BALLARD POWER SYSTEMS INC.

MANAGEMENT'S DISCUSSION AND ANALYSIS

FOURTH QUARTER 2019

FUEL CELL POWER
FOR A SUSTAINABLE
PLANET

Power to Change the World®

BALLARD®

CAUTION REGARDING FORWARD-LOOKING STATEMENTS

This document contains forward-looking statements about expected events and the financial and operating performance of Ballard Power Systems Inc. (“Ballard”, “the Company”, “the Corporation”, “we”, “us” or “our”). Forward-looking statements include any statements that do not refer to historical facts. Forward-looking statements are based on the beliefs of management and reflect our current expectations as contemplated under the safe harbor provisions of Section 21E of the United States Securities Exchange Act of 1934, as amended. Such statements include, but are not limited to, statements with respect to our objectives, goals, liquidity, sources of capital and our outlook including our estimated revenue and gross margins, cash flow from operations, Cash Operating Costs, EBITDA and Adjusted EBITDA (see Non-GAAP Measures), order backlog, order book of expected deliveries over the subsequent 12-months, future product costs and selling prices, future product sales and production volumes, expenses / costs, contributions and cash requirements to and from joint venture operations, our strategy, the markets for our products, and research and development activities, as well as statements with respect to our beliefs, plans, objectives, expectations, anticipations, estimates and intentions. Words such as "estimate", "project", "believe", "anticipate", "intend", "expect", "plan", "predict", "may", "should", "will", the negatives of these words or other variations thereof and comparable terminology are intended to identify forward-looking statements. These statements are not guarantees of future performance and involve assumptions, risks and uncertainties that are difficult to predict.

In particular, these forward-looking statements are based on certain factors and assumptions relating to our expectations with respect to new and existing customer and partner relationships, the generation of new sales, producing, delivering and selling the expected product and service volumes at the expected prices and controlling our costs. They are also based on a variety of general factors and assumptions including, but not limited to, our expectations regarding technology and product development efforts, manufacturing capacity and cost, product and service pricing, market demand, and the availability and prices of raw materials, labour and supplies. These assumptions have been derived from information available to the Company including information obtained by the Company from third parties. These assumptions may prove to be incorrect in whole or in part. In addition, actual results may differ materially from those expressed, implied, or forecasted in such forward-looking statements. Factors that could cause our actual results or outcomes to differ materially from the results expressed, implied or forecasted in such forward-looking statements include, but are not limited to: the condition of the global economy, including trade, public health (including the impact of the corona virus (COVID-19)) and other geopolitical risks; the rate of mass adoption of our products or related ecosystem, including the availability of cost-effective hydrogen; changes in product or service pricing or cost; changes in our customers' requirements, the competitive environment and/or related market conditions; the relative strength of the value proposition that we offer our customers with our products or services; changes in competitive technologies, including battery and fuel cell technologies; product safety, liability or warranty issues; challenges or delays in our technology and product development activities; changes in the availability or price of raw materials, labour and supplies; our ability to attract and retain business partners, suppliers, employees and customers; changing government or environmental regulations, including subsidies or incentives associated with the adoption of clean energy products, including hydrogen and fuel cells; our access to funding and our ability to provide the capital required for product development, operations and marketing efforts, working capital requirements, and joint venture capital contributions; our ability to protect our intellectual property; our ability to extract value from joint venture operations; currency fluctuations, including the magnitude of the rate of change of the Canadian dollar versus the U.S. dollar; potential merger and acquisition activities, including risks related to integration, loss of key personnel, disruptions to operations, costs of integration, and the integration failing to achieve the expected benefits of the transaction; the general assumption that none of the risks identified in the Risks and Uncertainties section of this report or in our most recent Annual Information Form will materialize. Readers should not place undue reliance on Ballard's forward-looking statements.

The forward-looking statements contained in this document speak only as of the date of this Management Discussion and Analysis (“MD&A”). Except as required by applicable legislation, Ballard does not undertake any obligation to release publicly any updates or revisions to these forward-looking statements to reflect events or circumstances after the date of this MD&A including the occurrence of unanticipated events.

1. INTRODUCTION

1.1 Preparation of the MD&A

This discussion and analysis of financial condition and results of operations of Ballard Power Systems Inc. ("Ballard", "the Company", "we", "us" or "our") is prepared as at March 4, 2020 and should be read in conjunction with our audited consolidated financial statements and accompanying notes for the year ended December 31, 2019. The results reported herein are presented in U.S. dollars unless otherwise stated and have been prepared in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board. Additional information relating to the Company, including our Annual Information Form, is filed with Canadian (www.sedar.com) and U.S. securities regulatory authorities (www.sec.gov) and is also available on our website at www.ballard.com.

1.2 Management's Report on Disclosure Controls and Procedures and Internal Controls over Financial Reporting

Disclosure controls and procedures

Our disclosure controls and procedures are designed to provide reasonable assurance that relevant information is gathered and reported to senior management, including the Chief Executive Officer ("CEO") and the Chief Financial Officer ("CFO"), on a timely basis so that appropriate decisions can be made regarding public disclosures.

As of the end of the period covered by this report, we evaluated, under the supervision and with the participation of management, including the CEO and the CFO, the effectiveness of the design and operation of our disclosure controls and procedures, as defined in Rules 13a–15(e) and 15d-15(e) of the Securities Exchange Act of 1934 ("Exchange Act"). The CEO and CFO have concluded that as of December 31, 2019, our disclosure controls and procedures were effective to ensure that information required to be disclosed in reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified therein, and accumulated and reported to management to allow timely discussions regarding required disclosure.

Internal control over financial reporting

The CEO and CFO, together with other members of management, are responsible for establishing and maintaining adequate internal control over the Company's financial reporting. Internal control over financial reporting is designed under our supervision, and overseen by the Company's board of directors, management, and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS.

There are inherent limitations in the effectiveness of internal control over financial reporting, including the possibility that misstatements may not be prevented or detected. Accordingly, even effective internal controls over financial reporting can provide only reasonable assurance with respect to financial statement preparation. Furthermore, the effectiveness of internal controls can change with circumstances.

Management, including the CEO and CFO, have evaluated the effectiveness of internal control over financial reporting, as defined in Rules 13a–15(f) of the Exchange Act, in relation to criteria described in *Internal Control–Integrated Framework (2013)* issued by the

Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on this evaluation, management has determined that internal control over financial reporting was effective as of December 31, 2019.

KPMG LLP, our independent registered public accounting firm, has audited our consolidated financial statements and expressed an unqualified opinion thereon. KPMG LLP has also expressed an unqualified opinion on the effectiveness of our internal control over financial reporting as of December 31, 2019.

Changes in internal control over financial reporting

During the year ended December 31, 2019, there were no changes in internal control over financial reporting that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting. Our design of disclosure controls and procedures and internal controls over financial reporting includes controls, policies and procedures covering all of our subsidiaries including Ballard Power Systems Europe A/S, Ballard Unmanned Systems Inc. (re-named from Protonex Technology Corporation as of January 1, 2019), and Guangzhou Ballard Power Systems Co., Ltd.

1.3 Risks and Uncertainties

An investment in our common shares involves risk. Investors should carefully consider the risks and uncertainties described below and in our Annual Information Form. The risks and uncertainties described in our Annual Information Form are not the only ones that we face. Additional risks and uncertainties, including those that we do not know about now or that we currently deem immaterial, may also adversely affect our business. For a more complete discussion of the risks and uncertainties which apply to our business and our operating results, please see our Annual Information Form and other filings with Canadian (www.sedar.com) and U.S. (www.sec.gov) securities regulatory authorities.

A summary of our identified risks and uncertainties are as follows:

- We may not be able to successfully execute our business plan;
- In our Heavy-Duty Motive market, we depend on a limited number of customers for a majority of our revenues and are subject to risks associated with early stage market activities related to fuel cell bus, truck, rail and marine applications;
- In our Heavy-Duty Motive market, we depend on Chinese customers for a significant portion of our revenues and we are subject to risks associated with economic conditions and government practices in China;
- In our Heavy-Duty Motive market, a significant amount of operations are conducted by joint ventures in China that we cannot operate solely for our benefit;
- In our Technology Solutions market, we depend on a limited number of customers for a majority of our revenues and are subject to risks related to the continued commitment of these customers to their fuel cell programs, including, in the case of one significant customer, to that customer's continued commitment to the commercialization of fuel cell passenger cars;
- In our Material Handling market, we depend on a single customer for the majority of our revenues and are subject to risks from that customer's internal stack development and commercialization plans;

- Emerging diseases, like COVID-19, may adversely affect our operations, our suppliers, our customers, or our joint ventures in China.
- We expect our cash reserves will be reduced due to future operating losses, working capital requirements, capital expenditures, capital contributions to our joint venture(s) in China and potential acquisitions and other investments by our business, and we cannot provide certainty as to how long our cash reserves will last or that we will be able to access additional capital when necessary;
- Potential fluctuations in our financial and business results make forecasting difficult and may restrict our access to funding for our commercialization plan;
- We are dependent upon Original Equipment Manufacturers and Systems Integrators to purchase certain of our products;
- Our technology and products may not meet the market requirements, including relating to performance, integration and / or cost;
- We may not be able to sell our products on a commercially viable basis on the timetable we anticipate, or at all;
- A mass market for our products may never develop or may take longer to develop than we anticipate;
- We are subject to risks inherent in international operations, including restrictions on the conversion of currencies and restrictions on repatriation of funds, including out of China;
- We have limited experience manufacturing fuel cell products on a commercial basis and our experience has been limited to relatively low production volumes;
- Warranty claims, product performance guarantees, or indemnification claims could negatively impact our gross margins and financial performance;
- We could be adversely affected by risks associated with acquisitions and investments;
- We depend on our intellectual property, and our failure to protect that intellectual property could adversely affect our expected future growth and success;
- We may experience cybersecurity threats to our information technology infrastructure and systems, and unauthorized attempts to gain access to our proprietary or confidential information, as may our customers, suppliers, subcontractors and joint venture partners;
- Global macro-economic conditions are beyond our control and may have an adverse impact on our business or on our key suppliers and / or customers;
- We currently face and will continue to face significant competition, and many current and future competitors may have significantly more resources;
- We could lose or fail to attract the personnel necessary to operate our business;
- Public Policy and regulatory changes could hurt the market for our products and services;
- We are dependent on third party suppliers for the supply of key materials and components for our products and services;
- Exchange rate fluctuations are beyond our control and may have a material adverse effect on our business, operating results, financial condition and profitability;
- Commodity price fluctuations are beyond our control and may have a material adverse

effect on our business, operating results, financial condition and profitability;

- We could be liable for environmental damages resulting from our research, development or manufacturing operations;
- If completed, potential merger and acquisition activity may fail to achieve the expected benefits of the transaction, including potential disruptions to operations, higher than anticipated costs and efforts to integrate, and loss of key personnel; and
- Our products use flammable fuels and some generate high voltages, which could subject our business to product safety, liability or other claims.

2. CORE BUSINESS AND STRATEGY

2.1 Core Business

At Ballard, our vision is to deliver fuel cell power for a sustainable planet. We are recognized as a world leader in proton exchange membrane ("PEM") fuel cell power system development and commercialization.

Our principal business is the design, development, manufacture, sale and service of PEM fuel cell products for a variety of applications, focusing on our power product markets of Heavy-Duty Motive (consisting of bus, truck, rail and marine applications), Portable Power / UAV, Material Handling and Backup Power, as well as the delivery of Technology Solutions, including engineering services, technology transfer, and the license and sale of our extensive intellectual property portfolio and fundamental knowledge for a variety of PEM fuel cell applications.

A fuel cell is an environmentally clean electrochemical device that combines hydrogen fuel with oxygen (from the air) to produce electricity. The hydrogen fuel can be obtained from natural gas, kerosene, methanol or other hydrocarbon fuels, or from water through electrolysis. Ballard's PEM fuel cell products typically feature high fuel efficiency, relatively low operating temperature, high durability, low noise and vibration, compact size, quick response to changes in electrical demand, and modular design. Embedded in each Ballard fuel cell product lies a stack of unit cells designed with our proprietary PEM fuel cell technology, which include membrane electrode assemblies, catalysts, plates, and other key components, and draw on intellectual property from our patent portfolio, together with our extensive experience and know-how, in key areas of PEM fuel cell stack design, operation, production processes and systems integration.

We are based in Canada, with head office, research, technology and product development, testing, manufacturing and service facilities in Burnaby, British Columbia. We also have a sales, assembly, service and research and development facility in Hobro, Denmark; a sales, assembly, research and development facility in Southborough, Massachusetts; and a sales, service, quality and supply chain office in Guangzhou, Guangdong Province, China.

We also have a non-controlling, 49% interest, in Weichai Ballard Hy-Energy Technologies Co., Ltd. ("Weichai Ballard JV"), located in Weifang, Shandong Province, China. Weichai Ballard JV will manufacture Ballard's next-generation LCS fuel cell stack and LCS-based power modules for bus, commercial truck and forklift applications with certain exclusive rights in China.

In addition, we have a non-controlling 10% interest in Guangdong Synergy Ballard Hydrogen Power Co., Ltd. ("Synergy Ballard JVCo"), located in Yunfu, Guangdong Province,

China. Synergy Ballard JVCo manufactures fuel cell stacks utilizing our FCvelocity®-9SSL fuel cell stack technology for use primarily in fuel cell engines assembled in China to provide propulsion power for zero-emission fuel cell electric buses and commercial vehicles with certain exclusive rights in China.

2.2 Strategic Imperatives

We strive to build value for our shareholders by developing, manufacturing, selling and servicing zero-emission, industry-leading PEM fuel cell technology products and services to meet the needs of our customers in select target markets.

We continue to execute on our e12345 strategy. **e12345** is shorthand for:

- Engaging the **e**-mobility ecosystem;
- Be number **1** in the world with best PEM fuel cell technology and products (best performance and value for our target markets);
- **2** growth platforms - Power Products and Technology Solutions;
- **3** key geographic markets - Europe, China, and California (key markets, with expectation to grow and opportunities in other markets as they become attractive, such as Japan, Korea, Australia, Canada);
- **4** parts of the value chain - MEAs & plates, stacks, modules/systems, service; and
- **5** key applications - bus, truck, rail, marine and passenger cars (secondary applications are material handling, stationary power and unmanned systems).

Our e12345 strategy supports commercialization, revenue and profitability, while also enabling future value based on longer-term market opportunities for our technology, products and intellectual property.

Our two-pronged approach is to build shareholder value through the sale and service of power products and the delivery of technology solutions. In power product sales, our focus is on meeting the power needs of our customers by delivering high value, high reliability, high quality and innovative PEM fuel cell products. Through technology solutions, our focus is on enabling our customers to solve their technical and business challenges and accelerate the adoption of fuel cell technology by delivering customized, high value, bundled technology solutions, including specialized engineering services, access to our intellectual property portfolio and know-how through licensing or sale, and by providing technology component supply.

Starting in 2015, we increased our efforts on growing our business in China. China represents a potentially unique opportunity for zero and low-emission motive solutions, given the convergence of macro trends that include:

- continued urbanization of China's population;
- continued infrastructure development and build-out of mass urban transportation;
- the large size of the Chinese vehicle market;
- rapid adoption of electric vehicles in China;
- serious air quality challenges in a number of Chinese cities;
- a Chinese government mandate to address climate change; and
- strong national and local government commitment supporting the adoption and commercialization of fuel cells in new-energy vehicle transportation applications.

As part of our strategy, we have been working to develop a local fuel cell supply chain and related ecosystem to address new-energy bus and commercial vehicle markets in China. We believe this strategy aligns with current and expected local content requirements for government subsidies supporting the adoption of fuel cell electric vehicles ("FCEVs"). Key elements of our strategy include adopting a business model in which we seek to mitigate market adoption risk and capital investment by engaging partnerships with local companies that are well positioned in their respective market.

We have established and are pursuing technology transfer and licensing opportunities with Chinese partners in order to localize the manufacture of Ballard-designed fuel cell modules and fuel cell stacks for heavy-duty motive applications in China, including bus, commercial vehicles, material handling and light-rail applications.

We also structure our business model in China to protect our core intellectual property. For example, we currently do not provide technology transfer and licensing relating to the manufacture of our proprietary membrane electrode assemblies ("MEAs"), a key high value technology component in our fuel cell stacks. We currently plan to continue to conduct research and development of MEAs and manufacture our MEAs in our head office facilities in Burnaby, Canada.

We continue to make significant investment in next generation products and technology, including MEAs, stacks, modules, and systems integration, as well as advanced manufacturing processes, technologies and equipment. We also continue to make significant investment in technology and product cost reduction and in production capacity expansion.

3. SELECT ANNUAL FINANCIAL INFORMATION AND 2020 BUSINESS OUTLOOK

3.1 Select Annual Financial Information

Results of Operations	**Year ended,**		
	2019	**2018**	**2017**
(Expressed in thousands of U.S. dollars, except per share amounts and gross margin %)			
Revenues	**$ 106,327**	**$ 96,586**	**$ 121,288**
Gross margin	**$ 22,595**	**$ 29,674**	**$ 41,600**
Gross margin %	**21%**	**31%**	**34%**
Total Operating Expenses	**$ 49,988**	**$ 50,472**	**$ 46,477**
Cash Operating Costs [1]	**$ 40,587**	**$ 42,982**	**$ 39,053**
Adjusted EBITDA [1]	**$ (28,182)**	**$ (13,465)**	**$ 3,324**
Net loss	**$ (39,050)**	**$ (27,322)**	**$ (8,048)**
Net loss per share	**$ (0.17)**	**$ (0.15)**	**$ (0.05)**
Adjusted Net Loss [1]	**$ (37,050)**	**$ (23,364)**	**$ (5,190)**
Adjusted Net Loss per share [1]	**$ (0.16)**	**$ (0.13)**	**$ (0.03)**
Financial Position (expressed in thousands of U.S. dollars)	**At December 31,**		
	2019	**2018**	**2017**
Total assets	**$ 340,319**	**$ 346,100**	**$ 177,657**
Cash, cash equivalents and short-term investments	**$ 147,792**	**$ 192,235**	**$ 60,255**

[1] Cash Operating Costs, Adjusted EBITDA, Adjusted Net Loss and Adjusted Net Loss per share are non-GAAP measures. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. See reconciliation to GAAP in the Supplemental Non-GAAP Measures section.

3.2 2019 Performance compared to 2019 Business Outlook

Given the early stage of hydrogen fuel cell market development and adoption and the uncertainty of timing in contract awards and program deliveries for 2019, we did not provide specific financial performance guidance for 2019, consistent with the Company's past approach. Our qualitative outlook expectations for 2019 are further detailed in the 2019 Outlook section of our 2018 year-end MD&A. Included in that outlook was that we expected total revenue in 2019 to be relatively flat compared to 2018 (revenue of $96.6 million), coincident with a strengthening of the prospects for long-term growth.

Actual revenues in 2019 of $106.3 million exceeded this revenue outlook by 10%, or $9.7 million, primarily as a result of higher than expected Heavy-Duty Motive revenues in the fourth quarter of 2019.

As expected, during 2019 we continued to focus on the execution of the collaboration agreement with Weichai Power Co. Ltd. ("Weichai"); make further penetration of the European and California markets in certain Heavy and Medium Duty Motive applications; and make additional investment in talent, technology, products and customer experience. In particular:

- In China, the proportion of total revenue generated in 2019 from the Heavy-Duty Motive market in China was slightly lower than in 2018. The collaboration agreement with Weichai that closed in the fourth quarter of 2018 represented a critical step in positioning the Company with strong players in China's Heavy-Duty Motive industry and in preparing for the effective delivery of zero-emission fuel cell solutions based on Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®LCS-based power modules. The collaboration with Weichai is expected to increase corporate revenue through the transfer of LCS technology and module designs and the sale of MEAs to Weichai Ballard JV in which Ballard has a 49% minority position.

  During 2019, we made total capital contributions to Weichai Ballard JV of approximately $21 million, including $14.5 million which was contributed in the first quarter of 2019 and $6.4 million contributed in the fourth quarter of 2019. We anticipate making additional contributions beyond 2019 in order to continue to fund our pro rata ownership share of Weichai Ballard JV's operations. In addition, we had expected to record equity investment losses in joint venture and associates of approximately ($12) million to ($15) million in 2019 primarily in connection with our investment in the operations of Weichai Ballard JV. Actual equity investment losses in 2019 of approximately ($11) million were better than expected due primarily to better than expected financial results of Synergy Ballard JVCo in the fourth quarter of 2019.

- In Europe, the proportion of total revenue generated from the European market increased slightly in 2019, relative to 2018, largely offsetting the proportionate decline in Heavy-Duty Motive revenue from China as we continued execution of the automotive program with AUDI AG ("Audi"), and delivered a number of modules to support fuel cell electric buses ("FCEBs") for deployment in Germany under the Joint Initiative for Hydrogen Vehicles across Europe ("JIVE") funding program.

- In North America, we saw increased market activity in California for FCEVs, which we believe will result in additional module purchase orders. In addition, we delivered a

higher volume of fuel cell stack sales in 2019 for Material Handling applications than in 2018. However, this increase in Material Handling revenues was more than offset by a significant decline in Portable Power / UAV revenues 2019, relative to 2018, as a result of the disposition of our Power Manager assets in October 2018.

- In Technology Solutions, revenue increased in 2019, as compared to 2018, supported primarily by ongoing work on the automotive program with Audi and the technology transfer program with Weichai Ballard JV. This increase in overall Technology Solutions revenue more than offset the overall decline in Heavy Duty Motive revenue.

3.3 2020 Business Outlook

We intend to maintain focus throughout 2020 on Heavy-Duty and Medium-Duty Motive applications in the bus, commercial truck, train and marine markets in order to increase adoption in our key markets of China, Europe and California. We continue to invest in next generation products and technology, including MEAs, stacks, modules, and systems integration, as well as advanced manufacturing processes, technologies and equipment. We also continue to invest in technology and product cost reduction and in production capacity expansion.

Our 2020 Business Outlook does not reflect any impact of the corona virus (COVID-19). It is currently too early to accurately project any impact, since the duration and scope of the outbreak is not yet known with any certainty. If the outbreak continues for an extended period of time, Ballard and Weichai Ballard JV may experience supply chain disruptions, a decline in sales activities, and reductions in operations and workforce.

Consistent with the Company's practice, and in view of the early stage of hydrogen fuel cell market development and adoption, we are not providing specific financial performance guidance for 2020. However, directionally we expect total revenue of approximately $130 million in fiscal 2020, compared to total revenue of $106.3 million in fiscal 2019, as commercial activities increase in our target geographic territories. This growth is expected to primarily result from commercial progress in the Heavy Duty Motive market, underpinned by increasing demand for FCEVs in China and Europe. Our 12-month Order Book of approximately $110 million at the end of 2019, together with a robust sales pipeline, establishes a strong foundation for projected growth in full year 2020 revenue.

In support of our 2020 Business Outlook:

- In China, we expect the Weichai Ballard JV facility to be commissioned and operating by mid-year 2020. We also expect delivery of MEAs to Weichai Ballard JV for the production of next-generation LCS fuel cell stacks and FCmove™ fuel cell modules. During 2020, we have a commitment to make capital contributions totaling approximately $20 million towards our pro rata ownership share of Weichai Ballard JV. This is in addition to $20.9 million contributed in 2019 and $14.6 million contributed in 2018, as part of our total capital contribution commitment of approximately $78 million. We also expect to report equity investment losses in joint venture and associates of approximately $10 million to $15 million in fiscal 2020 primarily in connection with the operations of Weichai Ballard JV.
- In Europe, we plan to continue to execute on our automotive program with Audi, and to

deliver a significant number of modules to support FCEBs in a number of countries. We also expect increased market activity for FCEBs which can be expected to result in additional module purchase orders.

- In North America, we expect continued market activity in California for FCEBs and fuel cell-powered trucks, which can be expected to result in additional module purchase orders. In addition, we expect a volume contraction of fuel cell stack sales for forklift applications.
- In Technology Solutions, revenue is expected to be relatively flat in 2020, compared to 2019, primarily reflecting ongoing work on our technology transfer programs with Audi and Weichai Ballard JV. In addition to the Audi and Weichai Ballard JV programs, Technology Solutions engineering services activity is expected with existing and new customers in a variety of markets.

We intend to establish an at-the-market equity program ("ATM Program") and to issue up to $75 million of common shares from treasury to the public from time to time at the Company's discretion, subject to favorable market conditions. The ATM Program will be conducted under our existing $150 million Base Shelf Prospectus and will be used to fund growth and strategic opportunities.

Our 2020 revenue outlook is supported by our 12-month Order Book of approximately $110 million which is derived from our Order Backlog of approximately $179 million as of December 31, 2019. Our Order Backlog represents the estimated aggregate value of orders at a given time for which customers have made contractual commitments and our 12-month Order Book represents the aggregate expected value of that portion of the Order Backlog that the Company expects to deliver in the subsequent 12-month period.

Our revenue outlook for 2020 is based on our internal forecast which reflects an assessment of overall business conditions and takes into account actual sales and financial results in the first two months of 2020; sales orders received for units and services expected to be delivered in the remainder of 2020; an estimate with respect to the generation of new sales and the timing of deliveries in each of our markets for the balance of 2020; and assumes an average U.S. dollar exchange rate in the mid $0.70's in relation to the Canadian dollar for 2020.

The primary risk factors to our business outlook expectations for 2020 are customer, production, or program delays or cancellations in delivering against existing power products and technology solutions orders and delays from forecast in terms of closing and delivering expected sales primarily in our Heavy-Duty Motive market including expected sales to Weichai Ballard JV and Synergy Ballard JVCo and the timing of sales of that inventory by those respective joint ventures to end-customers in China; adverse macro-economic conditions including trade, public health (including the impact of the corona virus (COVID-19)), and other geopolitical risks; changes in government subsidy and incentive programs; inadequate investment in hydrogen infrastructure and / or excessive hydrogen fuel costs, all of which could negatively impact our customers' access to capital and the success of their program plans which could adversely impact our business; disruptions in our Heavy-Duty market due to delays of supply of key materials and components from third party suppliers; disruptions in our Technology Solutions market as a result of our significant reliance on a limited number of customers including Audi and Weichai Ballard JV in this platform, which

are reliant on their internal commercialization plans and budget requirements; disruptions in our Technology Solutions market as a result of delays in achieving program milestones; disruptions in the Material Handling market as a result of our reliance on a single customer in this market and that customer's internal stack development and commercialization plans; and fluctuations in the Canadian dollar relative to the U.S. dollar, as a significant portion of our Technology Solutions revenues (including the technology development and engineering services agreement with Audi) are priced in Canadian dollars.

Our Order Backlog and our 12-month Order Book are currently comprised of a relatively limited number of contracts and a relatively limited number of customers. Given the relative immaturity of our industry and customer deployment programs, our Order Backlog and 12-month Order Book are potentially vulnerable to risk of cancellation, deferral or non-performance by our customers for a variety of reasons including: risks related to continued customer commitment to a fuel cell program; risks related to customer liquidity; credit risks; risks related to changes, reductions or eliminations in government policies, subsidies and incentives; risks related to slower market adoption; risks related to vehicle integration challenges; risks related to the development of effective hydrogen refueling infrastructure; risks related to the ability of our products to meet evolving market requirements; and supplier-related risks.

Furthermore, potential fluctuations in our financial results make financial forecasting difficult. In addition, due to the early stage of development of the market for hydrogen fuel cell products, it is difficult to accurately predict future revenues, cash flows or results of operations on a quarterly basis. The Company's revenues, cash flows and other operating results can vary significantly from quarter to quarter. As a result, quarter-to-quarter comparisons of revenues, cash flows and other operating results may not be meaningful; instead, we believe our operating performance should be assessed over a number of quarters and years. It is likely that in one or more future quarters, financial results will fall below the expectations of securities analysts and investors and the trading price of the Company's shares may be materially and adversely affected as a result.

4. RECENT DEVELOPMENTS (Including Contractual Updates)

4.1 Corporate

Ballard Included in S&P / TSX Composite

On September 13, 2019, the Company was included in the S&P/TSX Composite Index. Approximately 240 of the 1,500 companies listed on the TSX are included in the S&P/TSX Composite Index. Inclusion in the S&P/TSX Composite Index can be expected to positively impact index fund purchases of Ballard shares and may increase the Company's visibility and liquidity within the Canadian market.

Ballard's 3-Year Share Price Performance Positions the Company in TSX's Inaugural "TSX30"

On September 26, 2019, the Company was recognized by the Toronto Stock Exchange for its strong 3-year share price performance and named to the inaugural TSX30. The TSX30 program recognizes the top 30 performers on the Toronto Stock Exchange over the period July 2016 to June 2019, based on share price appreciation.

The TSX30 program considers all companies that have been listed on the Toronto Stock Exchange for at least 3-years, with a closing dividend-adjusted share price of at least

Canadian $0.50 and a market capitalization of at least Canadian $50 million as at June 30th, 2016. Of the 583 companies that met these criteria, the 30 companies with greatest share price appreciation over the period from July 1st, 2016 to June 30th, 2019 have been named to the inaugural TSX30 program.

Development of 8th Generation Zero-Emission Fuel Cell Module for Heavy-Duty Motive Market

On June 10, 2019, we unveiled our 8th generation high performance fuel cell module, the FCmove™-HD, at the UITP Global Public Transport Summit in Stockholm, Sweden. The FCmove™-HD fuel cell module is the first in a family of FCmove™ products expected to be introduced by Ballard and is specifically designed to meet the requirements of transit bus operators. Future FCmove™ products are expected to offer various power outputs to suit a broad range of commercial vehicles including trucks, coaches and trains.

Benefits of FCmove™-HD, compared to the prior generation heavy-duty fuel cell module, are expected to include lower lifecycle cost, improved reliability, simplified system integration, improved freeze start capability, and higher temperature operation. Ballard will continue to support the Company's existing customers that are using its prior generation FCveloCity® fuel cell modules.

Development of Next Generation Zero-Emission Fuel Cell Stack for Heavy-Duty Motive Applications

On September 18, 2018, we unveiled our next-generation high performance liquid-cooled fuel cell stack, the FCgen®-LCS ("LCS"), at the IAA Commercial Vehicles Trade Fair and Convention in Hannover, Germany. The FCgen®-LCS features important design and performance enhancements, while also offering a reduction in total-cost-of-ownership. This stack will be a core technology component of Ballard's FCmove™-HD power modules.

Benefits of the FCgen®-LCS, compared to the prior generation liquid-cooled fuel cell stack, are expected to include lower cost, improved durability, high power density, improved freeze start capability, higher tolerance to operating conditions, simplified systems integration, and improved sustainability. Ballard will continue to support the Company's existing customers where prior generation FCvelocity®-9SSL fuel cell stack technology is used.

4.2 China

Weichai Power Co., Ltd. and Weichai Ballard Hy-Energy Technologies Co., Ltd.

On November 13, 2018, we announced the closing of a strategic collaboration transaction with Weichai, initially disclosed on August 29, 2018. Ballard's strategic collaboration with Weichai includes the following key elements:

- *Equity Investment* – an equity investment in Ballard made by Weichai in the amount of $163.6 million, representing a 19.9% interest in the Company, through the subscription and purchase of 46.1 million shares from treasury at a price of $3.54, which reflected a 15% premium to the 30-day VWAP of $3.08 on August 29, 2018.

  In addition, Zhongshan Broad-Ocean Motor Co., Ltd. ("Broad-Ocean" – a current Ballard strategic investor and Chinese partner) – invested a further $20.2 million, through the

subscription and purchase of 5.7 million shares from treasury at the same price of $3.54 to maintain its 9.9% ownership position in Ballard.

As a result, the Weichai investment and the incremental Broad-Ocean equity investments in Ballard generated total gross proceeds of $183.8 million. The Weichai investment and the Broad-Ocean incremental investment are subject to 2-year "standstill" and resale restrictions (subject to customary exceptions). For so long as Weichai holds at least 15% of Ballard's outstanding shares, it will have the right to nominate two directors to Ballard's board of directors. On January 1, 2019, the Company appointed Mr. Jiang Kui (also known as Mr. Kevin Jiang) and Mr. Sun Shaojun (also known as Mr. Sherman Sun) to the Company's Board of Directors and expanded Ballard's Board of Directors from seven members to nine members.

Weichai has also agreed that, in the event of a third-party offer to buy Ballard, Weichai will have the right to make a superior proposal or otherwise must vote its shares in accordance with the Ballard board recommendation.

- *China Joint Venture and Technology Transfer Agreement* – Weichai and Ballard have established a joint venture company in Shandong Province to support China's Fuel Cell Electric Vehicle market, with Weichai holding a controlling ownership interest of 51% and Ballard holding a 49% ownership position. The joint venture, Weichai Ballard Hy-Energy Technologies Co., Ltd. ("Weichai Ballard JV") was established in the fourth quarter of 2018 with Weichai making an initial capital contribution in 2018 of RMB 102 million and Ballard making an initial capital contribution of $14.3 million (RMB 98 million equivalent). In the first and fourth quarters of 2019, Weichai made its planned second and third capital contributions totaling RMB 149.2 million and Ballard made its planned second and third capital contributions totaling $20.9 million (RMB 143.3 million equivalent). Weichai and Ballard will fund pro rata shares of the Weichai Ballard JV based on an agreed business plan. Weichai holds three of five Weichai Ballard JV board seats and Ballard holds two, with Ballard having certain shareholder protection provisions.

  The Weichai Ballard JV will manufacture Ballard's next-generation LCS fuel cell stack and LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China and will pay Ballard a total of $90 million under a program to develop and transfer technology to the Weichai Ballard JV in order to enable these manufacturing activities. Revenue earned from the $90 million Weichai Ballard JV technology transfer agreement ($5.6 million in the fourth quarter of 2019; $22.5 million in fiscal 2019; $1.2 million in the fourth quarter of 2018 and in fiscal 2018) is recorded as Technology Solutions revenues. During the fourth quarter of 2018, we received an initial 10% or $9.0 million prepayment from Weichai Ballard JV for this program with additional amounts paid to us as program milestones are successfully completed. We retain an exclusive right to the developed technologies outside China, subject to certain restrictions on sublicensing outside China. The Weichai Ballard JV will also purchase MEAs for LCS fuel cell stacks exclusively from Ballard under a long-term supply agreement.

- *Fuel Cell Sales* – Weichai has indicated that it intends to build and supply at least 2,000 fuel cell modules using Ballard technology by 2021 for commercial vehicles in China. Specific terms related to the source and scope of supply, product mix, pricing and timing

of shipments are subject to future agreement between the parties and the Weichai Ballard JV.

On May 1, 2019, we announced that we have reached agreement with Weichai Ballard JV for the supply of a mix of certain fuel cell products and components that will be used in the assembly of modules to power zero-emission FCEVs in China. The order has a total value of approximately $44 million to Ballard. Once assembled by Weichai Ballard JV, final modules will be sold to Weichai to support initial deployments against Weichai's commitment to supply a minimum of 2,000 fuel cell modules for commercial FCEVs in China. All products and components to be supplied by Ballard, as well as related applications engineering support, are planned for delivery through 2020, and will be based on Ballard's next-generation LCS stack technology. During the second quarter of 2019, we received initial prepayments of $7.5 million from Weichai Ballard JV for this order with additional amounts paid to us as product is delivered. Revenue earned from these agreements ($13.2 million in the fourth quarter of 2019; $14.7 million in fiscal 2019 and to date) is recorded as Heavy-Duty Motive revenues.

On December 16, 2019, we announced the receipt of an additional purchase order from Weichai Ballard JV for the delivery of MEAs valued at approximately $19 million, expected to be delivered in 2020 under a long-term MEA supply agreement. Revenue earned from this agreement (nil million in fiscal 2019) will be recorded as Heavy-Duty Motive revenues.

The Weichai Ballard JV production facility, located in Shandong Province, China, is expected to be commissioned and operational in the first half of 2020. Once operational, the Weichai Ballard JV production facility will begin the manufacture of next-generation LCS fuel cell stacks and LCS-based modules to power FCEVs for the China market. The Weichai Ballard JV is expected to have initial production capacity of 20,000 fuel cell stacks, or 10,000 modules, based on a two-shift operation.

Guangdong Synergy Ballard Hydrogen Power Co., Ltd.

During 2017, the FCvelocity®-9SSL fuel cell stack joint venture operation in the city of Yunfu in China's Guangdong Province commenced operations. Ballard has a non-controlling 10% interest in the joint venture, called Guangdong Synergy Ballard Hydrogen Power Co., Ltd. ("Synergy Ballard JVCo"), together with our partner Guangdong Nation Synergy Hydrogen Power Technology Co., Ltd. (a member of the "Synergy Group") who has a 90% interest. The fuel cell stacks manufactured by Synergy Ballard JVCo are expected to be used primarily in fuel cell engines assembled in China to provide propulsion power for zero-emission fuel cell electric buses and commercial vehicles in China. The Synergy Ballard JVCo operation is designed to achieve an annualized production capacity of approximately 20,000 fuel cell stacks.

The joint venture transaction and related sales agreements, which closed on October 25, 2016 (originally announced on July 18, 2016), contemplated Ballard's exclusive supply of MEAs for each fuel cell stack manufactured by Synergy Ballard JVCo, with minimum annual MEA volume commitments and a contemplated minimum sales value on a "take or pay" basis to Ballard of at least $150 million over the initial 5-year term from 2017 to 2021. However, as a result of various Chinese market circumstances, including fluctuating new energy vehicle subsidies, slower than anticipated build-out and operation of hydrogen refueling infrastructure and slower than anticipated market adoption, as well as a result of inventory build-up, liquidity and other challenges at Synergy Ballard JVCo, Synergy Ballard

JVCo did not meet its “take or pay” purchase commitments under the MEA supply agreement in the third and fourth quarters of 2018, nor did it make the contractual pre-payments required to enable any significant MEA shipments in the first quarter of 2019. As a result, during 2018 we removed all MEA supply agreement “take or pay” purchase commitments from our Order Backlog and 12-month Order Book. During the third quarter of 2019, we signed definitive agreements with Synergy Ballard JVCo amending the existing Stack Assembly License Agreement and MEA Long-Term Supply Agreement, which included a mutual release of the remaining purchase commitment under the above noted $150 million “take or pay” MEA purchase commitment. The definitive agreements, which were entered into effective July 19, 2019, did not impact any amount recorded in the June 30, 2019 and September 30, 2019 consolidated financial statements.

During the second quarter of 2019, we agreed to a new MEA equipment supply agreement with Synergy Ballard JVCo with a contemplated value of approximately $8 million to Ballard in 2019. Revenue earned from MEA and other supply agreements with Synergy Ballard JVCo ($6.5 million in the fourth quarter of 2019; $8.7 million in fiscal 2019; $0.8 million in the fourth quarter of 2018; $17.5 million in fiscal 2018; $14.9 million in fiscal 2017) is recorded as Heavy-Duty Motive revenues.

Synergy Ballard JVCo retains an exclusive right to manufacture and sell FCvelocity®-9SSL stacks in China until September 30, 2026. Exclusivity is subject to Synergy Ballard JVCo maintaining certain performance criteria, including compliance with: a code of ethics; Ballard’s quality policies and branding practices; payment terms; certain intellectual property covenants; achievement of certain minimum annual MEA volume commitments through 2026; and certain financing conditions.

Ballard has the exclusive right to purchase FCvelocity®-9SSL fuel cell stacks and sub-components from Synergy Ballard JVCo for sale outside China. Ballard contributed approximately $1.0 million for our 10% interest in Synergy Ballard JVCo in 2017, currently recognized at nil value. We have no obligation to provide future funding to Synergy Ballard JVCo.

Zhongshan Broad-Ocean Motor Co., Ltd.

As noted above, on November 13, 2018 Broad-Ocean invested a further $20.2 million, through the subscription and purchase of 5.7 million shares from treasury at the same price of $3.54 per share as paid by Weichai to maintain its 9.9% ownership position in Ballard. Broad-Ocean and Ballard have an Investor Rights Agreement under which Ballard granted Broad-Ocean certain anti-dilution rights to maintain its 9.9% ownership interest. Broad-Ocean has no special right to appoint nominees to Ballard's board of directors.

On April 6, 2017, we announced the closing of a transaction (the “Broad-Ocean Program”) previously announced on February 16, 2017, relating to technology transfer, licensing and supply arrangements with Broad-Ocean for the assembly and sale of FCveloCity® 30-kilowatt (kW) and 85kW fuel cell engines in China. Under the Broad-Ocean Program, Broad-Ocean can manufacture fuel cell modules in three strategic regions in China, including Shanghai. The Broad-Ocean Program and future amounts payable to Ballard are dependent on the attainment of certain commissioning milestones by Broad-Ocean. Each Ballard-designed fuel cell engine assembled by Broad-Ocean is required to utilize FCvelocity®-9SSL fuel cell stacks. Stack supply is expected to be provided by Synergy Ballard JVCo with

Ballard being the exclusive supplier of MEAs for stacks manufactured by Synergy Ballard JVCo.

On December 6, 2017, we announced that a subsidiary of Broad-Ocean called Shanghai Edrive Co. Ltd. ("Shanghai Edrive") had commissioned a fuel cell engine manufacturing facility located in the City of Shanghai, China, enabling Shanghai Edrive to assemble Ballard FCveloCity® 30-kilowatt (kW) fuel cell engines under the Broad-Ocean Program. Revenue earned from the Broad-Ocean Program (nil million in the fourth quarter and in fiscal 2019; $0.1 million in the fourth quarter of 2018; $3.5 million in fiscal 2018) is recorded as Technology Solutions revenues.

As a result of our introduction of our next-generation LCS fuel cell stack and LCS-based power modules into China with Weichai Ballard JV, we continue to engage with Broad-Ocean on how to proceed with the Broad-Ocean Program. However, at this time it is expected that Broad-Ocean will ultimately discontinue the Broad-Ocean Program.

4.3 Europe

AdKor GMBH and SFC ENERGY AG

On January 14, 2020, we announced the signing of Equipment Sales Agreements for the provision of an initial 500 FCgen®-1020ACS fuel cell stacks to adKor GmbH (“adKor”) and SFC Energy AG (“SFC Energy”), to be integrated into adKor’s Jupiter backup power systems for deployment at radio tower sites in Germany through the end of 2021. Contracts have been awarded to adKor for the supply of fuel cell backup power systems to support an initial tranche of 500 radio tower sites in Germany – with the potential for a total of up to 1,500 radio tower sites – and adKor has sub-contracted a portion of the work to SFC Energy. As a result, adKor and SFC Energy have signed development partnership and licensing agreements, will share production activities for the supply of Jupiter systems and are developing product line extensions. Revenue earned from these agreements will be recorded as Backup Power revenues.

HDF Energy

On December 10, 2019, we announced the signing of a Product Development Agreement with Hydrogene de France (“HDF Energy”), an Independent Power Producer dedicated to renewable power generation, for the development and integration of a multi-megawatt (MW) scale fuel cell system into HDF Energy’s Renewstable® power plant designed for stationary power applications. HDF Energy’s Renewstable® power plant is a multi-MW baseload system enabling large-scale storage of intermittent renewable wind or solar energy in the form of hydrogen – through the process of electrolysis – as well as electricity generation using that hydrogen feedstock together with a fuel cell system. In the initial HDF Energy project an installation is planned in French Guiana, an overseas region of France located off the northern Atlantic coast of South America, under the Centrale Electricité de l’Ouest Guyanais (“CEOG”) project.

Subject to certain conditions, the collaboration contemplates a future technology transfer of Ballard’s new MW-scale containerized PEM fuel cell system to HDF Energy with an exclusive royalty-bearing, non-transferable, multi-year global license for the manufacture and sale of MW-scale fuel cell systems for Renewstable® power plant systems. The collaboration also contemplates Ballard supplying LCS fuel cell stacks for these systems based on an exclusive

long-term supply agreement. HDF Energy is planning to establish a manufacturing facility in Bordeaux, France. The transaction is subject to completion of definitive agreements and is reliant in part on the CEOG project, which is subject to customary conditions for multi-year programs of this scope, including but not limited to permitting and regulatory approvals, financings and project execution activities.

Van Hool NV

On December 17, 2019, we announced that 8 ExquiCity tram-buses built by Van Hool NV ("Van Hool"), a bus OEM and Ballard partner headquartered in Belgium, and powered by 8 Ballard FCveloCity®-HD 100-kilowatt fuel cell modules have been inaugurated at a ceremony in Pau, France and are now in revenue service in Pau's Bus Rapid Transit System. Ballard initially announced a Letter of Intent in September, 2017 and shipped modules to Van Hool in 2018. These fuel cell-powered tram-buses were subsequently delivered to Pau in 2019 and are being operated by the SMTU-PPP (Syndicat Mixte de Transports urbains – Pau Portes des Pyrénées) and the STAP (Société de Transport de l'Agglomération Paloise). The clean energy hybrid tram-buses use fuel cells for primary power and lithium batteries for additional power when needed, with the only emission being water vapour. The tram-bus deployment in Pau is partially funded by Europe's FCH-JU program. GNVERT, a subsidiary of ENGIE, constructed and operates the hydrogen refueling station for the tram-buses.

On December 4, 2019, we announced the receipt of a purchase order from Van Hool for 20 FCveloCity®-HD 85-kilowatt (kW) fuel cell modules to power buses in Groningen, the Netherlands, under the JIVE2 funding program. Ballard plans to deliver the 20 FCveloCity®-HD 85kW modules in 2020. These are expected to power 20 Van Hool A330 model Fuel Cell Electric Buses (FCEBs) that are planned for deployment with Qbuzz, the transit agency for the city of Groningen, by the end of 2020. Europe's Joint Initiative For Hydrogen Vehicles Across Europe ("JIVE") funding programs are intended to pave the way to commercialization of fuel cell electric buses by coordinating procurement activities to unlock economies-of-scale and reduce costs as well as supporting new hydrogen refueling stations.

On May 1, 2018, we announced the receipt of a purchase order from Van Hool for 40 FCveloCity®-HD 85 kilowatt fuel cell modules to power buses under the JIVE funding programs. During 2018 and through 2019, Ballard completed its delivery requirements to Van Hool on this 40-module purchase order and a subsequent follow-on purchase order as Van Hool continues its delivery of buses to the Regionalverkehr Köln GmbH transit agency in Cologne, Germany and the WSW mobil GmbH transit agency in Wuppertal, Germany.

Revenue earned from all supply agreements with Van Hool ($0.7 million in the fourth quarter of 2019; $5.1 million in fiscal 2019; $2.3 million in the fourth quarter of 2018; $3.5 million in fiscal 2018) is recorded as Heavy-Duty Motive revenues.

BEHALA Berliner Hafen-und

On October 2, 2019, we announced receipt of a purchase order for 3 of our FCveloCity® 100 kilowatt (kW) fuel cell modules from Berlin-based BEHALA, a port and logistics specialist, to power the world's first zero-emission push boat. The boat, to be named Elektra, will be used primarily to transport goods between Berlin and Hamburg as well as on inner-city transport routes in Berlin.

Ballard plans to work with BEHALA and other consortium partners to assist in the design, construction and deployment of the Elektra, with construction of the almost 20 meter long

and 8.2 meter wide push boat scheduled to begin this month at the Hermann Barthel shipyard in Derben, Germany, and completion expected by end-2020. Propulsion power for the Elektra will be provided by the Ballard fuel cell modules along with modular batteries (2.507 kWh capacity). Ballard intends to ship 3 of its FCveloCity® 100kW fuel cell modules in 2020 and will also support integration, commissioning and testing during the demonstration phase of the project. While the Elektra is under construction, electricity and hydrogen infrastructure is planned to be installed in the vessel's inland waterways operating area. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

Provision of Fuel Cell Modules for Buses in Europe as a Member of New H2 Bus Consortium

On June 3, 2019, we announced that Ballard is a founding member of the new H2Bus Consortium, whose members are working together to deploy 1,000 zero-emission fuel cell electric buses ("FCEBs") and related infrastructure in European cities at commercially competitive rates. An initial 600 FCEBs are being supported by a €40 million grant from the EU's Connecting European Facilities (CEF) program, with buses expected to be deployed in certain European markets, including Denmark and the U.K. by 2023.

In addition to Ballard, initial H2Bus Consortium members included Everfuel, WrightBus, Hexagon Composites, Nel Hydrogen, and Ryse Hydrogen, all suppliers in the hydrogen fuel cell electric bus value chain. The H2Bus hydrogen fuel cell electric bus solution is expected to be the most cost effective true zero-emission option available, with a target single-decker bus price below €375,000, target hydrogen cost between €5 and €7 per kilogram and target bus service cost of €0.30 per kilometer.

WrightBus was expected to integrate Ballard's 8th-generation heavy duty power module, the FCmove™ (unveiled on June 8, 2019), into H2Bus Consortium buses. However, in September 2019 WrightBus entered into administration under U.K. insolvency laws.

Since then, Bamford Bus Company has announced that they have formally acquired certain assets of WrightBus as of October 22, 2019 and have recommenced operations with the intent to supply fuel cell buses to H2Bus and other projects. The H2Bus Consortium remains in discussion with Bamford Bus related to fulfilling the commitments of the H2 Bus Consortium.

WrightBus

As noted above, WrightBus entered administration in September 2019 under U.K. insolvency laws due to an inability to pay its debts. As a result, we (i) recognized a net ($1.5) million impairment loss on trade receivables in the third quarter of 2019 for amounts owed to us for product shipments no longer expected to be collected; and (ii) removed ($1.8) million from our 12-month Order Book and our Order Backlog as of September 30, 2019 for product orders received but no longer expected to be delivered.

Revenue earned from agreements with WrightBus prior to their entering administration (nil million in the fourth quarter of 2019; $1.7 million in fiscal 2019; $0.6 million in fiscal 2018) is recorded as Heavy-Duty Motive revenues.

Solaris Bus & Coach S.A.

On July 29, 2019, we announced a purchase order from Solaris Bus & Coach S.A.

("Solaris"), a leading European bus and trolleybus manufacturer and Ballard partner headquartered in Bolechowo, Poland, for 12 FCmove™-HD fuel cell modules to power 12 buses to be deployed with SASA Bolzano, the public transport operator in Bolzano, Italy under the JIVE funding program. The 12 FCmove™-HD modules are expected to ship in 2020 and the buses are expected to be deployed with SAS Bolzano by 2021. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

Establishment of Fuel Cell Center of Excellence in Europe for Marine Market Applications

On April 4, 2019, we announced that our subsidiary, Ballard Power Systems Europe A/S, is establishing a Marine Center of Excellence ("Marine CoE") dedicated to fuel cell marine applications at the Company's engineering, manufacturing and service facility in Hobro, Denmark. The Marine CoE will design and manufacture heavy duty fuel cell modules to address zero-emission powertrain requirements for the marine industry.

A new motive fuel cell system manufacturing hall was constructed at the Hobro location in 2019 with annual production capacity of more than 15 megawatts (MW) of fuel cell modules. Fuel cell module development work at the Marine CoE will be based on Ballard's new FCgen®-LCS fuel cell stack and our new FCmove™-HD fuel cell module, and will be designed to meet European marine certification requirements.

Norled A/S

On April 9, 2019, we announced that our subsidiary, Ballard Power Systems Europe A/S, has signed an Equipment Supply Agreement (ESA) with Norled A/S, one of Norway's largest ferry and express boat operators, to provide two of the Company's next-generation 200 kilowatt (kW) modules that will be used to power a hybrid ferry planned to begin operating in 2021. The Ballard modules will be designed and manufactured at the Company's new Marine CoE at its facility in Hobro, Denmark. The Norled vessel – which has carrying capacity for up to 299 passengers and 80 cars – is expected to be the first liquid hydrogen fuel cell-powered ferry in commercial operation globally. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

ABB Marine & Ports

On May 22, 2019, we announced a collaboration with ABB and other consortium partners in the Flagships project to develop and launch a zero-emission river push boat, planned for deployment in France in 2021 to push river barges. Ballard is planning to deliver two of its next-generation 200-kilowatt fuel cell modules in 2020, which will provide propulsion power for the vessel. The river push boat will be owned and operated by Sogestran Group subsidiary Compagnie Fluviale de Transport (CFT) on the Rhône river in France, with the objective of demonstrating that fuel cell-powered propulsion offers a cost-effective and practical zero-emission solution for owners and builders of mid-sized vessels carrying more than 100 passengers or the equivalent freight volumes inland or coastally.

Eniig and Fibia A/S

On February 5, 2019, we announced that our subsidiary, Ballard Power Systems Europe A/S, has signed Framework Agreements for the provision of FCgen®-H2PM direct hydrogen backup power systems with Eniig and Fibia A/S, operators of fiber optic broadband networks

in Denmark. Revenue earned from these agreements is recorded as Backup Power revenues.

Audi AG

On June 11, 2018, we announced the signing of a 3.5 year extension to our technology solutions contract with AUDI AG ("Audi"), part of the Volkswagen Group, extending the program to August 2022. The aggregate value of the contract extension is expected to be Canadian $80 to $130 million (approximately $62 to $100 million), subject to certain rights by Audi to reduce the program scope and value. The program, through a series of technical milestone awards, will support Audi through its small series production launch and encompasses automotive fuel cell stack development as well as system design support activities. Ballard is focused on the design and manufacture of world-leading, next-generation fuel cell stacks for use in Audi's demonstration car program. Ballard engineers are leading critical areas of fuel cell product design – including the MEA, plate and stack components – along with certain testing and integration work.

Ballard signed an initial 4 year contract with Volkswagen AG in March 2013, followed by a 2 year extension in February 2015. Audi assumed leadership of the program in 2016. Revenue earned from this and other agreements with Audi ($9.2 million in the fourth quarter of 2019; $26.7 million in fiscal 2019; $8.8 million in the fourth quarter of 2018; $26.6 million in fiscal 2018) is recorded as Technology Solutions revenues.

Siemens AG

On November 14, 2017, we announced the signing of a multi-year Development Agreement with Siemens AG ("Siemens") for the development of a zero-emission fuel cell engine to power Siemens' Mireo light rail train. The Development Agreement has a contemplated value of approximately $9.0 million to Ballard over 3 years. Under the terms of the Development Agreement, Ballard will develop a 200 kilowatt fuel cell engine for integration into Siemens' new Mireo train platform. Initial deployments of the fuel cell-powered Mireo train are planned for 2021. Revenue earned from this agreement ($0.7 million in the fourth quarter of 2019; $3.2 million in fiscal 2019; $0.2 million in the fourth quarter of 2018; $1.8 million in fiscal 2018) is recorded as Technology Solutions revenue.

4.4 North America

Divestiture of Power Manager assets

On October 5, 2018, we closed a transaction to divest certain assets of the Company's subsidiary, Ballard Unmanned Systems Inc. (formerly named Protonex Technology Corporation) ("Ballard Unmanned Systems") related to the Power Manager business to Revision Military Ltd. ("Revision"). At closing, Ballard received initial consideration of approximately $4.1 million, paid in $2.0 million cash and a $2.1 million note receivable payable in 2019 (collected in full in September 2019), and may receive up to a further $11.25 million, based on achievement of specific sales objectives during a 12-month earn-out period. Ballard has retained certain Ballard Unmanned Systems assets related to fuel cell propulsion systems for unmanned vehicles, under the Ballard brand. We decided to divest the Power Manager assets as they were considered to be no longer aligned with Ballard's strategic fuel cell focus, while retaining Ballard Unmanned Systems assets related

to the unmanned systems market.

During the fourth quarter of 2018, we recorded a loss on sale of assets of ($4.0) million on the divestiture of the Power Manager assets after estimating the amount of variable consideration included in the transaction price that is constrained to be $2.0 million, as opposed to the above noted maximum possible earn-out amount of $11.25 million. During the first quarter of 2019, we recorded an additional loss on sale of assets of ($2.0) million after adjusting the estimated amount of variable consideration from $2.0 million to nil. During October 2019, the estimated amount of variable consideration was confirmed as nil as Revision failed to meet the minimum specific sales objectives in the 12-month earn-out period to trigger any additional proceeds payable to us.

4.5 Other

Anglo American

On October 29, 2019, we announced receipt of a purchase order for the sale of nine FCveloCity®-HD 100 kilowatt (kW) fuel cell modules to Anglo American, the world's largest platinum group metals mining company and a strategic investor in Ballard. Eight of the FCveloCity®-HD modules are expected to power a retrofitted Ultra heavy-duty mining truck in a demonstration project during 2020 at one of Anglo American's mining operations in South Africa with the ninth module maintained as a spare. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

Nisshinbo Holdings

On February 21, 2018, we announced the receipt of a follow-on purchase order from Nisshinbo Holdings ("Nisshinbo") to progress a Technology Solutions program to the next stage that was initially announced on September 17, 2017. On September 17, 2017, we received a purchase order from Nisshinbo to engage in a multi-year Technology Solutions program to assess the potential development of fuel cell stacks using a Non Precious Metal Catalyst ("NPMC") for use in commercial material handling applications. With successful completion of this initial assessment, this next stage will focus on certain performance and power density enhancements to support development of low cost NPMC-based fuel cell stacks again for material handling applications. Revenue earned from this order and other related agreements with Nisshinbo ($0.4 million in the fourth quarter of 2019; $1.1 million in fiscal 2019; $0.4 million in the fourth quarter of 2018; $1.3 million in fiscal 2018), is recorded as Technology Solutions revenues.

Nisshinbo has been a strategic supplier of compression molded bipolar flow field carbon plates to Ballard for over 20 years. In November 2015, Nisshinbo also became a strategic equity investor in Ballard.

Other

On February 14, 2018, we announced that the signing of a Technology Solutions program with an unnamed strategic customer to develop a next generation air-cooled fuel cell stack. The multi-year program has an initial value to Ballard of approximately $4.2 million. A key objective of the Technology Solutions program is to design and validate an ultra-high durability, high performance air-cooled fuel cell stack for uses in a number of target market applications, including certain material handling applications, with a target operating lifetime

of 20,000 hours. A key market opportunity will be the integration of the next generation stacks into fuel cell systems for class 3 lift trucks, such as pallet jacks, deployed in high throughput distribution centers and warehouse operations. Other potential applications include systems for stationary continuous and backup power. Revenue earned from this agreement ($0.2 million in the fourth quarter of 2019; $1.5 million in fiscal 2019; $0.9 million in the fourth quarter of 2018; $1.9 million in fiscal 2018) is recorded as Technology Solutions revenues.

5. RESULTS OF OPERATIONS

5.1 Operating Segments

We report our results in the single operating segment of Fuel Cell Products and Services. Our Fuel Cell Products and Services segment consists of the sale and service of PEM fuel cell products for our power product markets of Heavy-Duty Motive (consisting of bus, truck, rail and marine applications), Portable Power / UAV, Material Handling and Backup Power, as well as the delivery of Technology Solutions, including engineering services, technology transfer and the license and sale of our extensive intellectual property portfolio and fundamental knowledge for a variety of fuel cell applications.

As a result of the sale of our Power Manager assets in the fourth quarter of 2018, we renamed the former Portable Power market as the Portable Power / UAV market. As the sale of the Power Manager assets is not presented as a discontinued operation, the Portable Power / UAV market includes revenues associated with our power manager business prior to its sale in October 2018, and product and service revenues generated from the retained Ballard Unmanned Systems assets related primarily to fuel cell propulsion systems for unmanned systems.

5.2 Summary of Key Financial Metrics – Three Months Ended December 31, 2019

Revenue and gross margin

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
Fuel Cell Products and Services	**2019**	2018	$ Change	% Change
Heavy-Duty Motive	**$ 21,392**	$ 10,629	$ 10,763	101%
Portable Power / UAV	**126**	371	(245)	(66%)
Material Handling	**1,932**	3,202	(1,270)	(40%)
Backup Power	**2,005**	1,366	639	47%
Technology Solutions	**16,428**	12,909	3,519	27%
Revenues	**41,883**	28,477	13,406	47%
Cost of goods sold	**33,235**	21,285	11,950	56%
Gross Margin	**$ 8,648**	$ 7,192	$ 1,456	20%
Gross Margin %	**21%**	25%	n/a	(4 pts)

Fuel Cell Products and Services Revenues of $41.9 million for the fourth quarter of 2019 increased 47%, or $13.4 million, compared to the fourth quarter of 2018. The 47% increase was driven by significantly higher Heavy-Duty Motive revenues as more moderate increases in Technology Solutions and Backup Power revenues were partially offset by declines in Material Handling and Portable Power / UAV revenues.

Heavy-Duty Motive revenues of $21.4 million increased $10.8 million, or 101%, due

primarily to higher shipments of a variety of fuel cell products to customers in China. Heavy-Duty Motive revenues on a quarter to quarter basis are also impacted by product mix due to varying customer requirements and various fuel cell products, including numerous power configurations required by our customers (and the resulting impact on selling price) of our fuel cell modules, fuel cell stacks, MEAs, and related component and parts kits. Heavy-Duty Motive revenues of $21.4 million in the fourth quarter of 2019 include $13.2 million to Weichai Ballard JV for the supply of a mix of certain fuel cell products and components that will be used in the assembly of modules to power zero-emission FCEVs in China; $6.5 million to Synergy Ballard JVCo for shipments of MEAs for use in their manufacture and assembly of FCveloCity® fuel cell stacks in China; $0.7 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their bus program; and $1.0 million for a variety of fuel cell products to a variety of customers around the world. Heavy-Duty Motive revenues of $10.6 million in the fourth quarter of 2018 include $0.8 million to Synergy Ballard JVCo for shipments of MEAs; $2.8 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; $3.5 million to New Flyer and $2.3 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs; and $1.2 million for a variety of fuel cell products to a variety of customers around the world.

Technology Solutions revenues of $16.4 million increased by $3.5 million, or 27%, due primarily to amounts earned on the Weichai Ballard JV technology transfer program as Audi program revenues were relatively flat period to period. Revenues of $16.4 million in the fourth quarter of 2019 were from a variety of customer programs including revenue from the Audi program of $9.2 million; the Weichai Ballard JV technology transfer program of $5.6 million; the Siemens development program of $0.7 million; the Nisshinbo program of $0.4 million; the program with the unnamed strategic customer of $0.2 million; and $0.3 million from a variety of other customer programs. Revenue in the fourth quarter of 2018 of $12.9 million were also from a variety of customer programs including revenue from the Audi program of $8.8 million; the Weichai Ballard JV technology transfer program of $1.2 million; the Siemens development program of $0.2 million; the Nisshinbo program of $0.4 million; the program with the unnamed strategic customer of $0.9 million; the Broad-Ocean technology transfer program of $0.1 million; and $1.3 million from a variety of other customer programs. Audi program revenues were nominally impacted in the fourth quarter of 2019, as compared to the fourth quarter of 2018, as a result of nominally higher Canadian dollar, relative to the U.S. dollar, as the Audi Agreement is priced in Canadian dollars. The underlying costs to satisfy the Audi Agreement are primarily denominated in Canadian dollars.

Material Handling revenues of $1.9 million decreased ($1.3) million, or (40%), primarily as a result of lower shipments to Plug Power.

Backup Power revenues of $2.0 million increased $0.6 million, or 47%, due primarily to an increase in hydrogen-based backup power product and service revenues in Europe as a result of higher shipments of FCgen®-H2PM direct hydrogen backup power systems to Eniig and Fibia A/S, operators of fiber optic broadband networks in Denmark.

Portable Power / UAV revenues of $0.1 million decreased ($0.2) million, or (66%), primarily as a result of lower UAV service revenues.

Fuel Cell Products and Services gross margins were $8.6 million, or 21% of revenues, for the fourth quarter of 2019, compared to $7.2 million, or 25% of revenues, for the fourth quarter of 2018. The increase in gross margin of $1.5 million, or 20%, was driven primarily by the 47% increase in total revenues, partially offset by a shift to lower overall margin product and service revenue mix resulting in a (4) percentage point decrease in gross margin as a percent of revenues.

Gross margin in the fourth quarter of 2019 was also negatively impacted as a result of net inventory adjustments of ($1.6) million related primarily to excess and impaired inventory; and was positively impacted by net warranty adjustments of $1.0 million related primarily to contractual expirations and reduced service costs. Gross margin in the fourth quarter of 2018 was negatively impacted as a result of net inventory adjustments of ($0.7) million related primarily to excess and impaired inventory.

Cash Operating Costs

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Research and Product Development (cash operating cost)	**$ 7,699**	$ 5,718	$ 1,981	35%
General and Administrative (cash operating cost)	**3,400**	3,514	(114)	(3%)
Sales and Marketing (cash operating cost)	**2,457**	1,965	492	25%
Cash Operating Costs	**$ 13,556**	$ 11,197	$ 2,359	21%

Cash Operating Costs and its components of Research and Product Development (cash operating cost), General and Administrative (cash operating cost), and Sales and Marketing (cash operating cost) are non-GAAP measures. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. See the reconciliation of Cash Operating Costs to GAAP in the Supplemental Non-GAAP Measures and Reconciliations section and the reconciliation of Research and Product Development (cash operating cost), General and Administrative (cash operating cost), and Sales and Marketing (cash operating cost) to GAAP in the Operating Expense section. Cash Operating Costs adjusts operating expenses for stock-based compensation expense, depreciation and amortization, impairment losses on trade receivables, restructuring charges, the impact of unrealized gains or losses on foreign exchange contracts, acquisition costs and financing charges.

Cash Operating Costs (see Supplemental Non-GAAP Measures and Reconciliations) for the fourth quarter of 2019 were $13.6 million, an increase of $2.4 million, or 21%, compared to the fourth quarter of 2018. The $2.4 million, or 21%, increase was driven by higher research and product development cash operating costs of $2.0 million and by higher sales and marketing cash operating costs of $0.5 million, partially offset by decreases in general and administrative cash operating costs of ($0.1) million. The $2.4 million, or 21% increase in cash operating costs in the fourth quarter of 2019 was driven primarily by higher program development and engineering expenses in Denmark by Ballard Power Systems Europe A/S related primarily to Marine market applications, by increased expenditure on research and technology development activities in Canada related to the ongoing improvement of all of our fuel cell products and by higher sales and marketing labour and business development expenses related to the 47% increase in quarterly revenues.

Adjusted EBITDA

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Adjusted EBITDA	$ **(7,432)**	$ (5,194)	$ (2,238)	(43%)

EBITDA and Adjusted EBITDA are non-GAAP measures. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. See reconciliation of Adjusted EBITDA to GAAP in the Supplemental Non-GAAP Measures and Reconciliations section. Adjusted EBITDA adjusts EBITDA for stock-based compensation expense, transactional gains and losses, asset impairment charges, unrealized gains or losses on foreign exchange contracts, finance and other income, and acquisition costs.

Adjusted EBITDA (see Supplemental Non-GAAP Measures and Reconciliations) for the fourth

quarter of 2019 was ($7.4) million, compared to ($5.2) million for the fourth quarter of 2018. The ($2.2) million increase in Adjusted EBITDA loss was driven primarily by higher equity in loss of investment in joint venture and associates of ($1.8) million primarily attributed to the ongoing establishment of operations of Weichai Ballard JV, which commenced startup late in the fourth quarter of 2018. In addition, Adjusted EBITDA in the fourth quarter of 2019 was negatively impacted by the increase in Cash Operating Costs of ($2.4) million. These negative impacts were partially offset by the increase in gross margin of $1.5 million as a result of the 47% increase in total revenues partially offset by the impact of the (4) point reduction in gross margin as a percent of revenues.

Net loss

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Net loss	$ **(10,273)**	$ (11,475)	$ 1,202	10%

Net loss for the fourth quarter of 2019 was ($10.3) million, or ($0.04) per share, compared to a net loss of ($11.5) million, or ($0.06) per share, in the fourth quarter of 2018. The $1.2 million decrease in net loss in the fourth quarter of 2019 was driven primarily by a decrease in loss on sale of assets of $4.0 million, and by higher finance and other income of $0.6 million primarily as a result of lower foreign exchange losses. These loss improvements in the fourth quarter of 2019 were partially offset by the increase in Adjusted EBITDA loss of ($2.2) million including higher equity in loss of investment in joint venture and associates of ($1.9) million, and by an increase in finance expense of ($0.2) million and an increase in depreciation and amortization expense of ($1.1) million primarily as a result of the adoption of *IFRS 16 Leases* on January 1, 2019.

As noted above, net loss in the fourth quarter of 2018 was negatively impacted by a loss on sale of assets of ($4.0) million related to an initial impairment charge arising from the divestiture of our Power Manager assets. Excluding the impact primarily of transactional gains and losses, Adjusted Net Loss (see Supplemental Non-GAAP Measures and Reconciliations) in the fourth quarter 2019 was ($10.3) million, or ($0.04) per share, compared to ($7.5) million, or ($0.04) per share, for the fourth quarter of 2018.

Cash provided by (used in) operating activities

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Cash provided by (used in) operating activities	**$ 4,108**	$ 188	$ 3,920	2081%

Cash provided by operating activities in the fourth quarter of 2019 was $4.1 million, consisting of net working capital inflows of $8.0 million, partially offset by cash operating losses of ($3.9) million. Cash provided by operating activities in the fourth quarter of 2018 was $0.2 million, consisting of net working capital inflows of $4.6 million, partially offset by cash operating losses of ($4.4) million. The $3.9 million increase in cash provided by operating activities in the fourth quarter of 2019, as compared to the fourth quarter of 2018, was driven by primarily by the relative decrease in working capital requirements of $3.4 million, combined with the relative improvement in cash operating losses of $0.5 million.

The relative $0.5 million decrease in cash operating losses in the fourth quarter of 2019 was negatively impacted by the increase in Adjusted EBITDA loss of ($2.2) million. However, this net (loss) increase in the fourth quarter of 2019 was offset by the impact of several items included in Adjusted EBITDA loss but excluded from cash operating losses (or vice-versa) including: higher equity investment losses in joint venture and associates of $1.9 million, higher impairment losses on trade receivables of $0.2 million, higher finance and other income of $0.6 million due primarily to lower foreign exchange losses, and lower income tax expense of $0.1 million related to withholding taxes on certain commercial contracts primarily in China.

The total change in working capital of $8.0 million in the fourth quarter of 2019 was driven primarily by lower inventory of $5.9 million as we delivered expected Heavy-Duty Motive shipments to customers in the fourth quarter of 2019, and by higher accounts payable and accrued liabilities of $7.4 million primarily as a result of the timing of supplier payments and annual compensation awards. These fourth quarter of 2019 inflows were partially offset by higher accounts and contract receivables of ($4.0) million primarily as a result of the timing of revenue recognition and the related customer collections, and by lower deferred revenue of ($3.3) million as we fulfilled contract deliverables on certain Heavy-Duty Motive and Technology Solutions contracts for which we received pre-payments in an earlier period.

This compares to a total change in working capital of $4.6 million in the fourth quarter of 2018 which was driven by higher deferred revenue of $8.5 million due primarily to a $9.0 million program prepayment received from Weichai Ballard JV, by lower inventory of $3.7 million as we delivered expected Heavy-Duty Motive shipments to customers in the fourth quarter of 2018, and by higher accrued warranty obligations of $1.6 million primarily on increased Heavy-Duty Motive product shipments. These fourth quarter 2018 inflows were partially offset by higher accounts receivable of ($9.8) million primarily as a result of the timing of revenues and the related customer collections.

5.3 Summary of Key Financial Metrics – Year Ended December 31, 2019

Revenue and gross margin

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
Fuel Cell Products and Services	**2019**	2018	$ Change	% Change
Heavy-Duty Motive	**$ 35,363**	$ 39,464	$ (4,101)	(10%)
Portable Power / UAV	**604**	7,109	(6,505)	(92%)
Material Handling	**10,758**	8,010	2,748	34%
Backup Power	**2,982**	2,426	556	23%
Technology Solutions	**56,620**	39,577	17,043	43%
Revenues	**106,327**	96,586	9,741	10%
Cost of goods sold	**83,732**	66,912	16,820	25%
Gross Margin	**$ 22,595**	$ 29,674	$ (7,079)	(24%)
Gross Margin %	**21%**	31%	n/a	(10 pts)

Fuel Cell Products and Services Revenues of $106.3 million for 2019 increased 10%, or $9.7 million, compared to 2018. The 10% increase was driven by higher Technology Solutions, Material Handling and Backup Power revenues which more than offset declines in Portable Power / UAV and Heavy-Duty Motive revenues.

Technology Solutions revenues of $56.6 million increased by $17.0 million, or 43%, due primarily to amounts earned on the Weichai Ballard JV technology transfer program as Audi program revenues were relatively flat period to period. Revenue of $56.6 million in 2019 were from a variety of customer programs including revenue from the Audi program of $26.7 million; the Weichai Ballard JV technology transfer program of $22.5 million; the Siemens development program of $3.2 million; the Nisshinbo program of $1.1 million; the program with the unnamed strategic customer of $1.5 million; and $1.6 million from a variety of other customer programs. Revenue in 2018 of $39.6 million were also from a variety of customer programs including revenue from the Audi program of $26.6 million; the Weichai Ballard JV technology transfer program of $1.2 million; the Siemens development program of $1.8 million; the Nisshinbo program of $1.3 million; the program with the unnamed strategic customer of $1.9 million; the Broad-Ocean technology transfer program of $3.5 million; and $3.3 million from a variety of other customer programs. Audi program revenues were also negatively impacted by approximately ($0.5) million in 2019, as compared to 2018, as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, as the Audi Agreement is priced in Canadian dollars. The underlying costs to satisfy the Audi Agreement are primarily denominated in Canadian dollars.

Heavy-Duty Motive revenues of $35.4 million decreased ($4.1) million, or (10%), due primarily to lower MEA shipments to Synergy Ballard JVCo of ($8.8) million, partially offset by increased shipments of a variety of fuel cell products primarily to other customers in China and Europe. Heavy-Duty Motive revenues on a quarter to quarter basis are also impacted by product mix due to varying customer requirements and various fuel cell products, including numerous power configurations required by our customers (and the resulting impact on selling price) of our fuel cell modules, fuel cell stacks, MEAs, and related component and parts kits. Heavy-Duty Motive revenues of $35.4 million in 2019 include $14.7 million to Weichai Ballard JV for the supply of a mix of certain fuel cell products and components that will be used in the assembly of modules to power zero-emission FCEVs in China; $8.7 million to Synergy Ballard JVCo for shipments of MEAs for use in their manufacture and assembly of FCveloCity® fuel cell stacks in China; $5.1 million to Van Hool and $1.7 million to WrightBus for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs; and $5.2 million for a variety of fuel cell products to a variety of customers around the world. Heavy-Duty Motive revenues of $39.5 million in 2018 include $17.5 million to Synergy Ballard JVCo for shipments of MEAs; $6.9 million to New Flyer and $3.5 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs; $2.3 million for shipments of FCveloCity®-HD7 200-kilowatt fuel cell modules to CRRC Sifang for their tram project; $5.9 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; and $3.4 million for a variety of fuel cell products to a variety of customers around the world.

Material Handling revenues of $10.8 million increased $2.7 million, or 34%, primarily as a result of higher shipments to Plug Power.

Backup Power revenues of $3.0 million increased $0.6 million, or 23%, due primarily to an increase in hydrogen-based backup power product and service revenues in Europe as a result of higher shipments of FCgen®-H2PM direct hydrogen backup power systems to Eniig and Fibia A/S, operators of fiber optic broadband networks in Denmark.

Portable Power / UAV revenues of $0.6 million decreased ($6.5) million, or (92%), as a result of lower revenues generated by Ballard Unmanned Systems primarily as a result of the disposition of our Power Manager assets in October 2018.

Fuel Cell Products and Services gross margins were $22.6 million, or 21% of revenues, for 2019, compared to $29.7 million, or 31% of revenues, for 2018. The decline in gross margin of ($7.1) million, or (24%), was driven primarily by a shift to lower overall margin product and service revenue mix resulting in a (10) percentage point decrease in gross margin as a percent of revenues, which more than offset the positive impact of the 10% increase in total revenues.

Gross margin in 2019 was also negatively impacted by significantly lower shipments of MEAs to Synergy Ballard JVCo, by significantly lower revenues generated by Ballard Unmanned Systems as a result of the disposition of our Power Manager assets in the fourth quarter of 2018, and by increased costs in the year on milestone attainment on certain technology solutions contracts. Gross margin in 2018 also benefited from an increase in higher margin Heavy-Duty Motive revenues, and by improved manufacturing overhead and related cost absorption as a result of improved scale and efficiency.

Gross margin in 2019 was also negatively impacted by net inventory adjustments of ($2.4) million related primarily to excess and impaired inventory; and positively impacted by net warranty adjustments of $1.0 million related primarily to contractual expirations and lower expected service costs. Gross margin in 2018 was negatively impacted by net inventory adjustments of ($1.0) million related primarily to excess and impaired inventory; and negatively impacted by net warranty adjustments of ($0.9) million related primarily to higher expected Heavy-Duty Motive service costs.

Cash Operating Costs

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Research and Product Development (cash operating cost)	**$ 21,936**	$ 23,755	$ (1,819)	(8%)
General and Administrative (cash operating cost)	**11,408**	11,705	(297)	(3%)
Sales and Marketing (cash operating cost)	**7,243**	7,522	(279)	(4%)
Cash Operating Costs	**$ 40,587**	$ 42,982	$ (2,395)	(6%)

Cash Operating Costs and its components of Research and Product Development (cash operating cost), General and Administrative (cash operating cost), and Sales and Marketing (cash operating cost) are non-GAAP measures. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. See the reconciliation of Cash Operating Costs to GAAP in the Supplemental Non-GAAP Measures and Reconciliations section and the reconciliation of Research and Product Development (cash operating cost), General and Administrative (cash operating cost), and Sales and Marketing (cash operating cost) to GAAP in the Operating Expense section. Cash Operating Costs adjusts operating expenses for stock-based compensation expense, depreciation and amortization, impairment losses on trade receivables, restructuring charges, the impact of unrealized gains or losses on foreign exchange contracts, acquisition costs and financing charges.

Cash Operating Costs (see Supplemental Non-GAAP Measures and Reconciliations) for 2019 were $40.6 million, a decrease of ($2.4) million, or (6%), compared to 2018. The ($2.4) million, or (6%), decrease was driven by lower research and product development cash operating costs of ($1.8) million, combined with decreases in general and administrative cash operating costs of ($0.3) million and decreases in sales and marketing cash operating costs of ($0.3) million. The ($2.4) million, or (6%) decrease in cash operating costs in 2019 was driven primarily by lower expenses in Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel in October 2018,

combined with lower labour costs in Canada as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These cost reductions were partially offset by higher program development and engineering expenses in Denmark by Ballard Power Systems Europe A/S related primarily to Marine market applications.

Although we have also increased our gross investment and expenditure on research and product development activities in Canada related to the ongoing improvement of all of our fuel cell products and the design and development of our next generation fuel cell products, including our new 8th generation high performance fuel cell module, the FCmove™-HD, and our new high performance liquid-cooled fuel cell stack, the FCgen®-LCS, this higher investment has been primarily offset by increased allocation of the gross research and product development expense to cost of goods sold as a result of increased work performed on revenue producing Technology Solutions projects.

Adjusted EBITDA

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Adjusted EBITDA	$ **(28,182)**	$ (13,465)	$ (14,717)	(109%)

EBITDA and Adjusted EBITDA are non-GAAP measures. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. See reconciliation of Adjusted EBITDA to GAAP in the Supplemental Non-GAAP Measures and Reconciliations section. Adjusted EBITDA adjusts EBITDA for stock-based compensation expense, transactional gains and losses, asset impairment charges, unrealized gains or losses on foreign exchange contracts, finance and other income, and acquisition costs.

Adjusted EBITDA (see Supplemental Non-GAAP Measures and Reconciliations) for 2019 was ($28.2) million, compared to ($13.5) million for 2018. The ($14.7) million increase in Adjusted EBITDA loss was driven primarily by higher equity in loss of investment in joint venture and associates of ($9.9) million primarily attributed to the ongoing establishment of operations of Weichai Ballard JV. In addition, Adjusted EBITDA in 2019 was negatively impacted by the ($7.1) million decrease in gross margin as a result of the impact of the (10) point reduction in gross margin as a percent of revenues which more than offset the benefit of the 10% increase in overall revenues, and by an increase in other operating expenses of ($1.3) million primarily as a result of impairment losses on trade receivables for amounts owed to us for product shipments to WrightBus. These negative impacts were partially offset by the decrease in Cash Operating Costs of $2.4 million.

In addition and as noted above, operating costs in 2019 were impacted by the positive impact of a weaker Canadian dollar, relative to the U.S. dollar, as compared to 2018. As a significant amount of our net operating costs (primarily labour) are denominated in Canadian dollars, gross margin, operating expenses and Adjusted EBITDA are impacted by changes in the Canadian dollar relative to the U.S. dollar. As the Canadian dollar relative to the U.S. dollar was approximately (2%), or (3) basis points, lower in 2019 as compared to 2018, positive foreign exchange impacts on our Canadian operating cost base and Adjusted EBITDA were approximately $1.8 million. A $0.01 decrease in the Canadian dollar, relative to the U.S. dollar, positively impacts annual Adjusted EBITDA by approximately $0.6 million.

Net loss

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Net loss	$ **(39,050)**	$ (27,323)	$ (11,727)	(43%)

Net loss for 2019 was ($39.1) million, or ($0.17) per share, compared to a net loss of ($27.3) million, or ($0.15) per share, in 2018. The ($11.7) million increase in net loss in 2019 was driven primarily by the increase in Adjusted EBITDA loss of ($14.7) million including higher equity in loss of investment in joint venture and associates of ($9.9) million, and by an increase in finance expense of ($0.9) million and an increase in depreciation and amortization expense of ($2.5) million primarily as a result of the adoption of *IFRS 16 Leases* on January 1, 2019. These loss increases in 2019 were partially offset by higher finance and other income of $3.3 million primarily as a result of higher interest income earned on our cash balances, and by a decline in loss on sale of assets of $2.1 million.

As noted above, net loss in 2019 was negatively impacted by a loss on sale of assets of ($2.0) million related to an additional impairment charge arising from the divestiture of our Power Manager assets to Revision in October 2017. Net loss in 2018 was negatively impacted by an initial loss on sale of assets of ($4.0) million related to the divestiture of our Power Manager assets. Excluding the impact primarily of transactional gains and losses, Adjusted Net Loss (see Supplemental Non-GAAP Measures and Reconciliations) in 2019 was ($37.1) million, or ($0.16) per share, compared to ($23.4) million, or ($0.13) per share, for 2018.

Cash provided by (used in) operating activities

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Cash provided by (used in) operating activities	**$ (14,230)**	$ (31,688)	$ 17,458	55%

Cash used in operating activities in 2019 was ($14.2) million, consisting of cash operating losses of ($14.1) million and net working capital outflows of ($0.1) million. Cash used in operating activities in 2018 was ($31.7) million, consisting of cash operating losses of ($14.4) million combined with net working capital outflows of ($17.3) million. The $17.5 million decline in cash used in operating activities in 2019, as compared to 2018, was driven by relative decline in working capital requirements of $17.2 million, combined with the relative decrease in cash operating losses of $0.3 million.

The relative $0.3 million decrease in cash operating losses in 2019 was negatively impacted by the increase in Adjusted EBITDA loss of ($14.7) million. However, this net (loss) increase in 2019 was offset by the impact of several items included in Adjusted EBITDA loss but excluded from cash operating losses (and vice-versa) including: higher equity investment losses in joint venture and associates of $9.9 million, higher impairment losses on trade receivables of $1.7 million, higher finance and other income of $3.3 million due primarily to higher investment income, and lower income tax expense of $0.4 million related to withholding taxes on certain commercial contracts primarily in China.

The total change in working capital of ($0.1) million in 2019 was driven by higher accounts and contract receivables of ($14.5) million primarily as a result of the timing of revenue recognition and the related customer collections, by higher inventory of ($0.8) million primarily to support expected Heavy-Duty Motive shipments in the first quarter of 2020, and by higher prepaid expenses of ($0.8) million as we made supplier payment deposits primarily on certain inventory purchases. These 2019 outflows were partially offset by

higher deferred revenue of $3.5 million as we collected net pre-payments on certain Heavy-Duty Motive and Technology Solutions contracts in advance of work performed, by higher accounts payable and accrued liabilities of $11.1 million primarily as a result of the timing of supplier payments and annual compensation awards, and by higher accrued warranty obligations of $1.4 million primarily on Heavy-Duty Motive product shipments.

This compares to a total change in working capital of ($17.3) million in 2018 which was driven by higher inventory of ($12.9) million primarily to support expected Heavy-Duty Motive shipments in 2019 and which were negatively impacted by higher MEA inventory as a result of minimal shipments to Synergy Ballard JVCo in the third and fourth quarters of 2018 as a result of them not making required prepayments under the MEA supply agreement, by higher accounts receivable of ($11.7) million primarily as a result of the timing of revenues and the related customer collections, and by lower accounts payable and accrued liabilities of ($5.6) million as a result of the timing of supplier payments and annual compensation awards. These 2018 outflows were partially offset by higher deferred revenue of $8.6 million due primarily to a $9.0 million program prepayment received from Weichai Ballard JV, and by higher accrued warranty obligations of $3.9 million primarily on Heavy-Duty Motive product shipments.

5.4 Operating Expenses and Other Items – Three Months and Year ended December 31, 2019

Research and product development expenses

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
Research and product development	**2019**	2018	$ Change	% Change
Research and product development expense	**$ 9,374**	$ 6,423	$ 2,951	46%
Less: Depreciation and amortization expense	**$ (1,278)**	$ (490)	$ (788)	(161%)
Less: Stock-based compensation expense	**$ (397)**	$ (215)	$ (182)	(85%)
Research and Product Development (cash operating cost)	**$ 7,699**	$ 5,718	$ 1,981	35%

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
Research and product development	**2019**	2018	$ Change	% Change
Research and product development expense	**$ 26,928**	$ 27,039	$ (111)	-%
Less: Depreciation and amortization expense	**$ (3,542)**	$ (2,158)	$ (1,384)	(64%)
Less: Stock-based compensation expense	**$ (1,450)**	$ (1,126)	$ (324)	(29%)
Research and Product Development (cash operating cost)	**$ 21,936**	$ 23,755	$ (1,819)	(8%)

Research and Product Development (cash operating cost) is a non-GAAP measure. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. Research and Product Development (cash operating cost) adjusts Research and product development expense for depreciation and amortization expense and stock-based compensation expense. See the reconciliation of the adjustments to Research and product development expense in the table above.

Research and product development expenses for the three months ended December 31, 2019 were $9.4 million, an increase of $3.0 million, or 46%, compared to the corresponding period of 2018. Excluding depreciation and amortization expense of ($1.3) million and ($0.5) million, respectively, in each of the periods, and excluding stock-based compensation expense of ($0.4) million and ($0.2) million, respectively, in each of the periods, research and product development cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $7.7 million in the fourth quarter of 2019, an increase of $2.0 million, or 35%, compared to the fourth quarter of 2018.

The $2.0 million, or 35%, increase in research and development cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in the fourth quarter of 2019, as compared to the fourth quarter of 2018, was driven primarily by higher program development and engineering expenses in Denmark by Ballard Power Systems Europe A/S related primarily to Marine market applications, combined with increased expenditure on research and technology development activities in Canada related to the ongoing improvement of all of our fuel cell products and new technology and product development.

Research and product development expenses for the year ended December 31, 2019 were $26.9 million, a decrease of ($0.1) million compared to the corresponding period of 2018. Excluding depreciation and amortization expense of ($3.5) million and ($2.2) million, respectively, in each of the periods, and excluding stock-based compensation expense of ($1.5) million and ($1.1) million, respectively, in each of the periods, research and product development cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $21.9 million in 2019, a decrease of ($1.8) million, or (8%), compared to 2018.

The ($1.8) million, or (8%), decline in research and development cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in 2019, as compared 2018, were driven primarily by lower program development and engineering expenses in Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel in October 2018, combined with lower labour costs in Canada as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These cost reductions were partially offset by higher program development and engineering expenses in Denmark by Ballard Power Systems Europe A/S related primarily to Marine market applications.

Although we have also increased our gross investment and expenditure on research and product development activities in Canada related to the ongoing improvement of all of our fuel cell products and the design and development of our next generation fuel cell products, including our new 8th generation high performance fuel cell module, the FCmove™-HD, and our new high performance liquid-cooled fuel cell stack, the FCgen®-LCS, this higher investment has been primarily offset by increased allocation of the gross research and product development expense to cost of goods sold as a result of increased work performed on revenue producing Technology Solutions projects. Labour and material costs incurred on revenue producing engineering services contracts are reallocated from gross research and product development expenses to cost of goods sold.

Government funding recoveries were also higher in 2019, as compared to 2018, and are attributable primarily to government funding recoveries earned in Denmark by Ballard Power Systems Europe A/S for work performed a variety of European programs. Government funding recoveries are reflected as a cost offset against gross research and product development expenses.

Depreciation and amortization expense included in research and product development expense for the three months and year ended December 31, 2019 was $1.3 million and $3.5 million, respectively, compared to $0.5 million and $2.2 million, respectively, for the corresponding periods of 2018. Depreciation and amortization expense relates primarily to amortization expense on our intangible assets and depreciation expense on our research

and product development facilities and equipment. Depreciation and amortization expense has increased in 2019 primarily as a result of increased investment in testing, lab and quality inspection equipment including the acquisition of certain strategic assets of AFCC in July 2018.

Stock-based compensation expense included in research and product development expense for the three months and year ended December 31, 2019 was $0.4 million and $1.5 million, compared to $0.2 million and $1.1 million, respectively, for the corresponding periods of 2018.

General and administrative expenses

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
General and administrative	**2019**	2018	$ Change	% Change
General and administrative expense	**$ 3,892**	$ 4,479	$ (587)	(13%)
Less: Depreciation and amortization expense	**$ (284)**	$ (302)	$ 18	6%
Less: Stock-based compensation expense	**$ (442)**	$ (213)	$ (229)	(107%)
Add: Impact of unrealized gains (losses) on foreign exchange contracts	**$ 234**	$ (450)	$ 684	152%
General and Administrative (cash operating cost)	**$ 3,400**	$ 3,514	$ (114)	(3%)

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
General and administrative	**2019**	2018	$ Change	% Change
General and administrative expense	**$ 13,212**	$ 14,760	$ (1,548)	(10%)
Less: Depreciation and amortization expense	**$ (1,137)**	$ (1,254)	$ 117	9%
Less: Stock-based compensation expense	**$ (1,472)**	$ (1,231)	$ (241)	(20%)
Add: Impact of unrealized gains (losses) on foreign exchange contracts	**$ 805**	$ (570)	$ 1,375	241%
General and Administrative (cash operating cost)	**$ 11,408**	$ 11,705	$ (297)	(3%)

General and Administrative (cash operating cost) is a non-GAAP measure. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. General and Administrative (cash operating cost) adjusts General and administrative expense for depreciation and amortization expense, stock-based compensation expense and the impact of unrealized gains or losses on foreign exchange contracts. See the reconciliation of the adjustments to General and administrative expense in the table above.

General and administrative expenses for the three months ended December 31, 2019 were $3.9 million, a decrease of ($0.6) million, or (13%), compared to the corresponding period of 2018. Excluding depreciation and amortization expense of ($0.3) million in each of the periods, excluding stock-based compensation expense of ($0.4) million and ($0.2) million, respectively, in each of the periods, and excluding the impact of unrealized gains (losses) on foreign exchange contracts of $0.2 and ($0.5) million, respectively, in each of the periods, general and administrative cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $3.4 million in the fourth quarter of 2019, a decrease of ($0.1) million, or (3%), compared to the fourth quarter of 2018.

The ($0.1) million, or (3%), decline in general and administrative cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in the fourth quarter of 2019, as compared to the fourth quarter of 2018, were driven primarily by lower realized losses on

our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs.

General and administrative expenses for the year ended December 31, 2019 were $13.2 million, a decrease of ($1.5) million, or (10%), compared to the corresponding period of 2018. Excluding depreciation and amortization expense of ($1.1) million and ($1.3) million, respectively, in each of the periods, excluding stock-based compensation expense of ($1.5) million and ($1.2) million, respectively, in each of the periods, and excluding the impact of unrealized gains (losses) on foreign exchange contracts of $0.8 and ($0.6) million, respectively, in each of the periods, general and administrative cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $11.4 million in 2019, a decrease of ($0.3) million, or (3%), compared to 2018.

The respective ($0.3) million, or (3%), decline in general and administrative cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in 2019, as compared to 2018, were driven primarily by lower general and administrative expenses in Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel in October 2018, and by lower labour costs in Canada as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These cost reductions in 2019 were partially offset by increased contract administration costs in Denmark by Ballard Power Systems Europe A/S.

Depreciation and amortization expense included in general and administrative expense for the *three months and year ended December 31, 2019* was $0.3 million and $1.1 million, respectively, compared to $0.3 million and $1.3 million, respectively, for the corresponding periods of 2018. Depreciation and amortization expense relates primarily to our office and information technology intangible assets including our recent investment in a new ERP system.

Stock-based compensation expense included in general and administrative expense for the three months and year ended December 31, 2019 was $0.4 million and $1.5 million, respectively, compared to $0.2 million and $1.2 million, respectively, for the corresponding periods of 2018.

The impact of unrealized gains (losses) on foreign exchange contracts included in general and administrative expense for the three months and year ended December 31, 2019 was $0.2 million and $0.8 million, respectively, compared to ($0.5) million and ($0.6) million, respectively, for the corresponding periods of 2018. We use forward foreign exchange contracts to manage our exposure to currency rate fluctuations. We record these contracts at their fair value as of the balance sheet date as either assets or liabilities with any changes in fair value in the period recorded in profit or loss (general and administrative expense) as these contracts are not designated or qualified under hedge accounting criteria. At December 31, 2019, we had outstanding foreign exchange currency contracts to purchase a total of Canadian $16.8 million at an average rate of 1.3232 Canadian per U.S. dollar, resulting in an unrealized gain of Canadian $0.3 million at December 31, 2019. This compares to outstanding foreign exchange currency contracts to purchase a total of Canadian $17.4 million at December 31, 2018, resulting in an unrealized loss of Canadian ($0.8) million at December 31, 2018.

Sales and marketing expenses

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
Sales and marketing	**2019**	2018	$ Change	% Change
Sales and marketing expense	**$ 2,637**	$ 2,033	$ 604	30%
Less: Depreciation and amortization expense	**$ (8)**	$ -	$ (8)	(100%)
Less: Stock-based compensation expense	**$ (172)**	$ (68)	$ (104)	(153%)
Sales and Marketing (cash operating cost)	**$ 2,457**	$ 1,965	$ 492	25%

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
Sales and marketing	**2019**	2018	$ Change	% Change
Sales and marketing expense	**$ 7,915**	$ 8,068	$ (153)	(2%)
Less: Depreciation and amortization expense	**$ (33)**	$ -	$ (33)	(100%)
Less: Stock-based compensation expense	**$ (639)**	$ (546)	$ (93)	(17%)
Sales and Marketing (cash operating cost)	**$ 7,243**	$ 7,522	$ (279)	(4%)

Sales and Marketing (cash operating cost) is a non-GAAP measure. We use certain Non-GAAP measures to assist in assessing our financial performance. Non-GAAP measures do not have any standardized meaning prescribed by GAAP and are therefore unlikely to be comparable to similar measures presented by other companies. Sales and Marketing (cash operating cost) adjusts Sales and marketing expense for depreciation and amortization expense and stock-based compensation expense. See the reconciliation of the adjustments to Sales and marketing expense in the table above.

Sales and marketing expenses for the three months ended December 31, 2019 were $2.6 million, an increase of $0.6 million, or 30%, compared to the corresponding period of 2018. Excluding stock-based compensation expense of ($0.2) million and ($0.1) million, respectively, in each of the periods, sales and marketing cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $2.5 million in the fourth quarter of 2019, an increase of $0.5 million, or 25%, compared to the fourth quarter of 2018.

The $0.5 million, or 25%, increase in sales and marketing cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in the fourth quarter of 2019, as compared to the fourth quarter of 2018, was driven primarily by higher sales and marketing labour and business development expenses related to the 47% increase in quarterly revenues.

Sales and marketing expenses for the year ended December 31, 2019 were $7.9 million, a decrease of ($0.2) million, or (2%), compared to the corresponding period of 2018. Excluding stock-based compensation expense of ($0.6) million and ($0.5) million, respectively, in each of the periods, sales and marketing cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $7.2 million in 2019, a decrease of ($0.3) million, or (4%), compared to 2018.

The ($0.3) million, or (4%), decline in sales and marketing cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in 2019, as compared to 2018, were driven primarily by lower sales and marketing expenses in Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel in October 2018, combined with lower labour costs in Canada as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These declines were partially offset by higher sales and marketing labour and business development expenses related to the 10% increase in annual revenues.

Stock-based compensation expense included in sales and marketing expense for the three months and year ended December 31, 2019 was $0.2 million and $0.6 million, respectively, relatively consistent with the corresponding periods of 2018.

Other expense for the three months and year ended December 31, 2019 was $0.2 million and $1.9 million, respectively, compared to $0.5 million and $0.6 million, respectively, for the corresponding periods of 2018. The following table provides a breakdown of other expense for the reported periods:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Impairment loss (recovery) on trade receivables	**$ 251**	$ 68	$ 183	269%
Restructuring expense (recovery)	**(3)**	438	(441)	(101%)
Acquisition charges	**-**	-	-	-
Other expenses (recovery)	**$ 248**	$ 506	$ (258)	(51%)

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Impairment loss (recovery) on trade receivables	**$ 1,787**	$ 98	$ 1,689	1,723%
Restructuring expense	**146**	507	(361)	(71%)
Acquisition charges	**-**	-	-	-
Other expenses (recovery)	**$ 1,933**	$ 605	$ 1,328	220%

Net impairment loss (recovery) on trade receivables for the three months and year ended December 31, 2019 was $0.3 million and $1.8 million, respectively, and primarily represents amounts owed to us totaling $1.5 million for product shipments sold to WrightBus that are no longer expected to be collected. During September 2019 WrightBus entered administration under U.K. insolvency laws due to an inability to pay its debts. In the event that we are able to recover on an impaired trade receivable through legal or other means, the recovered amount is recognized in the period of recovery as a reversal of the impairment loss.

Restructuring expenses of $0.5 million for the year ended December 31, 2018 relate primarily to a change in operations leadership combined with severance obligations paid to departed employees at Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel.

Finance income (loss) and other for the three months and year ended December 31, 2019 was $0.6 million and $2.9 million, respectively, compared to nil million and ($0.4) million, respectively, for the corresponding periods of 2018. The following tables provide a breakdown of finance and other income (loss) for the reported periods:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Employee future benefit plan expense	**$ (40)**	$ (58)	$ 18	31%
Pension administration expense	**(107)**	(104)	(3)	(3%)
Investment and other income (loss)	**598**	617	(19)	(3%)
Foreign exchange gain (loss)	**124**	(469)	593	126%
Finance income (loss) and other	**$ 575**	$ (14)	$ 589	4,207%

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
	2019	2018	$ Change	% Change
Employee future benefit plan expense	**$ (208)**	$ (226)	$ 18	8%
Pension administration expense	**(120)**	(117)	(3)	(3%)
Investment and other income (loss)	**3,599**	972	2,627	270%
Foreign exchange gain (loss)	**(420)**	(1,078)	658	61%
Finance income (loss) and other	**$ 2,851**	$ (449)	$ 3,300	735%

Employee future benefit plan expense for the years ended December 31, 2019 and 2018 were ($0.2) million in each of the periods and primarily represent the excess of expected interest cost on plan obligations in excess of the expected return on plan assets related to a curtailed defined benefit pension plan for certain former United States employees. Pension administration expense for the years ended December 31, 2019 and 2018 were ($0.1) million in each of the periods and represent administrative costs incurred in managing the plan.

Investment and other income for the three months and year ended December 31, 2019 were $0.6 million and $3.6 million, respectively, compared to $0.6 million and $1.0 million, respectively, for the corresponding periods of 2018. Amounts were earned primarily on our cash and cash equivalents and have increased relatively proportionately with the increase in our overall cash balances.

Foreign exchange gains (losses) for the three months and year ended December 31, 2019 were $0.1 million and ($0.4) million, respectively, compared to ($0.5) million and ($1.1) million, respectively, for the corresponding periods of 2018. Foreign exchange gains and losses are attributable primarily to the effect of the changes in the value of the Canadian dollar, relative to the U.S. dollar, on our Canadian dollar-denominated net monetary position. Foreign exchange gains and losses impacted by the conversion of Ballard Power Systems Europe A/S' assets and liabilities from the Danish Kroner to the U.S. dollar at exchange rates in effect at each reporting date are recorded in other comprehensive income (loss).

Finance expense for the three months and year ended December 31, 2019 was ($0.4) million and ($1.4) million, respectively, compared to ($0.1) million and ($0.5) million, respectively, for the corresponding periods of 2018. As a result of the adoption of *IFRS 16 Leases* on January 1, 2019, Finance expense for 2019 represents the interest expense incurred on all of our right-of-use assets with a lease term of greater than 12-months, including our head office building, manufacturing facility, and related storage facilities in Burnaby, British Columbia, as well as similar right-of-use assets in all of our

subsidiaries. Finance expense for 2018 was limited primarily to the lease expense on our head office building in Burnaby, British Columbia.

IFRS 16 Leases replaces *IAS 17 Leases* introduces a single lessee accounting model and requires a lessee to recognize assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value. A lessee is required to recognize a right-of-use asset representing its right to use the underlying asset and a lease liability representing its obligation to make lease payments. The most significant effect of the new standard is the lessee's recognition of the initial present value of unavoidable future lease payments as right-of-use lease assets and lease liabilities on the statement of financial position, including those for most leases that would currently be accounted for as operating leases.

Equity in income (loss) of investment in joint venture and associates for the three months and year ended December 31, 2019 was ($3.0) million and ($11.1) million, respectively, compared to ($1.1) million and ($1.2) million, respectively, in the corresponding periods of 2018. Equity in loss of investment in joint venture and associates relates to the pickup of 49% of the net income (loss) of Weichai Ballard JV as a result of our 49% ownership position, and 10% of the net income (loss) of Synergy Ballard JVCo as a result of our 10% ownership position. Both of these investments in China are accounted for using the equity method of accounting. The significant increase in the loss of investment in joint venture and associates in 2019 is due primarily to the increase in net loss in Weichai Ballard JV as they expense as incurred the ongoing $90 million technology transfer agreement with Ballard as research and product development expense as they commence the establishment of operations. Weichai Ballard JV will manufacture Ballard's next-generation LCS fuel cell stack and LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China.

Loss on sale of assets for the year ended December 31, 2019 were ($2.0) million, compared to ($4.0) million for the corresponding period of 2018. During the three months ended December 31, 2018, we recorded a loss on sale of assets of ($4.0) million on the divestiture of our Power Manager assets after estimating the amount of variable consideration included in the transaction price that is constrained to be $2.0 million, as opposed to the maximum possible earn-out amount of $11.25 million. During the three months ended March 31, 2019, we recorded an additional loss on sale of assets of ($2.0) million after adjusting the estimated amount of variable consideration from $2.0 million to nil. During October 2019, the estimated amount of variable consideration was confirmed as nil as Revision failed to meet the minimum specific sales objectives in the 12-month earn-out period to trigger any additional proceeds payable to us.

Income tax expense for the year ended December 31, 2019 was ($0.1) million, compared to ($0.4) million for the corresponding period of 2018. Income tax expense relates primarily to withholding taxes in China deducted from proceeds earned on certain Chinese commercial contracts.

5.4 Summary of Quarterly Results

The following table provides summary financial data for our last eight quarters:

(Expressed in thousands of U.S. dollars, except per share amounts and weighted average shares outstanding which are expressed in thousands)	Quarter ended,			
	Dec 31, 2019	Sep 30, 2019	Jun 30, 2019	Mar 31, 2019
Revenues	$ 41,883	$ 24,785	$ 23,651	$ 16,008
Net loss	$ (10,273)	$ (9,782)	$ (6,971)	$ (12,024)
Net loss per share attributable to Ballard, basic and diluted	$ (0.04)	$ (0.04)	$ (0.03)	$ (0.05)
Weighted average common shares outstanding	233,969	232,810	232,469	232,012
	Dec 31, 2018	Sep 30, 2018	Jun 30, 2018	Mar 31, 2018
Revenues	$ 28,477	$ 21,574	$ 26,445	$ 20,090
Net loss	$ (11,475)	$ (6,024)	$ (4,323)	$ (5,500)
Net loss per share attributable to Ballard, basic and diluted	$ (0.06)	$ (0.03)	$ (0.02)	$ (0.03)
Weighted average common shares outstanding	207,047	179,153	178,727	178,186

Summary of Quarterly Results: There were no significant seasonal variations in our quarterly results. Variations in our net loss for the above periods were affected primarily by the following factors:

- **Revenues**: Variations in fuel cell product and service revenues reflect the demand and timing of our customers' fuel cell vehicle, bus and fuel cell product deployments as well as the demand and timing of their engineering services projects. Variations in fuel cell product and service revenues also reflect the timing of work performed and the achievements of milestones under long-term fixed price contracts.
- **Operating expenditures**: Operating expenses were negatively impacted in the third quarter of 2019 by net impairment losses on trade receivables of ($1.5) million for amounts owed to us for product shipments sold to WrightBus that are no longer expected to be collected. Operating expenses were negatively impacted in the fourth quarter of 2018 by restructuring expenses of ($0.4) million related to a change in operations leadership combined with severance obligations paid to departed employees at Ballard Unmanned Systems as a result of the disposition of the Power Manager assets and associated personnel. Operating expenses also include the impact of changes in the value of the Canadian dollar, versus the U.S. dollar, on our Canadian dollar denominated expenditures.
- **Net loss:** Net loss for the first quarter of 2019 and the fourth quarter of 2018 was negatively impacted by a loss on sale of assets of ($2.0) million and ($4.0) million, respectively, as a result of the divestiture of our Power Manager assets to Revision on October 5, 2018. Net loss for the four quarters of 2019 was negatively impacted by equity in loss of investment in joint venture and associates as a result of the commencement of operations of Weichai Ballard JV

6. CASH FLOWS, LIQUIDITY AND CAPITAL RESOURCES

6.1 Summary of Cash Flows

Cash and cash equivalents were $147.8 million at December 31, 2019, compared to $192.2 million at December 31, 2018. The ($44.4) million decrease in cash and cash equivalents in 2019 was driven by net losses (excluding non-cash items) of ($14.1) million, net working capital outflows of ($0.1) million, equity investments in Weichai Ballard JV of ($20.9) million, purchases of property, plant and equipment of ($13.9) million, and by finance lease repayments of ($2.1) million. These 2019 outflows were partially offset by net proceeds received from share purchase option exercises of $4.6 million, and by final net proceeds received of $2.1 million on the repayment of the promissory note from Revision owing as a result of the divestiture of our Power Manager assets on October 5, 2018.

6.2 Cash Provided by (Used by) Operating Activities

For the three months ended December 31, 2019, cash provided by operating activities was $4.1 million, consisting of net working capital inflows of $8.0 million, partially offset by cash operating losses of ($3.9) million. For the three months ended December 31, 2018, cash provided by operating activities was $0.2 million, consisting of net working capital inflows of $4.6 million, partially offset by cash operating losses of ($4.4) million. The $3.9 million increase in cash provided by operating activities in the fourth quarter of 2019, as compared to the fourth quarter of 2018, was driven by relative decrease in working capital requirements of $3.4 million, combined with the relative improvement in cash operating losses of $0.5 million.

The relative $0.5 million decrease in cash operating losses in the fourth quarter of 2019 was negatively impacted by the increase in Adjusted EBITDA loss of ($2.2) million. However, this net (loss) increase in the fourth quarter of 2019 was offset by the impact of several items included in Adjusted EBITDA loss but excluded from cash operating losses (or vice-versa) including: higher equity investment losses in joint venture and associates of $1.9 million, higher impairment losses on trade receivables of $0.2 million, higher finance and other income of $0.6 million due primarily to lower foreign exchange losses, and lower income tax expense of $0.1 million related to withholding taxes on certain commercial contracts primarily in China.

In the fourth quarter of 2019, net working capital inflows of $8.0 million were driven primarily by lower inventory of $5.9 million as we delivered expected Heavy-Duty Motive shipments to customers in the fourth quarter of 2019, and by higher accounts payable and accrued liabilities of $7.4 million primarily as a result of the timing of supplier payments and annual compensation awards. These fourth quarter of 2019 inflows were partially offset by higher accounts and contract receivables of ($4.0) million primarily as a result of the timing of revenue recognition and the related customer collections, and by lower deferred revenue of ($3.3) million as we fulfilled contract deliverables on certain Heavy-Duty Motive and Technology Solutions contracts for which we received pre-payments in an earlier period.

This compares to a total change in working capital of $4.6 million in the fourth quarter of 2018 which was driven by higher deferred revenue of $8.5 million due primarily to a $9.0 million program prepayment received from Weichai Ballard JV, by lower inventory of $3.7 million as we delivered expected Heavy-Duty Motive shipments to customers in the fourth

quarter of 2018, and by higher accrued warranty obligations of $1.6 million primarily on increased Heavy-Duty Motive product shipments. These fourth quarter of 2018 inflows were partially offset by higher accounts receivable of ($9.8) million primarily as a result of the timing of revenues and the related customer collections.

For the year ended December 31, 2019, cash used in operating activities in 2019 was ($14.2) million, consisting of cash operating losses of ($14.1) million and net working capital outflows of ($0.1) million. For the year ended December 31, 2018, cash used in operating activities in 2018 was ($31.7) million, consisting of cash operating losses of ($14.4) million combined with net working capital outflows of ($17.3) million. The $17.5 million decline in cash used in operating activities in 2019, as compared to 2018, was driven by relative decline in working capital requirements of $17.2 million, combined with the relative decrease in cash operating losses of $0.3 million.

The relative $0.3 million decrease in cash operating losses in 2019 was negatively impacted by the increase in Adjusted EBITDA loss of ($14.7) million. However, this net (loss) increase in 2019 was offset by the impact of several items included in Adjusted EBITDA loss but excluded from cash operating losses (and vice-versa) including: higher equity investment losses in joint venture and associates of $9.9 million, higher impairment losses on trade receivables of $1.7 million, higher finance and other income of $3.3 million due primarily to higher investment income, and lower income tax expense of $0.4 million related to withholding taxes on certain commercial contracts primarily in China.

In 2019, net working capital outflows of ($0.1) million were driven by higher accounts and contract receivables of ($14.5) million primarily as a result of the timing of revenue recognition and the related customer collections, by higher inventory of ($0.8) million primarily to support expected Heavy-Duty Motive shipments in the first quarter of 2020, and by higher prepaid expenses of ($0.8) million as we made supplier payment deposits primarily on certain inventory purchases. These 2019 outflows were partially offset by higher deferred revenue of $3.5 million as we collected net pre-payments on certain Heavy-Duty Motive and Technology Solutions contracts in advance of work performed, by higher accounts payable and accrued liabilities of $11.1 million primarily as a result of the timing of supplier payments and annual compensation awards, and by higher accrued warranty obligations of $1.4 million primarily on Heavy-Duty Motive product shipments.

This compares to a total change in working capital of ($17.3) million in 2018 which was driven by higher inventory of ($12.9) million primarily to support expected Heavy-Duty Motive shipments in 2019 and which were negatively impacted by higher MEA inventory as a result of minimal shipments to Synergy Ballard JVCo in the third and fourth quarters of 2018 as a result of them not making required prepayments under the MEA supply agreement, by higher accounts receivable of ($11.7) million primarily as a result of the timing of revenues and the related customer collections, and by lower accounts payable and accrued liabilities of ($5.6) million as a result of the timing of supplier payments and annual compensation awards. These 2018 outflows were partially offset by higher deferred revenue of $8.6 million due primarily to a $9.0 million program prepayment received from Weichai Ballard JV, and by higher accrued warranty obligations of $3.9 million primarily on Heavy-Duty Motive product shipments.

6.3 Cash Provided by (Used by) Investing Activities

Investing activities resulted in net cash outflows of ($11.6) million and ($32.7) million, respectively, for the three months and year ended December 31, 2019, compared to net cash outflows of ($14.9) million and ($23.1) million, respectively for the corresponding periods of 2018.

Investing activities in 2019 of ($32.7) million consist primarily of investments in associated companies of ($20.9) million paid as planned for the second and third equity contributions in our 49% investment in Weichai Ballard JV, by capital expenditures of ($13.9) million incurred primarily for production and test equipment, partially offset by net proceeds received on sale of assets of $2.1 million from the repayment of the promissory note from Revision in the third quarter of 2019 owing as a result of the divestiture of our Power Manager assets on October 5, 2018.

Investing activities in 2018 of ($23.1) million consist primarily of investments in associated companies of ($14.6) million paid as an initial equity contribution in our 49% investment in Weichai Ballard JV, and capital expenditures of ($9.9) million incurred primarily for production and test equipment including the acquisition of certain strategic assets of AFCC in the third quarter of 2018 for approximately Canadian ($6) million. These 2018 investments were partially offset by initial net proceeds received of $1.3 million related to the sale of our Power Manager assets to Revision.

6.4 Cash Provided by (Used by) Financing Activities

Financing activities resulted in net cash inflows of $1.8 million and $2.6 million, respectively, for the three months and year ended December 31, 2019, compared to net cash inflows of $183.6 million and $186.1 million, respectively, for the corresponding periods of 2018.

Financing activities in 2019 of $2.6 million consist of proceeds from share purchase options of $4.6 million, partially offset by finance lease payments of ($2.1) million.

Financing activities in 2018 of $186.1 million consist of net proceeds of $183.7 million received from the Weichai and Broad-Ocean strategic equity investments in Ballard, proceeds from share purchase warrant exercises of $1.4 million, proceeds from share purchase option exercises of $1.6 million, partially offset by finance lease payments of ($0.6) million.

6.5 Liquidity and Capital Resources

At December 31, 2019, we had total liquidity of $147.8 million. We measure liquidity as our net cash position, consisting of the sum of our cash, cash equivalents and short-term investments of $147.8 million, net of amounts drawn on our $7 million Canadian demand revolving facility (“Operating Facility”) of nil. The Operating Facility is available to be used in helping to finance our short term working capital requirements and is secured by a hypothecation of our cash, cash equivalents and short-term investments.

We also have a $1.8 million Canadian capital leasing facility (“Leasing Facility”) which is available to be used to finance the acquisition and / or lease of operating equipment and is secured by a hypothecation of our cash, cash equivalents and short-term investments. As of December 31, 2019, nothing was outstanding on the Leasing Facility.

Our liquidity objective is to maintain cash balances sufficient to fund at least six quarters of forecasted cash used by operating activities and expected joint venture capital contributions at all times. Our strategy to attain this objective is to continue our drive to attain profitable operations that are sustainable by executing a business plan that continues to focus on Fuel Cell Products and Services revenue growth, improving overall gross margins, maintaining discipline over Cash Operating Costs, managing working capital requirements, and securing additional financing to fund our operations as needed until we do achieve profitable operations that are sustainable. We believe that we currently have adequate liquidity in cash and working capital to achieve our liquidity objective.

Failure to achieve or maintain this liquidity objective could have a material adverse effect on our financial condition and results of operations including our ability to continue as a going concern. There are also various risks and uncertainties affecting our ability to achieve this liquidity objective including, but not limited to, the market acceptance and rate of commercialization of our products, the ability to successfully execute our business plan, and general global economic conditions, certain of which are beyond our control. While we continue to make significant investments in product development and market development activities necessary to commercialize our products, make increased investments in working capital as we grow our business, and make ongoing capital contributions in support of our investment in Weichai Ballard JV, our actual liquidity requirements will also vary and will be impacted by our relationships with our lead customers and strategic partners including their ability to successfully finance and fund their operations and programs and agreements with us, our success in developing new channels to market and relationships with customers, our success in generating revenue growth from near-term product, service and licensing opportunities, our success in managing our operating expense and working capital requirements, foreign exchange fluctuations, and the progress and results of our research, development and demonstration programs.

We may also choose to pursue additional liquidity through the issuance of debt or equity in private or public market financings. To enable the timely issuance of equity securities in the public market, Ballard has a shelf prospectus (“Base Shelf Prospectus”) on file with the securities regulators in Canada, expiring in July 2020. The Base Shelf Prospectus was filed in each of the provinces and territories of Canada, except Quebec, and a corresponding shelf registration statement on Form F-10 (“Registration Statement”) was also filed with the United States Securities and Exchange Commission (“SEC”). These filings enable offerings of securities up to an aggregate initial offering price of $150 million at any time during the 25-month period that the Prospectus remains effective.

We intend to establish an at-the-market equity program (“ATM Program”) and to issue up to $75 million of common shares from treasury to the public from time to time at the Company’s discretion, subject to favorable market conditions. The ATM Program will be conducted under our existing $150 million Base Shelf Prospectus and will be used to fund growth and strategic opportunities.

No assurance can be given that any such additional liquidity will be available or that, if available, it can be obtained on terms favorable to the Company. If any securities are offered under the Base Shelf Prospectus and/or Registration Statement, the terms of any such securities and the intended use of the net proceeds resulting from such offering would

be established at the time of any offering and would be described in a Prospectus supplement filed with applicable Canadian securities regulators and/or the SEC, respectively, at the time of such an offering.

7. OTHER FINANCIAL MATTERS

7.1 Off-Balance Sheet Arrangements and Contractual Obligations

Periodically, we use forward foreign exchange contracts to manage our exposure to currency rate fluctuations. We record these contracts at their fair value as either assets or liabilities on our balance sheet. Any changes in fair value are either (i) recorded in other comprehensive income if formally designated and qualified under hedge accounting criteria; or (ii) recorded in profit or loss (general and administrative expense) if either not designated, or not qualified, under hedge accounting criteria. At December 31, 2019, we had outstanding foreign exchange currency contracts to purchase a total of Canadian $16.8 million at an average rate of 1.3232 Canadian per U.S dollar, resulting in an unrealized gain of Canadian $0.3 million at December 31, 2019. The outstanding foreign exchange currency contracts have not been designated under hedge accounting.

At December 31, 2019, we did not have any other material obligations under guarantee contracts, retained or contingent interests in transferred assets, outstanding derivative instruments or non-consolidated variable interests.

At December 31, 2019, we had the following contractual obligations and commercial commitments (including capital contribution commitments to Weichai Ballard JV):

(Expressed in thousands of U.S. dollars)		Payments due by period,			
Contractual Obligations	**Total**	Less than one year	1-3 years	4-5 years	After 5 years
Finance leases	**$ 24,847**	$ 3,723	$ 7,357	$ 7,446	$ 6,321
Asset retirement obligations	**1,914**	-	-	-	1,914
Capital contributions to Weichai Ballard JV	**42,746**	19,526	23,220	-	-
Total contractual obligations	**$ 69,507**	$ 23,249	$ 30,577	$ 7,446	$ 8,235

In addition, we have outstanding commitments of $7.8 million at December 31, 2019 related primarily to purchases of property, plant and equipment. Capital expenditures and expenditures on other intangible assets pertain to our regular operations and are expected to be funded through cash on hand.

In connection with the acquisition of intellectual property from UTC in 2014, we have a royalty obligation in certain circumstances to pay UTC a portion of any future intellectual property sale and licensing income generated from certain of our intellectual property portfolio for a period of 15-years expiring in April 2029. No royalties were paid to UTC in the years ended December 31, 2019 and 2018.

As of December 31, 2019, we retain a previous funding obligation to pay royalties of 2% of revenues (to a maximum of Canadian $5.4 million) on sales of certain fuel cell products for commercial distributed utility applications. No royalties have been incurred to date as a result of this agreement.

We also retain a previous funding obligation to pay royalties of 2% of revenues (to a

maximum of Canadian $2.2 million) on sales of certain fuel cell products for commercial transit applications. No royalties have been incurred to date as a result of this agreement.

In the ordinary course of business or as required by certain acquisition or disposition agreements, we are periodically required to provide certain indemnities to other parties. At December 31, 2019, we have not accrued any significant amount owing, or receivable, as a result of any indemnity agreements undertaken in the ordinary course of business.

7.2 Related Party Transactions

Related parties include our 49% owned equity accounted investee, Weichai Ballard JV, and our 10% owned equity accounted investee, Synergy Ballard JVCo, Transactions between us and our subsidiaries are eliminated on consolidation. For the three months and year ended December 31, 2019 and 2018, related party transactions and balances with Weichai Ballard JV and Synergy Ballard JVCo total as follows:

(Expressed in thousands of U.S. dollars)	Three Months Ended December 31,	
Transactions with related parties	**2019**	2018
Revenues	**$ 25,372**	$ 2,060
Cost of goods sold and operating expense	**$ -**	$ -

(Expressed in thousands of U.S. dollars)	Year Ended December 31,	
Transactions with related parties	**2019**	2018
Revenues	**$ 45,863**	$ 18.795
Cost of goods sold and operating expense	**$ -**	$ -

(Expressed in thousands of U.S. dollars)	As at Dec 31,	As at Dec 31,
Balances with related parties	**2019**	2018
Accounts receivable	**$ 10,122**	$ 1,604
Investments	**$ 21,642**	$ 13,989
Deferred revenue	**$ (11,903)**	$ (10,896)

We also provide key management personnel, being board directors and executive officers, certain benefits, in addition to their salaries. Key management personnel also participate in the Company's share-based compensation plans. Key management personnel compensation is summarized in note 27 to our annual consolidated financial statements for the year ended December 31, 2019.

7.3 Outstanding Share and Equity Information

As at March 4, 2020	
Common share outstanding	234,645,476
Warrants outstanding	-
Options outstanding	3,979,999
DSU's outstanding	811,378
RSU's / PSU's outstanding (subject to vesting and performance criteria)	1,305,265

8. ACCOUNTING MATTERS

8.1 Overview

Our consolidated financial statements are prepared in accordance with IFRS, which require us to make estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from those estimates. Estimates and underlying assumptions are reviewed on an ongoing basis Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

8.2 Critical Judgments in Applying Accounting Policies

Critical judgments that we have made in the process of applying our accounting policies and that have the most significant effect on the amounts recognized in the consolidated financial statements is limited to our assessment of our ability to continue as a going concern (See Note 2 (e) to our annual consolidated financial statements).

Our significant accounting policies are detailed in note 4 to our annual consolidated financial statements for the year ended December 31, 2019 except as described below. These changes in accounting policies are also expected to be reflected in the Company's consolidated financial statements as at and for the year ending December 31, 2020.

Effective January 1, 2019, we have adopted *IFRS 16 Leases* and *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments*. The effect of initially applying *IFRS 16 Leases* had a significant impact on our financial statements which is detailed below, whereas the adoption of *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments* did not have a significant impact on our financial statements. A number of other new standards and interpretations are also effective from January 1, 2019 but they did not have a significant impact on our financial statements. Changes to significant accounting policies are detailed below and in note 4 to our annual consolidated financial statements.

8.3 Key Sources of Estimation Uncertainty

The following are key assumptions concerning the future and other key sources of estimation uncertainty that have a significant risk of resulting in a material adjustment to the reported amount of assets, liabilities, income and expenses within the next financial year.

REVENUE RECOGNITION

Revenues are generated primarily from product sales, the license and sale of intellectual property and fundamental knowledge, and the provision of engineering services and technology transfer services. Product revenues are derived primarily from standard product sales contracts and from long-term fixed price contracts. Intellectual property and fundamental knowledge license revenues are derived primarily from standard licensing and technology transfer agreements. Engineering service and technology transfer service revenues are derived primarily from cost-plus reimbursable contracts and from long-term fixed price contracts.

Revenue is recognized when a customer obtains control of the goods or services. Determining the timing of the transfer of control, at a point in time or over time, requires judgment.

On standard product sales contracts, revenues are recognized when customers obtain control of the product, that is when transfer of title and risks and rewards of ownership of goods have passed, and when obligation to pay is considered certain. Invoices are generated and revenue is recognized at that point in time. Provisions for warranties are made at the time of sale. Revenue recognition for standard product sales contracts does not usually involve significant estimates.

On standard licensing and technology transfer agreements, revenues are recognized on the transfer of rights to a licensee, when it is determined to be distinct from other performance obligations, and if the customer can direct the use of, and obtain substantially all of the remaining benefits from the license as it exists at the time of transfer. In other cases, the proceeds are considered to relate to the right to use the asset over the license period and the revenue is recognized over that period. If it is determined that the license is not distinct from other performance obligations, revenue is recognized over time as the customer simultaneously receives and consumes the benefit. Revenue recognition for standard license and sale agreements does not usually involve significant estimates.

On cost-plus reimbursable contracts, revenues are recognized as costs are incurred, and include applicable fees earned as services are provided. Revenue recognition for cost-plus reimbursable contracts does not usually involve significant estimates.

On long-term fixed price contracts, the customer controls all of the work in progress as the services are being provided. This is because under these contracts, the deliverables are made to a customer's specification, and if a contract is terminated by the customer, then the Company is entitled to reimbursement of the costs incurred to date plus the applicable gross margin. Therefore, revenue from these contracts and the associated costs are recognized as the costs are incurred over time. On long-term fixed price contracts, revenues are recognized over time using cumulative costs incurred to date relative to total estimated costs at completion to measure progress towards satisfying performance obligations. Generally, revenue is recognized by multiplying the expected consideration by the ratio of cumulative costs incurred to date to the sum of incurred and estimated costs for completing the performance obligation. The cumulative effect of changes to estimated revenues and estimated costs for completing a contract are recognized in the period in which the revisions are identified. In the event that the estimated costs for completing the contract exceed the expected revenues on a contract, such loss is recognized in its entirety in the period it becomes known. Deferred revenue (i.e. contract liabilities) represents cash received from customers in excess of revenue recognized on uncompleted contracts.

- The determination of expected costs for completing a contract is based on estimates that can be affected by a variety of factors such as variances in the timeline to completion, the cost of materials, the availability and cost of labour, as well as productivity.
- The determination of potential revenues includes the contractually agreed amount and may be adjusted based on the estimate of our attainment on achieving certain defined contractual milestones. Management's estimation is required in determining the amount of consideration for which the Company expects to be entitled and in determining when a performance obligation has been met.

Estimates used to determine revenues and costs of long-term fixed price contracts involve

uncertainties that ultimately depend on the outcome of future events and are periodically revised as projects progress. There is a risk that a customer may ultimately disagree with management's assessment of the progress achieved against milestones, or that our estimates of the work required to complete a contract may change.

During the three months and year ended December 31, 2019 and 2018, there were no material adjustments to revenues relating to revenue recognized in a prior period.

ASSET IMPAIRMENT

The carrying amounts of our non-financial assets other than inventories are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. For goodwill and intangible assets that have indefinite useful lives, the recoverable amount is estimated at least annually.

The recoverable amount of an asset or cash-generating unit is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. In assessing fair value less costs to sell, the price that would be received on the sale of an asset in an orderly transaction between market participants at the measurement date is estimated. For the purposes of impairment testing, assets that cannot be tested individually are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows of other groups of assets. The allocation of goodwill to cash-generating units reflects the lowest level at which goodwill is monitored for internal reporting purposes. Many of the factors used in assessing fair value are outside the control of management and it is reasonably likely that assumptions and estimates will change from period to period. These changes may result in future impairments. For example, our revenue growth rate could be lower than projected due to economic, industry or competitive factors, or the discount rate used in our value in use model could increase due to a change in market interest rates. In addition, future goodwill impairment charges may be necessary if our market capitalization decreased due to a decline in the trading price of our common stock, which could negatively impact the fair value of our business.

An impairment loss is recognized if the carrying amount of an asset or its cash-generating unit exceeds its estimated recoverable amount. Impairment losses are recognized in net loss. Impairment losses recognized in respect of the cash-generating units are allocated first to reduce the carrying amount of any goodwill allocated to the units, and then to reduce the carrying amounts of the other assets in the unit on a pro-rata basis.

An impairment loss in respect of goodwill is not reversed. In respect of other assets, impairment losses recognized in prior periods are assessed at each reporting date for any indications that the cumulative loss has decreased or no longer exists. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

We perform the annual review of goodwill as at December 31 of each year, more often if

events or changes in circumstances indicate that it might be impaired. Under IFRS, the annual review of goodwill requires a comparison of the carrying value of the asset to the higher of (i) value in use; and (ii) fair value less costs to sell**.** Value in use is defined as the present value of future cash flows expected to be derived from the asset in its current state. As of December 31, 2019, our consolidated goodwill balance of $40.3 million relates solely to our Fuel Cell Products and Services segment. Based on the impairment test performed as at December 31, 2019, we have concluded that no goodwill impairment charge is required for the year ending December 31, 2019. Details of our 2019 goodwill impairment tests are as follows:

- One of the methods used to assess the recoverable amount of the goodwill is a fair value, less costs to sale, test. Our fair value test is in effect a modified market capitalization assessment, whereby we calculate the fair value of the Fuel Cell Products and Services segment by first calculating the value of the Company at December 31, 2019 based on the average closing share price in the month of December, add a reasonable estimated control premium to determine the Company's enterprise value on a controlling basis after adjusting for excess cash balances, and then deducting the estimated costs to sell from this enterprise value to arrive at the fair value of the Fuel Cell Products and Services segment. As a result of this assessment, we have determined that the fair value of the Fuel Cell Products and Services segment exceeds its carrying value as of December 31, 2019 indicating that no impairment charge is required for 2019.
- In addition to this fair value test, we also performed a value in use test on our Fuel Cell Products and Services segment that compared the carrying value of the segment to the present value of future cash flows expected to be derived from the segment. The principal factors used in this discounted cash flow analysis requiring significant estimation are the projected results of operations, the discount rate based on the weighted average cost of capital, and terminal value assumptions. Our value in use assessment resulted in an estimated fair value for the Fuel Cell Products and Services segment that is consistent with that as determined under the above fair value, less costs to sell, assessment. As a result of this assessment, we have determined that the fair value of the Fuel Cell Products segment exceeds its carrying value by a significant amount as of December 31, 2019 indicating that no impairment charge is required in 2019.

In addition to the above goodwill impairment test, we perform a quarterly assessment of the carrying amounts of our non-financial assets (other than inventories) to determine whether there is any indication of impairment. During the three months and year ended December 31, 2018, we recorded a loss on sale of assets of ($4.0) million on the divestiture of our Power Manager assets after estimating the amount of variable consideration included in the transaction price that is constrained to be $2.0 million, as opposed to the maximum possible earn-out amount of $11.25 million. During the three months ended March 31, 2019, we recorded an additional loss on sale of assets of ($2.0) million after adjusting the estimated amount of variable consideration from $2.0 million to nil. During October 2019, the estimated amount of variable consideration was confirmed as nil as Revision failed to meet the minimum specific sales objectives in the 12-month earn-out period to trigger any additional proceeds payable to us.

WARRANTY PROVISION

A provision for warranty costs is recorded on product sales at the time of shipment. In establishing the accrued warranty liabilities, we estimate the likelihood that products sold will experience warranty claims and the cost to resolve claims received.

In making such determinations, we use estimates based on the nature of the contract and past and projected experience with the products. Should these estimates prove to be incorrect, we may incur costs different from those provided for in our warranty provisions. During the three months and year ended December 31, 2019, we recorded provisions to accrued warranty liabilities of $1.9 million and $3.9 million, respectively, for new product sales, compared to $2.1 million and $4.4 million for the three months and year ended December 31, 2018.

We review our warranty assumptions and make adjustments to accrued warranty liabilities quarterly based on the latest information available and to reflect the expiry of contractual obligations. Adjustments to accrued warranty liabilities are recorded in cost of product and service revenues. As a result of these reviews and the resulting adjustments, our warranty provision and cost of revenues for the three months and year ended December 31, 2019 were adjusted downwards by $1.0 million in each of the periods, compared to adjustments upwards of nil million and ($0.9) million, respectively, for the three months and year ended December 31, 2018.

INVENTORY PROVISION

In determining the lower of cost and net realizable value of our inventory and establishing the appropriate provision for inventory obsolescence, we estimate the likelihood that inventory carrying values will be affected by changes in market pricing or demand for our products and by changes in technology or design which could make inventory on hand obsolete or recoverable at less than cost. We perform regular reviews to assess the impact of changes in technology and design, sales trends and other changes on the carrying value of inventory. Where we determine that such changes have occurred and will have a negative impact on the value of inventory on hand, appropriate provisions are made. If there is a subsequent increase in the value of inventory on hand, reversals of previous write-downs to net realizable value are made. Unforeseen changes in these factors could result in additional inventory provisions, or reversals of previous provisions, being required. During the three months and year ended December 31, 2019, net negative inventory adjustments of ($1.6) million and ($2.4) million, respectively, were recorded as a recovery (charge) to cost of product and service revenues, compared to net negative inventory adjustments of ($0.7) million and ($1.0) million, respectively, for the three months and year ended December 31, 2018.

FINANCIAL ASSETS INCLUDING IMPAIRMENT OF TRADE RECEIVABLES

A financial asset is classified as measured at: amortized cost; fair value through other comprehensive income (“FVOCI”) or fair value through profit or loss (“FVTPL”). The classification of financial assets is generally based on the business model in which a financial asset is managed and its contractual cash flow characteristics. Derivatives embedded in contracts where the host is a financial asset in the scope of the standard are never separated. Instead, the hybrid financial instrument as a whole is assessed for classification.

The Company's financial assets which consist primarily of cash and cash equivalents, trade and other receivables, and contract assets, are classified at amortized cost.

An 'expected credit loss' ("ECL") model applies to financial assets measured at amortized cost and debt investments at FVOCI, but not to investments in equity instruments. The Company's financial assets measured at amortized cost and subject to the ECL model consist primarily of trade receivables and contract assets.

In applying the ECL model, loss allowances are measured on either of the following bases:

- 12-month ECLs: these are ECLs that result from possible default events within the 12 months after the reporting date; and
- Lifetime ECLs: these are ECLs that result from all possible default events over the expected life of a financial instrument.

We have elected to measure loss allowances for trade receivables and contract assets at an amount equal to lifetime ECLs.

When determining whether the credit risk of a financial asset has increased significantly since initial recognition and when estimating ECLs, we consider reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on our historical experience and informed credit assessment and including forward-looking information.

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all cash shortfalls (i.e. the difference between the cash flows due to the entity in accordance with the contract and the cash flows that we expect to receive). ECLs are discounted at the effective interest rate of the financial asset. At each reporting date, we assess whether financial assets carried at amortized cost are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred. Loss allowances for financial assets measured at amortized cost are deducted from the gross carrying amount of the assets. Impairment (losses) recoveries related to trade receivables and contract assets are presented separately in the statement of profit or loss. During the three months and year ended December 31, 2019, net impairment (charges) on trade receivables and contract assets of ($0.3) million and ($1.8) million, respectively, were recorded in other operating expenses, compared to nominal amounts for the three months and year ended December 31, 2018. Net impairment (charges) in 2019 of ($1.8) million include ECL's of ($0.3) million.

LEASES

We apply judgment in determining whether a contract contains an identified asset. The identified asset should be physically distinct or represent substantially all of the capacity of the asset, and should provide the right to substantially all of the economic benefits from the use of the asset. We also apply judgment in determining whether or not we have the right to control the use of the identified asset. We have that right when we have the decision-making rights that are most relevant to changing how and for what purpose the asset is used. In rare cases where the decisions about how and for what purpose the asset is used are predetermined, we have the right to direct the use of the asset if we have the right to operate the asset or if the asset is designed in a way that predetermines how and for what

purpose the asset will be used.

We apply judgment in determining the incremental borrowing rate used to measure our lease liability for each lease contract, including an estimate of the asset-specific security impact. The incremental borrowing rate should reflect the interest that would have to be paid to borrow at a similar term and with a similar security.

The lease liability is subsequently increased by the interest cost on the lease liability and decreased by lease payments made. It is re-measured when there is a change in future lease payments arising from a change in an index or rate, a change in the estimate of the amount expected to be payable under a residual value guarantee, or as appropriate, changes in the assessment of whether a purchase or extension option is reasonably certain to be exercised or a termination option is reasonably certain not to be exercised.

We have applied judgment to determine the lease term for some lease contracts in which we are a lessee that include renewal options. At lease commencement, we assess whether it is reasonably certain to exercise any of the extension options based on the expected economic return from the lease. We periodically reassess whether we are reasonably certain to exercise the options and account for any changes at the date of the reassessment. The assessment of whether we are reasonably certain to exercise such options impacts the lease term which significantly affects the amount of lease liabilities and right-of-use assets recognized. We estimate the lease term by considering the facts and circumstances that can create an economic incentive to exercise an extension option, or not exercise a termination option. Certain qualitative and quantitative assumptions are made when deriving the value of the economic incentive.

EMPLOYEE FUTURE BENEFITS

The present value of our defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds that have terms to maturity approximating the terms of the related pension liability. Determination of benefit expense requires assumptions such as the discount rate to measure obligations, expected plan investment performance, expected healthcare cost trend rate, and retirement ages of employees. Actual results will differ from the recorded amounts based on these estimates and assumptions.

INCOME TAXES

We use the asset and liability method of accounting for income taxes. Under this method, deferred income taxes are recognized for the deferred income tax consequences attributable to differences between the financial statement carrying values of assets and liabilities and their respective income tax bases (temporary differences) and for loss carry-forwards. The resulting changes in the net deferred tax asset or liability are included in income.

Deferred tax assets and liabilities are measured using enacted, or substantively enacted, tax rates expected to apply to taxable income in the years in which temporary differences are expected to be recovered or settled. The effect on deferred income tax assets and liabilities, of a change in tax rates, is included in income in the period that includes the substantive enactment date. Deferred income tax assets are reviewed at each reporting period and are reduced to the extent that it is no longer probable that the related tax benefit will be

realized. In circumstances in which there is uncertainty over income tax treatments for current and / or deferred tax liabilities and asset, we contemplate whether uncertain tax treatments should be considered separately, or together as a group, based on which approach provides better predictions of the resolution. We then determine if it is probable that the tax authorities will accept the uncertain tax treatment; and if it is not probable that the uncertain tax treatment will be accepted, we measure the tax uncertainty based on the most likely amount of expected value, depending on whichever method better predicts the resolution of the uncertainty.

As of December 31, 2019 and 2018, we have not recorded any deferred income tax assets on our consolidated statement of financial position.

8.4 Recently Adopted Accounting Policy Changes

Effective January 1, 2019, we have adopted *IFRS 16 Leases* and *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments*. The effect of initially applying *IFRS 16 Leases* had a significant impact on our financial statements which is detailed below, whereas the adoption of *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments* did not have a material impact on our financial statements. A number of other new standards and interpretations were also effective from January 1, 2019 but they did not have a material impact on our financial statements.

IFRS 16 – LEASES

IFRS 16 Leases replaced *IAS 17 Leases and the related interpretations* and introduces a single lessee accounting model and requires a lessee to recognize assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value. A lessee is required to recognize a right-of-use asset representing its right to use the underlying asset and a lease liability representing its obligation to make lease payments. This standard substantially carried forward the lessor accounting requirements of *IAS 17 Leases*, while requiring enhanced disclosures to be provided by lessors. Other areas of the lease accounting model have been impacted, including the definition of a lease.

The most significant effect of the new standard is the lessee's recognition of the initial present value of unavoidable future lease payments as right-of-use lease assets and lease liabilities on the statement of financial position, including those for most leases that would currently be accounted for as operating leases. Both leases with durations of 12 months or less and leases for low-value assets may be exempted.

The presentation on the statement of income and other comprehensive income required by the new standard results in the presentation of most lease expenses as depreciation of right-of-use lease assets and financing costs arising from lease liabilities, rather than as a part of operating expenses; reported results from operating activities are thus higher under the new standard. Relative to the results of applying *IAS 17 Leases*, although actual cash flows will be unaffected, the lessee's statement of cash flows reflect increases in cash flows from operating activities offset equally by decreases in cash flows from financing activities. This is the result of the presentation of the payments of the "principal" component of leases that were accounted for as operating leases as a cash flow use within financing activities under *IFRS 16 Leases*.

We have adopted *IFRS 16 Leases* using the modified retrospective approach from January 1, 2019, and therefore have not restated comparatives for the 2018 reporting period, as permitted under the specific transitional provisions in the standard. The reclassifications and the adjustments arising from the new leasing rules are therefore recognized in retained earnings at January 1, 2019.

We have also elected not to reassess whether a contract is, or contains a lease at the date of initial application on January 1, 2019. Instead, for contracts entered into before January 1, 2019, we have relied on our assessment made applying *IAS 17 Leases and IFRIC 4 Determining whether an Arrangement contains a Lease*. The definition of a lease under *IFRS 16 Leases* was applied only to contracts entered into or changed on or after January 1, 2019. On adoption of IFRS 16, we recognized lease liabilities in relation to leases which had previously been classified as 'operating leases' under the principles of *IAS 17 Leases*. These liabilities were measured at the present value of the remaining lease payments, discounted using the Corporation's incremental borrowing rate as of January 1, 2019. Right-of-use assets are measured at an amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments.

We also used the following practical expedients when applying *IFRS 16 Leases* to leases previously classified as operating leases under *IAS 17 Leases*:

- Applied a single discount rate to a portfolio of leases with reasonably similar characteristics;
- Reliance on previous assessments on whether leases are onerous;
- Applied the exemption not to recognize right-of-use assets and liabilities for leases with less than 12 months of lease term;
- The exclusion of initial direct costs for the measurement of the right-of-use asset at the date of initial application; and
- The use of hindsight in determining the lease term where the contract contains options to extend or terminate the lease.

For leases previously classified as finance leases, we recognized the carrying amount of the lease asset and lease liability immediately before transition as the carrying amount of the right of use asset and the lease liability at the date of initial application. The measurement principles of *IFRS 16 Leases* are only applied after that date.

Under *IFRS 16 Leases*, we are required to assess the classification of a sub-lease with reference to the right-of-use asset, not the underlying asset. On transition, we concluded that sub-lease contracts previously classified as operating leases under *IAS 17 Leases* are also operating leases under *IFRS 16 Leases*.

Under IFRS 16 Leases, we continue to account for the sale-and-leaseback transaction for the manufacturing, research and office facility in Burnaby, BC completed in 2010 as a sale-and-leaseback transaction. At the time of the transaction, it was concluded that the building component of the sale-and-leaseback qualified as a finance lease and the land component was bifurcated and treated as an operating lease. As such, there is no adjustment to the right-of-use asset and the related lease liability of the building component upon transition. However, as the land component now meets the definition of a right-of-use asset under

IFRS 16, the land component of the sale-and-leaseback transaction has now been accounted for as a finance lease with the 0land component now recognized as a right-of-use asset with a related lease liability recognized.

As a result of applying *IFRS 16 Leases*, in relation to the leases that were previously classified as operating leases, we recognized $11.4 million of additional right-of-use assets, net of deferred lease inducements of $2.3 million and trade and other payables of $0.3 million, and $14.0 million of additional lease liabilities as at January 1, 2019.

IFRIC 23 – UNCERTAINTY OVER INCOME TAX TREATMENTS

IFRIC Interpretation 23 Uncertainty over Income Tax Treatments provides guidance on the accounting for current and deferred tax liabilities and assets in circumstances in which there is uncertainty over income tax treatments. The Interpretation requires:

- An entity to contemplate whether uncertain tax treatments should be considered separately, or together as a group, based on which approach provides better predictions of the resolution;
- An entity to determine if it is probable that the tax authorities will accept the uncertain tax treatment; and
- If it is not probable that the uncertain tax treatment will be accepted, measure the tax uncertainty based on the most likely amount of expected value, depending on whichever method better predicts the resolution of the uncertainty.

The adoption of *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments* did not have a significant impact on the Company's financial statements.

8.5 Future Accounting Policy Changes

The following is an overview of accounting standard changes that we will be required to adopt in future years. We do not expect to adopt any of these standards before their effective dates and we continue to evaluate the impact of these standards on our consolidated financial statements.

AMENDMENTS TO REFERENCES TO THE CONCEPTUAL FRAMEWORK IN IFRS STANDARDS

On March 29, 2018, the IASB issued a revised version of its *Conceptual Framework for Financial Reporting ("the Framework")* that underpins IFRS Standards. The IASB also issued *Amendments to References to the Conceptual Framework in IFRS Standards ("the Amendments"*) to update references in IFRS Standards to previous versions of the Conceptual Framework.

Some Standards include references to the 1989 and 2010 versions of the Framework. The IASB has published a separate document which contains consequential amendments to affected Standards so that they refer to the new Framework, with the exception of IFRS 3 Business Combinations which continues to refer to both the 1989 and 2010 Frameworks.

Both documents are effective from January 1, 2020 with earlier application permitted. The Company intends to adopt the Amendments in its financial statements for the annual period beginning on January 1, 2020. The adoption of the Amendments is not expected to have a material impact on the Company's financial statements.

DEFINITION OF A BUSINESS (AMENDMENTS TO IFRS 3)

On October 22, 2018, the IASB issued amendments to *IFRS 3 Business Combinations* that seek to clarify whether a transaction results in an asset or a business acquisition.

The amendments include an election to use a concentration test. This is a simplified assessment that results in an asset acquisition if substantially all of the fair value of the gross assets is concentrated in a single identifiable asset or a group of similar identifiable assets. If a preparer chooses not to apply the concentration test, or the test is failed, then the assessment focuses on the existence of a substantive process.

The amendments apply to businesses acquired in annual reporting periods beginning on or after January 1, 2020 with earlier adoption permitted. The Company intends to adopt the amendments in its financial statements for the annual reporting period beginning on January 1, 2020. The adoption of the amendments to IFRS 3 is not expected to have a material impact on the Company's financial statements.

DEFINITION OF MATERIAL (AMENDMENTS TO IAS 1 and IAS 8)

On October 31, 2018 the IASB refined its definition of material and removed the definition of material omissions or misstatements from *IAS 8*.

The definition of material has been aligned across *IFRS Standards and the Conceptual Framework for Financial Reporting*. The amendments provide a definition and explanatory paragraphs in one place. Pursuant to the amendments, information is material if omitting, misstating or obscuring it could reasonably be expected to influence decisions that the primary users of general purpose financial statements make on the basis of those financial statements, which provide financial information about a specific reporting entity.

The amendments are effective for annual periods beginning on or after January 1, 2020 with earlier adoption permitted. The Company intends to adopt the amendments in its financial statements for the annual reporting period beginning on January 1, 2020. The adoption of the amendments to IAS 1 and IAS 8 are not expected to have a material impact on the Company's financial statements.

9. SUPPLEMENTAL NON-GAAP MEASURES AND RECONCILIATIONS

9.1 Overview

In addition to providing measures prepared in accordance with GAAP, we present certain supplemental non-GAAP measures. These measures are Cash Operating Costs (including its components of research and product development (operating cost), general and administrative (operating cost) and sales and marketing (operating cost)), EBITDA and Adjusted EBITDA, and Adjusted Net Loss. These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore are unlikely to be comparable to similar measures presented by other companies. We believe these measures are useful in evaluating the operating performance of the Company's ongoing business. These measures should be considered in addition to, and not as a substitute for, operating expenses, net income, cash flows and other measures of financial performance and liquidity reported in accordance with GAAP. The calculation of these non-GAAP measures have been made on a consistent basis for all periods presented.

9.2 Cash Operating Costs

This supplemental non-GAAP measure is provided to assist readers in determining our operating costs on an ongoing cash basis. We believe this measure is useful in assessing performance and highlighting trends on an overall basis.

We also believe Cash Operating Costs is frequently used by securities analysts and investors when comparing our results with those of other companies. Cash Operating Costs differs from the most comparable GAAP measure, operating expenses, primarily because it does not include stock-based compensation expense, depreciation and amortization, impairment losses or recoveries on trade receivables, restructuring charges, acquisition costs, the impact of unrealized gains and losses on foreign exchange contracts, and financing charges. The following tables show a reconciliation of operating expenses to Cash Operating Costs for the three months and year ended December 31, 2019 and 2018:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,		
Cash Operating Costs	**2019**	2018	$ Change
Total Operating Expenses	**$ 16,151**	**$ 13,441**	$ 2,710
Stock-based compensation expense	**(1,011)**	**(496)**	(515)
Impairment recovery (losses) on trade receivables	**(251)**	**(68)**	(183)
Acquisition and integration costs	**-**	**-**	-
Restructuring (charges) recovery	**3**	**(438)**	441
Impact of unrealized gains (losses) on foreign exchange contracts	**234**	**(450)**	684
Depreciation and amortization	**(1,570)**	**(792)**	(778)
Cash Operating Costs	**$ 13,556**	**$ 11,197**	$ 2,359

(Expressed in thousands of U.S. dollars)	Year ended December 31,		
Cash Operating Costs	**2019**	2018	$ Change
Total Operating Expenses	**$ 49,988**	**$ 50,472**	$ (484)
Stock-based compensation expense	**(3,561)**	**(2,902)**	(659)
Impairment recovery (losses) on trade receivables	**(1,787)**	**(98)**	(1,689)
Acquisition and integration costs	**-**	**-**	-
Restructuring (charges) recovery	**(146)**	**(507)**	361
Impact of unrealized gains (losses) on foreign exchange contracts	**805**	**(570)**	1,375
Depreciation and amortization	**(4,712)**	**(3,413)**	(1,299)
Cash Operating Costs	**$ 40,587**	**$ 42,982**	$ (2,395)

The components of Cash Operating Costs of research and product development (cash operating cost), general and administrative (cash operating cost), and sales and marketing (cash operating cost) differ from their respective most comparable GAAP measure of research and product development expense, general and administrative expense, and sales and marketing expense, primarily because they do not include stock-based compensation expense and depreciation and amortization expense. A reconciliation of these respective operating expenses to the respective components of Cash Operating Costs for the three months and year ended December 31, 2019 and 2018 is included in Section 5.4 Operating Expenses and Other Items.

A breakdown of total stock-based compensation expense for the three months and year ended December 31, 2019 and 2018 are as follows:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,		
Stock-based compensation expense	**2019**	2018	$ Change
Total stock-based compensation expense recorded as follows:			
Cost of goods sold	**$ -**	**$ -**	$ -
Research and product development expense	**397**	**215**	182
General and administrative expense	**442**	**213**	229
Sales and marketing expense (recovery)	**172**	**68**	104
Stock-based compensation expense	**$ 1,011**	**$ 496**	$ 515

(Expressed in thousands of U.S. dollars)	Year ended December 31,		
Stock-based compensation expense	**2019**	2018	$ Change
Total stock-based compensation expense recorded as follows:			
Cost of goods sold	**$ -**	**$ -**	$ -
Research and product development expense	**1,450**	**1,126**	324
General and administrative expense	**1,472**	**1,231**	241
Sales and marketing expense (recovery)	**639**	**545**	94
Stock-based compensation expense	**$ 3,561**	**$ 2,902**	$ 659

A breakdown of total depreciation and amortization expense for the three months and year ended December 31, 2019 and 2018 are as follows:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,		
Depreciation and amortization expense	**2019**	2018	$ Change
Total depreciation and amortization expense recorded as follows:			
Cost of goods sold	**$ 703**	**$ 386**	$ 317
Research and product development expense	**1,278**	**490**	788
General and administrative expense	**284**	**302**	(18)
Sales and marketing expense	**8**	**-**	8
Depreciation and amortization expense	**$ 2,273**	**$ 1,178**	$ 1,095

(Expressed in thousands of U.S. dollars)	Year ended December 31,		
Depreciation and amortization expense	**2019**	2018	$ Change
Total depreciation and amortization expense recorded as follows:			
Cost of goods sold	**$ 2,802**	**$ 1,603**	$ 1,199
Research and product development expense	**3,542**	**2,158**	1,384
General and administrative expense	**1,137**	**1,254**	(117)
Sales and marketing expense	**33**	**-**	33
Depreciation and amortization expense	**$ 7,514**	**$ 5,015**	$ 2,499

9.3 EBITDA and Adjusted EBITDA

These supplemental non-GAAP measures are provided to assist readers in determining our operating performance. We believe this measure is useful in assessing performance and highlighting trends on an overall basis. We also believe EBITDA and Adjusted EBITDA are

frequently used by securities analysts and investors when comparing our results with those of other companies. EBITDA differs from the most comparable GAAP measure, net loss, primarily because it does not include finance expense, income taxes, depreciation of property, plant and equipment, and amortization of intangible assets. Adjusted EBITDA adjusts EBITDA for stock-based compensation expense, transactional gains and losses, asset impairment charges, finance and other income, the impact of unrealized gains and losses on foreign exchange contracts, and acquisition costs. The following tables show a reconciliation of net loss to EBITDA and Adjusted EBITDA for the three months and year ended December 31, 2019 and 2018:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,		
EBITDA and Adjusted EBITDA	**2019**	2018	$ Change
Net loss	**$ (10,273)**	**$ (11,475)**	$ 1,202
Depreciation and amortization	**2,273**	**1,178**	1,095
Finance expense	**352**	**121**	231
Income taxes	**14**	**68**	(54)
EBITDA	**$ (7,634)**	**$ (10,108)**	$ 2,474
Stock-based compensation expense	**1,011**	**496**	515
Acquisition and integration costs	**-**	**-**	-
Finance and other (income) loss	**(575)**	**13**	(588)
Impairment charges on intangible assets and property, plant and equipment	**-**	**-**	-
Loss (gain) on sale of assets	**-**	**3,955**	(3,955)
Impact of unrealized (gains) losses on foreign exchange contracts	**(234)**	**450**	(684)
Adjusted EBITDA	**$ (7,432)**	**$ (5,194)**	$ (2,238)

(Expressed in thousands of U.S. dollars)	Year ended December 31,		
EBITDA and Adjusted EBITDA	**2019**	2018	$ Change
Net loss	**$ (39,050)**	**$ (27,323)**	$ (11,727)
Depreciation and amortization	**7,514**	**5,015**	2,499
Finance expense	**1,434**	**503**	931
Income taxes	**20**	**370**	(350)
EBITDA	**$ (30,082)**	**$ (21,435)**	$ (8,647)
Stock-based compensation expense	**3,561**	**2,902**	659
Acquisition and integration costs	**-**	**-**	-
Finance and other (income) loss	**(2,851)**	**449**	(3,300)
Impairment charges on intangible assets and property, plant and equipment	**-**	**-**	-
Loss (gain) on sale of assets	**1,995**	**4,049**	(2,054)
Impact of unrealized (gains) losses on foreign exchange contracts	**(805)**	**570**	(1,375)
Adjusted EBITDA	**$ (28,182)**	**$ (13,465)**	$ (14,717)

9.4 Adjusted Net Loss

This supplemental non-GAAP measure is provided to assist readers in determining our financial performance. We believe this measure is useful in assessing our actual performance by adjusting our results from continuing operations for transactional gains and losses and impairment losses. Adjusted Net Loss differs from the most comparable GAAP measure, net loss, primarily because it does not include transactional gains and losses,

asset impairment charges, and acquisition costs. The following table shows a reconciliation of net loss to Adjusted Net Loss for the three months and year ended December 31, 2019 and 2018:

(Expressed in thousands of U.S. dollars)	Three months ended December 31,		
Adjusted Net Loss	**2019**	2018	$ Change
Net loss	**$ (10,273)**	$ (11,475)	$ 1,202
Acquisition and integration costs	**-**	-	-
Impairment charges (recovery) on intangible assets and property, plant and equipment	**-**	-	-
Loss on sale of assets	**-**	3,957	(3,957)
Adjusted Net Loss	**$ (10,273)**	$ (7,518)	$ (2,755)
Adjusted Net Loss per share	**$ (0.04)**	$ (0.04)	$ (0.00)

(Expressed in thousands of U.S. dollars)	Year ended December 31,		
Adjusted Net Loss	**2019**	2018	$ Change
Net loss	**$ (39,050)**	$ (27,323)	$ (11,727)
Acquisition and integration costs	**-**	-	-
Impairment charges (recovery) on intangible assets and property, plant and equipment	**-**	-	-
Loss on sale of assets	**2,000**	3,957	(1,957)
Adjusted Net Loss	**$ (37,050)**	$ (23,366)	$ (13,684)
Adjusted Net Loss per share	**$ (0.16)**	$ (0.13)	$ (0.03)