and FCE Ltd. had the option of making dividend payments in the form of common stock of the Company or cash. As of October 31, 2019, the Company did not have sufficient shares available to satisfy these obligations. On January 20, 2020, the Company, FCE Ltd. and Enbridge entered into a letter agreement (the "January 2020 Letter Agreement"), pursuant to which they agreed to amend the articles of FCE Ltd. relating to and setting forth the terms of the Series 1 Preferred Shares to: (i) remove the provisions of the articles permitting or requiring the issuance of shares of the Company's common stock in exchange for the Series 1 Preferred Shares or as payment of amounts due to the holders of the Series 1 Preferred Shares, (ii) remove certain provisions of the articles relating to the redemption of the Series 1 Preferred Shares, (iii) increase the annual dividend rate, commencing on January 1, 2020, to 15%, (iv) extend the final payment date for all accrued and unpaid dividends and all return of capital payments (i.e., payments of the principal redemption price) from December 31, 2020 to December 31, 2021, (v) clarify when dividend and return of capital payments are to be made in the future and extend the quarterly dividend and return of capital payments through December 31, 2021 (which were previously to be paid each quarter through December 31, 2020), (vi) remove certain terms and provisions of the articles that are no longer applicable, and (vii) make other conforming changes to the articles.

The Company's future liquidity will be dependent on its ability to (i) timely complete current projects in process within budget, including approved amounts that have been financed as financing does not cover overages, (ii) increase cash flows from its generation portfolio, including by meeting conditions required to timely commence operations of new projects and operating its generation portfolio in compliance with minimum performance guarantees, (iii) obtain approval of and receive funding for project construction under the Orion Facility and meet conditions for release of funds, (iv) increase order and contract volumes, which would lead to additional product sales and services agreements, (v) obtain funding for and receive payment for research and development under current and future Advanced Technology contracts, including achieving a \$5 million technological performance milestone in the JDA during calendar year 2020, and (vi) implement the cost reductions necessary to achieve profitable operations. Our business model requires substantial outside financing arrangements and satisfaction of the conditions of such financing arrangements to deploy our projects and facilitate the growth of our business. If financing is not available to us on acceptable terms if and when needed, if we do not satisfy the conditions of our financing arrangements or if we spend more than the financing approved for projects, we may be required to reduce planned spending, sell assets, seek alternative financing and take other measures, which could have a material adverse effect on our operations.

As of January 14, 2020, we had 14,034,001 shares of common stock available for issuance, of which 10,290,934 shares were reserved for issuance under various convertible securities, options, and warrants, under our stock purchase and incentive plans, and under our at-the-market sales plan. The limited number of shares available for issuance limits our ability to raise capital in the equity markets and satisfy obligations with shares instead of cash, which could adversely impact our ability to fund our business and operations. We must obtain stockholder approval to increase the number of shares of common stock we are authorized to issue under our Certificate of Incorporation. At the April 4, 2019 annual meeting of stockholders, our stockholders did not approve our request to increase the number of shares of common stock that we are authorized to issue from 225,000,000 shares to 335,000,000 shares. In the event that the Company's Board of Directors determines to seek stockholder approval for an increase in authorized shares in the future, there can be no assurances of obtaining such stockholder approval.

While there can be no assurances, we anticipate raising additional required capital from new and existing investors and lenders. We expect to work with lenders and financial institutions to secure long-term debt, tax equity and sale-leasebacks for our project asset portfolio as we achieve the Commercial Operation Dates for these projects. This financing, if received, may allow the Company to recycle capital from these projects by reinvesting the capital in other projects and to pay down the Orion Facility over time. It should be noted that the lenders and the Agent under the Orion Credit Agreement ("Orion") have broad approval rights over our ability to draw and allocate funds from the

Orion Facility. There can be no assurance that the Company can obtain such financing or that the Company can obtain such financing on terms acceptable to the Company. If the Company is unable to obtain such financing or raise additional capital, the Company may reduce its expenditures or slow its project spending. If the Company cannot obtain such financing or cannot obtain such financing on terms acceptable to the Company, it would negatively impact the Company's business model, operations, and liquidity.

We believe that our cash flows from our existing backlog, including PPAs, service agreements and Advanced Technology contracts, combined with our current unrestricted cash and cash equivalents, cash which is expected to become unrestricted, and available borrowings under the Orion Facility will be sufficient to meet our anticipated cash needs for at least the next 12 months.

Generation/Operating Portfolio, Projects and Backlog

To grow our generation portfolio, the Company will invest in developing and building turn-key fuel cell projects which will be owned by the Company and classified as project assets on the balance sheet. This strategy requires liquidity and the Company expects to continue to have increasing liquidity requirements as project sizes increase and more projects are added to backlog. We may commence building project assets upon the award of a project or execution of a multi-year PPA with an end-user that has a strong credit profile. Project development and construction cycles, which span the time between securing a PPA and commercial operation of the plant, vary substantially and can take years. As a result of these project cycles and strategic decisions to finance the construction of certain projects, we may need to make significant up-front investments of resources in advance of the receipt of any cash from the sale or long-term financing of such projects. These up-front investments may include using our working capital, availability under our construction financing facilities or other financing arrangements. Delays in construction progress and completing current projects in process within budget, or in completing financing or the sale of our projects may impact our liquidity in a material way.

Our operating portfolio (26.1 MW as of October 31, 2019) contributes higher long-term cash flows to the Company than if these projects had been sold. These projects currently generate approximately \$22.0 million per year in annual revenue depending on plant output, operations performance and site conditions. The Company plans to continue to grow this portfolio while also selling projects to investors. As of October 31, 2019, the Company had projects representing an additional 47.1 MW under development and construction, which projects are expected to generate operating cash flows in future periods. Retaining long-term cash flow positive projects, combined with our service fleet, is expected to result in reduced reliance on new project sales to achieve cash flow positive operations, however, operations and performance issues could impact results. The Company expects to finance the construction of the projects still under development and construction using proceeds from the Orion Facility, subject to lender approval, satisfaction of conditions for release of funding, including third party consents, and keeping project costs within approved budgets. We have worked with and are continuing to work with lenders and financial institutions to secure long-term debt, tax equity and sale-leasebacks for our project asset portfolio, but there can be no assurance that such financing can be attained, or that, if attained, it will be retained and sufficient. As of October 31, 2019, we have financed four projects through sale-leaseback transactions. As of October 31, 2019, total financing obligations and debt outstanding related to project assets was \$85.1 million. Future required payments totaled \$67.5 million as of October 31, 2019. The outstanding financing obligation under the sale-leaseback transactions includes an embedded gain, which will be recognized at the end of the lease term.

Our operating portfolio provides the Company with the full benefit of future cash flows, net of any debt service requirements.

The following table summarizes our operating portfolio as of October 31, 2019:

Project Name	Location	Power Off-Taker	Rated Capacity (MW)	Actual Commercial Operation Date (FuelCell Energy Fiscal Quarter)	PPA Term (Years)
Central CT State University (“CCSU”)	New Britain, CT	CCSU (CT University)	1.4	Q2 ‘12	10
UCI Medical Center (“UCI”)	Orange, CA	UCI (CA University Hospital)	1.4	Q1 ‘16	19
Riverside Regional Water Quality Control Plant	Riverside, CA	City of Riverside (CA Municipality)	1.4	Q4 ‘16	20
Pfizer, Inc.	Groton, CT	Pfizer, Inc.	5.6	Q4 ‘16	20
Santa Rita Jail	Dublin, CA	Alameda County, California	1.4	Q1 ‘17	20
Bridgeport Fuel Cell Project	Bridgeport, CT	Connecticut Light and Power Company (CT Utility)	14.9	Q1 ‘13	15
Total MW Operating:			26.1		

In May 2019, we closed on the acquisition of the 14.9 MW Bridgeport Fuel Cell Project in Bridgeport, Connecticut from Dominion Generation, Inc. We own and operate the Bridgeport Fuel Cell Project as part of our generation portfolio, which is included in the table above. The total cash consideration paid was \$35.5 million. We funded the acquisition with a combination of third party financing and \$15.0 million of restricted cash on hand that was tied to the project and released at closing. Liberty Bank and Fifth Third Bank jointly provided the senior project-level debt facility of \$25.0 million, while the Connecticut Green Bank provided additional subordinated capital. The PPA term runs through December 2028.

The following table summarizes projects in process in backlog as of October 31, 2019:

Project Name	Location	Power Off-Taker	Rated Capacity (MW)	Estimated Commercial Operation Date (FuelCell Energy Fiscal Quarter)	PPA Term (Years)
Triangle St	Danbury, CT	Tariff - Eversource (CT Utility)	3.7	Q1 ‘20	Tariff
Tulare BioMAT	Tulare, CA	Southern California Edison (CA Utility)	2.8	Q1 ‘20	20
Groton Sub Base	Groton, CT	CMEEC (CT Electric Co-op)	7.4	Q3 ‘20	20
Toyota	Los Angeles, CA	Southern California Edison; Toyota	2.2	Q4 ‘22	20
San Bernardino	San Bernardino, CA	City of San Bernardino Municipal Water Department	1.4	Q2 ‘21	20
LIPA 1	Long Island, NY	PSEG / LIPA, LI NY (Utility)	7.4	Q1 ‘21	20
CT RFP-1	Hartford, CT	Eversource/United Illuminating (CT Utilities)	7.4	Q3 ‘21	20
CT RFP-2	Derby, CT	Eversource/United Illuminating (CT Utilities)	14.8	Q2 ‘21	20
Total MW in Process:			47.1		

Backlog by revenue category is as follows:

- Services and license backlog totaled \$192.3 million as of October 31, 2019, compared to \$251.7 million as of October 31, 2018. Services backlog includes future contracted revenue from routine maintenance and scheduled module exchanges for power plants under service agreements.
- Generation backlog totaled \$1.1 billion as of October 31, 2019, compared to \$839.5 million as of October 31, 2018. Generation backlog represents future contracted energy sales under PPAs between the Company and the end-user of the power. During the quarter ended October 31, 2019, the Bolthouse Farms Project (with a prior backlog value of \$40.3 million) was removed from backlog because management has decided to pursue termination of the PPA given recent regulatory changes impacting the future cost profile for the Company and Bolthouse Farms.
- Product sales backlog totaled \$1,000 as of October 31, 2018. There was no product backlog as of October 31, 2019.
- Advanced Technologies contract backlog totaled \$12.0 million as of October 31, 2019 compared to \$32.4 million as of October 31, 2018.

Backlog represents definitive agreements executed by the Company and our customers. Projects for which we have a PPA are included in generation backlog, which represents future revenue under long-term PPAs. Projects sold to customers (and not retained by the Company) are included in product sales and service backlog and the related generation backlog is removed upon sale.

Factors that may impact our liquidity in fiscal year 2020 and beyond include:

- While the Company has access to the \$200.0 million Orion Facility to finance construction of its generation portfolio, the timing, availability and allocation of any new draws beyond the \$80.0 million which has been funded under the Orion Facility are at the discretion of the lenders, which may negatively impact the Company's liquidity as well as its ability to complete various construction projects. In addition, we expect to work with lenders and financial institutions to secure long-term debt, tax equity and sale-leasebacks for our project asset portfolio as we achieve the Commercial Operation Dates for these projects. This financing, if received, may allow the Company to recycle capital from these projects by reinvesting the capital in other projects and to pay down the Orion Facility over time. It should be noted that Orion has broad approval rights over our ability to draw and allocate funds from the Orion Facility. There can be no assurance that the Company can obtain such financing or that the Company can obtain such financing on terms acceptable to the Company. If the Company cannot obtain such financing or cannot obtain such financing on terms acceptable to the Company, it would negatively impact the Company's business, business model, operations, and liquidity.
- We bid on large projects in diverse markets that can have long decision cycles and uncertain outcomes. We manage production rate based on expected demand and projects schedules. Changes to production rate take time to implement. In conjunction with and following the reorganization and reduction in workforce in April 2019, we reduced our production rate to approximately 2 MW, which has resulted in an annualized production rate through October 31, 2019 of 17 MW. The annualized production rate as of January 2020 is 25 MW. The Company will evaluate future increases in production rate if and when warranted by business conditions.
- As project sizes and the number of projects evolve, project cycle times may increase. We may need to make significant up-front investments of resources in advance of the receipt of any cash from the sale of our projects. These amounts include development costs, interconnection costs, posting of letters of credit, bonding or other forms of security, and incurring engineering, permitting, legal, and other expenses.
- The amount of accounts receivable and unbilled receivables as of October 31, 2019 and October 31, 2018 was \$14.5 million (\$3.5 million of which is classified as "Other assets") and \$32.4 million (\$9.4 million of which is classified as "Other assets"), respectively. Unbilled accounts receivable represents revenue that has been recognized in advance of billing the customer under the terms of the underlying contracts. Such costs have been funded with working capital and the unbilled amounts are expected to be billed and collected from customers once we meet the billing criteria under the contracts. Our accounts receivable balances may fluctuate as of any balance sheet date depending on the timing of individual contract milestones and progress on completion of our projects.

- The amount of total inventory as of October 31, 2019 and October 31, 2018 was \$56.7 million (\$2.2 million is classified as long-term inventory) and \$53.6 million (none of which is classified as long-term inventory), respectively, which includes work in process inventory totaling \$31.2 million and \$29.1 million, respectively. Work in process inventory can generally be deployed rapidly while the balance of our inventory requires further manufacturing prior to deployment. To execute on our business plan, we must produce fuel cell modules and procure BOP components in required volumes to support our planned construction schedules and potential customer contractual requirements. As a result, we may manufacture modules or acquire BOP components in advance of receiving payment for such activities. This may result in fluctuations in inventory and in use of cash as of any given balance sheet date.
- The amount of total project assets as of October 31, 2019 and October 31, 2018 was \$144.1 million and \$99.6 million, respectively. Project assets consist of capitalized costs for fuel cell projects that are operating and producing revenue or are under construction. Project assets as of October 31, 2019 consisted of \$59.2 million of completed, operating installations and \$84.9 million of projects in development. As of October 31, 2019, we had 26.1 MW of our operating project assets that generated \$14.0 million of revenue in fiscal year 2019. Also, as of October 31, 2019, the Company had an additional 47.1 MW under development and construction, some of which is expected to generate operating cash flows in fiscal year 2020.
- Under the terms of certain contracts, the Company will provide performance security for future contractual obligations. As of October 31, 2019, we had pledged approximately \$6.7 million of our cash and cash equivalents as collateral for performance security and for letters of credit for certain banking requirements and contracts. This balance may increase with a growing backlog and installed fleet.
- For fiscal year 2020, we forecast capital expenditures of approximately \$2.0 million compared to capital expenditures of \$2.2 million in fiscal year 2019. Capital expenditures for fiscal year 2019 reflected the completion of the Company's conditioning facility at its Torrington manufacturing plant and maintenance capital expenditures.

Cash Flows

Cash and cash equivalents and restricted cash and cash equivalents totaled \$39.8 million as of October 31, 2019 compared to \$80.2 million as of October 31, 2018. As of October 31, 2019, restricted cash and cash equivalents was \$30.3 million, of which \$3.5 million was classified as current and \$26.9 million was classified as non-current, compared to \$40.9 million total restricted cash and cash equivalents as of October 31, 2018, of which \$5.8 million was classified as current and \$35.1 million was classified as non-current.

The following table summarizes our consolidated cash flows:

(dollars in thousands)	2019	2018	2017
Consolidated Cash Flow Data:			
Net cash (used in) provided by operating activities	\$ (30,572)	\$ 16,322	\$ (71,845)
Net cash used in investing activities	(69,300)	(51,260)	(31,444)
Net cash provided by financing activities	59,655	27,717	72,292
Effects on cash from changes in foreign currency rates	(244)	12	129
Net decrease in cash and cash equivalents	<u>\$ (40,461)</u>	<u>\$ (7,209)</u>	<u>\$ (30,868)</u>

The key components of our cash inflows and outflows were as follows:

Operating Activities – Net cash used in operating activities was \$30.6 million during fiscal year 2019 compared to \$16.3 million provided by operating activities during fiscal year 2018 and \$71.8 million used in operating activities during fiscal year 2017.

Net cash used in operating activities during fiscal year 2019 was primarily the result of the net loss of \$77.6 million and increases in inventory of \$6.4 million and unbilled receivables of \$4.5 million. These amounts were offset by increases in deferred revenue of \$6.0 million and accrued liabilities of \$2.4 million, decreases in accounts receivable of \$4.8 million and other assets of \$2.1 million and net non-cash adjustments of \$42.7 million.

Net cash provided by operating activities during fiscal year 2018 was primarily the result of decreases in accounts receivable of \$48.7 million, inventories of \$31.7 million, deferred revenue of \$1.3 million and net non-cash activity of \$15.4 million. Accounts receivable and inventory decreased primarily as a result of cash received and inventory delivered under the HYD contract. These amounts were offset by the net loss of \$47.3 million for fiscal year 2018, decreases in accounts payable of \$19.8 million and accrued liabilities of \$11.3 million, and an increase in other assets of \$2.3 million.

Net cash used in operating activities during fiscal year 2017 was primarily a result of the net loss of \$53.9 million, increases in accounts receivable of \$51.3 million and inventory of \$8.0 million, and decreases in accrued liabilities of \$2.3 million and deferred revenue of \$0.9 million. The decreases were offset by non-cash activity of \$20.2 million and an increase in accounts payable of \$25.0 million.

Investing Activities – Net cash used in investing activities was \$69.3 million during fiscal year 2019 compared to net cash used in investing activities of \$51.3 million during fiscal year 2018 and net cash used in investing activities of \$31.4 million during fiscal year 2017.

Net cash used in investing activities during fiscal year 2019 included the purchase by the Company of all of the outstanding membership interests in Bridgeport Fuel Cell, LLC (“BFC”), the owner of the 14.9 MW Bridgeport Fuel Cell Project, for \$35.5 million, \$31.7 million invested in project assets to expand our operating portfolio and \$2.2 million for capital expenditures.

Net cash used in investing activities during fiscal year 2018 included a \$41.2 million investment in project assets to expand our operating portfolio and \$10.0 million for capital expenditures.

Net cash used in investing activities during fiscal year 2017 included a \$19.7 million investment in project assets to expand our operating portfolio and \$12.4 million for capital expenditures which was primarily for the substantial completion of the Torrington facility expansion. Net cash used for the year was offset by cash received in connection with an asset acquisition of \$0.6 million.

Financing Activities - Net cash provided by financing activities was \$59.7 million during fiscal year 2019 compared to \$27.7 million in fiscal year 2018 and \$72.3 million in fiscal year 2017.

Net cash provided by financing activities during fiscal year 2019 resulted from the receipt of \$69.6 million of debt proceeds, which included \$26.7 million to acquire all of the membership interest in BFC, \$14.5 million from the Orion Facility and the remainder related to project level financings offset by debt repayments of \$48.4 million, the payment of deferred financing costs of \$3.3 million and the payment of preferred dividends and return of capital of \$1.8 million. The sale of common stock during fiscal year 2019 resulted in proceeds, net of fees, of \$43.6 million.

Net cash provided by financing activities during fiscal year 2018 resulted from net proceeds of \$25.3 million received in connection with the offering and issuance of the Series D Preferred Stock, the receipt of \$13.1 million under the amended loan and security agreement with Hercules and net proceeds received of \$10.5 million from warrant exercises and sales of our common stock under the At Market Issuance Sales Agreement entered into with B. Riley FBR, Inc. and Oppenheimer & Co. Inc. on June 13, 2018, offset by cash payments of \$16.6 million primarily relating to repayments under the loan and security agreement with Hercules and the payment of preferred dividends and return of capital of \$4.2 million.

Net cash provided by financing activities during fiscal year 2017 included net proceeds received from the issuance of the Series C preferred shares of \$27.9 million, cash received from a common stock offering of \$14.2 million, cash received from warrant exercises of \$12.7 million, and net proceeds from open market sales of common stock of \$12.6 million. Net cash provided by financing activities also included \$17.9 million of net proceeds from debt primarily relating to a sale-leaseback transaction with PNC Energy Capital, LLC (“PNC”). Cash received was offset by the repayment of debt of \$8.6 million, and the payment of preferred dividends and the return of capital of \$4.2 million.

Commitments and Significant Contractual Obligations

A summary of our significant future commitments and contractual obligations as of October 31, 2019 and the related payments by fiscal year is summarized as follows:

(dollars in thousands)	Payments Due by Period				
	Total	Less than 1 year	1 - 3 years	3 - 5 years	More Than 5 years
Contractual Obligations					
Purchase commitments ⁽¹⁾	\$ 34,553	\$ 32,053	\$ 2,478	\$ 22	\$ —
Series 1 Preferred obligation ⁽²⁾	5,039	1,662	3,377	—	—
Term and Construction loans (principal and interest) ⁽³⁾	84,413	22,189	20,900	20,474	20,662
Capital and operating lease commitments ⁽⁴⁾	13,973	1,024	2,500	1,742	8,707
Sale-leaseback financing obligation ⁽⁵⁾	17,512	3,560	5,564	4,528	3,860
Option fee ⁽⁶⁾	300	150	150	—	—
Series B Preferred dividends payable ⁽⁷⁾	—	—	—	—	—
Total	\$ 155,790	\$ 60,638	\$ 34,969	\$ 26,766	\$ 33,229

- (1) Purchase commitments with suppliers for materials, supplies and services incurred in the normal course of business.
- (2) As of October 31, 2019: The terms of the Series 1 Preferred Shares required payments of (i) an annual amount of Cdn. \$500,000 for dividends and (ii) an annual amount of Cdn. \$750,000 as return of capital payments payable in cash. These payments were scheduled to end on December 31, 2020. Dividends accrued at a 1.25% quarterly rate on the unpaid principal balance, and additional dividends accrued on the cumulative unpaid dividends at a rate of 1.25% per quarter, compounded quarterly. The amount of all accrued and unpaid dividends on the Series 1 Preferred Shares of Cdn. \$21.1 million as of October 31, 2019 and the balance of the principal redemption price of Cdn. \$4.4 million as of October 31, 2019 were scheduled to be paid to the holders of the Series 1 Preferred Shares on December 31, 2020. In addition, FCE Ltd. had the option of making dividend payments in the form of cash or shares of the Company's common stock. For purposes of preparing the above table, the final balance of accrued and unpaid dividends due December 31, 2020 of Cdn. \$21.1 million was assumed to be paid in the form of common stock and not included in this table, however, the Company did not have sufficient authorized and unissued shares of common stock to make such payment as of October 31, 2019. On January 20, 2020, the Company, FCE Ltd. and Enbridge entered into a letter agreement, pursuant to which they agreed to amend the articles of FCE Ltd. relating to and setting forth the terms of the Series 1 Preferred Shares to modify certain terms of the Series 1 Preferred Shares. Refer to Note 23. "Subsequent Events" for additional information regarding such letter agreement and such modified terms.
- (3) The Company has certain corporate and project finance term and construction loans outstanding, the terms of which are further summarized below.
- (4) Future minimum lease payments on capital and operating leases.
- (5) The amount represents payments due on sale-leaseback transactions of our wholly-owned subsidiaries, under their respective financing agreements with PNC. Lease payments under these sale-leasebacks are generally payable in fixed quarterly installments over a ten-year period.
- (6) The Company entered into an agreement with a customer on June 29, 2016 that includes a fee for the purchase of the plants at the end of the term of the agreement. The fee is payable in installments over the term of the agreement.
- (7) We pay \$3.2 million in annual dividends, if and when declared, on our Series B Preferred Stock. The \$3.2 million annual dividend payment, if declared, has not been included in this table as we cannot reasonably determine when or if we will be able to convert the Series B Preferred Stock into shares of our common stock. We may, at our option, convert these shares into the number of shares of our common stock that are issuable at the then prevailing conversion rate if the closing price of our common stock exceeds 150% of the then prevailing conversion price (\$1,692 per share at October 31, 2019) for 20 trading days during any consecutive 30 trading day period.

Term and Construction Loans

Webster Bank Loan. In November 2016, our wholly-owned subsidiary, FuelCell Energy Finance, LLC (“FuelCell Finance”), entered into a membership interest purchase agreement with GW Power LLC (“GWP”) whereby FuelCell Finance purchased all of the outstanding membership interests in New Britain Renewable Energy, LLC (“NBRE”) from GWP. GWP assigned the NBRE interests to FuelCell Finance free and clear of all liens other than a pledge in favor of Webster Bank, National Association (“Webster Bank”). FuelCell Finance assumed the debt outstanding to Webster Bank in the amount of \$2.3 million (the “Webster Facilities”). The term loan interest rate was 5.0% per annum and payments, which commenced in January 2017, were due on a quarterly basis. The balance outstanding as of October 31, 2019 was \$0.5 million. This balance was paid off subsequent to October 31, 2019 with proceeds from the Orion Facility, and the Webster Facilities were terminated.

State of Connecticut Loan. In October 2015, the Company entered into a definitive Assistance Agreement with the State of Connecticut and received a disbursement of \$10.0 million, which was used for the first phase of the expansion of the Company’s Torrington, Connecticut manufacturing facility. In conjunction with this financing, the Company entered into a \$10.0 million promissory note and related security agreements securing the loan with equipment liens and a mortgage on its Danbury, Connecticut location. Interest accrues at a fixed interest rate of 2.0%, and the loan is repayable over 15 years from the date of the first advance, which occurred in October of 2015. Principal payments were deferred for four years from disbursement and began on December 1, 2019. Under the Assistance Agreement, the Company was eligible for up to \$5.0 million in loan forgiveness if the Company created 165 full-time positions and retained 538 full-time positions for two consecutive years (the “Employment Obligation”) as measured on October 28, 2017 (the “Target Date”). The Assistance Agreement was subsequently amended in April 2017 to extend the Target Date by two years to October 28, 2019.

In January 2019, the Company and the State of Connecticut entered into a Second Amendment to the Assistance Agreement (the “Second Amendment”). The Second Amendment extends the Target Date to October 31, 2022 and amends the Employment Obligation to require the Company to continuously maintain a minimum of 538 full-time positions for 24 consecutive months. Based on the Company’s current headcount and plans for fiscal year 2020, it will be short of meeting this requirement. If the Company meets the Employment Obligation, as modified by the Second Amendment, and creates an additional 91 full-time positions, the Company may receive a credit in the amount of \$2.0 million to be applied against the outstanding balance of the loan. The Second Amendment deletes and cancels the provisions of the Assistance Agreement related to the second phase of the expansion project and the loans related thereto, but the Company had not drawn any funds or received any disbursements under those provisions. A job audit will be performed within 90 days of the Target Date. If the Company does not meet the Employment Obligation, then an accelerated payment penalty will be assessed at a rate of \$18,587.36 times the number of employees below the Employment Obligation. Such penalty is immediately payable and will be applied first to accelerate the payment of any outstanding fees or interest due and then to accelerate the payment of outstanding principal.

Connecticut Green Bank Loans. We had a long-term loan agreement with the Connecticut Green Bank for a loan totaling approximately \$5.9 million in support of the Bridgeport Fuel Cell Project. During the year ended October 31, 2019, this loan was partially repaid with a new project level loan from the Connecticut Green Bank (as discussed below) in connection with the Company’s acquisition of all of the membership interests in BFC. The balance under the long-term loan agreement as of October 31, 2019 was \$1.8 million. Subsequent to October 31, 2019, the long-term loan agreement was amended and the Connecticut Green Bank provided the Company with an additional loan in the aggregate principal amount of \$3.0 million. See Note 23. “Subsequent Events” of the Notes to Consolidated Financial Statements for additional information regarding the amendment to the loan agreement and the additional loan.

On May 9, 2019, in connection with the closing of the purchase of BFC, BFC entered into a subordinated credit agreement with the Connecticut Green Bank whereby Connecticut Green Bank provided financing in the amount of \$6.0 million (the “Subordinated Credit Agreement”). As security for the Subordinated Credit Agreement, Connecticut Green Bank received a perfected lien, subordinated and second in priority to the liens securing the \$25.0 million loaned under the BFC Credit Agreement (as defined below), in all of the same collateral securing the BFC Credit Agreement (as described below). The interest rate under the Subordinated Credit Agreement is 8% per annum. The debt service coverage ratio required to be maintained under the Subordinated Credit Agreement may not be less than 1.10 as of the end of each fiscal quarter, beginning with the quarter ended July 31, 2020. The term of the Subordinated Credit Agreement expires 7 years from the date of the advance of the loan. Principal and interest are due monthly in amounts sufficient to fully amortize the loan over an 84-month period ending in May 2026. The balance under the Subordinated Credit Agreement as of October 31, 2019 was \$5.8 million.

Enhanced Capital Loan. On January 9, 2019, the Company, through its indirect wholly-owned subsidiary, TRS Fuel Cell, LLC, entered into a Loan and Security Agreement (the “Enhanced Capital Loan Agreement”) with Enhanced Capital Connecticut Fund V, LLC (“Enhanced”) for a loan in the amount of \$1.5 million. The collateral for this loan included any project assets, accounts receivable and inventory owned by TRS Fuel Cell, LLC. Interest accrued at a rate of 6.0% per annum and was paid on the first business day of each month. The loan maturity date was three years from the date of the Enhanced Capital Loan Agreement, upon which the outstanding principal and any accrued interest would be due and payable. Under the terms of the Enhanced Capital Loan Agreement, the Company was required to close on tax equity financing by January 14, 2020. Given that the Company did not secure tax equity financing for this project, on January 13, 2020, TRS Fuel Cell, LLC and Enhanced entered into a payoff letter whereby the loan was paid off and extinguished on January 14, 2020.

Fifth Third Bank Groton Loan. On February 28, 2019, our indirect wholly-owned subsidiary, Groton Borrower entered into the Groton Agreement with Fifth Third Bank pursuant to which Fifth Third Bank agreed to make available to Groton Borrower a construction loan facility in an aggregate principal amount of up to \$23.0 million (the “Groton Facility”) to fund the manufacture, construction, installation, commissioning and start-up of the 7.4 MW fuel cell power plant for the CMEEC at the United States Navy submarine base in Groton, Connecticut. Groton Borrower made an initial draw under the Groton Facility on the date of closing of the facility of \$9.7 million and made an additional draw of \$1.4 million in April 2019. The original maturity date of the Groton Facility was the earlier of (a) October 31, 2019, (b) the commercial operation date of the Groton Project, or (c) one business day after receipt of proceeds of debt financing (i.e., take out financing) in an amount sufficient to repay the outstanding indebtedness under the Groton Facility.

On August 13, 2019, Groton Borrower and Fifth Third Bank entered into Amendment No. 1 to the Groton Agreement, which reduced the aggregate principal amount available to Groton Borrower under the Groton Facility from \$23.0 million to \$18.0 million and pursuant to which Groton Borrower committed to, among other things, deliver to Fifth Third Bank, no later than September 28, 2019 (which deadline was automatically extended to October 21, 2019 upon the Company’s repayment of its corporate loan facility with Hercules on September 30, 2019), a binding loan agreement for permanent financing and one or more binding letters of intent from tax equity investors.

On October 21, 2019, Groton Borrower and Fifth Third entered into Amendment No. 2 to the Groton Agreement (the “Second Groton Amendment”), pursuant to which Groton Borrower agreed to deliver to Fifth Third Bank, no later than December 16, 2019, a binding agreement, in form and substance reasonably acceptable to Fifth Third Bank: (i) executed by Groton Borrower and one or more Take-out Lenders (as defined in the Groton Agreement), pursuant to which the Take-out Lenders shall have, individually or collectively, agreed to provide a Take-out Financing (as defined in the Groton Agreement); or (ii) executed by Groton Borrower and one or more tax equity investors or other third parties, pursuant to which such tax equity investors or third parties, via a tax equity or other financing transaction, shall have, individually or collectively, agreed to provide funds to Groton Borrower in an amount no less than the then-outstanding Construction Loans (as defined in the Groton Agreement) under the Groton Agreement and accrued interest. The Second Groton Amendment further provided, however, that if (A) neither such binding agreement nor a commitment letter for either of such agreements (which commitment letter shall not include a due diligence or similar funding condition) was provided to Fifth Third Bank by November 21, 2019, then commencing on November 22, 2019 until delivery of such commitment letter, the interest rate on the loans was to be the LIBOR rate plus 4% per annum and within three business days after such date, Groton Borrower was to pay to Fifth Third Bank a fee of \$15,000 and (B) such binding agreement was not provided to Fifth Third by December 16, 2019, then commencing on December 17, 2019, the outstanding obligations under the Groton Agreement were to bear interest at a rate equal to the LIBOR rate plus 6% per annum. The total outstanding balance under the Groton Facility as of October 31, 2019 was \$11.1 million. This balance was paid off subsequent to the end of the fiscal year on November 22, 2019, and the Groton Facility was terminated.

BFC Loans. On May 9, 2019, in connection with the purchase of the membership interests of BFC, FuelCell Finance entered into a Credit Agreement with Liberty Bank, as administrative agent and co-lead arranger, and Fifth Third Bank, as co-lead arranger and swap hedger (the “BFC Credit Agreement”), whereby (i) Fifth Third Bank provided financing to BFC in the amount of \$12.5 million towards the purchase price for the BFC acquisition; and (ii) Liberty Bank provided financing to BFC in the amount of \$12.5 million towards the purchase price for the BFC acquisition. As security for the BFC Credit Agreement, Liberty Bank and Fifth Third Bank were granted a first priority lien in (i) all assets of BFC, including BFC’s cash accounts, fuel cells, and all other personal property, as well as third party contracts including the Energy Purchase Agreement between BFC and Connecticut Light and Power Company dated July 10, 2009, as amended; (ii) certain fuel cell modules that are intended to be used to replace the Bridgeport Fuel Cell Project’s fuel cell modules as part of routine operation and maintenance; and (iii) FuelCell Finance’s ownership interest in BFC.

The maturity date under the BFC Credit Agreement is May 9, 2025. Monthly principal and interest are to be paid in arrears in an amount sufficient to fully amortize the term loan over a 72 month period. BFC has the right to make additional principal payments or pay the balance due under the BFC Credit Agreement in full provided that it pays any associated breakage fees with regard to the interest rate swap agreements fixing the interest rate. The interest rate under the BFC Credit Agreement fluctuates monthly at the 30-day LIBOR rate plus 275 basis points on an initial total notional value of \$25.0 million, reduced for principal payments. An interest rate swap agreement was required to be entered into with Fifth Third Bank in connection with the BFC Credit Agreement to protect against movements in the floating LIBOR index. Accordingly, on May 16, 2019, BFC entered into the 1992 ISDA Master Agreement, along with the Schedule to such Agreement, with Fifth Third Bank, and executed the related trade confirmations on May 17, 2019. The net interest rate across the BFC Credit Agreement and the swap transaction results in a fixed rate of 5.09%.

The obligations of BFC to Fifth Third Bank under the swap agreement are treated as obligations under the BFC Credit Agreement and, accordingly, are secured by the same collateral securing the obligations of BFC under the BFC Credit Agreement.

The BFC Credit Agreement also requires BFC to maintain a debt service reserve at each of Liberty Bank and Fifth Third Bank of \$1.25 million, both of which were funded on May 10, 2019, to be held in deposit accounts at each respective bank, with funds to be disbursed with the consent of or at the request of the required lenders in their sole discretion. Each of Liberty Bank and Fifth Third Bank also has an operation and module replacement reserve (“O&M Reserve”) of \$250,000, both of which were funded at closing of the BFC Credit Agreement, to be held in deposit accounts at each respective bank, and thereafter BFC is required to deposit \$100,000 per month into each O&M Reserve for the first five years of the BFC Credit Agreement, with such funds to be released at the sole discretion of Liberty Bank and Fifth Third Bank, as applicable. BFC is also required to maintain excess cash flow reserve accounts at each of Liberty Bank and Fifth Third Bank and to evenly split and deposit the excess cash flows from the Bridgeport Fuel Cell Project into these accounts. Excess cash flow consists of cash generated by BFC from the Bridgeport Fuel Cell Project after payment of all expenses (including after payment of intercompany service fees to the Company), debt service to Liberty Bank and Fifth Third Bank, the funding of all required reserves, and payments to Connecticut Green Bank for the subordinated facility. BFC is also required to maintain a debt service coverage ratio of not less than 1.20, measured for the trailing year based on fiscal quarters beginning with the quarter ended July 31, 2020. The BFC Credit Agreement contains representations, warranties and other covenants. The Company also has certain quarterly and annual financial reporting requirements under the BFC Credit Agreement. The annual financial statements to be provided pursuant to such requirements are to be audited and accompanied by a report of an independent certified public accountant, which report shall not include a “going concern” matter of emphasis or any qualification or exception as to the scope of such audit.

Orion Senior Secured Credit Facility. On October 31, 2019, we (and certain of our subsidiaries as guarantors) entered into the Orion Credit Agreement with the Agent, and its affiliates, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., and Orion Energy Credit Opportunities Fund II PV, L.P., as lenders, regarding a \$200.0 million senior secured credit facility (the “Orion Facility”), structured as a delayed draw term loan, to be provided by the lenders, subject to certain lender approvals. In conjunction with the closing of the Orion Facility, on October 31, 2019, we drew down \$14.5 million and received \$14.1 million after a Loan Discount (described below) of \$0.4 million in the Initial Funding to fully repay debt outstanding to NRG and Generate and to fund dividends paid to the holders of our Series B Preferred Stock on or before November 15, 2019. The balance of the Initial Funding was used primarily to pay third party costs and expenses associated with closing of the Orion Facility.

The Initial Funding is secured by corporate assets as described in the Pledge and Security Agreement among us, certain of our subsidiaries as guarantors, and the Agent (the “Pledge and Security Agreement”), including our intellectual property assets and our interest in certain fuel cell projects owned by us, but not including liens on certain of our assets and projects which are currently subject to other third party financing and for which none of the proceeds of the Initial Funding were applied (“Excluded Assets”). Those corporate subsidiaries whose assets are pledged to the Agent as part of the collateral are also corporate guarantors of the Orion Facility. As of the Initial Funding, the following projects had assets that were not pledged as collateral for the Orion Facility and were included in Excluded Assets: (a) the Bridgeport Project; (b) the Pfizer Project; (c) the Riverside Regional Water Quality Control Project; (d) the Santa Rita Jail Project; (e) the Triangle Street Project; (f) the UC Irvine Medical Center Project; (g) the CCSU Project and (h) the Groton Project (as described elsewhere herein). Additionally, our corporate headquarters at 3 Great Pasture Road, Danbury, Connecticut and certain scheduled equipment previously pledged to the State of Connecticut to secure the \$10.0 million State of Connecticut loan used to complete the expansion of our Torrington manufacturing facility are Excluded Assets.

In connection with the Company's providing collateral to the Agent for the Orion Facility, the Company granted security interests to the Agent in all of the Company's bank accounts subject to deposit account security agreements, other than certain bank accounts referred to as "Excluded Accounts" and bank accounts maintained for Excluded Assets (as defined in the Orion Credit Agreement). Certain bank accounts have been established pursuant to the terms and conditions of the Orion Credit Agreement, for which security interests have been granted to the Agent, including general corporate accounts, accounts for each of the Covered Projects (as defined in the Orion Credit Agreement), a Project Proceeds Account (for the proceeds of Permitted Project Dispositions/Refinancings), a Borrower Waterfall Account (into which net operating cash flow of the Company after payment of operating expenses will be deposited for the payment of debt service to the Agent), a Debt Reserve Account (to fund a reserve for required debt service payments to the State of Connecticut and Connecticut Green Bank), a Preferred Reserve Account (to fund a reserve for required dividends on the Company's Series B Preferred Stock and the Series 1 Preferred Shares (or, in lieu of such dividends, the amount required to redeem shares of Series 1 Preferred Stock in an amount equal to the amount of dividends that would otherwise have been paid in respect thereof)), a Module Replacement Reserve Account (to fund a reserve intended to be for the cost of module replacements for projects owned by the Company that would occur during the outstanding term of the Orion Facility) and certain other accounts. Excluded Accounts consist of bank accounts of the Company used to collateralize performance bonds and other sureties for projects and third party obligations and certain other certain operating accounts of the Company (i.e., payroll, benefits, sales and income tax withholding and related accounts).

Subsequent to October 31, 2019, a second draw (the "Second Funding") of \$65.5 million, funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P., was made on November 22, 2019 to fully repay our outstanding third party debt with respect to the outstanding construction loan to Fifth Third Bank on the Groton Project and the outstanding loan to Webster Bank on the CCSU Project as well as to fund remaining going forward construction costs and anticipated capital expenditures relating to the Groton Project (a 7.4 MW project), the LIPA Yaphank Solid Waste Management Project (a 7.4 MW project), and the Tulare BioMAT project (a 2.8 MW project). The funds drawn in the Second Funding were reduced by a Loan Discount (described below) of \$1.6 million, which was retained by the lenders. Simultaneously with the Second Funding, the lien on our intellectual property assets that was granted to the Agent at the time of the Initial Funding was released and a lien was granted to the Agent to secure the Orion Facility on the assets of the Groton Project and CCSU Project as well as with respect to the equity interests in such project companies.

In conjunction with the Second Funding, the Company and the other loan parties entered into the First Amendment to the Orion Credit Agreement (the "First Orion Amendment"), which required the Company to establish a \$5 million debt reserve, with such reserve to be released on the first date following the date of the Second Funding on which all of the following events shall have occurred: (a) each of (x) the commercial operation date for the Tulare BioMAT project shall have occurred and (y) a disposition, refinancing or tax equity investment in the Tulare BioMAT project of at least \$5 million is consummated; (b) each of (x) the 7.4 MW project in Groton, Connecticut (the "Groton Project") shall have achieved its business plan in accordance with the Groton Construction Budget (as defined in the Credit Agreement), (y) the commercial operation date for the Groton Project shall have occurred and (z) the Groton Project shall have met its annualized output and heat rate guarantees for three months; and (c) a disposition, refinancing or tax equity investment of at least \$30 million shall have occurred with respect to the Groton Project. The First Orion Amendment further requires the Company to (i) provide, no later than December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing), a biogas sale and purchase agreement through December 31, 2021 for the Tulare BioMAT project, which was obtained as of such date; (ii) obtain by December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing) a fully executed contract for certain renewable energy credits for the Groton Project, which was obtained as of such date, and (iii) provide by January 31, 2020 (or such later date as the Agent may, in its sole discretion, agree in writing) certain consents and estoppels from CMEEC related to the Groton Project and an executed seventh modification to the lease between CMEEC and the United States Government, acting by and through the Department of the Navy. The First Orion Amendment provides that, if the requirements set forth in clauses (ii) and (iii) above are not timely satisfied, the Company will grant the Agent, on behalf of the lenders, a security interest and lien on all of the Company's intellectual property, with such lien and security interest to be released at such time as the Company has satisfied such requirements.

On January 20, 2020, in conjunction with the January 2020 Letter Agreement, and in order to obtain the lenders' consent to the January 2020 Letter Agreement as required under the Orion Credit Agreement, the Company and the

other loan parties entered into the Second Orion Amendment, which adds a new affirmative covenant to the Orion Credit Agreement that obligates the Company to, and to cause FCE Ltd. to, on or prior to November 1, 2021, either (i) pay and satisfy in full all of their respective obligations in respect of, and fully redeem and cancel, all of the Series 1 Preferred Shares of FCE Ltd., or (ii) deposit in a newly created account of FCE Ltd. or the Company cash in an amount sufficient to pay and satisfy in full all of their respective obligations in respect of, and to effect a redemption and cancellation in full of, all of the Series 1 Preferred Shares of FCE Ltd. The Second Orion Amendment also provides that the articles of FCE Ltd. setting forth the modified terms of the Series 1 Preferred Shares will be considered a “Material Agreement” under the Orion Credit Agreement. Under the Second Orion Amendment, a failure to satisfy this new affirmative covenant or to otherwise comply with the terms of the Series 1 Preferred Shares will constitute an event of default under the Orion Credit Agreement, which could result in the acceleration of any amounts outstanding under the Orion Credit Agreement.

We may draw the remainder of the Orion Facility, \$120.0 million, over the first 18 months following the Initial Funding and subject to the Agent’s approval to fund: (i) construction costs, inventory and other capital expenditures of additional fuel cell projects with contracted cash flows (under PPAs with creditworthy counterparties) that meet or exceed a mutually agreed coverage ratio; and (ii) inventory, working capital, and other costs that may be required to be delivered by us on purchase orders, service agreements, or other binding customer agreements with creditworthy counterparties.

Under the Orion Credit Agreement, we also agreed to grant to the Agent a right of first offer (“ROFO”) with regard to construction financing indebtedness proposed to be incurred by us with respect to fuel cell projects intended to be owed by us. To the extent that the ROFO is not exercised by the Agent, we may obtain construction financing for these projects from third parties. The ROFO does not apply to, and there is no restriction on our right to consummate, take-out financings, including tax equity financings, of any projects upon completion of those projects and such projects’ being placed in service.

Under the Orion Credit Agreement, cash interest of 9.9% per annum will be paid quarterly in cash. In addition to the cash interest, “PIK” interest of 2.05% per annum will accrue which will be added to the outstanding principal balance of the Orion Facility but will be paid quarterly in cash to the extent of available cash after payment of our operating expenses and the funding of certain reserves for the payment of outstanding indebtedness to the State of Connecticut and Connecticut Green Bank. Each lender will fund its commitments on each funding date in an amount equal to the principal amount of the loans to be funded by such lender on such date, less 2.50% of the aggregate principal amount of the loans funded by such lender on such date (the “Loan Discount”), in accordance with the Loan Discount Letter entered into between us and the Agent as of October 31, 2019 (the “Loan Discount Letter”). Such Loan Discount shall be in all respects fully earned on the Initial Funding Date and non-refundable and non-creditable thereafter.

Outstanding principal on the Orion Facility will be amortized on a straight-line basis over a seven-year term in quarterly payments beginning one year after the Initial Funding; provided that, if we do not have sufficient cash on hand to make any required quarterly amortization payments, such amounts shall be deferred and payable at such time as sufficient cash is available to make such payments subject to all outstanding principal being due and payable on the maturity date, which is the date that is eight years after the closing date or October 31, 2027.

The Orion Credit Agreement includes mandatory prepayment requirements and a prepayment premium of up to 30% of the amount being prepaid in the event that certain triggering events occur, including events of loss (destruction of or damage to any property of a loan party) where the proceeds received from such events of loss are not applied to the repair or restoration of the affected property, the sale, transfer or other disposition of project assets funded by the Orion Facility, if the proceeds from such disposition are not reinvested in substantially similar assets that are useful and necessary for the business (as defined in the Orion Credit Agreement) pursuant to a transaction permitted under the Orion Credit Agreement within a certain period of time, the incurrence of debt other than permitted indebtedness (as defined in the Orion Credit Agreement) and certain events of default (as defined in the Orion Credit Agreement), and also includes a post-default rate increase feature in the event certain events of default occur (in each case as defined in the Orion Credit Agreement).

In connection with the closing of the Orion Credit Agreement and the Initial Funding, on October 31, 2019, the Company issued warrants to the Initial Funding lenders under the Orion Credit Agreement to purchase up to a total of 6,000,000 shares of the Company’s common stock, at an exercise price of \$0.310 per share (the “Initial Funding Warrants”). In addition, under the Orion Credit Agreement, on the date of the Second Funding (November 22, 2019),

the Company issued the warrants to the Second Funding lenders to purchase up to a total of 14,000,000 shares of the Company's common stock, with an exercise price with respect to 8,000,000 of such shares of \$0.242 per share and with an exercise price with respect to 6,000,000 of such shares of \$0.620 per share (the "Second Funding Warrants", and together with the Initial Funding Warrants, collectively the "Orion Warrants").

The Orion Warrants have an 8-year term from the date of issuance, are exercisable immediately beginning on the date of issuance, and include provisions permitting cashless exercises. The Orion Warrants contain provisions regarding adjustment to their exercise prices and the type or class of security issuable upon exercise, including, without limitation, adjustments as a result of the Company undertaking or effectuating (a) a stock dividend or dividend of other securities or property, (b) a stock split, subdivision or combination, (c) a reclassification, (d) the distribution by the Company to substantially all of the holders of its common stock (or other securities issuable upon exercise of an Orion Warrant) of rights, options or warrants entitling such holders to subscribe for or purchase common stock (or other securities issuable upon exercise of an Orion Warrant) at a price per share that is less than the average of the closing sales price per share of the Company's common stock for the ten consecutive trading days ending on and including the trading day before such distribution is publicly announced, and (e) a Fundamental Transaction (as defined in the Orion Warrants) or Change of Control (as defined in the Orion Credit Agreement).

In addition to the commitments listed in the table under the heading "Commitments and Significant Contractual Obligations," we have the following outstanding obligations.

Restricted Cash

As of October 31, 2019 and 2018, we have pledged approximately \$30.3 million and \$40.9 million, respectively, of our cash and cash equivalents as performance security and for letters of credit for certain banking requirements and contracts. As of October 31, 2019 and 2018, outstanding letters of credit totaled \$5.7 million and \$3.8 million, respectively. The letters of credit outstanding as of October 31, 2019 expire on various dates through August 2028. Under the terms of certain contracts, we will provide performance security for future contractual obligations. The restricted cash balance as of October 31, 2019 also included \$17.9 million primarily to support obligations under the power purchase and service agreements related to the PNC sale-leaseback transactions and \$6.7 million relating to future obligations associated with the Bridgeport Fuel Cell Project.

As of October 31, 2019 and 2018, we had uncertain tax positions aggregating \$15.7 million and have reduced our NOL carryforwards by this amount. Because of the level of NOLs and valuation allowances, unrecognized tax benefits, even if not resolved in our favor, would not result in any cash payment or obligation and therefore have not been included in the contractual obligation table under the heading "Commitments and Significant Contractual Obligations."

Power purchase agreements

Under the terms of our PPAs, customers agree to purchase power from our fuel cell power plants at negotiated rates. Electricity rates are generally a function of the customers' current and estimated future electricity pricing available from the grid. We are responsible for all operating costs necessary to maintain, monitor and repair our fuel cell power plants. Under certain agreements, we are also responsible for procuring fuel, generally natural gas or Biogas, to run our fuel cell power plants. In addition, under certain agreements, we are required to produce minimum amounts of power under our PPAs and we have the right to terminate PPAs by giving written notice to the customer, subject to certain exit costs. As of October 31, 2019, our operating portfolio was 26.1 MW.

Service and warranty agreements

We warranty our products for a specific period of time against manufacturing or performance defects. Our standard U.S. warranty period is generally 15 months after shipment or 12 months after acceptance of the product. In addition to the standard product warranty, we have contracted with certain customers to provide services to ensure the power plants meet minimum operating levels for terms of up to 20 years. Pricing for service contracts is based upon estimates of future costs, which could be materially different from actual expenses. Refer to "Critical Accounting Policies and Estimates" for additional details.

Advanced Technologies contracts

We have contracted with various government agencies and certain companies from private industry to conduct research and development as either a prime contractor or sub-contractor under multi-year, cost-reimbursement and/or cost-share type contracts or cooperative agreements. Cost-share terms require that participating contractors share the total cost of the project based on an agreed upon ratio. In many cases, we are reimbursed only a portion of the costs

incurred or to be incurred on the contract. While government research and development contracts may extend for many years, funding is often provided incrementally on a year-by-year basis if contract terms are met and Congress authorizes the funds. As of October 31, 2019 and 2018, Advanced Technologies contracts backlog totaled \$12.0 million and \$32.4 million, respectively, of which \$11.8 million and \$15.9 million, respectively, is funded and \$0.2 million and \$16.5 million, respectively, is unfunded. Should funding be terminated or delayed or if business initiatives change, we may choose to devote resources to other activities, including internally funded research and development.

Off-Balance Sheet Arrangements

We have no off-balance sheet debt or similar obligations, other than operating leases, which are not classified as debt. We do not guarantee any third-party debt. See Note 20. "Commitments and Contingencies" to our consolidated financial statements for the year ended October 31, 2019 included in this Annual Report on Form 10-K for further information.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The preparation of financial statements and related disclosures requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities. Actual results could differ from those estimates. Estimates are used in accounting for, among other things, revenue recognition, contract loss accruals, excess, slow-moving and obsolete inventories, product warranty accruals, loss accruals on service agreements, share-based compensation expense, allowance for doubtful accounts, depreciation and amortization, impairment of goodwill and in-process research and development intangible assets, impairment of long-lived assets (including project assets) and contingencies. Estimates and assumptions are reviewed periodically, and the effects of revisions are reflected in the consolidated financial statements in the period they are determined to be necessary.

Our critical accounting policies are those that are both most important to our financial condition and results of operations and require the most difficult, subjective or complex judgments on the part of management in their application, often as a result of the need to make estimates about the effect of matters that are inherently uncertain. Our accounting policies are set forth below.

Goodwill and Intangible Assets

Goodwill represents the excess of the aggregate purchase price over the fair value of the net assets acquired in a purchase business combination and is reviewed for impairment at least annually. The intangible asset represents indefinite-lived in-process research and development for cumulative research and development efforts associated with the development of solid oxide fuel cells (SOFC) stationary power generation and is also reviewed at least annually for impairment.

Accounting Standards Codification Topic 350, "Intangibles - Goodwill and Other" ("ASC 350") permits the assessment of qualitative factors to determine whether events and circumstances lead to the conclusion that it is necessary to perform the two-step goodwill impairment test required under ASC 350.

The Company completed its annual impairment analysis of goodwill and in-process research and development assets as of July 31, 2019 and 2018. The Company performed a qualitative assessment for fiscal year 2019 and determined that it was more likely than not that there was no impairment of goodwill or the indefinite-lived intangible asset.

Impairment of Long Lived Assets (including Project Assets)

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable. If events or changes in circumstances indicate that the carrying amount of the asset group may not be recoverable, we compare the carrying amount of an asset group to future undiscounted net cash flows, excluding interest costs, expected to be generated by the asset group and their ultimate disposition. If the sum of the undiscounted cash flows is less than the carrying value, the impairment to be recognized is measured by the amount by which the carrying amount of the asset group exceeds the fair value of the asset group.

During the year ended October 31, 2019, the Company recorded project asset impairment charges for (i) the Triangle Street Project and (ii) the Bolthouse Farms Project, which are further described as follows:

- i. *Impairment charge for the Triangle Street Project:* In the fourth quarter of fiscal 2019, management determined that it will not be able to secure a PPA with terms acceptable to the Company for the Triangle Street Project. Therefore, it is management's current intention to operate the project under a merchant model for the next 5 years. The project will sell power through the Connecticut grid under wholesale tariff rates and Renewable Energy Credits (RECs) to market participants. As a result of management's decision to operate the project in this manner, an impairment charge of \$14.4 million was recorded in the fourth quarter of fiscal 2019. The amount of the impairment charge was determined by comparing the estimated discounted cash flows of the project and the expected residual value of the project to its carrying value. Management expects to continue to pursue economic enhancements for this project, but cannot currently assess the probability of closing on a revenue contract for the power above wholesale market rates.
- ii. *Impairment charge for the Bolthouse Farms Project:* An impairment charge for the Bolthouse Farms Project was recorded as management has decided to pursue termination of the PPA given recent regulatory changes impacting the future cost profile for the Company and Bolthouse Farms. Since it is considered probable that the PPA will be terminated, a \$3.1 million impairment charge was recorded, which reflects the difference between the carrying value of the asset and the value of the components that are expected to be redeployed to other projects. This project was removed from the Company's backlog as of October 31, 2019.

The Company recorded a \$0.5 million impairment of a project asset during the year ended October 31, 2018 due to the termination of the project.

Revenue Recognition

Under Accounting Standards Codification ("ASC") Topic 606: *Revenue from Contracts with Customer* ("Topic 606"), the amount of revenue recognized for any goods or services reflects the consideration that the Company expects to be entitled to receive in exchange for those goods and services. To achieve this core principle, the Company applies the following five-step approach: (1) identify the contract with the customer; (2) identify the performance obligations in the contract; (3) determine the transaction price; (4) allocate the transaction price to performance obligations in the contract; and (5) recognize revenue when or as a performance obligation is satisfied.

A contract is accounted for when there has been approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. Performance obligations under a contract are identified based on the goods or services that will be transferred to the customer that are both capable of being distinct and are distinct in the context of the contract. In certain instances, the Company has concluded distinct goods or services should be accounted for as a single performance obligation that is a series of distinct goods or services that have the same pattern of transfer to the customer. To the extent a contract includes multiple promised goods or services, the Company must apply judgment to determine whether the customer can benefit from the goods or services either on their own or together with other resources that are readily available to the customer (the goods or services are distinct) and if the promise to transfer the goods or services to the customer is separately identifiable from other promises in the contract (the goods or services are distinct in the context of the contract). If these criteria are not met, the promised services are accounted for as a single performance obligation. The transaction price is determined based on the consideration that the Company will be entitled to in exchange for transferring goods or services to the customer. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price, generally utilizing the expected value method. Determining the transaction price requires judgment. If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation based on a relative standalone selling price basis. Standalone selling price is determined by the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, the Company estimates the standalone selling price by taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations. Performance obligations are satisfied either over time or at a point in time as discussed in

further detail below. In addition, the Company's contracts with customers generally do not include significant financing components or non-cash consideration.

Revenue streams are classified as follows:

Product. Includes the sale of completed project assets, sale and installation of fuel cell power plants including site engineering and construction services, and the sale of modules, BOP components and spare parts to customers.

Service. Includes performance under long-term service agreements for power plants owned by third parties.

License and royalty. Includes license fees and royalty income from the licensure of intellectual property.

Generation. Includes the sale of electricity under PPAs and utility tariffs from project assets retained by the Company. This also includes revenue received from the sale of other value streams from these assets including the sale of heat, steam, capacity and renewable energy credits.

Advanced Technologies. Includes revenue from customer-sponsored and government-sponsored Advanced Technologies projects.

See below for discussion of revenue recognition under Topic 606 by disaggregated revenue stream, including a comparison to revenue recognition treatment under ASC 605, Revenue Recognition ("ASC 605"). Our revenue is generated from customers located throughout the U.S., Europe and Asia and from agencies of the U.S. government.

Completed project assets

Contracts for the sale of completed project assets include the sale of the project asset, the assignment of the service agreement, and the assignment of the PPA. The relative stand-alone selling price is estimated and is used as the basis for allocation of the contract consideration. Revenue is recognized upon the satisfaction of the performance obligations, which includes the transfer of control of the project asset to the customer, which is when the contract is signed and the PPA is assigned to the customer. See below for further discussion regarding revenue recognition for service agreements. The revenue recognition for completed project assets under Topic 606 is consistent with treatment under ASC 605.

Contractual payments related to the sale of the project asset and assignment of the PPA are generally received up-front. Payment terms for service agreements are generally ratable over the term of the agreement.

Service agreements

Service agreements represent a single performance obligation whereby the Company performs all required maintenance and monitoring functions, including replacement of modules, to ensure the power plant(s) under the service agreement generate a minimum power output. To the extent the power plant(s) under service agreements do not achieve the minimum power output, certain service agreements include a performance guarantee penalty. Performance guarantee penalties represent variable consideration, which is estimated for each service agreement based on past experience, using the expected value method. The net consideration for each service agreement is recognized using costs incurred to date relative to total estimated costs at completion to measure progress. Under ASC 605, revenue for service agreements was generally recorded ratably over the term of the service agreement, as the performance of routine monitoring and maintenance under the service agreements was expected to be incurred on a straight-line basis. If there was an estimated module exchange during the term, the costs of performance were not expected to be incurred on a straight-line basis, and therefore a portion of the initial contract value relating to the module exchange was deferred and recognized upon such module replacement event. Prior to the implementation of Topic 606, an estimate for a performance guarantee was not recorded until a performance issue occurred at a particular power plant. At that point, the actual power plant's output was compared against the minimum output guarantee and an accrual was recorded. Furthermore, under ASC 605, performance guarantee accruals were recorded based on actual performance and the related expense was recorded to service and license cost of revenues. The review of power plant performance was updated for each reporting period to incorporate the most recent performance of the power plant and minimum output guarantee payments made to customers, if applicable.

The Company reviews its cost estimates on service agreements on a quarterly basis and records any changes in estimates on a cumulative catch-up basis.

Loss accruals for service agreements are recognized to the extent that the estimated remaining costs to satisfy the performance obligation exceed the estimated remaining unrecognized net consideration. Estimated losses are recognized in the period in which losses are identified.

The Company records any amounts that are billed to customers in excess of revenue recognized as deferred revenue and revenue recognized in excess of amounts billed to customers as unbilled receivables. Payment terms for service agreements are generally ratable over the term of the agreement.

Advanced Technologies contracts

Advanced Technologies contracts include the promise to perform research and development services and as such this represents one performance obligation. Revenue from most government sponsored Advanced Technologies projects is recognized as direct costs are incurred plus allowable overhead less cost share requirements, if any. Revenue is only recognized to the extent the contracts are funded. Revenue from fixed price Advanced Technologies projects is recognized using the cost to cost input method. There was no impact of adoption of Topic 606 on revenue recognition for Advanced Technologies contracts.

The Company records any amounts that are billed to customers in excess of revenue recognized as deferred revenue and revenue recognized in excess of amounts billed to customers as unbilled receivables. Payments are based on costs incurred for government sponsored Advanced Technologies projects and upon completion of milestones for all other projects.

License agreements

The Company entered into manufacturing and technology transfer agreements (the “license agreements”) with POSCO Energy in 2007, 2009 and 2012. Revenue from the license fees received from POSCO Energy was previously recognized over the term of the associated agreements. In connection with the adoption of Topic 606, several performance obligations were identified including previously satisfied performance obligations for the transfer of licensed intellectual property, two performance obligations for specified upgrades of the previously licensed intellectual property, a performance obligation to deliver unspecified upgrades to the previously licensed intellectual property on a when-and-if-available basis, and a performance obligation to provide technical support for previously delivered intellectual property. The performance obligations related to the specified upgrades will be satisfied and related consideration recognized as revenue upon the delivery of the specified upgrades. The performance obligations for unspecified upgrades and technical support are being recognized on a straight-line basis over the license term on the basis that this represents the method that best depicts the progress towards completion of the related performance obligations. All fixed consideration for the license agreements was previously collected.

Effective as of June 11, 2019, the Company entered into the EMRE License Agreement with EMRE, pursuant to which the Company agreed, subject to the terms of the EMRE License Agreement, to grant EMRE and its affiliates a non-exclusive, worldwide, fully paid, perpetual, irrevocable, non-transferrable license and right to use the Company’s patents, data, know-how, improvements, equipment designs, methods, processes and the like to the extent it is useful to research, develop, and commercially exploit carbonate fuel cells in applications in which the fuel cells concentrate carbon dioxide from industrial and power sources and for any other purpose attendant thereto or associated therewith. Such right and license is sublicensable to third parties performing work for or with EMRE or its affiliates, but shall not otherwise be sublicensable. Upon the payment by EMRE to the Company of \$10.0 million, which was received by the Company on June 14, 2019, EMRE and its affiliates were fully vested in the rights and licenses granted in the EMRE License Agreement, and any further obligations under the license agreement are considered by the Company to be minimal. As a result, the total contract value of \$10.0 million was recorded as revenue for the fiscal year ended October 31, 2019.

Generation revenue

For project assets where customers purchase electricity from the Company under certain PPAs, the Company has determined that these agreements should be accounted for as operating leases pursuant to ASC 840, Leases. Revenue

is recognized when electricity has been delivered based on the amount of electricity delivered at rates specified under the contracts, assuming all other revenue recognition criteria are met. For PPAs that are not accounted for as leases, revenue is recognized based on the output method as there is a directly observable output to the customer (electricity delivered to the customer and immediately consumed). The Company is entitled to be compensated for performance completed to date (electricity delivered to the customer).

Sale-Leaseback Accounting

The Company, through a wholly-owned subsidiary, has entered into sale-leaseback transactions for commissioned project assets where we have entered into a PPA with a customer who is both the site host and end user of the power. Due to the Company's continuing involvement with the project and the projects being considered integral equipment, sale accounting is precluded by ASC 840-40, "Leases". Accordingly, the Company uses the financing method to account for these transactions.

Under the financing method of accounting for a sale-leaseback, the Company does not recognize as income any of the sale proceeds received from the lessor that contractually constitutes payment to acquire the assets subject to these arrangements. Instead, the sale proceeds received are accounted for as financing obligations and leaseback payments made by the Company are allocated between interest expense and a reduction to the financing obligation. Interest on the financing obligation is calculated using the Company's incremental borrowing rate at the inception of the arrangement on the outstanding financing obligation. While we receive financing for the full value of the related power plant asset, we have not recognized revenue on the sale-leaseback transaction. Instead, revenue is recognized through the sale of electricity and energy credits which are generated as energy is produced. The sale-leaseback arrangements with PNC allow the Company to repurchase the project assets at fair market value.

Inventories

Inventories consist principally of raw materials and work-in-process. Inventories are reviewed to determine if valuation adjustments are required for obsolescence (excess, obsolete, and slow-moving inventory). This review includes analyzing inventory levels of individual parts considering the current design of our products and production requirements as well as the expected inventory needs for maintenance on installed power plants.

Warranty and Service Expense Recognition

We warranty our products for a specific period of time against manufacturing or performance defects. Our U.S. warranty is generally limited to a term of 15 months after shipment or 12 months after acceptance of our products. We accrue for estimated future warranty costs based on historical experience. We also provide for a specific accrual if there is a known issue requiring repair during the warranty period. Estimates used to record warranty accruals are updated as we gain further operating experience. As of October 31, 2019 and October 31, 2018, the warranty accrual, which is classified in accrued liabilities on the Consolidated Balance Sheets, totaled \$0.1 million.

In addition to the standard product warranty, we have entered into service agreements with certain customers to provide monitoring, maintenance and repair services for fuel cell power plants. Under the terms of these service agreements, the power plant must meet a minimum operating output during the term. If minimum output falls below the contract requirement, we may be subject to performance penalties or may be required to repair and/or replace the customer's fuel cell module. The Company has accrued for performance guarantees of \$0.8 million and \$1.1 million as of October 31, 2019 and 2018, respectively. Refer to Note 2. "Revenue Recognition" for the change in accounting effective as of November 1, 2019 relating to performance guarantees

The Company records loss accruals for service agreements when the estimated cost of future module exchanges and maintenance and monitoring activities exceeds the remaining unrecognized contract value. Estimates for future costs on service agreements are determined by a number of factors including the estimated remaining life of the module, used replacement modules available, and future operating plans for the power plant. Our estimates are performed on a contract by contract basis and include cost assumptions based on what we anticipate the service requirements will be to fulfill obligations for each contract. As of October 31, 2019 and October 31, 2018, our loss accruals on service agreements totaled \$3.3 million and \$0.9 million, respectively.

At the end of our service agreements, customers are expected to either renew the service agreement or, based on the Company's rights to title of the module, the module will be returned to the Company as the plant is no longer being maintained. As of October 31, 2019, the Company had \$1.0 million related to the residual value of replacement modules in power plants under service agreements compared to \$1.2 million as of October 31, 2018.

ACCOUNTING GUIDANCE UPDATE

Recently Adopted Accounting Guidance

In May 2014, the Financial Accounting Standards Board (the "FASB") issued ASU 2014-09, "Revenue from Contracts with Customers (Topic 606)". The adoption of Topic 606 by the Company on November 1, 2018 using the modified retrospective transition method resulted in a cumulative effect adjustment that increased Accumulated deficit by \$6.7 million.

In January 2017, the FASB issued ASU 2017-04, "Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment" which provides for a one-step quantitative impairment test, whereby a goodwill impairment loss will be measured as the excess of a reporting unit's carrying amount over its fair value (not to exceed the total goodwill allocated to that reporting unit). It eliminates Step 2 of the current two-step goodwill impairment test, under which a goodwill impairment loss is measured by comparing the implied fair value of a reporting unit's goodwill with the carrying amount of that goodwill. The Company early adopted this ASU effective November 1, 2018. The adoption of this ASU did not have an impact on the Company's consolidated financial statements.

Recent Accounting Guidance Not Yet Effective

In February 2016, the FASB issued ASU 2016-02, "Leases" that amends the accounting and disclosure requirements for leases. The new guidance requires that a lessee shall recognize a right-of-use ("ROU") asset and a corresponding lease liability, initially measured at the present value of the lease payments, in its balance sheet. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the Consolidated Statements of Operations. The Company was required to adopt the new guidance on November 1, 2019. In July 2018, the FASB issued an amendment to the new leasing standard which provides an alternative transition method that allows companies to recognize a cumulative effect adjustment to the opening balance sheet upon adoption. The Company intends to elect this alternative transition method and forgo the adjustments to comparative-period financial information.

The Company has both operating and capital leases (refer to Note 20. "Commitments and Contingencies") as well as sale-leaseback transactions that are accounted for under the finance method. The new standard provides entities with several practical expedient elections. Among them, the Company intends to elect the package of practical expedients that permits the Company to not reassess prior conclusions related to its leasing arrangements, lease classifications and initial direct costs. In addition, the Company plans to elect the practical expedients to not separate lease and non-lease components, to use hindsight in determining the lease terms and impairment of ROU assets, and to not apply the new standard's recognition requirements to short-term leases or use the portfolio approach to a group of leases with similar characteristics. Upon adoption of this ASU, the Company will record ROU assets and the present value of its lease liabilities which are currently not recognized on its consolidated balance sheet. The Company is in the process of implementing changes to its business processes, systems and controls to support the new lease standard and its disclosure requirements.

On adoption, the Company expects to recognize a lease liability of approximately \$10.3 million and corresponding ROU assets of approximately \$10.1 million. Any cumulative effect of the adoption recorded to accumulated deficit is not expected to be significant. The Company also does not expect there to be a significant net effect on the consolidated statements of operations, however, what was previously presented as rent expense related to operating leases will be recognized as interest expense on the Company's minimum lease obligation and depreciation of right-of-use asset.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Exposure Risk

Cash is invested overnight with high credit quality financial institutions and therefore we are not exposed to market risk on our cash holdings from changing interest rates. Based on our overall interest rate exposure as of October 31, 2019, including all interest rate sensitive instruments, a change in interest rates of 1% would not have a material impact on our results of operations.

Foreign Currency Exchange Risk

As of October 31, 2019 and 2018, approximately 6% and 4%, respectively, of our total cash, cash equivalents and investments were in currencies other than U.S. dollars (primarily the Euro, Canadian dollars and South Korean Won) and we have no plans of repatriation. We make purchases from certain vendors in currencies other than U.S. dollars. Although we have not experienced significant foreign exchange rate losses to date, we may in the future, especially to the extent that we do not engage in currency hedging activities. The economic impact of currency exchange rate movements on our operating results is complex because such changes are often linked to variability in real growth, inflation, interest rates, governmental actions and other factors. These changes, if material, may cause us to adjust our financing and operating strategies.

Derivative Fair Value Exposure Risk

Series 1 Preferred Shares

The conversion feature and the variable dividend obligation of FCE Ltd.'s Series 1 Preferred Shares are embedded derivatives that require bifurcation from the host contract. The aggregate fair value of these derivatives included within long-term debt and other liabilities as of October 31, 2019 and 2018 was \$0.6 million and \$0.8 million, respectively. The fair value was based on valuation models using various assumptions, including historical stock price volatility, risk-free interest rate and a credit spread based on the yield indexes of technology high yield bonds, foreign exchange volatility as the Series 1 Preferred Shares are denominated in Canadian dollars, and the closing price of our common stock. Changes in any of these assumptions would change the underlying fair value with a corresponding charge or credit to operations.

Interest Rate Swap

On May 16, 2019, an interest rate swap agreement (the "Swap Agreement") was entered into with Fifth Third Bank in connection with the BFC Credit Agreement for the term of the loan. The net interest rate across the BFC Credit Agreement and the swap transaction results in a fixed rate of 5.09%. The interest rate swap will be adjusted to fair value on a quarterly basis. The estimated fair value is based on Level 2 inputs including primarily the forward LIBOR curve available to swap dealers. The valuation methodology involves comparison of (i) the sum of the present value of all monthly variable rate payments based on a reset rate using the forward LIBOR curve and (ii) the sum of the present value of all monthly fixed rate payments on the notional amount which is equivalent to the outstanding principal amount of the loan. The fair value adjustments for the fiscal year ended October 31, 2019 resulted in \$0.6 million of charges.

Item 8. CONSOLIDATED FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
FuelCell Energy, Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of FuelCell Energy, Inc. and subsidiaries (the Company) as of October 31, 2019 and 2018, the related consolidated statements of operations and comprehensive loss, changes in equity, and cash flows for each of the years in the three-year period ended October 31, 2019, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of October 31, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year period ended October 31, 2019, in conformity with U.S. generally accepted accounting principles.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company has changed its method of accounting for revenue as of November 1, 2018 due to the adoption of Financial Accounting Standards Board Accounting Standards Codification Topic 606, *Revenue from Contracts with Customers*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 1995.

Hartford, Connecticut
January 22, 2020

FUELCELL ENERGY, INC.
Consolidated Balance Sheets
October 31, 2019 and 2018
(Amounts in thousands, except share and per share amounts)

	2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents, unrestricted	\$ 9,434	\$ 39,291
Restricted cash and cash equivalents - short-term	3,473	5,806
Accounts receivable, net of allowance for doubtful accounts of \$0 and \$160 as of October 31, 2019 and 2018, respectively	3,292	9,280
Unbilled receivables	7,684	13,759
Inventories	54,515	53,575
Other current assets	5,921	8,592
Total current assets	84,319	130,303
Restricted cash and cash equivalents - long-term	26,871	35,142
Inventories - long-term	2,179	—
Project assets	144,115	99,600
Property, plant and equipment, net	41,134	48,204
Goodwill	4,075	4,075
Intangible assets	21,264	9,592
Other assets	9,489	13,505
Total assets	<u>\$ 333,446</u>	<u>\$ 340,421</u>
LIABILITIES AND EQUITY		
Current liabilities:		
Current portion of long-term debt	\$ 21,916	\$ 17,596
Accounts payable	16,943	22,594
Accrued liabilities	11,452	7,632
Deferred revenue	11,471	11,347
Preferred stock obligation of subsidiary	950	952
Total current liabilities	62,732	60,121
Long-term deferred revenue	28,705	16,793
Long-term preferred stock obligation of subsidiary	16,275	14,965
Long-term debt and other liabilities	90,140	71,619
Total liabilities	197,852	163,498
Redeemable Series B preferred stock (liquidation preference of \$64,020 as of October 31, 2019 and 2018)	59,857	59,857
Redeemable Series C preferred stock (liquidation preference of \$8,992 as of October 31, 2018)	—	7,480
Redeemable Series D preferred stock (liquidation preference of \$30,680 as of October 31, 2018)	—	27,392
Total equity:		
Stockholders' equity		
Common stock (\$0.0001 par value; 225,000,000 shares authorized as of October 31, 2019 and 2018; 193,608,684 and 7,972,686 shares issued and outstanding as of October 31, 2019 and 2018, respectively)	19	1
Additional paid-in capital	1,151,454	1,073,463
Accumulated deficit	(1,075,089)	(990,867)
Accumulated other comprehensive loss	(647)	(403)
Treasury stock, Common, at cost (42,496 and 13,042 shares as of October 31, 2019 and 2018, respectively)	(466)	(363)
Deferred compensation	466	363
Total stockholders' equity	75,737	82,194
Total liabilities and stockholders' equity	<u>\$ 333,446</u>	<u>\$ 340,421</u>

See accompanying notes to consolidated financial statements.

FUELCELL ENERGY, INC.
Consolidated Statements of Operations and Comprehensive Loss
For the Years Ended October 31, 2019, 2018, and 2017
(Amounts in thousands, except share and per share and related party revenue amounts)

	2019	2018	2017
Revenues:			
Product sales	\$ 481	\$ 52,490	\$ 43,047
Service agreements and license revenues	26,618	15,757	27,050
Generation revenues	14,034	7,171	7,233
Advanced Technologies contract revenues	19,619	14,019	18,336
Total revenues	<u>60,752</u>	<u>89,437</u>	<u>95,666</u>
Costs of revenues:			
Cost of product sales	18,552	54,504	49,843
Cost of service agreements and license revenues	18,943	15,059	25,285
Cost of generation revenues	31,642	6,421	5,076
Cost of Advanced Technologies contract revenues	12,884	10,360	12,728
Total cost of revenues	<u>82,021</u>	<u>86,344</u>	<u>92,932</u>
Gross (loss) profit	(21,269)	3,093	2,734
Operating expenses:			
Administrative and selling expenses	31,874	24,908	25,916
Research and development expenses	13,786	22,817	20,398
Restructuring expense	—	—	1,355
Total operating expenses	<u>45,660</u>	<u>47,725</u>	<u>47,669</u>
Loss from operations	(66,929)	(44,632)	(44,935)
Interest expense	(10,623)	(9,055)	(9,171)
Other income, net	93	3,338	247
Loss before (provision) benefit for income taxes	(77,459)	(50,349)	(53,859)
(Provision) benefit for income taxes	(109)	3,015	(44)
Net loss	(77,568)	(47,334)	(53,903)
Series A warrant exchange	(3,169)	—	—
Series B Preferred stock dividends	(3,231)	(3,200)	(3,200)
Series C Preferred stock deemed dividends and redemption value adjustment, net	(6,522)	(9,559)	—
Series D Preferred stock deemed dividends and redemption accretion	(9,755)	(2,075)	—
Net loss attributable to common stockholders	<u>\$ (100,245)</u>	<u>\$ (62,168)</u>	<u>\$ (57,103)</u>
Net loss to common stockholders per share			
Basic	\$ (1.82)	\$ (9.01)	\$ (13.73)
Diluted	\$ (1.82)	\$ (9.01)	\$ (13.73)
Weighted average shares outstanding			
Basic	55,081,266	6,896,189	4,159,575
Diluted	55,081,266	6,896,189	4,159,575
	2019	2018	2017
Net loss	\$ (77,568)	\$ (47,334)	\$ (53,903)
Other comprehensive loss:			
Foreign currency translation adjustments	(244)	12	129
Comprehensive loss	<u>\$ (77,812)</u>	<u>\$ (47,322)</u>	<u>\$ (53,774)</u>

See accompanying notes to consolidated financial statements.

FUELCCELL ENERGY, INC.
Consolidated Statements of Changes in Equity
For the Years Ended October 31, 2019, 2018, and 2017
(Amounts in thousands, except share amounts)

	Shares	Amount	Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Deferred Compensation	Total Equity	
Balance, October 31, 2016	2,931,202	\$	1,004,570	\$	(889,630)	\$	(544)	\$	114,396
Sale of common stock, warrants and public offering	1,000,000	—	13,884	—	—	—	—	—	13,884
Exercise of prepaid warrants and warrants	1,138,411	1	12,721	—	—	—	—	—	12,722
Sale of common stock	603,786	—	12,431	—	—	—	—	—	12,431
Common stock issued, non-employee compensation	7,167	—	129	—	—	—	—	—	129
Share based compensation	—	—	4,585	—	—	—	—	—	4,585
Taxes paid upon vesting of restricted stock awards, net of stock issued under benefit plans	107,056	—	(84)	—	—	—	—	—	(84)
Series C convertible preferred stock conversions	9,058	—	167	—	—	—	—	—	167
Preferred dividends — Series B	—	—	(3,200)	—	—	—	—	—	(3,200)
Effect of foreign currency translation	—	—	—	—	129	—	—	—	129
Adjustment for deferred compensation	—	—	—	—	—	(101)	101	—	—
Net loss	(5,611)	—	—	(53,903)	—	—	—	—	(53,903)
Balance, October 31, 2017	5,791,068	\$	1,045,203	\$	(943,533)	\$	(415)	\$	101,256
Sale of common stock, net of fees	476,265	—	7,129	—	—	—	—	—	7,129
Exercise of warrants	216,309	—	3,326	—	—	—	—	—	3,326
Common stock issued, non-employee compensation	13,226	—	282	—	—	—	—	—	282
Share based compensation	—	—	3,238	—	—	—	—	—	3,238
Taxes paid upon vesting of restricted stock awards, net of stock issued under benefit plans	(14,913)	—	(660)	—	—	—	—	—	(660)
Series C convertible preferred stock conversions	1,496,368	—	20,220	—	—	—	—	—	20,220
Preferred dividends — Series B	—	—	(3,200)	—	—	—	—	—	(3,200)
Series D Preferred stock redemption accretion	—	—	(2,075)	—	—	—	—	—	(2,075)
Effect of foreign currency translation	—	—	—	—	12	—	—	—	12
Adjustment for deferred compensation	(5,637)	—	—	—	—	(83)	83	—	—
Net loss	—	—	—	(47,334)	—	—	—	—	(47,334)
Balance, October 31, 2018	7,972,686	\$	1,073,463	\$	(990,867)	\$	(403)	\$	82,194
Sale of common stock, net of fees	119,128,677	12	43,654	—	—	—	—	—	43,666
Common stock issued, non-employee compensation	29,454	—	102	—	—	—	—	—	102
Share based compensation	—	—	2,804	—	—	—	—	—	2,804
Taxes paid upon vesting of restricted stock awards, net of stock issued under benefit plans	52,607	—	(200)	—	—	—	—	—	(200)
Series A Warrant Exchange	500,000	—	—	—	—	—	—	—	—
Series C convertible preferred stock conversions	3,914,218	—	15,489	—	—	—	—	—	15,489
Series C convertible preferred stock adjustment for beneficial conversion feature	—	—	—	—	—	—	—	—	—
Series C convertible stock redemption value adjustments	—	—	6,586	—	—	—	—	—	6,586
Preferred dividends — Series B	—	—	(14,597)	—	—	—	—	—	(14,597)
Series D convertible preferred stock conversions	—	—	(3,231)	—	—	—	—	—	(3,231)
Series D Preferred stock redemption accretion	62,040,496	6	31,177	—	—	—	—	—	31,183
Series D Preferred stock redemption accretion	—	—	(3,793)	—	—	—	—	—	(3,793)
Impact of the adoption of Topic 606	—	—	—	(6,654)	—	—	—	—	(6,654)
Effect of foreign currency translation	—	—	—	—	(244)	—	—	—	(244)
Adjustment for deferred compensation	(29,454)	—	—	—	—	(103)	103	—	—
Net loss	—	—	—	(77,568)	—	—	—	—	(77,568)
Balance, October 31, 2019	193,608,684	\$	1,151,454	\$	(1,075,089)	\$	(647)	\$	75,737

See accompanying notes to consolidated financial statement

FUELCELL ENERGY, INC.
Consolidated Statements of Cash Flows
For the Years Ended October 31, 2019, 2018 and 2017
(Amounts in thousands, except share amounts)

	2019	2018	2017
Cash flows from operating activities:			
Net loss	\$ (77,568)	\$ (47,334)	\$ (53,903)
Adjustments to reconcile net loss to net cash used in operating activities:			
Share-based compensation	2,804	3,238	4,585
(Gain) loss from change in fair value of embedded derivatives	(176)	60	91
Depreciation	12,353	8,648	8,518
Non-cash interest expense on preferred stock and debt obligations	6,097	5,957	6,256
Deferred income taxes	—	(3,035)	—
Impairment of property, plant and equipment and project assets	20,360	—	—
Unrealized loss on derivative contract	624	—	—
Unrealized foreign exchange (gains) losses	(29)	(223)	581
Other non-cash transactions	716	760	165
Decrease (increase) in operating assets:			
Accounts receivable	4,842	24,169	(35,388)
Unbilled receivables	(4,488)	24,562	(15,888)
Inventories	(6,427)	31,714	(7,972)
Other assets	2,120	(2,264)	(714)
Increase (Decrease) in operating liabilities:			
Accounts payable	(173)	(19,846)	25,020
Accrued liabilities	2,377	(11,345)	(2,290)
Deferred revenue	5,996	1,261	(906)
Net cash (used in) provided by operating activities	(30,572)	16,322	(71,845)
Cash flows from investing activities:			
Capital expenditures	(2,151)	(10,028)	(12,351)
Project asset expenditures	(31,675)	(41,232)	(19,726)
Asset acquisition	(35,474)	—	633
Net cash used in investing activities	(69,300)	(51,260)	(31,444)
Cash flows from financing activities:			
Repayment of debt	(48,395)	(16,616)	(8,571)
Proceeds from debt	69,596	13,091	17,877
Payments of deferred finance costs	(3,302)	(352)	(206)
Net proceeds from issuance of Series C preferred shares	—	—	27,866
Net proceeds from issuance of Series D preferred shares	—	25,317	—
Proceeds from sale of common stock and warrant exercises, net	43,573	10,455	39,396
Payment of preferred dividends and return of capital	(1,840)	(4,178)	(4,156)
Common stock issued for stock plans and related expenses	23	—	86
Net cash provided by financing activities	59,655	27,717	72,292
Effects on cash from changes in foreign currency rates	(244)	12	129
Net decrease increase in cash, cash equivalents, and restricted cash	(40,461)	(7,209)	(30,868)
Cash, cash equivalents, and restricted cash—beginning of year	80,239	87,448	118,316
Cash, cash equivalents, and restricted cash—end of year	\$ 39,778	\$ 80,239	\$ 87,448

See accompanying notes to the consolidated financial statements.

Note 1. Nature of Business, Basis of Presentation and Significant Accounting Policies

Nature of Business and Basis of Presentation

FuelCell Energy, Inc., together with its subsidiaries (the “Company”, “FuelCell Energy”, “we”, “us”, or “our”) is a leading integrated fuel cell company with a growing global presence in delivering environmentally-responsible distributed baseload power solutions through our proprietary molten-carbonate fuel cell technology. We develop turn-key distributed power generation solutions and operate and provide comprehensive service for the life of the power plant. We are working to expand the proprietary technologies that we have developed over the past five decades into new products, markets and geographies. Our mission and purpose remains to utilize our proprietary, state-of-the-art fuel cell power plants to reduce the global environmental footprint of baseload power generation by providing environmentally responsible solutions for reliable electrical power, hot water, steam, chilling, hydrogen, micro-grid applications, and carbon capture.

The consolidated financial statements include our accounts and those of our wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated.

On May 8, 2019, the Company effected a 1-for-12 reverse stock split, reducing the number of the Company’s common shares outstanding on that date from 183,411,230 shares to 15,284,269 shares. The number of authorized shares of common stock remained unchanged at 225,000,000 shares and the number of authorized shares of preferred stock remained unchanged at 250,000 shares. Additionally, the conversion rate of our Series B Preferred Stock (as defined elsewhere herein), the conversion price of our Series C Preferred Stock and Series D Preferred Stock (each as defined elsewhere herein), the exchange price of our Series 1 Preferred Shares (as defined elsewhere herein), the exercise price of all then outstanding options and warrants, and the number of shares reserved for future issuance pursuant to our equity compensation plans were all adjusted proportionately in connection with the reverse stock split. All share and per share amounts and conversion prices presented herein have been adjusted retroactively to reflect these changes.

Certain reclassifications have been made to the prior year amounts to conform to the presentation for fiscal year 2019. The Company adopted Financial Accounting Standards Board Accounting Standards Codification Topic 606, “Revenue from Contracts with Customers” (“Topic 606”) effective November 1, 2018 and applied the modified retrospective transition method. As a result of the adoption of Topic 606, Unbilled receivables has been reclassified as a separate line item from Accounts receivable, net on the Consolidated Balance Sheets and Unbilled receivables has been classified as a separate item from Accounts receivable, net in the Consolidated Statement of Cash Flows for the fiscal year ended October 31, 2018 and 2017.

Liquidity

The Company faced significant liquidity challenges in fiscal 2019, which were addressed through a series of actions late in the fiscal year and subsequent to fiscal year end. In the second and third quarters of fiscal 2019, management concluded that, as a result of the Company’s history of negative cash flows from operating and investing activities, negative working capital, aged accounts payable, forbearance agreements with suppliers, and significant short-term debt maturities, there was substantial doubt about the Company’s ability to continue as a going concern. To address these issues, we restructured our management team and our operations in ways that are intended to support our growth and achieve our profitability and sustainability goals. We raised capital under our at-the-market sales plan, which allowed us to pay down our accounts payable and stay current on our forbearance agreements. In addition, we repaid a substantial portion of our short-term debt, retired our Series C and Series D Preferred Stock obligations, entered into new or amended financing arrangements and entered into a license arrangement with EMRE, which resulted in \$10.0 million of up-front proceeds. While some of the indicators of substantial doubt still exist, such as historical losses and negative cash flows, as a result of the previous actions taken by the Company in response to the liquidity challenges that arose in the second and third quarters of fiscal 2019, management has concluded that substantial doubt was alleviated and the Company expects to meet its obligations for at least one year from the date of issuance of these financial statements. Key definitive agreements which support the Company’s future liquidity position include:

- On October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into a \$200.0 million senior secured credit facility with Orion Energy Partners Investment Agent, LLC, as Administrative Agent and Collateral Agent (the “Agent”), and its affiliates, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., and Orion Energy

Credit Opportunities Fund II PV, L.P., as lenders (the “Orion Facility”). The Orion Facility is structured as a delayed draw term loan to be provided by the lenders. In conjunction with the closing of the Orion Facility, on October 31, 2019, the Company drew down \$14.5 million (the “Initial Funding”). The Company drew down an additional \$65.5 million on November 22, 2019 (the “Second Funding”). The Company may draw the remainder of the Orion Facility, \$120.0 million, over the first 18 months following the Initial Funding and subject to the Agent’s approval to fund: (i) construction costs, inventory and other capital expenditures of additional fuel cell projects with contracted cash flows (under PPAs with creditworthy counterparties) that meet or exceed a mutually agreed coverage ratio; and (ii) inventory, working capital, and other costs that may be required to be delivered by the Company on purchase orders, service agreements, or other binding customer agreements with creditworthy counterparties.

- On November 5, 2019, the Company signed a two-year Joint Development Agreement (“JDA”) with EMRE, pursuant to which the Company will continue exclusive research and development efforts with EMRE to evaluate and develop new and/or improved carbonate fuel cells to reduce carbon dioxide emissions from industrial and power sources, in exchange for (a) payment of (i) an exclusivity and technology access fee of \$5.0 million, (ii) up to \$45.0 million for research and development efforts, and (iii) milestone-based payments of up to \$10.0 million after certain technological milestones are met, and (b) certain licenses.
- As of October 31, 2019, FCE Ltd. or the Company, as the guarantor of FCE Ltd.’s payment obligations with respect to the Series 1 Preferred Shares, was obligated to pay, on or before December 31, 2020, all accrued and unpaid dividends on the Series 1 Preferred Shares and the balance of the principal redemption price with respect to all of the Series 1 Preferred Shares. Interest under the Series 1 Preferred Shares accrued at annual rate of 5%. In addition, the holder of the Series 1 Preferred Shares had the right to exchange such shares for fully paid and non-assessable shares of common stock of the Company at certain specified prices, and FCE Ltd. had the option of making dividend payments in the form of common stock of the Company or cash. As of October 31, 2019, the Company did not have sufficient shares available to satisfy these obligations. On January 20, 2020, the Company, FCE Ltd. and Enbridge entered into a letter agreement (the “January 2020 Letter Agreement”), pursuant to which they agreed to amend the articles of FCE Ltd. relating to and setting forth the terms of the Series 1 Preferred Shares to: (i) remove the provisions of the articles permitting or requiring the issuance of shares of the Company’s common stock in exchange for the Series 1 Preferred Shares or as payment of amounts due to the holders of the Series 1 Preferred Shares, (ii) remove certain provisions of the articles relating to the redemption of the Series 1 Preferred Shares, (iii) increase the annual dividend rate, commencing on January 1, 2020, to 15%, (iv) extend the final payment date for all accrued and unpaid dividends and all return of capital payments (i.e., payments of the principal redemption price) from December 31, 2020 to December 31, 2021, (v) clarify when dividend and return of capital payments are to be made in the future and extend the quarterly dividend and return of capital payments through December 31, 2021 (which were previously to be paid each quarter through December 31, 2020), (vi) remove certain terms and provisions of the articles that are no longer applicable, and (vii) make other conforming changes to the articles.

The Company’s future liquidity will be dependent on its ability to (i) timely complete current projects in process within budget, including approved amounts that have been financed as financing does not cover overages, (ii) increase cash flows from its generation portfolio, including by meeting conditions required to timely commence operations of new projects and operating its generation portfolio in compliance with minimum performance guarantees, (iii) obtain approval of and receive funding for project construction under the Orion Facility and meet conditions for release of funds, (iv) increase order and contract volumes, which would lead to additional product sales and services agreements, (v) obtain funding for and receive payment for research and development under current and future Advanced Technology contracts, including achieving a \$5 million technological performance milestone in the JDA during calendar year 2020, and (vi) implement the cost reductions necessary to achieve profitable operations. Our business model requires substantial outside financing arrangements and satisfaction of the conditions of such financing arrangements to deploy our projects and facilitate the growth of our business. If financing is not available to us on acceptable terms if and when needed, if we do not satisfy the conditions of our financing arrangements or if we spend more than the financing approved for projects, we may be required to reduce planned spending, sell assets, seek alternative financing and take other measures, which could have a material adverse effect on our operations.

As of January 14, 2020, we had 14,034,001 shares of common stock available for issuance, of which 10,290,934 shares were reserved for issuance under various convertible securities, options, and warrants, under our stock purchase and incentive plans, and under our at-the-market sales plan. The limited number of shares available for issuance limits our ability to raise capital in the equity markets and satisfy obligations with shares instead of cash, which could adversely impact our ability to fund our business and operations. We must obtain stockholder approval to increase the number of shares of common stock we are authorized to issue under our Certificate of Incorporation. At the April 4, 2019 annual meeting of stockholders, our stockholders did not approve our request to increase the number of shares of common stock that we are authorized to issue from 225,000,000 shares to 335,000,000 shares. In the event that the Company's Board of Directors determines to seek stockholder approval for an increase in authorized shares in the future, there can be no assurances of obtaining such stockholder approval.

While there can be no assurances, we anticipate raising additional required capital from new and existing investors and lenders. We expect to work with lenders and financial institutions to secure long-term debt, tax equity and sale-leasebacks for our project asset portfolio as we achieve the Commercial Operation Dates for these projects. This financing, if received, may allow the Company to recycle capital from these projects by reinvesting the capital in other projects and to pay down the Orion Facility over time. It should be noted that the lenders and the Agent under the Orion Credit Agreement ("Orion") have broad approval rights over our ability to draw and allocate funds from the Orion Facility. There can be no assurance that the Company can obtain such financing or that the Company can obtain such financing on terms acceptable to the Company. If the Company is unable to obtain such financing or raise additional capital, the Company may reduce its expenditures or slow its project spending. If the Company cannot obtain such financing or cannot obtain such financing on terms acceptable to the Company, it would negatively impact the Company's business model, operations, and liquidity.

We believe that our cash flows from our existing backlog, including PPAs, service agreements and Advanced Technology contracts, combined with our current unrestricted cash and cash equivalents, cash which is expected to become unrestricted, and available borrowings under the Orion Facility will be sufficient to meet our anticipated cash needs for at least the next 12 months.

Significant Accounting Policies

Cash and Cash Equivalents and Restricted Cash

All cash equivalents consist of investments in money market funds with original maturities of three months or less at date of acquisition. We place our temporary cash investments with high credit quality financial institutions. As of October 31, 2019, \$30.3 million of cash and cash equivalents was pledged as collateral for letters of credit and for certain banking requirements and contractual commitments, compared to \$40.9 million pledged as of October 31, 2018. The restricted cash balance as of October 31, 2018 included \$15.0 million, which secured certain obligations of the Company under a 15-year service agreement for the Bridgeport Fuel Cell Park project and was classified as long-term. In connection with the acquisition of the Bridgeport Fuel Cell Project, \$15.0 million of restricted cash was released on May 9, 2019. The restricted cash balance as of October 31, 2019 and 2018 also includes \$17.9 million and \$17.7 million, respectively, to support obligations related to the PNC sale-leaseback transactions. As of October 31, 2019 and 2018, we had outstanding letters of credit of \$5.7 million and \$3.8 million, respectively, which expire on various dates through August 2025.

Inventories and Advance Payments to Vendors

Inventories consist principally of raw materials and work-in-process. Cost is determined using the first-in, first-out cost method. In certain circumstances, we will make advance payments to vendors for future inventory deliveries. These advance payments are recorded as Other current assets on the Consolidated Balance Sheets.

Inventories are reviewed to determine if valuation allowances are required for excess quantities or obsolescence. This review includes analyzing inventory levels of individual parts considering the current design of our products and production requirements as well as the expected inventory requirements for maintenance on installed power plants.

Project Assets

Project assets consist of capitalized costs for fuel cell projects in various stages of development, whereby we have entered into power purchase agreements (“PPAs”) prior to entering into a definitive sales or long-term financing agreement for the project, capitalized costs for fuel cell projects which are the subject of a sale-leaseback transaction with PNC Energy Capital, LLC (“PNC”), projects in development for which we expect to secure long-term contracts or projects retained by the Company under a merchant model. Project asset costs include costs for developing and constructing a complete turn-key fuel cell project. Development costs can include legal, consulting, permitting, interconnect, and other similar costs. To the extent we enter into a definitive sales agreement, we expense project assets to cost of sales after the respective project asset is sold to a customer and all revenue recognition criteria have been met.

Property, Plant and Equipment

Property, plant and equipment are stated at cost, less accumulated depreciation which is recorded based on the straight-line method over the estimated useful lives of the respective assets. Leasehold improvements are amortized on the straight-line method over the shorter of the estimated useful lives of the assets or the term of the lease. When property is sold or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in operations for the period.

Goodwill and Intangible Assets

Goodwill represents the excess of the aggregate purchase price over the fair value of the net assets acquired in a business combination and is reviewed for impairment at least annually.

Accounting Standards Codification Topic 350, "Intangibles - Goodwill and Other" (“ASC 350”) permits the assessment of qualitative factors to determine whether events and circumstances lead to the conclusion that it is necessary to perform the two-step goodwill impairment test required under ASC 350.

The Company completed its annual impairment analysis of goodwill and the in-process research & development assets (“IPR&D”) as of July 31, 2019 and 2018. The goodwill and IPR&D asset are both held by the Company’s Versa Power Systems, Inc. (“Versa”) reporting unit. Goodwill and the IPR&D asset are also reviewed for possible impairment whenever changes in conditions indicate that the fair value of a reporting unit or IPR&D asset is more likely than not below its carrying value. No impairment charges were recorded during the fiscal years ended October 31, 2019, 2018 and 2017.

Impairment of Long-Lived Assets (including Project Assets)

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable. If events or changes in circumstances indicate that the carrying amount of the asset group may not be recoverable, we compare the carrying amount of an asset group to future undiscounted net cash flows, excluding interest costs, expected to be generated by the asset group and their ultimate disposition. If the sum of the undiscounted cash flows is less than the carrying value, the impairment to be recognized is measured by the amount by which the carrying amount of the asset group exceeds the fair value of the asset group.

Revenue Recognition (Including Lease Agreements and Royalty Income)

Refer to Note 2. “Revenue Recognition” for information on the Company’s revenue recognition accounting policy which is effective for the fiscal year ended October 31, 2019 upon adoption of ASU 2014-09, “Revenue from Contracts with Customers.”

The revenue recognition policy for fiscal years ended October 31, 2018 and 2017 was as follows:

The Company earned revenue from (i) the sale and installation of fuel cell power plants including site engineering and construction services, (ii) the sale of completed project assets, (iii) equipment only sales (modules, balance of plants (“BOP”), component part kits and spare parts to customers), (iv) performance under long-term service agreements, (v) the sale of electricity and other value streams under power purchase agreements (“PPAs”) and utility tariffs from project assets retained by the Company, (vi) license fees and royalty income from manufacturing and technology transfer agreements, and (vii) government and customer-sponsored Advanced Technologies projects.

As further clarification, revenue elements are classified as follows:

Product. Includes the sale of completed project assets, the sale and installation of fuel cell power plants including site engineering and construction services, and, the sale of component part kits, modules, BOPs and spare parts to customers.

Service and license. Includes performance under long-term service agreements for power plants owned by third parties and license fees and royalty income from manufacturing and technology transfer agreements.

Generation. Includes the sale of electricity under PPAs and utility tariffs from project assets retained by the Company. This also includes revenue received from the sale of other value streams from these assets including the sale of heat, steam and renewable energy credits.

Advanced Technologies. Includes revenue from customer-sponsored and government-sponsored Advanced Technologies projects.

The Company's revenue is generated from customers located throughout the U.S., Europe and Asia and from agencies of the U.S. government.

For customer contracts where the Company is responsible for the supply of equipment and site construction (full turn-key construction project) and has adequate cost history and estimating experience, and with respect to which management believes it can reasonably estimate total contract costs, revenue is recognized under the percentage of completion method of accounting. The use of percentage of completion accounting requires significant judgment relative to estimating total contract costs, including assumptions relative to the length of time to complete the contract, the nature and complexity of the work to be performed and total project costs. Our estimates are based upon the professional knowledge and experience of our engineers, project managers and other personnel, who review each long-term contract on a quarterly basis to assess the contract's schedule, performance, technical matters and estimated cost at completion. When changes in estimated contract costs are identified, such revisions may result in current period adjustments to operations applicable to performance in prior periods. Revenues are recognized based on the percentage of the contract value that incurred costs to date as compared to estimated total contract costs, after giving effect to estimates of costs to complete based on most recent information. For customer contracts for new or significantly customized products, where management does not believe it has the ability to reasonably estimate total contract costs, revenue is recognized using the completed contract method and therefore all revenue and costs for the contract are deferred and not recognized until installation and acceptance of the power plant is complete. We recognize anticipated contract losses as soon as they become known and estimable. Actual results could vary from initial estimates and estimates will be updated as conditions change.

Revenue from equipment only sales where the Company does not have the obligations associated with overall construction of the project (modules, BOPs, fuel cell kits and spare parts sales) was recognized upon shipment or title transfer under the terms of the customer contract. Terms for certain contracts provide for a transfer of title and risk of loss to our customers at our factory locations and certain key suppliers upon completion of our contractual requirement to produce products and prepare the products for shipment. A shipment in place may occur in the event that the customer is not ready to take delivery of the products on the contractually specified delivery dates.

In June 2017, an EPC contractor, Hanyang Industrial Development Co., Ltd ("HYD"), was awarded a 20 MW project by a utility in South Korea (Korea Southern Power Company) utilizing the Company's SureSource technology. The Company was able to participate on this Korean project pursuant to a Memorandum of Understanding ("MOU") with POSCO Energy that permitted the Company access to the Asian fuel cell market, including the sale of SureSource solutions in South Korea. Effective July 15, 2018, the MOU was terminated. On August 29, 2017, the Company entered into a contract with HYD pursuant to which the Company provided equipment to HYD for this 20 MW fuel cell project as well as ancillary services including plant commissioning. Construction began in the fall of 2017 and the installation became operational in the summer of 2018. The value of the contract to the Company was \$70 million. The Company assessed the contract using the multi-element revenue recognition guidance and determined that each of the modules and BOPs as well as the ancillary services each represented separate deliverables with stand-alone value. The full contract value was allocated to each element based on estimated selling prices using cost plus expected margins and revenue recognition occurred upon completion of shipping and customer acceptance of each piece of equipment and the proportional performance method was used for the ancillary services provided. Approximately \$39 million of revenue was recognized in the fourth quarter of fiscal 2017 related to this contract and approximately \$31 million was recognized during fiscal year 2018.

Revenue from service agreements was generally recorded ratably over the term of the service agreement, as the Company's performance of routine monitoring and maintenance under these service agreements is generally expected to be incurred on a straight-line basis. For service agreements where the Company expects to have module exchanges at some point during the term (generally service agreements in excess of five years), the costs of performance are not expected to be incurred on a straight-line basis, and therefore, a portion of the initial contract value related to the module exchange(s) is deferred and is recognized upon such module replacement event(s).

The Company recognized license fees and other revenue over the term of the associated agreement. The Company records license fees and royalty income from POSCO Energy as a result of manufacturing and technology transfer agreements entered into in 2007, 2009 and 2012. The manufacturing and technology transfer agreements the Company entered into with POSCO Energy collectively provide them with the rights to manufacture SureSource power plants in South Korea and exclusive rights to sell in Asia.

Under PPAs and project assets retained by the Company, revenue from the sale of electricity and other value streams are recognized as electricity is provided to customers. These revenues are classified as generation revenues.

Advanced Technologies contracts are entered into with both private industry and government entities. Revenue from most government sponsored Advanced Technologies projects is recognized as direct costs are incurred plus allowable overhead less cost share requirements, if any. Revenue from fixed price Advanced Technologies projects is recognized using percentage of completion accounting. Advanced Technologies programs are often multi-year projects or structured in phases with subsequent phases dependent on reaching certain milestones prior to additional funding being authorized. Government contracts are typically structured with cost-reimbursement and/or cost-shared type contracts or cooperative agreements. We are reimbursed for reasonable and allocable costs up to the reimbursement limits set by the contract or cooperative agreement, and on certain contracts we are reimbursed only a portion of the costs incurred.

Sale-Leaseback Accounting

The Company, through a wholly-owned subsidiary, has entered into sale-leaseback transactions for commissioned project assets where we have entered into a PPA with a customer who is both the site host and end user of the power. Due to the Company's continuing involvement with the project and the projects being considered integral equipment, sale accounting is precluded by ASC 840-40, "Leases". Accordingly, the Company uses the financing method to account for these transactions.

Under the financing method of accounting for a sale-leaseback, the Company does not recognize as income any of the sale proceeds received from the lessor that contractually constitutes payment to acquire the assets subject to these arrangements. Instead, the sale proceeds received are accounted for as financing obligations and leaseback payments made by the Company are allocated between interest expense and a reduction to the financing obligation. Interest on the financing obligation is calculated using the Company's incremental borrowing rate at the inception of the arrangement on the outstanding financing obligation. While we receive financing for the full value of the related power plant asset, we have not recognized revenue on the sale-leaseback transaction. Instead, revenue is recognized through the sale of electricity and energy credits which are generated as energy is produced. The sale-leaseback arrangements with PNC allow the Company to repurchase the project assets at fair market value.

Warranty and Service Expense Recognition

We warranty our products for a specific period of time against manufacturing or performance defects. Our U.S. warranty is limited to a term generally 15 months after shipment or 12 months after acceptance of our products. We accrue for estimated future warranty costs based on historical experience. We also provide for a specific accrual if there is a known issue requiring repair during the warranty period. Estimates used to record warranty accruals are updated as we gain further operating experience. As of October 31, 2019 and 2018, the warranty accrual, which is classified as an Accrued liability on the Consolidated Balance Sheets, totaled \$0.1 million.

In addition to the standard product warranty, we have entered into service agreements with certain customers to provide monitoring, maintenance and repair services for fuel cell power plants. Under the terms of these service agreements, the power plant must meet a minimum operating output during the term. If minimum output falls below the contract requirement, we may be subject to performance penalties or may be required to repair and/or replace the customer's fuel cell module. The Company has accrued for performance guarantees of \$0.8 million and \$1.1 million as of October 31, 2019 and 2018, respectively. Refer to Note 2. "Revenue Recognition" for the change in accounting effective as of November 1, 2019 relating to performance guarantees.

The Company records loss accruals for service agreements when the estimated cost of future module exchanges and maintenance and monitoring activities exceeds the remaining unrecognized contract value. Estimates for future costs on service agreements are determined by a number of factors including the estimated remaining life of the module, used replacement modules available and future operating plans for the power plant. Our estimates are performed on a contract by contract basis and include cost assumptions based on what we anticipate the service requirements will be to fulfill obligations for each contract. As of October 31, 2019, our loss accruals on service agreements totaled \$3.3 million compared to \$0.9 million as of October 31, 2018.

At the end of our service agreements, customers are expected to either renew the service agreement or based on the Company's rights to title of the module, the module will be returned to the Company as the plant is no longer being maintained. As of October 31, 2019, the Company had \$1.0 million related to the residual value of replacement modules in power plants under service agreements compared to \$1.2 million as of October 31, 2018.

Research and Development Costs

We perform both customer-sponsored research and development projects based on contractual agreement with customers and company-sponsored research and development projects.

Costs incurred for customer-sponsored projects include manufacturing and engineering labor, applicable overhead expenses, materials to build and test prototype units and other costs associated with customer-sponsored research and development contracts. Costs incurred for customer-sponsored projects are recorded as cost of Advanced Technologies contract revenues in the Consolidated Statements of Operations.

Costs incurred for company-sponsored research and development projects consist primarily of labor, overhead, materials to build and test prototype units and consulting fees. These costs are recorded as research and development expenses in the consolidated statements of operations.

Concentrations

We contract with a concentrated number of customers for the sale of our products, for service agreement contracts and for Advanced Technologies contracts. For the years ended October 31, 2019, 2018 and 2017, our top customers accounted for 80%, 86% and 79%, respectively, of our total annual consolidated revenue.

The percent of consolidated revenues from each customer for the years ended October 31, 2019, 2018 and 2017, respectively, are presented below.

	2019	2018	2017
ExxonMobil Research and Engineering Company (EMRE)	40%	6%	9%
Dominion Bridgeport Fuel Cell, LLC	13%	3%	11%
Connecticut Light and Power	11%	—%	—%
U.S. Department of Energy (DOE)	6%	8%	9%
Pfizer, Inc.	6%	4%	4%
POSCO Energy	3%	5%	6%
Clearway Energy (formerly NRG Yield, Inc.)	1%	15%	—%
Hanyang Industrial Development Co., Ltd. (HYD)	—%	35%	40%
AEP Onsite Partners, LLC	—%	10%	—%
Total	80%	86%	79%

Derivatives

We do not use derivatives for speculative or trading purposes. Our derivative instruments include embedded derivatives in our Series 1 Preferred Shares. Changes in fair value are recorded to Other income, net on the Consolidated Statements of Operations. Refer to Note 15. "Redeemable Preferred Stock" for additional information.

The Company also has an interest rate swap that is adjusted to fair value on a quarterly basis. The fair value adjustment is based on Level 2 inputs including primarily the forward LIBOR curve available to swap dealers. The fair value methodology involves comparison of (i) the sum of the present value of all monthly variable rate payments based on a reset rate using the forward LIBOR curve and (ii) the sum of the present value of all monthly fixed rate payments on the notional amount which is equivalent to the outstanding principal amount of the loan. Refer to Note 13. “Debt” for further details.

Use of Estimates

The preparation of financial statements and related disclosures in conformity with accounting principles generally accepted in the U.S. requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities. Estimates are used in accounting for, among other things, revenue recognition, excess and obsolete inventories, product warranty costs, accruals for service agreements, allowance for uncollectible receivables, depreciation and amortization, impairment of goodwill, indefinite-lived intangible assets and long-lived assets, valuation of derivatives, income taxes, and contingencies. Estimates and assumptions are reviewed periodically, and the effects of revisions are reflected in the consolidated financial statements in the period they are determined to be necessary. Due to the inherent uncertainty involved in making estimates, actual results in future periods may differ from those estimates.

Foreign Currency Translation

The translation of the financial statements of FCE Korea Ltd., FCES GmbH and Versa Power Systems Ltd. results in translation gains or losses, which are recorded in accumulated other comprehensive loss within stockholders’ equity.

Our Canadian subsidiary, FCE FuelCell Energy, Ltd., is financially and operationally integrated and the functional currency is the U.S. dollar. We are also subject to foreign currency transaction gains and losses as certain transactions are denominated in foreign currencies. We recognized net foreign currency transaction (losses) gains of \$(0.1) million, \$0.3 million and \$(0.7) million for the years ended October 31, 2019, 2018 and 2017, respectively. These amounts have been included in Other income, net in the Consolidated Statements of Operations.

Recently Adopted Accounting Guidance

In May 2014, the Financial Accounting Standards Board (the “FASB”) issued ASU 2014-09, “Revenue from Contracts with Customers (Topic 606)”. The adoption of Topic 606 by the Company on November 1, 2018 using the modified retrospective transition method resulted in a cumulative effect adjustment that increased Accumulated deficit by \$6.7 million.

In January 2017, the FASB issued ASU 2017-04, “Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment” which provides for a one-step quantitative impairment test, whereby a goodwill impairment loss will be measured as the excess of a reporting unit’s carrying amount over its fair value (not to exceed the total goodwill allocated to that reporting unit). It eliminates Step 2 of the current two-step goodwill impairment test, under which a goodwill impairment loss is measured by comparing the implied fair value of a reporting unit’s goodwill with the carrying amount of that goodwill. The Company early adopted this ASU effective November 1, 2018. The adoption of this ASU did not have an impact on the Company’s consolidated financial statements.

Recent Accounting Guidance Not Yet Effective

In February 2016, the FASB issued ASU 2016-02, “Leases” that amends the accounting and disclosure requirements for leases. The new guidance requires that a lessee shall recognize a right-of-use (“ROU”) asset and a corresponding lease liability, initially measured at the present value of the lease payments, in its balance sheet. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the Consolidated Statements of Operations. The Company was required to adopt the new guidance on November 1, 2019. In July 2018, the FASB issued an amendment to the new leasing standard which provides an alternative transition method that allows companies to recognize a cumulative effect adjustment to the opening balance sheet upon adoption. The Company intends to elect this alternative transition method and forgo the adjustments to comparative-period financial information.

The Company has both operating and capital leases (refer to Note 20. “Commitments and Contingencies”) as well as sale-leaseback transactions that are accounted for under the finance method. The new standard provides entities with several practical expedient elections. Among them, the Company intends to elect the package of practical expedients that permits the Company to not reassess prior conclusions related to its leasing arrangements, lease classifications and initial direct costs. In addition, the Company plans to elect the practical expedients to not separate lease and non-lease components, to use hindsight in determining the lease terms and impairment of ROU assets, and to not apply the new standard’s recognition requirements to short-term leases or use the portfolio approach to a group of leases with similar characteristics. Upon adoption of this ASU, the Company will record ROU assets and the present value of its lease liabilities which are currently not recognized on its Consolidated Balance Sheet. The Company is in the process of implementing changes to its business processes, systems and controls to support the new lease standard and its disclosure requirements.

On adoption, the Company expects to recognize a lease liability of approximately \$10.3 million and corresponding ROU assets of approximately \$10.1 million. Any cumulative effect of the adoption recorded to accumulated deficit is not expected to be significant. The Company also does not expect there to be a significant net effect on the Consolidated Statements of Operations, however, what was previously presented as rent expense related to operating leases will be recognized as interest expense on the Company’s minimum lease obligation and depreciation of right-of-use asset.

Note 2. Revenue Recognition

Under Accounting Standards Codification (“ASC”) Topic 606: *Revenue from Contracts with Customer*, the amount of revenue recognized for any goods or services reflects the consideration that the Company expects to be entitled to receive in exchange for those goods and services. To achieve this core principle, the Company applies the following five-step approach: (1) identify the contract with the customer; (2) identify the performance obligation in the contract; (3) determine the transaction price; (4) allocate the transaction price to performance obligations in the contract; and (5) recognize revenue when or as a performance obligation is satisfied.

A contract is accounted for when there has been approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. Performance obligations under a contract are identified based on the goods or services that will be transferred to the customer that are both capable of being distinct and are distinct in the context of the contract. In certain instances, the Company has concluded distinct goods or services should be accounted for as a single performance obligation that is a series of distinct goods or services that have the same pattern of transfer to the customer. To the extent a contract includes multiple promised goods or services, the Company must apply judgment to determine whether the customer can benefit from the goods or services either on their own or together with other resources that are readily available to the customer (the goods or services are distinct) and if the promise to transfer the goods or services to the customer is separately identifiable from other promises in the contract (the goods or services are distinct in the context of the contract). If these criteria are not met, the promised services are accounted for as a single performance obligation. The transaction price is determined based on the consideration that the Company will be entitled to in exchange for transferring goods or services to the customer. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price, generally utilizing the expected value method. Determining the transaction price requires judgment. If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation based on a relative standalone selling price basis. Standalone selling price is determined by the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, the Company estimates the standalone selling price by taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations. Performance obligations are satisfied either over time or at a point in time as discussed in further detail below. In addition, the Company’s contracts with customers generally do not include significant financing components or non-cash consideration.

Revenue streams are classified as follows:

Product. Includes the sale of completed project assets, sale and installation of fuel cell power plants including site engineering and construction services, and the sale of modules, balance of plant (“BOP”) components and spare parts to customers.

Service. Includes performance under long-term service agreements for power plants owned by third parties.

License and royalty. Includes license fees and royalty income from the licensure of intellectual property.

Generation. Includes the sale of electricity under PPAs and utility tariffs from project assets retained by the Company. This also includes revenue received from the sale of other value streams from these assets including the sale of heat, steam, capacity and renewable energy credits.

Advanced Technologies. Includes revenue from customer-sponsored and government-sponsored Advanced Technologies projects.

See below for discussion of revenue recognition under Topic 606 by disaggregated revenue stream, including a comparison to revenue recognition treatment under ASC 605, Revenue Recognition (“ASC 605”). Our revenue is generated from customers located throughout the U.S., Europe and Asia and from agencies of the U.S. government.

Completed project assets

Contracts for the sale of completed project assets includes the sale of the project asset, the assignment of the service agreement, and the assignment of the PPA. The relative stand-alone selling price is estimated and is used as the basis for allocation of the contract consideration. Revenue is recognized upon the satisfaction of the performance obligations, which includes the transfer of control of the project asset to the customer, which is when the contract is signed and the PPA is assigned to the customer. See below for further discussion regarding revenue recognition for service agreements. The revenue recognition for completed project assets under Topic 606 is consistent with treatment under ASC 605.

Contractual payments related to the sale of the project asset and assignment of the PPA are generally received up-front. Payment terms for service agreements are generally ratable over the term of the agreement.

Service agreements

Service agreements represent a single performance obligation whereby the Company performs all required maintenance and monitoring functions, including replacement of modules, to ensure the power plant(s) under the service agreement generate a minimum power output. To the extent the power plant(s) under service agreements do not achieve the minimum power output, certain service agreements include a performance guarantee penalty. Performance guarantee penalties represent variable consideration, which is estimated for each service agreement based on past experience, using the expected value method. The net consideration for each service agreement is recognized using costs incurred to date relative to total estimated costs at completion to measure progress. Under ASC 605, revenue for service agreements was generally recorded ratably over the term of the service agreement, as the performance of routine monitoring and maintenance under the service agreements was expected to be incurred on a straight-line basis. If there was an estimated module exchange during the term, the costs of performance were not expected to be incurred on a straight-line basis, and therefore a portion of the initial contract value relating to the module exchange was deferred and recognized upon such module replacement event. Prior to the implementation of Topic 606, an estimate for a performance guarantee was not recorded until a performance issue occurred at a particular power plant. At that point, the actual power plant’s output was compared against the minimum output guarantee and an accrual was recorded. Furthermore, under ASC 605, performance guarantee accruals were recorded based on actual performance and the related expense was recorded to service and license cost of revenues. The review of power plant performance was updated for each reporting period to incorporate the most recent performance of the power plant and minimum output guarantee payments made to customers, if applicable.

The Company reviews its cost estimates on service agreements on a quarterly basis and records any changes in estimates on a cumulative catch-up basis.

Loss accruals for service agreements are recognized to the extent that the estimated remaining costs to satisfy the performance obligation exceed the estimated remaining unrecognized net consideration. Estimated losses are recognized in the period in which losses are identified.

The Company records any amounts that are billed to customers in excess of revenue recognized as deferred revenue and revenue recognized in excess of amounts billed to customers as unbilled receivables. Payment terms for service agreements are generally ratable over the term of the agreement.

Advanced Technologies contracts

Advanced Technologies contracts include the promise to perform research and development services and as such this represents one performance obligation. Revenue from most government sponsored Advanced Technologies projects is recognized as direct costs are incurred plus allowable overhead less cost share requirements, if any. Revenue is only recognized to the extent the contracts are funded. Revenue from fixed price Advanced Technologies projects is recognized using the cost to cost input method. There was no impact of adoption of Topic 606 on revenue recognition for Advanced Technologies contracts.

The Company records any amounts that are billed to customers in excess of revenue recognized as deferred revenue and revenue recognized in excess of amounts billed to customers as unbilled receivables. Payments are based on costs incurred for government sponsored Advanced Technologies projects and upon completion of milestones for all other projects.

License agreements

The Company entered into manufacturing and technology transfer agreements with POSCO Energy Co., Ltd. (“POSCO Energy”) in 2007, 2009 and 2012. Revenue from the license fees received from POSCO Energy was previously recognized over the term of the associated agreements. In connection with the adoption of Topic 606, several performance obligations were identified including previously satisfied performance obligations for the transfer of licensed intellectual property, two performance obligations for specified upgrades of the previously licensed intellectual property, a performance obligation to deliver unspecified upgrades to the previously licensed intellectual property on a when-and-if-available basis, and a performance obligation to provide technical support for previously delivered intellectual property. The performance obligations related to the specified upgrades will be satisfied and related consideration recognized as revenue upon the delivery of the specified upgrades. The performance obligations for unspecified upgrades and technical support are being recognized on a straight-line basis over the license term on the basis that this represents the method that best depicts the progress towards completion of the related performance obligations. All fixed consideration for the license agreements was previously collected.

Effective as of June 11, 2019, the Company entered into a License Agreement (the “EMRE License Agreement”) with ExxonMobil Research and Engineering Company (“EMRE”), pursuant to which the Company agreed, subject to the terms of the EMRE License Agreement, to grant EMRE and its affiliates a non-exclusive, worldwide, fully paid, perpetual, irrevocable, non-transferrable license and right to use the Company’s patents, data, know-how, improvements, equipment designs, methods, processes and the like to the extent it is useful to research, develop, and commercially exploit carbonate fuel cells in applications in which the fuel cells concentrate carbon dioxide from industrial and power sources and for any other purpose attendant thereto or associated therewith. Such right and license is sublicensable to third parties performing work for or with EMRE or its affiliates, but shall not otherwise be sublicensable. Upon the payment by EMRE to the Company of \$10.0 million, which was received by the Company on June 14, 2019, EMRE and its affiliates were fully vested in the rights and licenses granted in the EMRE License Agreement, and any further obligations under the EMRE License Agreement are considered by the Company to be minimal. As a result, the total contract value of \$10.0 million was recorded as revenue for the year ended October 31, 2019.

Generation revenue

For project assets where customers purchase electricity from the Company under certain PPAs, the Company has determined that these agreements should be accounted for as operating leases pursuant to ASC 840, Leases. Revenue is recognized when electricity has been delivered based on the amount of electricity delivered at rates specified under the contracts, assuming all other revenue recognition criteria are met. For PPAs that are not accounted for as leases, revenue is recognized based on the output method as there is a directly observable output to the customer (electricity delivered to the customer and immediately consumed). The Company is entitled to be compensated for performance completed to date (electricity delivered to the customer).

The cumulative effect of the changes made to the Company's Consolidated Balance Sheets as of November 1, 2018 as a result of the adoption of Topic 606 was as follows:

	October 31, 2018	Adjustment due to Topic 606	Balance at November 1, 2018
ASSETS			
Unbilled receivables	\$ 13,759	\$ 471	\$ 14,230
Other assets	13,505	(132)	13,373
LIABILITIES			
Accrued liabilities	\$ 7,632	\$ 995	\$ 8,627
Deferred revenue, current portion	11,347	(240)	11,107
Long-term deferred revenue	16,793	6,238	23,031
EQUITY			
Accumulated deficit	\$ (990,867)	\$ (6,654)	\$ (997,521)

The increase in long-term deferred revenue primarily pertains to license arrangement considerations previously recognized as revenue under ASC 605 that will be recognized when the specific upgrade performance obligations are met.

The following tables summarize the impacts of Topic 606 on the Company's consolidated financial statements as of and for the year ended October 31, 2019.

	October 31, 2019		
	As reported	Adjustments	Balances without adoption of Topic 606
ASSETS			
Unbilled receivables	\$ 7,684	\$ 97	\$ 7,781
Other assets	9,489	(1,024)	8,465
LIABILITIES			
Accrued liabilities	\$ 11,452	\$ (1,097)	\$ 10,355
Deferred revenue	11,471	488	11,959
Long-term deferred revenue	28,705	(9,579)	19,126
EQUITY			
Accumulated deficit	\$ (1,075,089)	\$ 9,261	\$ (1,065,828)

	For the Year Ended October 31, 2019		
	As reported	Adjustments	Balances without adoption of Topic 606
Total revenues	\$ 60,752	\$ 4,085	\$ 64,837
Total cost of revenues	82,021	1,478	83,499
Gross loss	(21,269)	2,607	(18,662)
Administrative and selling expenses	31,874	-	31,874
Research and development expenses	13,786	-	13,786
Loss from operations	(66,929)	2,607	(64,322)
Interest expense	(10,623)	-	(10,623)
Other income, net	93	-	93
Loss before provision for income taxes	(77,459)	2,607	(74,852)
Provision for income taxes	(109)	-	(109)
Net loss	\$ (77,568)	\$ 2,607	\$ (74,961)

For the year ended October 31, 2019, the only adjustment to comprehensive loss when comparing the balances with Topic 606 and the balances without Topic 606 included the adjustment to net loss.

For the year ended October 31, 2019, the impact of adoption of Topic 606 on the Consolidated Statement of Cash Flows included an adjustment to net loss of \$2.6 million and adjustments to changes in operating assets and liabilities consistent with the impact of adoption of Topic 606 on the October 31, 2019 Consolidated Balance Sheet as reflected above.

Contract Balances

Contract assets as of October 31, 2019 and October 31, 2018 were \$11.3 million and \$23.1 million, respectively. The contract assets relate to the Company's rights to consideration for work completed but not billed. These amounts are included on a separate line item as Unbilled receivables and balances expected to be billed later than one year from the balance sheet date are included within Other assets on the accompanying Consolidated Balance Sheets. The net change in contract assets represent amounts recorded as revenue offset by customer billings. For the year ended October 31, 2019, a total of \$6.6 million was transferred to accounts receivable from contract assets recognized at the beginning of the period and an additional adjustment was made to reduce contract assets as a result of the acquisition of the Bridgeport Fuel Cell Project (refer to Note 3. "Acquisition" for additional information).

Contract liabilities as of October 31, 2019 and October 31, 2018 were \$40.2 million and \$28.1 million, respectively. The contract liabilities relate to the advance billings to customers for services that will be recognized over time and in some instances for deferred revenue relating to the license performance obligations that will be recognized at a future point in time. These amounts are included within Deferred revenue and Long-term deferred revenue on the accompanying Consolidated Balance Sheets. The net change in contract liabilities represents customer billing offset by revenue recorded.

Remaining Performance Obligations

Remaining performance obligations are the aggregate amount of total contract transaction price that is unsatisfied or partially unsatisfied. As of October 31, 2019, the Company's total remaining performance obligations for service agreements, license agreements, and Advanced Technologies contracts were \$204.3 million. License revenue recognized over time will be recognized over the remaining term of the applicable license agreement. License revenue recognized at a point in time will be recognized when the first specified upgrade that has been developed is delivered and when the second specified upgrade is developed and delivered. Service revenue in periods in which there are no module replacements is expected to be relatively consistent from period to period, whereas module replacements will result in an increase in revenue when replacements occur. Advanced technologies revenue will be recognized as cost are incurred.

The Company has elected practical expedients in the accounting guidance that allow for revenue to be recorded in the amount that the Company has a right to invoice, if that amount corresponds directly with the value to the customer of the Company's performance to date, and not to disclose related unsatisfied performance obligations. Generation sales, to the extent the related power purchase agreements are within the scope of Topic 606, fall into this category, as these sales are recognized as revenue in the period the Company provides the electricity and completes the performance obligation, which is the same as the monthly amount billed to customers.

Note 3. Acquisition

On October 31, 2018, FuelCell Energy Finance, LLC (“FuelCell Finance”) entered into a membership interest purchase agreement (the “Purchase Agreement”) with Dominion Generation, Inc., amended on January 15, 2019 and May 9, 2019, pursuant to which FuelCell Finance purchased (on May 9, 2019) all of the outstanding membership interests in Dominion Bridgeport Fuel Cell, LLC (which is now known as Bridgeport Fuel Cell, LLC) (“BFC”). BFC owns a 14.9 MW fuel cell park in Bridgeport, Connecticut (the “Bridgeport Fuel Cell Project”), which the Company originally developed and constructed and has been operating for Dominion Generation, Inc. under a service agreement since December 2013.

On May 9, 2019, FuelCell Finance closed on the purchase of BFC for a total cash purchase price of \$35.5 million, subject to a dollar-for-dollar post-closing adjustment to the extent that the closing working capital was greater or less than \$1.0 million (the “BFC Purchase Price”). The Company recorded a working capital adjustment of \$0.6 million, which has been included in the BFC Purchase Price. Certain balance sheet accounts as of the transaction date, May 9, 2019, relating to the Bridgeport Fuel Cell Project service agreement (accounts receivable of \$2.7 million, unbilled receivables of \$15.3 million and accrued performance guarantees of \$1.3 million) were settled in connection with the acquisition and accordingly were included in the consideration for the acquisition.

The acquisition was funded by loans from Fifth Third Bank, Liberty Bank and Connecticut Green Bank (refer to Note 13. “Debt” for more information). The balance of the financing for the acquisition was funded by the \$15 million of restricted cash on hand that was tied to the Bridgeport Fuel Cell Project and released at closing.

ASC Topic 805, “Business Combinations” states that a business is an integrated set of activities and assets that is capable of being conducted and managed for the purpose of providing a return in the form of dividends, lower costs, or other economic benefits directly to investors or other owners, members, or participants. As the acquisition did not meet the definition of a business combination under ASC 805, the Company accounted for the transaction as an asset acquisition. In an asset acquisition, goodwill is not recognized, but rather any excess consideration transferred over the fair value of the net assets acquired is allocated on a relative fair value basis to the identifiable net assets. The Company determined the estimated fair values of net assets acquired using Level 3 inputs after review and consideration of relevant information, including discounted cash flows, quoted market prices and estimates made by management. The acquisition of BFC also included a PPA with Connecticut Light and Power that has favorable terms relative to market, a land lease with the City of Bridgeport, and working capital. A pre-existing service agreement was determined to be priced similar to current market rates and no gain or loss was recorded. A total of \$38.8 million of consideration was allocated to the fuel cell power plants installation which is recorded in Project Assets, a total of \$12.3 million of consideration was allocated to the PPA which is recorded as an intangible asset, and the remaining consideration was allocated to the acquired working capital. The project asset and PPA intangible asset will be depreciated and amortized over their respective useful lives. Additionally, the land lease with the City of Bridgeport was not assigned any consideration due to its insignificant value.

The major depreciable assets of the Bridgeport Fuel Cell Project are the fuel cell modules, which will be depreciated over their estimated remaining useful lives of approximately one to seven years, and balance of plant assets, which will be depreciated over their estimated remaining useful lives of approximately 15 years. The intangible asset is being amortized over its remaining useful life of approximately 10 years.

Note 4. Restructuring and Impairment

Fiscal Year 2019

On April 12, 2019, the Company undertook a reorganization, which included a reduction in force of 135 employees, which represented 30% of the Company's global workforce. The workforce was reduced at the North American production facility in Torrington, Connecticut, as well as at corporate offices in Danbury, Connecticut and at remote locations. There was no restructuring expense recorded because no severance was provided in connection with the reduction in force.

In connection with the reorganization, the Company also reviewed certain construction in process projects and identified a construction in process asset related to automation equipment for use in manufacturing which has been determined to be impaired due to uncertainty as to whether the asset will be completed as a result of the Company's liquidity position and continued low level of production rates. The Company recorded a charge of \$2.8 million which is included in Cost of product sales on the Consolidated Statements of Operations for the year ended October 31, 2019.

Fiscal Year 2018

There were no restructuring activities during the fiscal year ended October 31, 2018.

Fiscal Year 2017

On November 30, 2016, a business restructuring was announced to reduce costs and align production levels with then current levels of demand in a manner that was consistent with the Company's long-term strategic plan.

The workforce was reduced at both the North American production facility in Torrington, Connecticut, as well as at the corporate offices in Danbury, Connecticut and remote locations. A total of 96 positions, or approximately 17% of the Company's global workforce, were eliminated. The production rate was reduced to 25 MW annually, from the prior rate of 50 MW annually, in order to position for delays in anticipated order flow. Restructuring expense relating to eliminated positions of \$1.4 million was recorded and paid for in the year ended October 31, 2017, which has been presented under a separate caption in the Consolidated Statements of Operations.

Note 5. Accounts Receivable, Net and Unbilled Receivables

Accounts receivable, net and unbilled receivables as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Commercial customers:		
Amount billed	\$ 2,227	\$ 7,415
Unbilled receivables ⁽¹⁾	6,139	10,632
	<u>8,366</u>	<u>18,047</u>
Advanced Technologies (including U.S. Government ⁽²⁾):		
Amount billed	1,065	1,865
Unbilled receivables	1,545	3,127
	<u>2,610</u>	<u>4,992</u>
Accounts receivable, net and unbilled receivables	<u>\$ 10,976</u>	<u>\$ 23,039</u>

(1) Additional long-term unbilled receivables of \$3.6 million and \$9.4 million are included within "Other Assets" as of October 31, 2019 and 2018, respectively. The balance decreased because amounts previously recorded in connection with the Bridgeport Fuel Cell Project service agreement were settled in connection with the acquisition of the Bridgeport Fuel Cell Project.

(2) Total U.S. government accounts receivable, including unbilled receivables, outstanding as of October 31, 2019 and 2018 were \$1.2 million and \$2.3 million, respectively.

We bill customers for power plant and power plant component sales based on certain contractual milestones being reached. We bill service agreements based on the contract price and billing terms of the contracts. Generally, our Advanced Technologies contracts are billed based on actual revenues recorded, typically in the subsequent month. Some Advanced Technologies contracts are billed based on contractual milestones or costs incurred. Unbilled receivables relate to revenue recognized on customer contracts that have not been billed.

Accounts receivable are presented net of an allowance for doubtful accounts of \$0.2 million as of October 31, 2018. The Company had no allowance for doubtful accounts as of October 31, 2019. Uncollectible accounts receivables are charged against the allowance for doubtful accounts when all collection efforts have failed and it is deemed unlikely that the amount will be recovered.

Note 6. Inventories

Inventories as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Raw materials	\$ 25,466	\$ 24,467
Work-in-process ⁽¹⁾	31,228	29,108
Inventories	<u>\$ 56,694</u>	<u>\$ 53,575</u>

- (1) Work-in-process includes the standard components of inventory used to build the typical modules or module components that are intended to be used in future project asset construction, in future power plant orders or for use under our service agreements. Included in Work-in-process as of October 31, 2019 and 2018 is \$23.5 million and \$19.0 million, respectively, of completed standard components.

Additional long-term inventory of \$2.2 million as of October 31, 2019 includes a module that is contractually required to be segregated for use as a replacement at the Bridgeport Fuel Cell Project which is expected to be utilized beyond 12 months from October 31, 2019. There was no long-term inventory as of October 31, 2018.

Raw materials consist mainly of various nickel powders and steels, various other components used in producing cell stacks and purchased components for balance of plant. Work-in-process inventory is comprised of material, labor, and overhead costs incurred to build fuel cell stacks and modules, which are subcomponents of a power plant.

The Company incurred excess plant capacity and manufacturing variances of \$14.5 million and \$11.2 million for the years ended October 31, 2019 and 2018, respectively, which were included within product cost of revenues on the consolidated statements of operations.

Note 7. Project Assets

Project assets as of October 31, 2019 and 2018 were \$144.1 million and \$99.6 million, respectively. As of October 31, 2019, the gross project asset values were \$160.0 million and \$107.7 million, respectively, and the project asset accumulated depreciation was \$15.9 million and \$8.1 million, respectively. The estimated useful lives of these project assets are 20 years for balance of plant and site construction, and 5 to 7 years for modules. The Bridgeport Fuel Cell Project is being depreciated based on similar useful lives adjusted for time elapsed prior to the acquisition. Project assets as of October 31, 2019 and 2018 included six and five, respectively, completed, commissioned installations generating power with respect to which the Company has a PPA with the end-user of power and site host with an aggregate value of \$59.2 million and \$28.6 million as of October 31, 2019 and 2018, respectively. Certain of these assets are the subject of sale-leaseback arrangements with PNC, which are accounted for using the financing method. The increase in project assets is primarily a result of the acquisition of the Bridgeport Fuel Cell Project.

Project assets as of October 31, 2019 and 2018 also includes installations with carrying values of \$84.9 million and \$71.0 million, respectively, which are being developed and constructed by the Company under existing PPAs and have not been placed in service.

During the year ended October 31, 2019, the Company recorded project asset impairment charges for (i) the Triangle Street Project and (ii) the Bolthouse Farms Project, which are further described as follows:

- i. *Impairment charge for the Triangle Street Project:* In the fourth quarter of fiscal 2019, management determined that it will not be able to secure a PPA with terms acceptable to the Company for the Triangle

Street Project. Therefore, it is management’s current intention to operate the project under a merchant model for the next 5 years. The project will sell power through the Connecticut grid under wholesale tariff rates and Renewable Energy Credits (RECs) to market participants. As a result of management’s decision to operate the project in this manner, an impairment charge of \$14.4 million was recorded in the fourth quarter of fiscal 2019. The amount of the impairment charge was determined by comparing the estimated discounted cash flows of the project and the expected residual value of the project to its carrying value. Management expects to continue to pursue economic enhancements for this project, but cannot currently assess the probability of closing on a revenue contract for the power above wholesale market rates.

- ii. *Impairment charge for the Bolthouse Farms Project:* An impairment charge for the Bolthouse Farms Project was recorded as management has decided to pursue termination of the PPA given recent regulatory changes impacting the future cost profile for the Company and Bolthouse Farms. Since it is considered probable that the PPA will be terminated, a \$3.1 million impairment charge was recorded, which reflects the difference between the carrying value of the asset and the value of the components that are expected to be redeployed to other projects. This project was removed from the Company’s backlog as of October 31, 2019.

The Company recorded a \$0.5 million impairment of a project asset during the year ended October 31, 2018 due to the termination of a project. The impairments for both years were recorded as “Cost of generation revenues” in the Consolidation Statements of Operations.

Depreciation expense for project assets was \$6.8 million, \$4.1 million and \$4.1 million for the years ended October 31, 2019, 2018 and 2017, respectively.

Project construction costs incurred for long-term project assets are reported as investing activities in the Consolidated Statements of Cash Flows. The proceeds received from the sale and subsequent leaseback of project assets are classified as “Cash flows from financing activities” within the Consolidated Statements of Cash Flows and are classified as a financing obligation within “Current portion of long-term debt” and “Long-term debt and other liabilities” on the Consolidated Balance Sheets (refer to Note 13. “Debt” for more information).

Note 8. Property, Plant and Equipment

Property, plant and equipment as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018	Estimated Useful Life
Land	\$ 524	\$ 524	—
Building and improvements	20,395	19,674	10-26 years
Machinery, equipment and software	106,726	93,356	3-8 years
Furniture and fixtures	4,255	3,958	10 years
Construction in progress	1,144	17,711	—
	133,044	135,223	
Accumulated depreciation	(91,910)	(87,019)	
Property, plant and equipment, net	<u>\$ 41,134</u>	<u>\$ 48,204</u>	

During the year ended October 31, 2019, the Company recorded a \$2.8 million impairment of construction in process assets related to automation equipment due to uncertainty of completion. There were no impairments of property, plant and equipment for the years ended October 31, 2018 and 2017.

Depreciation expense for property, plant and equipment was \$4.9 million, \$4.6 million and \$4.4 million for the years ended October 31, 2019, 2018 and 2017, respectively.

Note 9. Goodwill and Intangible Assets

As of October 31, 2019 and 2018, the Company had goodwill of \$4.1 million and intangible assets of \$21.3 million and \$9.6 million, respectively, that were recorded in connection with the 2012 Versa acquisition and the 2019

Bridgeport Fuel Cell Project acquisition. The Versa intangible asset represents indefinite-lived IPR&D for cumulative research and development efforts associated with the development of solid oxide fuel cells stationary power generation. The Company recorded \$12.3 million as an intangible asset during fiscal year 2019 which is for the consideration from the Bridgeport acquisition which was allocated to the PPA (refer to Note 3. "Acquisition" for additional information). The balance for the Bridgeport related intangible asset was \$11.7 million as of October 31, 2019 and amortization recorded since the acquisition date of May 9, 2019 was \$0.6 million.

The Company completed its annual impairment analysis of goodwill and IPR&D assets as of July 31, 2019. The Company performed a qualitative analysis for fiscal years 2019, 2018 and 2017 and determined that there was no impairment of the goodwill or the indefinite-lived intangible asset.

Note 10. Other Current Assets

Other current assets as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Advance payments to vendors ⁽¹⁾	\$ 1,899	\$ 2,696
Deferred finance costs ⁽²⁾	-	97
Prepaid expenses and other ⁽³⁾	4,022	5,799
Other current assets	<u>\$ 5,921</u>	<u>\$ 8,592</u>

- (1) Advance payments to vendors relate to payments for inventory purchases ahead of receipt.
- (2) Represents the direct deferred finance costs that relate primarily to securing a \$40.0 million credit facility with NRG, which was being amortized over the five-year life of the facility. The facility was terminated during fiscal year 2019.
- (3) Primarily relates to other prepaid vendor expenses including insurance, rent and lease payments.

Note 11. Other Assets

Other assets as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Long-term stack residual value ⁽¹⁾	\$ 987	\$ 1,206
Long-term unbilled receivables ⁽²⁾	3,588	9,385
Other ⁽³⁾	4,914	2,914
Other assets	<u>\$ 9,489</u>	<u>\$ 13,505</u>

- (1) Relates to estimated residual value for module exchanges performed under the Company's service agreements where the useful life extends beyond the contractual term of the service agreement and the Company obtains title for the module from the customer upon expiration or non-renewal of the service agreement. If the Company does not obtain rights to title from the customer, the full cost of the module is expensed at the time of the module exchange.
- (2) Represents unbilled receivables that relate to revenue recognized on customer contracts that will be billed in future periods in excess of 12 months from the balance sheet date.
- (3) The Company entered into an agreement with one of its customers on June 29, 2016 which includes payments for the purchase of the customer's power plants at the end of the term of the agreement. The fee is payable in installments over the term of the agreement and the total paid as of October 31, 2019 and 2018 was \$2.3 million and \$2.0 million, respectively. Also included within "Other" are long-term security deposits and prepaid withholding taxes on deferred revenue as of October 31, 2019.

Note 12. Accrued Liabilities

Accrued liabilities as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Accrued payroll and employee benefits	\$ 2,282	\$ 2,550
Accrued product warranty costs ⁽¹⁾	144	147
Accrued service agreement and PPA costs ⁽²⁾	4,047	2,029
Accrued legal, taxes, professional and other	4,979	2,906
Accrued liabilities	<u>\$ 11,452</u>	<u>\$ 7,632</u>

- (1) Activity in the accrued product warranty costs for the years ended October 31, 2019 and 2018 included additions for estimates of future warranty obligations of \$0.1 million and \$0.4 million, respectively, on contracts in the warranty period and reductions related to actual warranty spend of \$0.1 million and \$0.6 million, respectively, as contracts progress through the warranty period or are beyond the warranty period.
- (2) The loss accruals on service contracts were \$0.9 million as of October 31, 2018, which increased to \$3.3 million as of October 31, 2019. The increase is a result of the adoption of Topic 606 and an increase in the estimate for future module cost exchanges. The accruals for performance guarantees on service agreements and PPAs decreased from \$1.1 million as of October 31, 2018 to \$0.8 million as of October 31, 2019 as a result of the acquisition of the Bridgeport Fuel Cell Project as amounts previously recorded in connection with the Bridgeport Fuel Cell Project service agreement were settled in connection with the acquisition of the Bridgeport Fuel Cell Project on May 9, 2019.

Note 13. Debt

Debt as of October 31, 2019 and 2018 consisted of the following (in thousands):

	2019	2018
Connecticut Development Authority Note	\$ -	\$ 284
Orion Energy Partners Credit Facility	14,500	-
Connecticut Green Bank Loan	7,555	6,052
Liberty Bank Term Loan Agreement (BFC Loan)	11,632	-
Fifth Third Bank Term Loan Agreement (BFC Loan)	11,632	-
Finance obligations for sale-leaseback transactions	45,219	46,062
State of Connecticut Loan	10,000	10,000
Hercules Loan and Security Agreement	-	25,343
New Britain Renewable Energy Term Loan	497	1,107
Enhanced Capital Loan and Security Agreement	1,500	-
Fifth Third Bank Construction Loan Agreement	11,072	-
Capitalized lease obligations	141	341
Deferred finance costs	(3,180)	(1,311)
Unamortized debt discount	(4,251)	-
Total debt	<u>\$ 106,317</u>	<u>\$ 87,878</u>
Current portion of long-term debt	(21,916)	(17,596)
Long-term debt	<u>\$ 84,401</u>	<u>\$ 70,282</u>

Aggregate annual principal payments under our loan agreements and capital lease obligations for the years subsequent to October 31, 2019 are as follows (in thousands):

Year 1	\$	20,974
Year 2		10,586
Year 3		11,410
Year 4		10,417
Year 5		10,736
Thereafter ⁽¹⁾		21,917
	<u>\$</u>	<u>86,040</u>

- (1) The annual principal payments included above only include sale-leaseback payments whereas the difference between debt outstanding as of October 31, 2019 and the annual principal payments represent accreted interest and amounts included in the finance obligation that exceed required principal payments.

Connecticut Development Authority Note

The Company had a loan agreement with the Connecticut Development Authority that was used to finance equipment purchases associated with our prior manufacturing capacity expansion. The interest rate was 5.0% per annum and the loan was collateralized by the assets procured under this loan as well as \$4.0 million of additional machinery and equipment. The original repayment terms required monthly interest and principal payments through May 2018. However, the repayment terms for the loan agreement with the Connecticut Development Authority were modified in April 2018, such that the remaining balance and interest was paid on a monthly basis through December 2018 and the loan was extinguished.

Orion Energy Partners Investment Agent, LLC Credit Agreement

On October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into a Credit Agreement (the “Orion Credit Agreement”) with Orion Energy Partners Investment Agent, LLC, as Administrative Agent and Collateral Agent (the “Agent”), and certain lenders affiliated with the Agent for a \$200.0 million senior secured credit facility (the “Orion Facility”), structured as a delayed draw term loan, to be provided by the lenders subject to certain lender approvals. Each lender will fund its commitments on each funding date in an amount equal to the principal amount of the loans to be funded by such lender on such date, less 2.50% of the aggregate principal amount of the loans funded by such lender on such date (the “Loan Discount”).

In conjunction with the closing of the Orion Facility, on October 31, 2019, the Company drew down \$14.5 million (the “Initial Funding”) and received \$14.1 million, after taking into account a discount of \$0.4 million as described above, to fully repay debt outstanding to NRG Energy, Inc. (“NRG”) and Generate Lending, LLC (“Generate”) and to fund dividends paid to the holders of our Series B Preferred Stock (as defined elsewhere herein) on or before November 15, 2019. The balance of the Initial Funding was used primarily to pay third party costs and expenses associated with closing of the Orion Facility. In connection with the closing of the Orion Facility and the Initial Funding, on October 31, 2019, the Company issued to the lenders warrants to purchase up to 6.0 million shares of the Company’s common stock (the “Initial Funding Warrants”) and made a commitment to issue warrants to purchase up to an additional 14.0 million shares of the Company’s common stock (the “Second Funding Warrants”) upon closing of the Second Funding under the Orion Facility, which occurred on November 22, 2019.

Subsequent to October 31, 2019, a second draw (the “Second Funding”) of \$65.5 million, funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P., was made on November 22, 2019 to fully repay outstanding third party debt of the Company with respect to the outstanding construction loan to Fifth Third Bank on the Groton Project and the outstanding loan to Webster Bank on the CCSU Project as well as to fund remaining going forward construction costs and anticipated capital expenditures relating to the Groton Project (a 7.4 MW project), the LIPA Yaphank Solid Waste Management Project (a 7.4 MW project), and the Tulare BioMAT Project (a 2.8 MW project). The Company received \$63.9 million after taking into account a loan discount of \$1.6 million as described above. Also in conjunction with the Second Funding, the Company issued to the Second Funding lenders warrants to purchase up to a total of 14.0 million shares of the Company’s common stock, with an initial exercise price with respect to 8.0 million of such shares of \$0.242 per share and with an initial exercise price with respect to 6.0 million of such shares of \$0.620 per share (the “Second Funding Warrants”).

The Company may draw the remainder of the Orion Facility, \$120.0 million, over the first 18 months following the Initial Funding and subject to the Agent's approval to fund: (i) construction costs, inventory and other capital expenditures of additional fuel cell projects with contracted cash flows (under PPAs with creditworthy counterparties) that meet or exceed a mutually agreed coverage ratio; and (ii) inventory, working capital, and other costs that may be required to be delivered by the Company on purchase orders, service agreements, or other binding customer agreements with creditworthy counterparties.

Under the Orion Credit Agreement, cash interest of 9.9% per annum will be paid quarterly. In addition to the cash interest, "PIK" interest of 2.05% per annum will accrue which will be added to the outstanding principal balance of the Orion Facility but will be paid quarterly in cash to the extent of available cash after payment of the Company's operating expenses and the funding of certain reserves for the payment of outstanding indebtedness to the State of Connecticut and Connecticut Green Bank. The Orion Credit Agreement contains representations, warranties and other covenants.

Outstanding principal on the Orion Facility will be amortized on a straight-line basis over a seven year term in quarterly payments beginning one year after the Initial Funding; provided that, if the Company does not have sufficient cash on hand to make any required quarterly amortization payments, such amounts shall be deferred and payable at such time as sufficient cash is available to make such payments subject to all outstanding principal being due and payable on the maturity date, which is the date that is eight years after the closing date or October 31, 2027.

The Orion Credit Agreement includes mandatory prepayment requirements and a prepayment premium of up to 30% of the amount being prepaid in the event that certain triggering events occur, including events of loss (destruction of or damage to any property of a loan party) where the proceeds received from such events of loss are not applied to the repair or restoration of the affected property, the sale, transfer or other disposition of project assets funded by the Orion Facility, if the proceeds from such disposition are not reinvested in substantially similar assets that are useful and necessary for the business (as defined in the Orion Credit Agreement) pursuant to a transaction permitted under the Orion Credit Agreement within a certain period of time, the incurrence of debt other than permitted indebtedness (as defined in the Orion Credit Agreement) and certain events of default (as defined in the Orion Credit Agreement), and also includes a post-default rate increase feature in the event certain events of default occur (in each case as defined in the Orion Credit Agreement). The Company assessed these mandatory prepayment and post-default rate features and determined that while they represent embedded derivatives and are required to be bifurcated and separately valued, the probability of occurrence for events that would trigger these features was determined to be sufficiently low such that no value was assigned to these features as of October 31, 2019.

Issuance of the Initial Funding Warrants and recognition of the Second Funding Warrants resulted in \$3.9 million being recorded as a liability with the offset recorded as a debt discount. Refer to Note 14. "Stockholders' Equity and Warrant Liabilities" for additional information on the Initial Funding Warrants and Second Funding Warrants including the accounting and terms.

In connection with the Company's providing collateral to the Agent for the Orion Facility, the Company granted security interests to the Agent in all of the Company's bank accounts subject to deposit account security agreements, other than certain bank accounts referred to as "Excluded Accounts" and bank accounts maintained for Excluded Assets (as defined in the Orion Credit Agreement). Certain bank accounts have been established pursuant to the terms and conditions of the Orion Credit Agreement, for which security interests have been granted to the Agent, including general corporate accounts, accounts for each of the Covered Projects (as defined in the Orion Credit Agreement), a Project Proceeds Account (for the proceeds of Permitted Project Dispositions/Refinancings), a Borrower Waterfall Account (into which net operating cash flow of the Company after payment of operating expenses will be deposited for the payment of debt service to the Agent), a Debt Reserve Account (to fund a reserve for required debt service payments to the State of Connecticut and Connecticut Green Bank), a Preferred Reserve Account (to fund a reserve for required dividends on the Company's Series B Preferred Stock and the Series 1 Preferred Shares (or, in lieu of such dividends, the amount required to redeem shares of Series 1 Preferred Stock in an amount equal to the amount of dividends that would otherwise have been paid in respect thereof)), a Module Replacement Reserve Account (to fund a reserve intended to be for the cost of module replacements for projects owned by the Company that would occur during the outstanding term of the Orion Facility) and certain other accounts. Excluded Accounts consist of bank accounts of the Company used to collateralize performance bonds and other sureties for projects and third party obligations and certain other certain operating accounts of the Company (i.e., payroll, benefits, sales and income tax withholding and related accounts).

Connecticut Green Bank Loans

As of October 31, 2018, the Company had a long-term loan agreement with the Connecticut Green Bank for a loan totaling \$5.9 million in support of the Bridgeport Fuel Cell Project. During the year ended October 31, 2019, this loan was partially repaid with a new project level loan from Connecticut Green Bank (as discussed below) in connection with the Company's acquisition of all of the membership interests in BFC. The balance under the long-term loan agreement as of October 31, 2019 was \$1.8 million. Subsequent to October 31, 2019, the long-term loan agreement was amended and the Connecticut Green Bank provided the Company with an additional loan in the aggregate principal amount of \$3.0 million. See Note 23. "Subsequent Events" for additional information regarding the amendment to the loan agreement and the additional loan.

On May 9, 2019, in connection with the closing of the purchase of BFC, BFC entered into a subordinated credit agreement with the Connecticut Green Bank whereby Connecticut Green Bank provided financing in the amount of \$6.0 million (the "Subordinated Credit Agreement"). As security for the Subordinated Credit Agreement, Connecticut Green Bank received a perfected lien, subordinated and second in priority to the liens securing the \$25.0 million loaned under the BFC Credit Agreement (as defined below), in all of the same collateral securing the BFC Credit Agreement. The interest rate under the Subordinated Credit Agreement is 8% per annum. The debt service coverage ratio required to be maintained under the Subordinated Credit Agreement may not be less than 1.10 as of the end of each fiscal quarter, beginning with the quarter ended July 31, 2020. The term of the Subordinated Credit Agreement expires 7 years from the date of the advance of the loan. Principal and interest are due monthly in amounts sufficient to fully amortize the loan over an 84 month period ending in May 2026. The Subordinated Credit Agreement contains representations, warranties and other covenants. The balance under the Subordinated Credit Agreement as of October 31, 2019 was \$5.8 million.

BFC Loans

On May 9, 2019, in connection with the purchase of the membership interests of BFC, FuelCell Finance (a subsidiary of the Company) entered into a Credit Agreement with Liberty Bank, as administrative agent and co-lead arranger, and Fifth Third Bank as co-lead arranger and swap hedger (the "BFC Credit Agreement"), whereby (i) Fifth Third Bank provided financing to BFC in the amount of \$12.5 million towards the BFC Purchase Price; and (ii) Liberty Bank provided financing to BFC in the amount of \$12.5 million towards the BFC Purchase Price. As security for the BFC Credit Agreement, Liberty Bank and Fifth Third Bank were granted a first priority lien in (i) all assets of BFC, including BFC's cash accounts, fuel cells, and all other personal property, as well as third party contracts including the Energy Purchase Agreement between BFC and Connecticut Light and Power Company dated July 10, 2009, as amended; (ii) certain fuel cell modules that are intended to be used to replace the Bridgeport Fuel Cell Project's fuel cell modules as part of routine operation and maintenance; and (iii) FuelCell Finance's ownership interest in BFC. The maturity date under the BFC Credit Agreement is May 9, 2025. Monthly principal and interest are to be paid in arrears in an amount sufficient to fully amortize the term loan over a 72 month period. BFC has the right to make additional principal payments or pay the balance due under the BFC Credit Agreement in full provided that it pays any associated breakage fees with regard to the interest rate swap agreements fixing the interest rate. The interest rate under the BFC Credit Agreement fluctuates monthly at the 30-day LIBOR rate plus 275 basis points on an initial total notional value of \$25.0 million, reduced for principal payments.

An interest rate swap agreement was required to be entered into with Fifth Third Bank in connection with the BFC Credit Agreement to protect against movements in the floating LIBOR index. Accordingly, on May 16, 2019, an interest rate swap agreement (the "Swap Agreement") was entered into with Fifth Third Bank in connection with the BFC Credit Agreement for the term of the loan. The net interest rate across the BFC Credit Agreement and the swap transaction results in a fixed rate of 5.09%. The interest rate swap will be adjusted to fair value on a quarterly basis. The estimated fair value is based on Level 2 inputs including primarily the forward LIBOR curve available to swap dealers. The valuation methodology involves comparison of (i) the sum of the present value of all monthly variable rate payments based on a reset rate using the forward LIBOR curve and (ii) the sum of the present value of all monthly fixed rate payments on the notional amount which is equivalent to the outstanding principal amount of the loan. The fair value adjustments for the fiscal year ended October 31, 2019 resulted in \$0.6 million of charges.

The BFC Credit Agreement requires BFC to maintain a debt service reserve at each of Liberty Bank and Fifth Third Bank of \$1.25 million, which debt service reserves were funded on May 10, 2019, to be held in deposit accounts at each respective bank, with funds to be disbursed with the consent of or at the request of the required lenders in their sole discretion. Each of Liberty Bank and Fifth Third Bank also has an operation and module replacement reserve (“O&M Reserve”) of \$250,000, both of which were funded at closing of the BFC Credit Agreement, to be held in deposit accounts at each respective bank, and thereafter BFC is required to deposit \$100,000 per month into each O&M Reserve for the first five years of the BFC Credit Agreement, with such funds to be released at the sole discretion of Liberty Bank and Fifth Third Bank, as applicable. BFC is also required to maintain excess cash flow reserve accounts at each of Liberty Bank and Fifth Third Bank and to evenly split and deposit the excess cash flows from the Bridgeport Fuel Cell Project into these accounts. Excess cash flow consists of cash generated by BFC from the Bridgeport Fuel Cell Project after payment of all expenses (including after payment of intercompany service fees to the Company), debt service to Liberty Bank and Fifth Third Bank, the funding of all required reserves, and payments to Connecticut Green Bank for the subordinated facility. BFC is also required to maintain a debt service coverage ratio of not less than 1.20, measured for the trailing year based on fiscal quarters beginning with the quarter ended July 31, 2020. The BFC Credit Agreement contains representations, warranties and other covenants. The Company also has certain quarterly and annual financial reporting requirements under the BFC Credit Agreement. The annual financial statements to be provided pursuant to such requirements are to be audited and accompanied by a report of an independent certified public accountant, which report shall not include a “going concern” matter of emphasis or any qualification or exception as to the scope of such audit.

Finance obligations for sale leaseback agreements

Several of the Company’s project finance subsidiaries previously entered into sale-leaseback agreements with PNC for commissioned projects where the Company had entered into a PPA with the site host/end-user of produced power. Under the financing method of accounting for a sale-leaseback, the Company did not recognize as income any of the sale proceeds received from the lessor that contractually constitute payments to acquire the assets subject to these arrangements. Instead, the sale proceeds received were accounted for as financing obligations. The outstanding financing obligation balance as of October 31, 2019 was \$45.2 million and the decrease from \$46.1 million on October 31, 2018 includes lease payments offset by the recognition of interest expense. The outstanding financing obligations include an embedded gain which will be recognized at the end of each of the 10-year lease terms.

State of Connecticut Loan

In October 2015, the Company closed on a definitive Assistance Agreement with the State of Connecticut and received a disbursement of \$10.0 million which was used for the first phase of the expansion of the Company’s Torrington, Connecticut manufacturing facility. In conjunction with this financing, the Company entered into a \$10.0 million promissory note and related security agreements securing the loan with equipment liens and a mortgage on its Danbury, Connecticut location. Interest accrues at a fixed interest rate of 2.0%, and the loan is repayable over 15 years from the date of the first advance, which occurred in October of 2015. Principal payments were deferred for four years from disbursement and began on December 1, 2019. Under the Assistance Agreement, the Company was eligible for up to \$5.0 million in loan forgiveness if the Company created 165 full-time positions and retained 538 full-time positions for two consecutive years (the “Employment Obligation”) as measured on October 28, 2017 (the “Target Date”). The Assistance Agreement contains representations, warranties and other covenants. The Assistance Agreement was subsequently amended in April 2017 to extend the Target Date by two years to October 28, 2019.

In January 2019, the Company and the State of Connecticut entered into a Second Amendment to the Assistance Agreement (the “Second Amendment”). The Second Amendment extends the Target Date to October 31, 2022 and amends the Employment Obligation to require the Company to continuously maintain a minimum of 538 full-time positions for 24 consecutive months. Based on the Company’s current headcount and plans for fiscal year 2020, it will be short of meeting this requirement. If the Company meets the Employment Obligation, as modified by the Second Amendment, and creates an additional 91 full-time positions, the Company may receive a credit in the amount of \$2.0 million to be applied against the outstanding balance of the loan. The Second Amendment deletes and cancels the provisions of the Assistance Agreement related to the second phase of the expansion project and the loans related thereto, but the Company had not drawn any funds or received any disbursements under those provisions. A job audit will be performed within 90 days of the Target Date. If the Company does not meet the Employment Obligation, then an accelerated payment penalty will be assessed at a rate of \$18,587.36 times the number of employees below the Employment Obligation. Such penalty is immediately payable and will be applied first to accelerate the payment of any outstanding fees or interest due and then to accelerate the payment of outstanding principal.

Hercules Loan and Security Agreement

In April 2016, the Company entered into a loan and security agreement (as amended from time to time, the “Hercules Agreement”) with Hercules Capital, Inc. (“Hercules”) for a loan in an aggregate principal amount of up to \$25.0 million. The original loan was a 30 month secured facility, and the original loan balance and all accrued and unpaid interest was due and payable by October 1, 2018.

The Hercules Agreement was subsequently amended on September 5, 2017, October 27, 2017, March 28, 2018, August 29, 2018, December 19, 2018, February 28, 2019, March 29, 2019, May 8, 2019, June 11, 2019 and July 24, 2019. The amendments provided for lower minimum cash covenants and were entered into to avoid events of default and accelerations of amounts due under the Hercules Agreement. Principal payments under the Hercules Agreement began on April 1, 2019. The term loan interest rate for the entire term of the loan was the greater of (i) 9.90% plus the prime rate minus 4.50%, and (ii) 9.90%. The initial end of term charge of \$1.7 million was paid on October 1, 2018. An additional end of term charge of \$0.9 million was due on April 1, 2020 or upon repayment of the principal balance. The additional end of term charge was being accreted over a 30-month term.

On September 30, 2019, the Company and Hercules entered into a payoff letter (the “Payoff Letter”). Pursuant to the Payoff Letter, the Company paid to Hercules, on September 30, 2019, a final payment of \$0.8 million, plus the end of term charge described above, which amounts represented the remaining outstanding principal balance, the remaining accrued interest outstanding, all remaining fees due under the Hercules Agreement, and the end of term charge, in full repayment of the Company’s outstanding obligations under the Hercules Agreement. Upon the payment of the \$0.8 million and the end of term charge, all outstanding indebtedness and obligations of the Company owing to Hercules under the Hercules Agreement were paid in full and the loan was extinguished.

Webster Bank Loan

In November 2016, we assumed debt with Webster Bank in the amount of \$2.3 million as a part of a project asset acquisition transaction. The term loan interest rate was 5.0% per annum and payments, which commenced in January 2017, were due on a quarterly basis. The balance outstanding as of October 31, 2019 and 2018 was \$0.5 million and \$1.1 million, respectively. The loan was paid off and extinguished subsequent to the fiscal year ended October 31, 2019.

Enhanced Capital Loan

On January 9, 2019, the Company, through its indirect wholly-owned subsidiary, TRS Fuel Cell, LLC, entered into a Loan and Security Agreement (the “Enhanced Capital Loan Agreement”) with Enhanced Capital Connecticut Fund V, LLC (“Enhanced”) for a loan in the amount of \$1.5 million. The collateral for this loan included any project assets, accounts receivable and inventory owned by TRS Fuel Cell, LLC. Interest accrued at a rate of 6.0% per annum and was paid on the first business day of each month. The loan maturity date was three years from the date of the Enhanced Capital Loan Agreement, upon which the outstanding principal and any accrued interest would be due and payable. Under the terms of the Enhanced Capital Loan Agreement, the Company was required to close on tax equity financing by January 14, 2020. Given that the Company did not secure tax equity financing for this project, on January 13, 2020, TRS Fuel Cell, LLC and Enhanced entered into a payoff letter whereby the loan was paid off and extinguished on January 14, 2020.

Fifth Third Bank Groton Loan

On February 28, 2019, the Company, through its indirect wholly-owned subsidiary, Groton Station Fuel Cell, LLC (“Groton Borrower”), entered into a Construction Loan Agreement (as amended from time to time, the “Groton Agreement”) with Fifth Third Bank pursuant to which Fifth Third Bank agreed to make available to Groton Borrower a construction loan facility in an aggregate principal amount of up to \$23.0 million (the “Groton Facility”) to fund the manufacture, construction, installation, commissioning and start-up of the 7.4 MW fuel cell power plant for the Connecticut Municipal Electric Energy Cooperative located on the U.S. Navy submarine base in Groton, Connecticut (the “Groton Project”). Groton Borrower made an initial draw under the Groton Facility on the date of closing of \$9.7 million and made an additional draw of \$1.4 million in April 2019. The original maturity date of the Groton Facility was the earlier of (a) October 31, 2019, (b) the commercial operation date of the Groton Project, or (c) one business day after receipt of proceeds of debt financing (i.e., take out financing) in an amount sufficient to repay the outstanding indebtedness under the Groton Facility.

On August 13, 2019, Groton Borrower and Fifth Third Bank entered into Amendment No. 1 to the Groton Agreement, which reduced the aggregate principal amount available to Groton Borrower under the Groton Facility from \$23.0 million to \$18.0 million and pursuant to which Groton Borrower committed to, among other things, deliver to Fifth Third Bank, no later than September 28, 2019 (which deadline was automatically extended to October 21, 2019 upon the Company's repayment of its corporate loan facility with Hercules on September 30, 2019), a binding loan agreement for permanent financing and one or more binding letters of intent from tax equity investors.

On October 21, 2019, Groton Borrower and Fifth Third entered into Amendment No. 2 to the Groton Agreement (the "Second Groton Amendment"), pursuant to which Groton Borrower agreed to deliver to Fifth Third Bank, no later than December 16, 2019, a binding agreement, in form and substance reasonably acceptable to Fifth Third Bank: (i) executed by Groton Borrower and one or more Take-out Lenders (as defined in the Groton Agreement), pursuant to which the Take-out Lenders shall have, individually or collectively, agreed to provide a Take-out Financing (as defined in the Groton Agreement); or (ii) executed by Groton Borrower and one or more tax equity investors or other third parties, pursuant to which such tax equity investors or third parties, via a tax equity or other financing transaction, shall have, individually or collectively, agreed to provide funds to Groton Borrower in an amount no less than the then-outstanding Construction Loans (as defined in the Groton Agreement) under the Groton Agreement and accrued interest. The Second Groton Amendment further provided, however, that if (A) neither such binding agreement nor a commitment letter for either of such agreements (which commitment letter shall not include a due diligence or similar funding condition) was provided to Fifth Third Bank by November 21, 2019, then commencing on November 22, 2019 until delivery of such commitment letter, the interest rate on the loans was to be the LIBOR rate plus 4% per annum and within three business days after such date, Groton Borrower was to pay to Fifth Third Bank a fee of \$15,000 and (B) such binding agreement was not provided to Fifth Third by December 16, 2019, then commencing on December 17, 2019, the outstanding obligations under the Groton Agreement were to bear interest at a rate equal to the LIBOR rate plus 6% per annum. The total outstanding balance under the Groton Facility as of October 31, 2019 was \$11.1 million. This balance was paid off and the loan was extinguished subsequent to the fiscal year ended October 31, 2019 on November 22, 2019, and the Groton Facility was terminated.

NRG Loan Agreement

In July 2014, the Company, through its wholly-owned subsidiary, FuelCell Finance, entered into a Loan Agreement with NRG (the "NRG Loan Agreement"). Pursuant to the NRG Loan Agreement, NRG extended a \$40.0 million revolving construction and term financing facility (the "NRG Loan Facility") to FuelCell Finance for the purpose of accelerating project development by the Company and its subsidiaries. Under the NRG Loan Agreement, FuelCell Finance and its subsidiaries were permitted to draw on the NRG Loan Facility to finance the construction of projects through the commercial operating date of the power plants. Additionally, FuelCell Finance had the option to continue the financing term for each project after the commercial operation date for a minimum term of 5 years per project. The interest rate was 8.5% per annum for construction-period financing and 8.0% per annum thereafter.

On December 13, 2018, FuelCell Finance's wholly owned subsidiary, Central CA Fuel Cell 2, LLC, drew a construction loan advance of \$5.8 million under the NRG Loan Facility. This advance was used to support the completion of construction of the 2.8 MW Tulare BioMAT project in California. In conjunction with the December 13, 2018 draw, FuelCell Finance and NRG entered into an amendment to the NRG Loan Agreement to revise the definitions of the terms "Maturity Date" and "Project Draw Period" under the NRG Loan Agreement and to make other related revisions. Pursuant to this amendment, FuelCell Finance and its subsidiaries could only request draws through December 31, 2018, and the Maturity Date of each note was the earlier of (a) March 31, 2019 and (b) the commercial operation date or substantial completion date, as applicable, with respect to the fuel cell project owned by the borrower under such note.

The Maturity Date was subsequently extended through amendments to the NRG Loan Agreement on March 29, 2019 (the "Third Amendment"), June 13, 2019, July 11, 2019, August 8, 2019 and September 30, 2019 (the "Seventh Amendment"). In connection with the Third Amendment, the Company agreed to make an additional payment of \$750,000 at the Maturity Date, which is recorded in interest expense on the Consolidated Statement of Operations. In addition, the Seventh Amendment, extended the Maturity Date of each note to the earlier of (a) October 31, 2019, or (b) closing of a corporate refinancing or other form of liquidity; provided, however, that if NRG determined, in its sole discretion, that the Company was not making sufficient progress toward the completion of the construction of the 2.8 MW Tulare BioMAT project in California, NRG had the right to accelerate the Maturity Date. The Company repaid and extinguished the loan on October 31, 2019.

Generate Construction Loan Agreement

On December 21, 2018, the Company, through its indirect wholly-owned subsidiary FuelCell Energy Finance II, LLC (“FCEF II”), entered into a Construction Loan Agreement (as amended from time to time, the “Generate Agreement”) with Generate pursuant to which Generate agreed (the “Commitment”) to make available to FCEF II a credit facility in an aggregate principal amount of up to \$100.0 million (the “Generate Facility”) to fund the manufacture, construction, installation, commissioning and start-up of stationary fuel cell projects to be developed by the Company on behalf of FCEF II during the 36 months from the date of the Generate Agreement. The Commitment to provide Working Capital Loans (as defined in the Generate Agreement) was to remain in place for 36 months from the date of the Generate Agreement (the “Availability Period”). Interest at 9.5% per annum was to be paid on the first business day of each month. The initial draw amount under the Generate Facility, funded at closing, was \$10.0 million. The initial draw reflected loan advances for the first Approved Project (as defined in the Generate Agreement) under the Generate Facility, the Bolthouse Farms 5 MW project in California. The Company entered into amendments to the Generate Agreement on June 28, 2019, August 13, 2019 and September 30, 2019, which primarily extended the repayment date of the loan and provided additional collateral. The loan was repaid and extinguished as of October 31, 2019.

Capital Leases

The Company leases computer equipment under master lease agreements. Lease payment terms are generally 36 months from the date of acceptance for leased equipment.

Deferred Finance Costs

Deferred finance costs relate primarily to (i) sale-leaseback transactions entered into with PNC which are being amortized over a 10-year term, (ii) payments under the Hercules Agreement, which were amortized over the term of the loan, (iii) payments under the loans obtained to purchase the membership interests in BFC which are being amortized over the 8-year term of the loans and (iv) payments to enter into the Orion Facility which will be amortized over the 8 year term of the loan.

Note 14. Stockholders’ Equity and Warrant Liabilities

Authorized Common Stock

In April 2017, the number of authorized shares of the Company's common stock was increased from 75,000,000 to 125,000,000, by vote of the holders of a majority of the outstanding shares of the Company's common stock.

On December 14, 2017, the number of authorized shares of the Company’s common stock was increased from 125,000,000 to 225,000,000, by a vote of the holders of a majority of the outstanding shares of the Company’s common stock.

At Market-Issuance Sales Agreements and Other Common Stock Sales

2019 At Market Issuance Sales Agreement

On October 4, 2019, the Company entered into an At Market Issuance Sales Agreement (the “Sales Agreement”) with B. Riley FBR, Inc. (the “Sales Agent”) to create an at-the-market equity program under which the Company may, from time to time, offer and sell up to 38.0 million shares of its common stock through the Sales Agent. However, to ensure that the Company had sufficient shares available for reservation and issuance upon exercise of all of the warrants to be issued to the lenders under the Orion Facility (as discussed in further detail below), the Company, effective as of October 31, 2019, reduced the number of shares reserved for future issuance and sale under the Sales Agreement from 27.9 million shares to 7.9 million shares (thus allowing for total aggregate issuances (past and future) of up to 18.0 million shares under the Sales Agreement) and reserved 20.0 million shares for issuance upon exercise of the warrants. Under the Sales Agreement, the Sales Agent is entitled to a commission in an amount equal to 3.0% of the gross proceeds from each sale of shares under the Sales Agreement.

During the year ended October 31, 2019, the Company sold 10.1 million shares of the Company's common stock at prevailing market prices under the Sales Agreement and received aggregate gross proceeds of \$3.0 million and paid \$0.1 million of fees and commissions

2018 At Market Issuance Sales Agreement

On June 13, 2018, the Company entered into an At Market Issuance Sales Agreement (the "Previous Sales Agreement") with B. Riley FBR, Inc. and Oppenheimer & Co. Inc. (together, the "Previous Agents") to create an at-the-market equity program under which the Company could from time to time to offer and sell shares of its common stock having an aggregate offering price of up to \$50.0 million through the Previous Agents. Under the Previous Sales Agreement, the Previous Agent making the sales was entitled to a commission in an amount equal to 3.0% of the gross proceeds from such sales.

During the year ended October 31, 2019, the Company sold 109.1 million shares of the Company's common stock under the Previous Sales Agreement at prevailing market prices, at an average sale price of \$0.39 per share and received aggregate gross proceeds of \$42.0 million and paid \$1.3 million of fees and commissions.

During the year ended October 31, 2018, the Company sold 0.5 million shares of the Company's common stock under the Previous Sales Agreement, at prevailing market prices, at an average sale price of \$16.72 per share and received aggregate gross proceeds of \$8.0 million and paid \$0.2 million of fees and commissions.

During the year ended October 31, 2017, the Company sold 0.6 million shares of the Company's common stock at an average sale price of \$21.00 per share through periodic offerings/sales on the open market under the Previous Sales Agreement and raised approximately \$12.6 million, net of aggregate selling commissions of \$0.1 million.

Public Offerings and Outstanding Warrants

On May 3, 2017, the Company completed an underwritten public offering of (i) 1,000,000 shares of its common stock, (ii) Series C warrants to purchase 1,000,000 shares of its common stock and (iii) Series D warrants to purchase 1,000,000 shares of its common stock, for gross proceeds of approximately \$15.4 million, at a public offering price of \$15.36 per share and accompanying warrants. Total net proceeds to the Company were approximately \$13.9 million. The Series C warrants have an exercise price of \$19.20 per share and a term of five years. A total of 962 shares of common stock were issued during fiscal year 2018 upon the exercise of Series C warrants and the Company received total proceeds of \$0.02 million. The Series D warrants had an exercise price of \$15.36 per share and a term of one year. A total of 215,347 shares of common stock were issued during fiscal year 2018 upon the exercise of Series D warrants and the Company received total proceeds of \$3.3 million. The Series D warrants were all exercised prior to October 31, 2018. No Series C warrants were exercised during the fiscal year ended October 31, 2019.

On July 12, 2016, the Company closed on a registered public offering of securities to a single institutional investor pursuant to a placement agent agreement with J.P. Morgan Securities LLC. In conjunction with the offering, the Company issued 640,000 Series A Warrants at an exercise price of \$69.96 per share. They were initially exercisable beginning on the date that was six months and one day after the issue date and will expire on the fifth anniversary of the initial exercisability date. The Company also issued 410,500 prefunded Series B Warrants which were immediately exercisable. They had an exercise price of \$0.0012 per share and were to expire on the fifth anniversary of the issue date. There were 318,834 prefunded Series B Warrants outstanding as of October 31, 2016, all of which were exercised during the year ended October 31, 2017.

On February 21, 2019, the Company entered into an Exchange Agreement (the "Exchange Agreement") with the holder (the "Warrant Holder") of the Series A Warrants. Pursuant to the Exchange Agreement, the Company agreed to issue to the Warrant Holder 500,000 shares of the Company's common stock (subject to adjustment for stock dividends, stock splits, stock combinations, and other reclassifications) in exchange for the transfer of the Series A Warrants back to the Company, in reliance on an exemption from registration provided by Section 3(a)(9) of the Securities Act of 1933, as amended. Following the transfer of the Series A Warrants back to the Company, the Series A Warrants were cancelled and no further shares were issuable pursuant to the Series A Warrants. During fiscal year 2019, the Company recorded a charge to common stockholders for the difference between the fair value of the Series

A Warrants prior to the modification of \$0.3 million and the fair value of the common shares issuable at the date of the Exchange Agreement of \$3.5 million.

In connection with the closing of the Orion Credit Agreement and the Initial Funding, on October 31, 2019, the Company issued the Initial Funding Warrants to the lenders under the Orion Credit Agreement to purchase up to a total of 6,000,000 shares of the Company’s common stock, at an exercise price of \$0.310 per share. In addition, under the Orion Credit Agreement, on the date of the Second Funding (November 22, 2019), the Company issued the Second Funding Warrants to the lenders under the Orion Credit Agreement to purchase up to a total of 14,000,000 shares of the Company’s common stock, with an exercise price with respect to 8,000,000 of such shares of \$0.242 per share and with an exercise price with respect to 6,000,000 of such shares of \$0.620 per share (the Initial Funding Warrants and the Second Funding Warrants are collectively referred to as the “Orion Warrants”).

The Orion Warrants have an 8-year term from the date of issuance, are exercisable immediately beginning on the date of issuance, and include provisions permitting cashless exercises. The Orion Warrants contain provisions regarding adjustment to their exercise prices and the type or class of security issuable upon exercise, including, without limitation, adjustments as a result of the Company undertaking or effectuating (a) a stock dividend or dividend of other securities or property, (b) a stock split, subdivision or combination, (c) a reclassification, (d) the distribution by the Company to substantially all of the holders of its common stock (or other securities issuable upon exercise of an Orion Warrant) of rights, options or warrants entitling such holders to subscribe for or purchase common stock (or other securities issuable upon exercise of an Orion Warrant) at a price per share that is less than the average of the closing sales price per share of the Company’s common stock for the ten consecutive trading days ending on and including the trading day before such distribution is publicly announced, and (e) a Fundamental Transaction (as defined in the Orion Warrants) or Change of Control (as defined in the Orion Credit Agreement).

Under the terms of the Orion Warrants, the Company may not effect the exercise of any portion of an Orion Warrant, and the holder of such warrant shall not have the right to exercise any portion of such warrant, to the extent that after giving effect to such exercise, such holder, collectively with its other attribution parties (as defined in the Orion Warrants), would beneficially own in excess of 4.99% of the shares of the Company’s common stock outstanding immediately after giving effect to such exercise; provided, however, that the holder may increase or decrease this limitation at any time, although any increase shall not be effective until the 61st day following the notice of increase.

The Company has accounted for the Initial Funding Warrants as a liability since there is a change of control provision in the Initial Funding Warrants regarding the composition of the board of directors and as such the Company could be required to repurchase the Initial Funding Warrants upon such change in control and therefore equity classification is precluded. The Company has accounted for the Second Funding Warrants as of October 31, 2019 under ASC 815, *Derivatives and Hedging* (“ASC 815”) since the Second Funding Warrants were considered contingent vesting warrants and therefore are considered to be an outstanding liability. Since the probability of vesting for the Second Funding Warrants was deemed to be 100%, there was no impact on the valuation. The Second Funding Warrants have been accounted for as a liability since the Company might be required to pay the holder under the same change of control provision as the Initial Funding Warrants and such event is outside the Company’s control and therefore equity classification is precluded.

The estimated fair value of the Orion Warrants was based on a Black-Scholes model using Level 2 inputs, including volatility of 96%, a risk free rate of 1.63%, the Company’s common stock price as of October 31, 2019 of \$0.24 per share and the term of 8 years which resulted in a total value of \$3.9 million. The Orion Warrants will be remeasured to fair value each reporting period.

The following table outlines the warrant activity during the fiscal year ended October 31, 2019:

	Series A Warrants	Series C Warrants	Orion Warrants (a)
Balance as of October 31, 2018	640,000	964,114	-
Warrants exchanged	(640,000)	—	—
Warrants issued	—	—	6,000,000
Balance as of October 31, 2019	<u>-</u>	<u>964,114</u>	<u>6,000,000</u>

(a) The Second Funding Warrants, exercisable to purchase 14.0 million shares of the Company’s common stock, were contingently issuable in connection with the Second Funding under the Orion Credit Agreement, which occurred on November 22, 2019. The Company accounted for the value of the Orion Warrants, which were

exercisable to purchase an aggregate of 20.0 million shares of the Company's common stock, as a liability as of October 31, 2019.

Refer to Note 23. "Subsequent Events" for information regarding the cashless exercise of certain of the Orion Warrants.

Nasdaq Marketplace Rule 5635(d)

On December 14, 2017, in accordance with Nasdaq Marketplace Rule 5635(d), the Company's common stockholders approved the issuance of shares of the Company's common stock exceeding 19.9% of the number of shares outstanding on September 5, 2017, upon the conversion and/or redemption of the Series C Convertible Preferred Stock issued in an underwritten offering in September 2017.

On April 4, 2019, in accordance with Nasdaq Marketplace Rule 5635(d), the Company's common stockholders approved the issuance of shares of the Company's common stock exceeding 19.9% of the number of shares outstanding on August 27, 2018, upon conversion of the Series D Convertible Preferred Stock issued in an underwritten offering in August 2018.

Note 15. Redeemable Preferred Stock

The Company is authorized to issue up to 250,000 shares of preferred stock, par value \$0.01 per share, in one or more series, of which (i) 30,680 shares were designated as Series D Convertible Preferred Stock (which is referred to herein as Series D Preferred Stock and the shares of which are referred to herein as Series D Preferred Shares) in August 2018, (ii) 33,500 shares were designated as Series C Convertible Preferred Stock (which is referred to herein as Series C Preferred Stock, and the shares of which are referred to herein as Series C Preferred Shares) in September 2017, and (iii) 105,875 shares were designated as 5% Series B Cumulative Convertible Perpetual Preferred Stock (referred to herein as Series B Preferred Stock) in March 2005. During the fiscal year ended October 31, 2019, all of the shares of Series D Preferred Stock and Series C Preferred Stock were converted into shares of common stock of the Company. Pursuant to our Certificate of Incorporation, as amended, our undesignated shares of preferred stock now include all of our shares of preferred stock that were previously designated as Series C Preferred Stock and Series D Preferred Stock, as all such shares have been retired and therefore have the status of authorized and unissued shares of preferred stock undesignated as to series.

Series D Preferred Stock

In August 2018, the Company issued 30,680 shares of Series D Preferred Stock, which were initially convertible into 1,852,657 shares of the Company's common stock at an initial conversion price of \$16.56 per share ("Series D Conversion Price"), subject to certain adjustments.

The net proceeds to the Company from the sale of the Series D Preferred Stock, after deducting the underwriting discounts and commissions and the offering expenses payable by the Company, were \$25.3 million.

As of October 31, 2018, there were 30,680 shares of Series D Preferred Stock issued and outstanding, with a carrying value of \$27.4 million. Upon conversion of the last outstanding Series D Preferred Shares on October 1, 2019, there were no further Series D Preferred Shares outstanding.

Based on a review of pertinent accounting literature, including ASC 470 – Debt, ASC 480 - Distinguishing Liabilities from Equity and ASC 815 - Derivative and Hedging, the Series D Preferred Shares were classified outside of permanent equity on the Consolidated Balance Sheets and were recorded at fair value on the issuance date (proceeds from the issuance, net of direct issuance cost). An assessment of the probability of the exercise of the potential redemption features in the Certificate of Designations, Preferences and Rights of the Series D Preferred Stock of the Company (the “Series D Certificate of Designation”) was performed at each reporting date to determine whether any changes in classification were required. As discussed below, as of October 31, 2018, the Company had not obtained stockholder approval to issue a number of shares of common stock equal to 20% or more of the Company’s outstanding voting stock prior to the date of issuance of the Series D Preferred Stock and therefore was accreting, as part of the stated value, the estimated value of the potential common stock shortfall if stockholder approval was not obtained. As of October 31, 2018, the Company determined that none of the other contingent redemption features were probable.

A description of certain terms and provisions of the Series D Preferred Shares that affected the accounting for the fiscal years ended October 31, 2019, 2018 and 2017 and that were in effect prior to the conversion of all of the Series D Preferred Shares during fiscal 2019 follows.

Conversion Right. The Series D Preferred Shares were convertible into shares of the Company’s common stock, subject to the requirements of Nasdaq Listing Rule 5635(d) and the beneficial ownership limitation provided in the Series D Certificate of Designation, at a conversion price equal to \$16.56 per share of common stock, subject to adjustment as provided in the Series D Certificate of Designation, including adjustments if the Company sold shares of common stock or equity securities convertible into or exercisable for shares of common stock, at prices below \$16.56 per share, in certain types of transactions. The holders were prohibited from converting Series D Preferred Shares into shares of common stock if, as a result of such conversion, such holder, together with its affiliates, would own more than 4.99% of the total number of shares of common stock then issued and outstanding. Each holder had the right to increase its maximum percentage up to 9.99% upon 60 days’ notice to the Company.

The Series D Conversion Price was subject to adjustment under certain circumstances in accordance with the Series D Certificate of Designation, including the following:

- The conversion price was to be proportionately reduced in the event of a subdivision of the Company’s common stock into a greater number of shares or proportionately increased in the event of a combination of the Company’s common stock into a smaller number of shares.
- In the event that the Company in any manner issued or sold or entered into any agreement to issue or sell Variable Price Securities (as defined in the Series D Certificate of Designation), which generally included any common stock, options or convertible securities that were issuable at a price which varies or may vary with the market price of the shares of common stock, including by way of one or more reset(s) to a fixed price, but excluding customary anti-dilution provisions (each of the formulations for such variable price being referred to as, the “Variable Price”), each holder of Series D Preferred Shares would have had the right (in its sole discretion) to substitute the Variable Price for the Conversion Price upon conversion of the Series D Preferred Shares. Sales of common stock pursuant to the Company’s Previous Sales Agreement would have been deemed Variable Price Securities with a Variable Price equal to the lowest price per share at which common stock was sold pursuant to that agreement. Under the Series D Certificate of Designation, the term “options” meant any rights, warrants or options to subscribe for or purchase shares of common stock or convertible securities, and the term “convertible securities” meant any stock or other security (other than options) that is at any time and under any circumstances, directly or indirectly, convertible into, exercisable or exchangeable for, or which otherwise entitles the holder thereof to acquire, any shares of common stock.
- At any time any Series D Preferred Shares remained outstanding, the Company could reduce the then current conversion price to any amount for any period of time deemed appropriate by the Company’s board of directors.
- The Series D Conversion Price or redemption amounts paid by the Company were also subject to adjustment upon the occurrence of certain triggering events as set forth in the Series D Certificate of Designation and summarized below under “Conversion Upon a Triggering Event” and “Redemption Upon a Triggering Event.”

Conversion Upon a Triggering Event. Subject to the requirements of Nasdaq Listing Rule 5635(d) and the beneficial ownership limitations provided in the Series D Certificate of Designation, in the event of a triggering event (as defined in the Series D Certificate of Designation and summarized below), the holders of Series D Preferred Shares could elect to convert such shares into shares of common stock at a conversion price equal to the lower of the Series D Conversion Price in effect on the Trading Day (as such term is defined in the Series D Certificate of Designation) immediately preceding the delivery of the conversion notice and 85% of the lowest volume weighted average price (“VWAP”) of the common stock on any of the five consecutive Trading Days ending on the Trading Day immediately prior to delivery of the applicable conversion notice. This conversion right would commence on the date of the triggering event and end on the later of (i) the date the triggering event was cured and (ii) ten Trading Days after the Company delivered notice of the triggering event.

A triggering event (as defined in the Series D Certificate of Designation) included, without limitation:

- any failure to pay any amounts due to the holders of the Series D Preferred Shares;
- the Company’s failure to timely deliver shares;
- the suspension of the Company’s common stock from trading or failure to be trading or listed on The Nasdaq Global Market, without obtaining a listing on another national securities exchange, for a period of five consecutive Trading Days;
- subject to limited exceptions, the Company’s failure for more than ten consecutive days to keep reserved for issuance 150% of the number of shares of common stock issuable upon conversion of the outstanding Series D Preferred Shares;
- certain bankruptcy events;
- the failure to pay certain indebtedness, a breach or violation of an agreement for monies owed in excess of \$750,000 that permitted the other party to such agreement to declare a default or accelerate amounts due, or the existence of a circumstance or event that would, with or without the passage of time or the giving of notice, result in a default under an agreement that would or was reasonably expected to have a material adverse effect; and
- breaches of certain covenants that were not timely cured, where a cure period was permitted.

Redemption. Commencing on December 1, 2018, and on the 16th day and 1st day of each calendar month thereafter until March 1, 2020, subject to extension in certain circumstances (the “Series D Maturity Date”), the Company was to redeem the stated value of Series D Preferred Stock in 31 equal installments of approximately \$989,677 (each installment amount, a “Series D Installment Amount” and the date of each such payment, a “Series D Installment Date”). The holders had the ability to defer installment payments, but not beyond the Series D Maturity Date. In addition, during each period commencing on the 11th Trading Day prior to a Series D Installment Date and prior to the immediately subsequent Series D Installment Date, the holders could elect to accelerate the conversion of Series D Preferred Shares at the then applicable installment conversion price, provided that the holders could not elect to effect any such acceleration during such installment period if either (a) in the aggregate, all the accelerations in such installment period would exceed the sum of three other Series D Installment Amounts, or (b) the number of Series D Preferred Shares subject to prior accelerations would exceed in the aggregate 12 Series D Installment Amounts.

Subject to certain beneficial ownership limitations, the Company could elect to pay the Series D Installment Amounts in cash or in shares of common stock or in a combination of cash and shares of common stock, except that the Company’s right to make payment in shares of common stock, or an installment conversion, was dependent upon satisfying certain equity conditions set forth in the Series D Certificate of Designation. The failure to satisfy such equity conditions is referred to herein as an equity conditions failure. Among other things, these equity conditions included the Company’s continued listing on The Nasdaq Global Market or another permitted exchange, the Company reserving 150% of the number of shares of common stock necessary to effect the conversion of the Series D Preferred Shares that then remained outstanding (without regard to any limitations on conversions, such as beneficial ownership limitations) during the applicable measurement period, and the Company’s common stock maintaining certain minimum average prices and trading volumes during the applicable measurement period. Upon an equity conditions failure, a holder of Series D Preferred Shares could waive such failure (subject to certain exceptions) and receive the Series D Installment Amount in shares of our common stock based on the installment conversion price (calculated as described in the following paragraph). Alternatively, a holder of Series D Preferred Shares could elect to receive all or part of the Series D Installment Amount due in cash, which was to include an 8% premium to the Series D Installment Amount.

Series D Installment Amounts paid in shares were to be that number of shares of common stock equal to (a) the applicable Series D Installment Amount, to be paid in common stock divided by (b) the lesser of (i) the then existing conversion price, (ii) 87.5% of the VWAP of the common stock on the Trading Day immediately prior to the applicable Series D Installment Date, and (iii) 87.5% of the arithmetic average of the two lowest VWAPs of the common stock during the 10 consecutive Trading Day period ending on and including the Trading Day immediately prior to the applicable Series D Installment Date as applicable, provided that the Company met standard equity conditions. The Company was required to make such election no later than the 11th Trading Day immediately prior to the applicable Series D Installment Date.

If the Company elected or was required to pay a Series D Installment Amount in whole or in part in cash, the amount paid would have been equal to 108% of the applicable Series D Installment Amount.

Redemption Upon a Triggering Event. In the event of a triggering event (as defined in the Series D Certificate of Designation and summarized above), the holders of Series D Preferred Shares could require the Company to redeem such Series D Preferred Shares in cash at a price equal to the greater of (a) 125% of the stated value of the Series D Preferred Shares being redeemed plus accrued dividends, if any, and (b) the market value of the number of shares issuable on conversion of the Series D Preferred Shares, valued at the greatest closing sales price during the period from the date immediately before the triggering event through the date the Company made the redemption payment.

The Series D Preferred Stock redemption accretion of \$3.8 million for the fiscal year ended October 31, 2019 reflects the accretion of the difference between the carrying value and the amount that would have been redeemed if stockholder approval had not been obtained for the issuance of common stock equal to 20.0% or more of the Company’s outstanding voting stock prior to the issuance of the Series D Preferred Stock. Additionally, prior to receiving stockholder approval of the issuance of 20.0% or more of the Company’s outstanding voting stock prior to the issuance of the Series D Preferred Stock, the holders were prohibited from converting Series D Preferred Shares into shares of common stock if such conversion would have caused the Company to issue pursuant to the terms of the Series D Preferred Stock a number of shares in excess of the maximum number of shares permitted to be issued thereunder without breaching the Company’s obligations under the rules or regulations of the Nasdaq Global Market. The Company received stockholder approval of such issuance at the annual meeting of the Company’s stockholders on April 4, 2019.

During the fiscal year ended October 31, 2019, holders of the Series D Preferred Stock converted all 30,680 Series D Preferred Shares into 62,040,496 shares of common stock, resulting in a reduction of \$31.2 million to the carrying value being recorded to equity. Conversions in which the conversion price was below the fixed conversion price (the initial conversion price of the Series D Preferred Stock) resulted in a variable number of shares being issued to settle the conversion amounts and were treated as a partial redemption of the Series D Preferred Shares. Conversions during the year ended October 31, 2019 that were settled in a variable number of shares and treated as redemptions resulted in deemed dividends of \$6.0 million. The deemed dividends represent the difference between the fair value of the shares of common stock issued to settle the conversion amounts and the carrying value of the Series D Preferred Shares.

As described above under the heading “Redemption Upon a Triggering Event,” a failure to pay any amounts due to the holders of the Series D Preferred Shares, as well as certain other triggering events, would have permitted the holders of the Series D Preferred Shares to require the Company to redeem such Series D Preferred Shares.

Alternatively, in the event of a triggering event, the holders of Series D Preferred Shares could elect to convert such shares into shares of common stock at a reduced conversion price, as described in additional detail above under the heading “Conversion Upon a Triggering Event.”

During the week of June 10, 2019, the holders of the Series D Preferred Stock asserted that certain triggering events had occurred under the Series D Certificate of Designation and indicated their intent to exercise their rights to convert certain of their shares at a reduced conversion price. While the Company did not agree with the basis for their assertions or their characterization of such events, there were provisions under the Series D Certificate of Designation which could be interpreted as giving the holders the right to demand such conversion at a reduced conversion price. Accordingly, during the period beginning on June 11, 2019 and ending on July 3, 2019, the Company effected conversions at reduced conversion prices ranging from \$0.14 to \$0.61.

Series C Preferred Stock

During the fiscal year ended October 31, 2017, the Company issued 33,500 shares of Series C Preferred Stock for net proceeds of \$27.9 million.

As of October 31, 2018, there were 8,992 shares of Series C Preferred Stock issued and outstanding, with a carrying value of \$7.5 million. Upon the conversion of the last outstanding Series C Preferred Shares on May 23, 2019, there were no further Series C Preferred Shares outstanding.

A summary of certain terms of the Series C Preferred Stock that were in effect prior to the conversion of all of the Series C Preferred Shares during fiscal 2019, including certain terms in effect prior to the date of the Waiver Agreement, dated February 21, 2019, between the Company and the holder of Series C Preferred Stock (the “Waiver Agreement”), and that affected the accounting for the fiscal years ended October 31, 2019, 2018 and 2017 follows.

Conversion Rights. The Series C Preferred Shares were convertible into shares of common stock, subject to the beneficial ownership limitations provided in the Certificate of Designations, Preferences and Rights of the Series C Preferred Stock of the Company (the “Series C Certificate of Designations”), at a conversion price equal to \$22.08 per share. The conversion price was subject to adjustment as provided in the Series C Certificate of Designations, including adjustments if the Company sold shares of common stock or equity securities convertible into or exercisable for shares of common stock, at variable prices below the conversion price then in effect. In the event of a triggering event (as defined in the Series C Certificate of Designations), the Series C Preferred Shares would have been convertible into shares of common stock at a conversion price equal to the lower of the conversion price then in effect and 85% of the lowest VWAP of the common stock of the five trading days immediately prior to delivery of the applicable conversion notice. The holders were prohibited from converting Series C Preferred Shares into shares of common stock if, as a result of such conversion, such holder, together with its affiliates, would own more than 8.99% of the total number of shares of common stock then issued and outstanding. Each holder had the right to increase its maximum percentage up to 9.99% upon 60 days’ notice to the Company.

As described below, under the Waiver Agreement, the holder waived any triggering event occurring after the date of the Waiver Agreement, as well as its right to demand, require or otherwise receive cash payments under the Series C Certificate of Designations, which waiver would have terminated upon the occurrence of certain key triggering events, the occurrence of a fundamental transaction, a breach of the Waiver Agreement, or the occurrence of a bankruptcy triggering event.

Installment Payments Prior to Execution of Waiver Agreement. On November 1, 2017 and on the 16th day and 1st day of each calendar month thereafter until March 1, 2019, subject to extension in certain circumstances (the “Series C Maturity Date”), inclusive, the Company was required to redeem the stated value of Series C Preferred Shares in 33 equal installments of approximately \$1.0 million (each bimonthly amount, a “Series C Installment Amount” and the date of each such payment, a “Series C Installment Date”). The holders had the ability to defer installment payments, but not beyond the Series C Maturity Date. In addition, during each period commencing on the 11th trading day prior to a Series C Installment Date and prior to the immediately subsequent Series C Installment Date, the holders could elect to accelerate the conversion of Series C Preferred Shares at the then applicable installment conversion price, provided that the holders could not elect to effect any such acceleration during such installment period if either (a) in the aggregate, all the accelerations in such installment period would exceed the sum of three other Series C Installment Amounts, or (b) the number of Series C Preferred Shares subject to prior accelerations would exceed in the aggregate 12 Series C Installment Amounts.

Subject to certain conditions as provided in the Series C Certificate of Designations, the Company could elect to pay the Series C Installment Amounts in cash or shares of common stock or in a combination of cash and shares of common stock.

Series C Installment Amounts paid in shares were to be that number of shares of common stock equal to (a) the applicable Series C Installment Amount, to be paid in common stock divided by (b) the least of (i) the then existing conversion price, (ii) 87.5% of the VWAP of the common stock on the trading day immediately prior to the applicable Series C Installment Date, and (iii) 87.5% of the arithmetic average of the two lowest VWAPs of the common stock during the 10 consecutive trading day period ending on and including the trading day immediately prior to the applicable Series C Installment Date, as applicable, provided that the Company met standard equity conditions. The Company was required to make such election no later than the 11th trading day immediately prior to the applicable Series C Installment Date.

If the Company elected or was required to pay a Series C Installment Amount in whole or in part in cash, the amount paid would have been equal to 108% of the applicable Series C Installment Amount.

Under the Waiver Agreement, the Company was no longer obligated to make installment payments under Section 9 of the Series C Certificate of Designations, and the holder was permitted to convert at any time, in its discretion, subject to certain beneficial ownership limitations.

Redemption. In the event of a triggering event, as defined in the Series C Certificate of Designations, the holders of the Series C Preferred Shares could force redemption at a price equal to the greater of (a) the conversion amount to be redeemed multiplied by 125% and (b) the product of (i) the conversion rate with respect to the conversion amount in effect at such time as such holder delivers a triggering event redemption notice multiplied by (ii) the greatest closing sale price of the common stock on any trading day during the period commencing on the date immediately preceding such triggering event and ending on the date the Company makes the entire payment required.

As described below, under the Waiver Agreement, the holder waived, subject to certain conditions and limitations, all triggering events occurring after the date of the Waiver Agreement.

On February 21, 2019, the Company entered into the Waiver Agreement with the holder of the Series C Preferred Stock (such holder, the “Series C Holder”). Under the Waiver Agreement, the Series C Holder waived any equity conditions failures that may have occurred under the Series C Certificate of Designations. The Series C Holder further waived any triggering event occurring after the date of the Waiver Agreement, as well as its right to demand, require or otherwise receive cash payments under the Series C Certificate of Designations, which waiver would have terminated upon the occurrence of certain key triggering events (failure to provide freely tradable shares, suspension from trading on the Nasdaq Global Market or another eligible market, or failure to convert or deliver shares under certain circumstances), the occurrence of a fundamental transaction, a breach of the Waiver Agreement, or the occurrence of a bankruptcy triggering event. In addition, the Company agreed in the Waiver Agreement, pursuant to Section 8(d) of the Series C Certificate of Designations, to adjust the conversion price of the Series C Preferred Stock in connection with future conversions, such that, when the Series C Holder converted its Series C Preferred Stock into common stock, it would receive approximately 25% more shares than it would have received upon conversion prior to the execution of the Waiver Agreement. Under the Waiver Agreement, the conversion price of the Series C Preferred Stock was stated to be the lowest of (i) \$4.45, (ii) 85% of the lowest closing bid price of the Company’s common stock during the period beginning on and including the fifth trading day prior to the date on which the applicable conversion notice was delivered to the Company and ending on and including the date on which the applicable conversion notice was delivered to the Company, and (iii) 85% of the quotient of (A) the sum of the five lowest

VWAPs of the Company's common stock during the 20 consecutive trading day period ending on and including the trading day immediately preceding the applicable conversion date divided by (B) five. To determine the number of shares of common stock to be issued upon conversion, 125% of the value of the Series C Preferred Shares being converted was divided by the applicable conversion price. The parties further agreed to waive the installment payment/conversion provisions in Section 9 of the Series C Certificate of Designations, which required installment conversions or payments to be made on the 1st and 16th of each month (as described in additional detail above). Under the Waiver Agreement, conversions of Series C Preferred Stock were permitted to occur and did occur after the original March 1, 2019 maturity date, and the Company further agreed to reserve specific numbers of shares for issuance to the Series C Holder and the holders of the Series D Preferred Stock until the Company effected a reverse stock split, which occurred on May 8, 2019, or increased its authorized shares of common stock.

The Waiver Agreement was treated for accounting purposes to be an extinguishment of the Series C Preferred Stock instrument as of February 21, 2019. The Series C Preferred Stock remained classified in mezzanine equity, however, the carrying value was adjusted to reflect the estimated fair value of the post-modification Series C Preferred Shares which incorporated the new terms outlined in the Waiver Agreement. The valuation utilized a Binomial Lattice Model ("Lattice Model") which is a commonly used methodology to value path-dependent options or stock units in order to capture their potential early conversion. The Lattice Model produces an estimated fair value based on changes in the underlying stock price over successive periods of time. The assumptions used in the model such as stock price, conversion price and conversion ratio were consistent with date of execution and terms in the Waiver Agreement. Other assumptions included the volatility of the Company's stock which was assumed to be 75% and a discount rate of 20% which was estimated based on various indices consistent with the Company's profile, venture capital rates of return and the Company's borrowing rate. The Lattice Model resulted in an estimated fair value as of February 21, 2019 of \$13.5 million whereby the Series C Preferred Stock carrying value was adjusted to this amount. As discussed below, a beneficial conversion feature was recorded during the three months ended January 31, 2019 due to reductions in the conversion price. Upon extinguishment during the three months ended April 30, 2019, the Company first allocated \$6.6 million to the reacquisition of the embedded conversion option equal to the intrinsic value that was previously recognized during the three months ended January 31, 2019 for the embedded conversion option. Because the remaining estimated fair value of the instrument on February 21, 2019 was less than the carrying amount of the Series C Preferred Stock, the amount of the shortfall resulted in a decrease in loss available to common stockholders for purposes of computing loss per share of \$0.6 million.

In order to resolve different interpretations of the provisions of the Series C Certificate of Designations that governed adjustments to the conversion price in connection with sales of common stock under the Company's at-the-market stock sales plan below the initial conversion price of \$22.08 and whether such sales constituted sales of variable priced securities under the Series C Certificate of Designations, the Company's Board of Directors agreed to reduce the conversion price of the Series C Preferred Shares from \$22.08 to \$18.00 effective August 27, 2018 in exchange for a waiver of certain anti-dilution and price adjustment rights under the Series C Certificate of Designations for future at-the-market sales of common stock. The conversion price of the Series C Preferred Shares was adjusted again on December 3, 2018 to \$6.96, on December 17, 2018 to \$6.00 and on January 2, 2019 to \$5.16. During the period from February 1, 2019 to May 23, 2019, the conversion price was further adjusted to prices ranging from \$4.45 to \$1.27, the conversion price as of the last conversion, which occurred on May 23, 2019. Conversions occurring fiscal year ended October 31, 2019 resulted in a variable number of shares being issued to settle the conversion amounts and were treated as a partial redemption of the Series C Preferred Shares. Conversions during the year ended October 31, 2019 that were settled in a variable number of shares and treated as partial redemptions resulted in deemed contributions \$1.5 million. The deemed contributions represent the difference between the fair value of the common shares issued to settle the conversion amounts and the carrying value of the Series C Preferred Shares. Additionally, as discussed in more detail above, the net loss attributable to common stockholders for the fiscal year ended October 31, 2019 was impacted by a \$0.5 million decrease in the loss resulting from accounting for the Waiver Agreement in February 2019, which was recorded during the three months ended April 30, 2019. The net loss attributable to common stockholders for the year ended October 31, 2019 also includes the \$8.6 million redemption value adjustment recorded during the three months ended January 31, 2019.

Based on review of pertinent accounting literature including ASC 470 – *Debt*, ASC 480 - *Distinguishing Liabilities from Equity* and ASC 815 - *Derivative and Hedging*, the Series C Preferred Shares were classified outside of permanent equity on the Consolidated Balance Sheets and were recorded at fair value on the issuance date (proceeds from the issuance, net of direct issuance cost). The decline in the Company's stock price during the three months ended January 31, 2019 and between January 31, 2019 and the execution of the Waiver Agreement in February 2019 resulted in equity conditions failures under the Series C Certificate of Designations, which were waived by the Series C Holder in the Waiver Agreement, as described above. Prior to the execution of such Waiver Agreement, the

conversion price was adjusted in December 2018 and January 2019 as described above. This contingent beneficial conversion feature resulted in a \$6.6 million reduction in the Series C Preferred Shares carrying value. Because the equity conditions failures were continuing as of January 31, 2019 (prior to the execution of the Waiver Agreement), the Series C Preferred Shares were adjusted to 108% of stated redemption value as of January 31, 2019 with a corresponding charge to common stockholders of \$8.6 million.

During the fiscal year ended October 31, 2019, holders of the Series C Preferred Stock converted 8,992 Series C Preferred Shares into 3,914,218 shares of common stock, resulting in a reduction in carrying value of \$15.5 million. Upon the conversion of the last outstanding Series C Preferred Shares on May 23, 2019, there were no further Series C Preferred Shares outstanding.

During the fiscal year ended October 31, 2018, holders of the Series C Preferred Stock converted 24,308 Series C Preferred Shares into common shares through installment conversions resulting in a reduction of \$20.2 million to the carrying value being recorded to equity. Installment conversions occurring prior to August 27, 2018 in which the conversion price was below the initial conversion price of \$22.08 per share resulted in a variable number of shares being issued to settle the installment amount and were treated as a partial redemption of the Series C Preferred Shares. As discussed above, the Company's Board of Directors agreed to reduce the conversion price of the Series C Preferred Shares from \$22.08 to \$18.00 effective August 27, 2018 in exchange for a waiver of certain anti-dilution and price adjustment rights under the Series C Certificate of Designations for future at-the-market sales. Installment conversions occurring between August 27, 2018 and October 31, 2018 in which the installment conversion price was below the adjusted conversion price of \$18.00 per share resulted in a variable number of shares being issued to settle the installment amount and were treated as a partial redemption of the Series C Preferred Shares. Installment conversions during the year ended October 31, 2018 that were settled in a variable number of shares and treated as partial redemptions resulted in deemed dividends of \$9.6 million.

Redeemable Series B Preferred Stock

The Company has designated 105,875 shares of its authorized preferred stock as Series B Preferred Stock (liquidation preference \$1,000.00 per share). As of October 31, 2019 and 2018, there were 64,020 shares of Series B Preferred Stock issued and outstanding, with a carrying value of \$59.9 million. The shares of Series B Preferred Stock and the shares of common stock issuable upon conversion of the shares of Series B Preferred Stock are covered by a registration rights agreement. The following is a summary of certain provisions of the Series B Preferred Stock.

Ranking. Shares of the Company's Series B Preferred Stock rank with respect to dividend rights and rights upon the Company's liquidation, winding up or dissolution:

- senior to shares of the Company's common stock;
- junior to the Company's debt obligations; and
- effectively junior to the Company's subsidiaries' (i) existing and future liabilities and (ii) capital stock held by others.

Dividends. The Series B Preferred Stock pays cumulative annual dividends of \$50.00 per share which are payable quarterly in arrears on February 15, May 15, August 15 and November 15. Dividends accumulate and are cumulative from the date of original issuance. Unpaid accumulated dividends do not bear interest.

The dividend rate is subject to upward adjustment as set forth in the Amended Certificate of Designation for the Series B Preferred Stock (the "Series B Certificate of Designation") if the Company fails to pay, or to set apart funds to pay, any quarterly dividend on the Series B Preferred Stock. The dividend rate is also subject to upward adjustment as set forth in the Registration Rights Agreement entered into with the initial purchasers of the Series B Preferred Stock (the "Registration Rights Agreement") if the Company fails to satisfy its registration obligations with respect to the Series B Preferred Stock (or the underlying common shares) under the Registration Rights Agreement.

No dividends or other distributions may be paid or set apart for payment on the Company's common stock (other than a dividend payable solely in shares of a like or junior ranking), nor may any stock junior to or on parity with the Series B Preferred Stock be redeemed, purchased or otherwise acquired for any consideration (or any money paid to or made available for a sinking fund for such stock) by the Company or on its behalf (except by conversion into or exchange for shares of a like or junior ranking), unless all accumulated and unpaid Series B Preferred Stock dividends

have been paid or funds or shares of common stock have been set aside for payment of accumulated and unpaid Series B Preferred Stock dividends.

The dividend on the Series B Preferred Stock may be paid in cash or, at the option of the holder, in shares of the Company's common stock, which will be registered pursuant to a registration statement to allow for the immediate sale of these shares of common stock in the public market. Dividends of \$3.2 million were paid in cash in each of the fiscal years ended October 31, 2018 and 2017, and dividends of \$1.6 million were paid in cash during the fiscal year ended October 31, 2019. There were no cumulative unpaid dividends as of October 31, 2018 and cumulative unpaid dividends as of October 31, 2019 were \$1.6 million.

No dividends were declared or paid by the Company on the Series B Preferred Stock in connection with the May 15, 2019 and August 15, 2019 dividend payment dates. Based on the dividend rate in effect on May 15, 2019 and August 15, 2019, the aggregate amount of such dividend payments would have been \$1.6 million. Because such dividends were not paid on May 15 or August 15, under the terms of the Series B Certificate of Designation, the holders of shares of Series B Preferred Stock were entitled to receive, when, as and if, declared by the Board, dividends at a dividend rate per annum equal to the normal dividend rate of 5% plus an amount equal to the number of dividend periods for which the Company failed to pay or set apart funds to pay dividends multiplied by 0.0625%, for each subsequent dividend period until the Company has paid or provided for the payment of all dividends on the shares of Series B Preferred Stock for all prior dividend periods. On October 30, 2019, dividends were declared by the Board of Directors with respect to the May 15, 2019 and August 15, 2019 dividend payment dates as well as the November 15, 2019 dividend payment date. Such dividend payments were made subsequent to the fiscal year ended October 31, 2019.

Liquidation. The holders of Series B Preferred Stock are entitled to receive, in the event that the Company is liquidated, dissolved or wound up, whether voluntarily or involuntarily, \$1,000.00 per share plus all accumulated and unpaid dividends up to but excluding the date of that liquidation, dissolution, or winding up ("Liquidation Preference"). Until the holders of Series B Preferred Stock receive their Liquidation Preference in full, no payment will be made on any junior shares, including shares of the Company's common stock. After the Liquidation Preference is paid in full, holders of the Series B Preferred Stock will not be entitled to receive any further distribution of the Company's assets. As of October 31, 2019 and 2018, the Series B Preferred Stock had a Liquidation Preference of \$64.0 million.

Conversion Rights. Each share of Series B Preferred Stock may be converted at any time, at the option of the holder, into 0.591 shares of the Company's common stock (which is equivalent to an initial conversion price of \$1,692.00 per share) plus cash in lieu of fractional shares. The conversion rate is subject to adjustment upon the occurrence of certain events, as described in the Series B Certificate of Designation. The conversion rate is not adjusted for accumulated and unpaid dividends. If converted, holders of Series B Preferred Stock do not receive a cash payment for all accumulated and unpaid dividends; rather, all accumulated and unpaid dividends are canceled.

The Company may, at its option, cause shares of Series B Preferred Stock to be automatically converted into that number of shares of common stock that are issuable at the then prevailing conversion rate. The Company may exercise its conversion right only if the closing price of its common stock exceeds 150% of the then prevailing conversion price (\$1,692.00 per share as of October 31, 2019) for 20 trading days during any consecutive 30 trading day period, as described in the Series B Certificate of Designation.

If holders of Series B Preferred Stock elect to convert their shares in connection with certain fundamental changes, as defined in the Series B Certificate of Designation, the Company will in certain circumstances increase the conversion rate by a number of additional shares of common stock upon conversion or, in lieu thereof, the Company may in certain circumstances elect to adjust the conversion rate and related conversion obligation so that shares of Series B Preferred Stock are converted into shares of the acquiring or surviving company, in each case as described in the Series B Certificate of Designation.

The adjustment of the conversion price is to prevent dilution of the interests of the holders of the Series B Preferred Stock from certain dilutive transactions with holders of common stock.

Redemption. The Company does not have the option to redeem the shares of Series B Preferred Stock. However, holders of the Series B Preferred Stock can require the Company to redeem all or part of their shares at a redemption price equal to the Liquidation Preference of the shares to be redeemed in the case of a "fundamental change" (as described in the Series B Certificate of Designation). A fundamental change will be deemed to have occurred if any of the following occurs:

- any “person” or “group” is or becomes the beneficial owner, directly or indirectly, of 50% or more of the total voting power of all classes of the Company’s capital stock then outstanding and normally entitled to vote in the election of directors;
- during any period of two consecutive years, individuals who at the beginning of such period constituted the board of directors (together with any new directors whose election by the Company’s board of directors or whose nomination for election by the stockholders was approved by a vote of two-thirds of the Company’s directors then still in office who were either directors at the beginning of such period or whose election or nomination for election was previously so approved) cease for any reason to constitute a majority of the directors then in office;
- the termination of trading of the Company’s common stock on The Nasdaq Stock Market and such shares are not approved for trading or quoted on any other U.S. securities exchange or established over-the-counter trading market in the U.S.; or
- the Company consolidates with or merges with or into another person or another person merges with or into the Company or the sale, assignment, transfer, lease, conveyance or other disposition of all or substantially all of the Company’s assets and certain of its subsidiaries, taken as a whole, to another person and, in the case of any such merger or consolidation, the Company’s securities that are outstanding immediately prior to such transaction and which represent 100% of the aggregate voting power of the Company’s voting stock are changed into or exchanged for cash, securities or property, unless pursuant to the transaction such securities are changed into securities of the surviving person that represent, immediately after such transaction, at least a majority of the aggregate voting power of the voting stock of the surviving person.

Notwithstanding the foregoing, holders of shares of Series B Preferred Stock will not have the right to require the Company to redeem their shares if:

- the last reported sale price of shares of the Company’s common stock for any five trading days within the 10 consecutive trading days ending immediately before the later of the fundamental change or its announcement equaled or exceeded 105% of the conversion price of the shares of Series B Preferred Stock immediately before the fundamental change or announcement;
- at least 90% of the consideration (excluding cash payments for fractional shares and in respect of dissenters’ appraisal rights) in the transaction or transactions constituting the fundamental change consists of shares of capital stock traded on a U.S. national securities exchange or quoted on the Nasdaq Stock Market, or which will be so traded or quoted when issued or exchanged in connection with a fundamental change, and as a result of the transaction or transactions, shares of Series B Preferred Stock become convertible into such publicly traded securities; or
- in the case of a fundamental change event described in the fourth bullet above, the transaction is affected solely to change the Company’s jurisdiction of incorporation.

Moreover, the Company will not be required to redeem any Series B Preferred Stock upon the occurrence of a fundamental change if a third party makes an offer to purchase the Series B Preferred Stock in the manner, at the price, at the times and otherwise in compliance with the requirements set forth above and such third party purchases all Series B Preferred Stock validly tendered and not withdrawn.

The Company may, at its option, elect to pay the redemption price in cash, in shares of the Company’s common stock valued at a discount of 5% from the market price of shares of the Company’s common stock, or in any combination thereof. Notwithstanding the foregoing, the Company may only pay such redemption price in shares of the Company’s common stock that are registered under the Securities Act of 1933 and eligible for immediate sale in the public market by non-affiliates of the Company.

Voting Rights. Holders of Series B Preferred Stock currently have no voting rights; however, holders may receive certain voting rights, as described in the Series B Certificate of Designation, if (a) dividends on any shares of Series B Preferred Stock, or any other class or series of stock ranking on parity with the Series B Preferred Stock with respect to the payment of dividends, shall be in arrears for dividend periods, whether or not consecutive, containing in the

aggregate a number of days equivalent to six calendar quarters or (b) the Company fails to pay the redemption price, plus accrued and unpaid dividends, if any, on the redemption date for shares of Series B Preferred Stock following a fundamental change.

So long as any shares of Series B Preferred Stock remain outstanding, the Company will not, without the consent of the holders of at least two-thirds of the shares of Series B Preferred Stock outstanding at the time (voting separately as a class with all other series of preferred stock, if any, on parity with the Series B Preferred Stock upon which like voting rights have been conferred and are exercisable) issue or increase the authorized amount of any class or series of shares ranking senior to the outstanding shares of the Series B Preferred Stock as to dividends or upon liquidation. In addition, the Company will not, subject to certain conditions, amend, alter or repeal provisions of the Company's certificate of incorporation, including the Series B Certificate of Designation, whether by merger, consolidation or otherwise, so as to adversely amend, alter or affect any power, preference or special right of the outstanding shares of Series B Preferred Stock or the holders thereof without the affirmative vote of not less than two-thirds of the issued and outstanding Series B Preferred Stock shares.

Class A Cumulative Redeemable Exchangeable Preferred Shares (the "Series 1 Preferred Shares")

As of October 31, 2019, FCE FuelCell Energy Ltd. ("FCE Ltd."), one of the Company's indirect subsidiaries, had 1,000,000 Class A Cumulative Redeemable Exchangeable Preferred Shares (the "Series 1 Preferred Shares") issued and outstanding, which were and are held solely by Enbridge, Inc. ("Enbridge"). The Company guarantees the return of principal and dividend obligations of FCE Ltd. to the holder of the Series 1 Preferred Shares.

On March 31, 2011 and April 1, 2011, the Company entered into agreements with Enbridge to modify the provisions of the Series 1 Preferred Shares of FCE Ltd. Consistent with the previous Series 1 Preferred Share agreement, FuelCell Energy continues to guarantee the return of principal and dividend obligations of FCE Ltd. to the holders of Series 1 Preferred Shares under the modified agreement.

On January 20, 2020, the Company, FCE Ltd., and Enbridge entered into the January 2020 Letter Agreement pursuant to which they agreed to modify certain terms of the Series 1 Preferred Shares. Refer to Note 23. "Subsequent Events" for additional information regarding such letter agreement and such modified terms.

The following summary of the terms of the Series 1 Preferred Shares describes such terms as they existed on October 31, 2019 (prior to any modification covered by the January 2020 Letter Agreement).

The terms of the Series 1 Preferred Shares required (i) annual dividend payments of Cdn. \$500,000 and (ii) annual return of capital payments of Cdn. \$750,000. These payments, which were made on a quarterly basis, commenced on March 31, 2011 and were scheduled to end on December 31, 2020. Dividends accrued at a 1.25% quarterly rate on the unpaid principal balance, and additional dividends accrued on the cumulative unpaid dividends (inclusive of the Cdn. \$12.5 million unpaid dividend balance as of the modification date) at a rate of 1.25% compounded quarterly. The amount of all accrued and unpaid dividends on the Series 1 Preferred Shares of Cdn. \$21.1 million and the balance of the principal redemption price of Cdn. \$4.4 million as of October 31, 2019 were scheduled to be paid to the holders of the Series 1 Preferred Shares on December 31, 2020. FCE Ltd. had the option, subject to the Company having sufficient authorized and unissued shares, of making dividend payments in the form of cash or shares of the Company's common stock under the terms of the Series 1 Preferred Shares.

In addition to the above, the significant terms of the Series 1 Preferred Shares as they existed on October 31, 2019 (prior to any modification covered by the letter agreement referenced above) include the following:

- *Voting Rights* — The holders of the Series 1 Preferred Shares are not entitled to any voting rights.
- *Dividends* — Dividend payments could be made in cash or shares of common stock of the Company, at the option of FCE Ltd., and if common stock was issued, it could be unregistered. If FCE Ltd. elected to make such payments by issuing shares of common stock of the Company, the number of shares of common stock was to be determined by dividing the cash dividend obligation by 95% of the volume weighted average price in U.S. dollars at which board lots of the common shares were traded on The Nasdaq Stock Market during the 20 consecutive trading days preceding the end of the calendar quarter for which such dividend in common shares was to be paid, converted into Canadian dollars using the Bank of Canada's noon rate of exchange on the day of determination.
- *Redemption* — The Series 1 Preferred Shares were redeemable by FCE Ltd. for Cdn. \$25.00 per share less any amounts paid as a return of capital in respect of such share plus all unpaid dividends and accrued interest.
- *Liquidation or Dissolution* — In the event of the liquidation or dissolution of FCE Ltd., the holders of Series 1 Preferred Shares will be entitled to receive Cdn. \$25.00 per share less any amounts paid as a return of capital in respect of such share plus all unpaid dividends and accrued interest. The Company has guaranteed any liquidation obligations of FCE Ltd.
- *Exchange Rights* — A holder of Series 1 Preferred Shares had the right, at its option, to exchange such shares for fully paid and non-assessable shares of common stock of the Company at the following exchange prices:
 - Cdn. \$19,974.24 per share of the Company's common stock after July 31, 2015 until July 31, 2020; and
 - at any time after July 31, 2020, a price equal to 95% of the then current market price (in Cdn. \$) of shares of the Company's common stock at the time of conversion.

The exchange rates set forth above were subject to adjustment if the Company: (i) subdivided or consolidated the common stock; (ii) paid a stock dividend; (iii) issued rights, options or other convertible securities to the Company's common stockholders enabling them to acquire common stock at a price less than 95% of the then-current price; or (iv) fixed a record date to distribute to the Company's common stockholders shares of any other class of securities, indebtedness or assets.

For example, if, under the terms as they existed on October 31, 2019, the holder of the Series 1 Preferred Shares was to exercise its conversion rights after July 31, 2020, then, assuming the common stock price was \$0.24 (the common stock closing price on October 31, 2019) and the exchange rate was U.S. \$1.00 to Cdn. \$1.32 (the exchange rate on October 31, 2019) at the time of conversion, the Company would have been required to issue approximately 1,234,279 shares of its common stock.

Because the Series 1 Preferred Shares represent a mandatorily redeemable financial instrument, they are presented as a liability on the Consolidated Balance Sheet.

The Company made payments of Cdn. \$0.3 million, Cdn. \$1.3 million and Cdn. \$1.3 million during fiscal years 2019, 2018 and 2017, respectively. The Company's return of capital and dividend payments were not made for the calendar quarters ended on March 31, 2019, June 30, 2019 and September 30, 2019. Subsequent to the fiscal year ended October 31, 2019, the Company made the return of capital and dividend payments for the obligations due as of March 31, 2019, June 30, 2019 and September 30, 2019. The Company recorded interest expense, which reflects the amortization of the fair value discount of approximately Cdn. \$3.0 million, Cdn. \$2.8 million and Cdn. \$2.6 million in the fiscal years ended October 31, 2019, 2018 and 2017, respectively. As of October 31, 2019 and 2018, the carrying value of the Series 1 Preferred Shares was Cdn. \$22.7 million (\$17.2 million) and Cdn. \$20.9 million (\$15.9 million), respectively, and was classified as preferred stock obligation of subsidiary on the Consolidated Balance Sheets.

Derivative liability related to Series 1 Preferred Shares

The conversion feature and variable dividend contained in the terms of the Series 1 Preferred Shares are not clearly and closely related to the characteristics of the Series 1 Preferred Shares. Accordingly, these features qualify as embedded derivative instruments and are required to be bifurcated and recorded as derivative financial instruments at fair value.

The conversion feature is valued using a lattice model. Based on the pay-off profiles of the Series 1 Preferred Shares as of October 31, 2019, it was assumed that we would exercise the call option to force conversion in 2020. Conversion after 2020 would have delivered a fixed pay-off to the investor and was modeled as a fixed payment in 2020. The cumulative dividend is modeled as a quarterly cash dividend component (to satisfy the minimum dividend payment requirement), and a one-time cumulative dividend payment in 2020.

The variable dividend is valued using a Monte Carlo simulation model.

The assumptions used in these valuation models include historical stock price volatility, risk-free interest rate and a credit spread based on the yield indexes of technology high yield bonds, foreign exchange volatility as the security is denominated in Canadian dollars, and the closing price of our common stock. The aggregate fair value of these derivatives included within long-term debt and other liabilities on the Consolidated Balance Sheets as of October 31, 2019 and 2018 was \$0.6 million and \$0.8 million, respectively.

Note 16. Segment Information

We are engaged in the development, design, production, construction and servicing of high temperature fuel cells for clean electric power generation. Critical to the success of our business is, among other things, our research and development efforts, both through customer-sponsored projects and Company-sponsored projects. The research and development activities are viewed as another product line that contributes to the development, design, production and sale of fuel cell products, however, it is not considered a separate operating segment. The chief operating decision maker does not review and assess financial information at a discrete enough level to be able to assess performance of research and development activities as if they operated as a standalone business segment, therefore, the Company has identified one business segment: fuel cell power plant production and research.

Revenues, by geographic location (based on the customer's ordering location) for the years ended October 31, 2019, 2018 and 2017 were as follows (in thousands):

	2019	2018	2017
United States	\$ 56,211	\$ 50,953	\$ 47,539
South Korea	2,686	36,279	44,217
England	1,496	387	368
Germany	359	1,795	2,740
Canada	—	23	729
Spain	—	—	73
Total	<u>\$ 60,752</u>	<u>\$ 89,437</u>	<u>\$ 95,666</u>

Service agreement revenue which is included within Service agreements and license revenues on the consolidated statement of operations was \$15.1 million, \$13.5 million and \$24.4 million, for the years ended October 31, 2019, 2018 and 2017, respectively.

Long-lived assets located outside of the United States as of October 31, 2019 and 2018 are not significant individually or in the aggregate.

Note 17. Benefit Plans

We have stockholder approved equity incentive plans, a stockholder approved Employee Stock Purchase Plan (the "ESPP") and an employee tax-deferred savings plan, which are described in more detail below.

2018 Omnibus Incentive Plan

The Company's 2018 Omnibus Incentive Plan (the "2018 Incentive Plan") was approved by the Company's stockholders at the 2018 Annual Meeting of Stockholders, which was held on April 5, 2018. The 2018 Incentive Plan provides that a total of 0.3 million shares of the Company's common stock may be issued thereunder. The 2018 Incentive Plan authorizes grants of stock options, stock appreciation rights ("SARs"), restricted stock awards ("RSAs"), restricted stock units ("RSUs"), performance shares, performance units and incentive awards to key employees, directors, consultants and advisors. Stock options, RSAs and SARs have restrictions as to transferability. Stock option exercise prices are fixed by the Company's board of directors but shall not be less than the fair market value of our common stock on the date of the grant. SARs may be granted in conjunction with stock options. Stock options generally vest ratably over 4 years and expire 10 years from the date of grant. As of October 31, 2019, there were 0.1 million shares available for grant under the 2018 Incentive Plan.

Other Equity Incentive Plans

The Company has a 2010 Equity Incentive Plan. In April 2017, the number of shares of common stock reserved for issuance under the 2010 Equity Incentive Plan was increased to 4.5 million shares. Under the 2010 Equity Incentive Plan, the Board was authorized to grant incentive stock options, nonstatutory stock options, SARs, RSAs, RSUs, performance units, performance shares, dividend equivalent rights and other stock based awards to our officers, key employees and non-employee directors. Stock options, RSAs and SARs have restrictions as to transferability. Stock option exercise prices are fixed by the Board but shall not be less than the fair market value of our common stock on the date of the grant. SARs may be granted in conjunction with stock options. Stock options generally vest ratably over 4 years and expire 10 years from the date of grant. The Company also has an international award program to provide RSUs for the benefit of certain employees outside the United States. At October 31, 2019, equity awards outstanding under the 2010 Equity Incentive Plan consisted of incentive stock options, nonstatutory stock options, RSAs and RSUs.

The Company's 1998, 2006 and 2010 Equity Incentive Plans remain in effect only to the extent of awards outstanding under the plans as of October 31, 2019.

Share-based compensation was reflected in the consolidated statements of operations as follows (in thousands):

	2019	2018	2017
Cost of revenues	\$ 593	\$ 543	\$ 1,050
General and administrative expense	1,865	2,256	2,721
Research and development expense	272	355	679
	<u>\$ 2,730</u>	<u>\$ 3,154</u>	<u>\$ 4,450</u>

Stock Options

We account for stock options awarded to non-employee directors under the fair value method. The fair value of stock options is estimated on the grant date using the Black-Scholes option valuation model and the following weighted-average assumptions (there were no options granted in fiscal year 2019):

	2018	2017
Expected life (in years)	7.0	7.0
Risk free interest rate	2.8%	2.2%
Volatility	72.7%	79.5%
Dividend yield	—%	—%

The expected life is the period over which our non-employee directors are expected to hold the options and is based on historical data for similar grants. The risk free interest rate is based on the expected U.S. Treasury rate over the expected life. Expected volatility is based on the historical volatility of our stock. Dividend yield is based on our expected dividend payments over the expected life.

The following table summarizes our stock option activity for the year ended October 31, 2019:

Options	Shares	Weighted-Average Option Price
Outstanding as of October 31, 2018	26,958	\$ 124.08
Granted	-	\$ -
Cancelled	(2,031)	\$ 362.58
Outstanding as of October 31, 2019	<u>24,927</u>	<u>\$ 104.73</u>

The weighted average grant-date fair value per share for options granted during the years ended October 31, 2018 and 2017 was \$21.36 and \$18.00, respectively. There were no options exercised in fiscal years 2019, 2018 or 2017.

The following table summarizes information about stock options outstanding and exercisable as of October 31, 2019:

Range of Exercise Prices	Options Outstanding			Options Exercisable	
	Number outstanding	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price	Number exercisable	Weighted Average Exercise Price
\$0.00 — \$38.76	13,192	7.8	\$ 19.16	13,192	\$ 19.16
\$38.77 — \$416.16	11,735	3.7	\$ 200.93	11,735	\$ 200.93
	<u>24,927</u>	5.9	\$ 104.73	<u>24,927</u>	\$ 104.73

There was no intrinsic value for options outstanding and exercisable at October 31, 2019.

Restricted Stock Awards and Units

The following table summarizes our RSA and RSU activity for the year ended October 31, 2019:

Restricted Stock Awards and Units	Shares	Weighted-Average Fair Value
Outstanding as of October 31, 2018	364,215	24.36
Granted	71,885	4.40
Vested	(177,961)	20.59
Forfeited	(67,024)	22.40
Outstanding as of October 31, 2019	<u>191,115</u>	16.11

RSA and RSU expense is based on the fair value of the award at the date of grant and is amortized over the vesting period, which is generally over 3 or 4 years. As of October 31, 2019, the 0.2 million outstanding RSAs and RSUs had an average remaining life of 0.8 years and an aggregate intrinsic value of \$45,500.

As of October 31, 2019, total unrecognized compensation cost related to RSAs and RSUs was \$1.7 million which is expected to be recognized over the next year on a weighted-average basis.

Stock Awards

During the years ended October 31, 2019, 2018 and 2017, we awarded 29,454, 13,226 and 7,167 shares, respectively, of fully vested, unrestricted common stock to the independent members of our board of directors as a component of board of director compensation which resulted in recognizing \$0.1 million, \$0.3 million and \$0.1 million of expense, respectively.

Employee Stock Purchase Plan

The 2018 Employee Stock Purchase Plan (the “ESPP”) was approved by the Company’s stockholders at the 2018 Annual Meeting of Stockholders. The adoption of the ESPP allows the Company to provide eligible employees of FuelCell Energy, Inc. and of certain designated subsidiaries with the opportunity to voluntarily participate in the ESPP, enabling such participants to purchase shares of the Company’s common stock at a discount to market price at the time of such purchase. The maximum number of the Company’s shares of common stock that may be issued under the ESPP is 41,667 shares. The previous Employee Stock Purchase Plan was suspended as of May 1, 2017 because we did not have sufficient shares of common stock available for issuance.

Under the ESPP, eligible employees have the right to purchase shares of common stock at the lesser of (i) 85% of the last reported sale price of our common stock on the first business day of the offering period, or (ii) 85% of the last reported sale price of the common stock on the last business day of the offering period, in either case rounded up to avoid impermissible trading fractions. Shares issued pursuant to the ESPP contain a legend restricting the transfer or sale of such common stock for a period of 0.5 years after the date of purchase.

The ESPP activity for the year ended October 31, 2019 was de minimis.

Employee Tax-Deferred Savings Plans

We offer a 401(k) plan (the “Plan”) to all full time employees that provides for tax-deferred salary deductions for eligible employees (beginning the first month following an employee’s hire date). Employees may choose to make voluntary contributions of their annual compensation to the Plan, limited to an annual maximum amount as set periodically by the Internal Revenue Service. Employee contributions are fully vested when made. Under the Plan, there is no option available to the employee to receive or purchase our common stock. Matching contributions of 2% under the Plan aggregated \$0.5 million for each of the years ended October 31, 2019, 2018, and 2017.

Note 18. Income Taxes

The components of loss before income taxes for the years ended October 31, 2019, 2018, and 2017 were as follows (in thousands):

	2019	2018	2017
U.S.	\$ (74,133)	\$ (47,314)	\$ (49,723)
Foreign	(3,326)	(3,035)	(4,136)
Loss before income taxes	<u>\$ (77,459)</u>	<u>\$ (50,349)</u>	<u>\$ (53,859)</u>

The Company recorded an income tax provision totaling \$0.1 million for the year ended October 31, 2019 compared to income tax benefit of \$3.0 million and a tax provision of \$0.04 million for the years ended October 31, 2018 and 2017, respectively. The income tax expense for the year ended October 31, 2019 primarily related to foreign taxes in South Korea and Canada. The income tax benefit for the year ended October 31, 2018 primarily related to the Tax Cuts and Jobs Act (the “Act”) that was enacted on December 22, 2017. The Act reduced the U.S. federal corporate tax rate from 34% to 21% effective January 1, 2018 which resulted in a deferred tax benefit of \$1.0 million primarily related to a reduction of the Company’s deferred tax liability for in process research and development (“IPR&D”). The Act also established an unlimited carryforward period for the net operating loss (“NOL”) the Company generated after 2017. This provision of the Act resulted in a reduction of the valuation allowance attributable to deferred tax assets at the enactment date by \$2.0 million based on the indefinite life of the resulting NOL as well as the deferred tax liability for IPR&D.

The income tax expense for the year ended October 31, 2017 related to foreign withholding taxes and income taxes in South Korea and there was no deferred federal income tax expense (benefit) for the year ended October 31, 2017. Franchise tax expense, which is included in administrative and selling expenses, was \$0.2 million, \$0.5 million and \$0.5 million for the years ended October 31, 2019, 2018 and 2017, respectively.

The reconciliation of the federal statutory income tax rate to our effective income tax rate for the years ended October 31, 2019, 2018 and 2017 was as follows:

	<u>2019</u>	<u>2018</u>	<u>2017</u>
Statutory federal income tax rate	(21.0)%	(23.2)%	(34.0)%
Increase (decrease) in income taxes resulting from:			
State taxes, net of Federal benefits	(2.9)%	0.7%	(1.3)%
Foreign withholding tax	0.1%	0.0%	0.1%
Net operating loss expiration and true-ups	(1.3)%	4.6%	(4.6)%
Nondeductible expenditures	0.2%	1.5%	1.9%
Change in tax rates	(0.1)%	201.6%	(0.8)%
Other, net	(0.3)%	0.0%	0.6%
Valuation allowance	25.4%	(191.2)%	38.2%
Effective income tax rate	<u>0.1%</u>	<u>(6.0)%</u>	<u>0.1%</u>

Our deferred tax assets and liabilities consisted of the following at October 31, 2019 and 2018 (in thousands):

	<u>2019</u>	<u>2018</u>
Deferred tax assets:		
Compensation and benefit accruals	\$ 7,446	\$ 7,767
Bad debt and other allowances	905	426
Capital loss and tax credit carry-forwards	12,645	12,295
Net operating losses (domestic and foreign)	217,430	202,643
Deferred license revenue	4,264	4,765
Inventory valuation allowances	312	238
Accumulated depreciation	9,200	4,374
Grant revenue	798	910
Gross deferred tax assets:	253,000	233,418
Valuation allowance	(250,985)	(231,403)
Deferred tax assets after valuation allowance	2,015	2,015
Deferred tax liability:		
In process research and development	(2,321)	(2,356)
Net deferred tax liability	<u>\$ (306)</u>	<u>\$ (341)</u>

We continually evaluate our deferred tax assets as to whether it is “more likely than not” that the deferred tax assets will be realized. In assessing the realizability of our deferred tax assets, management considers the scheduled reversal of deferred tax liabilities, projected future taxable income and tax planning strategies. Based on the projections for future taxable income over the periods in which the deferred tax assets are realizable, management believes that significant uncertainty exists surrounding the recoverability of the deferred tax assets. As a result, we recorded a valuation allowance against our net deferred tax assets. None of the valuation allowance will reduce additional paid in capital upon subsequent recognition of any related tax benefits. As of October 31, 2019, we had federal and state NOL carryforwards of \$850.0 million and \$438.8 million, respectively. The federal NOL carryforwards expire in varying amounts from 2020 through 2037 while state NOL carryforwards expire in varying amounts from fiscal year 2020 through 2039. Federal NOLs generated beginning in fiscal 2018 are not subject to expiration subsequent to the Act discussed above. Additionally, we had \$8.8 million of state tax credits available that will expire from tax years 2020 to 2039.

We complete a detailed Section 382 ownership shift analysis on an annual basis to determine whether any of our NOL and credit carryovers will be subject to limitation. Based on that study, we determined that there was no ownership change as of the end of our fiscal year 2019 that impacts Section 382. The acquisition of Versa in fiscal year 2013 triggered a Section 382 ownership change at the level of Versa Power System which will limit the future usage of some of the federal and state NOLs that we acquired in that transaction. Accordingly, a valuation allowance has been recorded against the deferred tax asset associated with these attributes.

The Company's financial statements reflect expected future tax consequences of uncertain tax positions that the Company has taken or expects to take on a tax return (including a decision whether to file or not file a return in a particular jurisdiction) presuming the taxing authorities' full knowledge of the position and all relevant facts.

The liability for unrecognized tax benefits as of October 31, 2019 and 2018 was \$15.7 million. This amount is directly associated with a tax position taken in a year in which federal and state NOL carryforwards were generated. Accordingly, the amount of unrecognized tax benefit has been presented as a reduction in the reported amounts of our federal and state NOL carryforwards. It is our policy to record interest and penalties on unrecognized tax benefits as income taxes; however, because of our significant NOLs, no provision for interest or penalties has been recorded.

We file income tax returns in the U.S. and certain states, primarily Connecticut and California, as well as income tax returns required internationally for South Korea and Germany. We are open to examination by the Internal Revenue Service and various states in which we file for fiscal year 2002 to the present. During the fiscal year ended October 31, 2018, the Company underwent an IRS examination for its fiscal year 2016 tax year which was closed without material adjustment.

Note 19. Loss Per Share

Basic earnings (loss) per common share ("EPS") are generally calculated as income (loss) available to common stockholders divided by the weighted average number of common shares outstanding. Diluted EPS is generally calculated as income (loss) available to common stockholders divided by the weighted average number of common shares outstanding plus the dilutive effect of common share equivalents.

The calculation of basic and diluted EPS for the years ended October 31, 2019, 2018 and 2017 was as follows (amounts in thousands, except share and per share amounts):

	2019	2018	2017
Numerator			
Net loss	\$ (77,568)	\$ (47,334)	\$ (53,903)
Series A warrant exchange	(3,169)	—	—
Series B Preferred stock dividends	(3,231)	(3,200)	(3,200)
Series C Preferred stock deemed dividends and redemption value adjustments, net	(6,522)	(9,559)	—
Series D Preferred stock deemed dividends and redemption accretion	(9,755)	(2,075)	—
Net loss attributable to common stockholders	<u>\$ (100,245)</u>	<u>\$ (62,168)</u>	<u>\$ (57,103)</u>
Denominator			
Weighted average common shares outstanding - basic	55,081,266	6,896,189	4,159,575
Effect of dilutive securities ⁽¹⁾	—	—	—
Weighted average common shares outstanding - diluted	<u>55,081,266</u>	<u>6,896,189</u>	<u>4,159,575</u>
Net loss to common stockholders per share - basic	\$ (1.82)	\$ (9.01)	\$ (13.73)
Net loss to common stockholders per share - diluted ⁽¹⁾	\$ (1.82)	\$ (9.01)	\$ (13.73)

- (1) Due to the net loss to common stockholders in each of the years presented above, diluted earnings per share was computed without consideration to potentially dilutive instruments as their inclusion would have been antidilutive. As of October 31, 2019, 2018 and 2017, potentially dilutive securities excluded from the diluted loss per share calculation are as follows:

	October 31, 2019	October 31, 2018	October 31, 2017
Orion Warrants	6,000,000	—	—
May 2017 Offering – Series C Warrants	964,114	964,114	965,075
May 2017 Offering – Series D Warrants	—	—	215,348
July 2016 Offering – Series A Warrants	—	640,000	640,000
Outstanding options to purchase common stock	24,927	26,958	25,830
Unvested Restricted Stock Awards	24,574	93,286	158,224
Unvested Restricted Stock Units	166,541	270,929	92,500
Series C Preferred Shares to satisfy conversion requirements ⁽¹⁾	—	499,556	1,508,152
Series D Preferred Shares to satisfy conversion requirements ⁽²⁾	—	1,852,657	—
5% Series B Cumulative Convertible Preferred Stock ⁽³⁾	37,837	37,837	37,837
Series 1 Preferred Shares to satisfy conversion requirements ⁽³⁾	1,264	1,264	1,264
Total potentially dilutive securities	<u>7,219,257</u>	<u>4,386,601</u>	<u>3,644,230</u>

- (1) The number of shares of common stock issuable upon conversion of the Series C Preferred Stock was calculated using the liquidation preference value outstanding on October 31, 2018 of \$9.0 million divided by the reduced conversion price of \$18.00 and the liquidation preference of \$33.3 million divided by the conversion price of \$22.08 as of October 31, 2017. The actual number of shares was subject to variation depending on the actual market price of the Company's common shares on the dates of such conversions. All Series C Preferred Stock was converted prior to October 31, 2019.
- (2) The number of shares of common stock issuable upon conversion of the Series D Preferred Stock was calculated using the liquidation preference value outstanding on October 31, 2018 of \$30.7 million divided by the conversion price of \$16.56. The actual number of shares issued was subject to variation depending on the actual market price of the Company's common shares on the dates of such conversions. All Series D Preferred Stock was converted prior to October 31, 2019.
- (3) Refer to Note 15. "Redeemable Preferred Stock" for information regarding the calculation of the common shares issuable upon conversion as of October 31, 2019.

Note 20. Commitments and Contingencies

Lease Agreements

As of October 31, 2019 and 2018, we had capital lease obligations of \$0.1 million and \$0.3 million, respectively. Lease payment terms are primarily thirty-six months from the date of lease.

We also lease certain computer and office equipment and manufacturing facilities in Torrington and Danbury, Connecticut under operating leases expiring on various dates through 2030. Rent expense was \$1.0 million, \$1.2 million and \$1.6 million for the years ended October 2019, 2018 and 2017, respectively.

Non-cancelable minimum payments applicable to operating and capital leases at October 31, 2019 were as follows (in thousands):

	Operating Leases	Capital Leases
2019	\$ 922	\$ 102
2020	1,240	35
2021	1,221	4
2022	1,022	—
2023	720	—
Thereafter	8,707	—
Total	<u>\$ 13,832</u>	<u>\$ 141</u>

Service Agreements

Under the provisions of its service agreements, the Company provides services to maintain, monitor, and repair customer power plants to meet minimum operating levels. Under the terms of such service agreements, the particular power plant must meet a minimum operating output during defined periods of the term. If minimum output falls below the contract requirement, the Company may be subject to performance penalties and/or may be required to repair or replace the customer's fuel cell module(s).

Power Purchase Agreements

Under the terms of the Company's PPAs, customers agree to purchase power from the Company's fuel cell power plants at negotiated rates. Electricity rates are generally a function of the customers' current and estimated future electricity pricing available from the grid. As owner or lessee of the power plants, the Company is responsible for all operating costs necessary to maintain, monitor and repair the power plants. Under certain agreements, the Company is also responsible for procuring fuel, generally natural gas or biogas, to run the power plants. In addition, under the terms of some of the PPA agreements, the Company is subject to a performance penalty.

Other

At October 31, 2019, the Company has unconditional purchase commitments aggregating \$34.6 million, for materials, supplies and services in the normal course of business.

The Company is involved in legal proceedings, claims and litigation arising out of the ordinary conduct of its business. Although the Company cannot assure the outcome, management presently believes that the result of such legal proceedings, either individually, or in the aggregate, will not have a material adverse effect on the Company's consolidated financial statements, and no material amounts have been accrued in the Company's consolidated financial statements with respect to these matters.

Note 21. Supplemental Cash Flow Information

The following represents supplemental cash flow information, including amounts effectively settled as described in Note 3. "Acquisitions" (dollars in thousands):

	Year Ended October 31,		
	2019	2018	2017
Cash interest paid	\$ 4,091	\$ 4,486	\$ 2,715
Income taxes paid	48	2	2
Noncash financing and investing activity:			
Common stock issued for Employee Stock Purchase Plan in settlement of prior year accrued employee contributions	—	—	50
Noncash reclass between inventory and project assets	—	10,793	7,282
Assumption of debt in conjunction with asset acquisition	—	—	2,289
Acquisition of project assets	16,704	—	2,386
Series C Preferred stock conversions	15,491	20,220	—
Series C preferred share modification	(6,047)	—	—
Series D preferred share conversions	31,183	—	—
Accrued purchase of fixed assets, cash paid in subsequent period	71	1,579	2,490
Accrued purchase of project assets, cash paid in subsequent period	222	3,115	2,380

Note 22. Quarterly Information (Unaudited)

Selected unaudited financial data for each quarter of fiscal year 2019 and 2018 is presented below. We believe that the information reflects all normal recurring adjustments necessary for a fair presentation of the information for the periods presented.

<i>(in thousands)</i>	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year
Year ended October 31, 2019					
Revenues	\$ 17,783	\$ 9,216	\$ 22,712	\$ 11,041	\$ 60,752
Gross (loss) profit	(2,205)	(3,640)	7,965	(23,389)	(21,269)
Loss on operations	(15,244)	(17,623)	(1,070)	(32,992)	(66,929)
Net loss	(17,548)	(19,530)	(5,311)	(35,179)	(77,568)
Series A warrant exchange	-	(3,169)	-	-	(3,169)
Series B Preferred stock dividends	(800)	(800)	(810)	(821)	(3,231)
Series C preferred stock deemed contributions (dividends)	(9,005)	1,599	884	-	(6,522)
Series D preferred stock deemed dividends	(5,685)	(976)	(3,091)	(3)	(9,755)
Net loss to common stockholders	(33,038)	(22,876)	(8,328)	(36,003)	(100,245)
Net loss to common stockholders per basic and diluted common share ⁽¹⁾	\$ (3.97)	\$ (2.06)	\$ (0.18)	\$ (0.23)	\$ (1.82)
Year ended October 31, 2018					
Revenues	\$ 38,613	\$ 20,830	\$ 12,110	\$ 17,884	\$ 89,437
Gross profit (loss)	4,635	(629)	(2,056)	1,143	3,093
Loss on operations	(5,553)	(12,735)	(14,474)	(11,870)	(44,632)
Net loss	(4,183)	(13,174)	(15,881)	(14,096)	(47,334)
Series B Preferred stock dividends	(800)	(800)	(800)	(800)	(3,200)
Series C Preferred stock deemed dividends	(3,463)	(4,199)	(939)	(958)	(9,559)
Series D Preferred stock redemption accretion	—	—	—	(2,075)	(2,075)
Net loss to common stockholders	(8,446)	(18,173)	(17,620)	(17,929)	(62,168)
Net loss to common stockholders per basic and diluted common share ⁽¹⁾	\$ (1.41)	\$ (2.74)	\$ (2.45)	\$ (2.31)	\$ (9.01)

- (1) The full year net loss to common stockholders basic and diluted share may not equal the sum of the quarters due to weighting of outstanding shares.

Note 23. Subsequent Events

ExxonMobil Research and Engineering Company Joint Development Agreement

On November 5, 2019, the Company signed a two-year JDA with EMRE, pursuant to which the Company will continue exclusive research and development efforts with EMRE to evaluate and develop new and/or improved carbonate fuel cells to reduce carbon dioxide emissions from industrial and power sources, in exchange for (a) payment of (i) an exclusivity and technology access fee of \$5.0 million, (ii) up to \$45.0 million for research and development efforts, and (iii) milestone-based payments of up to \$10.0 million after certain technological milestones are met, and (b) certain licenses to patents and patent applications, and copyrightable works resulting from the JDA.

Orion Credit Agreement

As disclosed in Note 13. "Debt", on October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into the Orion Credit Agreement with the Agent and certain of its affiliates as lenders for a \$200.0 million senior secured credit facility, structured as a delayed draw term loan, to be provided by the lenders. On November 22, 2019, the Company made a second draw under the Orion Credit Agreement (the "Second Funding") of \$65.5 million, which was funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P. (the "Orion Lenders"), such that the total fundings to the Company under the Orion Facility were equal to

\$80.0 million. The funds drawn in the Second Funding were reduced by a Loan Discount (described further in Note 13. "Debt") of \$1.6 million, which was retained by the Orion Lenders. Proceeds from the Second Funding were used to repay outstanding third party debt of the Company with respect to certain other Company projects, including the construction loan from Fifth Third Bank on the Groton Project and the loan from Webster Bank on the CCSU Project, as well as to fund remaining going forward construction costs relating to certain projects, including the Groton Project (a 7.4 MW project), the LIPA Yaphank Solid Waste Management Project (a 7.4 MW project), and the Tulare BioMAT project (a 2.8 MW project).

In accordance with the Orion Credit Agreement in connection with the Second Funding, on November 22, 2019, the Company issued to the Orion Lenders warrants to purchase up to a total of 14.0 million shares of the Company's common stock (the "Second Funding Warrants"), with an initial exercise price with respect to 8.0 million of such shares of \$0.242 per share and with an initial exercise price with respect to 6.0 million of such shares of \$0.620 per share (such \$0.620 per share exercise price being at a premium to the market price at the time of entry into the Orion Credit Agreement).

In conjunction with the Second Funding, the Company and the other loan parties entered into the First Amendment to the Orion Credit Agreement (the "First Orion Amendment"), which required the Company to establish a \$5.0 million debt reserve, with such reserve to be released on the first date following the date of the Second Funding on which all of the following events shall have occurred: (a) each of (x) the commercial operation date for the Tulare BioMAT project shall have occurred and (y) a disposition, refinancing or tax equity investment in the Tulare BioMAT project of at least \$5 million is consummated; (b) each of (x) the Groton Project shall have achieved its business plan in accordance with the Groton Construction Budget (as defined in the Orion Credit Agreement), (y) the commercial operation date for the Groton Project shall have occurred and (z) the Groton Project shall have met its annualized output and heat rate guarantees for three months; and (c) a disposition, refinancing or tax equity investment of at least \$30 million shall have occurred with respect to the Groton Project. The First Orion Amendment further requires the Company (i) to provide, no later than December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing), a biogas sale and purchase agreement through December 31, 2021 for the Tulare BioMAT project, which was obtained as of such date, (ii) to obtain by December 31, 2019 (or such later date as the Agent may, in its sole discretion, agree in writing) a fully executed contract for certain renewable energy credits for the Groton Project, which was obtained as of such date, and (iii) to provide by January 31, 2020 (or such later date as the Agent may, in its sole discretion, agree in writing) certain consents and estoppels from CMEEC related to the Groton Project and an executed, seventh modification to the lease between CMEEC and the United States Government, acting by and through the Department of the Navy. The First Orion Amendment provides that, if the requirements set forth in clauses (ii) and (iii) above are not timely satisfied, the Company will grant the Agent, on behalf of the Orion Lenders, a security interest and lien on all of the Company's intellectual property, with such lien and security interest to be released at such time as the Company has satisfied such requirements.

In addition, in connection with the January 2020 Letter Agreement among the Company, FCE Ltd. and Enbridge described below, on January 20, 2020, in order to obtain the lenders' consent to the January 2020 Letter Agreement as required under the Orion Credit Agreement, the Company and the other loan parties entered into the Second Amendment to the Orion Credit Agreement (the "Second Orion Amendment"), which adds a new affirmative covenant to the Orion Credit Agreement that obligates the Company to, and to cause FCE Ltd. to, on or prior to November 1, 2021, either (i) pay and satisfy in full all of their respective obligations in respect of, and fully redeem and cancel, all of the Series 1 Preferred Shares of FCE Ltd., or (ii) deposit in a newly created account of FCE Ltd. or the Company cash in an amount sufficient to pay and satisfy in full all of their respective obligations in respect of, and to effect a redemption and cancellation in full of, all of the Series 1 Preferred Shares of FCE Ltd. The Second Orion Amendment also provides that the articles of FCE Ltd. setting forth the modified terms of the Series 1 Preferred Shares will be considered a "Material Agreement" under the Orion Credit Agreement. Under the Second Orion Amendment, a failure to satisfy this new affirmative covenant or to otherwise comply with the terms of the Series 1 Preferred Shares will constitute an event of default under the Orion Credit Agreement, which could result in the acceleration of any amounts outstanding under the Orion Credit Agreement.

Cashless Exercise of Certain Orion Warrants

On January 9, 2020, the Orion Lenders exercised, on a cashless basis, Orion Warrants (with cash exercise prices of \$0.310 per share and \$ 0.242 per share) representing the right to purchase, in the aggregate, 12.0 million shares of the Company's common stock. Because these warrants were exercised on a cashless basis pursuant to the formula set forth in the warrants, the Orion Lenders received, in the aggregate, a "net number" of 9,396,319 shares of the Company's common stock upon the exercise of Initial Funding Warrants representing the right to purchase 6.0 million shares of the Company's common stock and Second Funding Warrants representing the right to purchase 6.0 million shares of the Company's common stock. The other 2,603,681 shares, which were not issued to the Orion Lenders due to the cashless nature of the exercise, are no longer required to be reserved for issuance upon exercise of the Orion Warrants.

Termination of Construction Loan Agreement with Fifth Third Bank

As disclosed in Note 13. "Debt", on February 28, 2019, the Company, through its indirect wholly-owned subsidiary, Groton Borrower, entered into the Groton Agreement with Fifth Third Bank pursuant to which Fifth Third Bank agreed to make available to Groton Borrower a construction loan facility in an aggregate principal amount of up to \$23.0 million to fund the manufacture, construction, installation, commissioning and start-up of the 7.4 MW Groton Project. Groton Borrower made an initial draw under the Groton Facility on the date of closing of the facility of \$9.7 million and made an additional draw of \$1.4 million in April 2019. The total outstanding balance under the Groton Facility as of November 22, 2019 (prior to the payment described below) was \$11.1 million. Groton Borrower and Fifth Third Bank entered into a payoff letter, dated November 22, 2019, pursuant to which, on November 22, 2019, the Agent, on behalf of Groton Borrower, paid off all of Groton Borrower's indebtedness to Fifth Third Bank under the Groton Agreement and thereby terminated the Groton Facility.

Termination of Term Loan Agreements with Webster Bank

On November 22, 2019, the Webster Bank debt was repaid in full and the borrowing arrangement was terminated.

Connecticut Green Bank Loan

As described in Note 13. "Debt", the Company had a long-term loan agreement with the Connecticut Green Bank ("Green Bank") for a loan totaling approximately \$5.9 million in support of the Bridgeport Fuel Cell Project (as amended from time to time, the "Green Bank Loan Agreement"). On and effective as of December 19, 2019, the Company and Green Bank entered into an amendment to the Green Bank Loan Agreement (the "Green Bank Amendment"). Upon the execution of the Green Bank Amendment on December 19, 2019, Green Bank made an additional loan to the Company in the aggregate principal amount of \$3.0 million (the "December 2019 Loan"), which is to be used (i) first, to pay closing fees related to the acquisition of the Bridgeport Fuel Cell Project and the Subordinated Credit Agreement, other fees, and accrued interest from May 9, 2019, totaling \$404,000 ("Accrued Fees"), and (ii) thereafter, for general corporate purposes as determined by the Company, including, but not limited to, expenditures in connection with the project being constructed by Groton Station Fuel Cell, LLC ("Groton Fuel Cell"). Pursuant to the terms of the Green Bank Amendment, Green Bank will have no further obligation to make loans under the Green Bank Loan Agreement and the Company will have no right to make additional draws under the Green Bank Loan Agreement.

The Green Bank Amendment provides that, until such time as the loan (which includes both the outstanding principal balance of the original loan under the Green Bank Loan Agreement and the outstanding principal amount of the December 2019 Loan) has been repaid in its entirety, interest on the outstanding balance of the loan shall accrue monthly in arrears from the date of the Green Bank Amendment at a rate of 5% per annum until May 8, 2019 and at a rate of 8% per annum thereafter, payable by the Company on a monthly basis in arrears. The Green Bank Amendment further provides that the payment by the Company of the Accrued Fees (as described above) includes any shortfall of interest due but unpaid by the Company through and including November 30, 2019. Interest payments made by the Company after the date of the Green Bank Amendment are to be applied first to interest that has accrued on the outstanding principal balance of the original loan under the Green Bank Loan Agreement and then to interest that has accrued on the December 2019 Loan.

The Green Bank Amendment also modifies the repayment and mandatory prepayment terms and extends the maturity date set forth in the original Green Bank Loan Agreement. Under the Green Bank Amendment, to the extent that excess cash flow reserve funds under the BFC Credit Agreement are eligible for disbursement to Bridgeport Fuel Cell, LLC pursuant to Section 6.23(c) of the BFC Credit Agreement, such funds are to be paid to Green Bank, to be applied first to repay the outstanding principal balance of the original loan under the Green Bank Loan Agreement and thereafter to repay the outstanding principal amount of the December 2019 Loan, until repaid in full. The Green Bank Amendment further provides that the entire unpaid balance of the loan and all other obligations due under the Green Bank Loan Agreement will be due and payable on May 9, 2026 if not paid sooner in accordance with the Green Bank Loan Agreement. Finally, with respect to mandatory prepayments, the Green Bank Amendment provides that, when the Company has closed on the subordinated project term loan pursuant to the Commitment Letter, dated February 6, 2019, issued by Green Bank to Groton Fuel Cell to provide a subordinated project term loan to Groton Fuel Cell in the amount of \$5.0 million (the “Groton Commitment Letter”), the Company will be required prepay to Green Bank the lesser of any then outstanding amount of the December 2019 Loan and the amount of the subordinated project term loan actually advanced by Green Bank.

Series B Preferred Stock Dividend

On October 30, 2019, the Company declared dividends on the Series B Preferred Stock, which included the accrued dividends payable under the Series B Certificate of Designation with respect to the May 15, 2019 and August 15, 2019 dividend payment dates and the dividends payable with respect to the November 15, 2019 dividend payment date, which were paid on or about November 15, 2019. The aggregate dividend payment was \$2.4 million.

Series 1 Preferred Stock Return of Capital and Dividend Payment

On November 26, 2019, the Company made the return of capital and dividend payments due as of March 31, 2019, June 30, 2019 and September 30, 2019, in an aggregate amount equal to Cdn. \$0.9 million on the Series 1 Preferred Stock.

Series 1 Preferred Stock – Letter Agreement

As described in Note 15. “Redeemable Preferred Stock,” as of October 31, 2019, FCE Ltd. or the Company, as the guarantor of FCE Ltd.’s payment obligations with respect to the Series 1 Preferred Shares, was obligated to pay, on or before December 31, 2020, all accrued and unpaid dividends on the Series 1 Preferred Shares and the balance of the principal redemption price with respect to all of the Series 1 Preferred Shares. As of October 31, 2019, the aggregate amount of all accrued and unpaid dividends to be paid on the Series 1 Preferred Shares on December 31, 2020 was expected to be Cdn. \$21.1 million and the balance of the principal redemption price to be paid on December 31, 2020 with respect to all of the Series 1 Preferred Shares was expected to be Cdn. \$4.4 million. Interest under the Series 1 Preferred Shares accrued at annual rate of 5%. In addition, the holder of the Series 1 Preferred Shares had the right to exchange such shares for fully paid and non-assessable shares of common stock of the Company at certain specified prices, and FCE Ltd. had the option of making dividend payments in the form of common stock of the Company or cash.

On January 20, 2020, the Company, FCE Ltd. and Enbridge entered into a letter agreement (the “January 2020 Letter Agreement”), pursuant to which they agreed to amend the articles of FCE Ltd. relating to and setting forth the terms of the Series 1 Preferred Shares to: (i) remove the provisions of the articles permitting or requiring the issuance of shares of the Company’s common stock in exchange for the Series 1 Preferred Shares or as payment of amounts due to the holders of the Series 1 Preferred Shares, (ii) remove certain provisions of the articles relating to the redemption of the Series 1 Preferred Shares, (iii) increase the annual dividend rate, commencing on January 1, 2020, to 15%, (iv) extend the final payment date for all accrued and unpaid dividends and all return of capital payments (i.e., payments of the principal redemption price) from December 31, 2020 to December 31, 2021, (v) clarify when dividend and return of capital payments are to be made in the future and extend the quarterly dividend and return of capital payments through December 31, 2021 (which were previously to be paid each quarter through December 31, 2020), (vi) remove certain terms and provisions of the articles that are no longer applicable, and (vii) make other conforming changes to the articles. In addition, the parties agreed to amend the Company’s guarantee in favor of Enbridge as necessary or as the parties may mutually agree, in either case, in order to be consistent with such amended articles and to maintain the Company’s guarantee of FCE Ltd.’s obligations under the Series 1 Preferred Shares.

After taking into account the amendments to the terms of the Series 1 Preferred Shares described in the January 2020 Letter Agreement, the aggregate amount of all accrued and unpaid dividends to be paid on the Series 1 Preferred Shares on December 31, 2021 is expected to be Cdn. \$26.5 million and the balance of the principal redemption price to be paid on December 31, 2021 with respect to all of the Series 1 Preferred Shares is expected to be Cdn. \$3.5 million.

Sales of Common Stock under Sales Agreement

During the period beginning on November 7, 2019 and ending on (and including) November 11, 2019, the Company issued and sold a total of approximately 7.9 million shares of its common stock under the Sales Agreement at prevailing market prices, with an average sale price of \$0.46 per share, and raised aggregate gross proceeds of approximately \$3.6 million, before deducting expenses and commissions. Commissions of \$0.1 million were paid to the Sales Agent in connection with these sales, resulting in net proceeds to the Company of approximately \$3.5 million.

The Company had sold an aggregate of approximately 17,998,846 shares of common stock under the Sales Agreement as of November 11, 2019.

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

Item 9A. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures.

The Company maintains disclosure controls and procedures, which are designed to provide reasonable assurance that information required to be disclosed in the Company's periodic SEC reports is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to its principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

We carried out an evaluation, under the supervision and with the participation of our principal executive officer and principal financial officer, of the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this report. Based on that evaluation, the Company's principal executive officer and principal financial officer have concluded that, due to the material weakness described below, the Company's disclosure controls and procedures were ineffective as of the end of the period covered by this report.

Notwithstanding the material weakness described below, management has concluded that our consolidated financial statements included in this Form 10-K for the fiscal year ended October 31, 2019 are fairly stated in all material respects in accordance with generally accepted accounting principles in the United States of America for each of the periods presented and that they may be relied upon.

Management's Annual Report on Internal Control Over Financial Reporting.

Management of FuelCell Energy, Inc., and its subsidiaries (the "Company"), are responsible for establishing and maintaining adequate internal control over financial reporting. The Company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles in the United States of America. Internal control over financial reporting includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles in the United States of America, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Under the supervision and with the participation of management, including our principal executive and principal financial officers, we evaluated the Company's internal control over financial reporting as of October 31, 2019, based on criteria for effective internal control over financial reporting established in the *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on that evaluation, management concluded that the Company's internal control over financial reporting was not effective as of October 31, 2019 due to the material weakness in internal control over financial reporting described below.

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

We previously disclosed in our Form 10-Qs for the quarters ended April 30, 2019 and July 31, 2019 that the Company did not have resources to sufficiently address asset impairments on a timely basis or the accounting considerations and disclosures related to the Company's amended credit facilities. As a result, we concluded that there was a material weakness in internal control over financial reporting, as we did not maintain effective controls over the accounting for and disclosures in the consolidated financial statements related to asset impairments and credit facilities. This control deficiency has not been remediated as of October 31, 2019 and the Company further identified that it did not have resources to sufficiently address certain other non-routine transactions and disclosures.

This material weakness resulted in material misstatements that were corrected in the consolidated financial statements prior to issuance.

Remediation plan for material weakness

Subsequent to the evaluation made in connection with filing our Form 10-Q for the quarter ended April 30, 2019, our management, with the oversight of the Audit and Finance Committee of the Board of Directors, began the process of remediating the material weakness. Progress to date includes engagement of a third party resource to help evaluate the accounting and disclosure for significant matters each quarter. Management also plans to add additional experienced accounting staff. In addition, under the oversight of the Audit and Finance Committee, management will continue to review and make necessary changes to the overall design of our internal control environment to improve the overall effectiveness of internal control over financial reporting.

We have made progress in accordance with our remediation plan and our goal is to remediate this material weakness in fiscal year 2020. However, the material weakness will not be considered remediated until the applicable controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. We are committed to continuing to improve our internal control processes and will continue to review, optimize and enhance our financial reporting controls and procedures, however, there can be no assurance that this will occur within 2020.

Changes in Internal Control Over Financial Reporting.

Other than the material weakness and remediation process discussed above, there have been no other changes in our internal control over financial reporting that occurred during the fourth quarter of fiscal 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. OTHER INFORMATION

Letter Agreement with FCE FuelCell Energy Ltd. ("FCE Ltd.") and Enbridge Inc. ("Enbridge")

On January 20, 2020, the Company, FCE Ltd. (one of the Company's indirect subsidiaries), and Enbridge entered into a letter agreement (the "January 2020 Letter Agreement"), pursuant to which they agreed to amend the articles of FCE Ltd. (the "Articles") relating to and setting forth the terms of the Class A Cumulative Redeemable Exchangeable Preferred Shares (the "Series 1 Preferred Shares") as described below. As of January 20, 2020, there were 1,000,000 Series 1 Preferred Shares of FCE Ltd. outstanding, all of which were held by Enbridge. The Series 1 Preferred Shares were originally acquired by the Company as a result of a business combination in 2003. The Company guarantees the return of principal and dividend obligations of FCE Ltd. to Enbridge, as the holder of the Series 1 Preferred Shares.

Prior to the amendment of the Articles and the terms of the Series 1 Preferred Shares as described below, the terms of the Series 1 Preferred Shares required (i) annual dividend payments of Cdn. \$500,000 and (ii) annual return of capital payments of Cdn. \$750,000, to be made on a quarterly basis until December 31, 2020. Dividends accrued at a 1.25% quarterly rate on the unpaid principal balance, and additional dividends accrued on the cumulative unpaid dividends (inclusive of the Cdn. \$12.5 million unpaid dividend balance as of March 31, 2011) at a rate of 1.25% compounded quarterly. The aggregate amount of all accrued and unpaid dividends on the Series 1 Preferred Shares (Cdn. \$21.1 million) and the balance of the principal redemption price with respect to all of the outstanding Series 1 Preferred Shares (Cdn. \$4.4 million) was to be paid on or before December 31, 2020. In addition, the holder of the Series 1 Preferred Shares had the right to exchange such shares for fully paid and non-assessable shares of common stock of

the Company at certain specified prices, and FCE Ltd. had the option of making dividend payments in the form of common stock of the Company or cash.

In the January 2020 Letter Agreement, the Company, FCE Ltd., and Enbridge agreed to amend the Articles of FCE Ltd. and the terms of the Series 1 Preferred Shares to: (i) remove the provisions of the Articles permitting or requiring the issuance of shares of the Company's common stock in exchange for the Series 1 Preferred Shares or as payment of amounts due to the holders of the Series 1 Preferred Shares, (ii) remove certain provisions of the Articles relating to the redemption of the Series 1 Preferred Shares, (iii) increase the annual dividend rate, commencing on January 1, 2020, to 15%, (iv) extend the final payment date for all accrued and unpaid dividends and all return of capital payments (i.e., payments of the principal redemption price) from December 31, 2020 to December 31, 2021, (v) clarify when dividend and return of capital payments are to be made in the future and extend the quarterly dividend and return of capital payments through December 31, 2021 (which were previously to be paid each quarter through December 31, 2020), (vi) remove certain terms and provisions of the Articles that are no longer applicable, and (vii) make other conforming changes to the Articles. In addition, the parties agreed to amend the Company's guarantee in favor of Enbridge as necessary or as the parties may mutually agree, in either case, in order to be consistent with such amended Articles and to maintain the Company's guarantee of FCE Ltd.'s obligations under the Series 1 Preferred Shares.

Accordingly, as amended, the terms of the Series 1 Preferred Shares require (i) annual dividend payments of Cdn. \$500,000 and (ii) annual return of capital payments of Cdn. \$750,000, to be made on a quarterly basis until December 31, 2021. Commencing on January 1, 2020, dividends accrue at an annual rate of 15% on the principal redemption price with respect to the Series 1 Preferred Shares and any accrued and unpaid dividends on the Series 1 Preferred Shares. The aggregate amount of all accrued and unpaid dividends on the Series 1 Preferred Shares (estimated at Cdn. \$26.5 million) and the balance of the principal redemption price with respect to all of the outstanding Series 1 Preferred Shares (estimated at Cdn. \$3.5 million) is to be paid on or before December 31, 2021. Further, the holder of the Series 1 Preferred Shares no longer has the right to exchange such shares for shares of common stock of the Company, and FCE Ltd. no longer has the option of making dividend payments in shares of common stock of the Company.

The foregoing summary of the terms of the January 2020 Letter Agreement and the amendments to the terms of the Series 1 Preferred Shares is qualified in its entirety by reference to (i) the January 2020 Letter Agreement, a copy of which is attached as Exhibit 4.13 to this Annual Report on Form 10-K and incorporated herein by reference, and (ii) Schedule A setting forth the amended rights, privileges, restrictions and conditions of the Series 1 Preferred Shares of FCE Ltd., a copy of which is attached as Exhibit 4.14 to this Annual Report on Form 10-K and incorporated herein by reference.

Second Amendment to Orion Credit Agreement

On October 31, 2019, the Company and certain of its subsidiaries as guarantors entered into a Credit Agreement (the "Orion Credit Agreement") with Orion Energy Partners Investment Agent, LLC, as Administrative Agent and Collateral Agent (the "Agent"), and its affiliates, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., and Orion Energy Credit Opportunities Fund II PV, L.P., as lenders, for a \$200.0 million senior secured credit facility (the "Orion Facility"), structured as a delayed draw term loan, to be provided by the lenders, subject to certain lender approvals. In conjunction with the closing of the Orion Facility, on October 31, 2019, the Company drew down \$14.5 million. On November 22, 2019, a second draw (the "Second Funding") of \$65.5 million, funded by Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II GPFA, L.P., Orion Energy Credit Opportunities Fund II PV, L.P., and Orion Energy Credit Opportunities FuelCell Co-Invest, L.P., was made. In conjunction with the Second Funding, the Company, the Agent, and the other loan parties entered into the First Amendment to the Orion Credit Agreement, which required the Company to establish a \$5.0 million debt reserve.

In connection with the January 2020 Letter Agreement among the Company, FCE Ltd. and Enbridge described above, on January 20, 2020, in order to obtain the lenders' consent to the January 2020 Letter Agreement as required under the Orion Credit Agreement, the Company, the Agent, and the other loan parties entered into the Second Amendment to the Orion Credit Agreement (the "Second Orion Amendment"), which adds a new affirmative covenant to the Orion Credit Agreement that obligates the Company to, and to cause FCE Ltd. to, on or prior to November 1, 2021, either (i) pay and satisfy in full all of their respective obligations in respect of, and fully redeem and cancel, all of the Series 1 Preferred Shares of FCE Ltd., or (ii) deposit in a newly created account of FCE Ltd. or the Company cash in an

amount sufficient to pay and satisfy in full all of their respective obligations in respect of, and to effect a redemption and cancellation in full of, all of the Series 1 Preferred Shares of FCE Ltd. The Second Orion Amendment also provides that the Articles setting forth the modified terms of the Series 1 Preferred Shares will be considered a “Material Agreement” under the Orion Credit Agreement. Under the Second Orion Amendment, a failure to satisfy this new affirmative covenant or to otherwise comply with the terms of the Series 1 Preferred Shares will constitute an event of default under the Orion Credit Agreement, which could result in the acceleration of any amounts outstanding under the Orion Credit Agreement.

The foregoing summary of the terms of Second Orion Amendment is qualified in its entirety by reference to the Second Orion Amendment, a copy of which is attached as Exhibit 10.117 to this Annual Report on Form 10-K and incorporated herein by reference.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this Item 10, with respect to our executive officers, is included in Part I of the Annual Report on Form 10-K. The other information required by this Item 10 is incorporated by reference to the Company's 2020 Proxy Statement to be filed with the SEC within 120 days after fiscal year end.

Our board of directors has adopted a Code of Ethics (the "Code"), which applies to the board of directors, named executive officers, and all employees. The Code provides a statement of certain fundamental principles and key policies and procedures that govern the conduct of our business. The Code covers all major areas of professional conduct, including employment policies, conflicts of interest, intellectual property and the protection of confidential information, as well as strict adherence to all laws and regulations applicable to the conduct of our business. As required by the Sarbanes-Oxley Act of 2002, our Audit and Finance Committee has procedures to receive, retain, investigate and resolve complaints received regarding our accounting, internal accounting controls or auditing matters and to allow for the confidential and anonymous submission by employees of concerns regarding questionable accounting or auditing matters. The Code can be found in the Corporate Governance sub-section of the section entitled "Investors" on our website at www.fuelcellenergy.com. We intend to disclose any changes in, or waivers from, the Code by posting such information on the same website or by filing a Current Report on Form 8-K, in each case to the extent such disclosure is required by rules of the SEC or Nasdaq.

Item 11. EXECUTIVE COMPENSATION

Information required under this Item is incorporated by reference to the Company's 2020 Proxy Statement to be filed with the SEC within 120 days after fiscal year end.

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information required under this Item is incorporated by reference to the Company's 2020 Proxy Statement to be filed with the SEC within 120 days after fiscal year end.

Equity Compensation Plan Information

The following table sets forth information with respect to the Company's equity compensation plans as of the end of the fiscal year ended October 31, 2019.

Plan Category	Number of Common Shares to be issued upon exercise of outstanding options and rights	Weighted-average exercise price of outstanding options and rights	Number of securities remaining available for future issuance under equity compensation plans
<i>Equity compensation plans approved by security holders:</i>			
Equity incentive plans ⁽¹⁾	24,927	\$ 104.73	65,468
Employee stock purchase plan	—	—	34,539
Total	<u>24,927</u>	<u>\$ 104.73</u>	<u>100,007</u>

(1) Includes the Company's 2018 Omnibus Incentive Plan.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required under this Item is incorporated by reference to the Company's 2020 Proxy Statement to be filed with the SEC within 120 days after fiscal year end.

Item 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Information required under this Item is incorporated by reference to the Company's 2020 Proxy Statement to be filed with the SEC within 120 days after fiscal year end.

PART IV

Item 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this report:

- 1 Financial Statements — See Index to Consolidated Financial Statements at Item 8 of the Annual Report on Form 10-K.
- 2 Financial Statement Schedules — Supplemental schedules are not provided because of the absence of conditions under which they are required or because the required information is given in the financial statements or notes thereto.
- 3 Exhibits — The following exhibits are filed as part of, or incorporated by reference into, this Annual Report on Form 10-K.

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
3.1	<u>Certificate of Incorporation of the Company, as amended, July 12, 1999 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K dated September 21, 1999).</u>
3.2	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated November 21, 2000 (incorporated by reference to Exhibit 3.3 to the Company's Annual Report on Form 10-K dated January 12, 2017).</u>
3.3	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated October 31, 2003 (incorporated by reference to Exhibit 3.11 to the Company's Current Report on Form 8-K dated November 3, 2003).</u>
3.4	<u>Amended Certificate of Designation of Series B Cumulative Convertible Perpetual Preferred Stock, dated March 14, 2005 (incorporated by reference to Exhibit 3.4 to the Company's Annual Report on Form 10-K dated January 12, 2017).</u>
3.5	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated April 8, 2011 (incorporated by reference to Exhibit 3.5 to the Company's Annual Report on Form 10-K dated January 12, 2017).</u>
3.6	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated April 5, 2012 (incorporated by reference to Exhibit 3.6 to the Company's Annual Report on Form 10-K dated January 12, 2017).</u>
3.7	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated December 3, 2015 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K dated December 3, 2015).</u>
3.8	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated April 18, 2016 (incorporated by reference to Exhibit 3.9 to the Company's Quarterly Report on Form 10-Q for the period ending April 30, 2016).</u>
3.9	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated April 7, 2017 (incorporated by reference to Exhibit 3.10 to the Company's Quarterly Report on Form 10-Q for the period ending April 30, 2017).</u>
3.10	<u>Certificate of Amendment of the Certificate of Incorporation of the Company, dated December 14, 2017 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K dated December 14, 2017).</u>
3.11	<u>Certificate of Amendment of the Certificate of Incorporation of FuelCell Energy, Inc., dated May 8, 2019 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on May 8, 2019).</u>
3.12	<u>Amended and Restated By-Laws of the Company, dated December 15, 2016 (incorporated by reference to Exhibit 3.2 to the Company's Current Report on Form 8-K dated December 15, 2016).</u>
4.1	<u>Specimen of Common Share Certificate (incorporated by reference to Exhibit 4 to the Company's Annual Report on Form 10-K for fiscal year ended October 31, 1999).</u>
4.2	<u>Schedule A to Articles of Amendment of FuelCell Energy, Ltd., setting forth the rights, privileges, restrictions and conditions of Class A Cumulative Redeemable Exchangeable Preferred Stock (incorporated by reference to exhibit of the same number contained in the Company's Quarterly Report on Form 10-Q for the period ended January 31, 2009).</u>

Exhibit No.	Description
4.3	Letter Agreement, dated March 31, 2011, and Guarantee, dated April 1, 2011, by and between the Company and Enbridge, Inc., and Revised Special Rights and Restrictions attributable to the Class A Preferred Stock of FuelCell Energy, Ltd. (incorporated by reference to Exhibits <u>4.1</u> , <u>4.2</u> and <u>4.3</u> to the Company's Current Report on Form 8-K dated March 31, 2011).
4.4	<u>Certificate of Designation for the Company's 5% Series B Cumulative Convertible Perpetual Preferred Stock (incorporated by reference to Exhibit 3.1 to the Company's Current Report Form 8-K, dated November 22, 2004).</u>
4.5	<u>Certificate of Designations for the Company's Series C Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, dated September 5, 2017).</u>
4.6	Certificate of Designations, Preferences and Rights for the Company's Series D Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K dated August 27, 2018).
4.7	Specimen Series D Convertible Preferred Stock Certificate. (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K dated August 27, 2018).
4.8	<u>Form of Series A Warrants to purchase common stock (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K dated July 6, 2016).</u>
4.9	<u>Form of Series B Warrants to purchase common stock (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K dated July 6, 2016).</u>
4.10	<u>Form of Series C Warrants to purchase common stock (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K dated April 27, 2017).</u>
4.11	<u>Form of Series D Warrants to purchase common stock (incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K dated April 27, 2017).</u>
4.12	<u>Form of Warrant to purchase common stock (incorporated by reference to Exhibit 10.6 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
4.13	<u>Letter Agreement, dated January 20, 2020, among FuelCell Energy, Inc., FCE FuelCell Energy Ltd., and Enbridge Inc. relating to the amendment of the terms of the Class A Cumulative Preferred Stock of FCE FuelCell Energy Ltd.</u>
4.14	<u>Schedule A setting forth the amended rights, privileges, restrictions and conditions of the Class A Cumulative Preferred Stock of FCE FuelCell Energy Ltd.</u>
4.15	<u>Description of Securities Registered Under Section 12 of the Securities Exchange Act of 1934, as amended.</u>
10.1	<u>Purchase and Sale Agreement between Groton Fuel Cell 1, LLC and PNC Energy Capital LLC, dated October 31, 2016 (incorporated by reference to Exhibit 10.1 to the Company's Annual Report on Form 10-K for the period ended October 31, 2016).</u>
10.2	<u>Lease Agreement between Groton Fuel Cell 1, LLC and PNC Energy Capital LLC, dated October 31, 2016 (incorporated by reference to Exhibit 10.2 to the Company's Annual Report on Form 10-K for the period ended October 31, 2016).</u>
10.3	<u>Pledge Agreement between FuelCell Energy Finance, LLC and PNC Energy Capital LLC, dated October 31, 2016 (incorporated by reference to Exhibit 10.3 to the Company's Annual Report on Form 10-K for the period ended October 31, 2016).</u>
10.4	<u>**Alliance Agreement between FuelCell Energy, Inc. and POSCO Energy, dated as of February 7, 2007 (incorporated by reference to Exhibit 10.1 to the Company's Form 10-Q/A for the period ended January 31, 2009).</u>

Exhibit No.	Description
10.5	<u>**Technology Transfer, License and Distribution Agreement between FuelCell Energy, Inc. and POSCO Energy, dated as of February 7, 2007 (incorporated by reference to Exhibit 10.2 to the Company's Form 10-Q/A for the period ended January 31, 2009).</u>
10.6	<u>Loan Agreement, dated April 29, 2008, between the Company and the Connecticut Development Authority (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the period ended January 31, 2009).</u>
10.7	<u>**Stack Technology Transfer and License Agreement dated as of October 27, 2009, by and between FuelCell Energy, Inc. and POSCO Energy (incorporated by reference to Exhibit 10.1 of the Company's Current Report Form 8-K, dated October 27, 2009).</u>
10.8	<u>*The FuelCell Energy, Inc. Section 423 Amended and Restated Stock Purchase Plan (incorporated by reference to Exhibit 10.36 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.9	<u>Lease agreement, dated March 8, 2000, between the Company and Technology Park Associates, L.L.C. (incorporated by reference to Exhibit 10.55 to the Company's Quarterly Report on Form 10-Q for the period ended April 30, 2000).</u>
10.10	<u>Security agreement, dated June 30, 2000, between the Company and the Connecticut Development Authority (incorporated by reference to Exhibit 10.56 to the Company's Quarterly Report on Form 10-Q for the period ended July 31, 2000).</u>
10.11	<u>Loan agreement, dated June 30, 2000, between the Company and the Connecticut Development Authority (incorporated by reference to Exhibit 10.57 to the Company's Quarterly Report on Form 10-Q for the period ended July 31, 2000).</u>
10.12	<u>*FuelCell Energy, Inc. Amended and Restated 1998 Equity Incentive Plan (incorporated by reference to Exhibit 10.54 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.13	<u>*FuelCell Energy, Inc. 2006 Equity Incentive Plan (incorporated by reference to Exhibit 10.58 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.14	<u>*FuelCell Energy, Inc. Amended and Restated 2010 Equity Incentive Plan (incorporated by reference to Exhibit 10.59 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.15	<u>Letter agreement, dated September 28, 2015, between the Company and Technology Park Associates, L.L.C. exercising the extension option per the terms of the Lease Agreement, dated March 8, 2000, between the Company and Technology Park Associates, L.L.C. (incorporated by reference to Exhibit 10.60 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.16	<u>Intracreditor Subordination and Confirmation Agreement made and effective as of January 4, 2011 by JPMorgan Chase Bank, N.A. (incorporated by reference to Exhibit 10.63 to the Company's Annual Report on Form 10-K for the period ended October 31, 2010).</u>
10.17	<u>*Employment Agreement, dated January 28, 2010, between the Company and Arthur Bottone, Senior Vice President, Chief Commercial Officer (incorporated by reference to Exhibit 10.65 to the Company's Annual Report on Form 10-K for the period ended October 31, 2010).</u>
10.18	<u>*Employment Agreement, dated and effective as of February 8, 2011, between the Company and Arthur Bottone, President and Chief Executive Officer (incorporated by reference to Exhibit 10.1 to the Company's Current Quarterly Report on Form 10-Q for the period ended April 30, 2019).</u>
10.19	<u>*First Amendment to Employment Agreement, dated December 19, 2011 and effective as of January 1, 2012 between the Company and Arthur Bottone, President and Chief Executive Officer (incorporated by reference to Exhibit 10.3 of the Company's Current Report Form 8-K dated December 19, 2011).</u>

Exhibit No.	Description
10.20	<u>*Employment Agreement, dated March 21, 2012 and effective as of January 1, 2012 between the Company and Anthony Rauseo, Chief Operating Officer (incorporated by reference to the Exhibit 10.67 to the Company's Current Report Form 8-K, dated March 21, 2012).</u>
10.21	<u>*Employment Agreement, dated March 21, 2012 and effective as of January 1, 2012 between the Company and Michael Bishop, Chief Financial Officer (incorporated by reference to the Exhibit 10.68 to the Company's Current Report Form 8-K, dated March 21, 2012).</u>
10.22	<u>Cell Technology Transfer and License Agreement dated October 31, 2012 by and between the Company and POSCO Energy, Co., Ltd. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K/A dated as of October 31, 2012 and filed on January 7, 2013).</u>
10.23	<u>Amendment to Technology Transfer Distribution and Licensing Agreement dated as of February 7, 2007 and the Stack Technology Transfer License Agreement dated as of October 27, 2009, each by and between the Company and POSCO Energy, Co., Ltd. (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K dated as of October 31, 2012).</u>
10.24	<u>Securities Purchase Agreement, dated April 30, 2012, by and between the Company and POSCO Energy Co., Ltd., dated April 30, 2012 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated April 30, 2012).</u>
10.25	<u>Loan Agreement, dated as of March 5, 2013, between Clean Energy Finance and Investment Authority, as Lender, and the Company, as Borrower (incorporated by reference to Exhibit 10.69 to the Company's Quarterly Report on Form 10-Q for the period ended January 31, 2013).</u>
10.26	<u>Security Agreement, dated March 5, 2013, by the Company in favor of the Clean Energy Finance and Investment Authority (incorporated by reference to Exhibit 10.70 to the Company's Quarterly Report on Form 10-Q for the quarter ended January 31, 2013).</u>
10.27	<u>Securities Purchase Agreement, dated July 30, 2014, between the Company and NRG Energy, Inc. (incorporated by reference to Exhibit 10.82 to the Company's Quarterly Report on Form 10-Q for the quarter ended July 31, 2014).</u>
10.28	<u>Loan Agreement, dated July 30, 2014, between FuelCell Energy Finance, LLC and NRG Energy, Inc. (incorporated by reference to Exhibit 10.83 to the Company's Quarterly Report on Form 10-Q for the quarter ended July 31, 2014).</u>
10.29	<u>Assistance Agreement, dated November 19, 2015, by and between the State of Connecticut Acting by the Department of Economic Community and Development and the Company (incorporated by reference to Exhibit 10.84 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.30	<u>Phase 1 Promissory Note, dated November 19, 2015, between the Company and the State of Connecticut Acting by and through the Department of Economic Community and Development (incorporated by reference to Exhibit 10.85 to the Company's Annual Report on Form 10-K for the period ended October 31, 2015).</u>
10.31	<u>Securities Purchase Agreement, dated July 6, 2016, between the Company and investors as listed on a Schedule of Buyers contained within the Security Purchase Agreement (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K dated July 6, 2016).</u>
10.32	<u>Amendment No. 1 to Securities Purchase Agreement, dated July 8, 2016, between the Company and investors as listed on a Schedule of Buyers contained within the Securities Purchase Agreement (incorporated by reference to Exhibit 10.5 to the Company's Current Report on Form 8-K dated July 12, 2016).</u>
10.33	<u>Amendment to Alliance Agreement, dated as of October 10, 2016, by and between the Company and POSCO Energy Co., Ltd. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated October 10, 2016).</u>

Exhibit No.	Description
10.34	<u>Amendment to Technology Transfer, Distribution and Licensing Agreement, dated as of October 10, 2016, by and between the Company and POSCO Energy Co., Ltd. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K dated October 10, 2016).</u>
10.35	<u>Amendment to Stack Technology Transfer and License Agreement, dated as of October 10, 2016, by and between the Company and POSCO Energy Co., Ltd. (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K dated October 10, 2016).</u>
10.36	<u>Memorandum of Understanding for Market Transition dated as of March 17, 2017, by and between the Company and POSCO Energy Co., Ltd. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated March 17, 2017).</u>
10.37	<u>First Amendment to Assistance Agreement, dated as of April 3, 2017, and approved by the State of Connecticut, Office of the Attorney General on April 17, 2017 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated April 17, 2017).</u>
10.38	<u>*Employment Agreement, dated April 7, 2017, between the Company and Jennifer D. Arasimowicz, Senior Vice President, General Counsel and Corporate Secretary (incorporated by reference to Exhibit 10.90 to the Company's Quarterly Report on Form 10-Q for the period ending April 30, 2017).</u>
10.39	<u>Loan and Security Agreement, dated April 14, 2016, among FuelCell Energy, Inc. and Hercules Capital, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated April 14, 2016).</u>
10.40	<u>First Amendment to Loan and Security Agreement, dated September 5, 2017, by and among the Company, Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated September 5, 2017).</u>
10.41	<u>Second Amendment to Loan and Security Agreement, dated October 27, 2017, by and among the Company, Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated October 27, 2017).</u>
10.42	<u>Third Amendment to Loan and Security Agreement, dated March 28, 2018, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated March 28, 2018).</u>
10.43	<u>FuelCell Energy, Inc. 2018 Omnibus Incentive Plan (incorporated by reference to Annex A to the FuelCell Energy, Inc. Definitive Proxy Statement filed with the Securities and Exchange Commission on Schedule 14A on February 16, 2018).</u>
10.44	<u>Form of Restricted Stock Award Agreement (U.S. Employees) (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K dated April 5, 2018).</u>
10.45	<u>Form of Restricted Stock Unit Award Agreement (U.S. Employees) (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K dated April 5, 2018).</u>
10.46	<u>Form of Restricted Stock Unit Award Agreement (Non-Employee Directors).(incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated November 8, 2018).</u>
10.47	<u>Form of Option Award Agreement (Non-Employee Directors) (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K dated April 5, 2018).</u>
10.48	<u>FuelCell Energy, Inc. 2018 Employee Stock Purchase Plan (incorporated by reference to Annex B to the FuelCell Energy, Inc. Definitive Proxy Statement filed with the Securities and Exchange Commission on Schedule 14A on February 16, 2018).</u>

Exhibit No.	Description
10.49	<u>At Market Issuance Sales Agreement among FuelCell Energy, Inc., B. Riley FBR, Inc. and Oppenheimer & Co. Inc., dated June 13, 2018. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated June 13, 2018).</u>
10.50	<u>Fourth Amendment to Loan and Security Agreement, dated August 29, 2018, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated August 27, 2018).</u>
10.51	<u>Membership Interest Purchase Agreement, dated October 31, 2018, by and between FuelCell Energy Finance, LLC and Dominion Generation, Inc. (incorporated by reference to Exhibit 10.112 to the Company's Annual Report on Form 10-K filed on January 10, 2019).</u>
10.52	<u>First Amendment to Loan Agreement, dated as of April 18, 2016, by and among FuelCell Energy Finance, LLC, Riverside FuelCell, LLC and NRG Energy, Inc. (incorporated by reference to Exhibit 10.114 to the Company's Annual Report on Form 10-K filed on January 10, 2019).</u>
10.53	<u>Second Amendment to Loan Agreement, dated as of December 13, 2018, by and among FuelCell Energy Finance, LLC and NRG Energy, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K/A filed on December 20, 2018).</u>
10.54	<u>Construction Loan Agreement, dated December 21, 2018, by and among FuelCell Energy Finance II, LLC, certain of its subsidiaries as the Project Company Guarantors and Generate Lending, LLC. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on December 26, 2018).</u>
10.55	<u>Right to Finance Agreement, dated December 21, 2018, by and between FuelCell Energy, Inc., FuelCell Energy Finance II, LLC and Generate Lending, LLC. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on December 26, 2018).</u>
10.56	<u>Guaranty Agreement, dated December 21, 2018, by FuelCell Energy, Inc. in favor of Generate Lending, LLC. (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on December 26, 2018).</u>
10.57	<u>Fifth Amendment to Loan and Security Agreement, dated December 19, 2018, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on December 26, 2018).</u>
10.58	<u>Securities Purchase Agreement, dated June 9, 2009, by and between the Company and POSCO Power (incorporated by reference to Exhibit 4.01 to the Company's Current Report on Form 8-K dated October 27, 2009).</u>
10.59	<u>Second Amendment to Assistance Agreement, dated as of January 24, 2019, and approved by the State of Connecticut, Office of the Attorney General on January 28, 2019 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on February 5, 2019).</u>
10.60	<u>Waiver Agreement, dated February 21, 2019, by and between FuelCell Energy, Inc. and the Sole Holder of Series C Convertible Preferred Stock (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on February 21, 2019).</u>
10.61	<u>Exchange Agreement, dated February 21, 2019, by and between FuelCell Energy, Inc. and the Holder of the Series A Warrant to Purchase Common Stock, issued on July 12, 2016 (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on February 21, 2019).</u>
10.62	<u>Form of Consent and Waiver, dated February 21, 2019, by and between FuelCell Energy, Inc. and each Holder of Series D Convertible Preferred Stock (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on February 21, 2019).</u>

Exhibit No.	Description
10.63	<u>Construction Loan Agreement, dated as of February 28, 2019, by and between Groton Station Fuel Cell, LLC and Fifth Third Bank (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on March 5, 2019).</u>
10.64	<u>Guaranty Agreement, dated as of February 28, 2019, by FuelCell Energy, Inc. in favor of Fifth Third Bank (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on March 5, 2019).</u>
10.65	<u>Sixth Amendment to Loan and Security Agreement, dated February 28, 2019 and effective as of February 22, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on March 5, 2019).</u>
10.66	<u>Seventh Amendment to Loan and Security Agreement, dated March 29, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on April 3, 2019).</u>
10.67	<u>Third Amendment to Loan Agreement, dated as of March 29, 2019, by and among FuelCell Energy Finance, LLC, Central CA Fuel Cell 2, LLC, and NRG Energy, Inc. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on April 3, 2019).</u>
10.68	<u>Amendment to Membership Interest Purchase Agreement dated as of January 15, 2019 between Dominion Generation, Inc. and FuelCell Energy Finance, LLC.</u>
10.69	<u>Second Amendment to Membership Interest Purchase Agreement dated as of May 9, 2019 between Dominion Generation, Inc. and FuelCell Energy Finance, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.70	<u>Credit Agreement, dated as of May 9, 2019 among Dominion Bridgeport Fuel Cell, LLC, as Borrower, Liberty Bank, as Administrative Agent and Co-Lead Arranger and Fifth Third Bank, as Co-Lead Arranger, the Lenders (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.71	<u>\$12,500,000 Promissory Note from Dominion Bridgeport Fuel Cell, LLC for the benefit of Liberty Bank (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.72	<u>\$12,500,000 Promissory Note from Dominion Bridgeport Fuel Cell, LLC for the benefit of Fifth Third Bank (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.73	<u>Security Agreement dated as of May 9, 2019 by Dominion Bridgeport Fuel Cell, LLC in favor of Liberty Bank, as Administrative Agent (incorporated by reference to Exhibit 10.5 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.74	<u>Pledge and Security Agreement dated as of May 9, 2019 by FuelCell Energy Finance, LLC for the benefit of Liberty Bank, as Administrative Agent (incorporated by reference to Exhibit 10.6 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.75	<u>Credit Agreement, dated as of May 9, 2019 among Dominion Bridgeport Fuel Cell, LLC, as Borrower, and Connecticut Green Bank, as Administrative Agent and Collateral Agent, the Lenders (incorporated by reference to Exhibit 10.7 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.76	<u>\$6,026,165.34 Promissory Note from Dominion Bridgeport Fuel Cell, LLC for the benefit of Connecticut Green Bank (incorporated by reference to Exhibit 10.8 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>

Exhibit No.	Description
10.77	<u>Security Agreement dated as of May 9, 2019 by Dominion Bridgeport Fuel Cell, LLC in favor of Connecticut Green Bank, as Administrative Agent. (incorporated by reference to Exhibit 10.9 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.78	<u>Pledge and Security Agreement dated as of May 9, 2019 by FuelCell Energy Finance, LLC for the benefit of Connecticut Green Bank, as Administrative Agent (incorporated by reference to Exhibit 10.10 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.79	<u>Eighth Amendment to Loan and Security Agreement, dated May 8, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.11 to the Company's Current Report on Form 8-K filed on May 14, 2019).</u>
10.80	<u>International Swap Dealers Association, Inc. Master Agreement dated as of May 16, 2019 between Fifth Third Financial Risk Solutions, a division of Fifth Third Bank, and Bridgeport Fuel Cell, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on May 22, 2019).</u>
10.81	<u>Schedule to the 1992 Master Agreement dated as of May 16, 2019 between Fifth Third Risk Solutions, a division of Fifth Third Bank, and Bridgeport Fuel Cell, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on May 22, 2019).</u>
10.82	<u>License Agreement, effective as of June 11, 2019, between ExxonMobil Research and Engineering Company and FuelCell Energy, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on June 12, 2019).</u>
10.83	<u>Ninth Amendment to Loan and Security Agreement, dated June 11, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on June 12, 2019).</u>
10.84	<u>Engagement Letter, dated and effective as of June 2, 2019, between the Company and Huron Consulting Services LLC (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended April 30, 2019).</u>
10.85	<u>Fourth Amendment to Loan Agreement, dated as of June 13, 2019, by and among FuelCell Energy Finance, LLC, Central CA Fuel Cell 2, LLC, and NRG Energy, Inc. (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended April 30, 2019).</u>
10.86	<u>First Amendment to Construction Loan Agreement dated as of June 28, 2019 by and among FuelCell Energy Finance II, LLC, the Initial Project Company Guarantors party thereto, and Generate Lending, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 3, 2019).</u>
10.87	<u>First Amendment to Right to Finance Agreement dated as of June 28, 2019, by and among FuelCell Energy, Inc., FuelCell Energy Finance II, LLC and Generate Lending, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on July 3, 2019).</u>
10.88	<u>Fifth Amendment to Loan Agreement, dated as of July 11, 2019, by and among FuelCell Energy Finance, LLC, Central CA Fuel Cell 2, LLC, and NRG Energy, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 12, 2019).</u>

Exhibit No.	Description
10.89	<u>Tenth Amendment to Loan and Security Agreement, dated July 24, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 25, 2019).</u>
10.90	<u>*Employment Agreement, dated as of July 30, 2019, by and between FuelCell Energy, Inc. and Michael Lisowski (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 30, 2019).</u>
10.91	<u>*Employment Agreement, dated as of July 30, 2019, by and between FuelCell Energy, Inc. and Anthony Leo (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on July 30, 2019).</u>
10.92	<u>*Summary of Cash Incentive Plan of FuelCell Energy, Inc. (incorporated by reference to Exhibit 10.30 to the Company's Form 10-Q for the quarter ended July 31, 2019).</u>
10.93	<u>*Form of Letter Agreement Issued to Employees Under Cash Incentive Plan of FuelCell Energy, Inc. (incorporated by reference to Exhibit 10.30 to the Company's Form 10-Q for the quarter ended July 31, 2019).</u>
10.94	<u>Sixth Amendment to Loan Agreement, dated as of August 8, 2019, by and among FuelCell Energy Finance, LLC, Central CA Fuel Cell 2, LLC, and NRG Energy, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on August 13, 2019).</u>
10.95	<u>Second Amendment to Construction Loan Agreement, dated as of August 13, 2019, by and among FuelCell Energy Finance II, LLC, the Initial Project Company Guarantors party thereto and Generate Lending, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on August 13, 2019).</u>
10.96	<u>Second Amendment to Right to Finance Agreement, dated as of August 13, 2019 by and between FuelCell Energy, Inc., FuelCell Energy Finance II, LLC and Generate Lending, LLC (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on August 13, 2019).</u>
10.97	<u>Amendment No. 1 to Construction Loan Agreement, dated as of August 13, 2019, by and between Groton Station Fuel Cell, LLC and Fifth Third Bank (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on August 13, 2019).</u>
10.98	<u>Amendment to Engagement Letter, dated August 19, 2019 and effective as of August 26, 2019, between FuelCell Energy, Inc. and Huron Consulting Services LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on August 20, 2019).</u>
10.99	<u>*Employment Agreement, effective as of August 26, 2019, by and between FuelCell Energy, Inc. and Jason B. Few. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on August 20, 2019).</u>
10.100	<u>Seventh Amendment to Loan Agreement, dated as of September 30, 2019, by and between FuelCell Energy Finance, LLC, Central CA Fuel Cell 2, LLC, and NRG Energy, Inc. . (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on October 2, 2019).</u>
10.101	<u>Third Amendment to Construction Loan Agreement, dated as of September 30, 2019, by and between FuelCell Energy Finance II, LLC, the Initial Project Company Guarantors party thereto and Generate Lending, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on October 2, 2019).</u>
10.102	<u>Third Amendment to Right to Finance Agreement, dated as of September 30, 2019 by and between FuelCell Energy, Inc., FuelCell Energy Finance II, LLC and Generate Lending, LLC (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on October 2, 2019).</u>

Exhibit No.	Description
10.103	<u>Letter Agreement regarding Payoff of Loan and Security Agreement, dated September 30, 2019, by and among FuelCell Energy, Inc., Versa Power Systems, Inc., Versa Power Systems Ltd., Hercules Capital, Inc. and Hercules Funding II, LLC (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on October 2, 2019).</u>
10.104	<u>At Market Issue Sales Agreement, effective October 4, 2019, by and between FuelCell Energy, Inc. and B. Riley FBR, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on October 4, 2019).</u>
10.105	<u>Amendment No. 2 to Construction Loan Agreement, dated as of October 21, 2019, by and between Groton Station Fuel Cell, LLC and Fifth Third Bank (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on October 25, 2019).</u>
10.106	<u>Joint Development Agreement, effective October 31, 2019, by and between FuelCell Energy, Inc. and ExxonMobil Research and Engineering Company. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.107	<u>Credit Agreement, dated as of October 31, 2019, by and between FuelCell Energy, Inc., the Guarantors from time to time party thereto, the Lenders and Orion Energy Partners Investment Agent, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.108	<u>Pledge and Security Agreement, dated as of October 31, 2019, by and between FuelCell Energy, Inc., the Guarantors from time to time party thereto, the Lenders and Orion Energy Partners Investment Agent, LLC (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.109	<u>Loan Discount Letter, dated as of October 31, 2019, by and between FuelCell Energy, Inc. and Orion Energy Partners Investment Agent, LLC (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.110	<u>Agent Reimbursement Letter, dated as of October 31, 2019, by and between FuelCell Energy, Inc. and Orion Energy Partners Investment Agent, LLC (incorporated by reference to Exhibit 10.5 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.111	<u>Observer Right Agreement, dated as of October 31, 2019, by and between FuelCell Energy, Inc., the Guarantors from time to time party thereto, Orion Energy Credit Opportunities Fund II, L.P., Orion Energy Credit Opportunities Fund II PV, L.P. and Orion Energy Credit Opportunities Fund II GPFA, L.P. (incorporated by reference to Exhibit 10.7 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.112	<u>Payoff Letter, dated as of October 31, 2019, by and between FuelCell Energy Finance, LLC and NRG Energy, Inc. (incorporated by reference to Exhibit 10.8 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.113	<u>Payoff Letter, dated as of October 30, 2019, by and between FuelCell Energy Finance II, LLC and Generate Lending, LLC (incorporated by reference to Exhibit 10.9 to the Company's Current Report on Form 8-K filed on November 6, 2019).</u>
10.114	<u>First Amendment to Credit Agreement, dated as of November 22, 2019, by and among FuelCell Energy, Inc., each of the Guarantors party to the Credit Agreement, each of the lenders party to the Credit Agreement and Orion Energy Partners Investment Agent, LLC. (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on November 25, 2019).</u>
10.115	<u>Payoff Letter, Termination, and Release, dated as of November 22, 2019, by and among Groton Station Fuel Cell, LLC and Fifth Third Bank, National Association (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on November 25, 2019).</u>

Exhibit No.	Description
10.116	<u>Amendment to Loan Agreement, dated as of December 19, 2019, by and among FuelCell Energy, Inc. and Connecticut Green Bank (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on December 20, 2019).</u>
10.117	<u>Second Amendment to Credit Agreement, dated as of January 20, 2020, by and among FuelCell Energy, Inc., each of the Guarantors party to the Credit Agreement, each of the lenders party to the Credit Agreement and Orion Energy Partners Investment Agent, LLC.</u>
21	<u>Subsidiaries of the Registrant</u>
23.1	<u>Consent of Independent Registered Public Accounting Firm</u>
31.1	<u>Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes Oxley Act of 2002</u>
31.2	<u>Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes Oxley Act of 2002</u>
32.1	<u>Certification of Chief Executive Officer pursuant to Section 906 of the Sarbanes Oxley Act of 2002</u>
32.2	<u>Certification of Chief Financial Officer pursuant to Section 906 of the Sarbanes Oxley Act of 2002</u>
101.SCH#	XBRL Schema Document
101.INS#	XBRL Instance Document
101.CAL#	XBRL Calculation Linkbase Document
101.LAB#	XBRL Labels Linkbase Document
101.PRE#	XBRL Presentation Linkbase Document
101.DEF#	XBRL Definition Linkbase Document

The exhibits marked with the section symbol (#) are interactive data files.

* Management Contract or Compensatory Plan or Arrangement

** Confidential Treatment has been granted for portions of this document

Item 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

FUELCELL ENERGY, INC.

/s/ Jason B. Few
Jason B. Few
President, Chief Executive Officer
and Chief Commercial Officer

Dated: January 22, 2020

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Signature</u>	<u>Capacity</u>	<u>Date</u>
<u>/s/ Jason B. Few</u> <u>Jason B. Few</u>	President, Chief Executive Officer, Chief Commercial Officer and Director (Principal Executive Officer)	January 22, 2020
/s/ Michael S. Bishop Michael S. Bishop	Executive Vice President, Chief Financial Officer and Treasurer (Principal Financial Officer and Principal Accounting Officer)	January 22, 2020
/s/ James H. England James H. England	Director – Chairman of the Board	January 22, 2020
/s/ Chris Groobey Chris Groobey	Director	January 22, 2020
/s/ Matthew Hilzinger Matthew Hilzinger	Director	January 22, 2020
/s/ Natica von Althann Natica von Althann	Director	January 22, 2020

STOCKHOLDER INFORMATION

Corporate Offices

FuelCell Energy, Inc.
3 Great Pasture Road
Danbury, CT 06810

Form 10-K

A copy of the Annual Report on Form 10-K for the year ended October 31, 2019, which is filed with the U.S. Securities and Exchange Commission, can be accessed from our website at www.fuelcellenergy.com. We will provide, without charge, a copy of the Annual Report on Form 10-K for the year ended October 31, 2019. You may request a copy by writing to Investor Relations at the address below.

Company Contacts

For additional information about FuelCell Energy, Inc. please contact:

FuelCell Energy, Inc.
Investor Relations
3 Great Pasture Road
Danbury, CT 06810
IR@fce.com

Corporate Website

www.fuelcellenergy.com

Registrar and Transfer Agent

Stockholders with questions regarding lost certificates, address changes or changes of ownership should contact:

American Stock Transfer & Trust Company, LLC
Operations Center
6201 15th Avenue
Brooklyn, NY 11219
(800) 937.5449
(718) 921.8124
info@amstock.com
www.amstock.com

Independent Registered Public Accounting Firm

KPMG LLP

Legal Counsel

Foley & Lardner LLP

Annual Meeting

The Annual Meeting of Stockholders will be held Thursday, April 9, 2020 at 10:00 a.m. Eastern Daylight Time

The Annual Meeting will be a completely "virtual meeting", conducted via live audio webcast on the Internet. You will be able to attend the Annual Meeting as well as vote and submit your questions during the live audio webcast of the meeting by visiting www.virtualshareholdermeeting.com/FCEL2020 and entering the 16-digit control number included in our notice of internet availability of the proxy materials, on your proxy card or in the instructions that accompanied your proxy materials.

Non-Discrimination Statement

FuelCell Energy, Inc. is an Equal Opportunity/Affirmative Action employer. In order to provide equal employment and advancement opportunities to all individuals, our employment decisions will be based on merit, qualifications and abilities. We do not discriminate in employment opportunities or practices on the basis of race, color, religion, creed, age, sex, marital status, national origin, disability, protected veteran status, sexual orientation, gender identification, genetic information, or any other characteristic protected by federal, state or local law.

DIRECTORS AND OFFICERS

BOARD OF DIRECTORS

James H. England ^{1, 2, 3, 5}

Chief Executive Officer of
Stahlman—England Irrigation, Inc.

Jason Few ²

President, Chief Executive Officer and
Chief Commercial Officer of
FuelCell Energy, Inc.

Matthew F. Hilzinger ^{2, 3, 4, 5}

Former Executive Vice President and
Chief Financial Officer of
USG Corporation

Natica von Althann ^{2, 3, 4, 5}

Former Financial Executive at Bank of America
and Citigroup

Chris Groobey ^{2, 3, 4, 5}

Former Partner at Wilson
Sonsini Goodrich & Rosati

¹ Chairman of the Board of Directors

² Executive Committee

³ Audit and Finance Committee

⁴ Compensation Committee

⁵ Nominating and Corporate Governance Committee

OFFICERS

Jason Few

President, Chief Executive Officer and Chief Commercial Officer

Michael S. Bishop

Executive Vice President, Chief Financial Officer and Treasurer

Jennifer D. Arasimowicz

Executive Vice President, General Counsel, Chief Administrative Officer and Corporate Secretary

Anthony J. Leo

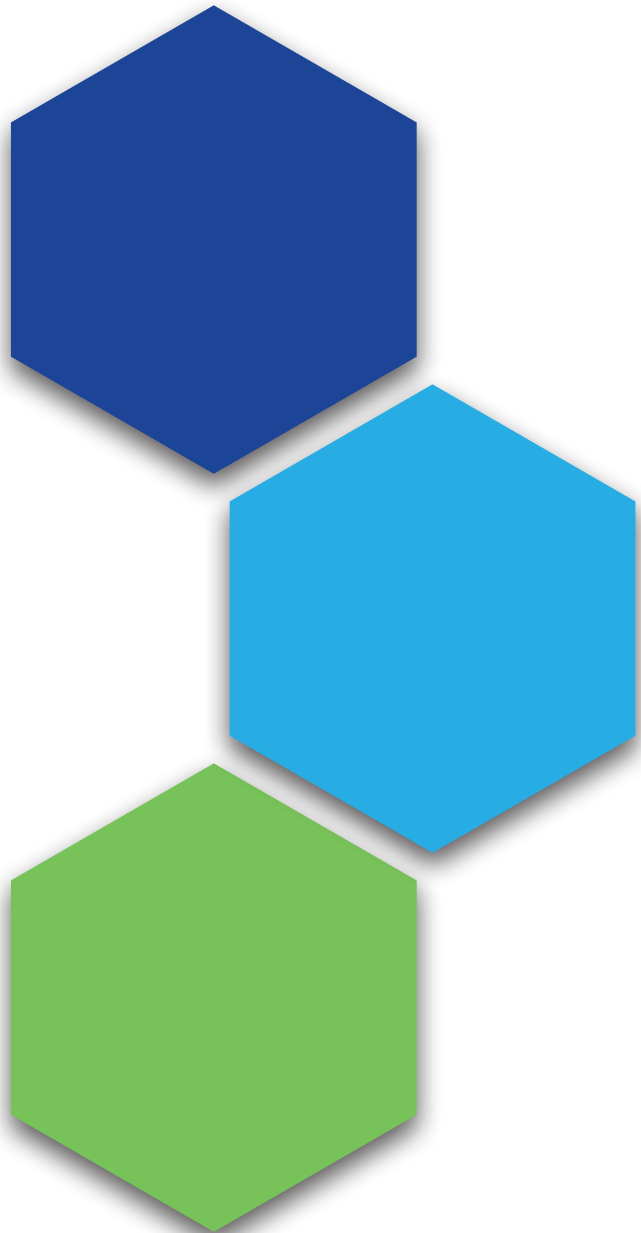
Executive Vice President, Chief Technology Officer

Michael J. Lisowski

Executive Vice President, Chief Operating Officer

Statements in this Report relating to matters not historical are forward-looking statements that involve important factors that could cause actual results to differ materially from those anticipated. Cautionary statements identifying such important factors are described in reports, including the Form 10-K for the fiscal year ended October 31, 2019, filed by FuelCell Energy, Inc. with the Securities and Exchange Commission and available at www.fuelcellenergy.com.

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