

**BALLARD POWER SYSTEMS INC.**  
**MANAGEMENT'S DISCUSSION AND ANALYSIS**  
**FOURTH QUARTER 2018**



## 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, 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; 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.

## MANAGEMENT'S DISCUSSION AND ANALYSIS

March 6, 2019

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## 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 6, 2019 and should be read in conjunction with our audited consolidated financial statements and accompanying notes for the year ended December 31, 2018. 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](http://www.sedar.com)) and U.S. securities regulatory authorities ([www.sec.gov](http://www.sec.gov)) and is also available on our website at [www.ballard.com](http://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, 2018, 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 effected 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, 2018.

KPMG LLP, our independent registered public accounting firm, has audited our consolidated financial statements and expressed an unqualified opinion thereon. KPMG has also expressed an unqualified opinion on the effectiveness of our internal control over financial reporting as of December 31, 2018.

#### *Changes in internal control over financial reporting*

During the year ended December 31, 2018, 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, Protonex Technology Corporation (re-named Ballard Unmanned Systems Inc. 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 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](http://www.sedar.com)) and U.S. ([www.sec.gov](http://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 a limited number of Chinese customers for a majority of our revenues. Macro-economic conditions, including government subsidy programs and significant and recent volatility in China's capital markets, may adversely impact our Chinese customer's access to capital and program plans which could adversely impact our business. Furthermore, successful large-scale deployment of zero-emission vehicles will require adequate investment in hydrogen fueling infrastructure and competitive pricing of hydrogen. Inadequate hydrogen fueling infrastructure and/or excessive hydrogen fuel costs could negatively impact deployment of zero-emission vehicles and may negatively impact our business, financial condition and results of operations. Our performance in China is dependent on our business model of localization, including the strength and performance of our localization partners. A key part of our strategy is based on the localization of stack and module production with joint venture partners, where we do not control the joint venture;



- 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 single customer for the majority of our revenues and are subject to risks related 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;
- We expect our cash reserves will be reduced due to future operating losses, working capital requirements and capital contributions to our joint venture(s) in China, 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 and / or cost;
- We may not be able to achieve commercialization of our products 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;
- We have limited experience manufacturing fuel cell products on a commercial basis;
- 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;
- 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;
- 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 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 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 clean-energy fuel cell products feature high fuel efficiency, relatively low operating temperature, 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 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 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; and a sales, assembly, research and development facility in Southborough, Massachusetts. We also have an office in Guangzhou, the capital of Guangdong Province, China. This office serves as the Company’s initial operations center in China, with China management, sales and business development, technical, quality, supply chain, after-sales and administrative support personnel. We also have a non-controlling, 49% interest, in the newly established

Weichai Ballard Hy-Energy Technologies Co., Ltd. (“Weichai Ballard JV”), located in China. Weichai Ballard JV is intended to 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. In addition, we retain a non-controlling 10% interest in Guangdong Synergy Ballard Hydrogen Power Technology Co., Ltd. (“Synergy Ballard JVCo”), also located in China. Synergy Ballard JVCo is intended to manufacture fuel cell stacks utilizing our existing 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 in China.

## **1.2 Strategic Imperatives**

We plan 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 are pursuing a corporate strategy and business model that leverages growth and mitigates risk by diversifying our business across a portfolio of market opportunities that are enabled by substantially the same core competencies, technology, products and intellectual property. Our business model includes two growth platforms (power products and technology solutions), multiple markets within each of these platforms, geographic diversification and customer diversification.

We are also pursuing a strategy that supports commercialization, revenue and profitability, while also enabling future value based on longer-term market opportunities for our technology, products and intellectual property, such as the global automotive fuel cell market and the unmanned aerial vehicle (“UAV”) or drone market.

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 deep 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 and continued growth 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, including the implementation of supporting subsidy programs.

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 (“FCEV”). 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 market our products and invest in manufacturing operations and supply chain localization.

As part of our strategy, we 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 typically seek to structure our arrangements in a way that provide us with payments from our partners of significant value for technology transfer early in the transfer process, requirements for ongoing purchases by our partners of components from us, and requirements for our partners to comply with certain performance conditions and reporting requirements, including quality, branding, and intellectual property protections. We believe these typical transaction structures provide for near-, mid- and long-term revenue and cash flow streams by building in program phases, technology transfer payments, license payments, required supply purchases, and recurring royalty or other long-term cash generation structures. We also typically structure our commercial transactions in China to restrict sales to that country and to position Ballard as the exclusive purchaser of fuel cell modules or fuel cell stacks manufactured by our partners in China for sale outside of China. We believe this structure provides us with additional flexibility in satisfying global market demand for our modules and stacks by supplementing or mitigating our mid- and long-term manufacturing strategy.

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 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.

### 3. SELECT ANNUAL FINANCIAL INFORMATION AND 2019 BUSINESS OUTLOOK

#### 3.1 Select Annual Financial Information

Results of Operations	Year ended,		
	2018	2017	2016
(Expressed in thousands of U.S. dollars, except per share amounts and gross margin %)			
Revenues	\$ 96,586	\$ 121,288	\$ 85,270
Gross margin	\$ 29,674	\$ 41,600	\$ 24,184
Gross margin %	31%	34%	28%
Total Operating Expenses	\$ 50,472	\$ 46,477	\$ 42,253
Cash Operating Costs <sup>(1)</sup>	\$ 42,982	\$ 39,053	\$ 34,338
Adjusted EBITDA <sup>(1)</sup>	\$ (13,465)	\$ 3,324	\$ (9,883)
Net loss attributable to Ballard	\$ (27,322)	\$ (8,048)	\$ (21,112)
Net loss per share attributable to Ballard, basic and diluted	\$ (0.15)	(0.05)	\$ (0.13)
Adjusted Net Loss <sup>(1)</sup>	\$ (23,364)	\$ (5,190)	\$ (19,286)
Adjusted Net Loss per share <sup>(1)</sup>	\$ (0.13)	\$ (0.03)	\$ (0.12)
<b>Financial Position</b>	<b>At December 31,</b>		
(expressed in thousands of U.S. dollars)	2018	2017	2016
Total assets	\$ 346,100	\$ 177,657	\$ 183,446
Cash, cash equivalents and short-term investments	\$ 192,235	\$ 60,255	\$ 72,628

<sup>1</sup> 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 2018 Performance compared to Revised 2018 Business Outlook

Although we did not provide specific financial performance guidance for 2018 during the first three quarters of 2018, we did however outline our qualitative outlook expectations for 2018 which are detailed in the 2018 Outlook section of our 2017 year-end MD&A. In summary and given the relatively early stage of development in some of our markets, the length and uncertainty of timing in contract award and program deliveries in 2018, together with the significant one-time contributions from key projects in 2017, we had expected revenue to be relatively flat in 2018, as compared to 2017 (with revenue of \$121.3 million), coincident with a strengthening of the underlying business mix for long-term growth prospects.

However as previously reported, Ballard's revenue in the third quarter of 2018 was lower than expected due primarily to slower growth in market demand in China which resulted in significantly reduced MEA sales to Synergy Ballard JVCo under our "take or pay" MEA supply agreement. This decline in the third quarter of 2018, and in our outlook for 2018, has been primarily the result of the relatively slow pace of hydrogen fueling station roll-out, along with evolving government subsidy rules and delays in FCEV certifications. During the third quarter of 2018, we also announced (i) a strategic collaboration with Weichai, (ii) the divestiture of our Power Manager business, and (iii) unveiled our next-generation fuel cell stack. We continue to position Ballard as the leading fuel cell technology provider in the FCEV market for Heavy Duty Motive applications. Given the uncertainties regarding Synergy Ballard JVCo's ability to meet its "take or pay" commitments under the MEA supply agreement, combined with the recent sale of the Power Manager business (which closed in

October 2018) and the associated absence of Power Manager-related revenue in the fourth quarter of 2018, we had therefore revised our revenue expectations for 2018 to approximately \$90 million to \$95 million.

Actual revenues in 2018 of \$96.6 million slightly exceeded this revised revenue outlook of between \$90 million to \$95 million and were primarily as a result of higher than expected Technology Solutions revenues in the fourth quarter of 2018.

### **3.3 2019 BUSINESS OUTLOOK**

Given the early stage of hydrogen fuel cell market development and adoption, and consistent with the Company's past approach, Ballard is not providing specific financial performance guidance for 2019. However, directionally the Company anticipates total revenue on a year-over-year basis in 2019 to be relatively flat to 2018, as work progresses on the establishment of the new joint venture operation in China with Weichai and on addressing commercial opportunities stemming from growing momentum in other key target markets.

During 2019, Ballard intends to focus on the early stage execution of the collaboration agreement with Weichai, further penetration of the European and California markets in certain Heavy and Medium Duty Motive applications, and continued investment in talent, technology, products and customer experience. The foundation for the 2019 Outlook includes a 12-Month Order Book of approximately \$69 million at the beginning of the year, along with a robust sales pipeline. Industry activity levels continue to increase in China, Europe and North America, including development programs, demonstration programs and commercial deployments.

In China, Ballard has been pursuing the development of a local fuel cell supply chain and related ecosystem to address the growing zero-emission bus and commercial vehicle markets. The collaboration with Weichai that closed in the fourth quarter of 2018 represents 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 has generated increased cash reserves and, moving forward, is expected to increase corporate revenue through the transfer of LCS technology and module designs and the sale of MEAs to the joint venture in which Ballard has a 49% minority position. During 2019, the Company plans to make additional capital contributions to Weichai Ballard JV of approximately \$21 million, including \$14.5 million which was contributed in February 2019. Ballard anticipates making additional contributions beyond 2019 in order to continue to fund our pro rata ownership share of Weichai Ballard JV's operations. In addition, the Company expects to record equity investment losses in joint venture and associates of approximately \$15 million to \$20 million in 2019 in connection with the operations of Weichai Ballard JV. Since the technology transfer and the establishment of operations in the joint venture will take some time, the proportion of total revenue generated from the China market in 2019 is expected to be lower than in 2018.

In Europe, during 2019 the Company will continue execution of the HyMotion program with Audi, will deliver a significant 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, and also expects increased market activity for FCEBs, which can be expected to result in additional module purchase orders. The proportion of total revenue generated from the European market is expected to increase in 2019, relative to 2018, largely offsetting the proportionate decline in revenue from China.

Within North America in 2019, Ballard expects increased market activity in California for FCEVs, which can be expected to result in additional module purchase orders. In addition, a consistent volume of fuel cell stack sales for forklift applications is also expected.

Technology Solutions revenue is expected to increase in 2019, underpinned by ongoing work on the HyMotion program with Audi, technology transfer activity in relation to the joint venture with Weichai, as well as engineering services activity with existing and new customers in the automotive, rail, material handling and UAV sectors. This revenue increase is expected to largely offset a decline in Heavy Duty Motive revenue.

In summary, given the relatively early stage of development in some markets and the uncertainty of timing in contract awards and program deliveries in 2019, Ballard expects revenue to be relatively flat compared to 2018, coincident with a strengthening of the underlying business mix for long-term growth prospects.

Our 2019 revenue outlook is supported by our 12-month Order Book of approximately \$69 million which is derived from our Order Backlog of approximately \$195 million as of December 31, 2018. 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 outlook for 2019 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 2019; sales orders received for units and services expected to be delivered in the remainder of 2019; an estimate with respect to the generation of new sales and the timing of deliveries in each of our markets for the balance of 2019; and assumes an average U.S. dollar exchange rate in the mid \$0.70’s in relation to the Canadian dollar for 2019.

The primary risk factors to our revised business outlook expectations for 2019 are customer or production delays in delivering against existing 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 / or Weichai; adverse macro-economic conditions, 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 Heavy-Duty market; 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 growth platform, which are reliant on their internal commercialization plans and budget requirements; 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 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. The Company's revenues, cash flows and other operating results can vary significantly from quarter to quarter. Sales and margins may be lower than anticipated due to general economic conditions, market-related factors, operating factors and competitive factors. Cash receipts may also vary from quarter to quarter due to the timing of cash collections from customers. 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. 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. It is likely that in one or more future quarters, financial results will fall below the expectations of securities analysts and investors. If this occurs, the trading price of the Company's shares may be materially and adversely affected.

## **4 RECENT DEVELOPMENTS (Including Contractual Updates)**

### **4.1 Corporate**

#### 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 ("LCS"), the FCgen®-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 8th-generation power module portfolio for use in Heavy-Duty Motive applications – including buses, commercial trucks and trains – planned for initial launch in 2019, and other applications such as forklifts.

Benefits of the FCgen®-LCS, compared to the current generation liquid-cooled fuel cell stack that it will replace, are expected to include lower cost, improved durability, high power density, freeze start capability, higher tolerance to operating conditions, simplified systems integration, and sustainability.

Ballard will continue to support the Company's existing customers where current generation FCvelocity®-9SSL fuel cell stack technology is used.





### Acquisition of assets of Automotive Fuel Cell Cooperation Corporation

On July 3, 2018, we announced that the acquisition of certain strategic assets of Automotive Fuel Cell Cooperation Corporation (“AFCC”), a private company owned by Daimler AG (“Daimler”) and Ford Motor Company (“Ford”). Pursuant to the wind-down of AFCC’s operations in Vancouver, which were co-located with Ballard at our headquarters, Daimler and Ford have instead in-housed and relocated their fuel cell stack development activities to their respective operations in Germany and the United States. As a result, Daimler and Ford agreed to sell AFCC assets to Ballard for approximately Canadian \$6 million.

This acquisition supports and accelerates our growth plans in two key respects. First, it immediately provides needed expansion of our product and material testing capabilities that will be used to support new and existing programs, products, as well as customers. In addition, we have acquired key production equipment that supports forecasted growth over the next five years. With these assets already in place and functioning within Ballard’s existing facilities, this transaction accelerated the expansion of our fuel cell testing, production and lab capacity at a lower cost, compared to acquiring new equipment. The acquired assets include testing equipment, prototype production equipment, and lab and quality inspection equipment.

### Filing of Base Shelf Prospectus ahead of expiry of existing Shelf Prospectus

Ballard had a shelf prospectus on file with the securities regulators in Canada and the United States, expiring on July 16, 2018. Prior to expiry of that shelf prospectus, we filed a final short form base shelf prospectus (“Prospectus”), which provides us continued flexibility to make offerings of securities during the effective period of the Prospectus, until July 2020. The 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 US\$150 million at any time during the 25-month period that the Prospectus remains effective. If any securities are offered under the 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.

## **4.2 China**

### Weichai Power Co., Ltd.

On November 13, 2018, we announced the closing of a strategic collaboration transaction with Weichai Power Co., Ltd. (“Weichai”), initially detailed 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 use of proceeds is expected to include investment in Ballard's core fuel cell business, equity contributions to a joint venture company established by Weichai and Ballard, and support of potential M&A transactions.

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 an initial 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). Subsequent to year-end, Weichai made its planned second capital contribution of RMB 102 million and Ballard made its planned second capital contribution of \$14.5 million (RMB 98 million equivalent). Weichai and Ballard will fund pro rata shares of the Weichai Ballard JV based on an agreed business plan. Weichai will hold three of five Weichai Ballard JV board seats and Ballard will hold 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 \$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 (\$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, Ballard received an initial 10%, or \$9.0 million prepayment from Weichai Ballard JV for this program. Ballard will also retain an exclusive right to the developed technologies outside China.

The Weichai Ballard JV will purchase MEAs for LCS fuel cell stacks exclusively from Ballard under a long-term supply agreement. Revenue earned from an MEA supply agreement (nil million to date) will be recorded as Heavy-Duty Motive revenues.

- Fuel Cell Sales – Weichai 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.

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.

On December 6, 2017, we announced that a subsidiary of strategic partner Broad-Ocean called Shanghai Edrive Co. Ltd. ("Shanghai Edrive") has commissioned its fuel cell engine manufacturing facility located in the City of Shanghai, China. Shanghai Edrive plans to primarily assemble Ballard FCveloCity® 30-kilowatt (kW) fuel cell engines at the facility under a technology transfer, licensing and supply arrangement between Ballard and Broad-Ocean that closed earlier in 2017. Broad-Ocean also has plans to assemble Ballard-designed engines at locations in Shandong and Hubei Provinces.

On June 5, 2017, we announced the closing of an approximate \$18 million supply contract with Broad-Ocean to support the expected deployment of 400 FCveloCity® fuel cell engines integrated into clean energy buses and trucks in key Chinese cities. This announcement, together with an approximate \$11 million transaction announced on April 6, 2017 for the planned deployment of 200 FCveloCity® fuel cell engines, means that Ballard is supporting Broad-Ocean through the expected deployment of 600 fuel cell engines having a total value of approximately \$29 million. All 600 fuel cell engines and related components were delivered by Ballard in 2017. Revenue earned from these agreements (nil million in 2018; \$20.7 million in the fourth quarter of 2017; \$28.7 million in fiscal 2017), which are complete, is recorded as Heavy-Duty Motive revenues.

On April 6, 2017, we also 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. In each of the three assembly operation locations, Broad-Ocean will also need to engage with local governments as well as with bus and commercial vehicle OEMs for deployment of fuel cell buses and commercial vehicles incorporating Ballard-designed modules manufactured by Broad-Ocean. Ballard will have the exclusive right to purchase fuel cell engines from any of the Broad-Ocean manufacturing operations for sale outside China. 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. Revenue earned from these Broad-Ocean technology transfer agreements (\$0.1 million in the fourth quarter of 2018; \$3.5 million in fiscal 2018; \$0.6 million in the fourth quarter of 2017; \$2.0 million in fiscal 2017) is recorded as Technology Solutions revenues.

Broad-Ocean has also expressed an interest in acquiring a 10% ownership position in the Weichai Ballard JV, which if transacted, would correspondingly reduce Ballard's ownership

position from 49% to 39%. Discussions regarding this investment are currently underway between the parties.

On August 18, 2016, Broad-Ocean purchased 17.25 million Ballard common shares issued from treasury for total proceeds to Ballard of \$28.3 million. The investment represented approximately 9.9% of Ballard's outstanding common shares following the transaction. Broad-Ocean and Ballard also entered into 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.

#### 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 Technology 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, based on 3 shifts running 5-days per week.

The joint venture transaction and related sales agreements, which closed on October 25, 2016 and originally announced on July 18, 2016, had a contemplated minimum sales value to Ballard of approximately \$170 million over 5-years (of which approximately \$53 million has been recognized as of December 31, 2018) include these key elements:

- Ballard provided approximately \$20 million of technology transfer services, test equipment, production equipment specification and procurement services, training and commissioning support in relation to the establishment of a production line in Yunfu for the manufacture and assembly of FCvelocity®-9SSL fuel cell stacks. Revenue earned from the technology transfer agreements (\$0.1 million in fiscal 2018; \$1.7 million in the fourth quarter of 2017; \$16.0 million in fiscal 2017; \$4.4 million in fiscal 2016), which are effectively complete, is recorded primarily as Technology Solutions revenues.
- Ballard's exclusive supply of membrane electrode assemblies ("MEA"s), a key component of every fuel cell, for each fuel cell stack manufactured by Synergy Ballard JVCo, with minimum annual MEA volume commitments with 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. Revenue earned from the MEA supply agreement (\$0.8 million in the fourth quarter of 2018; \$17.5 million in fiscal 2018; \$4.7 million in the fourth quarter of 2017; \$14.9 million in fiscal 2017; nil million in fiscal 2016) is recorded as Heavy-Duty Motive revenues.

As a result of various Chinese market circumstances, including dynamic 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 fourth quarter of 2018 and first quarter of 2019 MEA shipments. As previously noted, our Order Backlog and our 12-month Order Book, which had prior to the end of the third quarter of 2018 included certain contractual commitments under the MEA supply agreement with Synergy Ballard JVCo, are subject to risk including risks related to market demand for Synergy Ballard JVCo’s products, and risks related to the ability of Synergy Ballard JVCo to finance its operations including fulfilling its purchase commitments to us under the MEA supply agreement. As a result, there continues to be no reasonable assurance that Synergy Ballard JVCo will be able to meet the “take or pay” purchase commitment going forward. Accordingly, we have continued to remove all remaining purchase commitments in the MEA supply agreement from the Order Backlog and 12-month Order Book.

Synergy Ballard JVCo has an exclusive right to manufacture and sell FCvelocity®-9SSL stacks in China. Exclusivity is subject to Synergy Ballard JVCo achieving certain performance criteria, including compliance with: a code of ethics; Ballard’s quality policies and branding practices; payment terms; and certain intellectual property covenants; as well as achievement of the minimum annual contemplated “take or pay” MEA volume commitments. We remain in discussions with Synergy Ballard JVCo to address current issues and future opportunities including the status of the MEA supply and related agreements.

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 its 10% interest in Synergy Ballard JVCo in 2017. We have no obligation to provide future funding to Synergy Ballard JVCo.

#### China - Other

On September 28, 2015, we announced the signing of a joint development agreement and a supply agreement to develop and commercialize a fuel cell engine specifically designed for integration into low floor trams manufactured by CRRC Qingdao Sifang Company, Ltd. (“CRRC Sifang”), a Chinese rolling stock manufacturer. The agreements include delivery of ten customized FCvelocity® modules and have an initial expected value of approximately \$6 million. Ballard has developed a new prototype configuration of its FCvelocity® fuel cell module to deliver 200 kilowatts of net power for use in powering trams in urban deployments. An initial deployment of eight fuel cell-powered trams is planned by CRRC Sifang and the City of Foshan on the Gaoming Line. With delays in the construction of the Gaoming Line, deployment of these trams by CRRC Sifang is now expected to occur starting in 2019. As of June 30, 2018, we had delivered all ten FCvelocity®-HD7 200-kilowatt fuel cell modules in support of this program. Revenue earned from these agreements (nil million in the fourth quarter of 2018; \$2.3 million in fiscal 2018; nil million in the fourth quarter of 2017; \$3.1 million fiscal 2017; \$0.9 million in fiscal 2016), which are effectively complete, is recorded as either Heavy-Duty Motive or Technology Solutions revenues depending on the nature of work performed.



### 4.3 Europe

#### Eniig and Fibia A/S

On February 5, 2019, we announced that the Company's European 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. Ballard also received initial orders for a total of 30 FCgen®-H2PM 5-kilowatt (kW) systems, including installation, hydrogen storage and power management equipment, having a total value of approximately \$1.2 million under these Framework Agreements. This includes 20 systems for Eniig and 10 systems for Fibia. Revenue earned from these agreements (nil million to date) will be recorded as Backup Power revenues.

#### Audi AG

On June 11, 2018, we announced the signing of a 3.5 year extension to our current technology solutions contract with AUDI AG ("Audi"), part of the Volkswagen Group ("Volkswagen AG"), extending the HyMotion 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). The program, through a series of technical milestone awards, will support Audi through its small series production launch. The HyMotion program 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 related agreements with Audi (\$8.8 million in the fourth quarter of 2018; \$26.6 million in fiscal 2018; \$5.0 million in the fourth quarter of 2017; \$18.0 million in fiscal 2017; \$13.9 million in fiscal 2016) are recorded as Technology Solutions revenues.

#### ABB Marine & Ports

On June 27, 2018, we announced signing of a Memorandum of Understanding ("MOU") with ABB to undertake collaboration activities toward the development of megawatt (MW) scale PEM fuel cell power systems for the marine market, with an initial focus on the cruise ship segment. The multi-year collaboration between Ballard and ABB will include joint market development activities, systems design and development work, as well as systems testing and validation activities. The goal will be development of commercial ready MW-scale containerized PEM fuel cell power systems for the marine market, with an initial focus on the cruise ship segment. These systems could be used in a variety of ways, including provision of power for hotel operations while cruise ships are docked at port as well as the provision of primary propulsion power when ships are at sea. Revenue earned from this and related agreements (\$0.2 million in fiscal 2018) will be recorded as Technology Solutions revenues.

## Van Hool NV

On May 1, 2018, we announced the receipt of a purchase order from Van Hool NV (“Van Hool”), a bus OEM in Belgium, for 40 FCveloCity®-HD fuel cell modules to power buses under the Joint Initiative for Hydrogen Vehicles across Europe (“JIVE”) funding programs. The purchase order is further to Ballard’s announcement of a Letter of Intent, which was issued on February 28, 2018. Ballard continues to make initial shipments of the FCveloCity®-HD 85 kilowatt modules in 2018, with initial deliveries of buses by Van Hool expected in 2019. Van Hool plans to deploy 30 buses with the Regionalverkehr Köln GmbH transit agency in Cologne, Germany, and the remaining 10 buses with WSW mobil GmbH transit agency in Wuppertal, Germany. Revenue earned from this agreement with Van Hool (\$0.8 million in the fourth quarter of 2018; \$1.2 million in fiscal 2018 and to date) is recorded as Heavy-Duty Motive revenues.

On September 13, 2017, we announced the acceptance of a Letter of Intent to provide FCveloCity®-HD 100-kilowatt fuel cell engines to power ExquiCity tram-buses to be built by Van Hool for delivery in Pau, France to the SMTU-PPP (Syndicat Mixte de Transports urbains – Pau Portes des Pyrénées) and the STAP (Société de Transport de l’Agglomération Paloise). During the second quarter of 2018, we finalized contracting for this order and have now delivered the fuel cell engines to Van Hool. Revenue earned from this and other agreements under the 3Emotion European program with Van Hool (\$1.5 million in the fourth quarter of 2018; \$2.2 million in fiscal 2018 and to date) is recorded as Heavy-Duty Motive 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 (\$0.2 million in the fourth quarter of 2018; \$1.8 million in fiscal 2018; \$0.7 million in the fourth quarter of 2017 and in fiscal 2017) is recorded as Technology Solutions revenue.

## **4.4 North America**

### Protonex Technology Corporation – Divestiture of Power Manager assets

On October 5, 2018, we closed the previously announced transaction (on August 31, 2018) to divest certain assets of the Company’s subsidiary, Protonex Technology Corporation (“Protonex”), related to the Power Manager business to Revision Military Ltd. (“Revision”), a private U.S.-based company. 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 the second quarter of 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 Protonex assets related to fuel cell propulsion systems for unmanned vehicles, under the Ballard brand. We decided to divest assets of the Protonex Power Manager assets as they were considered to be no longer aligned with Ballard’s strategic fuel cell focus, while retaining Protonex assets related to the unmanned systems

market. The divestiture reduces complexity while adding resources for us to invest in our core fuel cell business. In 2015, Ballard paid approximately \$17.5 million in shares and cash to acquire Protonex, which included the Power Manager business, a Solid Oxide Fuel Cells business which was divested in January 2018, and the unmanned systems business.

During the fourth quarter of 2018, we recorded a loss on sale of assets of (\$4.0) million for 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. The estimate of the ultimate transaction price, including the estimate of the amount of earn-out variable consideration that is considered constrained of \$2.0 million, will be reassessed each quarter-end during 2019. Any change in the estimated transaction price will result in an adjustment to the above noted loss on sale of assets which will be recognized on a prospective basis.

#### Protonex Technology Corporation – Revenue contracts and other

On June 25, 2018, we announced that Protonex had received a \$1.0 million order for the supply of SPM-622 Squad Power Manager Kits to support U.S. Army brigades deploying overseas. Revenue earned from this agreement (nil million to date) is recorded as Portable Power revenues. This agreement was transferred to Revision on the sale of the Power Manager assets.

On March 26, 2018, we announced that Protonex had received a \$1.9 million follow-on purchase order for the supply of SPM-622 Squad Power Manager Kits to support U.S. Army Security Force Assistance Brigades (SFAB). Revenue earned from this agreement (nil million in the fourth quarter of 2018; \$1.9 million in fiscal of 2018), which is complete, is recorded as Portable Power / UAV revenues.

On January 30, 2018, we announced that Protonex received a \$1.6 million purchase order for the supply of SPM-622 Squad Power Manager Kits for end customer U.S. Special Operations Command. The purchase order was the first issued by the Program Executive Office (PEO) – Soldier, as part of the newly approved program of record, with Milestone C approval having been received in 2017. Revenue earned from this agreement (nil million in the fourth quarter of 2018; \$1.6 million in fiscal of 2018), which is complete, is recorded as Portable Power / UAV revenues.

#### Protonex Technology Corporation – Divestiture of Solid Oxide Fuel Cell assets

On January 3, 2018, we announced that as a result of our strategic review in 2017 of our Protonex subsidiary, we implemented certain changes at Protonex including the divestiture of certain non-core assets. This action is in addition to steps taken in August 2017 to reduce and align the Protonex cost base. In the fourth quarter of 2017, it was determined that certain of Protonex' Solid Oxide Fuel Cells ("SOFC") assets were not core to Ballard's PEM fuel cell business, and the Company decided to divest these non-core assets. As a result, certain SOFC assets were transferred to a private, start-up company, Upstart Power Inc. ("Upstart"), effective December 31, 2017, for nominal consideration. This action enabled Ballard to significantly reduce the cost structure at Protonex. During the fourth quarter of 2017, we recorded a loss on sale of assets of (\$0.5) million related primarily to the sale of SOFC inventory to Upstart. We also recorded impairment losses of (\$1.5) million in the fourth quarter of 2017 related to a write-down of certain SOFC intangible assets and

property, plant and equipment.

#### Hyster-Yale Group, Inc.

On April 30, 2018, we announced the signing of a Master Supply Agreement (“MSA”) with Hyster-Yale Group, Inc. (“Hyster-Yale”) encompassing the supply of minimum annual volumes of Ballard FCgen®-1020 air-cooled fuel cell stacks for use in powering Class 3 lift trucks and support on the design of a fuel cell electric propulsion system to power these lift trucks. The MSA runs until 2022. Hyster-Yale is a leading global lift truck OEM. In 2014, Hyster-Yale’s acquisition of Nuvera activated a strategy to design purpose-built, optimized fuel cell-powered lift trucks, and put in place significant expertise and capabilities for fuel cells. The collaboration with Ballard, Nuvera, and Hyster-Yale will focus on air-cooled stacks for low power applications, complementing the existing Nuvera fuel cell solutions. Revenue earned from this agreement will be recorded as Material Handling revenues.

#### New Flyer Industries Inc.

On February 13, 2017, we announced the Company’s membership in the “Fuel Cell Electric Bus Commercialization Consortium” (FCEBCC), a large-scale project for which funding has now been committed to support deployment of 20 zero-emission hydrogen fuel cell electric buses at two California transit agencies. Ten buses are to be deployed with Alameda Contra-Costa Transit District (AC Transit) and 10 buses are to be deployed with the Orange County Transportation Authority (OCTA). In support, Ballard has provided its FCveloCity®-HD 85-kilowatt fuel cell engines to New Flyer of America Inc., a subsidiary of New Flyer Industries Inc. (“New Flyer”), the largest transit bus and motor coach manufacturer and parts distributor in North America. Ballard’s engines are to power New Flyer 40-foot Xcelisior XHE40 fuel cell buses, which are planned to be delivered by New Flyer and in-service with AC Transit and OCTA starting in late 2018 and into 2019. The buses are to be supported by advanced hydrogen fueling infrastructure provided by The Linde Group. Revenue earned from this and other agreements with New Flyer (\$3.5 million in the fourth quarter of 2018; \$6.9 million in fiscal 2018 and to date) is recorded as Heavy-Duty Motive revenues.

### **4.5 Other**

#### 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 related agreements (\$0.4 million in the fourth quarter of 2018; \$1.3 million in fiscal 2018; \$0.7 million in the fourth quarter of 2017; \$1.6 million in fiscal 2017), which are effectively complete, is recorded as Technology Solutions revenues.

This followed an announcement that Nisshinbo and Ballard had successfully collaborated on

development of the world's first NPMC-based PEM fuel cell product – the FCgen®-1040 – which is a new 30-watt air-cooled fuel cell stack incorporating NPMC with possible uses in ultralight-weight applications such as laptop and cell phone chargers, and military soldier power devices. The NPMC is an innovative technology enabling a reduction in product cost through the use of significantly lower amounts of platinum.

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 (\$0.9 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 our sale of the Power Manager assets in the fourth quarter of 2018, we have 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, and product and service revenues generated from the retained Protonex assets related primarily to fuel cell propulsion systems for unmanned systems.



## 5.2 Summary of Key Financial Metrics – Three Months Ended December 31, 2018

### Revenue and gross margin

(Expressed in thousands of U.S. dollars)

Three months ended December 31,

Fuel Cell Products and Services	2018	2017	\$ Change	% Change
Heavy-Duty Motive	\$ 10,629	\$ 26,551	\$ (15,922)	(60%)
Portable Power / UAV	371	1,510	(1,139)	(75%)
Material Handling	3,202	1,307	1,895	145%
Backup Power	1,366	712	654	92%
Technology Solutions	12,909	10,177	2,732	27%
<b>Revenues</b>	<b>28,477</b>	<b>40,257</b>	<b>(11,780)</b>	<b>(29%)</b>
Cost of goods sold	21,285	27,661	(6,376)	(23%)
<b>Gross Margin</b>	<b>\$ 7,192</b>	<b>\$ 12,596</b>	<b>\$ (5,404)</b>	<b>(43%)</b>
Gross Margin %	25%	31%	n/a	(6 pts)

Fuel Cell Products and Services Revenues of \$28.5 million for the fourth quarter of 2018 declined (29%), or (\$11.8) million, compared to the fourth quarter of 2017. The (29%) decline was driven by significantly lower Heavy-Duty Motive and Portable Power / UAV revenues, which was partially offset by increases in Technology Solutions, Material Handling and Backup Power revenues.

Heavy-Duty Motive revenues of \$10.6 million decreased (\$15.9) million, or (60%), due primarily to lower shipments of a variety of fuel cell bus products to customers, principally 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 \$10.6 million in the fourth quarter of 2018 include \$0.8 million for shipments of MEAs under the MEA Supply Agreement with Synergy Ballard JVCo for use in their manufacture and assembly of FCveloCity® fuel cell stacks in China; \$2.8 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; and \$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. Heavy-Duty Motive revenues of \$26.6 million in the fourth quarter of 2017 include \$20.7 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products and MEAs to Broad-Ocean to complete both of the \$11 million supply contract announced on April 6, 2017 for 200 FCveloCity® fuel cell engines and the \$18 million supply contract announced on June 5, 2017 for 400 FCveloCity® fuel cell engines; and \$4.7 million for shipments of MEAs under the MEA Supply Agreement with Synergy Ballard JVCo.

Technology Solutions revenues of \$12.9 million increased by \$2.7 million, or 27%, due primarily to higher amounts earned from the Audi program which more than offset declines as a result of the completion in 2017 of the technology transfer and related agreements with Synergy Ballard JVCo. Amounts earned of \$12.9 million in the fourth quarter of 2018 were from a variety of customer programs including amounts earned from the Audi program of \$8.8 million; the Weichai Ballard JV technology transfer program of \$1.2 million; the program with the unnamed strategic customer of \$0.9 million; the Nisshinbo program of \$0.4 million; the Siemens development program of \$0.2 million; and the Broad-Ocean

technology transfer program of \$0.1 million. Amounts earned of \$10.2 million in the fourth quarter of 2017 were also from a variety of customer programs including amounts earned from the Audi program revenues of \$5.0 million; Synergy Ballard JVCo of \$1.4 million on the completed in 2017 FCvelocity®-9SSL fuel cell stack production line in Yunfu, China; the Siemens development program of \$0.7 million; the Nisshinbo program of \$0.7 million; the Broad-Ocean technology transfer program of \$0.6 million; and amounts earned on a variety of other programs including the HDF distributed generation project, the TRC and CRRC Sifang tram development projects, and the project to enable Synergy Group to exclusively manufacture and sell Ballard's direct hydrogen FCgen®-H2PM fuel cell backup power systems in China. Audi program revenues were also negatively impacted by approximately (\$0.5) million in the fourth quarter of 2018, as compared to the fourth quarter of 2017, as a result of an approximate (4%) 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.

Material Handling revenues of \$3.2 million increased \$1.9 million, or 145%, primarily as a result of higher stack shipments to Plug Power combined with the impact of a higher average selling price due to product mix.

Portable Power / UAV revenues of \$0.4 million decreased (\$1.1) million, or (75%), as a result of lower product and service revenues generated by Protonex primarily as a result of the disposition of the Power Manager assets in October 2018.

Backup Power revenues of \$1.4 million increased \$0.7 million, or 92%, due primarily to an increase in hydrogen-based backup power product and service revenues in Europe and Japan for backup power applications.

Fuel Cell Products and Services gross margins were \$7.2 million, or 25% of revenues, for the fourth quarter of 2018, compared to \$12.6 million, or 31% of revenues, for the fourth quarter of 2017. The decline in gross margin of (\$5.4) million, or (43%), was driven primarily by the (29%) decrease in total revenues, combined with a shift to a slightly lower overall margin product and service revenue mix resulting in a (6) percentage point decrease in gross margin as a percent of revenues. Gross margin in the fourth quarter of 2017 particularly benefited from the increase in higher margin Heavy-Duty Motive revenues, combined with improved manufacturing overhead and related cost absorption as a result of improved scale and efficiency.

Gross margin in the fourth quarter of 2018 was also negatively impacted by net inventory adjustments of (\$0.7) million related primarily to excess and impaired inventory; whereas Gross margin in 2017 benefited from positive net warranty adjustments of \$0.7 million related primarily to contractual expirations and improved lifetimes and reliability of our Heavy-Duty Motive products.

## Cash Operating Costs

		Three months ended December 31,			
<i>(Expressed in thousands of U.S. dollars)</i>					
	2018	2017	\$ Change	% Change	
Research and Product Development (cash operating cost)	\$ 5,718	\$ 6,730	\$ (1,012)	(15%)	
General and Administrative (cash operating cost)	3,514	2,544	970	38%	
Sales and Marketing (cash operating cost)	1,965	1,970	(5)	(-%)	
<b>Cash Operating Costs</b>	<b>\$ 11,197</b>	<b>\$ 11,244</b>	<b>\$ (47)</b>	<b>-%</b>	

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 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, unrealized gains or losses on foreign exchange contracts, acquisition costs and financing charges.

Cash Operating Costs (see Supplemental Non-GAAP Measures) for the fourth quarter of 2018 were \$11.2 million, relatively flat to the fourth quarter of 2017. The minor decrease was driven by lower product development cash operating costs of (\$1.0) million, offset by an increase in general and administrative cash operating costs of \$1.0 million, as sales and marketing cash operating costs were relatively flat period over period.

The minor decrease in cash operating costs in the fourth quarter of 2018 was driven primarily by lower expenses in Protonex 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 (4%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These cost reductions were effectively offset by higher general and administrative costs due primarily to higher realized losses on our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs, and by higher legal and advisory costs due to the timing of transactional contracting and human resources costs.

## Adjusted EBITDA

		Three months ended December 31,			
<i>(Expressed in thousands of U.S. dollars)</i>					
	2018	2017	\$ Change	% Change	
<b>Adjusted EBITDA</b>	<b>\$ (5,194)</b>	<b>\$ 2,086</b>	<b>\$ (7,280)</b>	<b>(349%)</b>	

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 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) for the fourth quarter of 2018 was (\$5.2) million, compared to \$2.1 million for the fourth quarter of 2017. The (\$7.3) million decline in Adjusted EBITDA was driven primarily by the (\$5.4) million decrease in gross margin as a result of the (29%) decline in overall revenues combined with the (6) point reduction in gross margin as a percent of revenues, as Cash Operating Costs were relatively flat period over period. In addition, Adjusted EBITDA in 2018 was negatively impacted by higher equity investment losses in joint venture and associates of (\$1.4) million, and by higher restructuring expenses of (\$0.5) million.

In addition and as noted above, operating costs in the fourth quarter of 2018 were impacted by the positive impact of a weaker Canadian dollar, relative to the U.S. dollar, as compared to the fourth quarter of 2017. 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 (4%), or (5) basis points, lower in the fourth quarter of 2018 as compared to the fourth quarter of 2017, positive foreign exchange impacts on our Canadian operating cost base and Adjusted EBITDA were approximately \$0.6 million. A \$0.01 decrease in the Canadian dollar, relative to the U.S. dollar, positively impacts annual Adjusted EBITDA by approximately \$0.5 million.

### ***Net income (loss)***

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,			
	<b>2018</b>	2017	\$ Change	% Change	
<b>Net income (loss)</b>	\$ (11,475)	\$ (2,887)	\$ (8,588)	(297%)	

Net loss for the fourth quarter of 2018 was (\$11.5) million, or (\$0.06) per share, compared to a net loss of (\$2.9) million, or (\$0.02) per share, in the fourth quarter of 2017. The (\$8.6) million increase in net loss in the fourth quarter of 2018 was driven primarily by the increase in Adjusted EBITDA loss of (\$7.3) million, and by an increase in loss on sale of assets of (\$3.5) million, partially offset by lower asset impairment charges of \$1.5 million.

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 the divestiture by Protonex of its Power Manager assets to Revision. Net loss in the fourth quarter of 2017 was negatively impacted by a loss on sale of assets of (\$0.5) million and asset impairment charges of (\$1.5) million both related primarily to the divestiture of certain SOFC assets during the Upstart Transaction. Excluding the impact of asset impairment charges, transactional gains and losses, and acquisition costs, Adjusted Net Loss (see Supplemental Non-GAAP Measures) in the fourth quarter of 2018 was (\$7.5) million, or (\$0.04) per share, compared to (\$0.9) million, or (\$0.01) per share, for the fourth quarter of 2017.

### ***Cash provided by (used in) operating activities***

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,			
	<b>2018</b>	2017	\$ Change	% Change	
<b>Cash provided by (used in) operating activities</b>	\$ 188	\$ (728)	\$ 916	126%	

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. Cash used in operating activities in the fourth quarter of 2017 was (\$0.7) million, consisting of cash operating income of \$1.7 million partially offset by net working capital outflows of (\$2.4) million. The \$0.9 million improvement in cash provided by (used in) operating activities in the fourth quarter of 2018, as compared to the fourth quarter of 2017, as compared to the fourth quarter of 2017, was driven by the relative decrease in working capital requirements of \$7.1 million, partially offset by the increase in cash operating losses of (\$6.1) million. The relative (\$6.1) million increase in cash operating losses in the fourth quarter of 2018 was due primarily to the increase in Adjusted EBITDA loss of (\$7.3) million, partially offset by higher equity investment losses in joint venture and associates of \$1.4 million which are included in Adjusted EBITDA but excluded from cash operating losses.

The total change in working capital of \$4.6 million in the fourth quarter of 2018 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.

This compares to a total change in working capital of (\$2.4) million in the fourth quarter of 2017 which was driven by higher accounts receivable of (\$5.7) million primarily as a result of the timing of revenues and the related customer collections, and by lower deferred revenue of (\$1.5) 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. These fourth quarter of 2017 outflows were partially offset by higher accounts payable and accrued liabilities of \$2.1 million as a result of the timing of supplier payments and annual compensation awards, by lower inventory of \$2.0 million as we delivered expected Heavy-Duty Motive shipments to customers in the last quarter of 2017, and by higher accrued warranty obligations of \$0.8 million due to increased product shipments.

### 5.3 Summary of Key Financial Metrics – Year Ended December 31, 2018

#### *Revenue and gross margin*

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,			
Fuel Cell Products and Services	2018	2017	\$ Change	% Change	
Heavy-Duty Motive	\$ 39,464	\$ 63,684	\$ (24,220)	(38%)	
Portable Power / UAV	7,109	4,468	2,641	59%	
Material Handling	8,010	7,535	475	6%	
Backup Power	2,426	1,933	493	26%	
Technology Solutions	39,577	43,668	(4,091)	(9%)	
<b>Revenues</b>	<b>96,586</b>	121,288	(24,702)	(20%)	
Cost of goods sold	66,912	79,688	(12,776)	(16%)	
<b>Gross Margin</b>	<b>\$ 29,674</b>	\$ 41,600	\$ (11,926)	(29%)	
Gross Margin %	<b>31%</b>	34%	n/a	(3 pts)	

Fuel Cell Products and Services Revenues of \$96.6 million in 2018 decreased (20%), or (\$24.7) million, compared to 2017. The (20%) decline was driven by lower Heavy-Duty Motive and Technology Solutions revenues, which more than offset increases in Portable Power / UAV, Backup Power and Material Handling revenues.

Heavy-Duty Motive revenues of \$39.5 million decreased (\$24.2) million, or (38%), due primarily to decreased shipments of a variety of fuel cell products to customers, principally 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 \$39.5 million in 2018 include \$17.5 million for shipments of MEAs under the MEA Supply Agreement with Synergy Ballard JVCo for use in

their manufacture and assembly of FCveloCity® fuel cell stacks in China; \$5.9 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; \$2.3 million for shipments of FCveloCity®-HD7 200-kilowatt fuel cell modules to CRRC Sifang for their tram project; and \$6.9 million to New Flyer and \$3.4 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs. Heavy-Duty Motive revenues of \$63.7 million in 2017 include \$28.7 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products and MEAs to Broad-Ocean to complete both of the \$11 million supply contract announced on April 6, 2017 for 200 FCveloCity® fuel cell engines and the \$18 million supply contract announced on June 5, 2017 for 400 FCveloCity® fuel cell engines. Heavy-Duty Motive revenues in 2017 also include \$14.9 million for shipments of MEAs under the MEA Supply Agreement with Synergy Ballard JVCo; \$8.7 million for shipments of FCvelocity®-9SSL fuel cell stacks to Synergy Group for a variety of programs; \$2.9 million of shipments of FCveloCity®-HD7 200-kilowatt fuel cell modules to CRRC Sifang, \$2.5 million of shipments of FCveloCity®-HD7 85-kilowatt fuel cell modules to Solaris, and \$2.1 million of shipments of FCveloCity®-HD6 150-kilowatt fuel cell modules to Sunline.

Technology Solutions revenues of \$39.6 million decreased (\$4.1) million, or (9%), due primarily to lower amounts earned in 2018 from technology transfer and related agreements with Synergy Ballard JVCo, partially offset by increases in amounts earned on other the Audi and other programs. Amounts earned of \$39.6 million in 2018 were from a variety of customer programs including amounts earned from the Audi program of \$26.6 million; the Broad-Ocean technology transfer program of \$3.5 million; the program with the unnamed strategic customer of \$0.9 million; the Siemens development program of \$1.8 million; the Nisshinbo program of \$1.3 million; and the Weichai Ballard JV technology transfer program of \$1.2 million. Amounts earned of \$43.7 million in 2017 were also from a variety of customer programs including amounts earned from the Audi program of \$18.0 million; Synergy Ballard JVCo of \$15.1 million on the completed in 2017 FCvelocity®-9SSL fuel cell stack production line in Yunfu, China; the Broad-Ocean technology transfer program of \$2.0 million; the Nisshinbo program of \$1.6 million; the Siemens development program of \$0.7 million; and amounts earned on a variety of other programs including the HDF distributed generation project, the TRC and CRRC Sifang tram development projects, and the project to enable Synergy Group to exclusively manufacture and sell Ballard's direct hydrogen FCgen®-H2PM fuel cell backup power systems in China. Audi service revenues were nominally impacted in 2018, as compared to 2017, 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 \$8.0 million increased \$0.5 million, or 6%, primarily as a result of product mix to Plug Power as slightly lower stack shipments benefited by a higher average selling price.

Portable Power / UAV revenues of \$7.1 million increased \$2.6 million, or 59%, due to higher product revenues generated by Protonex prior to the disposition of the Power Manager assets in October 2018, partially offset by lower service revenues. Revenues from Protonex in 2018 include \$1.9 million of product shipments of SPM-622 Squad Power Manager Kits to complete a \$1.9 million purchase order from U.S. Army Security Force Assistance Brigades



(SFAB), and \$1.6 million of shipments of SPM-622 Squad Power Manager Kits to complete a purchase order for end customer U.S. Special Operations Command.

Backup Power revenues of \$2.4 million increased \$0.5 million, or 26%, due primarily to an increase in hydrogen-based backup power product and service revenues in Europe and Japan for a variety of backup power applications.

Fuel Cell Products and Services gross margins were \$29.7 million, or 31% of revenues, for 2018, compared to \$41.6 million, or 34% of revenues, for 2017. The decline in gross margin of (\$11.9) million, or (29%), was driven primarily by the (20%) decrease in total revenues, combined with a shift to slightly lower overall margin product and service revenue mix resulting in a (3) percentage point decline in gross margin as a percent of revenues. Gross margin in 2017 particularly benefited from the increase in higher margin Technology Solutions revenues (particularly including amounts earned from Synergy Ballard JVCo related to the completed in 2017 FCvelocity®-9SSL fuel cell stack production operation in Yunfu, China) and from the increase in higher margin Heavy-Duty Motive revenues.

Gross margin in 2018 was also negatively impacted by net inventory adjustments of (\$1.0) million related primarily to excess and impaired inventory, and negatively impacted by warranty adjustments of (\$0.9) million related primarily to increased Heavy-Duty Motive service costs. Gross margin in 2017 benefited from positive net warranty adjustments of \$0.7 million related primarily to contractual expirations and improved lifetimes and reliability of our Heavy-Duty Motive products.

### **Cash Operating Costs**

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,			
	2018	2017	\$ Change	% Change	
Research and Product Development (cash operating cost)	\$ 23,755	\$ 21,332	\$ 2,423	11%	
General and Administrative (cash operating cost)	11,705	10,248	1,457	14%	
Sales and Marketing (cash operating cost)	7,522	7,473	49	1%	
<b>Cash Operating Costs</b>	<b>\$ 42,982</b>	<b>\$ 39,053</b>	<b>\$ 3,929</b>	<b>10%</b>	

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 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, unrealized gains or losses on foreign exchange contracts, acquisition costs and financing charges.

Cash Operating Costs (see Supplemental Non-GAAP Measures) in 2018 were \$43.0 million, an increase of \$3.9 million, or 10%, compared to 2017. The \$3.9 million, or 10%, increase was driven primarily by an increase in research and product development cash operating costs of \$2.4 million, combined with increases in general and administrative cash operating costs of \$1.5 million and nominal increases in sales and marketing cash operating costs.

The 10% increase in cash operating costs in 2018 was driven primarily by increased investment in research and product development 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 high performance liquid-cooled fuel cell stack, the FCgen®-LCS. In addition, operating expenses were negatively impacted by increased investment to support our commercial efforts in China, and by increased general

and administrative costs due primarily to higher realized losses on our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs, and by higher legal and advisory costs due to the timing of transactional contracting and human resources costs. These cost increases were partially offset by lower costs at Protonex as a result of the Company's rationalization initiatives undertaken in the third and fourth quarters of 2017 and by the disposition of the Power Manager assets and associated personnel in October 2018.

### **Adjusted EBITDA**

	Year ended December 31,			
	2018	2017	\$ Change	% Change
<b>Adjusted EBITDA</b>	\$ (13,465)	\$ 3,324	\$ (16,789)	(505%)

(Expressed in thousands of U.S. dollars)

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 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) in 2018 was (\$13.5) million, compared to \$3.3 million for 2017. The (\$16.8) million decline in Adjusted EBITDA was driven by the (\$11.9) million decrease in gross margin as a result of the (20%) decline in overall revenues combined with the (3) point reduction in gross margin as a percent of revenues, and by the increase in Cash Operating Costs of (\$3.9) million primarily as a result of higher research and product development and general and administrative cash operating costs, and by higher equity investment losses in joint venture and associates of (\$1.4) million, partially offset by lower restructuring expenses of \$0.3 million.

Operating costs in 2018 were nominally impacted by the impact of changes in the Canadian dollar, relative to the U.S. dollar, as the average annual rate for 2018 was consistent with the average annual rate for 2017. 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. A \$0.01 increase in the Canadian dollar, relative to the U.S. dollar, negatively impacts annual Cash Operating Costs and Adjusted EBITDA by approximately (\$0.5) million.

### **Net income (loss)**

	Year ended December 31,			
	2018	2017	\$ Change	% Change
<b>Net income (loss)</b>	\$ (27,323)	\$ (8,048)	\$ (19,275)	(239%)

(Expressed in thousands of U.S. dollars)

Net loss in 2018 was (\$27.3) million, or (\$0.15) per share, compared to a net loss of (\$8.0) million, or (\$0.05) per share, in 2017. The (\$19.3) million increase in net loss in 2018 was driven primarily by the increase in Adjusted EBITDA loss of (\$16.8) million, combined with higher finance and other expense of (\$2.2) million in 2018 due primarily to higher foreign exchange losses, and an increase in loss on sale of assets of (\$2.7) million. These net (loss) increases in 2018 were partially offset by lower income tax expense of \$1.2 million related to withholding taxes on certain Chinese commercial contracts, and by lower asset impairment charges of \$1.5 million.

As noted above, net loss in 2018 was negatively impacted by a loss on sale of assets of (\$4.0) million related to the divestiture by Protonex of its Power Manager assets to Revision.

Net loss in 2017 was negatively impacted by a loss on sale of assets of (\$0.5) million and asset impairment charges of (\$1.5) million both related to the divestiture of certain SOFC assets during the Upstart Transaction, and by a loss on sale of assets of (\$0.9) million as a result of the CHEM Backup Power Transaction. Excluding the impact of asset impairment charges, transactional gains and losses, and acquisition costs, Adjusted Net Loss (see Supplemental Non-GAAP Measures) in 2018 was (\$23.4) million, or (\$0.13) per share, compared to (\$5.2) million, or (\$0.03) per share, for 2017.

### **Cash provided by (used in) operating activities**

*(Expressed in thousands of U.S. dollars)*

	Year ended December 31,			
	2018	2017	\$ Change	% Change
<b>Cash provided by (used in) operating activities</b>	<b>\$ (31,688)</b>	<b>\$ (9,768)</b>	<b>\$ (21,920)</b>	<b>(224%)</b>

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. Cash used in operating activities in 2017 was (\$9.8) million, consisting of cash operating income of \$2.5 million offset by net working capital outflows of (\$12.3) million. The (\$21.9) million increase in cash used in operating activities in 2018, as compared to 2017, was driven by the relative increase in cash operating losses of (\$16.9) million and by the relative increase in working capital requirements of (\$5.0) million. The relative (\$16.9) million increase in cash operating losses in 2018 was due primarily to the increase in Adjusted EBITDA loss of (\$16.8) million, combined with higher finance and other expense of (\$2.2) million in 2018 due primarily to higher foreign exchange losses. These net (loss) increases in 2018 were partially offset by lower income tax expense of \$1.2 million related to withholding taxes on certain Chinese commercial contracts, and by higher equity investment losses in joint venture and associates of \$1.4 million which are included in Adjusted EBITDA but excluded from cash operating losses.

The total change in working capital of (\$17.3) million in 2018 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.

This compares to a total change in working capital of (\$12.3) million in 2017 which was driven by lower deferred revenue of (\$12.5) million as we fulfilled contract deliverables on certain Heavy-Duty Motive and Technology Solutions contracts for which we received prepayments in an earlier period, by higher accounts receivable of (\$9.4) million primarily as a result of the timing of revenues and the related customer collections, and by higher inventory of (\$0.6) million primarily to support expected shipments in the first quarter of

2018. These 2017 working capital outflows were partially offset by higher accounts payable and accrued liabilities of \$6.9 million as a result of the timing of supplier payments and accrued compensation awards, by higher accrued warranty obligations of \$2.4 million due to increased product shipments, and by lower prepaid expenses of \$0.9 million.

#### 5.4 Operating Expenses and Other Items – Three Months and Year ended December 31, 2018

##### *Research and product development expenses*

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
<b>Research and product development</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	<b>% Change</b>
Research and product development expense	\$ 6,423	\$ 7,787	\$ (1,364)	(18%)
Less: Depreciation and amortization expense	\$ (490)	\$ (654)	\$ 164	25%
Less: Stock-based compensation expense	\$ (215)	\$ (403)	\$ 188	47%
Research and Product Development (cash operating cost)	\$ 5,718	\$ 6,730	\$ (1,012)	(15%)

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,		
<b>Research and product development</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	<b>% Change</b>
Research and product development expense	\$ 27,039	\$ 25,022	\$ 2,017	8%
Less: Depreciation and amortization expense	\$ (2,158)	\$ (2,566)	\$ 408	16%
Less: Stock-based compensation expense	\$ (1,126)	\$ (1,124)	\$ (2)	-%
Research and Product Development (cash operating cost)	\$ 23,755	\$ 21,332	\$ 2,423	11%

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 Non-GAAP Measures section.

**Research and product development expenses for the three months ended December 31, 2018** were \$6.4 million, a decrease of (\$1.4) million, or (18%), compared to the corresponding period of 2017. Excluding depreciation and amortization expense of (\$0.5) million and (\$0.7) million, respectively, in each of the periods, and excluding stock-based compensation expense of (\$0.2) million and (\$0.4) million, respectively, in each of the periods, research and product development cash operating costs (see Supplemental Non-GAAP Measures) were \$5.7 million in the fourth quarter of 2018, a decrease of (\$1.0) million, or (15%), compared to the fourth quarter of 2017.

The (\$1.0) million, or (15%), decrease in research and development cash operating costs (see Supplemental Non-GAAP Measures) in the fourth quarter of 2018 was driven primarily by lower program development and engineering expenses in Protonex as a result of the disposition of our Power Manager assets and associated personnel in October 2018. This decline, combined with lower labour costs in Canada as a result of an approximate (4%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base, was partially offset by increased investment in research and product development 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 high performance liquid-cooled fuel cell stack, the FCgen®-LCS.

**Research and product development expenses for the year ended December 31, 2018** were \$27.0 million, an increase of \$2.0 million, or 8%, compared to the

corresponding period of 2017. Excluding depreciation and amortization expense of (\$2.2) million and (\$2.6) million, respectively, in each of the periods, and excluding stock-based compensation expense of (\$1.1) million in each of the periods, research and product development cash operating costs (see Supplemental Non-GAAP Measures) were \$23.8 million in 2018, an increase of \$2.4 million, or 11%, compared to 2017.

The \$2.4 million, or 11%, increase in research and development cash operating costs (see Supplemental Non-GAAP Measures) in 2018 were driven primarily by increased investment in research and product development 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 high performance liquid-cooled fuel cell stack, the FCgen®-LCS. These cost increases were partially offset by lower costs at Protonex as a result of the Company's rationalization initiatives undertaken in the third and fourth quarters of 2017 and by the disposition of the Power Manager assets and associated personnel in October 2018.

Government funding recoveries were also lower in 2018 as compared to 2017 due primarily to a decline in government funding recoveries in Denmark by Ballard Power Systems Europe A/S. Government research funding, and development costs capitalized as fuel cell technology intangible assets, are reflected as cost offsets to research and product development expenses, whereas labour and material costs incurred on revenue producing engineering services projects are reallocated from research and product development expenses to cost of goods sold.

*Depreciation and amortization expense included in research and product development expense for the three months and year ended December 31, 2018 was \$0.5 million and \$2.2 million, respectively, compared to \$0.7 million and \$2.6 million, respectively, for the corresponding periods of 2017. Depreciation and amortization expense relates primarily to amortization expense on our intangible assets and depreciation expense on our research and product development equipment. Amortization expense on intangible assets is primarily due to the acquisition of Protonex on October 1, 2015 and the resulting amortization of acquired intangible assets.*

*Stock-based compensation expense included in research and product development expense for the three months and year ended December 31, 2018 was \$0.2 million and \$1.1 million, respectively, relatively consistent with the amounts recognized in the corresponding periods of 2017 of \$0.4 million and \$1.1 million, respectively.*

### **General and administrative expenses**

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,			
<b>General and administrative</b>	<b>2018</b>	<b>2017</b>	\$ Change	% Change	
General and administrative expense	\$ 4,479	\$ 3,223	\$ 1,256	39%	
Less: Depreciation and amortization expense	\$ (302)	\$ (352)	\$ 50	14%	
Less: Stock-based compensation expense	\$ (213)	\$ (516)	\$ 303	59%	
Add: Unrealized gain (loss) on foreign exchange contracts	\$ (450)	\$ 189	\$ (639)	(338%)	
General and Administrative (cash operating cost)	\$ 3,514	\$ 2,544	\$ 970	38%	

(Expressed in thousands of U.S. dollars)

General and administrative	Year ended December 31,			
	2018	2017	\$ Change	% Change
General and administrative expense	\$ 14,760	\$ 12,602	\$ 2,158	17%
Less: Depreciation and amortization expense	\$ (1,254)	\$ (1,019)	\$ (235)	(23%)
Less: Stock-based compensation expense	\$ (1,231)	\$ (1,524)	\$ 293	19%
Add: Unrealized gain (loss) on foreign exchange contracts	\$ (570)	\$ 189	\$ (759)	(402%)
General and Administrative (cash operating cost)	\$ 11,705	\$ 10,248	\$ 1,457	14%

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 unrealized gains or losses on foreign exchange contracts. See the reconciliation of the adjustments to General and administrative expense in the Non-GAAP Measures section.

**General and administrative expenses for the three months ended December 31, 2018** were \$4.5 million, an increase of \$1.3 million, or 39%, compared to the corresponding period of 2017. Excluding depreciation and amortization expense of (\$0.3) million and (\$0.4) million, respectively, in each of the periods, excluding stock-based compensation expense of (\$0.2) million and (\$0.5) million, respectively, in each of the periods, and excluding unrealized gains (losses) on foreign exchange contracts of (\$0.5) and \$0.2 million, respectively, in each of the periods, general and administrative cash operating costs (see Supplemental Non-GAAP Measures) were \$3.5 million in the fourth quarter of 2018, an increase of \$1.0 million, or 38%, compared to the fourth quarter of 2017.

The \$1.0 million, or 38%, increase in general and administrative cash operating costs (see Supplemental Non-GAAP Measures) in the fourth quarter of 2018 was driven primarily by higher realized losses on our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs, and by higher legal and advisory costs due to the timing of transactional contracting and human resources costs. These cost increases in the fourth quarter of 2018 were partially offset by lower expenses in Protonex 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 (4%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base.

**General and administrative expenses for the year ended December 31, 2018** were \$14.8 million, an increase of \$2.2 million, or 17%, compared to the corresponding period of 2017. Excluding depreciation and amortization expense of (\$1.3) million and (\$1.0) million, respectively, in each of the periods, excluding stock-based compensation expense of (\$1.2) million and (\$1.5) million, respectively, in each of the periods, and excluding unrealized gains (losses) on foreign exchange contracts of (\$0.6) million and \$0.2 million, respectively, in each of the periods, general and administrative cash operating costs (see Supplemental Non-GAAP Measures) were \$11.7 million in 2018, an increase of \$1.5 million, or 14%, compared 2017.

The \$1.5 million, or 14%, increase in general and administrative cash operating costs (see Supplemental Non-GAAP Measures) in 2018 was driven primarily by higher realized losses on our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs, and by higher legal and advisory costs due to the timing of transactional



contracting and human resources costs. These cost increases in 2018 were partially offset by lower costs at Protonex as a result of the Company's rationalization initiatives undertaken in the third and fourth quarters of 2017 and by the disposition of the Power Manager assets and associated personnel in October 2018.

*Depreciation and amortization expense included in general and administrative expense for the three months and year ended December 31, 2018 was \$0.3 million and \$1.3 million, respectively, compared to \$0.4 million and \$1.0 million respectively, for the corresponding periods of 2017. Depreciation and amortization expense relates primarily to our office and information technology intangible assets and has increased in 2018 primarily as a result of 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, 2018 was \$0.2 million and \$1.2 million, respectively, compared to \$0.5 million and \$1.5 million, respectively, for the corresponding periods of 2016. The decline in 2018 is primarily as a result of cost reduction activities at Protonex including the disposition of the Power Manager assets and associated personnel.*

*Unrealized gains (losses) on foreign exchange contracts included in general and administrative expense for the three months and year ended December 31, 2018 was (\$0.5) million and (\$0.6) million, respectively, compared to \$0.2m for each of the corresponding periods of 2017. 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, 2018, we had outstanding foreign exchange currency contracts to purchase a total of Canadian \$17.4 million at an average rate of 1.3014 Canadian per U.S. dollar, resulting in an unrealized loss of Canadian (\$0.8) million at December 31, 2018.*

### **Sales and marketing expenses**

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
<b>Sales and marketing</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	<b>% Change</b>
Sales and marketing expense	\$ 2,033	\$ 2,144	\$ (111)	(5%)
Less: Depreciation and amortization expense	\$ -	\$ -	\$ -	-%
Less: Stock-based compensation expense	\$ (68)	\$ (174)	\$ 106	61%
<b>Sales and Marketing (cash operating cost)</b>	<b>\$ 1,965</b>	<b>\$ 1,970</b>	<b>\$ (5)</b>	<b>-%</b>

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,		
<b>Sales and marketing</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	<b>% Change</b>
Sales and marketing expense	\$ 8,068	\$ 7,951	\$ 117	1%
Less: Depreciation and amortization expense	\$ -	\$ (1)	\$ 1	-%
Less: Stock-based compensation expense	\$ (546)	\$ (477)	\$ (69)	(15%)
<b>Sales and Marketing (cash operating cost)</b>	<b>\$ 7,522</b>	<b>\$ 7,473</b>	<b>\$ 49</b>	<b>1%</b>

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 Non-GAAP Measures section.

**Sales and marketing expenses for the three months ended December 31, 2018** were \$2.0 million, a decrease of (\$0.1) million, or (5%), compared to the corresponding

period of 2017. Excluding stock-based compensation expense of (\$0.1) million and (\$0.2) million, respectively, in each of the periods, sales and marketing cash operating costs (see Supplemental Non-GAAP Measures) were \$2.0 million in the fourth quarter of 2018, flat compared to the fourth quarter of 2017.

**Sales and marketing expenses for the year ended December 31, 2018** were \$8.1 million, an increase of \$0.1 million, or 1%, compared to the corresponding period of 2017. Excluding stock-based compensation expense of (\$0.5) million in each of the periods, sales and marketing cash operating costs (see Supplemental Non-GAAP Measures) were \$7.5 million in 2018, an increase of \$0.05 million, or 1%, compared to 2017.

The nominal increase in sales and marketing cash operating costs (see Supplemental Non-GAAP Measures) in 2018 was driven primarily by an increased investment to support our commercial sales and marketing efforts in China. This cost increase was effectively offset by lower costs at Protonex as a result of the Company's rationalization initiatives undertaken in the third and fourth quarters of 2017 and the disposition of the Power Manager assets and associated personnel in October 2018.

*Stock-based compensation expense included in sales and marketing expense for the three months and year ended December 31, 2018* was \$0.1 million and \$0.5 million, respectively, relatively consistent with the amounts recognized in the corresponding periods of 2017 of \$0.2 million and \$0.5 million, respectively.

**Other expense for the three months and year ended December 31, 2018** was \$0.5 million and \$0.6 million, respectively, compared to nil million and \$0.9 million, respectively, for the corresponding periods of 2017. The following table provides a breakdown of other expense for the reported periods:

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,			
	2018	2017	\$ Change	% Change	
Impairment loss (recovery) on trade receivables	\$ 68	\$ 101	\$ (33)	(32%)	
Restructuring expense (recovery)	438	(71)	509	717%	
Acquisition charges	-	-	-	-	
<b>Other expenses (recovery)</b>	<b>\$ 506</b>	<b>\$ 30</b>	<b>\$ 476</b>	<b>1,587%</b>	

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,			
	2018	2017	\$ Change	% Change	
Impairment loss (recovery) on trade receivables	\$ 98	\$ 103	\$ (5)	(5%)	
Restructuring expense	507	799	(292)	(37%)	
Acquisition charges	-	-	-	-	
<b>Other expenses (recovery)</b>	<b>\$ 605</b>	<b>\$ 902</b>	<b>\$ (297)</b>	<b>(33%)</b>	

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 Protonex as a result of the disposition of the Power Manager assets and associated personnel. Restructuring expenses of \$0.8 million for the year ended December 31, 2017 relate primarily to a leadership change in sales and marketing combined with cost reduction initiatives in the general and administration function

undertaken in the first quarter of 2017, and by cost reduction initiatives at Protonex undertaken in the third quarter of 2017.

Net impairment loss (recovery) on trade receivables for the three months ended December 31, 2018 and 2017 were nominal. 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.

**Finance income (loss) and other for the three months and year ended December 31, 2018** was nil million and (\$0.4) million, respectively, compared to (\$0.2) million and \$1.8 million, respectively, for the corresponding periods of 2017. The following tables provide a breakdown of finance and other income (loss) for the reported periods:

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
	2018	2017	\$ Change	% Change
Employee future benefit plan expense	\$ (58)	\$ (51)	\$ (7)	(14%)
Pension administration expense	(104)	-	(104)	(100%)
Investment and other income (loss)	617	147	470	320%
Foreign exchange gain (loss)	(469)	(322)	(147)	(46%)
<b>Finance income (loss) and other</b>	<b>\$ (14)</b>	<b>\$ (226)</b>	<b>\$ 212</b>	<b>94%</b>

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,		
	2018	2017	\$ Change	% Change
Employee future benefit plan expense	\$ (226)	\$ (230)	\$ 4	2%
Pension administration expense	(117)	(118)	1	1%
Investment and other income (loss)	972	436	535	123%
Foreign exchange gain (loss)	(1,078)	1,692	(2,770)	(164%)
<b>Finance income (loss) and other</b>	<b>\$ (449)</b>	<b>\$ 1,780</b>	<b>\$ (2,230)</b>	<b>(125%)</b>

Employee future benefit plan expense for the years ended December 31, 2018 and 2017 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, 2018 and 2017 were (\$0.1) million in each of the periods and represent administrative costs incurred in managing the plan.

Foreign exchange gains (losses) for the three months and year ended December 31, 2018 were (\$0.5) million and (\$1.1) million, respectively, compared to (\$0.3) million and \$1.7 million, respectively, for the corresponding periods of 2017. 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).

Investment and other income for the months and year ended December 31, 2018 were \$0.6

million and \$1.0 million, respectively, compared to \$0.1 million and \$0.4 million, respectively, for the corresponding periods of 2017. Amounts were earned primarily on our cash and cash equivalents.

***Finance expense for the three months and year ended December 31, 2018*** was (\$0.1) million and (\$0.5) million, respectively, compared to (\$0.2) million and (\$0.7) million, respectively, for the corresponding periods of 2017. Finance expense relates primarily to the sale and leaseback of our head office building in Burnaby, British Columbia which was completed in 2010. Due to the long term nature of the lease, the leaseback of the building qualifies as a finance (or capital) lease.

***Equity in income (loss) of investment in joint venture and associates for the three months and year ended December, 2018*** was (\$1.1) million and (\$1.2) million, respectively, compared to \$0.3 million and \$0.2 million, respectively, for the corresponding periods of 2017. Equity in income of investment in joint venture and associates relates to the pickup of 10% of the net income (loss) of Synergy Ballard JVCo as a result of our 10% ownership position, and 49% of the net income (loss) of Weichai Ballard JV as a result of our 49% ownership position. Both of these investments in China are accounted for using the equity method of accounting.

***Loss on sale of assets for the three months and year ended December 31, 2018*** were (\$4.0) million primarily as a result of the divestiture of our Power Manager assets to Revision on October 5, 2018. 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 the second quarter of 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. The loss on sale of Power Manager assets of (\$4.0) million was calculated 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. The estimate of the ultimate transaction price, including the estimate of the amount of earn-out variable consideration that is considered constrained of \$2.0 million, will be reassessed each quarter-end during 2019. Any change in the estimated transaction price will result in an adjustment to the above noted loss on sale of assets which will be recognized on a prospective basis.

***Loss on sale of assets for the three months and year ended December 31, 2017*** were (\$0.5) million and (\$1.4) million, respectively, consisting of additional losses incurred in the first three quarters of 2017 of (\$0.9) million as a result of the CHEM Backup Power Transaction, and a loss incurred in the fourth quarter of 2017 of (\$0.5) million on the Upstart SOFC Transaction.

During 2017, we recorded a loss on sale of assets of (\$0.9) million as the remaining estimated potential purchase price owing from the 2016 CHEM Transaction was written down to its revised and final fair value of \$0.9 million (which was collected in the fourth quarter of 2017) from its previous fair value estimate of \$1.8 million as of December 31, 2016.

During the fourth quarter of 2017, we sold certain Protonex solid oxide fuel cells ("SOFC) assets consisting primarily of SOFC inventory to Upstart Power Inc. for nominal

consideration, resulting in a loss on sale of assets of (\$0.5) million. This action had enabled Ballard to significantly reduce the cost structure at Protonex. No restructuring expense was incurred as a result of this transaction.

**Impairment (Loss) on Intangible Assets and Property, Plant and Equipment for the three months and year ended December 31, 2017** was (\$1.5) million and consists of a (\$1.2) million impairment charge on intangible assets and a (\$0.3) million impairment charge on property, plant and equipment as we wrote-down certain SOFC fuel cell assets to their estimated net realizable value of \$0.05 million. The impairment charges were incurred during the fourth quarter of 2017 while we continued to review strategic alternatives for our SOFC fuel cell assets at Protonex prior to concluding the transaction with Upstart Power Inc.

**Income tax expense for the three months ended and year ended December 31, 2018** was (\$0.1) million and (\$0.4) million, respectively, compared to (\$0.2) million and (\$1.6) million, respectively, for the corresponding periods of 2017. Income tax expense relates primarily to withholding taxes in China deducted from proceeds earned on certain Chinese commercial contracts.

## 5.5 Summary of Quarterly Results

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

	Quarter ended,			
	Dec 31, 2018	Sep 30, 2018	Jun 30, 2018	Mar 31, 2018
<i>(Expressed in thousands of U.S. dollars, except per share amounts and weighted average shares outstanding which are expressed in thousands)</i>				
Revenues	\$ 28,477	\$ 21,574	\$ 26,445	\$ 20,090
Net income (loss) attributable to Ballard	\$ (11,475)	\$ (6,024)	\$ (4,323)	\$ (5,500)
Net income (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
	Dec 31, 2017	Sep 30, 2017	Jun 30, 2017	Mar 31, 2017
Revenues	\$ 40,257	\$ 31,854	\$ 26,521	\$ 22,656
Net income (loss) attributable to Ballard	\$ (2,887)	\$ (1,027)	\$ (1,201)	\$ (2,935)
Net income (loss) per share attributable to Ballard, basic and diluted	\$ (0.02)	\$ (0.01)	\$ (0.01)	\$ (0.02)
Weighted average common shares outstanding	177,803	176,438	175,953	174,853

**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. Revenues were positively impacted in the fourth quarter of 2017 as we fulfilled an \$18 million supply contract (announced on June 5, 2017) for 400 FCveloCity® fuel cell engines and consisting primarily of shipments of FCveloCity®-MD 30-kilowatt fuel cell products and MEAs.

- **Operating expenditures:** 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 Protonex as a result of the disposition of the Power Manager assets and associated personnel. Operating expenses were negatively impacted in the first quarter of 2017 by restructuring expenses of (\$0.6) million related to a leadership change in sales and marketing and by cost reduction initiatives in the general and administration function. 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 income (loss):** Net income (loss) for the fourth quarter of 2018 was negatively impacted by a loss on sale of assets of (\$4.0) million as a result of the divestiture of our Power Manager assets to Revision on October 5, 2018. Net income (loss) for the fourth quarter of 2017 was negatively impacted by a loss on sale of assets of (\$0.5) million as we sold certain SOFC fuel cell inventory to Upstart for nominal proceeds. Net loss in the fourth quarter of 2017 was also negatively impacted by impairment charges of (\$1.5) million consisting of a (\$1.2) million impairment charge on intangible assets and a (\$0.3) million impairment charge on property, plant and equipment as we wrote-down certain SOFC fuel cell assets to their estimated net realizable value of \$0.05 million. Net income (loss) for the second quarter of 2017 was negatively impacted by a loss on sale of assets of (\$0.8) million as we recorded an impairment adjustment against the potential purchase price receivable from the CHEM Transaction by reducing the estimated fair value of the potential remaining earn-out to \$1.0 million from \$1.8 million.

## 6 CASH FLOWS, LIQUIDITY AND CAPITAL RESOURCES

### 6.1 Summary of Cash Flows

Cash and cash equivalents were \$192.2 million at December 31, 2018, compared to \$60.3 million at December 31, 2017. The \$131.9 million increase in cash and cash equivalents in 2018 was driven by net proceeds received from the Weichai and Broad-Ocean strategic financings of \$183.7 million, net proceeds received from share purchase warrant exercises of \$1.4 million, net proceeds received from share purchase option exercises of \$1.6 million, and initial net proceeds received on the sale of Power Manager assets of \$1.3 million. These 2018 inflows were partially offset by net losses (excluding non-cash items) of (\$14.4) million, net working capital outflows of (\$17.3) million, initial equity investment in Weichai Ballard JV of (\$14.6) million, purchases of property, plant and equipment of (\$9.9) million, and by finance lease repayments of (\$0.6) million.

### 6.2 Cash Provided by (Used by) Operating Activities

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. For the three months ended December 31, 2017, cash used in operating activities was (\$0.7) million, consisting of cash operating income of \$1.7 million partially offset by net working capital outflows of (\$2.4) million. The \$0.9 million improvement in cash provided by (used in) operating activities in the fourth quarter of 2018, as compared to the fourth quarter of 2017, as compared to the fourth quarter of



2017, was driven by the relative decrease in working capital requirements of \$7.1 million, partially offset by the increase in cash operating losses of (\$6.1) million. The relative (\$6.1) million increase in cash operating losses in the fourth quarter of 2018 was due primarily to the increase in Adjusted EBITDA loss of (\$7.3) million, partially offset by higher equity investment losses in joint venture and associates of \$1.4 million which are included in Adjusted EBITDA but excluded from cash operating losses.

In the fourth quarter of 2018, net working capital inflows of \$4.6 million were 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 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.

In the fourth quarter of 2017, net working capital outflows of (\$2.4) million were driven by higher accounts receivable of (\$5.7) million primarily as a result of the timing of revenues and the related customer collections, and by lower deferred revenue of (\$1.5) 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. These fourth quarter of 2017 outflows were partially offset by higher accounts payable and accrued liabilities of \$2.1 million as a result of the timing of supplier payments and annual compensation awards, by lower inventory of \$2.0 million as we delivered expected Heavy-Duty Motive shipments to customers in the last quarter of 2017, and by higher accrued warranty obligations of \$0.8 million due to increased product shipments.

For the year ended December 31, 2018, cash used in operating activities was (\$31.7) million, consisting of cash operating losses of (\$14.4) million combined with net working capital outflows of (\$17.3) million. For the year ended December 31, 2017, cash used in operating activities was (\$9.8) million, consisting of cash operating income of \$2.5 million offset by net working capital outflows of (\$12.3) million. The (\$21.9) million increase in cash used in operating activities in 2018, as compared to 2017, was driven by the relative increase in cash operating losses of (\$16.9) million and by the relative increase in working capital requirements of (\$5.0) million. The relative (\$16.9) million increase in cash operating losses in 2018 was due primarily to the increase in Adjusted EBITDA loss of (\$16.8) million, combined with higher finance and other expense of (\$2.2) million in 2018 due primarily to higher foreign exchange losses. These net (loss) increases in 2018 were partially offset by lower income tax expense of \$1.2 million related to withholding taxes on certain Chinese commercial contracts, and by higher equity investment losses in joint venture and associates of \$1.4 million which are included in Adjusted EBITDA but excluded from cash operating losses.

In 2018, net working capital outflows of (\$17.3) million were 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.

In 2017, net working capital outflows of (\$12.3) million were driven by lower deferred revenue of (\$12.5) 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, by higher accounts receivable of (\$9.4) million primarily as a result of the timing of revenues and the related customer collections, and by higher inventory of (\$0.6) million primarily to support expected shipments in the first quarter of 2018. These 2017 working capital outflows were partially offset by higher accounts payable and accrued liabilities of \$6.9 million as a result of the timing of supplier payments and accrued compensation awards, by higher accrued warranty obligations of \$2.4 million due to increased product shipments, and by lower prepaid expenses of \$0.9 million.

### **6.3 Cash Provided by (Used by) Investing Activities**

Investing activities resulted in net cash outflows of (\$14.9) million and (\$23.1) million, respectively, for the three months and year ended December 31, 2018, compared to net cash outflows of (\$0.5) million and (\$6.5) million, respectively, for the corresponding periods of 2017.

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 the Power Manager assets by Protonex to Revision.

Investing activities in 2017 of (\$6.5) million consist primarily of capital expenditures of (\$3.1) million, investments in other intangible assets of (\$3.4) million related primarily to the implementation of a new Enterprise Resource Planning (“ERP”) management reporting software system, investments in associated companies of (\$1.0) million paid for our 10% investment in Synergy Ballard JVCo, partially offset by final net proceeds of \$1.0 million received in the fourth quarter of 2017 from the CHEM Transaction.

### **6.4 Cash Provided by (Used by) Financing Activities**

Financing activities resulted in net cash inflows of \$183.6 million and \$186.1 million, respectively, for the three months and year ended December 31, 2018, compared to net cash inflows of \$1.6 million and \$5.0 million, respectively, for the three months and year ended December 31, 2017.

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.

Financing activities in 2017 of \$5.0 million consist of proceeds from share purchase warrant exercises of \$2.0 million, proceeds from share purchase option exercises of \$3.6 million, partially offset by capital lease payments of (\$0.6) million.

## **6.5 Liquidity and Capital Resources**

At December 31, 2018, we had total liquidity of \$192.2 million. We measure liquidity as our net cash position, consisting of the sum of our cash, cash equivalents and short-term investments of \$192.2 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, 2018, 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 on file with the securities regulators in Canada and the United States, expiring in July 2020. The 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.

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 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 and forward platinum purchase contracts to manage our exposure to currency rate fluctuations and platinum price 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, 2018, we had outstanding foreign exchange currency contracts to purchase a total of Canadian \$17.4 million at an average rate of 1.3014 Canadian per U.S dollar, resulting in an unrealized loss of Canadian (\$0.8) million at December 31, 2018. The outstanding foreign exchange currency contracts are not qualified under hedge accounting.

At December 31, 2018, 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, 2018, we had the following contractual obligations and commercial commitments (including capital contribution commitments to Weichai Ballard JV):

<b>Contractual Obligations</b>	<b>Total</b>	Payments due by period,			
		Less than one year	1-3 years	4-5 years	After 5 years
Operating leases	\$ 17,770	\$ 2,335	\$ 4,436	\$ 4,148	\$ 6,851
Finance leases	7,107	1,023	2,355	2,355	1,374
Asset retirement obligations	1,825	-	-	-	1,825
Capital contributions to Weichai Ballard JV	64,121	20,839	34,198	9,084	-
<b>Total contractual obligations</b>	<b>\$ 90,823</b>	<b>\$ 24,197</b>	<b>\$ 40,989</b>	<b>\$ 15,587</b>	<b>\$ 10,050</b>

In addition, we have outstanding commitments of \$2.9 million at December 31, 2018



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, 2018 and 2017.

As of December 31, 2018, 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, 2018, we have not accrued any amount owing, or receivable, as a result of any indemnity agreements undertaken in the ordinary course of business.

In January, February and April 2018, certain related class action complaints were filed in U.S. Federal Court alleging violations of U.S. federal securities laws. In April plaintiffs voluntarily dismissed all but one of their cases, Porwal v. Ballard Power Systems, Inc. et al (S.D. N.Y.). Under the current scheduling order in this action, Plaintiffs filed an amended complaint on June 22, 2018. Ballard will vigorously contest, and defend against, Plaintiffs' claims and believes the claims are without merit.

## 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, 2018 and 2017, related party transactions and balances with Weichai Ballard JV and Synergy Ballard JVCo total as follows:

<i>(Expressed in thousands of U.S. dollars)</i>	Three Months Ended December 31,	
	2018	2017
<b>Transactions with related parties</b>		
Revenues	\$ 2,060	\$ 6,369
Cost of goods sold	\$ -	\$ -

<i>(Expressed in thousands of U.S. dollars)</i>	Year Ended December 31,	
	2018	2017
<b>Transactions with related parties</b>		
Revenues	\$ 18,795	\$ 30,916
Cost of goods sold	\$ -	\$ -

<i>(Expressed in thousands of U.S. dollars)</i>	As at December 31,	
<b>Balances with related parties</b>	<b>2018</b>	2017
Accounts receivable	\$ 1,604	\$ 1,415
Investments	\$ 13,989	\$ 676
Deferred revenue	\$ (10,896)	\$ (2,973)

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 31 to our annual consolidated financial statements for the year ended December 31, 2018.

### 7.3 Outstanding Share and Equity Information

<b>As at March 6, 2019</b>	
Common share outstanding	231,929,309
Warrants outstanding	-
Options outstanding	5,053,795
DSU's outstanding	747,213
RSU's / PSU's outstanding (subject to vesting and performance criteria)	1,778,192

## 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, 2018.

### 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. 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 typically on a percentage-of-completion basis, which consists of recognizing revenue for a performance obligation on a given contract proportionately with its percentage of completion at any given time. The percentage of completion is determined by dividing the cumulative costs incurred as at the balance sheet date by the sum of incurred and anticipated costs for completing a contract. The cumulative effect of changes to anticipated revenues and anticipated costs for completing a contract are recognized in the period in which the revisions are identified. If the anticipated costs exceed the anticipated revenues on a contract, such loss is recognized in its entirety in the period it becomes known.

- The determination of anticipated 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 is expected 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 our assessment of the progress achieved against milestones, or that our estimates of the work required completing a contract may change.

During the three months and year ended December 31, 2018 and 2017, there was 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, 2018, 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, 2018, we have concluded that no goodwill impairment charge is required for the year ending December 31, 2018. Details of our 2018 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, 2018 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, 2018 indicating that no impairment charge is required for 2017.
- 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 ("WACC"), and terminal value assumptions. Our value in use test was based on a WACC of 10%; an average estimated compound annual growth rate of approximately 23% from 2019 to 2023; a terminal year EBITDA multiplied by a terminal value multiplier of 10; and a WACC of 8% and a terminal year revenue multiple of 5 for Weichai Ballard JV. 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, 2018 indicating that no impairment charge is required in 2018.

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 year ended December 31, 2018, we recorded a loss on sale of assets of (\$4.0) million on the divestiture by Protonex of its Power Manager assets to Revision on October 5, 2018 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. This estimate of the ultimate transaction price, including the estimate of the amount of earn-out variable consideration that is considered constrained of \$2.0 million, will be reassessed each quarter-end during 2019. During the year ended December 31, 2017, we recorded a loss on sale of assets of (\$0.9) million as the remaining estimated potential purchase price owing from the 2016 CHEM Transaction was written down to its revised and final fair value of \$0.9 million (which was collected in the fourth quarter of 2017) from its previous fair value estimate of \$1.8 million as of December 31, 2016. During the fourth quarter of 2017, we also recognized a loss on sale of assets of (\$0.5) million as we sold certain SOFC fuel cell inventory to Upstart for nominal proceeds, and recorded impairment charges of (\$1.5) million consisting of a (\$1.2) million impairment charge on intangible assets and a (\$0.3) million impairment charge on property, plant and equipment as we wrote-down certain SOFC fuel cell assets to their estimated net realizable value of \$0.05 million.

#### 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, 2018, we recorded provisions to accrued warranty liabilities of \$2.1 million and \$4.4 million, respectively, for new product sales, compared to \$1.6 million and \$4.1 million, respectively, for the three months and year ended December 31, 2017.

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, 2018 were adjusted upwards by nil million and (\$0.9) million, respectively, in each of the periods, compared to an adjustment downwards by \$0.7 million for the three months and year ended December 31, 2017. The negative adjustments to the accrued warranty liability provisions in 2018 were due primarily to increased Heavy-Duty Motive service costs, whereas the positive adjustments to the accrued warranty liability provision in 2017 were due primarily to contractual expirations and improved lifetimes and reliability of our Heavy-Duty Motive products.

## 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, 2018, net inventory adjustments of (\$0.7) million and (\$1.0) million, respectively, were recorded as a recovery (charge) to cost of product and service revenues, compared to net inventory adjustments of (\$0.1) million and nil million, respectively, for the three months and year ended December 31, 2017.

## 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, 2018 and 2017, nominal net impairment (charges) on trade receivables and contract assets were recorded in other operating income.

#### 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. As of December 31, 2018 and 2017, 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, 2018, we have initially adopted *IFRS 15 Revenue from Contracts with Customers* and *IFRS 9 Financial Instruments*. The effect of initially applying these standards did not have a material impact on the Company's financial statements. A number of other new standards are also effective from January 1, 2018 but they also did not have a material impact on the Company's financial statements.

#### IFRS 15 – REVENUE FROM CONTRACTS WITH CUSTOMERS

*IFRS 15 Revenue from Contracts with Customers* establishes a comprehensive framework for determining whether, how much and when revenue is recognized. It replaced *IAS 18*



*Revenue, IAS 11 Construction Contracts* and related interpretations. The Company has adopted IFRS 15 using the cumulative effect method (without practical expedients; with the effect of initially applying this standard recognized at the date of initial application (i.e. January 1, 2018). Accordingly, the information presented for 2017 has not been restated – i.e. it is presented, as previously reported, under IAS 18, IAS 11 and related interpretations.

IFRS 15 contains a single model that applies to contracts with customers and two approaches to recognizing revenue: at a point in time or over time. The model features a contract-based five-step analysis of transactions to determine whether, how much, and when revenue is recognized. New estimates and judgmental thresholds have been introduced, which may affect the amount and/or timing of revenue recognized. The new standard applies to contracts with customers. It does not apply to insurance contracts, financial instruments or lease contracts, which fall in the scope of other IFRSs. The clarifications to IFRS 15 provide additional guidance with respect to the five-step analysis, transition, and the application of the Standard to licenses of intellectual property.

The adoption of IFRS 15 did not have a material impact on the Company's financial statements.

#### IFRS 9 – FINANCIAL INSTRUMENTS

*IFRS 9 Financial Instruments* sets out requirements for recognizing and measuring financial assets, financial liabilities and some contracts to buy or sell non-financial items. This standard replaces *IAS 39 Financial Instruments: Recognition and Measurement*.

Under IFRS 9, financial assets are classified and measured based on the business model in which they are held and the characteristics of their contractual cash flows. The standard introduces additional changes relating to financial liabilities. It also amends the impairment model by introducing a new 'expected credit loss' model for calculating impairment.

IFRS 9 also includes a new general hedge accounting standard which aligns hedge accounting more closely with risk management. This new standard does not fundamentally change the types of hedging relationships or the requirement to measure and recognize ineffectiveness; however it will provide more hedging strategies that are used for risk management to qualify for hedge accounting and introduce more judgment to assess the effectiveness of a hedging relationship. Special transitional requirements have been set for the application of the new general hedging model.

The adoption of IFRS 9 did not have a material 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.

#### IFRS 16 – LEASES

On January 13, 2016, the IASB issued *IFRS 16 Leases*. IFRS 16 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 carries forward the lessor accounting requirements of IAS 17, 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. Transitional provisions have been provided.

The new standard is effective for annual periods beginning on or after January 1, 2019. IFRS 16 will replace *IAS 17 Leases* and the related interpretations.

The most significant effect of the new standard will be 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 will result 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 would thus be higher under the new standard. Relative to the results of applying the current standard, although actual cash flows will be unaffected, the lessee's statement of cash flows will 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 would currently be accounted for as operating leases as a cash flow use within financing activities under the new standard.

The Company will adopt IFRS 16 in its financial statements for the fiscal year beginning on January 1, 2019. The Company intends to apply the modified retrospective approach and will not restate comparative amounts for the year prior to first adoption. Right-of-use assets will be measured on transition at the amount of the lease liability on adoption (adjusted for any prepaid or accrued lease expenses). As a transitional practical expedient permitted by the new standard, the Company will not reassess whether contracts are, or contain, leases as at January 1, 2019, that were previously identified as leases applying IAS 17 Leases, and IFRIC 4 Determining whether an Arrangement contains a Lease. Only contracts entered into (or changed) after January 1, 2019, will be assessed for being, or containing, leases applying the criteria of the new standard. The Company also intends to apply the practical expedient for leases that have duration of 12 months or less.

Based on the analysis completed to date of the Company's leasing arrangements open as of December 31, 2018, on adoption of the new standard on January 1, 2019 the Company expects to recognize, right-of-use assets of between approximately \$9 million to \$11 million, net of lease incentives (primarily deferred lease inducements) of approximately \$2 million, and lease liabilities of between approximately \$13 million to \$15 million.

#### IFRIC 23 – UNCERTAINTY OVER INCOME TAX TREATMENTS

On June 7, 2017, the IASB issued *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments*. The Interpretation 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 Interpretation is applicable for annual periods beginning on or after January 1, 2019. The Company will adopt the Interpretation in its financial statements for the fiscal year beginning on January 1, 2019. Based on an analysis of the Company's historic tax filing positions as of January 1, 2019, the Company does not expect the Interpretation to have a material impact on the 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 does not intend to adopt the Amendments in its financial statements before the annual period beginning on January 1, 2020. The extent of the impact of the change has not yet been determined.

#### 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 combination.

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 does not intend to adopt the amendments in its financial statements before the annual reporting period beginning on January 1, 2020. The extent of the impact of adoption of the amendments has not yet been determined.

## 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 does not intend to adopt the amendments in its financial statements before the annual reporting period beginning on January 1, 2020. The extent of the impact of adoption of the amendments has not yet been determined.

## **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, net income, cash flows and other measures of financial performance and liquidity reported in accordance with GAAP.

### **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, 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, 2018 and 2017:

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
<b>Cash Operating Costs</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	
Total Operating Expenses	\$ 13,441	\$ 13,184	\$ 257	
Stock-based compensation expense	(496)	(1,093)	597	
Impairment recovery (losses) on trade receivables	(68)	(101)	33	
Acquisition and integration costs	-	-	-	
Restructuring (charges) recovery	(438)	71	(509)	
Unrealized gain (loss) on foreign exchange contracts	(450)	189	(639)	
Financing charges	-	-	-	
Depreciation and amortization	(792)	(1,006)	214	
<b>Cash Operating Costs</b>	<b>\$ 11,197</b>	<b>\$ 11,244</b>	<b>\$ (47)</b>	

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,		
<b>Cash Operating Costs</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	
Total Operating Expenses	\$ 50,472	\$ 46,477	\$ 3,995	
Stock-based compensation expense	(2,902)	(3,125)	222	
Impairment recovery (losses) on trade receivables	(98)	(103)	5	
Acquisition and integration costs	-	-	-	
Restructuring (charges) recovery	(507)	(799)	292	
Unrealized gain (loss) on foreign exchange contracts	(570)	189	(759)	
Financing charges	-	-	-	
Depreciation and amortization	(3,413)	(3,586)	174	
<b>Cash Operating Costs</b>	<b>\$ 42,982</b>	<b>\$ 39,053</b>	<b>\$ 3,929</b>	

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 month and year ended December 31, 2018 and 2017 is included in Operating Expense and Other Items.

A breakdown of total stock-based compensation expense for the three months and year ended December 31, 2018 and 2017 are as follows:

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
<b>Stock-based compensation expense</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	
Total stock-based compensation expense recorded as follows:				
Cost of goods sold	\$ -	\$ -	\$ -	
Research and product development expense	215	403	(188)	
General and administrative expense	213	516	(303)	
Sales and marketing expense (recovery)	68	174	(106)	
<b>Stock-based compensation expense</b>	<b>\$ 496</b>	<b>\$ 1,093</b>	<b>\$ (597)</b>	

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,	
<b>Stock-based compensation expense</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>
Total stock-based compensation expense recorded as follows:			
Cost of goods sold	\$ -	\$ -	\$ -
Research and product development expense	1,126	1,124	2
General and administrative expense	1,231	1,524	(293)
Sales and marketing expense (recovery)	545	477	68
<b>Stock-based compensation expense</b>	<b>\$ 2,902</b>	<b>\$ 3,125</b>	<b>\$ (223)</b>

A breakdown of total depreciation and amortization expense for the three months and year ended December 31, 2018 and 2017 are as follows:

<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,	
<b>Depreciation and amortization expense</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>
Total depreciation and amortization expense recorded as follows:			
Cost of goods sold	\$ 386	\$ 474	\$ (88)
Research and product development expense	490	654	(164)
General and administrative expense	302	352	(50)
Sales and marketing expense	-	1	(1)
<b>Depreciation and amortization expense</b>	<b>\$ 1,178</b>	<b>\$ 1,481</b>	<b>\$ (303)</b>

<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,	
<b>Depreciation and amortization expense</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>
Total depreciation and amortization expense recorded as follows:			
Cost of goods sold	\$ 1,603	\$ 1,477	\$ 126
Research and product development expense	2,158	2,566	(408)
General and administrative expense	1,254	1,019	235
Sales and marketing expense	-	1	(1)
<b>Depreciation and amortization expense</b>	<b>\$ 5,015</b>	<b>\$ 5,064</b>	<b>\$ (48)</b>

### 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, 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, 2018 and 2017:



<i>(Expressed in thousands of U.S. dollars)</i>		Three months ended December 31,		
<b>EBITDA and Adjusted EBITDA</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	
Net income (loss)	\$ (11,475)	\$ (2,887)	\$ (8,588)	
Depreciation and amortization	1,178	1,481	(303)	
Finance expense	121	168	(47)	
Income taxes	68	210	(142)	
<b>EBITDA</b>	<b>\$ (10,108)</b>	<b>\$ (1,028)</b>	<b>\$ (9,080)</b>	
Stock-based compensation expense	496	1,093	(597)	
Acquisition and integration costs	-	-	-	
Finance and other (income) loss	13	226	(213)	
Impairment charges on intangible assets and property, plant and equipment	-	1,484	(1,484)	
Loss (gain) on sale of assets	3,955	500	3,455	
Unrealized loss (gain) on foreign exchange contracts	450	(189)	639	
<b>Adjusted EBITDA</b>	<b>\$ (5,194)</b>	<b>\$ 2,086</b>	<b>\$ (7,280)</b>	
<i>(Expressed in thousands of U.S. dollars)</i>		Year ended December 31,		
<b>EBITDA and Adjusted EBITDA</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>	
Net income (loss)	\$ (27,323)	\$ (8,048)	\$ (19,275)	
Depreciation and amortization	5,015	5,064	(49)	
Finance expense	503	732	(229)	
Income taxes	370	1,571	(1,201)	
<b>EBITDA</b>	<b>\$ (21,435)</b>	<b>\$ (681)</b>	<b>\$ (20,754)</b>	
Stock-based compensation expense	2,902	3,125	(223)	
Acquisition and integration costs	-	-	-	
Finance and other (income) loss	449	(1,780)	2,229	
Impairment charges on intangible assets and property, plant and equipment	-	1,484	(1,484)	
Loss (gain) on sale of assets	4,049	1,365	2,684	
Unrealized loss (gain) on foreign exchange contracts	570	(189)	759	
<b>Adjusted EBITDA</b>	<b>\$ (13,465)</b>	<b>\$ 3,324</b>	<b>\$ (16,789)</b>	

#### 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, 2018 and 2017:

<i>(Expressed in thousands of U.S. dollars)</i>			
	Three months ended December 31,		
<b>Adjusted Net Loss</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>
Net (loss)	\$ (11,475)	\$ (2,887)	\$ (8,588)
Acquisition and integration costs	-	-	-
Impairment charges (recovery) on intangible assets and property, plant and equipment	-	1,484	(1,484)
Loss on sale of assets	3,957	500	3,457
<b>Adjusted Net Loss</b>	<b>\$ (7,518)</b>	<b>\$ (903)</b>	<b>\$ (6,615)</b>
<b>Adjusted Net Loss per share</b>	<b>\$ (0.04)</b>	<b>\$ (0.01)</b>	<b>\$ (0.03)</b>

<i>(Expressed in thousands of U.S. dollars)</i>			
	Year ended December 31,		
<b>Adjusted Net Loss</b>	<b>2018</b>	<b>2017</b>	<b>\$ Change</b>
Net (loss)	\$ (27,323)	\$ (8,048)	\$ (19,275)
Acquisition and integration costs	-	-	-
Impairment charges (recovery) on intangible assets and property, plant and equipment	-	1,484	(1,484)
Loss on sale of assets	3,957	1,374	2,583
<b>Adjusted Net Loss</b>	<b>\$ (23,366)</b>	<b>\$ (5,190)</b>	<b>\$ (18,176)</b>
<b>Adjusted Net Loss per share</b>	<b>\$ (0.13)</b>	<b>\$ (0.03)</b>	<b>\$ (0.10)</b>