UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 40-F

☐ Registration statement pursuant to Section 12 of the Securities Exchange Act of 1934

or

☒ Annual report pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934

For the fiscal year ended: **December 31, 2019** Commission File Number: **000-53543**

Ballard Power Systems Inc.

(Exact name of registrant as specified in its charter)

British Columbia, Canada	**3620**	**Not Applicable**
(Province or Other Jurisdiction of Incorporation or Organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification No.)

9000 Glenlyon Parkway

Burnaby, BC

Canada V5J 5J8

(604) 454-0900

(Address and telephone number of registrant's principal executive offices)

C T Corporation System

28 Liberty St.

New York, NY 10005

(212) 894-8940

(Name, address (including zip code) and telephone number (including area code) of agent for service in the United States)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of Each Class:	Trading Symbol	Name of Each Exchange On Which Registered:
Common Shares	**BLDP**	**NASDAQ Global Market**

Securities registered or to be registered pursuant to Section 12(g) of the Act: **Not applicable**

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act: **Not applicable**

For annual reports, indicate by check mark the information filed with this form:

☒ Annual Information Form ☒ Audited Annual Financial Statements

Indicate the number of outstanding shares of each of the registrant's classes of capital or common stock as of the close of the period covered by the annual report: **As of December 31, 2019, there were 233,539,538 common shares outstanding.**

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

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

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 12b-2 of the Exchange Act.
Emerging growth company ☐

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

This Annual Report (this "Annual Report") on Form 40-F shall be incorporated by reference into or as an exhibit to, as applicable, the following Registration Statements of the Registrant filed under the Securities Act of 1933: Form S-8 (File No. 333-225494, 333-161807 and 333-156553); and Form F-10 (File No. 333-225493).

DOCUMENTS INCORPORATED BY REFERENCE

The following documents of Ballard Power Systems Inc. (the "Registrant" or the "Company") are filed as exhibits to this Annual Report and are hereby incorporated by reference herein:

- the Registrant's Annual Information Form for the year ended December 31, 2019;
- the Registrant's Audited Consolidated Financial Statements as at and for the years ended December 31, 2019 and 2018, including the notes thereto, together with the report of the independent registered public accounting firm thereon; and
- the Registrant's Management's Discussion and Analysis for the year ended December 31, 2019.

EXPLANATORY NOTE

The Company is a Canadian issuer eligible to file its annual report pursuant to Section 13 of the United States Securities Exchange Act of 1934, as amended (the "Exchange Act") on Form 40-F. The Company is a "foreign private issuer" as defined in Rule 3b-4 under the Exchange Act and Rule 405 under the Securities Act of 1933, as amended. Accordingly, the Company's equity securities are exempt from Sections 14(a), 14(b), 14(c), 14(f) and 16 of the Exchange Act pursuant to Rule 3a12-3.

The Company is permitted, under a multi-jurisdictional disclosure system adopted by the United States, to prepare this Annual Report on Form 40-F in accordance with Canadian disclosure requirements, which are different from those of the United States.

The Company prepares its financial statements in accordance with International Financial Reporting Standards as issued by the International Financial Accounting Boards, and they may be subject to Canadian auditing and auditor independence standards. Accordingly, the financial statements of the Company incorporated by reference in this Annual Report may not be comparable to financial statements of United States companies.

CAUTIONARY STATEMENT REGARDING FORWARD LOOKING STATEMENTS

This Annual Report contains forward-looking statements concerning anticipated developments in the operations of the Company in future periods, planned development activities, the adequacy of the Company's financial resources and other events or conditions that may occur in the future. Forward-looking statements are frequently, but not always, identified by words such as "estimate", "project", "believe", "anticipate", "intend", "expect", "plan", "predict", "may", "should", "will" and similar expressions, or by statements that events, conditions or results "will," "may," "could" or "should" occur or be achieved. Forward-looking statements are statements about the future and are inherently uncertain, and actual achievements of the Company or other future events or conditions may differ materially from those reflected in the forward-looking statements due to a variety of risks, uncertainties and other factors, including, without limitation, those described in the Annual Information Form incorporated by reference in this Annual Report.

The Company's forward-looking statements are based on the beliefs, expectations and opinions of management on the date the statements are made and the Company assumes no obligation to update such forward-looking statements in the future. For the reasons set forth above, investors should not place undue reliance on forward-looking statements.

DISCLOSURE CONTROLS AND PROCEDURES

The required disclosure is included in Management's Discussion and Analysis, which is incorporated herein by reference to Exhibit 99.2.

MANAGEMENT'S ANNUAL REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

The required disclosure is included in Management's Discussion and Analysis, which is incorporated herein by reference to Exhibit 99.2.

ATTESTATION REPORT OF THE REGISTERED PUBLIC ACCOUNTING FIRM

The Registrant's independent registered public accounting firm, KPMG LLP, independently assessed the effectiveness of the Registrant's internal control over financial reporting. KPMG LLP's attestation is located in the Report of Independent Registered Public Accounting Firm included in the Registrant's Audited Consolidated Financial Statements, which is incorporated herein by reference to Exhibit 99.1.

CHANGES IN INTERNAL CONTROLS OVER FINANCIAL REPORTING

During the period covered by this Annual Report, no changes occurred in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

NOTICES PURSUANT TO REGULATION BTR

There were no notices required by Rule 104 of Regulation BTR that the Company sent during the year ended December 31, 2019 concerning any equity security subject to a blackout period under Rule 101 of Regulation BTR.

AUDIT COMMITTEE AND AUDIT COMMITTEE FINANCIAL EXPERT

The Board has a separately designated standing audit committee (the "Audit Committee") established for the purpose of overseeing the accounting and financial reporting processes of the Company and audits of the financial statements of the Company in accordance with Section 3(a)(58)(A) of the Exchange Act. As of the date of this Annual Report, the Company's Audit Committee is comprised of Douglas P. Hayhurst, Ian Sutcliffe, and Janet Woodruff and James Roche is an *ex officio* member of the Audit Committee, each of whom the Board has determined is independent, as that term is defined in the listing standards of the NASDAQ Global Market ("Nasdaq") and Rule 10A-3 of the Exchange Act.

The Registrant's Board of Directors has determined that the Audit Committee has at least two members, Douglas P. Hayhurst and Janet Woodruff, who qualify as an audit committee financial expert under as defined in paragraph (8)(b) of General Instruction B of Form 40-F, and is independent, as defined in the listing standards of Nasdaq. A description of Mr. Hayhurst's and Ms. Woodruff's qualifications are included in the Annual Information Form, under the heading "Audit Committee Matters", which is incorporated herein by reference to Exhibit 99.3.

CODE OF ETHICS

The Registrant has adopted a code of ethics that applies to all members of its Board of Directors, as well as its officers and employees. A copy of the code of ethics is posted on the Registrant's Internet website at www.ballard.com, and is available in print to any person without charge, upon written request to the corporate secretary of the Registrant at the principal executive offices of the Registrant provided above. If there are any amendments to the code of ethics, the Registrant intends to provide a brief description of the amendment and a copy of the amendment via its website. No waivers of the code of ethics have been granted to any principal officer of the Registrant or any person performing similar functions during the year ended December 31, 2019.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

The required disclosure is included in the Annual Information Form, under the heading "Audit Committee Matters," which is incorporated herein by reference to Exhibit 99.3.

OFF-BALANCE SHEET ARRANGEMENTS

The required disclosure is included under the heading "Off-Balance Sheet Arrangements & Contractual Obligations" in Management's Discussion and Analysis, which is incorporated herein by reference to Exhibit 99.2.

CONTRACTUAL OBLIGATIONS

The required disclosure is included under the heading “Off-Balance Sheet Arrangements & Contractual Obligations” in Management’s Discussion and Analysis, which is incorporated herein by reference to Exhibit 99.2.

NASDAQ CORPORATE GOVERNANCE

The Registrant’s common shares are listed on Nasdaq. Nasdaq Marketplace Rule 5615(a)(3) permits a foreign private issuer, such as the Registrant, to follow its home country practice in lieu of most of the requirements of the 5600 Series of the Nasdaq Marketplace Rules. For a discussion of the significant differences between our corporate governance practices and those required to be followed by U.S. domestic issuers under Nasdaq’s corporate governance requirements, please refer to our website at www.ballard.com.

UNDERTAKING

The Company undertakes to make available, in person or by telephone, representatives to respond to inquiries made by the Commission staff, and to furnish promptly, when requested to do so by the Commission staff, information relating to: the securities registered pursuant to Form 40-F; the securities in relation to which the obligation to file an annual report on Form 40-F arises; or transactions in said securities.

CONSENT TO SERVICE OF PROCESS

The Company has previously filed with the Commission a written consent to service of process on Form F-X. Any change to the name or address of the Company’s agent for service shall be communicated promptly to the Commission by amendment to the Form F-X referencing the file number of the Company.

EXHIBIT INDEX

The following documents are being filed with the Commission as exhibits to this Annual Report on Form 40-F.

Exhibit	Description
99.1	Ballard Power Systems Inc. Consolidated Financial Statements for the years ended December 31, 2019 and 2018
99.2	Ballard Power Systems Inc. Management’s Discussion and Analysis for the year ended December 31, 2019
99.3	Annual Information Form for Ballard Power Systems Inc. for the year ended December 31, 2019
99.4	Certifications pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
99.5	Certifications pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
99.6	Consent of KPMG LLP
101	Interactive Data File, formatted as Inline XBRL
104	Cover Page from this Annual Report on Form 40-F, formatted as Inline XBRL

SIGNATURES

Pursuant to the requirements of the Exchange Act, the Registrant certifies that it meets all of the requirements for filing on Form 40-F and has duly caused this Annual Report to be signed on its behalf by the undersigned, thereto duly authorized.

BALLARD POWER SYSTEMS INC.

Date: March 5, 2020

By: /s/ Anthony Guglielmin

Name: Anthony Guglielmin

Title: Vice President and Chief Financial Officer

Consolidated Financial Statements
(Expressed in U.S. dollars)

BALLARD POWER SYSTEMS INC.

Years ended December 31, 2019 and 2018

MANAGEMENT'S REPORT

Management's Responsibility for the Financial Statements and Report on Internal Control over Financial Reporting

The consolidated financial statements contained in this Annual Report have been prepared by management in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board. The integrity and objectivity of the data in these consolidated financial statements are management's responsibility. Management is also responsible for all other information in the Annual Report and for ensuring that this information is consistent, where appropriate, with the information and data contained in the consolidated financial statements.

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external reporting purposes in accordance with IFRS. Internal control over financial reporting may not prevent or detect fraud or misstatements because of limitations inherent in any system of internal control. Management has assessed the effectiveness of the Corporation's internal control over financial reporting based on the framework in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and concluded that the Corporation's internal control over financial reporting was effective as of December 31, 2019. In addition, management maintains disclosure controls and procedures to provide reasonable assurance that material information is communicated to management and appropriately disclosed. Some of the assets and liabilities include amounts, which are based on estimates and judgments, as their final determination is dependent on future events.

The Board of Directors oversees management's responsibilities for financial reporting through the Audit Committee, which consists of eight directors who are independent and not involved in the daily operations of the Corporation. The Audit Committee meets on a regular basis with management and the external and internal auditors to discuss internal controls over the financial reporting process, auditing matters and financial reporting issues. The Audit Committee is responsible for appointing the external auditors (subject to shareholder approval), and reviewing and approving all financial disclosure contained in our public documents and related party transactions.

The external auditors, KPMG LLP, have audited the financial statements and expressed an unqualified opinion thereon. KPMG has also expressed an unqualified opinion on the effective operation of the internal controls over financial reporting as of December 31, 2019. The external auditors have full access to management and the Audit Committee with respect to their findings concerning the fairness of financial reporting and the adequacy of internal controls.

"RANDALL MACEWEN"

RANDALL MACEWEN
President and
Chief Executive Officer
March 4, 2020

"TONY GUGLIELMIN"

TONY GUGLIELMIN
Vice President and
Chief Financial Officer
March 4, 2020

KPMG LLP
Chartered Professional Accountants
PO Box 10426 777 Dunsmuir Street
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Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors
Ballard Power Systems Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated statements of financial position of Ballard Power Systems Inc. (the Corporation) as of December 31, 2019 and 2018, the related consolidated statements of loss and comprehensive income (loss), changes in equity, and cash flows for the years then ended, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Corporation as of December 31, 2019 and 2018, and the results of its operations and its cash flows for the years then ended, in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Corporation's internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated March 4, 2020 expressed an unqualified opinion on the effectiveness of the Corporation's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 3(a) to the consolidated financial statements, the Company has changed its accounting policy for leases as of January 1, 2019 due to the adoption of IFRS 16, *Leases*.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Evaluation of the estimate of costs to complete engineering and technology transfer services for long-term fixed-price contracts

As discussed in Notes 4(j), 5(a) and 21 to the consolidated financial statements, the Corporation recognizes engineering and technology transfer service revenues from long-term fixed-price contracts over time by multiplying the expected consideration from the contract by the ratio of the cumulative costs incurred to date to the sum of incurred and estimated costs for completing the contract. Engineering and technology transfer service revenues from long-term fixed-price contracts are inherently uncertain in that revenue from these contracts is fixed while the estimates of costs required to complete these contracts are subject to significant variability. Engineering and technology transfer service revenues from long-term fixed-price contracts totaled $59.1 million for the year ended December 31, 2019.

We identified the evaluation of the estimate of costs to complete engineering and technology transfer services for long-term fixed-price contracts as a critical audit matter. A higher degree of auditor judgment was required to evaluate the key assumptions used to estimate costs to complete the contracts, including the labour hours and cost of materials to complete the contracts.

The primary procedures we performed to address this critical audit matter included the following. We tested internal controls over the Corporation's process to estimate costs to complete the contracts, including controls related to the development of the key assumptions noted above. We evaluated the Corporation's ability to estimate costs to complete the contracts by comparing actual labour hours and cost of materials incurred to satisfy the performance obligation to historical estimates prepared by the Corporation. For a selection of customer contracts, we interviewed operational personnel of the Corporation to evaluate progress to date, the estimate of costs to complete the contracts, and factors impacting the amount of labour hours and cost of materials to complete the contracts. We evaluated contract progress by inspecting correspondence between the Corporation and the customer and evaluated the labour hours and cost of materials to complete the contracts for consistency with the status of delivery and the underlying contractual terms. We compared the Corporation's current estimate of costs to complete the contracts to those estimated in prior periods and investigated changes during the period. We compared labour hours and cost of materials incurred subsequent to the Corporation's year-end date to assess the consistency with the estimated costs for the period.

//**s**// **KPMG LLP**

We have served as the Corporation's auditor since 1999.

Chartered Professional Accountants

Vancouver, Canada
March 4, 2020

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KPMG LLP
Chartered Professional Accountants
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Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors
Ballard Power Systems Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Ballard Power Systems Inc.'s (the Corporation) internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Corporation maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated statement of financial position of the Corporation as of December 31, 2019 and 2018, the related consolidated statements of loss and comprehensive income (loss), changes in equity, and cash flows for the years then ended, and the related notes (collectively, the consolidated financial statements), and our report dated March 4, 2020 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Corporation's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Management's Responsibility for the Financial Statements and Report on Internal Control over Financial Reporting". Our responsibility is to express an opinion on the Corporation's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Corporation in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

//**s**// **KPMG LLP**

Chartered Professional Accountants

Vancouver, Canada
March 4, 2020

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BALLARD POWER SYSTEMS INC.
Consolidated Statement of Financial Position
(Expressed in thousands of U.S. dollars)

	Note	**December 31, 2019**	December 31, 2018
Assets			
Current assets:			
Cash and cash equivalents		**$ 147,792**	$ 192,235
Trade and other receivables	7	**49,316**	38,524
Inventories	8	**30,098**	29,311
Prepaid expenses and other current assets		**2,320**	1,523
Total current assets		**229,526**	261,593
Non-current assets:			
Property, plant and equipment	9	**42,836**	21,620
Intangible assets	10	**5,687**	8,285
Goodwill	11	**40,287**	40,287
Investments	12	**21,647**	13,994
Other non-current assets		**336**	321
Total assets		**$ 340,319**	$ 346,100
Liabilities and Equity			
Current liabilities:			
Trade and other payables	14	**$ 31,427**	$ 21,154
Deferred revenue	15	**20,156**	16,681
Provisions and other current liabilities	16	**10,488**	9,243
Current lease liability	17	**2,445**	631
Total current liabilities		**64,516**	47,709
Non-current liabilities:			
Non-current lease liability	17	**17,306**	5,064
Deferred gain on finance lease liability	17	**2,150**	2,566
Provisions and other non-current liabilities	16	**1,688**	3,862
Employee future benefits	18	**4,396**	4,299
Total liabilities		**90,056**	63,500
Equity:			
Share capital	19	**1,182,660**	1,174,889
Contributed surplus	19	**290,640**	291,260
Accumulated deficit		**(1,223,850)**	(1,184,400)
Foreign currency reserve		**813**	851
Total equity		**250,263**	282,600
Total liabilities and equity		**$ 340,319**	$ 346,100

See accompanying notes to consolidated financial statements.

Approved on behalf of the Board:

"Doug Hayhurst"	"Jim Roche"
Director	Director

BALLARD POWER SYSTEMS INC.
Consolidated Statement of Loss and Comprehensive Income (Loss)
For the year ended December 31

(Expressed in thousands of U.S. dollars, except per share amounts and number of shares)

	Note	2019	2018
Revenues:			
Product and service revenues	21	**$ 106,327**	$ 96,586
Cost of product and service revenues		**83,732**	66,912
Gross margin		**22,595**	29,674
Operating expenses:			
Research and product development		**26,928**	27,039
General and administrative		**13,212**	14,760
Sales and marketing		**7,915**	8,068
Other expense	23	**1,933**	605
Total operating expenses		**49,988**	50,472
Results from operating activities		**(27,393)**	(20,798)
Finance income (loss) and other	24	**2,851**	(449)
Finance expense	24	**(1,434)**	(503)
Net finance income (loss)		**1,417**	(952)
Loss on sale of assets	25	**(1,995)**	(4,049)
Equity in loss of investment in joint venture and associates	12 & 27	**(11,059)**	(1,154)
Loss before income taxes		**(39,030)**	(26,953)
Income tax expense	26	**(20)**	(370)
Net loss		**(39,050)**	(27,323)
Other comprehensive income (loss):			
Items that will not be reclassified to profit or loss:			
Actuarial gain (loss) on defined benefit plans	18	**(400)**	305
		(400)	305
Items that may be reclassified subsequently to profit or loss:			
Foreign currency translation differences		**(38)**	647
		(38)	647
Other comprehensive income (loss), net of tax		**(438)**	952
Total comprehensive loss		**$ (39,488)**	$ (26,371)
Basic and diluted loss per share			
Loss per share		**$ (0.17)**	**$ (0.15)**
Weighted average number of common shares outstanding		**232,820,675**	**185,836,596**

See accompanying notes to consolidated financial statements.

BALLARD POWER SYSTEMS INC.
Consolidated Statement of Changes in Equity
(Expressed in thousands of U.S. dollars except per share amounts and number of shares)

	Ballard Power Systems Inc. Equity					
	Number of shares	Share capital	Contributed surplus	Accumulated deficit	Foreign currency reserve	Total equity
Balance, December 31, 2017	178,062,667	$ 986,497	$ 290,536	$ (1,157,382)	$ 204	$ 119,855
Net loss	—	—	—	(27,323)	—	(27,323)
Private placement (note 19)	51,831,659	183,672	—	—	—	183,672
DSUs redeemed (note 19)	154,752	356	(792)	—	—	(436)
RSUs redeemed (note 19)	149,980	338	(802)	—	—	(464)
Options exercised (note 19)	945,022	2,592	(964)	—	—	1,628
Warrants exercised (note 19)	747,563	1,434	—	—	—	1,434
Share-based compensation (note 19)	—	—	3,282	—	—	3,282
						—
Other comprehensive income:						
Defined benefit plan actuarial gain	—	—	—	305	—	305
Foreign currency translation for foreign operations	—	—	—	—	647	647
Balance, December 31, 2018	231,891,643	$ 1,174,889	$ 291,260	$ (1,184,400)	$ 851	$ 282,600
Net loss	**—**	**—**	**—**	**(39,050)**	**—**	**(39,050)**
RSUs redeemed (note 19)	**387,686**	**548**	**(1,582)**	**—**	**—**	**(1,034)**
Options exercised (note 19)	**2,234,997**	**7,223**	**(2,599)**	**—**	**—**	**4,624**
Share-based compensation (note 19)	**—**	**—**	**3,561**	**—**	**—**	**3,561**
Other comprehensive loss:						
Defined benefit plan actuarial loss	**—**	**—**	**—**	**(400)**	**—**	**(400)**
Foreign currency translation for foreign operations	**—**	**—**	**—**	**—**	**(38)**	**(38)**
Balance, December 31, 2019	**234,514,326**	**$ 1,182,660**	**$ 290,640**	**$ (1,223,850)**	**$ 813**	**$ 250,263**

See accompanying notes to consolidated financial statements.

BALLARD POWER SYSTEMS INC.
Consolidated Statement of Cash Flows
For the year ended December 31

(Expressed in thousands of U.S. dollars)

	Note	2019	2018
Cash provided by (used in):			
Operating activities:			
Net loss for the year		**$ (39,050)**	$ (27,323)
Adjustments for:			
Depreciation and amortization		**7,514**	5,015
Impairment loss on trade receivables	23	**1,787**	98
Unrealized (gain)/loss on forward contracts		**(805)**	570
Equity in loss of investment in joint venture and associates	12 & 27	**11,059**	1,154
Loss on sale of assets	25	**1,995**	4,049
(Gain) loss on decommissioning liabilities		**119**	(85)
Amortization of deferred lease inducement		**—**	(476)
Employee future benefits	18	**208**	226
Employee future benefits plan contributions	18	**(511)**	(536)
Share-based compensation	19	**3,561**	2,902
		(14,123)	(14,406)
Changes in non-cash working capital:			
Trade and other receivables		**(14,494)**	(11,702)
Inventories		**(787)**	(12,932)
Prepaid expenses and other current assets		**(812)**	426
Trade and other payables		**11,083**	(5,573)
Deferred revenue		**3,475**	8,607
Warranty provision		**1,428**	3,892
		(107)	(17,282)
Cash used in operating activities		**(14,230)**	(31,688)
Investing activities:			
Additions to property, plant and equipment	9	**(13,934)**	(9,854)
Net proceeds on sale of property, plant and equipment	25	**2,137**	1,345
Investment in joint venture and associates	12	**(20,949)**	(14,606)
Cash used in investing activities		**(32,746)**	(23,115)
Financing activities:			
Principal payments of lease liabilities	17	**(2,053)**	(598)
Net proceeds on issuance of share capital from share option exercises	19	**4,624**	1,628
Net proceeds on issuance of share capital from warrant exercises	19	**—**	1,434
Net proceeds on issuance of share capital from private placement	19	**—**	183,672
Cash provided by financing activities		**2,571**	186,136
Effect of exchange rate fluctuations on cash and cash equivalents held		**(38)**	647
Increase (decrease) in cash and cash equivalents		**(44,443)**	131,980
Cash and cash equivalents, beginning of year		**192,235**	60,255
Cash and cash equivalents, end of year		**147,792**	192,235

Supplemental disclosure of cash flow information (note 28).

See accompanying notes to consolidated financial statements.

1. Reporting entity:

The principal business of Ballard Power Systems Inc. (the "Corporation") is the design, development, manufacture, sale and service of proton exchange membrane ("PEM") fuel cell products for a variety of applications, focusing on the power product markets of Heavy-Duty Motive (consisting of bus, truck, rail and marine applications), Portable Power / Unmanned Aerial Vehicle ("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 the Corporation's extensive intellectual property portfolio and fundamental knowledge for a variety of PEM fuel cell applications. A fuel cell is an environmentally clean electrochemical device that combines hydrogen fuel with oxygen (from the air) to produce electricity.

The Corporation is a company domiciled in Canada and its registered office is located at 9000 Glenlyon Parkway, Burnaby, British Columbia, Canada, V5J 5J8. The consolidated financial statements of the Corporation as at and for the year ended December 31, 2019 comprise the Corporation and its subsidiaries (note 4(a)).

2. Basis of preparation:

(a) Statement of compliance:

These consolidated financial statements of the Corporation have been prepared in accordance with International Financial Reporting Standards ("IFRS") as issued by the International Accounting Standards Board ("IASB").

The consolidated financial statements were authorized for issue by the Board of Directors on March 4, 2020.

Details of the Corporation's significant accounting policies are included in note 4.

This is the first set of the Corporation's annual financial statements in which *IFRS 16 Leases* and *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments* have been applied. Changes to significant accounting policies are described in note 3.

(b) Basis of measurement:

The consolidated financial statements have been prepared on the historical cost basis except for the following material items in the statement of financial position:

- Financial assets classified as measured at: amortized cost; fair value through other comprehensive income (FVOCI) or fair value through profit or loss (FVTPL); and
- Employee future benefits liability is recognized as the net of the present value of the defined benefit obligation, less the fair value of plan assets.

(c) Functional and presentation currency:

These consolidated financial statements are presented in U.S. dollars, which is the Corporation's functional currency.

(d) Use of estimates:

The preparation of the consolidated financial statements in conformity with IFRS requires the Corporation's management 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 these 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.

2. Basis of preparation (cont'd):

(d) Use of estimates (cont'd):

Significant areas having estimation uncertainty include revenue recognition, asset impairment, warranty provision, inventory provision, impairment loss (recoveries) on trade receivables, employee future benefits, and income taxes. These estimates and judgments are discussed further in note 5.

(e) Future operations:

The Corporation is required to assess its ability to continue as a going concern or whether substantial doubt exists as to the Corporation's ability to continue as a going concern into the foreseeable future. The Corporation has forecast its cash flows for the foreseeable future and despite the ongoing volatility and uncertainties inherent in the business, the Corporation believes it has adequate liquidity in cash and working capital to finance its operations. The Corporation's ability to continue as a going concern and realize its assets and discharge its liabilities and commitments in the normal course of business is dependent upon the Corporation having adequate liquidity and achieving profitable operations that are sustainable. There are various risks and uncertainties affecting the Corporation including, but not limited to, the market acceptance and rate of commercialization of the Corporation's products, the ability of the Corporation to successfully execute its business plan, and general global economic conditions, certain of which are beyond the Corporation's control.

The Corporation's strategy to mitigate these risks and uncertainties is to continue its drive to attain profitable operations that are sustainable by executing a business plan that continues to focus on revenue growth, improving overall gross margins, maintaining discipline over operating expenses, managing working capital requirements, and securing additional financing to fund operations as needed until the Corporation does achieve profitable operations that are sustainable. Failure to implement this plan could have a material adverse effect on the Corporation's financial condition and or results of operations.

3. Changes in accounting policies:

The Corporation has consistently applied the accounting policies set out in note 4 to all periods presented in these consolidated financial statements, except as described below. The Corporation has adopted *IFRS 16 Leases* and *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments,* effective January 1, 2019. The effect of applying *IFRS 16 Leases* had a significant impact on the financial statements which is detailed below, whereas the adoption of *IFRIC Interpretation 23 Uncertainty over Income Tax Treatments* did not have a significant impact on the Corporation's financial statements. A number of other new standards and interpretations are also effective from January 1, 2019 but they did not have a significant impact on the Corporation's financial statements.

Due to the transition methods chosen by the Corporation in applying these standards, comparative information throughout these financial statements has not been restated to reflect the requirements of the new standards.

(a) *IFRS 16 LEASES*

The Corporation has adopted *IFRS 16 Leases* using the modified retrospective approach from January 1, 2019, and therefore has not restated comparatives for the 2018 reporting period, as permitted under the specific transitional provisions in the standard. The reclassifications and the adjustments arising from the new leasing rules are therefore recognized in retained earnings at January 1, 2019. There was no adjustment to retained earnings as a result of this change in accounting policy.

The Corporation has elected not to reassess whether a contract is, or contains a lease at the date of initial application. Instead, for contracts entered into before the transition date the Corporation relied on its assessment made applying *IAS 17 Leases* and *IFRIC 4 Determining Whether an Arrangement Contains a Lease ("IFRIC 4").* The definition of a lease under *IFRS 16 Leases* was applied only to contracts entered into or changed on or after January 1, 2019.

3. Changes in accounting policies (cont'd):

(a) *IFRS 16 LEASES (cont'd)*

On adoption of *IFRS 16 Leases*, the Corporation recognized lease liabilities in relation to leases which had previously been classified as "operating lease" under the principles of *IAS 17 Leases*. These liabilities were measured at the present value of the remaining lease payments, discounted using the Corporation's incremental borrowing rate as of January 1, 2019. Right-of-use assets are measured at an amount equal to the lease liability, adjusted by the amount of any prepaid or accrued lease payments.

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

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

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

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

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

On transition to *IFRS 16 Leases*, the Corporation recognized additional right-of-use assets and lease liabilities, and reduced prepaid expenses, accrued liabilities and deferred lease inducements. The impact on transition is summarized below.

		January 1, 2019
Right-of-use assets	$	11,434
Prepaid expenses		(20)
Accrued liabilities		282
Deferred lease inducements		2,292
Lease liability		(13,988)

3. Changes in accounting policies (cont'd):

When measuring lease liabilities for leases that were classified as operating leases, the Corporation discounted lease payments using its incremental borrowing rate at January 1, 2019. The weighted-average rate applied is 7%.

		January 1, 2019
Operating lease commitment disclosed as at December 31, 2018	$	17,770
Discounted using the lessee's incremental borrowing rate as at the date of initial application		14,110
Add: Finance lease liabilities previously recognized as at December 31, 2018		5,695
Less: Short term leases not recognized under IFRS 16		(122)
Lease liability recognized as at January 1, 2019	$	19,683

(b) *IFRIC INTERPRETATION 23 UNCERTAINTY OVER INCOME TAX TREATMENTS*

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

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

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

4. Significant accounting policies:

The accounting policies set out below have been applied consistently to all periods presented in these consolidated financial statements, unless otherwise indicated. Certain prior year comparative figures have been reclassified to comply with current year presentation.

(a) Basis of consolidation:

The consolidated financial statements include the accounts of the Corporation and its principal subsidiaries as follows:

	Percentage ownership	
	2019	2018
Guangzhou Ballard Power Systems Co., Ltd.	100 %	100 %
Ballard Hong Kong Ltd.	100 %	100 %
Ballard Unmanned Systems (formerly named Protonex Technology Corporation)	100 %	100 %
Ballard Services Inc.	100 %	100 %
Ballard Fuel Cell Systems Inc.	100 %	100 %
Ballard Power Systems Europe A/S	100 %	100 %
Ballard Power Corporation	100 %	100 %

4. Significant accounting policies (cont'd):

(a) Basis of consolidation (cont'd):

The Corporation also has a non-controlling, 49% interest, in Weichai Ballard Hy-Energy Technologies Co., Ltd ("Weichai Ballard JV") and a non-controlling, 10% interest, in Guangdong Synergy Ballard Hydrogen Power Co., Ltd ("Synergy Ballard JVCo"). Both of these associated companies are accounted for using the equity method of accounting.

Subsidiaries are entities controlled by the Corporation. The Corporation controls an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns though its power over the entity. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. Intercompany balances and transactions are eliminated in the consolidated financial statements.

(i) Weichai Ballard JV

On November 13, 2018, the Corporation, through Ballard Hong Kong Ltd ("BHKL"), entered into an agreement with Weichai Power Co., Ltd ("Weichai Power") to create a new limited liability company based in China called Weichai Ballard Hy-Energy Technologies Co., Ltd ("Weichai Ballard JV") . The purpose of Weichai Ballard JV is to manufacture the Corporation's next-generation liquid-cooled fuel cell stack ("LCS") and LCS-based power modules for bus, commercial truck and forklift applications with certain exclusive rights in China. Under the agreement, Weichai is to contribute RMB 561,000,000 ($80,560,000 equivalent at December 31, 2019 exchange rate) and the Corporation is to contribute RMB 539,000,000 ($77,976,000 equivalent at December 31, 2019 exchange rate) representing 51% and 49% of the registered capital in Weichai Ballard JV, respectively. The parties will make these contributions in cash over a four year period and are not obligated to contribute any additional capital in excess of the amounts noted above.

During 2018, the Corporation made an initial capital contribution of $ 14,286,000 (RMB 98,000,000 equivalent). During 2019, the Corporation made two additional capital contributions totalling $ 20,944,000 (RMB 143,325,000 equivalent). Weichai Power and the Corporation are committed to fund pro rata shares of Weichai Ballard JV based on an agreed business plan. Weichai Power holds three of five Weichai Ballard JV board seats and the Corporation holds two, with the Corporation having certain shareholder protection provisions. Weichai Ballard JV is not controlled by the Corporation and therefore is not consolidated. The Corporation's 49% investment in Weichai Ballard JV is accounted for using the equity method of accounting.

(ii) Guangzhou Ballard Power Systems

On January 10, 2017, the Corporation incorporated Guangzhou Ballard Power Systems Co., Ltd. ("GBPS"), a 100% wholly foreign-owned enterprise ("WFOE") in China to serve as the Corporation's operations entity for all of China.

(iii) Ballard Power Systems Europe

On January 5, 2017, the Corporation purchased the remaining 43% interest in its European subsidiary, Ballard Power Systems Europe A/S ("BPSE"), held by Dansk Industri Invest A/S for a nominal value, thus resulting in the Corporation now owning 100% of BPSE.

(iv) Synergy Ballard JVCo

On September 26, 2016, the Corporation, through BHKL, entered into a joint venture agreement with Guangdong Nation Synergy Hydrogen Power Technology Co., Ltd ("Synergy") to create a new limited liability company based in China called Guangdong Synergy Ballard Hydrogen Power Co., Ltd ("Synergy Ballard JVCo"). The purpose of Synergy Ballard JVCo is to manufacture fuel cell stacks utilizing the Corporation's FCvelocity®-9SSL fuel cell stack technology for use primarily in fuel cell engines assembled in China to provide propulsion power for zero-emission fuel cell electric buses and commercial vehicles with certain exclusive rights in China.

4. Significant accounting policies (cont'd):

(a) Basis of consolidation (cont'd):

(iv) Synergy Ballard JVCo (cont'd)

In setting up the joint venture, as specified in the Equity Joint Venture Agreement ("EJV") dated September 26, 2016, Synergy contributed RMB 60,300,000 ($9,000,000) and the Corporation contributed RMB 6,700,000, ($971,000) in March 2017 representing 90% and 10% of the registered capital in Synergy Ballard JVCo, respectively. The parties made their contributions in cash and the Corporation is not obligated to contribute any additional capital in excess of the amounts noted above. Synergy Ballard JVCo is not controlled by the Corporation and therefore is not consolidated. The Corporation's 10% investment in Synergy Ballard JVCo is accounted for using the equity method of accounting.

(v) Ballard Hong Kong Ltd

On July 19, 2016, the Corporation incorporated Ballard Hong Kong Ltd ("BHKL"), a 100% owned holding company in Hong Kong, China.

(vi) Ballard Unmanned Systems

On October 1, 2015, the Corporation acquired Ballard Unmanned Systems (formerly named Protonex Technology Corporation ("Protonex") prior to January 1, 2019), a designer and manufacturer of advanced power management products and portable fuel cell solutions.

(b) Foreign currency:

(i) Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currencies of the Corporation and its subsidiaries at the exchange rate in effect at the transaction date. Monetary assets and liabilities denominated in other than the functional currency are translated at the exchange rates in effect at the balance sheet date. The resulting exchange gains and losses are recognized in earnings. Non-monetary assets and liabilities denominated in other than the functional currency that are measured at fair value are translated to the functional currency at the exchange rate at the date that the fair value was determined. Non-monetary items that are measured in terms of historical cost in other than the functional currency are translated using the exchange rate at the date of the transaction.

(ii) Foreign operations

The assets and liabilities of foreign operations are translated to the presentation currency using exchange rates at the reporting date. The income and expenses of foreign operations are translated to the presentation currency using exchange rates at the dates of the transactions. Foreign currency differences are recognized in other comprehensive income.

(c) Financial instruments:

(i) Financial assets

The Corporation initially recognizes loans and receivables and deposits on the date that they originated and all other financial assets on the trade date at which the Corporation becomes a party to the contractual provisions of the instrument. The Corporation derecognizes a financial asset when the contractual rights to the cash flows from the asset expire, or when it transfers substantially all the risks and rewards of ownership of the financial asset.

4. Significant accounting policies (cont'd):

(c) Financial instruments (cont'd):

Financial assets at fair value through profit or loss

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

The Corporation also periodically enters into foreign exchange forward contracts and platinum futures contracts to limit its respective exposure to foreign currency rate fluctuations and platinum price fluctuations. These derivatives are recognized initially at fair value and are recorded as either assets or liabilities based on their fair value. Subsequent to initial recognition, these derivatives are measured at fair value and changes to their value are recorded through profit or loss.

(ii) Financial liabilities

Financial liabilities comprise the Corporation’s trade and other payables. The financial liabilities are initially recognized on the date they are originated and are derecognized when the contractual obligations are discharged or cancelled or expire. These financial liabilities are recognized initially at fair value and subsequently are measured at amortized costs using the effective interest method, when materially different from the initial amount. Fair value is determined based on the present value of future cash flows, discounted at the market rate of interest.

(iii) Share capital

Share capital is classified as equity. Incremental costs directly attributable to the issue of shares and share options are recognized as a deduction from equity. When share capital is repurchased, the amount of the consideration paid, including directly attributable costs, is recognized as a deduction from equity. Repurchased shares are classified as treasury shares and are presented as a deduction from equity. When treasury shares are subsequently reissued, the amount received is recognized as an increase in equity, and the resulting surplus or deficit on the transaction is transferred to or from retained earnings.

(d) Inventories:

Inventories are recorded at the lower of cost and net realizable value. The cost of inventories is based on the first-in first-out principle, and includes expenditures incurred in acquiring the inventories, production or conversion costs and other costs incurred in bringing them to their existing location and condition. In the case of manufactured inventories and work in progress, cost includes materials, labor and appropriate share of production overhead based on normal operating capacity. Costs of materials are determined on an average per unit basis.

Net realizable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and selling expenses. In establishing any impairment of inventory, management estimates the likelihood that inventory carrying values will be affected by changes in market demand, technology and design, which would impair the value of inventory on hand.

4. Significant accounting policies (cont'd):

(e) Property, plant and equipment:

(i) Recognition and measurement

Items of property, plant and equipment are measured at cost less accumulated depreciation and any accumulated impairment losses. The cost of self-constructed assets includes the cost of materials, costs directly attributable to bringing the assets to a working condition for their intended use, and the costs of dismantling and removing items and restoring the site on which they are located. If significant parts of an item of property, plant and equipment have different useful lives, then they are accounted for as separate items (major components) of property, plant and equipment.

Any gain or loss on disposal of an item of property, plant and equipment is recognized in profit or loss.

(ii) Subsequent expenditures

Subsequent expenditures are capitalized only if it is probable that the future economic benefits associated with the expenditures will flow to the Corporation.

(iii) Depreciation

Depreciation is calculated to write-off the cost of items of property, plant and equipment less their estimated residual values using the straight-line method over their estimated useful lives, and is generally recognized in profit or loss.

The estimated useful lives of property, plant and equipment for current and comparative periods are as follows:

Computer equipment	3 to 10 years
Furniture and fixtures	5 to 10 years
Leasehold improvements	The shorter of initial term of the respective lease and estimated useful life
Production and test equipment	4 to 15 years

Leased assets are depreciated over the shorter of the lease term or their useful lives unless it is reasonably certain that the Corporation will obtain ownership by the end of the lease term.

Right-of-use asset - Property	2 to 15 years
Right-of-use asset - Office equipment	2 to 5 years
Right-of-use asset - Vehicle	5 years

Depreciation methods, useful lives and residual values are reviewed at each reporting date and adjusted if appropriate.

(f) Leases:

IFRS 16 Leases introduced a single, on-balance sheet accounting model for lessees. As a result, the Corporation, as a lessee, has recognized right-of-use assets representing its rights to use the underlying assets, and lease liabilities representing its obligation to make lease payments. Lessor accounting remains similar to previous accounting policies.

The Corporation has applied *IFRS 16 Leases* using the modified retrospective approach and therefore the comparative information has not been restated and continues to be reported under *IAS 17 Leases* and *IFRIC 4*. The details of accounting policies under *IAS 17 Leases* and *IFRIC 4* are disclosed separately if they are different from those under *IFRS 16 Leases* and the impact of changes is disclosed in note 3.

4. Significant accounting policies (cont'd):

(f) Leases (cont'd)

Accounting policy applicable from January 1, 2019

At inception of a contract, the Corporation assesses whether a contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. To assess whether a contract conveys the right to control the use of an identified asset, the Corporation assesses whether:

- the contract involves the use of an identified asset - this may be specified explicitly or implicitly, and should be physically distinct or represent substantially all of the capacity of a physically distinct asset. If the supplier has a substantive substitution right, then the asset is not identified;
- the Corporation has the right to obtain substantially all of the economic benefits from use of the asset throughout the period of use; and
- the Corporation has the right to direct the use of the asset. The Corporation has this right when it has the decision-making rights that are most relevant to changing how and for what purpose the asset is used. In rare cases where all the decisions about how and for what purpose the asset is used are predetermined, the Corporation has the right to direct the use of the asset if either:
    - the Corporation has the right to operate the asset; or
    - the Corporation designed the asset in a way that predetermines how and for what purpose it will be used.

This policy is applied to contracts entered into, or changed, on or after January 1, 2019.

i. As a Lessee

The Corporation recognizes a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, less any lease incentives received.

The right-of-use asset is subsequently depreciated using the straight-line method from the commencement date to the earlier of the end of the useful life of the right-of-use asset or the end of the lease term. The estimated useful lives of right-of-use assets are determined on the same basis as those of property and equipment. In addition, the right-of-use asset is periodically reduced by impairment losses, if any, and adjusted for certain remeasurements of the lease liability.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, the Corporation’s incremental borrowing rate. Generally, the Corporation uses its incremental borrowing rate as the discount rate.

4. Significant accounting policies (cont'd):

(f) Leases (cont'd)

Lease payments included in the measurement of the lease liability comprise:

- Fixed payments, including in-substance fixed payments;
- Variable lease payments that depend on an index or a rate, initially measured using the index or rate at the commencement date;
- Amounts expected to be payable under a residual value guarantee; and
- The exercise price under a purchase option that the Corporation is reasonably certain to exercise, lease payments in an optional renewal period if the Corporation is reasonably certain to exercise an extension option, and penalties for early termination of a lease unless the Corporation is reasonably certain not to terminate early.

The lease liability is subsequently measured at amortized cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate, if there is a change in the Corporation's estimate of the amount expected to be payable under a residual value guarantee or if the Corporation changes its assessment of whether it will exercise a purchase, extension or termination option. When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

The Corporation presents right-of-use assets in 'Property, plant and equipment' and lease liabilities in 'Lease liability' in the statement of financial position.

The Corporation has elected not to recognize right-of-use assets and lease liabilities for short-term leases of properties, equipment and vehicles that have a lease term of 12 months or less. The Corporation recognizes the lease payments associated with these leases as an operating expense on a straight-line basis over the lease term.

ii. As a Lessor

When the Corporation is an intermediate lessor, it accounts for its interests in the head lease and the sub-lease separately. It assesses the lease classification of a sub-lease with reference to the right-of-use asset arising from the head lease, not with reference to the underlying asset, and makes an overall assessment of whether the lease transfers to the lessee substantially all of the risks and rewards of ownership incidental to ownership of the underlying asset. If this is the case, then the lease is a finance lease; if not, then it is an operating lease. As part of this assessment, the Corporation considers certain indicators such as whether the lease is for the major part of the economic life of the asset.

The Corporation recognizes lease payments received under operating leases as income on a straight-line basis over the lease term in operating expense.

The accounting policies applicable to the Corporation as a lessor in the comparative period were not different from *IFRS 16 Leases*. However, when the Corporation was an intermediate lessor the sub-leases were classified with reference to the underlying asset.

Accounting policy applicable before January 1, 2019

Leases where the Corporation assumes substantially all the risks and rewards of ownership are classified as finance leases. Upon initial recognition the leased asset is measured at an amount equal to the lower of its fair value and the present value of the minimum lease payments. Subsequent to initial recognition, the asset is accounted for in accordance with the accounting policy applicable to that asset. Other leases are operating leases and not recognized in the statement of financial position.

4. Significant accounting policies (cont'd):

(f) Leases (cont'd)

Minimum lease payments made under finance leases are apportioned between finance expense and reduction of the outstanding liability. Finance expense is allocated to each period during the lease term so as to produce a constant periodic rate of interest on the remaining balance of the liability.

Payments made under operating leases are recognized in income on a straight-line basis over the term of the lease. Lease incentives received are recognized as a reduction to the lease expense over the term of the lease.

(g) Goodwill and intangible assets:

(i) Recognition and measurement

Goodwill	Goodwill arising on the acquisition of subsidiaries is measured at cost less accumulated impairment losses.
Research and development	Expenditure on research activities is recognized in profit or loss as incurred. Development expenditure is capitalized only if the expenditure can be measured reliably, the product or process is technically and commercially feasible, future economic benefits are probable and the Corporation intends to and has sufficient resources to complete development and to use or sell the asset. Otherwise, it is recognized in profit or loss as incurred. Subsequent to initial recognition, development expenditure is measured at cost less accumulated amortization and any accumulated impairment losses.
Intangible assets	Intangible assets, including patents, know-how, in-process research and development, trademarks and service marks and software systems that are acquired or developed by the Corporation and have finite useful lives are measured at cost less accumulated amortization and any accumulated impairment losses.

(ii) Subsequent expenditure

Subsequent expenditure is capitalized only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditures, including expenditures on internally generated goodwill, are recognized in profit or loss as incurred.

(iii) Amortization

Amortization is calculated to write-off the cost of intangible assets less their estimated residual values using the straight-line method over their estimated useful lives, and is recognized in profit or loss. Goodwill is not amortized.

The estimated useful lives for current and comparative periods are as follows:

Internally generated fuel cell intangible assets	3 to 5 years
Patents, know-how and in-process research & development	5 to 20 years
ERP management reporting software system	5 to 10 years
Trademarks and service marks	15 years
Domain names	15 years
Customer base and relationships	10 years
Acquired non-compete agreements	1 year

Amortization methods, useful lives and residual values are reviewed at each reporting date and adjusted if appropriate.

4. Significant accounting policies (cont'd):

(h) Impairment:

(i) Financial assets

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 Corporation'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.

The Corporation has 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, the Corporation considers 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 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.

(ii) Non-financial assets

The carrying amounts of the Corporation's 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 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. Fair value less costs to sell is defined as the estimated price that would be received on the sale of the asset in an orderly transaction between market participants at the measurement date. 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.

4. Significant accounting policies (cont'd):

(h) Impairment (cont'd):

(ii) Non-financial assets (cont'd)

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 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.

(i) Provisions:

A provision is recognized if, as a result of a past event, the Corporation has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risk specific to the liability. The unwinding of the discount is recognized as a finance expense.

Warranty provision

A provision for warranty costs is recorded on product sales at the time the sale is recognized. In establishing the warranty provision, management estimates the likelihood that products sold will experience warranty claims and the estimated cost to resolve claims received, taking into account the nature of the contract and past and projected experience with the products.

Decommissioning liabilities

Legal obligations to retire tangible long-lived assets are recorded at the net present value of the expected costs of settlement at acquisition with a corresponding increase in asset value. These include assets leased under operating leases. The liability is accreted over the life of the asset to the ultimate settlement amount and the increase in asset value is depreciated over the remaining useful life of the asset.

(j) Revenue recognition:

The Corporation generates revenues 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 services revenues are derived primarily from cost-plus reimbursable contracts and from long-term fixed price contracts.

Revenue is recognized when a customer obtains control of the goods or services. Determining the timing of the transfer of control, at a point in time or over time, requires judgment. On standard product sales contracts, revenues are recognized when customers obtain control of the product, that is when transfer of title and risks and rewards of ownership of goods have passed and when obligation to pay is considered certain. Invoices are generated and revenue is recognized at that point in time. Provisions for warranties are made at the time of sale.

4. Significant accounting policies (cont'd):

(j) Revenue recognition (cont'd):

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.

On cost-plus reimbursable contracts, revenues are recognized as costs are incurred, and include applicable fees earned as services are provided.

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 Corporation is entitled to reimbursement of the costs incurred to date plus the applicable gross margin. Therefore, revenue from these contracts and the associated costs are recognized as the costs are incurred over time.

On long-term fixed price contracts, revenues are recognized over time using cumulative costs incurred to date relative to total estimated costs at completion to measure progress towards satisfying performance obligations. Generally, revenue is recognized by multiplying the expected consideration by the ratio of cumulative costs incurred to date to the sum of incurred and estimated costs for completing the performance obligation. The cumulative effect of changes to estimated revenues and estimated costs for completing a contract are recognized in the period in which the revisions are identified. In the event that the estimated costs exceed the expected revenues on a contract, such loss is recognized in its entirety in the period it becomes known.

Deferred revenue (i.e. contract liabilities) represents cash received from customers in excess of revenue recognized on uncompleted contracts.

(k) Finance income and expense:

Finance income comprises interest income on funds invested, gains on the disposal of available-for-sale financial assets and changes in the fair value of financial assets at fair value through profit or loss. Interest income is recognized as it accrues in income, using the effective interest method.

Finance expense comprise interest expense on capital leases, unwinding of the discount on provisions, changes in the fair value of financial assets at fair value through profit or loss and impairment losses recognized on financial assets. Foreign currency gains and losses are reported on a net basis.

(l) Income taxes:

The Corporation follows 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 date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized.

4. Significant accounting policies (cont'd):

(m) Employee benefits:

Defined contribution plans

A defined contribution plan is a post-employment benefit plan under which an entity pays fixed contributions into a separate entity and will have no legal or constructive obligation to pay further amounts.

Obligations for contributions to defined contribution pension plans are recognized as an employee benefit expense in profit or loss in the periods during which services are rendered by employees. Prepaid contributions are recognized as an asset to the extent that a cash refund or a reduction in future payments is available. Contributions to a defined contribution plan that are due more than 12 months after the end of the period in which the employees render the service are discounted to their present value.

Defined benefit plans

A defined benefit plan is a post-employment pension plan other than a defined contribution plan. The Corporation's net obligation in respect of defined benefit pension plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in return for their service in the current and prior periods; that benefit is discounted to determine its present value. Any unrecognized past service costs and the fair value of any plan assets are deducted. The discount rate is the yield at the reporting date on AA credit-rated bonds that have maturity dates approximating the terms of the Corporation's obligations and that are denominated in the same currency in which the benefits are expected to be paid. The calculation is performed annually by a qualified actuary using the projected unit credit method.

When the calculation results in a benefit to the Corporation, the recognized asset is limited to the total of any unrecognized past service costs and the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan. In order to calculate the present value of economic benefits, consideration is given to any minimum funding requirements that apply to any plan in the Corporation. An economic benefit is available to the Corporation if it is realizable during the life of the plan, or on settlement of the plan liabilities.

The Corporation recognizes all remeasurements arising from defined benefit plans, which comprise actuarial gains and losses, immediately in other comprehensive income. Remeasurements recognized in other comprehensive income are not recycled through profit or loss in subsequent periods.

Other long-term employee benefits

The Corporation's net obligation in respect of long-term employee benefits other than pension plans is the amount of future benefit that employees have earned in return for their service in the current and prior periods; that benefit is discounted to determine its present value, and the fair value of any related assets is deducted. The discount rate is the yield at the reporting date on AA credit-rated bonds that have maturity dates approximating the terms of the Corporation's obligations. The calculation is performed using the projected unit credit method. Any actuarial gains and losses are recognized in other comprehensive income or loss in the period in which they arise.

Termination benefits

Termination benefits are recognized as an expense (restructuring expense recorded in other operating expense) when the Corporation is committed demonstrably, without realistic possibility of withdrawal, to a formal detailed plan to either terminate employment before the normal retirement date, or to provide termination benefits as a result of an offer made to encourage voluntary redundancy. Termination benefits for voluntary redundancies are recognized as an expense if the Corporation has made an offer of voluntary redundancy, it is probable that the offer will be accepted, and the number of acceptances can be estimated reliably. If benefits are payable more than 12 months after the reporting period, then they are discounted to their present value.

4. Significant accounting policies (cont'd):

(m) Employee benefits (cont'd):

Short-term employee benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided.

A liability is recognized for the amount expected to be paid under short-term cash bonus or profit sharing plans if the Corporation has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee, and the obligation can be estimated reliably.

(n) Share-based compensation plans:

The Corporation uses the fair-value based method of accounting for share-based compensation for all awards of shares and share options granted. The resulting compensation expense, based on the fair value of the awards granted, excluding the impact of any non-market service and performance vesting conditions, is charged to income over the period that the employees unconditionally become entitled to the award, with a corresponding increase to contributed surplus.

Fair values of share options are calculated using the Black-Scholes valuation method as of the grant date and adjusted for estimated forfeitures. For awards with graded vesting, the fair value of each tranche is calculated separately and recognized over its respective vesting period. Non-market vesting conditions are considered in making assumptions about the number of awards that are expected to vest. At each reporting date, the Corporation reassesses its estimates of the number of awards that are expected to vest and recognizes the impact of any revision in the income statement with a corresponding adjustment to contributed surplus.

The Corporation issues shares and share options under its share-based compensation plans as described in note 19. Any consideration paid by employees on exercise of share options or purchase of shares, together with the amount initially recorded in contributed surplus, is credited to share capital.

(o) Earnings (loss) per share:

Basic earnings (loss) per share is computed using the weighted average number of common shares outstanding during the period, adjusted for treasury shares. Diluted earnings per share is calculated using the treasury stock method.

Under the treasury stock method, the dilution is calculated based upon the number of common shares issued should deferred share units (“DSUs”), restricted share units (“RSUs”), and “in the money” options, if any, be exercised. When the effects of outstanding stock-based compensation arrangements would be anti-dilutive, diluted loss per share is not calculated.

(p) Government assistance and investment tax credits:

Government assistance and investment tax credits are recorded as either a reduction of the cost of the applicable assets, or credited against the related expense incurred in the statement of comprehensive loss, as determined by the terms and conditions of the agreements under which the assistance is provided to the Corporation or the nature of the expenditures which gave rise to the credits. Government assistance and investment tax credit receivables are recorded when their receipt is reasonably assured.

(q) Segment reporting:

An operating segment is a component of the Corporation that engages in business activities from which it may earn revenues and incur expenses, including revenues and expenses that relate to transactions with any of the Corporation’s other components. Segment results include items directly attributable to a segment as well as those that can be allocated on a reasonable basis. Unallocated items comprise mainly corporate assets, head office expenses, and income tax assets and liabilities.

5. Critical judgments in applying accounting policies and key sources of estimation uncertainty:

Critical judgments in applying accounting policies:

Critical judgments that management has made in the process of applying the Corporation's accounting policies and that have the most significant effect on the amounts recognized in the consolidated financial statements are limited to management's assessment of the Corporation's ability to continue as a going concern (note 2(e)).

Key sources of estimation uncertainty:

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

(a) Revenue recognition:

On long-term fixed price contracts, revenues are recorded over time using costs incurred to date relative to total estimated costs at completion to measure progress towards satisfying performance obligations. Revenue is recognized by multiplying the expected consideration by the ratio of cumulative costs incurred to date to the sum of incurred and estimated costs for completing the performance obligation. The cumulative effect of changes to expected revenues and expected costs for completing a contract are recognized in the period in which the revisions are identified. If the expected costs exceed the expected revenues on a contract, such loss is recognized in its entirety in the period it becomes known.

(i) The determination of expected costs for completing a contract is based on estimates that can be affected by a variety of factors such as variances in the timeline to completion, the cost of materials, the availability and cost of labour, as well as productivity.

(ii) The determination of potential revenues includes the contractually agreed amount and may be adjusted based on the estimate of the Corporation's attainment on achieving certain defined contractual milestones. Management's estimation is required in determining the amount of consideration to which the Corporation expects to be entitled and in determining when a performance obligation has been met.

Estimates used to determine revenues and costs of long-term fixed price contracts involve uncertainties that ultimately depend on the outcome of future events and are periodically revised as projects progress. There is a risk that a customer may ultimately disagree with management's assessment of the progress achieved against milestones, or that the Corporation's estimates of the work required to complete a contract may change.

(b) Asset impairment:

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, the revenue growth rate could be lower than projected due to economic, industry or competitive factors, or the discount rate used in the value in use model could increase due to a change in market interest rates. In addition, future goodwill impairment charges may be necessary if the market capitalization decreased due to a decline in the trading price of the Corporation's common stock, which could negatively impact the fair value of the Corporation's operating segments.

5. Critical judgments in applying accounting policies and key sources of estimation uncertainty (cont'd):

(c) Warranty provision:

A provision for warranty costs is recorded on product sales at the time of shipment. In establishing the warranty provision, management estimates the likelihood that products sold will experience warranty claims and the cost to resolve claims received. In making such determinations, the Corporation uses estimates based on the nature of the contract and past and projected experience with the products. Should these estimates prove to be incorrect, the Corporation may incur costs different from those provided for in the warranty provision. Management reviews warranty assumptions and makes adjustments to the provision at each reporting date based on the latest information available, including the expiry of contractual obligations. Adjustments to the warranty provision are recorded in cost of product and service revenues.

(d) Inventory provision:

In determining the lower of cost and net realizable value of inventory and in establishing the appropriate provision for inventory obsolescence, management estimates the likelihood that inventory carrying values will be affected by changes in market pricing or demand for the products and by changes in technology or design which could make inventory on hand obsolete or recoverable at less than the recorded value. Management performs regular reviews to assess the impact of changes in technology and design, sales trends and other changes on the carrying value of inventory. Where it is determined that such changes have occurred and will have an negative impact on the value of inventory on hand, appropriate provision 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.

(e) Financial assets including impairment of trade receivables:

An ECL model applies to financial assets measured at amortized cost, contract assets and debt investments at FVOCI, but not to investments in equity instruments. The Corporation's financial assets that are 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.

The Corporation has 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, the Corporation considers 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 the Corporation’s 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 the Corporation expects to receive). ECLs are discounted at the effective interest rate of the financial asset. At each reporting date, the Corporation assesses 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.

5. Critical judgments in applying accounting policies and key sources of estimation uncertainty (cont'd):

(f) Employee future benefits:

The present value of the 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.

(g) Income taxes:

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. Management reviews the deferred income tax assets at each reporting period and records adjustments to the extent that it is no longer probable that the related tax benefit will be realized.

6. Recent accounting pronouncements and future accounting policy changes:

The following is an overview of accounting standard changes that the Corporation will be required to adopt in future years. The Corporation expects to adopt these standards as at their effective dates and will continue to evaluate the impact of these standards on the consolidated financial statements.

(a) 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 Corporation intends to adopt the Amendments in its financial statements for the annual period beginning on January 1, 2020. The adoption of the Amendments is not expected to have a material impact on the Corporation's financial statements.

(b) Definition of a Business (Amendments to *IFRS 3 Business Combinations*)

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 Corporation intends to adopt the amendments in its financial statements for the annual reporting period beginning on January 1, 2020. The adoption of the Amendments is not expected to have a material impact on the Corporation's financial statements.

6. Recent accounting pronouncements and future accounting policy changes (cont'd):

(c) 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 Corporation intends to adopt the amendments in its financial statements for the annual reporting period beginning on January 1, 2020. The adoption of the Amendments is not expected to have a material impact on the Corporation's financial statements.

7. Trade and other receivables:

	December 31, 2019	December 31, 2018
Trade accounts receivable	$ 27,009	$ 21,724
Other receivables	3,345	7,706
Contract assets	18,962	9,094
	$ 49,316	$ 38,524

Contract assets primarily relate to the Corporation's rights to consideration for work completed but not billed as at December 31, 2019 for engineering services and technology transfer services.

Contract assets	December 31, 2019
At January 1, 2019	$ 9,094
Additions to contract assets	32,137
Invoiced during the year	(22,269)
At December 31, 2019	$ 18,962

Information about the Corporation's exposure to credit and market risks, and impairment losses for trade receivables and contract assets is included in note 30.

8. Inventories:

	December 31, 2019	December 31, 2018
Raw materials and consumables	$ 12,848	$ 15,547
Work-in-progress	9,848	10,034
Finished goods	3,222	1,460
Service inventory	4,180	2,270
	$ 30,098	$ 29,311

In 2019, the amount of raw materials and consumables, finished goods and work-in-progress recognized as cost of product and service revenues amounted to $47,559,000 (2018 - $39,647,000).

8. Inventories (cont'd):

In 2019, the write-down of inventories to net realizable value amounted to $ 2,985,000 (2018 - $1,300,000) and the reversal of previously recorded write-downs amounted to $609,000 (2018 - $409,000), resulting in a net write-down of $ 2,376,000 (2018 - $891,000). In addition, $143,000 of inventory write down was charged to program expense (2018 – $nil) . Write-downs and reversals are included in either cost of product and service revenues, or research and product development expense, depending on the nature of inventory.

9. Property, plant and equipment:

	December 31, 2019	December 31, 2018
Property, plant and equipment owned	$ 27,746	$ 21,620
Right-of-use assets	15,090	—
	$ 42,836	$ 21,620

Property, plant and equipment owned:

Net carrying amounts	December 31, 2019	December 31, 2018
Building	$ —	$ 5,007
Computer equipment	1,427	1,639
Furniture and fixtures	51	67
Leasehold improvements	1,260	1,019
Production and test equipment	25,008	13,888
	$ 27,746	$ 21,620

Cost	December 31, 2018	Additions	Disposals	Reclass to Right-of-use assets	Effect of movements in exchange rates	December 31, 2019
Building under finance lease	$ 12,180	$ —	$ —	$ (12,180)	$ —	$ —
Computer equipment	5,584	214	(63)	4	(6)	5,733
Furniture and fixtures	1,103	1	—	(4)	(2)	1,098
Leasehold improvements	7,936	630	—	—	(7)	8,559
Production and test equipment	43,310	13,089	(716)	—	(2)	55,681
	$ 70,113	$ 13,934	$ (779)	$ (12,180)	$ (17)	$ 71,071

Accumulated depreciation	December 31, 2018	Depreciation	Disposals	Reclass to Right-of-use assets	Effect of movements in exchange rates	December 31, 2019
Building under finance lease	$ 7,173	$ —	$ —	$ (7,173)	$ —	$ —
Computer equipment	3,945	422	(63)	4	(2)	4,306
Furniture and fixtures	1,036	16	—	(4)	(1)	1,047
Leasehold improvements	6,917	389	—	—	(7)	7,299
Production and test equipment	29,422	1,969	(716)	—	(2)	30,673
	$ 48,493	$ 2,796	$ (779)	$ (7,173)	$ (12)	$ 43,325

9. Property, plant and equipment (cont'd):

Cost	December 31, 2017	Additions	Disposals	Effect of movements in exchange rates	December 31, 2018
Building under finance lease	$ 12,180	$ —	$ —	$ —	$ 12,180
Computer equipment	4,787	1,016	(215)	(4)	5,584
Furniture and fixtures	1,190	6	(87)	(6)	1,103
Leasehold improvements	8,246	71	(363)	(18)	7,936
Production and test equipment	36,431	8,932	(2,047)	(6)	43,310
	$ 62,834	$ 10,025	$ (2,712)	$ (34)	$ 70,113

Accumulated depreciation	December 31, 2017	Depreciation	Disposals	Effect of movements in exchange rates	December 31, 2018
Building under finance lease	$ 6,361	$ 812	$ —	$ —	$ 7,173
Computer equipment	3,767	383	(200)	(5)	3,945
Furniture and fixtures	1,035	60	(54)	(5)	1,036
Leasehold improvements	6,622	524	(211)	(18)	6,917
Production and test equipment	29,735	1,299	(1,607)	(5)	29,422
	$ 47,520	$ 3,078	$ (2,072)	$ (33)	$ 48,493

During the year ended December 31, 2018, the Corporation had cash additions of $ 9,854,000 and non-cash additions of $ 171,000 related to an adjustment for asset retirement obligations. The Corporation also disposed of certain property, plant and equipment totaling $495,000 primarily related to Ballard Unmanned Systems' Power Manager business (note 25).

Right-of-use assets

The Corporation leases certain assets under lease agreements, comprising primarily of leases of land and buildings, office equipment and vehicles (note 17).

Right-of-use assets Net carrying amounts	December 31, 2019	December 31, 2018
Property	$ 14,921	$ —
Equipment	67	—
Vehicle	102	—
	$ 15,090	$ —

Cost	January 1, 2019	Additions	Effect of movements in exchange rates	December 31, 2019
Property	$ 23,427	$ 1,147	$ (6)	$ 24,568
Equipment	76	13	(5)	84
Vehicle	111	31	—	142
	$ 23,614	$ 1,191	$ (11)	$ 24,794

9. Property, plant and equipment (cont'd):

Accumulated depreciation	January 1, 2019	Depreciation	Effect of movements in exchange rates	December 31, 2019
Property	$ 7,173	$ 2,474	$ —	$ 9,647
Equipment	—	22	(5)	17
Vehicle	—	40	—	40
	$ 7,173	$ 2,536	$ (5)	$ 9,704

10. Intangible assets:

	December 31, 2019	December 31, 2018
Intellectual property acquired from UTC	$ 970	$ 1,417
Intellectual property acquired from H2 Logic A/S	—	43
Intellectual property acquired from Ballard Unmanned Systems (formerly Protonex)	630	787
Internally generated fuel cell intangible assets	168	1,199
ERP management reporting software system	3,912	4,825
Intellectual property acquired by Ballard Power Systems Europe	7	14
	$ 5,687	$ 8,285

Intangible assets Balance	Cost	Accumulated amortization	Net carrying amount
At January 1, 2018	$ 69,547	$ 51,597	$ 17,950
Amortization expense	—	2,354	(2,354)
Disposals	(9,138)	(1,827)	(7,311)
At December 31, 2018	60,409	52,124	8,285
Amortization expense	—	2,598	(2,598)
At December 31, 2019	$ 60,409	$ 54,722	$ 5,687

Amortization expense on intangible assets is allocated to research and product development expense or general and administration expense depending upon the nature of the underlying assets. In 2019, amortization of $2,598,000 (2018 - $2,354,000) was recorded.

During the year ended December 31, 2018, the Corporation disposed of intangible assets of $ 7,311,000 related to Ballard Unmanned Systems' (formerly Protonex) Power Manager business (note 25).

11. Goodwill:

For the purpose of impairment testing, goodwill is allocated to the Corporation’s cash-generating units which represent the lowest level within the Corporation at which the goodwill is monitored for internal management purposes, which is not higher than the Corporation’s operating segments (note 29).

Fuel Cell Products and Services

As of December 31, 2019, the aggregate carrying amount of the Corporation’s goodwill is $ 40,287,000 (2018 - $40,287,000).

11. Goodwill (cont'd):

The impairment testing 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.

The Corporation's fair value test is a modified market capitalization assessment, whereby the fair value of the Fuel Cell Products and Services segment is determined by first calculating the value of the Corporation at December 31, 2019 based on the average closing share price in the month of December, adding a reasonable estimated control premium to determine the Corporation's enterprise value on a controlling basis after adjusting for excess cash balances, and deducting the estimated costs to sell to arrive at the fair value of the Fuel Cell Products and Services segment. Based on the fair value test, the Corporation has determined that the fair value of the Fuel Cell Products and Services segment exceeds its carrying value as of December 31, 2019.

In addition to the fair value test, the Corporation also performed a value in use test on the Fuel Cell Products and Services segment, comparing 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 the discounted cash flow analysis requiring significant estimation are the projected results of operations, the discount rate based on the weighted average cost of capital and terminal value assumptions. The value in use assessment resulted in an estimated fair value for the Fuel Cell Products and Services segment that is consistent with the conclusion determined under the fair value, less costs to sell, assessment.

As the recoverable amount of the Fuel Cell Products and Services segment was determined to be greater than its carrying amount, no impairment loss was recorded in 2019 or 2018.

12. Investments:

	December 31, 2019	December 31, 2018
Investment in Synergy Ballard JVCo (note 4)	$ —	$ —
Investment in Weichai Ballard JV (note 4)	21,642	13,989
Other	5	5
	$ 21,647	$ 13,994

For the year ended December 31, 2019, the Corporation recorded $11,059,000 (2018 - $1,154,000) in equity loss of investment in JV and associates, comprising of equity loss in Weichai Ballard JV of $10,580,000 (2018 - $617,000) and equity loss in Synergy Ballard JVCo of $479,000 (2018 - $537,000).

Investment in Weichai Ballard JV

Investment in Weichai Ballard JV	December 31, 2019	December 31, 2018
Beginning balance	$ 13,989	$ —
Capital contribution to JV	20,944	14,286
Incorporation costs	4	320
Recognition (deferral) of 49% profit on inventory sold (not yet sold) to third party, net	(2,715)	—
Equity in loss	(10,580)	(617)
Ending balance	$ 21,642	$ 13,989

Weichai Ballard JV is an associate in which the Corporation has significant influence and a 49% ownership interest. During the year ended December 31, 2019, the Corporation made committed capital contributions of $20,944,000 (RMB 143,325,000 equivalent) (2018 - $14,286,000 (RMB 98,000,000 equivalent)) to Weichai Ballard JV.

12. Investments (cont'd):

The following tables summarize the financial information of Weichai Ballard JV as included in its own financial statements as of December 31, 2019, adjusted for foreign exchange differences, the application of the Corporation's accounting policies, and the Corporation's incorporation costs.

	December 31, 2019	December 31, 2018
Percentage ownership interest (49%)		
Current assets	$ 48,836	$ 28,963
Non-current assets	15	—
Current liabilities	(553)	(1,123)
Non-current liabilities	(534)	—
Net assets (100%)	47,764	27,840
Corporation's share of net assets (49%)	23,404	13,642
Incorporation costs	324	320
Effects of movements in exchange rates	(2,086)	27
Carrying amount of investment in Weichai Ballard JV	$ 21,642	$ 13,989

	December 31, 2019	December 31, 2018
Revenue (100%)	$ 6,950	$ —
Net loss (100%)	$ 21,591	$ 1,259
Corporation's share of net loss (49%)	$ 10,580	$ 617

At December 31, 2019, as specified in the Equity Joint Venture Agreement, the Corporation is committed to capital contributions to Weichai Ballard JV as follows:

Less than one year (RMB 135,975,000)	$ 19,526
One to three years (RMB 161,700,000)	23,220
Total capital contributions	$ 42,746

Investment in Synergy Ballard JVCo

Investment in Synergy Ballard JVCo	December 31, 2019	December 31, 2018
Beginning balance	$ —	$ 676
Recognition (deferral) of 10% profit on inventory sold (not yet sold) to third party, net	479	(139)
Equity in loss	(479)	(537)
Ending balance	$ —	$ —

Synergy Ballard JVCo is an associate in which the Corporation has significant influence and a 10% ownership interest. During the year ended December 31, 2019, the Corporation made committed capital contributions of $nil (2018 - $nil) to Synergy Ballard JVCo.

13. Bank facilities:

The Corporation has certain bank facilities available to it, which are secured by a hypothecation of the Corporation's cash and cash equivalents.

Operating Facility

The Corporation has a demand revolving facility ("Operating Facility") in which an operating line of credit of up to CDN $ 7,000,000 is made available to be drawn upon by the Corporation. The Operating Facility can be utilized to finance the short-term working capital requirements of the business. Outstanding amounts are charged interest at the bank's prime rate minus 0.50% per annum and are repayable on demand by the bank.

At December 31, 2019, $nil (2018 - $nil) was outstanding on the Operating Facility.

Leasing Facility

The Corporation also has a CDN $1,830,770 capital leasing facility ("Leasing Facility") which can be utilized to finance the acquisition and lease of operating equipment. Interest is charged on outstanding amounts at the bank's prime rate per annum and is repayable on demand by the bank in the event of certain conditions.

At December 31, 2019, $nil (2018 - $nil) was outstanding on the Leasing Facility which is included in lease liability (note 17).

Forward Contract Facility

The Corporation also has a Canadian dollar credit facility ("EncoreFX Facility") that allows the Corporation to purchase forward foreign exchange contracts of up to $30,000,000 with an aggregate out-the-money mark-to-market limit of $1,500,000.

Periodically, the Corporation uses forward foreign exchange contracts to manage exposure to currency rate fluctuations. These contracts are recorded at their fair value as either assets or liabilities on the balance sheet. Any changes in fair value are either (i) recorded in the statement of comprehensive income if formally designated and qualified under hedge accounting criteria; or (ii) recorded in the statement of operations if either not designated, or not qualified, under hedge accounting criteria.

At December 31, 2019, the Corporation had outstanding foreign exchange currency contracts to purchase a total of CDN $ 16,800,000 (2018 – CDN $17,400,000) at an average rate of 1.32 CDN per U.S. dollar, resulting in an unrealized gain of CDN $ 306,000 at December 31, 2019 (2018 – unrealized loss of CDN $777,000). The unrealized gain on forward foreign exchange contracts is presented in prepaid expenses and other current assets on the balance sheet.

The outstanding foreign exchange currency contracts are not qualified under hedge accounting.

14. Trade and other payables:

	December 31, 2019	December 31, 2018
Trade accounts payable	$ 14,884	$ 6,924
Compensation payable	12,596	8,505
Other liabilities	3,559	5,327
Taxes payable	388	398
	$ 31,427	$ 21,154

15. Deferred revenue:

Deferred revenue (i.e. contract liabilities) represents cash received from customers in excess of revenue recognized on uncompleted contracts.

Deferred revenue	December 31, 2019	December 31, 2018
Beginning Balance	$ 16,681	$ 8,082
Additions to deferred revenue	41,197	19,353
Revenue recognized during the year	(37,722)	(10,754)
Ending Balance	$ 20,156	$ 16,681

16. Provisions and other liabilities:

Balance	Restructuring provision	Warranty provision	Other liabilities	Total
At January 1, 2018	$ 248	$ 5,199	$ 4,253	$ 9,700
Provisions made during the year	509	5,474	(63)	5,920
Provisions used/paid during the year	(560)	(1,409)	—	(1,969)
Provisions reversed/expired during the year	(2)	(208)	—	(210)
Effect of movements in exchange rates	(4)	(4)	(328)	(336)
At December 31, 2018	191	9,052	3,862	13,105
Provisions made during the year	104	3,855	40	3,999
Provisions used/paid during the year	(289)	(1,458)	—	(1,747)
Provisions reversed/expired during the year	(2)	(967)	(2,292)	(3,261)
Effect of movements in exchange rates	4	(2)	78	80
At December 31, 2019	$ 8	$ 10,480	$ 1,688	$ 12,176

At December 31, 2018				
Current	$ 191	$ 9,052	$ —	$ 9,243
Non-current	—	—	3,862	3,862
	$ 191	$ 9,052	$ 3,862	$ 13,105

At December 31, 2019				
Current	$ 8	$ 10,480	$ —	$ 10,488
Non-current	—	—	1,688	1,688
	$ 8	$ 10,480	$ 1,688	$ 12,176

Restructuring provision

During 2018, restructuring charges relate primarily to a change in operations leadership combined with severance obligations paid to departed employees at Ballard Unmanned Systems as a result of the disposition of the Power Manager assets and associated personnel (note 25).

16. Provisions and other liabilities (cont'd):

Warranty provision

The Corporation recorded $3,855,000 (2018 - $4,414,000) of warranty provisions related to new product sales This was offset by warranty expenditures of $1,458,000 (2018 - $1,409,000) and downward warranty adjustments of $ 967,000 (2018 - $852,000 upward warranty adjustments), due primarily to contractual expirations and changes in estimated and actual costs to repair. The remaining $2,000 (2018 – $4,000) decrease to the warranty provision related to the effect of movements in exchange rates.

Other liabilities: Decommissioning liabilities

A provision for decommissioning liabilities has been recorded for the Corporation's head office building in Burnaby, British Columbia and is related to estimated site restoration obligations at the end of the lease term. The Corporation has made certain modifications to the leased building to facilitate the manufacturing and testing of its fuel cell products. Consequently, the site restoration obligations relate primarily to dismantling and removing various manufacturing and test equipment and restoring the infrastructure of the leased building to its original state of when the lease was entered into.

Due to the long-term nature of the liability, the most significant uncertainty in estimating the provision is the costs that will be incurred. The Corporation has determined a range of reasonably possible outcomes of the total costs for the head office building. In determining the fair value of the decommissioning liabilities, the estimated future cash flows have been discounted at 1.68% per annum (2018 – 2.18%).

The Corporation performed an assessment of the estimated cash flows required to settle the obligations for the building as of December 31, 2019. Based on the assessment, no increase in the provision (2018 - $171,000) was recorded against decommissioning liabilities, in addition to accretion costs of $40,000 (2018 - $36,000).

The total undiscounted amount of the estimated cash flows required to settle the obligation for the building is $ 1,914,000 (2018 - $1,825,000) which is expected to be settled at the end of the lease term in 2025.

Other liabilities: Deferred lease inducement

A lease extension and modification agreement was signed in December 2017 for the second building that eliminated the decommissioning liability at the end of the new 10 year lease term. The contractual elimination of the decommissioning liability of $2,292,000 for the second building was being treated as a lease inducement and was originally deferred and amortized on a straight-line basis over the amended 10 year lease term, commencing January 2018.

At January 1, 2019, this deferred lease inducement was reclassified to right-of-use assets as per *IFRS 16 Leases* (notes 3, 4, and 9).

17. Lease liability:

The Corporation leases certain assets under lease agreements. The lease liability consists primarily of leases of land and buildings, office equipment and vehicles. The leases have interest rates ranging from 3.90% to 9.45% per annum and expire between May 2020 and December 2027.

17. Lease liability (cont'd):

	December 31, 2019	December 31, 2018
Property	$ 2,382	$ 631
Equipment	24	—
Vehicle	39	—
Lease Liability, Current	$ 2,445	$ 631

Property	$ 17,200	$ 5,064
Equipment	45	—
Vehicle	61	—
Lease Liability, Non-current	$ 17,306	$ 5,064

Lease Liability	$ 19,751	$ 5,695

The Corporation is committed to minimum lease payments as follows:

Maturity Analysis	December 31, 2019
Less than one year	$ 3,723
Between one and five years	14,803
More than five years	6,321
Total undiscounted lease liabilities	$ 24,847

The adoption of *IFRS 16 Leases* had the following impact for the year ended December 31, 2019.

Amounts recognized in profit or loss	December 31, 2019
Interest on lease liabilities	$ 1,383
Income from sub-leasing right-of-use assets	$ 1,556
Expenses relating to short-term leases	$ 179

Amounts recognized in the statement of cash flows	
Interest paid	$ 1,383
Principal payments of lease liabilities	$ 2,053
Expenses relating to short-term leases	$ 179
Total cash outflow for leases	$ 3,615

Deferred gains were also recorded on closing of the finance lease agreement and are amortized over the lease term. At December 31, 2019, the outstanding deferred gain was $2,150,000 (2018 – $2,566,000).

18. Employee future benefits:

	December 31, 2019	December 31, 2018
Net defined benefit pension plan liability	$ 4,308	$ 4,215
Net other post-retirement benefit plan liability	88	84
Employee future benefits	$ 4,396	$ 4,299

The Corporation maintains a defined benefit pension plan covering existing and former employees in the United States. The benefits under the pension plan are based on years of service and salary levels accrued as of December 31, 2009. In 2009, amendments were made to the defined benefit pension plan to freeze benefits accruing to employees at their respective years of service and salary levels obtained as of December 31, 2009. Certain employees in the United States are also eligible for post-retirement healthcare, life insurance, and other benefits.

The Corporation accrues the present value of its obligations under employee future benefit plans and related costs, net of the present value of plan assets.

The measurement date used to determine pension and other post-retirement benefit obligations and expense is December 31 of each year. The most recent actuarial valuation of the employee future benefit plans for funding purposes was as of January 1, 2019. The next actuarial valuation of the employee future benefit plans for funding purposes is expected to be performed as of January 1, 2020.

The Corporation expects contributions of approximately $ 600,000 to be paid to its defined benefit plans in 2020.

The following tables reconcile the opening balances to the closing balances for the net defined benefit liability and its components for the two plans. The expense recognized in profit or loss is recorded in finance income (loss) and other.

	Defined benefit obligation		Fair value of plan assets		Net defined benefit liability	
Defined benefit pension plan	**2019**	2018	**2019**	2018	**2019**	2018
Balance at January 1	**$ 16,255**	$ 17,603	**$ (12,040)**	$ (12,809)	**$ 4,215**	$ 4,794
Included in profit or loss						
Current service cost	**37**	57	**—**	—	**37**	57
Interest cost (income)	**661**	621	**(493)**	(455)	**168**	166
Benefits payable	**—**	—	**—**	—	**—**	—
	698	678	**(493)**	(455)	**205**	223
Included in other comprehensive income						
Remeasurements loss (gain):						
Actuarial loss (gain) arising from:						
Demographic assumptions	**(236)**	(49)	**—**	—	**(236)**	(49)
Financial assumptions	**2,343**	(1,331)	**—**	—	**2,343**	(1,331)
Experience adjustment	**(131)**	(2)	**—**	—	**(131)**	(2)
Return on plan assets excluding interest income	**—**	—	**(1,593)**	1,075	**(1,593)**	1,075
Plan expenses	**(35)**	(35)	**35**	35	**—**	—
	1,941	(1,417)	**(1,558)**	1,110	**383**	(307)
Other						
Contributions paid by the employer	**—**	—	**(495)**	(495)	**(495)**	(495)
Benefits paid	**(622)**	(609)	**622**	609	**—**	—
	(622)	(609)	**127**	114	**(495)**	(495)
Balance at December 31	**$ 18,272**	$ 16,255	**$ (13,964)**	$ (12,040)	**$ 4,308**	$ 4,215

18. Employee future benefits (cont'd):

	Defined benefit obligation		Fair value of plan assets		Net defined benefit liability	
Other post-retirement benefit plan	**2019**	2018	**2019**	2018	**2019**	2018
Balance at January 1	**$ 84**	$ 120	**$ —**	$ —	**$ 84**	$ 120
Included in profit or loss						
Interest cost (income)	**3**	3	**—**	—	**3**	3
	3	3	**—**	—	**3**	3
Included in other comprehensive income						
Remeasurements loss (gain):						
Actuarial loss (gain) arising from:						
Demographic assumptions	**—**	—	**—**	—	**—**	—
Financial assumptions	**7**	(5)	**—**	—	**7**	(5)
Experience adjustment	**10**	7	**—**	—	**10**	7
	17	2	**—**	—	**17**	2
Other						
Contributions paid by the employer	**—**	—	**(16)**	(41)	**(16)**	(41)
Benefits paid	**(16)**	(41)	**16**	41	**—**	—
	(16)	(41)	**—**	—	**(16)**	(41)
Balance at December 31	**$ 88**	$ 84	**$ —**	$ —	**$ 88**	$ 84

Included in other comprehensive income (loss)	December 31, 2019	December 31, 2018
Defined benefit pension plan actuarial gain (loss)	$ (383)	$ 307
Other post-retirement benefit plan actuarial gain (loss)	(17)	(2)
	$ (400)	$ 305

Pension plan assets comprise:

	2019	2018
Cash and cash equivalents	2 %	3 %
Equity securities	61 %	59 %
Debt securities	37 %	38 %
Total	100 %	100 %

The significant actuarial assumptions adopted in measuring the fair value of benefit obligations at December 31 were as follows:

	2019		2018	
	Pension plan	Other benefit plan	Pension plan	Other benefit plan
Discount rate	3.16 %	2.84 %	4.16 %	3.96 %
Rate of compensation increase	n/a	n/a	n/a	n/a

The significant actuarial assumptions adopted in determining net expense for the years ended December 31 were as follows:

	2019		2018	
	Pension plan	Other benefit plan	Pension plan	Other benefit plan
Discount rate	4.16 %	2.84 %	3.60 % 3.96	3.96 %
Rate of compensation increase	n/a	n/a	n/a	n/a

18. Employee future benefits (cont'd):

The assumed health care cost trend rates applicable to the other post-retirement benefit plan at December 31 were as follows:

	2019	2018
Initial medical/dental health care cost trend rate	n/a	n/a
Cost trend rate declines to medical and dental	n/a	n/a
Year that the medical rate reaches the rate it is assumed to remain at	2024	2023
Year that the dental rate reaches the rate it is assumed to remain at	2019	2018

A one-percentage-point change in assumed health care cost trend rates would not have a material impact on the Corporation's financial statements.

19. Equity:

Share-based Compensation	December 31, 2019	December 31, 2018
Option Expense	$ 1,926	$ 1,676
DSU Expense	281	307
DSU Expense Adjustment	—	(45)
RSU Expense	1,354	964
Total Share-based Compensation (included in net loss)	$ 3,561	$ 2,902
2018 DSU Expense (issued in 2019) (note 20 (e))	—	380
Total Share-based Compensation (per statement of equity)	$ 3,561	$ 3,282

(a) Share capital:

Authorized and issued:

Unlimited number of common shares, voting, without par value.

Unlimited number of preferred shares, issuable in series.

Private placement:

On November 13, 2018, the Corporation closed a private placement strategic equity investment with Weichai Power of 46,131,712 common shares and with Broad-Ocean Motor Co., Ltd. of a further 5,699,947 common shares issued from treasury at $ 3.5464 per share for gross proceeds of $163,602,000 and $20,214,000, respectively.

Gross Offering proceeds (51,831,659 shares at $3.5464 per share)	$ 183,816
Less: Share issuance costs	(144)
Net Offering proceeds	$ 183,672

19. Equity (cont'd):

(b) Share Purchase Warrants:

Warrants Outstanding	Exercise price of $1.50	Exercise price of $2.00	Total Warrants
At January 1, 2018	122,563	662,500	785,063
Warrants exercised in 2018	(122,563)	(625,000)	(747,563)
Warrants expired in 2018	—	(37,500)	(37,500)
At December 31, 2018	—	—	—

During 2019, nil (2018 - 747,563) warrants were exercised for an equal amount of common shares for net proceeds of $nil (2018 - $1,434,000).

At December 31, 2019 and 2018, nil share purchase warrants were issued and outstanding.

(c) Share options:

The Corporation has options outstanding under a consolidated share option plan. All directors, officers and employees of the Corporation, and its subsidiaries, are eligible to participate in the share option plans although as a matter of policy, options are currently not issued to directors. Option exercise prices are denominated in either Canadian or U.S. dollars, depending on the residency of the recipient. Canadian dollar denominated options have been converted to U.S. dollars using the year-end exchange rate for presentation purposes.

All options have a term of seven years from the date of grant unless otherwise determined by the board of directors. One-third of the options vest and may be exercised, at the beginning of each of the second, third, and fourth years after granting.

As at December 31, options outstanding from the consolidated share option plan were as follows:

Balance	Options for common shares	Weighted average exercise price
At January 1, 2018	4,828,173	$ 2.01
Options granted	1,675,640	3.27
Options exercised	(945,022)	1.66
Options forfeited	(400,663)	2.22
Options expired	(24,667)	1.35
At December 31, 2018	5,133,461	2.45
Options granted	1,317,521	3.19
Options exercised	(2,234,997)	2.12
Options forfeited	(94,336)	2.46
Options expired	(5,500)	1.26
At December 31, 2019	4,116,149	$ 2.87

19. Equity (cont'd):

(c) Share options (cont'd):

The following table summarizes information about the Corporation's share options outstanding as at December 31, 2019:

	Options outstanding			Options exercisable	
Range of exercise price	Number outstanding	Weighted average remaining contractual life (years)	Weighted average exercise price	Number exercisable	Weighted average exercise price
$0.83 - $1.46	303,096	3.1	$ 1.36	303,096	$ 1.36
$1.68 - $2.36	969,041	3.3	2.16	624,061	2.22
$2.79 - $3.09	820,692	4.6	2.89	299,322	2.87
$3.14 - $4.61	2,023,320	5.7	3.43	188,991	3.70
	4,116,149	4.7	$ 2.87	1,415,470	$ 2.37

During 2019, 2,234,997 options were exercised for an equal amount of common shares for proceeds of $ 4,624,000. During 2018, 945,022 options were exercised for an equal amount of common shares for proceeds of $1,628,000.

During 2019, options to purchase 1,317,521 common shares were granted with a weighted average fair value of $ 1.40 (2018 – 1,675,640 options and $1.70 fair value). The granted options vest annually over three years.

The fair values of the options granted were determined using the Black-Scholes valuation model under the following weighted average assumptions:

	2019	2018
Expected life	4 years	4 years
Expected dividends	Nil	Nil
Expected volatility	57 %	64 %
Risk-free interest rate	2 %	2 %

As at December 31, 2019, options to purchase 4,116,149 common shares were outstanding (2018 – 5,133,461). During 2019, compensation expense of $1,926,000 (2018 – $1,676,000) was recorded in net loss based on the grant date fair value of the awards recognized over the vesting period.

(d) Share distribution plan:

The Corporation has a consolidated share distribution plan that permits the issuance of common shares for no cash consideration to employees of the Corporation to recognize their past contribution and to encourage future contribution to the Corporation. At December 31, 2019, there were 13,700,924 (2018 – 12,051,923) shares available to be issued under this plan.

During 2018 and 2019, no shares were issued under this plan and therefore no compensation expense was recorded against income.

(e) Deferred share units:

Deferred share units ("DSUs") are granted to the board of directors and executives. Eligible directors must elect to receive at least half of their annual retainers and executives may elect to receive all or part of their annual bonuses in DSUs. Each DSU is redeemable for one common share in the capital of the Corporation after the director or executive ceases to provide services to the Corporation. Shares will be issued from the Corporation's share distribution plan.

19. Equity (cont'd):

(e) Deferred share units (cont'd):

Balance	DSUs for common shares
At January 1, 2018	865,344
DSUs granted	179,469
DSUs exercised	(297,600)
At December 31, 2018	747,213
DSUs granted	64,165
DSUs exercised	—
At December 31, 2019	811,378

During 2019, $281,000 of compensation expense was recorded in net loss relating to 64,165 DSUs granted during the year.

During 2018, $307,000 of compensation expense was recorded in net loss relating to 91,361 DSUs granted during the year. For the remaining 88,108 DSUs granted during the year, estimated compensation expense of $ 380,000 was recorded in net income in 2017. Upon the issuance of the DSUs in 2018, a $45,000 adjustment increasing net income was recorded.

During 2019, nil DSUs (2018 – 297,600) were exercised, net of applicable taxes, which resulted in the issuance of nil common shares (2018 – 154,752), resulting in an impact on equity of $nil (2018 - $ 436,000).

As at December 31, 2019, 811,378 deferred share units were outstanding (2018 – 747,213).

(f) Restricted share units:

Restricted share units (“RSUs”) are granted to employees and executives. Each RSU is convertible into one common share. The RSUs vest after a specified number of years from the date of issuance, and under certain circumstances, are contingent on achieving specified performance criteria. A performance factor adjustment is made if there is an over-achievement (or under-achievement) of specified performance criteria, resulting in additional (or fewer) RSUs being converted.

The Corporation has two plans under which RSUs may be granted, the consolidated share distribution plan and the market purchase RSU plan. Awards under the consolidated share distribution plan (note 19(d)) are satisfied by the issuance of treasury shares on maturity. Awards granted under the market purchase RSU Plan are satisfied by shares purchased on the open market by a trust established for that purpose. No common shares were repurchased in 2019 and 2018.

Balance	RSUs for common shares
At January 1, 2018	1,674,637
RSUs granted	379,257
RSU performance factor adjustment	218,213
RSUs exercised	(290,820)
RSUs forfeited	(203,095)
At December 31, 2018	1,778,192
RSUs granted	449,625
RSU performance factor adjustment	(192,016)
RSUs exercised	(730,536)
RSUs forfeited	—
At December 31, 2019	1,305,265

19. Equity (cont'd):

(f) Restricted share units (cont'd):

During 2019, 449,625 RSUs were issued (2018 – 379,257). The fair value of RSU grants is measured based on the stock price of the shares underlying the RSU on the date of grant. During 2019, compensation expense of $1,354,000 (2018 - $964,000) was recorded in net loss.

During 2019, 730,536 RSUs (2018 – 290,820) were exercised, net of applicable taxes, which resulted in the issuance of 387,686 common shares (2018 – 149,980), resulting in an impact on equity of $ 1,034,000 (2018 - $464,000).

As at December 31, 2019, 1,305,265 RSUs were outstanding (2018 – 1,778,192).

20. Commitments and contingencies:

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

The Corporation retains a previous funding obligation to pay royalties of 2% of revenues, to a maximum of $ 4,613,000 (CDN $5,351,000), on sales of certain fuel cell products for commercial distributed utility applications. As of December 31, 2019, no royalties have been incurred to date for this agreement.

The Corporation also retains a previous funding obligation to pay royalties of 2% of revenues, to a maximum of $ 1,896,000 (CDN $2,200,000), on sales of certain fuel cell products for commercial transit applications. As of December 31, 2019, no royalties have been incurred to date for this agreement.

At December 31, 2019, the Corporation has outstanding commitments aggregating up to a maximum of $7,790,000 relating primarily to purchases of property, plant and equipment.

The Corporation is committed to capital contributions to Weichai Ballard JV over a three year period (note 12). The Coporation is also committed to minimum lease payments (note 17).

21. Disaggregation of revenue:

The Corporation's operations and main revenue streams are the same as those described in note 4. The Corporation's revenue is derived from contracts with customers.

In the following table, revenue is disaggregated by geographical market, by market application, and by timing of revenue recognition.

21. Disaggregation of revenue (cont'd):

	December 31, 2019	December 31, 2018
Geographical markets		
China	$ 47,132	$ 30,791
Europe	41,856	37,590
North America	14,266	23,871
Other	3,073	4,334
	$ 106,327	$ 96,586
Market application		
Heavy Duty Motive	35,363	39,464
Portable Power	604	7,109
Material Handling	10,758	8,010
Back Up Power	2,982	2,426
Technology Solutions	56,620	39,577
	$ 106,327	$ 96,586
Timing of revenue recognition		
Products transferred at a point in time	47,250	53,729
Products and services transferred over time	59,077	42,857
	$ 106,327	$ 96,586

22. Personnel expenses:

Personnel expenses are included in cost of product and service revenues, research and product development expense, general and administrative expense, sales and marketing expense, and other expense.

	December 31, 2019	December 31, 2018
Salaries and employee benefits	$ 54,794	$ 46,381
Share-based compensation (note 19)	3,561	2,902
	$ 58,355	$ 49,283

23. Other operating expense:

	December 31, 2019	December 31, 2018
Net impairment loss on trade receivables	$ 1,537	$ 98
Impairment loss allowance	250	—
Total impairment loss on trade receivables	1,787	98
Restructuring costs	146	507
	$ 1,933	$ 605

Net impairment loss on trade receivables of $ 1,537,000 for the year ended December 31, 2019 (2018 - $ 98,000) relates primarily to amounts owed to the Corporation for product sales in previous periods no longer expected to be collected as a customer in Europe has entered into administration under U.K. insolvency laws due to an inability to pay its debts. In the event that the Corporation recovers any amounts previously recorded as impairment losses, the recovered amount will be recognized as a reversal of the impairment loss in the period of recovery.

23. Other operating expense (cont'd):

For the year ended December 31, 2019, the Corporation recorded an impairment loss allowance of $ 250,000 (2018 - $nil). Information about the Corporation's exposure to credit and market risks, and impairment losses for trade receivables and contract assets is included in note 30.

During 2019, restructuring charges of $146,000 relate primarily to cost reduction initiatives. During 2018, restructuring charges of $507,000 related primarily to a change in operations leadership combined with severance obligations paid to departed employees at Ballard Unmanned Systems as a result of the disposition of the Power Manager assets and associated personnel (note 25).

24. Finance income and expense:

		2019		2018
Employee future benefit plan expense (note 18)	$	(208)	$	(226)
Pension administration expense		(120)		(117)
Investment and other income		3,710		1,034
Other income (loss)		(111)		(62)
Foreign exchange gain (loss)		(420)		(1,078)
Finance income (loss) and other	$	2,851	$	(449)
Finance expense	$	(1,434)	$	(503)

25. Loss on sale of assets:

		2019		2018
Loss on sale of Power Manager assets	$	(2,000)	$	(3,957)
Loss on sale of SOFC assets		—		(94)
Gain on miscellaneous disposals		5		2
	$	(1,995)	$	(4,049)

		2019		2018
Cash proceeds received on sale of Power Manager assets	$	2,132	$	2,000
Less: Disposition costs		—		(707)
Net cash proceeds received on sale of Power Manager assets	$	2,132	$	1,293
Cash proceeds received on sale of SOFC assets		—		50
Cash proceeds from miscellaneous disposals		5		2
Net cash proceeds received on sale of assets	$	2,137	$	1,345

Loss on sale of Power Manager assets

During the year ended December 31, 2018, the Corporation divested certain assets of it's subsidiary, Ballard Unmanned Systems Inc. related to the Power Manager business to Revision Military Ltd. ("Revision"), a private U.S. based company. At closing, the Corporation received initial consideration of approximately $4,132,000, paid in $2,000,000 cash and a $2,132,000 note receivable (collected in full in September 2019), and could have received up to a further $11,250,000, based on achievement of specific sales objectives during a 12-month earn-out period. The Corporation retained certain assets related to fuel cell propulsion systems for unmanned vehicles under the Ballard brand and divested its Power Manager assets as they were considered to be no longer aligned with the Corporation's strategic fuel cell focus.

25. Loss on sale of assets (cont'd):

During the year ended December 31, 2018, the Corporation recorded a loss on sale of assets of $ 3,957,000 on the divestiture of the Power Manager assets after estimating the amount of variable consideration included in the transaction price that is constrained to be $2,000,000, as opposed to the above noted maximum possible earn-out amount of $11,250,000. During the three months ended March 31, 2019, the Corporation recorded an additional loss on sale of assets of $2,000,000 after adjusting the estimated amount of variable consideration from $2,000,000 to $nil. During October 2019, the estimated amount of variable consideration was confirmed as $nil as Revision failed to meet the minimum specific sales objectives in the 12-month earn-out period to trigger any additional proceeds payable to the Corporation.

Various miscellaneous disposals also occurred during the year ended December 31, 2019, resulting in a net gain on sale of property, plant and equipment of $5,000 partially offsetting the loss on sale of assets above, resulting in a net loss on sale of assets of $ 1,995,000. The proceeds on disposal of these miscellaneous items of $5,000 and the repayment of $2,132,000 on the above note receivable result in net proceeds on sale of property, plant, and equipment of $2,137,000.

26. Income taxes:

(a) Current tax expense:

The components of income tax benefit (expense) included in the determination of the profit (loss) from continuing operations comprise of:

		2019		2018
Current tax expense				
Current period income tax	$	9	$	51
Withholding tax		11		319
Total current tax expense	$	20	$	370
Deferred tax expense				
Origination and reversal of temporary differences	$	(16,287)	$	1,834
Adjustments for prior periods		2,715		(1,138)
Change in unrecognized deductible temporary differences		13,572		(696)
Total deferred tax expense	$	—	$	—
Total income tax expense	$	20	$	370

The Corporation's effective income tax rate differs from the combined Canadian federal and provincial statutory income tax rate for companies. The principal factors causing the difference are as follows:

		2019		2018
Net loss before income taxes	$	(39,030)	$	(26,953)
Expected tax recovery at 27.00% (2018 – 27.00%)	$	(10,538)	$	(7,277)
Increase (reduction) in income taxes resulting from:				
Non-deductible expenses (non-taxable income)		(73)		1,009
Investment tax credits earned		(3,126)		(2,439)
Foreign tax rate differences		1,304		227
Change in unrecognized deductible temporary differences		12,442		8,531
Other		11		319
Income taxes	$	20	$	370

26. Income taxes (cont'd):

(b) Unrecognized deferred tax liabilities:

At December 31, 2019, the Corporation did not have any deferred tax liabilities resulting from taxable temporary differences related to unremitted earnings of controlled subsidiaries.

(c) Unrecognized deferred tax asset:

At December 31, 2019, the Corporation did not recognize any deferred tax assets resulting from the following deductible temporary differences for financial statement and income tax purposes.

		2019		2018
Scientific research expenditures	$	97,340	$	83,661
Accrued warranty provision		6,600		10,197
Share issuance costs		238		668
Losses from operations carried forward		115,977		107,339
Investment tax credits		34,341		30,231
Property, plant and equipment and intangible assets		193,336		174,006
	$	447,832	$	406,102

Deferred tax assets have not been recognized in respect of these deductible temporary differences because it is not currently probable that future taxable profit will be available against which the Corporation can utilize the benefits.

The Corporation has available to carry forward the following as at December 31:

		2019		2018
Canadian scientific research expenditures	$	97,340	$	83,661
Canadian losses from operations		34,847		33,801
Canadian investment tax credits		34,341		30,231
German losses from operations for corporate tax purposes		525		553
U.S. federal losses from operations		51,696		45,140
Denmark losses from operations		26,405		25,757
Hong Kong losses from operations		33		24

The Canadian scientific research expenditures may be carried forward indefinitely. The Canadian losses from operations may be used to offset future Canadian taxable income and expire over the period from 2031 to 2039.

The German, Hong Kong and Denmark losses from operations may be used to offset future taxable income in Germany, Hong Kong and Denmark for corporate tax and trade tax purposes and may be carried forward indefinitely.

The U.S. federal losses from operations incurred prior to January 1, 2018 may be used to offset future U.S. taxable income and expire over the period from 2021 to 2037 and may be carried forward indefinitely for losses incurred after January 1, 2018.

The Canadian investment tax credits may be used to offset future Canadian income taxes otherwise payable and expire over the period from 2020 to 2039.

27. Related party transactions:

Related parties include shareholders with a significant ownership interest in the Corporation, including its subsidiaries and affiliates, and the Corporation's equity accounted investees: Weichai Ballard JV and Synergy Ballard JVCo (note 12).

For the year ended December 31, 2019 and 2018, related party transactions and balances with the Corporation's 49% owned equity accounted investee, Weichai Ballard JV, were as follows:

Balances with related party - Weichai Ballard JV		2019		2018
Trade and other receivables	$	10,057	$	1,123
Investments		21,642		13,989
Deferred revenue		11,857		8,875

Transactions during the year with related party - Weichai Ballard JV		2019		2018
Revenues	$	37,197	$	1,248

For the year ended December 31, 2019 and 2018, related party transactions and balances with the Corporation's 10% owned equity accounted investee, Synergy Ballard JVCo, were as follows:

Balances with related party - Synergy Ballard JVCo		2019		2018
Trade and other receivables	$	65	$	481
Investments		—		—
Deferred revenue		46		2,021

Transactions during the year with related party - Synergy Ballard JVCo		2019		2018
Revenues	$	8,666	$	17,547

The Corporation provides key management personnel, being board directors and executive officers, certain benefits, in addition to their salaries. Key management personnel also participate in the Corporation's share-based compensation plans (note 19).

In addition to cash and equity compensation, the Corporation provides the executive officers with certain personal benefits, including car allowance, medical benefit program, long and short-term disability coverage, life insurance and an annual medical, financial planning allowance and relocation allowances and services as necessary.

The employment agreements for the executive officers are substantially the same with slight variations by individual. The maximum obligation that is required to be provided in the event of termination is notice of 12 months plus one month for every year of employment completed with the Corporation, or payment in lieu of such notice, consisting of the salary, bonus and other benefits that would have been earned during such notice period. If there is a change of control, and if the executive officer's employment is terminated, including a constructive dismissal, within 2 years following the date of a change of control, the executive officer is entitled to a payment equivalent to payment in lieu of a 24 month notice period. The minimum obligation that is required is limited to that required by employment standards legislation plus one day for every full month of employment since hire date, with no distinction made for a change of control situation.

27. Related party transactions (cont'd):

Key management personnel compensation is comprised of:

	2019	2018
Salaries and employee benefits	$ 3,098	$ 2,869
Post-employment retirement benefits	56	49
Termination benefits	—	12
Share-based compensation (note 19)	1,651	1,353
	$ 4,805	$ 4,283

28. Supplemental disclosure of cash flow information:

Non-cash financing and investing activities:	2019	2018
Compensatory shares	$ 548	$ 693
Recognition (write-down) of constrained earn-out receivable on sale of assets (note 25)	(2,000)	2,000
Recognition of right-of-use assets (note 4)	11,434	—
Recognition of additional lease liabilities (note 4)	(13,988)	—

29. Operating segments:

The Corporation operates in a single segment, Fuel Cell Products and Services, which consists of the design, development, manufacture, sale and service of PEM fuel cell products for a variety of applications, focusing on the 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 licensing and sale of the Corporation's extensive intellectual property portfolio and fundamental knowledge for a variety of PEM fuel cell applications.

As a result of the sale of the Power Manager assets (note 25) in 2018, the Corporation has 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 the Power Manager business prior to its sale, and product and service revenues generated from the retained Ballard Unmanned Systems assets related primarily to fuel cell propulsion systems for unmanned systems.

In 2019, revenues included sales to two individual customers of $37,932,000 and $26,164,000, respectively, which each exceeded 10% of total revenue. In 2018, revenues included sales to two individual customers of $26,587,000, and $17,547,000, respectively, which each exceeded 10% of total revenue.

29. Operating segments (cont'd):

Revenues from continuing operations by geographic area, which are attributed to countries based on customer location for the years ended December 31, are as follows:

Revenues	2019	2018
China	$ 47,132	$ 30,791
Germany	30,604	28,685
U.S.	13,500	23,505
Belgium	5,408	3,531
UK	2,794	1,431
Japan	2,743	3,901
Denmark	1,701	1,889
Canada	766	366
Norway	478	187
Switzerland	359	—
France	287	276
Taiwan	216	287
Netherlands	115	892
Finland	65	198
Spain	20	168
Other countries	139	479
	$ 106,327	$ 96,586

Non-current assets by geographic area are as follows:

Non-current assets	December 31, 2019	December 31, 2018
Canada	$ 82,665	$ 65,346
U.S.	4,836	4,880
China	21,663	14,012
Denmark	1,629	269
	$ 110,793	$ 84,507

30. Financial instruments:

(a) Fair value:

The Corporation's financial instruments consist of cash and cash equivalents, trade and other receivables, investments, and trade and other payables. The fair values of cash and cash equivalents, trade and other receivables, and trade and other payables approximate their carrying values because of the short-term nature of these instruments.

Fair value measurements recognized in the statement of financial position must be categorized in accordance with the following levels:

(i) Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities;

(ii) Level 2: Inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices);

(iii) Level 3: Inputs for the asset or liability that are not based on observable market data (unobservable inputs).

30. Financial instruments (cont'd):

(b) Financial risk management:

The Corporation primarily has exposure to foreign currency exchange rate risk, commodity risk, interest rate risk, and credit risk.

Foreign currency exchange rate risk

Foreign currency exchange rate risk is the risk that the fair value of deferred cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates. The Corporation is exposed to currency risks primarily due to its holdings of Canadian dollar denominated cash equivalents and its Canadian dollar denominated purchases and accounts payable. Substantially all receivables are denominated in U.S. dollars.

The Corporation limits its exposure to foreign currency risk by holding Canadian denominated cash and cash equivalents in amounts up to 100% of forecasted twelve month Canadian dollar net expenditures and up to 50% of the following twelve months of forecasted Canadian dollar net expenditures, thereby creating an economic hedge. Periodically, the Corporation also enters into forward foreign exchange contracts to further limit its exposure. At December 31, 2019, the Corporation held Canadian dollar denominated cash and cash equivalents of CDN $15,916,000 and outstanding forward foreign exchange contracts to sell a total of CDN $ 16,800,000 in 2020 at an average rate of CDN $1.32 to US $1.00.

The following exchange rates applied during the year ended December 31, 2019:

	$U.S. to $1.00 CDN	$CDN to $1.00 U.S.
January 1, 2019 Opening rate	$0.734	$1.363
December 31, 2019 Closing rate	$0.770	$1.299
Fiscal 2019 Average rate	$0.754	$1.327

Based on cash and cash equivalents and forward foreign exchange contracts held at December 31, 2019, a 10% increase in the Canadian dollar against the U.S. dollar, with all other variables held constant, would result in an increase in foreign exchange gains of approximately $2,518,000 recorded against net income.

If the Canadian dollar weakened 10% against the U.S. dollar, there would be an equal, and opposite impact, on net income. This sensitivity analysis includes foreign currency denominated monetary items, and adjusts their translation at year-end, for a 10% change in foreign currency rates.

Commodity risk

Commodity risk is the risk of financial loss due to fluctuations in commodity prices, in particular, for the price of platinum and palladium, which are key components of the Corporation's fuel cell products. Platinum and palladium are scarce natural resources and therefore the Corporation is dependent upon a sufficient supply of these commodities. To manage its exposure to commodity price fluctuations, the Corporation may include platinum and or palladium pricing adjustments directly into certain significant customer contracts, and may also periodically enter into platinum and or palladium forward contracts. At December 31, 2019, there were no outstanding forward platinum contracts under the Forward Contract Facility.

Interest rate risk

Interest rate risk is the risk that the fair value of deferred cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Corporation is exposed to interest rate risk arising primarily from fluctuations in interest rates on its cash and cash equivalents. The Corporation limits its exposure to interest rate risk by continually monitoring and adjusting portfolio duration to align to forecasted cash requirements and anticipated changes in interest rates.

30. Financial instruments (cont'd):

(b) Financial risk management (cont'd)

Interest rate risk (cont'd)

Based on cash and cash equivalents at December 31, 2019, a 0.25% decline in interest rates, with all other variables held constant, would result in a decrease in investment income of $369,000. If interest rates had been 0.25% higher, there would be an equal and opposite impact on net income.

Credit risk

Credit risk is the risk of financial loss to the Corporation if a customer or counterparty to a financial instrument fails to meet its contractual obligations, and arises principally from the Corporation's receivables from customers.

The carrying amounts of financial assets and contract assets represent the maximum credit exposure.

Impairment loss on financial assets and contract assets recognized in profit and loss of $ 1,787,000 (2018 - $98,000) were comprised of realized impairment loss recognized during the year of $1,537,000 (2018 - $98,000) and an impairment loss allowance of $ 250,000 (2018 - $nil).

The Corporation's exposure to credit risk is influenced mainly by the individual characteristics of each customer. However, management also considers the factors that may influence the credit risk of its customer base, including the default risk associated with the industry and country in which customers operate. Details of concentration of revenue are included in note 21.

The Corporation limits its exposure to credit risk from trade receivables and contract assets by contracting prepayments (from 50% to 100%) from certain customers.

The Corporation determines probability of default based on the following common credit risk characteristics: geographic region, age of customer relationship, and duration of remaining contract. The Corporation calculates probability of default using a forecasted default rate over the next twelve months for the automotive and manufacturing industries, ranging from 0.8% to 1.2%, depending on the individual assessment by customer. The loss given default is assumed to be 100% due to the Corporation's position as an unsecured creditor.

The movement in the allowance for impairment in respect of trade receivables and contract assets during the year was as follows.

Impairment loss allowance	December 31, 2019	December 31, 2018
Beginning Balance	$ —	$ —
Net measurement of loss allowance	250	—
Ending Balance	$ 250	$ —

BALLARD POWER SYSTEMS INC.
MANAGEMENT'S DISCUSSION AND ANALYSIS
FOURTH QUARTER 2019

FUEL CELL POWER
FOR A SUSTAINABLE
PLANET



Power to Change the World®

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CAUTION REGARDING FORWARD-LOOKING STATEMENTS

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

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

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

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1. INTRODUCTION

1.1 Preparation of the MD&A

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

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

Disclosure controls and procedures

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

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

Internal control over financial reporting

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

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

Management, including the CEO and CFO, have evaluated the effectiveness of internal control over financial reporting, as defined in Rules 13a–15(f) of the Exchange Act, in relation to criteria described in *Internal Control–Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on this evaluation, management has determined that internal control over financial reporting was effective as of December 31, 2019.

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

Changes in internal control over financial reporting

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

1.3 Risks and Uncertainties

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

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

- We may not be able to successfully execute our business plan;
- In our Heavy-Duty Motive market, we depend on a limited number of customers for a majority of our revenues and are subject to risks associated with early stage market activities related to fuel cell bus, truck, rail and marine applications;
- In our Heavy-Duty Motive market, we depend on Chinese customers for a significant portion of our revenues and we are subject to risks associated with economic conditions and government practices in China;
- In our Heavy-Duty Motive market, a significant amount of operations are conducted by joint ventures in China that we cannot operate solely for our benefit;
- In our Technology Solutions market, we depend on a limited number of customers for a majority of our revenues and are subject to risks related to the continued commitment of these customers to their fuel cell programs, including, in the case of one significant customer, to that customer's continued commitment to the commercialization of fuel cell passenger cars;
- In our Material Handling market, we depend on a single customer for the majority of our revenues and are subject to risks from that customer's internal stack development and commercialization plans;
- Emerging diseases, like COVID-19, may adversely affect our operations, our suppliers, our customers, or our joint ventures in China.
- We expect our cash reserves will be reduced due to future operating losses, working capital requirements, capital expenditures, capital contributions to our joint venture(s) in China and potential acquisitions and other investments by our business, and we cannot provide certainty as to how long our cash reserves will last or that we will be able to access additional capital when necessary;
- Potential fluctuations in our financial and business results make forecasting difficult and may restrict our access to funding for our commercialization plan;

- We are dependent upon Original Equipment Manufacturers and Systems Integrators to purchase certain of our products;
- Our technology and products may not meet the market requirements, including relating to performance, integration and / or cost;
- We may not be able to sell our products on a commercially viable basis on the timetable we anticipate, or at all;
- A mass market for our products may never develop or may take longer to develop than we anticipate;
- We are subject to risks inherent in international operations, including restrictions on the conversion of currencies and restrictions on repatriation of funds, including out of China;
- We have limited experience manufacturing fuel cell products on a commercial basis and our experience has been limited to relatively low production volumes;
- Warranty claims, product performance guarantees, or indemnification claims could negatively impact our gross margins and financial performance;
- We could be adversely affected by risks associated with acquisitions and investments;
- We depend on our intellectual property, and our failure to protect that intellectual property could adversely affect our expected future growth and success;
- We may experience cybersecurity threats to our information technology infrastructure and systems, and unauthorized attempts to gain access to our proprietary or confidential information, as may our customers, suppliers, subcontractors and joint venture partners;
- Global macro-economic conditions are beyond our control and may have an adverse impact on our business or on our key suppliers and / or customers;
- We currently face and will continue to face significant competition, and many current and future competitors may have significantly more resources;
- We could lose or fail to attract the personnel necessary to operate our business;
- Public Policy and regulatory changes could hurt the market for our products and services;
- We are dependent on third party suppliers for the supply of key materials and components for our products and services;
- Exchange rate fluctuations are beyond our control and may have a material adverse effect on our business, operating results, financial condition and profitability;
- Commodity price fluctuations are beyond our control and may have a material adverse effect on our business, operating results, financial condition and profitability;
- We could be liable for environmental damages resulting from our research, development or manufacturing operations;
- If completed, potential merger and acquisition activity may fail to achieve the expected benefits of the transaction, including potential disruptions to operations, higher than anticipated costs and efforts to integrate, and loss of key personnel; and
- Our products use flammable fuels and some generate high voltages, which could subject our business to product safety, liability or other claims.

2. CORE BUSINESS AND STRATEGY

2.1 Core Business

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

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

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

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

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

In addition, we have a non-controlling 10% interest in Guangdong Synergy Ballard Hydrogen Power Co., Ltd. ("Synergy Ballard JVCo"), located in Yunfu, Guangdong Province, China. Synergy Ballard JVCo manufactures fuel cell stacks utilizing our FCvelocity®-9SSL fuel cell stack technology for use primarily in fuel cell engines assembled in China to provide propulsion power for zero-emission fuel cell electric buses and commercial vehicles with certain exclusive rights in China.

2.2 Strategic Imperatives

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

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

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

- **5** key applications - bus, truck, rail, marine and passenger cars (secondary applications are material handling, stationary power and unmanned systems).

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

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

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

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

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

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

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

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

3. SELECT ANNUAL FINANCIAL INFORMATION AND 2020 BUSINESS OUTLOOK

3.1 Select Annual Financial Information

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

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

3.2 2019 Performance compared to 2019 Business Outlook

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

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

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

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

transfer of LCS technology and module designs and the sale of MEAs to Weichai Ballard JV in which Ballard has a 49% minority position.

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

- In Europe, the proportion of total revenue generated from the European market increased slightly in 2019, relative to 2018, largely offsetting the proportionate decline in Heavy-Duty Motive revenue from China as we continued execution of the automotive program with AUDI AG ("Audi"), and delivered a number of modules to support fuel cell electric buses ("FCEBs") for deployment in Germany under the Joint Initiative for Hydrogen Vehicles across Europe ("JIVE") funding program.
- In North America, we saw increased market activity in California for FCEVs, which we believe will result in additional module purchase orders. In addition, we delivered a higher volume of fuel cell stack sales in 2019 for Material Handling applications than in 2018. However, this increase in Material Handling revenues was more than offset by a significant decline in Portable Power / UAV revenues 2019, relative to 2018, as a result of the disposition of our Power Manager assets in October 2018.
- In Technology Solutions, revenue increased in 2019, as compared to 2018, supported primarily by ongoing work on the automotive program with Audi and the technology transfer program with Weichai Ballard JV. This increase in overall Technology Solutions revenue more than offset the overall decline in Heavy Duty Motive revenue.

3.3 2020 Business Outlook

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

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

Consistent with the Company's practice, and in view of the early stage of hydrogen fuel cell market development and adoption, we are not providing specific financial performance guidance for 2020. However, directionally we expect total revenue of approximately $130 million in fiscal 2020, compared to total revenue of $106.3 million in fiscal 2019, as commercial activities increase in our target geographic territories. This growth is expected to primarily result from commercial progress in the Heavy Duty Motive

market, underpinned by increasing demand for FCEVs in China and Europe. Our 12-month Order Book of approximately $110 million at the end of 2019, together with a robust sales pipeline, establishes a strong foundation for projected growth in full year 2020 revenue.

In support of our 2020 Business Outlook:

- In China, we expect the Weichai Ballard JV facility to be commissioned and operating by mid-year of 2020. We also expect delivery of MEAs to Weichai Ballard JV for the production of next-generation LCS fuel cell stacks and FCmove™ fuel cell modules. During 2020, we have a commitment to make capital contributions totaling approximately $20 million towards our pro rata ownership share of Weichai Ballard JV. This is in addition to $20.9 million contributed in 2019 and $14.6 million contributed in 2018, as part of our total capital contribution commitment of approximately $78 million. We also expect to report equity investment losses in joint venture and associates of approximately $10 million to $15 million in fiscal 2020 primarily in connection with the operations of Weichai Ballard JV.
- In Europe, we plan to continue to execute on our automotive program with Audi, and to deliver a significant number of modules to support FCEBs in a number of countries. We also expect increased market activity for FCEBs which can be expected to result in additional module purchase orders.
- In North America, we expect continued market activity in California for FCEBs and fuel cell-powered trucks, which can be expected to result in additional module purchase orders. In addition, we expect a volume contraction of fuel cell stack sales for forklift applications.
- In Technology Solutions, revenue is expected to be relatively flat in 2020, compared to 2019, primarily reflecting ongoing work on our technology transfer programs with Audi and Weichai Ballard JV. In addition to the Audi and Weichai Ballard JV programs, Technology Solutions engineering services activity is expected with existing and new customers in a variety of markets.

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

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

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

The primary risk factors to our business outlook expectations for 2020 are customer, production, or program delays or cancellations in delivering against existing power products and technology solutions orders and delays from forecast in terms of closing and delivering expected sales primarily in our Heavy-Duty Motive market including expected sales to Weichai Ballard JV and Synergy Ballard JVCo and the timing of sales of that inventory by those respective joint ventures to end-customers in China; adverse macro-economic

conditions including trade, public health (including the impact of the corona virus (COVID-19)), and other geopolitical risks; changes in government subsidy and incentive programs; inadequate investment in hydrogen infrastructure and / or excessive hydrogen fuel costs, all of which could negatively impact our customers' access to capital and the success of their program plans which could adversely impact our business; disruptions in our Heavy-Duty market due to delays of supply of key materials and components from third party suppliers; disruptions in our Technology Solutions market as a result of our significant reliance on a limited number of customers including Audi and Weichai Ballard JV in this platform, which are reliant on their internal commercialization plans and budget requirements; disruptions in our Technology Solutions market as a result of delays in achieving program milestones; disruptions in the Material Handling market as a result of our reliance on a single customer in this market and that customer's internal stack development and commercialization plans; and fluctuations in the Canadian dollar relative to the U.S. dollar, as a significant portion of our Technology Solutions revenues (including the technology development and engineering services agreement with Audi) are priced in Canadian dollars.

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

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

4. RECENT DEVELOPMENTS (Including Contractual Updates)

4.1 Corporate

Ballard Included in S&P / TSX Composite

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

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

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

The TSX30 program considers all companies that have been listed on the Toronto Stock Exchange for at least 3-years, with a closing dividend-adjusted share price of at least Canadian $0.50 and a market capitalization of at least Canadian $50 million as at June 30th, 2016. Of the 583 companies that met these criteria, the 30 companies with greatest share price appreciation over the period from July 1st, 2016 to June 30th, 2019 have been named to the inaugural TSX30 program.

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

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

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

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

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

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

4.2 China

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

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

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

  In addition, Zhongshan Broad-Ocean Motor Co., Ltd. ("Broad-Ocean" – a current Ballard strategic investor and Chinese partner) – invested a further $20.2 million, through the subscription and purchase of 5.7 million shares from treasury at the same price of $3.54 to maintain its 9.9% ownership position in Ballard.

  As a result, the Weichai investment and the incremental Broad-Ocean equity investments in Ballard generated total gross proceeds of $183.8 million. The Weichai investment and the Broad-Ocean incremental investment are subject to 2-year "standstill" and resale restrictions (subject to customary

exceptions). For so long as Weichai holds at least 15% of Ballard's outstanding shares, it will have the right to nominate two directors to Ballard's board of directors. On January 1, 2019, the Company appointed Mr. Jiang Kui (also known as Mr. Kevin Jiang) and Mr. Sun Shaojun (also known as Mr. Sherman Sun) to the Company's Board of Directors and expanded Ballard's Board of Directors from seven members to nine members.

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

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

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

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

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

the fourth quarter of 2019; $14.7 million in fiscal 2019 and to date) is recorded as Heavy-Duty Motive revenues.

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

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

Guangdong Synergy Ballard Hydrogen Power Co., Ltd.

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

The joint venture transaction and related sales agreements, which closed on October 25, 2016 (originally announced on July 18, 2016), contemplated Ballard's exclusive supply of MEAs for each fuel cell stack manufactured by Synergy Ballard JVCo, with minimum annual MEA volume commitments and a contemplated minimum sales value on a "take or pay" basis to Ballard of at least $150 million over the initial 5-year term from 2017 to 2021. However, as a result of various Chinese market circumstances, including fluctuating new energy vehicle subsidies, slower than anticipated build-out and operation of hydrogen refueling infrastructure and slower than anticipated market adoption, as well as a result of inventory build-up, liquidity and other challenges at Synergy Ballard JVCo, Synergy Ballard JVCo did not meet its "take or pay" purchase commitments under the MEA supply agreement in the third and fourth quarters of 2018, nor did it make the contractual pre-payments required to enable any significant MEA shipments in the first quarter of 2019. As a result, during 2018 we removed all MEA supply agreement "take or pay" purchase commitments from our Order Backlog and 12-month Order Book. During the third quarter of 2019, we signed definitive agreements with Synergy Ballard JVCo amending the existing Stack Assembly License Agreement and MEA Long-Term Supply Agreement, which included a mutual release of the remaining purchase commitment under the above noted $150 million "take or pay" MEA purchase commitment. The definitive agreements, which were entered into effective July 19, 2019, did not impact any amount recorded in the June 30, 2019 and September 30, 2019 consolidated financial statements.

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

Synergy Ballard JVCo retains an exclusive right to manufacture and sell FCvelocity®-9SSL stacks in China until September 30, 2026. Exclusivity is subject to Synergy Ballard JVCo maintaining certain performance criteria, including compliance with: a code of ethics; Ballard's quality policies and branding practices;

payment terms; certain intellectual property covenants; achievement of certain minimum annual MEA volume commitments through 2026; and certain financing conditions.

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

Zhongshan Broad-Ocean Motor Co., Ltd.

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

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

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

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

4.3 Europe

AdKor GMBH and SFC ENERGY AG

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

HDF Energy

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

Subject to certain conditions, the collaboration contemplates a future technology transfer of Ballard's new MW-scale containerized PEM fuel cell system to HDF Energy with an exclusive royalty-bearing, non-transferable, multi-year global license for the manufacture and sale of MW-scale fuel cell systems for Renewstable® power plant systems. The collaboration also contemplates Ballard supplying LCS fuel cell stacks for these systems based on an exclusive long-term supply agreement. HDF Energy is planning to establish a manufacturing facility in Bordeaux, France. The transaction is subject to completion of definitive agreements and is reliant in part on the CEOG project, which is subject to customary conditions for multi-year programs of this scope, including but not limited to permitting and regulatory approvals, financings and project execution activities.

Van Hool NV

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

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

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

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

BEHALA Berliner Hafen-und

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

Ballard plans to work with BEHALA and other consortium partners to assist in the design, construction and deployment of the Elektra, with construction of the almost 20 meter long and 8.2 meter wide push boat scheduled to begin this month at the Hermann Barthel shipyard in Derben, Germany, and completion expected by end-2020. Propulsion power for the Elektra will be provided by the Ballard fuel cell modules along with modular batteries (2.507 kWh capacity). Ballard intends to ship 3 of its FCveloCity® 100kW fuel cell modules in 2020 and will also support integration, commissioning and testing during the demonstration phase of the project. While the Elektra is under construction, electricity and hydrogen infrastructure is planned to be installed in the vessel's inland waterways operating area. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

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

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

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

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

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

WrightBus

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

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

Solaris Bus & Coach S.A.

On July 29, 2019, we announced a purchase order from Solaris Bus & Coach S.A. ("Solaris"), a leading European bus and trolleybus manufacturer and Ballard partner headquartered in Bolechowo, Poland, for 12 FCmove™-HD fuel cell modules to power 12 buses to be deployed with SASA Bolzano, the public transport operator in Bolzano, Italy under the JIVE funding program. The 12 FCmove™-HD modules are expected to ship in 2020 and the buses are expected to be deployed with SAS Bolzano by 2021. Revenue earned from this agreement will be recorded as Heavy-Duty Motive revenues.

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

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

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

Norled A/S

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

ABB Marine & Ports

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

Eniig and Fibia A/S

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

Eniig and Fibia A/S, operators of fiber optic broadband networks in Denmark. Revenue earned from these agreements is recorded as Backup Power revenues.

Audi AG

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

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

Siemens AG

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

4.4 North America

Divestiture of Power Manager assets

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

During the fourth quarter of 2018, we recorded a loss on sale of assets of ($4.0) million on the divestiture of the Power Manager assets after estimating the amount of variable consideration included in the transaction price that is constrained to be $2.0 million, as opposed to the above noted maximum possible earn-out amount of $11.25 million. During the first quarter of 2019, we recorded an additional loss on sale of assets of ($2.0) million after adjusting the estimated amount of variable consideration from $2.0 million to nil.

During October 2019, the estimated amount of variable consideration was confirmed as nil as Revision failed to meet the minimum specific sales objectives in the 12-month earn-out period to trigger any additional proceeds payable to us.

4.5 Other

Anglo American

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

Nisshinbo Holdings

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

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

Other

On February 14, 2018, we announced that the signing of a Technology Solutions program with an unnamed strategic customer to develop a next generation air-cooled fuel cell stack. The multi-year program has an initial value to Ballard of approximately $4.2 million. A key objective of the Technology Solutions program is to design and validate an ultra-high durability, high performance air-cooled fuel cell stack for uses in a number of target market applications, including certain material handling applications, with a target operating lifetime of 20,000 hours. A key market opportunity will be the integration of the next generation stacks into fuel cell systems for class 3 lift trucks, such as pallet jacks, deployed in high throughput distribution centers and warehouse operations. Other potential applications include systems for stationary continuous and backup power. Revenue earned from this agreement ($0.2 million in the fourth quarter of 2019; $1.5 million in fiscal 2019; $0.9 million in the fourth quarter of 2018; $1.9 million in fiscal 2018) is recorded as Technology Solutions revenues.

5. RESULTS OF OPERATIONS

5.1 Operating Segments

We report our results in the single operating segment of Fuel Cell Products and Services. Our Fuel Cell Products and Services segment consists of the sale and service of PEM fuel cell products for our power product markets of Heavy-Duty Motive (consisting of bus, truck, rail and marine applications), Portable

Power / UAV, Material Handling and Backup Power, as well as the delivery of Technology Solutions, including engineering services, technology transfer and the license and sale of our extensive intellectual property portfolio and fundamental knowledge for a variety of fuel cell applications.

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

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

Revenue and gross margin

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
Fuel Cell Products and Services	**2019**	2018	$ Change	% Change
Heavy-Duty Motive	**$ 21,392**	$ 10,629	$ 10,763	101 %
Portable Power / UAV	**126**	371	(245)	(66 %)
Material Handling	**1,932**	3,202	(1,270)	(40 %)
Backup Power	**2005**	1366	639	47 %
Technology Solutions	**16,428**	12,909	3,519	27 %
Revenues	**41,883**	28,477	13,406	47 %
Cost of goods sold	**33,235**	21,285	11,950	56 %
Gross Margin	**$ 8,648**	$ 7,192	$ 1,456	20 %
Gross Margin %	**21 %**	25 %	n/a	(4 pts)

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

Heavy-Duty Motive revenues of $21.4 million increased $10.8 million, or 101%, due primarily to higher shipments of a variety of fuel cell products to customers in China. Heavy-Duty Motive revenues on a quarter to quarter basis are also impacted by product mix due to varying customer requirements and various fuel cell products, including numerous power configurations required by our customers (and the resulting impact on selling price) of our fuel cell modules, fuel cell stacks, MEAs, and related component and parts kits. Heavy-Duty Motive revenues of $21.4 million in the fourth quarter of 2019 include $13.2 million to Weichai Ballard JV for the supply of a mix of certain fuel cell products and components that will be used in the assembly of modules to power zero-emission FCEVs in China; $6.5 million to Synergy Ballard JVCo for shipments of MEAs for use in their manufacture and assembly of FCveloCity® fuel cell stacks in China; $0.7 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their bus program; and $1.0 million for a variety of fuel cell products to a variety of customers around the world. Heavy-Duty Motive revenues of $10.6 million in the fourth quarter of 2018 include $0.8 million to Synergy Ballard JVCo for shipments of MEAs; $2.8 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; $3.5 million to New Flyer and $2.3 million to Van Hool for shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs; and $1.2 million for a variety of fuel cell products to a variety of customers around the world.

Technology Solutions revenues of $16.4 million increased by $3.5 million, or 27%, due primarily to amounts earned on the Weichai Ballard JV technology transfer program as Audi program revenues were relatively

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

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

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

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

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

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

Cash Operating Costs

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

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

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

Adjusted EBITDA

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

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

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

Net loss

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

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

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

Cash provided by (used in) operating activities

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

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

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

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

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

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

Revenue and gross margin

(Expressed in thousands of U.S. dollars)	Year ended December 31,			
Fuel Cell Products and Services	**2019**	2018	$ Change	% Change
Heavy-Duty Motive	**$ 35,363**	$ 39,464	$ (4,101)	(10 %)
Portable Power / UAV	**604**	7,109	(6,505)	(92 %)
Material Handling	**10,758**	8,010	2,748	34 %
Backup Power	**2982**	2426	556	23 %
Technology Solutions	**56,620**	39,577	17,043	43 %
Revenues	**106,327**	96,586	9,741	10 %
Cost of goods sold	**83,732**	66,912	16,820	25 %
Gross Margin	**$ 22,595**	$ 29,674	$ (7,079)	(24 %)
Gross Margin %	**21 %**	31 %	n/a	(10 pts)

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

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

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

shipments of FCveloCity®-HD7 85&100-kilowatt fuel cell modules for their respective bus programs; $2.3 million for shipments of FCveloCity®-HD7 200-kilowatt fuel cell modules to CRRC Sifang for their tram project; $5.9 million for shipments of FCveloCity®-MD 30-kilowatt fuel cell products primarily to customers in China; and $3.4 million for a variety of fuel cell products to a variety of customers around the world.

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

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

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

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

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

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

Cash Operating Costs

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

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

Cash Operating Costs (see Supplemental Non-GAAP Measures and Reconciliations) for 2019 were $40.6 million, a decrease of ($2.4) million, or (6%), compared to 2018. The ($2.4) million, or (6%), decrease was driven by lower research and product development cash operating costs of ($1.8) million, combined with decreases in general and administrative cash operating costs of ($0.3) million and decreases in sales and marketing cash operating costs of ($0.3) million. The ($2.4) million, or (6%) decrease in cash operating costs in 2019 was driven primarily by lower expenses in Ballard Unmanned Systems as a result of the disposition of our Power Manager assets and associated personnel in October 2018, combined with lower labour costs in Canada as a result of an approximate (2%) lower Canadian dollar, relative to the U.S. dollar, and the resulting positive impact on our Canadian operating cost base. These cost reductions were partially offset by higher program development and engineering expenses in Denmark by Ballard Power Systems Europe A/S related primarily to Marine market applications.

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

Adjusted EBITDA

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

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

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

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

Net loss

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

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

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

Cash provided by (used in) operating activities

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

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

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

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

awards, and by higher accrued warranty obligations of $1.4 million primarily on Heavy-Duty Motive product shipments.

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

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

Research and product development expenses

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

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

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

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

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

Research and product development expenses for the year ended December 31, 2019 were $26.9 million, a decrease of ($0.1) million compared to the corresponding period of 2018. Excluding depreciation and amortization expense of ($3.5) million and ($2.2) million, respectively, in each of the periods, and excluding stock-based compensation expense of ($1.5) million and ($1.1) million, respectively, in each of

the periods, research and product development cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) were $21.9 million in 2019, a decrease of ($1.8) million, or (8%), compared to 2018.

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

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

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

Depreciation and amortization expense included in research and product development expense for the three months and year ended December 31, 2019 was $1.3 million and $3.5 million, respectively, compared to $0.5 million and $2.2 million, respectively, for the corresponding periods of 2018. Depreciation and amortization expense relates primarily to amortization expense on our intangible assets and depreciation expense on our research and product development facilities and equipment. Depreciation and amortization expense has increased in 2019 primarily as a result of increased investment in testing, lab and quality inspection equipment including the acquisition of certain strategic assets of AFCC in July 2018.

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

General and administrative expenses

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

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

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

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

The ($0.1) million, or (3%), decline in general and administrative cash operating costs (see Supplemental Non-GAAP Measures and Reconciliations) in the fourth quarter of 2019, as compared to the fourth quarter of 2018, were driven primarily by lower realized losses on our foreign exchange contracts which are designed as a hedge against our Canadian dollar labour costs.

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

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

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

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

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

Sales and marketing expenses

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(Expressed in thousands of U.S. dollars)	Three months ended December 31,			
	2019	2018	$ Change	% Change
Employee future benefit plan expense	**$ (40)**	$ (58)	$ 18	31 %
Pension administration expense	**(107)**	(104)	(3)	(3 %)
Investment and other income (loss)	**598**	617	(19)	(3 %)
Foreign exchange gain (loss)	**124**	(469)	593	126 %
Finance income (loss) and other	**$ 575**	$ (14)	$ 589	4207 %

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

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

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

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

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

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

Equity in income (loss) of investment in joint venture and associates for the three months and year ended December 31, 2019 was ($3.0) million and ($11.1) million, respectively, compared to ($1.1) million and ($1.2) million, respectively, in the corresponding periods of 2018. Equity in loss of investment in joint venture and associates relates to the pickup of 49% of the net income (loss) of Weichai Ballard JV as a result of our 49% ownership position, and 10% of the net income (loss) of Synergy Ballard JVCo as a result of our 10% ownership position. Both of these investments in China are accounted for using the equity method of accounting. The significant increase in the loss of investment in joint venture and associates in

2019 is due primarily to the increase in net loss in Weichai Ballard JV as they expense as incurred the ongoing $90 million technology transfer agreement with Ballard as research and product development expense as they commence the establishment of operations. Weichai Ballard JV will manufacture Ballard's next-generation LCS fuel cell stack and LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China.

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

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

5.4 Summary of Quarterly Results

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

(Expressed in thousands of U.S. dollars, except per share amounts and weighted average shares outstanding which are expressed in thousands)	Quarter ended,			
	December 31, 2019	September 30, 2019	June 30, 2019	March 31, 2019
Revenues	$ 41,883	$ 24,785	$ 23,651	$ 16,008
Net loss	$ (10,273)	$ (9,782)	$ (6,971)	$ (12,024)
Net loss per share attributable to Ballard, basic and diluted	$ (0.04)	$ (0.04)	$ (0.03)	$ (0.05)
Weighted average common shares outstanding	233,969	232,810	232,469	232,012

	December 31, 2018	September 30, 2018	June 30, 2018	March 31, 2018
Revenues	$ 28,477	$ 21,574	$ 26,445	$ 20,090
Net loss	$ (11,475)	$ (6,024)	$ (4,323)	$ (5,500)
Net loss per share attributable to Ballard, basic and diluted	$ (0.06)	$ (0.03)	$ (0.02)	$ (0.03)
Weighted average common shares outstanding	207,047	179,153	178,727	178,186

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

- **Revenues**: Variations in fuel cell product and service revenues reflect the demand and timing of our customers' fuel cell vehicle, bus and fuel cell product deployments as well as the demand and timing of their engineering services projects. Variations in fuel cell product and service revenues also reflect the timing of work performed and the achievements of milestones under long-term fixed price contracts.
- **Operating expenditures**: Operating expenses were negatively impacted in the third quarter of 2019 by net impairment losses on trade receivables of ($1.5) million for amounts owed to us for product shipments sold to WrightBus that are no longer expected to be collected. Operating expenses were negatively impacted in the fourth quarter of 2018 by restructuring expenses of ($0.4) million related to a change in operations leadership combined with severance obligations paid to departed employees at

Ballard Unmanned Systems as a result of the disposition of the Power Manager assets and associated personnel. Operating expenses also include the impact of changes in the value of the Canadian dollar, versus the U.S. dollar, on our Canadian dollar denominated expenditures.

- **Net loss:** Net loss for the first quarter of 2019 and the fourth quarter of 2018 was negatively impacted by a loss on sale of assets of ($2.0) million and ($4.0) million, respectively, as a result of the divestiture of our Power Manager assets to Revision on October 5, 2018. Net loss for the four quarters of 2019 was negatively impacted by equity in loss of investment in joint venture and associates as a result of the commencement of operations of Weichai Ballard JV.

6. CASH FLOWS, LIQUIDITY AND CAPITAL RESOURCES

6.1 Summary of Cash Flows

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

6.2 Cash Provided by (Used by) Operating Activities

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

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

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

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

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

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

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

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

6.3 Cash Provided by (Used by) Investing Activities

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

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

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

6.4 Cash Provided by (Used by) Financing Activities

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

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

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

6.5 Liquidity and Capital Resources

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

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

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

requirements, and securing additional financing to fund our operations as needed until we do achieve profitable operations that are sustainable. We believe that we currently have adequate liquidity in cash and working capital to achieve our liquidity objective.

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

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

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

No assurance can be given that any such additional liquidity will be available or that, if available, it can be obtained on terms favorable to the Company. If any securities are offered under the Base Shelf Prospectus and/or Registration Statement, the terms of any such securities and the intended use of the net proceeds resulting from such offering would be established at the time of any offering and would be described in a Prospectus supplement filed with applicable Canadian securities regulators and/or the SEC, respectively, at the time of such an offering.

7. OTHER FINANCIAL MATTERS

7.1 Off-Balance Sheet Arrangements and Contractual Obligations

Periodically, we use forward foreign exchange contracts to manage our exposure to currency rate fluctuations. We record these contracts at their fair value as either assets or liabilities on our balance sheet. Any changes in fair value are either (i) recorded in other comprehensive income if formally designated and qualified under hedge accounting criteria; or (ii) recorded in profit or loss (general and administrative expense) if either not designated, or not qualified, under hedge accounting criteria. At December 31, 2019,

we had outstanding foreign exchange currency contracts to purchase a total of Canadian $16.8 million at an average rate of 1.3232 Canadian per U.S dollar, resulting in an unrealized gain of Canadian $0.3 million at December 31, 2019. The outstanding foreign exchange currency contracts have not been designated under hedge accounting.

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

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

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

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

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

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

We also retain a previous funding obligation to pay royalties of 2% of revenues (to a maximum of Canadian $2.2 million) on sales of certain fuel cell products for commercial transit applications. No royalties have been incurred to date as a result of this agreement.

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

7.2 Related Party Transactions

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

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

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

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

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

7.3 Outstanding Share and Equity Information

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

8. ACCOUNTING MATTERS

8.1 Overview

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

8.2 Critical Judgments in Applying Accounting Policies

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

Our significant accounting policies are detailed in note 4 to our annual consolidated financial statements for the year ended December 31, 2019 except as described below. These changes in accounting policies are

also expected to be reflected in the Company's consolidated financial statements as at and for the year ending December 31, 2020.

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

8.3 Key Sources of Estimation Uncertainty

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

REVENUE RECOGNITION

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

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

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

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

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

On long-term fixed price contracts, the customer controls all of the work in progress as the services are being provided. This is because under these contracts, the deliverables are made to a customer's specification, and if a contract is terminated by the customer, then the Company is entitled to

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

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

Estimates used to determine revenues and costs of long-term fixed price contracts involve uncertainties that ultimately depend on the outcome of future events and are periodically revised as projects progress. There is a risk that a customer may ultimately disagree with management's assessment of the progress achieved against milestones, or that our estimates of the work required to complete a contract may change.

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

ASSET IMPAIRMENT

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

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

market capitalization decreased due to a decline in the trading price of our common stock, which could negatively impact the fair value of our business.

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

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

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

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

In addition to the above goodwill impairment test, we perform a quarterly assessment of the carrying amounts of our non-financial assets (other than inventories) to determine whether there is any indication of impairment. During the three months and year ended December 31, 2018, we recorded a loss on sale of assets of ($4.0) million on the divestiture of our Power Manager assets after estimating the amount of

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

WARRANTY PROVISION

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

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

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

INVENTORY PROVISION

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

FINANCIAL ASSETS INCLUDING IMPAIRMENT OF TRADE RECEIVABLES

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

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

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

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

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

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

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

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

LEASES

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

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

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

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

EMPLOYEE FUTURE BENEFITS

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

INCOME TAXES

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

Deferred tax assets and liabilities are measured using enacted, or substantively enacted, tax rates expected to apply to taxable income in the years in which temporary differences are expected to be recovered or settled. The effect on deferred income tax assets and liabilities, of a change in tax rates, is included in income in the period that includes the substantive enactment date. Deferred income tax assets are reviewed at each reporting period and are reduced to the extent that it is no longer probable that the related tax benefit will be realized. In circumstances in which there is uncertainty over income tax treatments for current and / or deferred tax liabilities and asset, we contemplate whether uncertain tax treatments should be considered separately, or together as a group, based on which approach provides better predictions of the resolution. We then determine if it is probable that the tax authorities will accept the uncertain tax treatment; and if it is not probable that the uncertain tax treatment will be accepted, we measure the tax uncertainty based on the most likely amount of expected value, depending on whichever method better predicts the resolution of the uncertainty.

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

8.4 Recently Adopted Accounting Policy Changes

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

IFRS 16 – LEASES

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

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

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

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

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

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

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

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

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

Under IFRS 16 Leases, we continue to account for the sale-and-leaseback transaction for the manufacturing, research and office facility in Burnaby, BC completed in 2010 as a sale-and-leaseback transaction. At the time of the transaction, it was concluded that the building component of the sale-and-leaseback qualified as a finance lease and the land component was bifurcated and treated as an operating lease. As such, there is no adjustment to the right-of-use asset and the related lease liability of the building component upon transition. However, as the land component now meets the definition of a right-of-use asset under IFRS 16, the land component of the sale-and-leaseback transaction has now been accounted for as a finance lease with the 0land component now recognized as a right-of-use asset with a related lease liability recognized.

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

IFRIC 23 – UNCERTAINTY OVER INCOME TAX TREATMENTS

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

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

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

8.5 Future Accounting Policy Changes

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

AMENDMENTS TO REFERENCES TO THE CONCEPTUAL FRAMEWORK IN IFRS STANDARDS

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

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

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

DEFINITION OF A BUSINESS (AMENDMENTS TO IFRS 3)

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

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

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

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

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

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

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

9. SUPPLEMENTAL NON-GAAP MEASURES AND RECONCILIATIONS

9.1 Overview

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

9.2 Cash Operating Costs

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

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

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

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

The components of Cash Operating Costs of research and product development (cash operating cost), general and administrative (cash operating cost), and sales and marketing (cash operating cost) differ from

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

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

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

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

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

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

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

9.3 EBITDA and Adjusted EBITDA

These supplemental non-GAAP measures are provided to assist readers in determining our operating performance. We believe this measure is useful in assessing performance and highlighting trends on an overall basis. We also believe EBITDA and Adjusted EBITDA are frequently used by securities analysts and investors when comparing our results with those of other companies. EBITDA differs from the most comparable GAAP measure, net loss, primarily because it does not include finance expense, income taxes, depreciation of property, plant and equipment, and amortization of intangible assets. Adjusted EBITDA adjusts EBITDA for stock-based compensation expense, transactional gains and losses, asset impairment charges, finance and other income, the impact of unrealized gains and losses on foreign exchange contracts, and acquisition costs. The following tables show a reconciliation of net loss to EBITDA and Adjusted EBITDA for the three months and year ended December 31, 2019 and 2018:

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

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

9.4 Adjusted Net Loss

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

a reconciliation of net loss to Adjusted Net Loss for the three months and year ended December 31, 2019 and 2018:

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

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



BALLARD POWER SYSTEMS INC.

ANNUAL INFORMATION FORM

For the year ended December 31, 2019

Dated March 5, 2020

BALLARD®

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This Annual Information Form and the documents incorporated by reference herein contain forward-looking statements that 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. When used in this Annual Information Form, the words "estimate", "project", "believe", "anticipate", "intend", "expect", "plan", "predict", "may", "could", "should", "will", the negatives of these words or other variations thereof and comparable terminology are intended to identify forward-looking statements. Such statements include, but are not limited to, statements with respect to our objectives, goals, liquidity, sources and uses of capital, outlook, strategy, order backlog, order book of expected deliveries, future product costs and selling prices, future product sales, future production volumes, the markets for our products, expenses / costs, contributions and cash requirements to and from joint venture operations and research and development activities. Such statements reflect our current views with respect to future events based on currently available information and are subject to risks and uncertainties that could cause actual results to differ materially from those contemplated in those forward-looking statements, including, without limitation, the risks and uncertainties which are discussed in the section of this Annual Information Form entitled "Risk Factors" and the condition of the global economy, including trade, public health (including the impact of the corona virus (COVID-19)) and other geopolitical risks; the rate of mass adoption of our products or related ecosystem, including the availability of cost-effective hydrogen; changes in product or service pricing or cost; changes in our customers' requirements, the competitive environment and/or related market conditions; the relative strength of the value proposition that we offer our customers with our products or services; changes in competitive technologies, including battery and fuel cell technologies; product safety, liability or warranty issues; challenges or delays in our technology and product development activities; changes in the availability or price of raw materials, labour and supplies; our ability to attract and retain business partners, suppliers, employees and customers; changing government or environmental regulations, including subsidies or incentives associated with the adoption of clean energy products, including hydrogen and fuel cells; our access to funding and our ability to provide the capital required for product development, operations and marketing efforts, working capital requirements, and joint venture capital contributions; our ability to protect our intellectual property; our ability to extract value from joint venture operations; currency fluctuations, including the magnitude of the rate of change of the Canadian dollar versus the U.S. dollar; potential merger and acquisition activities, including risks related to integration, loss of key personnel, disruptions to operations, costs of integration, and the integration failing to achieve the expected benefits of the transaction.

The forward-looking statements contained in this Annual Information Form speak only as of the date of this Annual Information Form. Except as required by applicable legislation, Ballard does not undertake any obligation to release publicly any revisions to these forward-looking statements to reflect events or circumstances after the date of this Annual Information Form, including the occurrence of unanticipated events.

In this Annual Information Form, references to "Corporation", "Ballard", "we", "us" and "our" refers to Ballard Power Systems Inc. and, as applicable, its subsidiaries. All dollar

amounts are in United States dollars unless otherwise indicated. Canadian dollars are indicated by the symbol “C$”, and euros by the symbol “€”.

Except where otherwise indicated, all information presented is as of December 31, 2019.

CORPORATE STRUCTURE

Name, Address and Incorporation

Ballard was incorporated on November 12, 2008 under the *Canada Business Corporations Act* (Canada), under the name "7076991 Canada Inc." Ballard changed its name to "Ballard Power Systems Inc." on December 31, 2008. On August 24, 2016, Ballard continued into British Columbia under the *Business Corporations Act* (British Columbia). Ballard's head office is located at 9000 Glenlyon Parkway, Burnaby, British Columbia, Canada V5J 5J8, and its registered office is located at Suite 1700, 666 Burrard Street, Vancouver, British Columbia, Canada V6C 2X8.

Previously, Ballard Power Systems Inc. was a British Columbia company incorporated on May 30, 1989. The original predecessor to Ballard was founded in 1979 under the name Ballard Research Inc. to conduct research and development on high-energy lithium batteries. In the course of investigating environmentally-clean energy systems with commercial potential, we began to develop fuel cells and have been developing fuel cell products since 1983.

Our Vision, Mission, and Values

Our vision is to deliver fuel cell power for a sustainable planet. Our mission is to use our fuel cell expertise to deliver valuable and innovative solutions to our customers globally, create rewarding opportunities for our team, provide extraordinary value to our shareholders and power the hydrogen society.

Our values represent our core beliefs, and underpin how we carry on our business. In addition to our value pillars of safety and innovation, we have five key cultural values:

- *Listen and Deliver* – We listen to our customers, understand their business, and deliver innovative and valuable solutions for lasting partnerships;
- *Quality Always* – We deliver quality in everything we do;
- *Inspire Excellence* – We live with integrity, passion, urgency, agility and humility;
- *Row Together* – We achieve success through respect, trust and collaboration; and
- *Own It* – We step up, take ownership for our results, and trust others to do the same.

Intercorporate Relationships

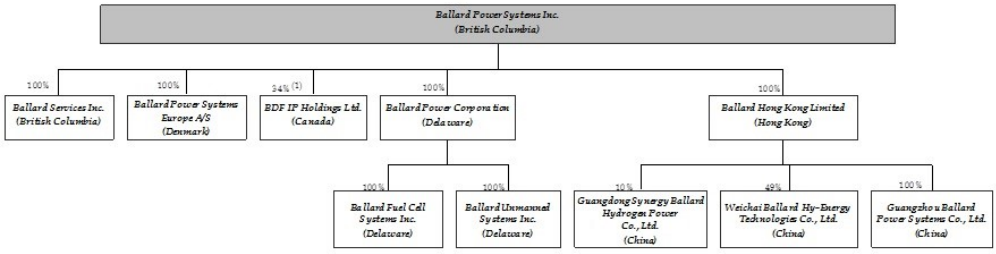
We have six principal subsidiaries and affiliates: Ballard Fuel Cell Systems Inc., a Delaware corporation that provides certain services to customers in the U.S. and internationally and does certain development work; Ballard Power Systems Europe A/S (formerly Dantherm Power A/S) ("**Ballard Europe**"), a Danish corporation that provides sales, assembly, research and development, and engineering services; BDF IP Holdings Ltd. ("**IP Holdings**"), a Canadian corporation that holds intellectual property assets; Ballard Services Inc., a British Columbia company that provides engineering services; Ballard Unmanned Systems Inc. (formerly Protonex Technology Corporation) ("**Ballard Unmanned Systems**"), a Delaware corporation that provides sales, assembly, research and development services; and Guangzhou Ballard Power

Systems Co., Ltd., a Chinese wholly foreign-owned entity, that provides sales, service, quality and supply chain services.

We also have a non-controlling, 49% interest, in Weichai Ballard Hy-Energy Technologies Co., Ltd. ("**Weichai-Ballard JV**"), located in Weifang, Shandong Province, China, with Weichai Power Co., Ltd. ("**Weichai**") holding a 51% interest. The Weichai-Ballard JV is intended to manufacture Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China.

We also have a non-controlling 10% interest in Guangdong Synergy Ballard Hydrogen Power Co., Ltd. ("**Synergy-Ballard JV**"), located in Yunfu, Guangdong Province, China, with Guangdong Nation Synergy Hydrogen Power Technology Co. Ltd. ("**Nation-Synergy**") holding a 90% interest. The Synergy-Ballard JV is intended to manufacture fuel cell stacks utilizing our FCvelocity®-9SSL fuel cell stack technology for use primarily in fuel cell engines assembled in China to provide propulsion power for zero-emission fuel cell electric buses and commercial vehicles in China.

The following chart shows these principal subsidiaries and affiliates, their respective jurisdictions of incorporation and our percentage of share ownership in each of them, all as of March 5, 2020:



Notes

(1) Ballard holds all of the non-voting, participating shares of IP Holdings and 34% of the voting, non-participating shares of IP Holdings, with each of Mercedes-Benz AG and Ford Motor Company holding 33% of the voting, non-participating shares of IP Holdings.

Recent History

Over the past three years, we have continued to focus on building and commercializing our proton exchange membrane ("**PEM**") fuel cell business for a variety of mobility and stationary power applications. The following are key developments during that period:

Ballard Receives $19.2 Million Order from the Weichai-Ballard JV for MEAs to Power Fuel Cell Electric Vehicles in China

On December 16, 2019, we announced an additional purchase order from the Weichai-Ballard JV for the delivery of membrane electrode assemblies ("**MEA**") valued at $19.2 million, expected to be delivered in 2020 under an MEA supply agreement.

Ballard and HDF Energy Sign Development Agreement for Multi-Megawatt Fuel Cell Systems

On December 9, 2019, we signed a Product Development Agreement with Hydrogène de France (“**HDF Energy**”) for the development and integration of a multi-megawatt (“**MW**”) scale PEM fuel cell system into HDF Energy’s Renewstable® power plant designed for stationary power applications.

HDF Energy’s Renewstable® power plant is a multi-MW baseload system enabling large-scale storage of intermittent renewable wind or solar energy in the form of hydrogen – through the process of electrolysis – as well as electricity generation using that hydrogen feedstock together with a fuel cell system.

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

In the initial HDF Energy project an installation is planned in French Guiana, an overseas region of France located off the northern Atlantic coast of South America, under the Centrale Electricité de l’Ouest Guyanais (“**CEOG**”) project.

The transaction remains subject to completion of definitive agreements and is reliant in part on the CEOG project, which is subject to customary conditions for multi-year programs of this scope, including but not limited to permitting and regulatory approvals, financings and project execution activities.

$44 Million Order from the Weichai-Ballard JV to Support Initial Fuel Cell Vehicle Deployments in China

On May 1, 2019, we announced that we had reached agreement with the Weichai-Ballard JV for the supply of a mix of certain fuel cell products and components that will be used in the assembly of modules to power zero-emission fuel cell electric vehicles (“**FCEVs**”) in China. The order will have a total value of approximately $44 million to Ballard.

Once assembled by the Weichai-Ballard JV, final modules will be sold to Weichai to support initial deployments against Weichai’s commitment to supply a minimum of 2,000 fuel cell modules for commercial FCEVs in China. All products and components to be supplied by Ballard, as well as related applications engineering support, are planned for delivery in 2019 and 2020, and will be based on Ballard’s next-generation FCgen®-LCS stack technology.

Strategic Collaboration with Weichai

On November 13, 2018, we closed a strategic collaboration transaction with Weichai. The strategic collaboration included an equity investment by Weichai in Ballard, formation of a joint venture company and a development program, each of which is discussed in more detail below.

Weichai, through its wholly-owned subsidiary Weichai Power Hong Kong International Development Co., Limited ("**Weichai HK**"), made an equity investment in Ballard in the amount of approximately $163.6 million, representing a 19.9% interest in Ballard, through the purchase of common 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 licensee – invested a further approximately $20.2 million, to maintain its 9.9% ownership position in Ballard through the subscription and purchase of common shares from treasury via a wholly-owned subsidiary.

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 directly or indirectly holds at least 15% of Ballard's outstanding shares, it has the right to nominate two directors to Ballard's board of directors. In 2019, Weichai nominated two directors to Ballard's board of directors. If there is a third-party offer to buy Ballard, Weichai has the right to make a superior proposal or otherwise it must vote its shares in accordance with the recommendation of Ballard's board of directors.

Weichai and Ballard established the Weichai Ballard JV on November 26, 2018 in Shandong Province to support China's fuel cell electric vehicle market. Ballard holds a 49% ownership position and Weichai holds a 51% ownership position. In December 2018, Weichai made its initial capital contribution of RMB 102 million and Ballard made its initial capital contribution of $14.3 million (RMB 98 million equivalent). In February 2019, 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). In December 2019, Weichai made its planned third capital contribution of RMB 47.175 million and Ballard made its planned third capital contribution of $6.5 million (RMB 45.325 million equivalent). Weichai and Ballard will fund pro rata shares of the Weichai-Ballard JV based on an agreed business plan. Weichai holds three of five Weichai-Ballard JV board seats and Ballard holds two, with Ballard having certain minority shareholder protections.

The Weichai-Ballard JV is planning on manufacturing Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®-LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China. The Weichai-Ballard JV will pay Ballard $90 million under the Research and Development Agreement to develop and transfer technology to the Weichai-Ballard JV in order to enable these manufacturing activities. In December 2018, Ballard received an initial 10% or $9.0 million prepayment from the Weichai-Ballard JV for this program with additional amounts paid to us as development program milestones are successfully completed. The Weichai-Ballard JV will purchase MEAs for FCgen®-LCS fuel cell stacks exclusively from Ballard under a long-term supply agreement. Ballard will grant the Weichai-Ballard JV a non-exclusive royalty-free licence to Ballard's background technology incorporated into the products it develops for the Weichai-Ballard JV. Ballard will also retain an exclusive right to the transferred technologies outside of China.

Weichai intends to build and supply at least 2,000 fuel cell modules using Ballard or Weichai-Ballard JV 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 agreement between the parties and the Weichai-Ballard JV.

Transaction to Divest Power Manager Business

On October 5, 2018, we announced that we had closed an asset purchase agreement to divest certain assets related to the Power Manager business of Ballard Unmanned Systems to Revision Military, a private U.S.-based company. Ballard retained certain assets related to fuel cell propulsion systems for unmanned vehicles.

Terms of the transaction included upfront consideration of $4.1 million to Ballard – payable in cash and note – and up to a further $11.25 million, based on achievement of specific sales objectives during a 12-month earn-out period. As Revision Military failed to meet the minimum specific sales objectives during the earn-out period, no additional proceeds were payable to Ballard.

Ballard Acquires Fuel Cell Assets from AFCC Automotive Fuel Cell Cooperation Corporation ("AFCC")

On July 3, 2018, we announced that we had acquired certain strategic assets of AFCC, a private company owned by Daimler AG and Ford Motor Company for approximately C$6 million. The acquired assets included certain testing equipment, prototype production equipment and lab and quality inspection equipment.

Ballard and Audi AG Sign 3.5-Year Extension to Long-Term Program for Fuel Cell Passenger Cars

On June 11, 2018, we announced that we had signed a 3.5-year extension to our current Technology Solutions contract with Audi AG ("**Audi**"), part of the Volkswagen Group, extending the HyMotion program to August 2022. The aggregate value of the contract extension is expected to be C$80 to 130 million (approximately US$62 to $100 million), subject to certain rights by Audi to reduce the program scope and value. The program will support Audi through its small series production launch.

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. The agreement signed June 11, 2018 replaces the prior technology development agreements, except for certain key surviving provisions of the prior agreements.

Ballard Receives Purchase Order for 40 Fuel Cell Modules to Power Van Hool Buses in Germany

On April 30, 2018, we announced we had received a purchase order from Van Hool NV ("**Van Hool**"), a bus OEM partner in Belgium, for 40 FCveloCity®-HD fuel cell modules to power buses under the Joint Initiative for hydrogen Vehicles across Europe (JIVE) funding programs.

Development Program for Next-Gen Air-Cooled Fuel Cell Stack for Forklift Trucks

On February 14, 2018, we announced that we had signed 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 expected 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.

Ballard Unmanned Systems Cost Reductions

On January 3, 2018, we announced further cost reductions in the solid oxide fuel cell ("**SOFC**") business at Ballard Unmanned Systems. In 2017 we determined that Ballard Unmanned Systems' small-scale SOFC stationary power products assets were not core to our PEM fuel cell business, and we decided to divest these non-core assets. As a result, certain SOFC assets were transferred to a private, start-up company, Upstart Power Inc., effective December 31, 2017, for nominal consideration.

Multi-Year Development Agreement with Siemens AG

On November 14, 2017, we announced we had entered into a Development Agreement with Siemens AG for the development of a zero-emission fuel cell engine to power Siemens' Mireo light rail train. The Development Agreement has an expected value of $9.0 million over three years. Under the terms of the Development Agreement, we will develop a 200 kilowatt fuel cell engine for integration into Siemens' new Mireo train platform. Initial sales activities for the fuel cell-powered Mireo train are planned for 2021.

Supply Agreements with Broad-Ocean

On April 6, 2017, we announced the entering into of an $11 million supply contract with strategic partner Broad-Ocean for the supply and delivery of 200 FCveloCity® fuel cell engines expected to be used in demonstrations of clean energy buses and commercial vehicles in key Chinese cities. The engines were manufactured and supplied by Ballard from its operations in British Columbia. The 200 fuel cell engines were shipped to Broad-Ocean in 2017.

On June 5, 2017, we announced that an $18 million supply contract with Broad-Ocean to support the expected deployment of an additional 400 FCveloCity® fuel cell engines integrated into clean energy buses and trucks in key Chinese cities. The 400 fuel cell engines were shipped to Broad-Ocean in 2017. All 600 fuel cell engines and related components were delivered by Ballard in 2017.

Licensing and Local Assembly Transaction with Broad-Ocean

On February 16, 2017, we announced that we had signed a definitive agreement 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 agreement, Broad-Ocean can manufacture fuel cell modules in three strategic regions in China, including Shanghai. The definitive agreement and future amounts payable to Ballard are dependent on the attainment of certain commissioning milestones by Broad-Ocean.

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

Strategic Collaboration and Equity Investment Transaction with Broad-Ocean

On July 26, 2016, Broad-Ocean and Ballard entered into a strategic collaboration that included a $28.3 million equity investment in Ballard. On August 18, 2016, the investment by Broad-Ocean was completed through a subscription and purchase of 17,250,000 common shares of Ballard issued from treasury at a price per share of $1.64, and representing approximately 9.9% of Ballard's then-outstanding common shares. 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, to maintain its 9.9% ownership position in Ballard.

In connection with the completion of the investment, Broad-Ocean and Ballard also entered into an Investor Rights Agreement under which Broad-Ocean: agreed to a two-year hold period on the common shares purchased, which has since expired; provided Ballard with a right of first refusal to sell Broad-Ocean additional treasury shares if Broad-Ocean wishes to increase its ownership position up to 20%; was granted anti-dilution rights to maintain its 9.9% ownership interest; and agreed to a two-year "standstill" under which it will not purchase more than 19.9% of Ballard's outstanding common shares without receiving approval of Ballard's board of directors.

As part of the purchase by Broad-Ocean of additional common shares of Ballard in connection with the investment by Weichai discussed above, Broad-Ocean and Ballard amended the existing investor rights agreement to extend each of Broad-Ocean's covenants referred to in the paragraph above, except the two-year hold period applies only to the shares purchased in connection with the Weichai transaction in 2018.

Local Production of Fuel Cell Stacks in China

In 2017, the Synergy-Ballard JV, our joint venture for the production of FCveloCity®-9SSL fuel cell stacks in the City of Yunfu in Guangdong Province, commenced operations.

Pursuant to the Equity Joint Venture Agreement for the Synergy-Ballard JV, Ballard contributed RMB 6.7 million (approximately $1.0 million) for its non-controlling 10% joint venture interest, appointed one of the three members of the Synergy-Ballard JV board of directors, has veto rights over certain key Synergy-Ballard JV decisions, must agree with Nation-Synergy on the Synergy-Ballard JV marketing strategy, and has no obligation to provide additional funding to the Synergy-Ballard JV.

The Synergy-Ballard JV has the exclusive right to manufacture and sell FCveloCity®-9SSL fuel cell stacks in China. The fuel cell stacks will be packaged into locally-assembled fuel cell engines and integrated into zero-emission buses and commercial vehicles in China.

Exclusivity is subject to certain performance criteria of the Synergy-Ballard JV, including compliance with a code of ethics, compliance with Ballard's quality policies, compliance with Ballard's branding policies, achievement of the minimum annual "take or pay" MEA volumes, compliance with payment terms, and compliance with certain intellectual property covenants. Ballard has the exclusive right to purchase fuel cell stacks and sub-components from the Synergy-Ballard JV for sale outside China.

Ballard received approximately $18.4 million in Technology Solutions revenue for technology transfer services, test equipment, production equipment specification and procurement services, training and commissioning support in relation to the establishment of an FCveloCity®-9SSL fuel cell stack production line in Yunfu, with the majority of this revenue recognized in 2017.

Ballard is the exclusive supplier of MEAs for each fuel cell stack manufactured by the Synergy-Ballard JV. As a result of various Chinese market circumstances, including dynamic new energy vehicle subsidies, slower than anticipated build-out and operation of hydrogen refuelling infrastructure and slower than anticipated market adoption, as well as a result of inventory build-up, liquidity and other challenges at Synergy-Ballard JV, Synergy-Ballard JV 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. During 2018 we removed all remaining purchase commitments in the MEA supply agreement from the Order Backlog and 12-month Order Book.

During the third quarter of 2019, we signed definitive agreements with the Synergy Ballard JV amending the existing Stack Assembly License Agreement and MEA Long-Term Supply Agreement, which included a mutual release of the remaining purchase commitment under the "take or pay" MEA purchase commitment.

Sale of Methanol Telecom Backup Power Business

On May 17, 2016, we announced that we had entered into a definitive agreement to sell certain of our methanol Telecom Backup Power business assets to Chung-Hsin Electric & Machinery Manufacturing Corporation ("**CHEM**"), a major Taiwanese power equipment company, for a purchase price of up to $6.1 million.

The sale closed on May 31, 2016 and at the closing CHEM made an upfront payment of $3 million. The remaining potential purchase price of up to $3.1 million consisted of an earn-out arising from sales of methanol Telecom Backup Power systems by CHEM during the 18-month period to November 2017 derived from the sales pipeline transferred to CHEM on closing. During 2017, we collected approximately $1.0 million on this potential earn-out and impaired the residual value.

In addition to the purchase price, CHEM purchased $2 million of fuel cell stacks exclusively from us during the earnout period.

OUR BUSINESS

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

Our principal business is the design, development, manufacture, sale and service of PEM fuel cell products for a variety of applications, focusing on our power product markets of Heavy-Duty Motive (consisting of bus, truck, rail and marine applications), Portable Power / UAV, Material Handling, and Backup Power, as well as the delivery of Technology Solutions,

including engineering services, technology transfer, and the license and sale of our extensive intellectual property portfolio and fundamental knowledge for a variety of PEM fuel cell applications.

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

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

Strategy

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

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

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

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

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

- continued urbanization of China's population;
- continued infrastructure development and build-out of mass urban transportation;
- the large size 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 the new-energy bus and commercial vehicle markets in China. We believe this strategy aligns with current and expected local content requirements for government subsidies supporting the adoption of fuel cell electric vehicles (FCEVs). Key elements of our strategy include adopting a business model in which we seek to mitigate market adoption risk and capital investment by engaging partnerships with local companies that are well positioned in their respective market.

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

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

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

Revenues from Market Segments

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

license and sale of our extensive intellectual property portfolio and fundamental knowledge for a variety of fuel cell applications.

As a result of the sale of our Power Manager assets in the fourth quarter of 2018, we 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 the sale to Revision Military, and product and service revenues generated from the retained Ballard Unmanned Systems assets related primarily to fuel cell propulsion systems for unmanned systems.

The following chart shows the percentage of total revenues which arises from sales to investees and sales of products and services to other customers, for the years 2019 and 2018:

	2019	2018
Revenues from Fuel Cell Products and Services		
Percentage of total revenues	100%	100%
Portion representing sales to investees(1)	43.1%	19.5%
Portion representing sales to customers other than investees	56.9%	80.5%

(1) In this table, "investees" means Guangdong Synergy Ballard Hydrogen Power Co., Ltd., a joint venture formed in China of which we hold a 10% equity interest and Weichai Ballard Hy-Energy Technologies Co., Ltd., a joint venture formed in China, of which we hold a 49% equity interest.

Our Markets, Products and Services

Product & Service Overview

Ballard's product offering provides for a cost effective and flexible set of fuel cell power solutions. Ballard provides products in four distinct product classes:

(1) **MEAs**: We provide our proprietary MEAs to the Synergy-Ballard JV and the Weichai-Ballard JV that use the MEAs to produce our proprietary FCveloCity®-9SSL fuel cell stacks and FCgen®-LCS fuel cell stacks, respectively.

(2) **Fuel cell stacks**: We provide our proprietary FCgen® and FCveloCity® fuel cell stacks to OEM customers and system integrators that use the stacks to produce fuel cell systems for power solutions. As the fuel cell stack provider, we are the power inside the system.

(3) **Fuel cell modules**: We design and build, including specifying and procuring balance of plant components, self-contained FCveloCity® and FCMove™ motive modules using our fuel cell stacks that are plug-and-play into commercial vehicle powertrains. As a fuel cell module provider, we make it easier for OEMs and system integrators to create fuel cell powertrains.

(4) **Fuel cell systems**: We also build complete fuel cell systems for stationary power markets that are designed to solve certain energy needs of our customers, including back-up for critical infrastructure. Through Ballard Unmanned Systems, we build fuel cell systems for UAVs.

Through Ballard Unmanned Systems, we built power management devices for military customers that allowed them to optimize their energy use. The assets used to design, build and sell these products were divested in October 2018 as discussed above.

Our technology solutions offerings primarily involve the provision of engineering services and customer access through licensing to our intellectual property portfolio and know-how.

The following table lists the key fuel cell and non-fuel cell products we currently produce, offer for sale, have under development or are testing:

Motive Power Product Family:		
Product Name	**Application**	**Status**
FCgen®-LCS	Buses, commercial vehicles, light rail, and material handling	Latest generation of product offered – currently in final testing and validation
FCveloCity®-9SSL	Buses, commercial vehicles, light rail, and material handling	Sales to OEMs and system integrators
FCgen®-1020ACS	Material handling	Sales to OEMs and system integrators
FCveloCity® modules	Buses, commercial vehicles, and light rail	Sales to OEMs and system integrators
FCmove™ modules	Buses, commercial vehicles, and light rail	Latest generation of product offered - currently in final testing and validation

Stationary Power Product Family:		
Product Name	**Application**	**Status**
FCgen®-1020ACS	Backup power	Sales to OEMs and system integrators
FCgen®-H2PM	Backup power systems	Sales to customers
ClearGen®	Distributed Generation systems	Sales to customers

UAV Product Family:		
Product Name	**Application**	**Status**
FCair®-600 and FCair®-1200	UAV power system	Prototype testing

Fuel Cell Products and Services

Power Products Markets

Heavy-Duty Motive

We provide fuel cell modules for public transit systems, including buses and light rail, and for commercial trucks. For fuel cell electric vehicles that are used as fuel cell buses, fuel cell commercial trucks and light rail systems rely on centralized fueling depots that simplify the hydrogen infrastructure requirements and are typically government-subsidized, thus enabling the purchase of pre-commercial fleets.

We design and manufacture the FCveloCity® fuel cell module platform, which in various forms is capable of delivering 30 kW to 200 kW of power for use in the Heavy-Duty Motive market. We supply the fuel cell modules to hybrid drive, bus and light rail manufacturer customers that deliver zero-emission fuel cell-powered vehicles to transit operators around the world. The demand for zero-emission mass transit systems is driven in many jurisdictions by the requirement to reduce greenhouse gases and other harmful emissions that are impacting urban areas.

FCveloCity® power module platform cost reduction efforts were focused on unit cell design enhancements, including improved durability and lifetime. This effort was partially funded by a C$4.8 million award announced in January 2010 (revised to C$6.9 million in June 2012) from Sustainable Development Technology Canada ("**SDTC**"), and was successfully completed in 2014 to further develop fuel cell power module technology for the transit bus market. Product cost reductions continued with the launch in 2015 of our seventh generation motive module FCveloCity® platform, which reduced the total cost of the module by 25%. This platform is available in various configurations ranging in power from 30 kW to 200 kW to address different levels of battery/fuel cell hybridization and a variety of applications. The FCveloCity®-MD series is optimized for smaller buses (less than 12 meters in length), the FCveloCity®-HD module is the workhorse of the standard-size (12-18 meter) fuel cell bus industry, and the FCveloCity®-XD series is aimed at light rail.

In 2019 we unveiled our eighth generation high performance fuel cell module, the FCmove™-HD, at the UITP Global Public Transport Summit being held in Stockholm, Sweden.

The FCmove™ family or products is designed to power heavy-duty motive applications including buses, commercial trucks and trains.

To date, Ballard-powered fuel cell buses and trucks have accumulated more than 30 million kilometres in service, with several fuel cell buses having operated more than the 30,000 hours.

Competition

Diesel-powered buses and commercial trucks currently dominate the market today. Compressed natural gas ("**CNG**") and diesel electric hybrid powertrains are lower-emission alternatives to diesel engines, but are in limited service today. Other variants available today include gasoline hybrid buses and CNG hybrid buses. Electric trolley buses provide a zero-emission alternative; however, their purchase price is high and the overhead catenary power infrastructure is expensive to maintain and is considered aesthetically undesirable in many urban centres. The recent developments in battery-powered powertrain vehicles have created a zero emission alternative to fuel cell buses in the form of battery electric buses and commercial trucks. These battery-powered heavy-duty vehicles will continue to offer a viable zero emission bus for applications where long range and extended operating hours between recharges are not a requirement.

We believe that fuel cell electric vehicles are the best zero-emission alternative for medium-duty and heavy-duty applications in certain use cases in bus, truck, train and marine. In comparison to battery electric vehicles, we believe fuel cell electric vehicles in medium-duty and heavy-duty applications: are able to operate over a longer range and on more demanding routes; offer higher energy density to maximize payload; are capable of refueling quickly, ensuring the vehicle is on the road generating revenue for the fleet operator; and offer high energy efficiency.

Companies developing fuel cell systems for heavy-duty applications include Beijing Sinohytec Co. Ltd., Horizon Fuel Cell Technologies Pte. Ltd., Hydrogenics Corporation ("**Hydrogenics**"), who was acquired by Cummins Inc. in 2019, Hyundai Motor Company, Plug Power, Inc., Powercell Sweden AB, Robert Bosch GmbH, Shanghai Re-Fire Technology Co., Ltd., Symbio SAS, and Toyota Motor Corporation.

We believe that we are well positioned to compete with our competitors based on our talented workforce, intellectual property portfolio, technology, number of products, vertical integration, customers, brand, and extensive operating hours in real world heavy-duty operations.

Portable Power / UAV

On October 5, 2018 we completed the sale of assets related to the Power Manager business of Ballard Unmanned Systems. On December 31, 2017 we divested our non-core SOFC business at Ballard Unmanned Systems. Details of the SOFC and Power Manager transactions are discussed above in the Recent History Section.

Ballard Unmanned Systems has a decade of experience developing fuel cell based power systems for UAVs for the defense industry. Ballard Unmanned Systems has integrated its fuel cells onto UAV platforms from leading platform providers including Insitu (a Boeing company), Lockheed-Martin, Aerovironment, and others. As UAV technology has transitioned from

defense to commercial use, Ballard has developed commercial variants of 600 watt and 1,200 watt UAV fuel cell systems.

In UAV markets, flight duration (and hence range) is a critical limiting factor for many applications. Airspace regulators across the globe are actively developing rules to allow operation of UAVs in beyond visual line of sight (BVLOS) missions. If BVLOS rules come into force, UAV operators will be able to address applications that require long distances and range limitations due to battery capacity and weight will become more critical. Many integrators and operators are considering the use of fuel cell powered UAVs as an alternative to battery propulsion due to the ability of fuel cells to offer significantly longer range.

Competition

Several other companies have developed fuel cell systems for UAVs, including Doosan, EnergyOR (acquired by Plug Power in 2019), Intelligent Energy, and MicroMultiCopter Aero Technology Co., Ltd. (MMC). We believe that Ballard fuel cell systems are the most reliable and proven systems on the market, due to their long history in the defense UAV sector. At this point, with commercial fuel cell UAV power in its infancy, no provider has established a clear leadership position. However, we believe Ballard's experience in the defense UAV market, as well as robust technology and field experience give us an enviable head-start on establishing this industry leadership.

Non-fuel-cell competition includes traditional lithium-polymer battery systems and internal combustion engines. Batteries have been consistently identified as the most significant limitation in commercial UAV operations, and there is general acceptance in the industry that battery technology will not develop fast enough to meet present flight duration requirements. Internal combustion engines can provide mission durations comparable with fuel cells, but the audible noise and continued cost of ownership associated with internal combustion engines makes them a less desirable solution.

Material Handling

The material handling market includes industrial vehicles such as forklifts, automated guided vehicles and ground support equipment. Our initial focus is on battery-powered Class 1 counterbalance lift trucks, Class 2 reach trucks and Class 3 pallet forklifts. Our products for the material handling market are the FCveloCity®-9SSL stack, which is applicable to Class 1, Class 2 and Class 3 forklift truck solutions, the FCveloCity®-1020ACS stack for Class 3 material handling applications, and the FCgen®-LCS stack which is expected to be applicable to Class 1, Class 2 and Class 3 forklift truck solutions.

Our main customer in North America is Plug Power, a specialized system integrator achieving market penetration deploying its GenDrive™ battery pack replacement fuel cell systems. Ballard's current fuel cell stack supply agreement with Plug Power continues through 2020 with the potential for two 1-year extensions.

Competition

Class 2 and Class 3 forklift trucks are currently dominated by battery-powered solutions, as are Class 1 forklift trucks intended for indoor applications. Internal combustion engine power is typically seen as the solution for forklift trucks in Class 1 for outdoor applications. Compared

to batteries, fuel cell systems in Class 1, Class 2 and Class 3 forklift trucks can provide extended run time without frequent and lengthy battery replacement and recharging cycles. For high-throughput, multi-shift warehouse or manufacturing operations, fuel cell powered forklift trucks can provide a lower life-cycle cost when compared with battery solutions.

Plug Power is the only company currently offering a full suite of Class 1, 2 and 3 forklift solutions to the material handling market. We currently sell and supply fuel cell stacks to Plug Power. Plug Power has developed its own air-cooled and liquid-cooled fuel cell stacks to vertically integrate into their material handling solutions. Plug Power's own fuel cell stacks compete with our fuel cell stacks for supply in Plug Power's business. Ballard is also engaged with other companies to increase potential sales beyond Plug Power for the forklift market.

Other companies developing fuel cell systems for material handling applications include Nuvera, which was acquired by Hyster-Yale in 2014.

Advanced battery technology continues to make progress in the material handling market. However, the high up-front cost of advanced batteries continues to be a barrier to broad market adoption. Furthermore, advanced battery technologies still requires significant time for recharging and, in many cases, cannot meet desired run times without requiring spare batteries and substantial space for battery charging and storage.

Backup Power

The backup power market includes stationary applications for telecommunications equipment and other critical infrastructure. In May 2016, we sold our methanol ElectraGen®-ME assets to CHEM.

We continue to supply the backup power market through the sale of our hydrogen backup power product, the FCgen®-H2PM. The FCgen®-H2PM is manufactured by Ballard Europe.

We continue to provide fuel cell systems to back-up critical communication infrastructure with a focus on fibre optics network backbones, critical hub sites and emergency communication networks (police, fire, ambulance and other emergency response services) in Europe with our FCgen®-H2PM product. Several Scandinavian countries have passed regulations to impose extended backup time (more than 12 hours) for critical infrastructure. Fuel cell technology provides an alternative power solution to ensure site power availability during unexpected and extended power outages to harden critical telecommunication networks.

The FCgen®-H2PM fuel cell system has been designed to integrate easily with existing power equipment and can be installed at low cost in many environments including dense urban areas and rooftop sites. Using the FCgen®-H2PM backup power solution allows operators to harden their network while reducing operating costs.

Competition

The backup power market is currently dominated by diesel generators and batteries. Advanced battery technology continues to make modest progress in the backup power generation market. However, advanced battery technologies still require lengthy recharging and, in many cases, cannot meet desired run times without requiring substantial space. We believe that PEM fuel cell products are superior to batteries in some applications, because of their ability to provide extended run time without frequent or lengthy recharging, as well as their ability to offer

lower life cycle costs, given that batteries require periodic replacement. For certain applications and markets we believe fuel cell backup power offers a value proposition against diesel generators with lower operating cost, low emission and noise, and less risk of theft.

Companies developing PEM fuel cell systems for backup power applications include Altergy, CHEM, Hydrogenics, Plug Power and Serenergy. We seek to gain competitive advantage through fuel cell designs that provide superior performance, efficiency, durability and cost.

Technology Solutions

This business platform was established in 2011 to leverage our expertise in fuel cell design, prototyping, manufacturing and servicing. The mandate of the Technology Solutions business platform is to help customers solve difficult technical and business challenges in their PEM fuel cell programs or address new business opportunities. We offer customized, bundled technology solutions, including specialized PEM fuel cell engineering services, access to our intellectual property portfolio and know-how, as well as the supply of technology components.

Our current Technology Solutions efforts are predominantly in support of automotive and heavy-duty motive research and product development programs. In 2019 we also executed on programs in rail, marine, stationary, material handling and unmanned vehicles applications.

As noted in the Recent History section above, in 2018 we signed a 3.5-year extension to its current Technology Solutions contract with Audi, part of the Volkswagen Group, extending the development program to August 2022.

In 2019, we continue to execute on the development of a 200 kilowatt fuel cell engine zero-emission fuel cell engine to power Siemens' Mireo light rail train pursuant to the Development Agreement entered into with Siemens in 2017.

In 2019, Ballard also executed the first year of the Research and Development Agreement to develop and transfer technology to the Weichai-Ballard JV in order to enable manufacturing of Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®-LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China.

Competition

Our main competition in the automotive sector for engineering services is the automakers' 'in-house' capabilities or specialized automotive engineering companies like AVL. Fuel cell development companies, like FEV Group GmbH, Hydrogenics, Powercell Sweden AB and Ricardo offer competing fuel cell development programs.

Impact of Regulations and Public Policy

In the course of carrying on our business we believe we have become aware of government regulation and public policies that may be supportive of our business, the fuel cell industry in general or zero-emission vehicles. The statements below in this section are based on our understanding of the regulations and public policies in place in the particular jurisdiction as of the date of this Annual Information Form that we believe to be correct. While we believe the statements below in this section to be correct, regulation and public policy may change without notice and our understanding regulations and public policies may be incorrect.

Public funding for hydrogen and fuel cells in China, Japan, Germany, the rest of Europe, South Korea and the United States each exceeds $100 million per year, with the worldwide total exceeding $1 billion per year. This funding has, and is expected to continue to, help drive demand for fuel cell products.

The U.S. Federal Transit Agency manages the competitive Low or No Emission Vehicle Program which provides funding to state and local governmental authorities for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities. For the Fiscal Year 2020, there is $130 million funding available from the FTA for the Low or No Emission Vehicle Program (Low-No Program).

The California Air and Resource Board ("**CARB**") Low Carbon Transportation and AQIP programs provide mobile source incentives to reduce greenhouse gas (GHG) emissions, criteria pollutants, and air toxics through the development of advanced technology and clean transportation. Low Carbon Transportation investments are supported by California Cap-and-Trade auction proceeds projects. AQIP, established by the California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 is a voluntary incentive program administered by CARB to fund clean vehicle and equipment projects, research of biofuels production. Each year, the legislature appropriates funding to CARB for low carbon transportation and the air quality impacts of alternative fuels, and workforce training. On August 31, 2016, the California Legislature appropriated $363 million to CARB for Low Carbon Transportation projects and provided direction on how these funds will be used. Among the funded projects in 2016 were the Zero-Emission Truck and Bus Pilot Commercial Deployment Project which will fund the deployment of 25 fuel cell electric buses in California. On September 15, 2017, the California legislature passed AB 134, which gives significant funding to zero emission buses in fiscal years 2017-18. The package provides $895 million to vehicles in total, with $560 million for ARB's Low Carbon Transportation Program, and $180 million to the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project ("**HVIP**"), including a $300,000 voucher for fuel cell electric buses. The proposed project allocations for the HVIP fiscal year 2018-19 funding plan includes $208.6 million dedicated to heavy-duty vehicles with $125 million for clean truck and bus vouchers. In October 2019, CARB approved $533 million funding plan for clean transportation investments. Of the $533 million total, $485 million comes from the cap-and-trade program; the remainder – $48 million – is from the Air Quality Improvement Program. CARB uses this funding to accelerate development and early commercial deployment of the cleanest vehicle technologies.

In Europe, the Fuel Cells and Hydrogen Joint Undertaking ('**FCH JU"**) – a partnership of the European Commission with industry and the research community under the framework of the Fuel Cells and Hydrogen Joint Technology Initiative – supports research, technological development and demonstration (RTD) activities in fuel cell and hydrogen energy technologies in Europe. The FCH JU's aim is to accelerate the market introduction of these technologies. In May 2014, the Council of the European Union formally agreed to continue the Fuel Cells and Hydrogen Joint Technology Initiative under the EU Horizon 2020 Framework Program. The current phase (2014 – 2020), will have a total budget of €1.33 billion, provided on a matched basis. Calls for proposals under Horizon 2020 have occurred for 2014, 2015, 2016, 2017, 2018 and 2019 with 2020 calls for proposals open through April 2020. FCH-JU had a budget of €80.8m for the 2019 call and €93m for the 2020 call. On February 26, 2017 the Joint Initiative

for hydrogen Vehicles across Europe – commonly known as the JIVE project – was officially launched. This collaborative initiative is set to deploy 139 fuel cell electric buses across Europe. A phase 2 program with the deployment of 152 additional buses was approved as part of the 2017 call.

In 2018 the European Union Connecting Europe Facility program ("**CEF**") awarded €40 million for the deployment of a large scale fleet of fuel cell buses and supporting infrastructure in selected region in Europe. The H2Bus Europe project consortium including Ballard, Everfuel, NEL, Hexagon and Wrightbus was announced in June 2019 with the goal of deploying 600 buses across the United Kingdom, Denmark and Latvia partially funded by the CEF program.

In China, the Ministry of Finance proposed in April 2015 and confirmed in January 2017, extended subsidies for new energy vehicles (low emission vehicles) to 2020, with subsidies for battery electric vehicles being reduced by 20 percent by 2018 and by 40 percent by 2020. The new energy vehicle subsidy policy does not currently provide for subsidy reductions for fuel cell vehicles. Subsidies will be granted to buyers of pure electric, highly electrified plug-in hybrid and fuel-cell vehicles, including both cars and buses. An update on national new energy vehicle policies and associated incentives for fuel cell vehicles is expected in 2020.

In Japan, incentives focus on fuel cell systems for residential co-generation systems and transportation. The current government subsidy for the purchase of a hydrogen fuel cell car is approximately $20,000. In 2015, the Japanese government announced that it plans to spend 45.2 billion yen (more than $350 million) on fuel-cell vehicle subsidies and hydrogen stations for the 2020 Olympics as part of a plan to reduce Japan‘s reliance on nuclear power. Hydrogen-related policy materials, namely, the Basic Hydrogen Strategy (December 2017), the Fifth Strategic Energy Plan (July 2018), and the Tokyo Statement (October 2018) were formulated and released. In order to ensure the achievement of the goals set forth in the Basic Hydrogen Strategy and the Fifth Strategic Energy Plan toward the realization of a hydrogen-based society, on March 12, 2019, the Council for a Strategy for Hydrogen and Fuel Cells renewed the existing Strategic Roadmap for Hydrogen and Fuel Cells. The renewed roadmap defines: (i) new targets on the specification of basic technologies and the breakdown of costs; (ii) necessary measures for achieving these goals; and (iii) that Japan will convene a working group consisting of experts to review the status of implementation in each area stipulated by the roadmap. Those targets include the deployment of 200,000 fuel cell cars by 2025 and 800,000 by 2030 along with 1,200 fuel cell buses by 2030.

In Canada, SDTC operates the SD Tech Fund which supports the late-stage development and pre-commercial demonstration of clean technology solutions. These solutions being products and processes that contribute to clean air, clean water and clean land, that address climate change and improve the productivity and the global competitiveness of the Canadian industry.

The Strategic Innovation Fund announced in July 2017 by Innovation, Science and Economic Development Canada, allocates repayable and non-repayable contributions to firms of all sizes across all of Canada's industrial and technology sectors. The program has a budget of $1.26 billion over five years. It consolidates and simplifies the Strategic Aerospace and Defence Initiative, Technology Demonstration Program, Automotive Innovation Fund and Automotive

Supplier Innovation Program. In July 2018, the Government of Canada made available up to $250 million in new support through SIF.

In May 2019 in Vancouver, Canada, at the 10th Clean Energy Ministerial ("**CEM10"**) meeting, a new international hydrogen partnership will be announced under the leadership of Canada, the United States, Japan, the Netherlands and the European Commission with participation of several other CEM member countries. The International Energy Agency ("**IEA"**) will be coordinating efforts under this initiative.

Research and Product Development

Ballard's research activities are primarily focused on the MEA and its sub-components, aimed at improving the overall cost, durability, and reliability of our products. Material development for other unit cell components, such as bipolar plates, frames, seals and adhesives, are areas of research focus. Product development activities have been primarily directed at module development and cost reduction. Progress is driven by leveraging stack component designs, materials, and manufacturing processes across multiple product platforms. In addition, warranty cost reduction is enabled through improved durability and reliability growth.

Intellectual Property

Ballard's technical strengths lay in our proprietary MEA design, combined with our extensive stack and system integration capabilities, which enables development of complete end-user systems that meet or exceed customer specifications, across a wide range of market applications.

Our intellectual property covers multiple aspects of our technology, including: materials and components; cell, stack and systems architecture; stack/system operation and control; and manufacturing processes. Our intellectual property portfolio is not limited to our patents and patent applications; it also includes know-how and trade secrets developed over more than 30 years of research, product development and production.

As of March 5, 2020, Ballard owns or controls through IP Holdings: 43 United States granted patents; 100 non-United States granted patents; 10 United States published patent applications; and 42 published non-United States patent applications. Our patents will expire between March 2020 and July 2038.

Ballard Unmanned Systems' intellectual property comprises approximately 23 United States granted patents, 23 non-US granted patents, no United States published patent applications and 1 published non-United States patent application.

We hold licence rights to additional intellectual property from a number of third parties. We have a royalty-free license to approximately 950 issued patents and pending patent applications from Audi for bus and non-automotive applications as well as for certain limited pre-commercial purposes in automotive applications. In addition, these licences include non-exclusive, royalty-free access to all of the intellectual property rights held by NuCellSys GmbH, a Daimler subsidiary, and to all of the intellectual property rights relating to fuel cells developed by Daimler, Ford and their subsidiaries (either directly or through AFCC), including any intellectual property rights developed by them to January 31, 2013. As of March 5, 2020, of the

approximately 2,000 patents and patent applications that were included in these licenses, approximately 180 of them are currently granted or pending.

Manufacturing

Our PEM fuel cell products and clean energy solutions are produced in six facilities – three in Burnaby, British Columbia, one in Bend, Oregon, one in Southborough, Massachusetts, and one in Hobro, Denmark. Along with these facilities, the Synergy-Ballard JV, of which Ballard is a 10% owner, operates an FCveloCity®-9SSL fuel cell stack assembly line in Yunfu, China. The Burnaby facilities are focused on our core fuel cell competencies, which include the production of MEAs, integration and testing of fuel cell stacks, assembly and testing of motive modules, as well as support of other products required through our engineering services contracts. The Weichai-Ballard JV is planning to manufacture Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®-LCS-based power modules for bus, commercial truck and forklift applications.

We continue to make investments in our manufacturing process, equipment and capabilities and processes which are targeted at supporting higher volume production and automated processing to support future growth. Ballard Unmanned Systems develops, tests, and manufactures its UAV products in Southborough, Massachusetts. Ballard Europe develops, tests, and manufactures backup power systems in Hobro, Denmark.

Certain of the materials and components used in the production of MEAs, fuel cell stacks, and balance of plant are proprietary in nature and have been developed in joint collaboration between Ballard and our key supply base. Strategic supply agreements have been executed with these suppliers to ensure security of supply, protection of our intellectual property, and adherence to our strict quality and reliability standards.

Safety

Our products are designed and manufactured with the safety of our employees, customers, and end-users in mind. All equipment and processes that are introduced into our working environment are evaluated using a rigorous Preliminary Hazard Assessment procedure to ensure they are safe to use.

In 2019 we continued to work diligently to continue to strengthen the culture of safety across our entire global footprint. We have enhanced the robustness of our safety protocols in the areas of Joint Health and Safety Committees, Management Leadership and Commitment, Hazard Identification and Control, Industry-Specific Programs, Workplace Inspections, Accident Investigations, and Health and Safety Administration and as a result passed a recertification audit for the Occupational Safety Standard of Excellence in 2019.

Quality

Quality is an integral part of the Ballard culture. We will measure our success through the satisfaction of our customers.

Our processes and systems are focused on ensuring that every product that is shipped to our customers conforms to their expectations and contractual requirements while being produced in a safe and environmentally conscious manner. We adhere to our Quality Policy Statement, which reads, "At Ballard, Quality is intrinsic to our identity. Our team is empowered to do

things right – the first time – to satisfy customer needs and deliver on our promise." We will accomplish this by:

- Satisfying the requirements and addressing the Quality concerns of all stakeholders in pursuit of our strategic objectives;
- Providing the necessary resources to ensure our employees are able to fulfill their responsibilities;
- Establishing & communicating effective Quality metrics and targets;
- Monitoring the performance of our products and processes to discover improvement opportunities; and
- Continually improving our Quality Management System.

We are certified to automotive standard IATF16949 while maintaining ISO9001:2015 in our Burnaby facilities. In addition, we passed supplier audits conducted by Audi, Siemens and Mercedes-Benz as well. Conformance to these quality systems is ensured through our Integrated Management System. We also strive for continuous improvements in our manufacturing processes through such practices as Lean Manufacturing, 5-S and Six Sigma. The Synergy-Ballard JV in Yunfu, China carries the IATF16949 and ISO9001:2015 certifications.

Facilities

We, or our wholly-owned subsidiaries, currently have the following principal facilities: (a) a leased 116,797 ft² (10,850 m²) facility in Burnaby, British Columbia that houses our corporate headquarters and our fuel cell development, manufacturing, assembly and testing activities; (b) a leased 112,000 ft² (10,405 m²) facility in Burnaby that houses some of our manufacturing facilities, as well as manufacturing facilities of Mercedes-Benz Canada Inc. through a sublease; (c) a leased 4,100 ft² (381 m²) facility in Hobro, Denmark; and (d) a subleased 1,150 ft² (107 m²) facility in Southborough, Massachusetts that houses all of Ballard Unmanned Systems' operations. The Synergy-Ballard JV's operations in Yunfu, China occupies approximately 40,000 ft² (3,700 m²) of a purpose built 120,000 ft² (11,000 m²) facility dedicated to fuel cell stack and module assembly. The Weichai-Ballard JV's operations in Weifang, China are conducted in an approximately 150,000 ft² (14,000 m²) facility.

As per our Quality Statement, we are committed to ensuring that each of these facilities is operated in full compliance with all applicable laws, as well as all health, safety, and regulatory standards.

Sustainability

In 2019, we launched our "Mission Carbon Zero" initiative; a multi-year approach to evaluate and reduce the environmental impact of our organization and our products. Through this project we are working towards our goal of being carbon neutral by 2030.

Our multi-year, cross-functional our "Mission Carbon Zero" initiative includes:

- A corporate emissions inventory (to evaluate and track our annual carbon footprint) for Ballard facilities in Canada and Europe.

- A lifecycle inventory of our fuel cell stacks and heavy duty power modules (to measure carbon footprint from cradle to gate).
- Informing our customers about our product LCA (Life-Cycle Assessment).
- Defining long term strategies and actions to reduce and offset our emission to reach carbon neutrality.
- Reporting on progress towards our emission reduction targets.

Human Resources

As of December 31, 2019, we had 610 employees in Canada, 18 in the United States, 60 in the European Union, and 15 in China, representing such diverse disciplines as electrochemistry, polymer chemistry, chemical, mechanical, electronic and electrical engineering, manufacturing, marketing, sales, business development, legal, finance, human resources, information technology and business management. Our employees in Canada and the United States are not represented by any labour union. Each employee must agree to confidentiality provisions as part of the terms of his or her employment, and certain employees have also executed non-competition agreements with us.

SHARE CAPITAL AND MARKET FOR SECURITIES

Our authorized share capital consists of an unlimited number of common shares and an unlimited number of preferred shares. As of March 5, 2020, our issued share capital consisted of 234,645,476 common shares. Our common shares are listed and trade on the Toronto Stock Exchange ("**TSX**") and on the National Association of Securities Dealers Automated Quotation Global Market ("**NASDAQ**") and trade under the symbol "BLDP" on both exchanges. Prior to January 1, 2017 our common shares traded on the TSX under the symbol "BLD".

The following table shows the monthly trading activity for our common shares on the TSX and NASDAQ during 2019:

	TSX		NASDAQ	
	Price Range (C$)	**Average Daily Volume (#)**	**Price Range (US$)**	**Average Daily Volume (#)**
January	$3.68 - 4.58	188,786	$2.71 - 3.54	630,808
February	$4.23 - 4.93	126,184	$3.19 - 3.75	537,212
March	$3.96 - 4.75	167,581	$2.97 - 3.59	693,686
April	$4.04 - 4.66	135,552	$3.04 - 3.51	696,470
May	$4.38 - 5.75	293,664	$3.29 - 4.27	1,221,244
June	$4.62 - 5.55	193,200	$3.50 - 4.17	837,639
July	$5.20 - 5.58	141,891	$3.99 - 4.24	847,650
August	$5.49 - 6.19	259,657	$4.15 - 4.68	930,315
September	$5.96 - 7.45	781,220	$4.48 - 5.64	1,673,091
October	$6.34 - 7.95	390,327	$4.78 - 6.10	1,335,859
November	$7.38 - 9.57	486,510	$5.64 - 7.26	1,843,619
December	$7.98 - 9.28	330,715	$6.07 - 7.18	1,231,607

The holders of our common shares are entitled to one vote for each share held on all matters to be voted on by such shareholders and, subject to the rights and priorities of the holders of preferred shares, are entitled to receive such dividends as may be declared by our Board out of funds legally available therefor and, in the event of liquidation, wind-up or dissolution, to receive our remaining property, after the satisfaction of all outstanding liabilities.

Our preferred shares are issuable in series and our Board is entitled to determine the designation, preferences, rights, conditions, restrictions, limitations and prohibitions to be attached to each series of such shares. Currently there are no preferred shares outstanding.

DIVIDEND RECORD AND POLICY

To date, we have not paid any dividends on our shares and, because it is anticipated that all available cash will be needed to implement our business plans, we have no plans to pay dividends in the immediate future.

ESCROWED SECURITIES AND SECURITIES SUBJECT TO CONTRACTUAL RESTRICTIONS ON TRANSFER

The following tables sets out the number of common shares in escrow or subject to contractual restrictions on transfer and the percentage that number represents of the outstanding securities of that class.

Designation of Class	Number of Securities Held in Escrow or that are Subject to a Contractual Restriction on Transfer	Percentage of Class
Common	51,831,659	22.35%

Pursuant to the investor rights agreement dated November 13, 2018 between Ballard and Weichai HK with respect to the 46,131,712 common shares of Ballard purchased that date and the investor rights agreement amendment dated November 13, 2018 between Ballard and Broad-Ocean Motor (Hong Kong) Co. Limited ("**Broad-Ocean HK**") with respect to the 5,699,947 common shares of Ballard purchased that date, neither Weichai HK nor Broad-Ocean HK may trade such shares of Ballard before November 13, 2020 unless:

(1) in connection with a sale, transfer or disposition pursuant to any plan of arrangement, re-organization, amalgamation, takeover bid, merger or other similar combination transaction where an offer to purchase or exchange or reorganize the voting shares has been made to all shareholders of Ballard by a third party or involves all the voting shares;

(2) in connection with a sale, transfer or disposition to an affiliate of the shareholder, provided that the shareholder causes such affiliate to whom such voting shares are transferred to expressly agree in writing to be bound by the terms of the particular Investor Rights Agreement, and provided further that such sale, transfer or disposition is made in accordance with applicable securities laws;

(3) if a proceeding is commenced against or involving Ballard under the *Bankruptcy and Insolvency Act* (Canada) or the *Companies' Creditors Arrangement Act* (Canada) or any similar legislation; or

(4) if Ballard has received notice from any securities regulatory authority that the voting shares will be permanently cease-traded within a specified period.

In 2016, Broad-Ocean HK purchased 17,250,000 common shares of Ballard issued from treasury. The shares acquired by Broad-Ocean HK in 2016 were subject to a two-year hold period which expired in 2018.

DIRECTORS AND OFFICERS

Board of Directors

The following chart provides the following information as of March 5, 2020: the name and province or state of residence of each of our directors; each director's respective positions and offices held with Ballard, their principal occupation during the past five years; the period of time each has served as a director; and the number of shares and deferred share units (the "**DSUs**") beneficially owned or controlled by each of them.

Name, Province/State and Country of Residence[1]	Principal Occupation[1]	Director Since	Shares Beneficially Owned or Controlled or Directed[1] (#/% of Class)	Deferred Share Units Owned or Controlled[2] (#/% of Class)
Douglas P. Hayhurst British Columbia, Canada	Corporate Director of Ballard. Previously, Mr. Hayhurst was an executive with IBM Canada Business Consulting Services (*consulting services*) and a partner with PricewaterhouseCoopers Management Consultants (*consulting services*) . Prior to that, Mr. Hayhurst held various senior executive management roles with Pricewaterhouse including National Deputy Managing Partner (Toronto) and Managing Partner for British Columbia (Vancouver).	2012	5,000 / 0.002%	206,817 / 25.49%

Name, Province/State and Country of Residence[1]	Principal Occupation[1]	Director Since	Shares Beneficially Owned or Controlled or Directed[1] (#/% of Class)	Deferred Share Units Owned or Controlled[2] (#/% of Class)
Jiang Kui (Kevin) Shandong, China	Mr. Jiang is President of Shandong Heavy Industry Group Co., Ltd. (*heavy machinery and automotive manufacturing*) . He is also a non-executive director of Weichai Power Co., Ltd, (*diesel engine, powertrain and hydraulic products manufacturing*), a director of the Power Solutions International Inc. (*cleantech engine and powertrain manufacturing*), and a director of Ferretti International Holdings S.p.A. (*engineering and construction*). Previously, Mr. Jiang was deputy general manager of Assembly Department of Shandong Bulldozer General Factory *(heavy machinery manufacturing*); deputy general manager of Shantui Construction Machinery Import and Export Company (*heavy machinery*); a director and senior officer of Shantui Engineering Machinery Co., Ltd. (*heavy machinery*); deputy general manager of Shandong Engineering Machinery Group Co., Ltd. (*heavy machinery*); executive deputy general manager and vice chairman of Weichai Group Holdings Limited, (*diesel engine, powertrain and hydraulic products manufacturing*); and chairman of Shanzhong Jianji Co., Ltd. (*heavy machinery*) . Mr. Jiang's principal business is acting as the General Manager of Shandong Heavy Industry Group Co., Ltd. (*heavy machinery and automotive manufacturing)).*	2019	0 / 0.00%	0 / 0.00%

Name, Province/State and Country of Residence[1]	Principal Occupation[1]	Director Since	Shares Beneficially Owned or Controlled or Directed[1] (#/% of Class)	Deferred Share Units Owned or Controlled[2] (#/% of Class)
Duy-Loan Le Texas, USA	Corporate Director of Ballard. Ms. Le is President of DLE Management Consulting LLC (*management consulting services*), a position she has held since 2016. Ms. Le is also a Director of Cree, Inc. (*LED lighting*). Previously, Ms. Le was a Senior Fellow at Texas Instruments Incorporated (*semiconductor design and manufacturing*) from 2002 to 2015; Program Manager and Fellow from 1998 to 2002; and Design Engineer and Manager from 1982 to 1998.	2017	50,000 / 0.021%	29,961 / 3.69%
R. Randall (Randy) MacEwen British Columbia, Canada	Mr. MacEwen has served as the President and Chief Executive Officer of Ballard since October 2014. Previously, Mr. MacEwen was the founder and Managing Partner at NextCleanTech LLC (*consulting services*) from 2010 to 2014.	2014	318,310 / 0.136%	148,046 / 18.25%
Marty T. Neese California, USA	Corporate Director of Ballard. Previously, he was Chief Operating Officer of Velodyne LiDAR, Inc. (*autonomous vehicles*) from February 2017 to October 2017. Prior to that, Mr. Neese was Chief Operating Officer of SunPower Corporation (*solar power equipment and services*) from 2008 to 2017; responsible for Global Operations at Flextronics (*electronics manufacturing services*) from 2007 to 2008 following its acquisition of Solectron Corporation (*electronics manufacturing services*) where he was Executive Vice President from 2004 to 2007.	2015	0 / 0.00%	65,637 / 8.09%

Name, Province/State and Country of Residence[1]	Principal Occupation[1]	Director Since	Shares Beneficially Owned or Controlled or Directed[1] (#/% of Class)	Deferred Share Units Owned or Controlled[2] (#/% of Class)
James Roche Ontario, Canada	Non-executive Chairman of the Board and Corporate Director of Ballard. Mr. Roche is currently President and CEO of Stratford Managers Corporation, and was a founding member and executive at Newbridge Networks Corporation. He subsequently co- founded Tundra Semiconductor Corporation, and was President and CEO of the publicly-traded company. Mr. Roche has also served as President and CEO of CMC Microsystems and ThinkRF Corp.	2015	50,000 / 0.021%	77,622 / 9.57%
Sun Shaojun (Sherman) Shandong, China	Mr. Sun is a director of Weichai Group Holdings Limited and Weichai Heavy-duty Machinery Co., Ltd., and chairman of Power Solutions International Inc. (*cleantech engine and powertrain manufacturing*) . Previously, Mr. Sun was supervisor and chief engineer at Weifang Diesel Engine Factory (*diesel engine manufacturing*) director of Torch Automobile Group Co., Ltd. (*heavy machinery and automotive manufacturing*) . Mr. Sun's principal business is acting as the Executive President of Weichai Power Co., Ltd. (*diesel engine, powertrain and hydraulic products manufacturing*).	2019	0 / 0.00%	0 / 0.00%

Name, Province/State and Country of Residence[1]	Principal Occupation[1]	Director Since	Shares Beneficially Owned or Controlled or Directed[1] (#/% of Class)	Deferred Share Units Owned or Controlled[2] (#/% of Class)
Ian Sutcliffe Ontario, Canada	Corporate Director of Ballard. Mr. Sutcliffe has been a partner at Sutcliffe & Associates Management Consultants (*management consulting services*) since June 1985. Previously, Mr. Sutcliffe was Executive Chair of PureFacts Financial Solutions (*financial software services*) from May 2013 to November 2016. Prior to that, he was co-CEO of PHeMI, Inc. (*medical software and IT infrastructure*) from July 2010 to November 2012; CEO, Chairman and independent director of BluePoint Data (*IT services*) from Sept 2001 to June 2011; and Vice Chair and CEO of BCS Global (*video conferencing services*) from January 2003 to March 2004. Mr. Sutcliffe was President of Mediconsult.com (*public internet health services*) from June 1995 to June 1999 and President and CEO from 1999 to 2001.	2013	10,000 / 0.004%	96,671 / 11.91%
Janet Woodruff British Columbia, Canada	Corporate Director of Ballard. Previously, Ms. Woodruff served as acting CEO to the Transportation Investment Corporation (*transportation infrastructure management*) from 2014 to 2015, advisor to the Board (2013-2014) and interim Chief Financial Officer (2012-2013). Prior to that, she was Vice President and Special Advisor to BC Hydro (*public utility*) from 2010 to 2011; Interim President (2009-2010) and Vice President, Corporate Services and Chief Financial Officer (207-2008) of BC Transmission Corporation (*electricity transmission infrastructure*); and Chief Financial Officer and Vice President, Systems Development and Performance of Vancouver Coastal Health from 2003 to 2007.	2017	0 / 0.00%	29,756 / 3.67%

Notes

1. The information as to place of residence, principal occupation, business or employment of, and shares beneficially owned, or controlled or directed, directly or indirectly, by a director is not within the knowledge of our management and has been furnished by the director.
2. Rounded to the nearest whole number.

Directors are elected yearly at our annual shareholders' meeting and serve on the Board until the following annual shareholders' meeting, at which time, they either stand for re-election or leave the Board. If no meeting is held, each director serves until his or her successor is elected or appointed, unless the director resigns earlier.

The Board has formed three committees: the Audit Committee; the Commercial Committee; and the Corporate Governance & Compensation Committee. The Audit Committee members are Mr. Hayhurst (chair), Mr. Sutcliffe and Ms. Woodruff. The Commercial Committee members are Ms. Le, Mr. Neese (chair) and Mr. Sutcliffe. The Corporate Governance & Compensation Committee members are Mr. Hayhurst, Ms. Le, Mr. Sun, and Ms. Woodruff (chair). The chair of the Board is an *ex officio* member of each committee.

In 2012 Mr. Hayhurst was a director of Catalyst Paper Corporation during the time it restructured its debt under the *Companies' Creditors Arrangement Act* (Canada). In 2012, Mr. Sutcliffe was a director of BluePoint Data Inc. when the B.C. Securities Commission issued a cease trade order against BluePoint Data Inc. for failure to file its financial statements and management's discussion and analysis related thereto for the year ended December 31, 2011. The order remains in effect. Mr. Sutcliffe resigned as a director on June 27, 2012, subsequent to which BluePoint Data Inc. sold its business and distributed the proceeds to its shareholders. Mr. Roche was Chair of Aonix Advanced Materials Corp. (a private company) when a bankruptcy order was issued against it under the *Bankruptcy and Insolvency Act* (Canada) on October 13, 2017

Conflicts of Interest

Mr. Sun and Mr. Jiang are directors and officers of Weichai or affiliates of Weichai and as a result have potential material conflicts of interest with Ballard as a result of the contractual relationships between and amongst Ballard, Weichai and the Weichai-Ballard JV as discussed above in the Recent History section and below in the Material Contracts section of this Annual Information Form.

Senior Officers

As of March 5, 2020, we had five senior officers. The name and province or state of residence of each executive officer, the offices held by each officer and each officer's principal occupation during the last five years are as follows:

Name and Province/State of Residence	Position	Principal Occupation
R. Randall (Randy) MacEwen British Columbia, Canada	President and Chief Executive Officer	Executive of Ballard. Formerly the founder and Managing Partner at NextCleanTech LLC from 2010 to 2014.
Anthony Guglielmin British Columbia, Canada	Vice President and Chief Financial Officer	Executive of Ballard. Formerly SVP Finance and Chief Financial Officer of Canada Line Rapid Transit Inc. (2005 to 2009).
Sarbjot (Jyoti) Sidhu British Columbia, Canada	Vice President, Operations	Senior officer of Ballard. Formerly Director, Quality of Ballard.
Kevin Colbow British Columbia, Canada	Vice President , Technology & Product Development	Senior officer of Ballard. Formerly Vice President, Technology Solutions of Ballard.
Robert Campbell British Columbia, Canada	Vice President and Chief Commercial Officer	Senior officer of Ballard. Formerly President and CEO of SoloPower Systems, Inc. (2013 – 2017).

In 2013, Mr. Campbell was the President and CEO of SoloPower Systems, Inc. during a financial restructuring with its secured creditors.

Shareholdings of Directors and Senior Officers

As of March 5, 2020, our directors and executive officers, as a group, beneficially owned, or controlled or directed, directly or indirectly, 644,628 of our common shares, being 0.275% of our issued and outstanding common shares, and 796,222 DSUs.

AUDIT COMMITTEE MATTERS

Audit Committee Mandate

The Audit Committee operates under a mandate that is approved by the Board and which outlines the responsibilities of the Audit Committee. A copy of the Audit Committee's mandate is attached as Appendix "A" and posted on our website. This mandate is reviewed annually and the Audit Committee's performance is assessed.

Composition of the Audit Committee

The following table sets forth the name of each of the current members of the Audit Committee, whether such member is independent, whether such member is financially literate and the relevant education and experience of such member.

Name	Independent?	Financially Literate?	Relevant Education and Experience
Douglas P. Hayhurst (Chair)	Yes	Yes	Mr. Hayhurst was an executive with IBM Canada Business Consulting Services and a Partner with PricewaterhouseCoopers Management Consultants. Prior to that, Mr. Hayhurst held various senior executive management roles with Price Waterhouse including National Deputy Managing Partner (Toronto) and Managing Partner for British Columbia (Vancouver). Mr. Hayhurst received a Fellowship (FCA) from the Institutes of Chartered Accountants of British Columbia and of Ontario. He has completed the Directors Education Program of the Institute of Corporate Directors and has received his ICD.D designation.
James Roche (*ex officio*)	Yes	Yes	Corporate Director of Ballard. Mr. Roche is currently President and CEO of Stratford Managers Corporation, and was a founding member and executive at Newbridge Networks Corporation. He subsequently co-founded Tundra Semiconductor Corporation, and was President and CEO of the publicly-traded company. Mr. Roche has also served as President and CEO of CMC Microsystems and ThinkRF Corp.
Ian Sutcliffe	Yes	Yes	Mr. Sutcliffe has been a partner at Sutcliffe & Associates Management Consultants since June 1985. Previously, he was CEO, Chairman and independent director of BluePoint Data from September 2001 to June 2011 and Vice Chair and CEO of BCS Global from January 2003 to March 2004. Mr. Sutcliffe was President of Mediconsult.com from June 1995 to June 1999 and President and CEO from 1999 to 2001. Prior to that, he was with Coopers & Lybrand in Vancouver and London, England from June 1979 to June 1985.
Janet Woodruff	Yes	Yes	Ms. Woodruff was acting CEO to the Transportation Investment Corporation from 2014 to 2015, advisor to the board (2013-2014) and interim Chief Financial Officer (2012-2013). Formerly Vice President and Special Advisor to BC Hydro from 2010 to 2011; Interim President (2009-2010) and Vice President, Corporate Services and Chief Financial Officer (2007-2008) of BC Transmission Corporation. Formerly, Chief Financial Officer and Vice President, Systems Development and Performance of Vancouver Coastal Health from 2003 to 2007.

The Audit Committee is responsible for recommending the appointment of our external auditors (for shareholder approval at our annual general meeting), monitoring the external

auditors' qualifications and independence, and determining the appropriate level of remuneration for the external auditors. The external auditors report directly to the Audit Committee.

The Audit Committee also approves in advance, on a case-by-case basis, any services to be provided by the external auditors that are not related to the audit. The following table shows the costs incurred with KPMG LLP in 2019 and 2018 for audit and non-audit related work, all of which were approved by the Audit Committee:

Type of Audit Fees	2019 (C$)	2018 (C$)
Audit Fees	$566,500	$516,800
Audit-Related Fees	Nil	Nil
Tax Fees	Nil	$18,000
All Other Fees	Nil	Nil

Audit Fees

Audit fees were for professional services rendered by KPMG LLP for the audit of the annual financial statements, quarterly reviews and services provided in connection with statutory and regulatory filings or engagements relating to prospectuses and other offering documents.

Audit-Related Fees

Audit-related fees would be for assurance and related services reasonably related to the performance of the audit or review of financial statements or other services traditionally performed by the auditor but are not reported under the heading audit fees above. There were no fees paid to KPMG LLP that would be considered "Audit-Related Fees" in 2019 and 2018.

Tax Fees

There were no fees paid to KPMG LLP that would be considered "Tax Fees" in 2019. Tax fees paid to KPMG LLP in 2018 related to specialized customs and duties advice.

All Other Fees

All other fees to be disclosed under this category would be for products and services other than those described under the headings audit fees, audit-related fees and tax fees above. There were no fees paid to KPMG LLP that would be considered "All Other Fees" in 2019 or 2018.

LEGAL PROCEEDINGS

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 with respect to the statements of Ballard) about its business partnerships and deployment of hydrogen fuel cell technology in China. In April 2019, the plaintiffs voluntarily dismissed all but one of the cases, *Porwal v. Ballard Power Systems Inc., et al.* (S.D. N.Y.). In March 2019 our motion to dismiss the remaining class action was granted by the U.S. Federal Court and, as the plaintiffs did not appeal the decision, the case was closed.

In addition to the legal proceedings noted above, from time to time, we may be involved in litigation relating to claims arising out of our operations in the normal course of business.

INTEREST OF MANAGEMENT AND OTHERS IN MATERIAL TRANSACTIONS

The Weichai-Ballard JV is 51% owned by Weichai and Weichai's wholly-owned subsidiary, Weichai HK, owns 19.9% of Ballard's common shares.

The Weichai-Ballard JV will manufacture Ballard's next-generation FCgen®-LCS fuel cell stack and FCgen®LCS-based power modules for bus, commercial truck and forklift applications with exclusive rights in China.

As noted above, two of Ballard's directors, Mr. Sun and Mr. Jiang, are directors and officers of Weichai or affiliates of Weichai.

Section 7.2 of Management's Discussion and Analysis for the year ended December 31, 2019 and note 26 of our financial statements for the year ended December 31, 2019 describe and state the approximate amount of the material interest of Weichai HK during the three most recently completed financial years.

Except as described above, none of our insiders, directors or executive officers, nor any associate or affiliate of such persons, has had any material interest, direct or indirect, in any transaction of ours within our three most recently completed financial years, nor in any transaction or proposed transaction within our current financial year that has materially affected or would materially affect us or any of our subsidiaries.

TRANSFER AGENT AND REGISTRAR

Our transfer agent and registrar is Computershare Trust Company of Canada, 100 University Avenue, 9th Floor, Toronto, Ontario, M5J 2Y1.

MATERIAL CONTRACTS

Particulars of every contract that is material to Ballard, other than a contract entered into in the ordinary course of business that is not required to be disclosed under *National Instrument 51-102 – Continuous Disclosure Obligations*, and that was entered into within the most recently completed financial year, or before the most recently completed financial year but is still in effect, are listed below.

Weichai Strategic Collaboration Transaction

On November 13, 2018 we entered into a strategic collaboration transaction with Weichai that included the following material agreements:

1. A Subscription Agreement between Weichai and Ballard dated August 29, 2018. The Subscription Agreement resulted in an equity investment in Ballard by Weichai in the amount of approximately $163.6 million, representing 19.9% of the outstanding common shares of the capital of Ballard.

2. An Investor Rights Agreement between Weichai HK and Ballard dated November 13, 2018. The key terms of Investor Rights Agreement are set out in the Recent History section of this Annual Information Form.
3. A Joint Venture Agreement between Weichai and Ballard HK dated November 13, 2018. The key terms of Joint Venture Agreement are set out in the Recent History section of this Annual Information Form.

The Subscription Agreement was filed on SEDAR on September 3, 2018 and the Investor Rights Agreement and Joint Venture Agreement were filed on SEDAR on November 23, 2018.

Power Manager Asset Sale

On August 31, 2018, our wholly-owned subsidiary Ballard Unmanned Systems entered into an asset purchase agreement to sell our Power Manager assets to Revision Military. The particulars of the Asset Purchase Agreement are described above in the Recent History section of this Annual Information Form.

We filed the Asset Purchase Agreement on SEDAR on September 7, 2018.

Technology Development Agreement with Audi

On June 11, 2018 we entered into a 3.5-year extension to our current Technology Solutions contract with Audi extending the HyMotion program to August 2022. The aggregate value of the contract extension is expected to be C$80 – 130 million (US$62 – 100 million), subject to certain rights by Audi to reduce the program scope and value. The program will support Audi through its small series production launch. The particulars of the Technology Development Agreement are described in above in this Annual Information Form.

We filed the Technology Development Agreement on SEDAR on June 21, 2018. The preceding technology development agreement and associated amending agreement with Audi and VW were filed on SEDAR on February 20, 2015 and March 15, 2013, respectively.

Broad-Ocean Licensing Transaction

On February 16, 2017, we announced that we had signed a definitive agreement relating to technology transfer, licensing and supply arrangements with strategic partner Broad-Ocean for the assembly and sale of FCveloCity® 30kW and 85kW fuel cell engines in China. The particulars of the Fuel Cell Module Assembly Framework Agreement and Module Assembly License Agreements are described above in the Recent History section of this Annual Information Form.

Ballard filed the Fuel Cell Module Assembly Framework Agreement and Module Assembly License Agreements on SEDAR on April 25, 2017 in conjunction with the filing of a Material Change Report in respect of the transaction.

FCveloCity®-9SSL Fuel Cell Stack Production Operation

On July 18, 2016 we entered definitive agreements in Foshan, China with Nation-Synergy for the establishment of an FCveloCity®-9SSL fuel cell stack production operation in the City of Yunfu, in Guangdong Province. The transaction completed on October 25, 2016.

Ballard filed the 9SSL Production Line Master Agreement and form of Equity Joint Venture Agreement on SEDAR on July 27, 2016 in conjunction with the filing of a Material Change Report in respect of the transaction. On November 4, 2016, we filed the final Equity Joint Venture Agreement and Sales and Marketing Agreement in conjunction with the filing of a Material Change Report in respect of the closing of the transaction. The particulars of the 9SSL Production Line Master Agreement, Equity Joint Venture Agreement, and Sales and Marketing Agreement are described above in the Recent History section of this Annual Information Form.

Ballard Unmanned Systems Acquisition

On June 29, 2015, Ballard entered into an agreement and plan of merger with BPC Subco Inc. (**MergerCo**"), a wholly-owned subsidiary of Ballard, and Protonex Technology Corporation (the "**Merger Agreement**") under which MergerCo merged with Protonex Technology Corporation. Pursuant to the Merger Agreement, Ballard Power Corporation, a wholly-owned subsidiary of Ballard, became the sole stockholder of the post-merger corporation, also named Protonex Technology Corporation (now Ballard Unmanned Systems).

The merger occurred on October 1, 2015 and as consideration for the merger Ballard assumed and paid certain of Ballard Unmanned Systems' debt obligations and transaction costs at closing, being approximately $3.8 million, and paid the balance of the consideration through the issuance of approximately 11.4 million Ballard shares.

On June 29, 2015 Ballard filed the Merger Agreement on SEDAR in conjunction with the filing of a Material Change Report in respect of the transaction.

Audi IP Asset Transfer

On February 11, 2015, we entered into an agreement with Audi (the **IP Transfer and License Agreement**") under which we agreed to transfer to Audi certain of the transportation-related fuel cell intellectual property assets we previously acquired from United Technologies Corporation. These assets consist of approximately 900 patents and patent applications as well as know-how primarily related to PEM fuel cell technology.

As consideration for the patents and patent applications, Ballard received $40 million from Audi, of which $10 million was paid to UTC as a royalty under the terms of our prior acquisition from UTC. As consideration for the know-how, Ballard received $10 million from Audi on transfer thereof, of which $900,000 was paid to UTC.

In addition, we retain the sole right to use the patents, patent applications and know-how transferred to Audi for all non-automotive purposes, as well as a non-exclusive right for use in buses, and a non-exclusive right for use in certain limited pre-commercial automotive purposes, all on a royalty-free basis. We also retain the right to provide technology solutions services to other automotive OEMs.

In connection with the transaction, Volkswagen extended its existing technology development agreement with us as described below.

Ballard filed the IP Transfer and License Agreement on SEDAR on February 20, 2015 in conjunction with the filing of a Material Change Report in respect of the transaction.

INTERESTS OF EXPERTS

KPMG LLP, our independent auditors, has audited our consolidated financial statements for the years ended December 31, 2019 and 2018. As at the date hereof, KPMG LLP has confirmed that they are independent with respect to the Corporation within the meaning of the relevant rules and related interpretations prescribed by the relevant professional bodies in Canada and any applicable legislation or regulations and also that they are independent accountants with respect to the Corporation under all relevant U.S. professional and regulatory standards.

RISK FACTORS

An investment in our common shares involves risk. Investors should carefully consider the risks and uncertainties described below and the other information contained in, and incorporated into, this Annual Information Form, including "Management's Discussion and Analysis" and our financial statements for the year ended December 31, 2019. The risks and uncertainties described below 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.

We may not be able to successfully execute our business plan.

The execution of our business plan poses many challenges and is based on a number of assumptions. We may not be able to successfully execute our business plan. If we experience significant cost overruns on our programs, or if our business plan is more costly than we anticipate, certain research and development activities may be delayed or eliminated, resulting in changes or delays to our commercialization plans, or we may be compelled to secure additional funding (which may or may not be available) to execute our business plan. We cannot predict with certainty our future revenues or results from our operations. If the assumptions on which our revenue or expenditure forecasts are based change, the benefits of our business plan may change as well. In addition, we may consider expanding our business beyond what is currently contemplated in our business plan. Depending on the financing requirements of a potential acquisition or new product opportunity, we may be required to raise additional capital through the issuance of equity or debt. If we are unable to raise additional capital on acceptable terms, we may be unable to pursue a potential acquisition or new product opportunity.

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 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. While we continually seeking to expand our customer base, we expect the limited number of customers will continue for the next several years. Our future success is dependent upon the continued purchases of our products by these customers. Any fluctuations in anticipated demand from these customers may negatively impact our business, financial condition and results of operations.

If we are unable to broaden our customer base and expand relationships with other potential customers, our business in the Heavy-Duty Motive market will continue to be impacted by unanticipated demand fluctuations due to our dependence on these customers. Unanticipated demand fluctuations may have a negative impact on our revenues and business, and an adverse effect on our business, financial condition and results of operations.

In addition, our dependence on a small number of customers in our Heavy-Duty Motive market exposes us to numerous other risks, including: (i) a slowdown or delay in the customers' deployment of our products could significantly reduce demand for our products as well as increase pricing pressure on our products due to increased purchasing leverage; (ii) customer-specific factors resulting in a choice to pursue an alternative technology or supplier; (iii) reductions in a few customers' forecasts and demand could result in excess inventories; (iv) the current or future economic conditions could negatively affect our major customers and cause them to significantly reduce operations or file for bankruptcy; (v) concentration of accounts receivable credit risk, which could have a material adverse effect on our liquidity and financial condition if one of our major customers declared bankruptcy or delayed payment of their receivables; and (vi) changes in government support for zero-emission vehicles could adversely affect the end-user cost of vehicles incorporating our heavy-duty motive products.

In our Heavy-Duty Motive market, we depend on Chinese customers for a significant portion of our revenues and we are subject to risks associated with economic conditions and government practices in China.

We sell most of our products in the Heavy-Duty Motive market to Chinese customers, and while we are continually seeking to expand our customer base, we expect this will continue for the foreseeable future. Any significant economic slowdown in China, change in Chinese government policy around subsidies for zero-emission vehicles or hydrogen fueling infrastructure could have an adverse impact on our business, financial condition and results of operations.

In addition, macro-economic conditions, including government subsidy programs and significant and volatility in China's capital markets, may adversely impact our Chinese customers' 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 fuel. Inadequate hydrogen fueling infrastructure and/or excessive hydrogen fuel costs could negatively impact deployment of fuel cell powered 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.

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.

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. Stack manufacturing in the Heavy-Duty Motive market in China will be carried out by the Synergy-Ballard JV. The Weichai-Ballard JV is planning to manufacture our next-generation FCgen®-LCS fuel cell stack

and FCgen®-LCS-based power modules for bus, commercial truck and forklift applications. We share ownership and management of the Synergy-Ballard JV with one or more parties who may not have the same goals, strategies, priorities or resources as we do and may compete with us outside the joint venture. Similarly, we share ownership and management of the Weichai-Ballard JV with one or more parties who may not have the same goals, strategies, priorities or resources as we do and may compete with us outside the joint venture.

Joint ventures are intended to be operated for the equal benefit of all co-owners, rather than for our exclusive benefit. Operating a business as a joint venture often requires additional organizational formalities as well as time-consuming procedures for sharing information and making decisions. If a co-owner changes or relationships deteriorate, our success in the joint venture may be materially adversely affected. In addition, because we have a minority share ownership, we have limited control over the actions of each of the Synergy-Ballard JV and the Weichai-Ballard JV. As a result, we may be unable to prevent misconduct or other violations of applicable laws by the Synergy-Ballard JV and the Weichai-Ballard JV. To the extent another party makes decisions that negatively impact the Synergy-Ballard JV or the Weichai-Ballard JV or internal control issues arise within either joint venture, we may have to take responsive or other action or we may be subject to penalties, fines or other related actions for these activities.

In our Technology Solutions market, we depend on a limited number of customers for a majority of our revenues and are subject to risks related to the continued commitment of these customers to their fuel cell programs, including, in the case of one significant customer, to that customer's continued commitment to the commercialization of fuel cell passenger cars.

We provide most of our services in the Technology Solutions market to two customers, the Volkswagen Group and the Weichai-Ballard JV, and while we are continually seeking to expand our customer base, we expect this will continue for the foreseeable future. Our future success in this market is dependent upon the continued demand by these customers and expansion of our customer base. Any decline in or loss of demand from these customers or other customers for any reason may have a negative impact on our revenues, and an adverse effect on our business, financial condition and results of operations.

In the case of the Volkswagen Group specifically, we are dependent on its continued commitment to the commercialization of fuel cell passenger cars. In the case of the Weichai-Ballard JV specifically, we are dependent on Weichai's continued commitment to PEM fuel cell technology for heavy-duty vehicles.

In addition, our dependence on a limited number of customers in this market exposes us to numerous other risks, including: current or future economic conditions could negatively affect our major customers and cause them to significantly reduce operations or file for bankruptcy.

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 fuel cell stack development and commercialization plans.

We sell most of our products in the Material Handling market to a single customer, Plug Power, and while we are continually seeking to expand our customer base, we expect this will continue for the foreseeable future. Plug Power has developed its own fuel cell stacks to

integrate into their material handling products. If Plug Power decides to solely use its own fuel cell stacks, then these fuel cell stacks may displace our fuel cell stacks. Any decline in business with this customer could have an adverse impact on our business, financial condition and results of operations. Our future success is dependent upon the continued purchases of our products by this customer. Any fluctuations in demand from this customer or other customers may negatively impact our business, financial condition and results of operations.

If we are unable to broaden our customer base and expand relationships with other potential customers, our business in this market will continue to be impacted by unanticipated demand fluctuations due to our dependence on a single customer. Unanticipated demand fluctuations can have a negative impact on our revenues and business, and an adverse effect on our business, financial condition and results of operations. In addition, our dependence on a single customer in this market exposes us to numerous other risks, including: (i) a slowdown or delay in the customer's deployment of our products could significantly reduce demand for our products as well as increase pricing pressure on our products due to increased purchasing leverage; (ii) reductions in the customer's forecasts and demand could result in excess inventories; (iii) the current or future economic conditions could negatively affect the customer and cause it to significantly reduce operations or file for bankruptcy; (iv) concentration of accounts receivable credit risk, which could have a material adverse effect on our liquidity and financial condition if the customer declared bankruptcy or delayed payment of their receivables; and (v) reductions in the customer's demand as a result of their own strategic action to dual source their supply of fuel cell stacks.

Emerging diseases, like COVID-19, may adversely affect our operations, our suppliers, our customers, or our joint ventures in China.

Emerging diseases, like coronavirus disease 2019 (**COVID-19**), and government actions to address them, may adversely affect our operations, our suppliers, our customers, or our joint ventures in China.

An epidemic, such as the COVID-19 outbreak, may prevent, or cause delays in, acquiring components of our products, producing our products, delivering our services, completing sales of our products or services whether by direct impacts to our operations, or impacts to the operations of our suppliers, customers or to the financial markets. Our joint ventures in China may similarly be affected. It is unknown whether and how our customers, suppliers, or joint ventures may be affected if such an epidemic continues.

We expect our cash reserves will be reduced due to future operating losses, working capital requirements, capital expenditures, capital contributions to our joint venture(s) in China and potential acquisitions and other investments by our business, and we cannot provide certainty as to how long our cash reserves will last or that we will be able to access additional capital when necessary.

We expect to incur continued losses and generate negative cash flow until we can produce sufficient revenues to cover our costs. Further, we are obligated to fund our pro rata share of the Weichai-Ballard JV based on an agreed business plan. We may never become profitable. Even if we do achieve profitability, we may be unable to sustain or increase our profitability in the future. For the reasons discussed in more detail below, there are substantial

uncertainties associated with our achieving and sustaining profitability. We expect our cash reserves will be reduced due to future operating losses, working capital requirements and funding obligations to the Weichai-Ballard JV, and we cannot provide certainty as to how long our cash reserves will last or that we will be able to access additional capital if and 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 expect our revenues and operating results to vary significantly from quarter to quarter. As a result, quarter-to-quarter comparisons of our revenues and operating results may not be meaningful. Due to the stage of development of our business, it is difficult to predict our future revenues or results of operations accurately. We are also subject to normal operating risks such as credit risks, foreign currency risks and fluctuations in commodity prices. As a result, it is possible that in one or more future quarters, our operating results may fall below the expectations of investors and securities analysts. Not meeting investor and security analyst expectations may materially and adversely impact the trading price of our common shares and restrict our ability to secure required funding to pursue our commercialization plans.

We are dependent upon Original Equipment Manufacturers and Systems Integrators to purchase certain of our products.

To be commercially useful, our fuel cell products must be integrated into products manufactured by Systems Integrators and OEMs. We can offer no guarantee that Systems Integrators or OEMs will manufacture appropriate, durable or safe products or, if they do manufacture such products, that they will choose to use our fuel cell products. Any integration, design, manufacturing or marketing problems encountered by Systems Integrators or OEMs could adversely affect the market for our fuel cell products and our financial results.

We, directly or through joint ventures that we are party to, sell a significant portion of our products in the Heavy-Duty Motive market in China and to relatively small System Integrator customers with limited experience developing fuel cell system products on a commercial basis. We do not know whether these customers will be able to successfully develop, manufacture or market products to their customers. In addition, our dependence on such customers in this market increases the risks of difficulties in integration, design, manufacturing or marketing of their products; and that current or future macro-economic conditions in China could negatively affect them and cause them to significantly reduce operations or file for bankruptcy.

Our technology and products may not meet the market requirements, including requirements relating to performance, integration and / or cost.

The market requirements for our products and, by extension, our technology changes rapidly. Our existing and planned products may not meet the market requirements for any number of characteristics, including performance, integration characteristics, cost, freeze-protection, ingress protection, and durability.

We may not be able to sell our products on a commercially viable basis on the timetable we anticipate, or at all.

We cannot guarantee that we will be able to develop commercially viable fuel cell products on the timetable we anticipate, or at all. Selling our fuel cell products on a

commercially viable basis requires technological advances to improve the durability, reliability and performance of these products, and to develop commercial volume manufacturing processes for these products. It also depends upon our ability to reduce the costs of these products, since they are currently more expensive than products based on existing technologies, such as internal combustion engines and batteries. We may not be able to sufficiently reduce the cost of these products without reducing their performance, reliability and durability, which would adversely affect the willingness of consumers to buy our products. We cannot guarantee that we will be able to internally develop the technology necessary to sell our fuel cell products on a commercially viable basis or that we will be able to acquire or license the required technology from third parties.

In addition, before we release any product to market, we subject it to numerous field tests. These field tests may encounter problems and delays for a number of reasons, many of which are beyond our control. If these field tests reveal technical defects or reveal that our products do not meet performance goals, our anticipated time line for selling our products on a commercially viable basis could be delayed, and potential purchasers may decline to purchase our products.

A mass market for our products may never develop or may take longer to develop than we anticipate.

Our fuel cell products represent emerging markets, and we do not know whether end-users will want to use them in commercial volumes. In such emerging markets, demand and market acceptance for recently introduced products and services are subject to a high level of uncertainty and risk. The development of a mass market for our fuel cell products may be affected by many factors, some of which are beyond our control, including the emergence of newer, more competitive technologies and products, the cost of fuels used by our products, regulatory requirements, consumer perceptions of the safety of our products and related fuels, and end-user reluctance to buy a new product.

If a mass market fails to develop, or develops more slowly than we anticipate, we may never achieve profitability. In addition, we cannot guarantee that we will continue to develop, manufacture or market our products if sales levels do not support the continuation of the product.

We are subject to risks inherent in international operations, including restrictions on the conversion of currencies and restrictions on repatriation of funds, including out of China.

Our success depends on our ability to secure international customers and receive payments from international customers and joint ventures in which we are participants.

We face numerous challenges in our international business activities, including restrictions on the conversion of currencies, restrictions on repatriation of funds, war, insurrection, civil unrest, strikes and other political risks, negotiation of contracts with government entities, unexpected changes in regulatory and other legal requirements, fluctuations in exchange rates, longer accounts receivable requirements and collections, difficulties in managing international operations, potentially adverse tax consequences, and the burdens of complying with a wide variety of international laws.

Trade disputes and trade barriers, whether tariff or non-tariff, could prevent us from selling our products in key geographical markets, make our products uncompetitive with local competitors, and prevent us from sourcing key components of our products.

We have limited experience developing and manufacturing products that meet foreign regulatory and commercial requirements in our target markets.

Any of the above factors could have a material adverse effect on our business, results of operations and financial performance.

We have limited experience manufacturing fuel cell products on a commercial basis and our experience has been limited to relatively low production volumes.

To date, we have limited experience manufacturing fuel cell products on a commercial basis and our experience has been limited to relatively low production volumes. We cannot be sure that we will be able to develop efficient, low-cost, high-volume automated processes that will enable us to meet our cost goals and profitability projections. While we currently have sufficient production capacity to fulfill customer orders in the near-term, we expect that we will increase our production capacity based on market demand. We cannot be sure that we will be able to achieve any planned increases in production capacity or that unforeseen problems relating to our manufacturing processes will not occur. Even if we are successful in developing high-volume automated processes and achieving planned increases in production capacity, we cannot be sure that we will do so in time to meet our product commercialization schedule or to satisfy customer demand. If our business does not grow as quickly as anticipated, our existing and planned manufacturing facilities would, in part, represent excess capacity for which we may not recover the cost, in which case our revenues may be inadequate to support our committed costs and planned growth, and our gross margins and business strategy would be adversely affected. Any of these factors could have a material adverse effect on our business, results of operations and financial performance.

Warranty claims, product performance guarantees, or indemnification claims could negatively impact our gross margins and financial performance.

There is a risk that our warranty accrual estimates are not sufficient and we may recognize additional expenses, including those related to litigation, as a result of warranty claims in excess of our current expectations. Such warranty claims may necessitate changes to our products or manufacturing processes and/or a product recall, all of which could hurt our reputation and the reputation of our products and may have an adverse impact on our financial performance and/or on future sales. While we attempt to mitigate these risks through product development, quality assurance and customer support and service processes, there can be no assurance that these processes are adequate. Even in the absence of any warranty claims, a product deficiency such as a design or manufacturing defect could be identified, necessitating a product recall or other corrective measures, which could hurt our reputation and the reputation of our products and may have an adverse impact on our financial performance and/or on future sales.

New products may have different performance characteristics from previous products. In addition, we have limited field experience with existing commercial products from which to make our warranty accrual estimates.

We could be adversely affected by risks associated with acquisitions and investments.

We may in the future, seek to expand our business through acquisitions and investments in capital equipment and new business processes.

Acquisitions will be in part dependent on management's ability to identify, acquire and develop suitable acquisition targets in both new and existing markets. In certain circumstances, acceptable acquisition targets might not be available. Acquisitions involve a number of risks, including: (i) the possibility that we, as successor owner, may be legally and financially responsible for liabilities of prior owners; (ii) the possibility that we may pay more than the acquired company or assets are worth; (iii) the additional expenses associated with completing an acquisition and amortizing any acquired intangible assets; (iv) the difficulty of integrating the operations and personnel of an acquired business; (v) the challenge of implementing uniform standards, controls, procedures and policies throughout an acquired business; (vi) the inability to integrate, train, retrain and motivate key personnel of an acquired business; and (vii) the potential disruption of our ongoing business and the distraction of management from our day-to-day operations.

While necessary for the growth of our business, investments in capital equipment and new business processes, involve allocating resources based on future expectations that may or may not be correct. Investments in capital equipment and new business processes may not address the requirements of the targeted markets in the future and may result in lower than expected returns on such investments.

The above risks and difficulties, if they materialize, could disrupt our ongoing business, distract management, result in the loss of key personnel, increase expenses and otherwise have a material adverse effect on our business, results of operations and financial performance.

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

Failure to protect our existing intellectual property rights may result in the loss of our exclusivity regarding, or the right to use, our technologies. If we do not adequately ensure our freedom to use certain technology, we may have to pay others for rights to use their intellectual property, pay damages for infringement or misappropriation, or be enjoined from using such intellectual property. We rely on patent, trade secret, trademark and copyright laws to protect our intellectual property. Some of our intellectual property is not covered by any patent or patent application, and the patents to which we currently have rights expire between 2020 and 2038. Our present or future-issued patents may not protect our technological leadership, and our patent portfolio may not continue to grow at the same rate as it has in the past. Moreover, our patent position is subject to complex factual and legal issues that may give rise to uncertainty as to the validity, scope and enforceability of a particular patent. Accordingly, there is no assurance that: (i) any of the patents owned by us or other patents that third parties license to us will not be invalidated, circumvented, challenged, rendered unenforceable or licensed to others; or (ii) any of our pending or future patent applications will be issued with the breadth of claim coverage sought by us, if issued at all. In addition, effective patent, trade secret, trademark and copyright protection may be unavailable, limited or not applied for in certain countries.

We also seek to protect our proprietary intellectual property, including intellectual property that may not be patented or patentable, in part by confidentiality agreements and, if applicable, inventors' rights agreements with our strategic partners and employees. We can provide no assurance that these agreements will not be breached, that we will have adequate remedies for any breach, or that such persons or institutions will not assert rights to intellectual property arising out of these relationships.

Certain of our intellectual property have been licensed to us on a non-exclusive basis from third parties who may also license such intellectual property to others, including our competitors. If necessary or desirable, we may seek further licences under the patents or other intellectual property rights of others. However, we may not be able to obtain such licences or the terms of any offered licences may not be acceptable to us. The failure to obtain a licence from a third party for intellectual property we use could cause us to incur substantial liabilities and to suspend the manufacture or shipment of products or our use of processes requiring the use of such intellectual property.

We may become subject to lawsuits in which it is alleged that we have infringed the intellectual property rights of others or commence lawsuits against others who we believe are infringing upon our rights. Our involvement in intellectual property litigation could result in significant expense to us, adversely affecting the development of sales of the challenged product or intellectual property and diverting the efforts of our technical and management personnel, whether or not such litigation is resolved in our favour.

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.

We depend on information technology infrastructure and systems ("**IT Systems**"), hosted internally and outsourced, to process, transmit and store electronic data and financial information (including proprietary or confidential information), and manage business operations. Our business requires the appropriate and secure utilization of sensitive, confidential or personal data or information belonging to our employees, customers and partners. In addition, Ballard proprietary or confidential information may be stored on IT Systems of our suppliers, customers and partners. Increased global cybersecurity vulnerabilities, threats and more sophisticated and targets cyber-related attacks pose a risk to the security of Ballard's and its customers', partners', suppliers' and third-party service providers' IT Systems and the confidentiality, availability and integrity of Ballard's and its customers' and partners' data or information. While we have made investments seeking to address these threats, including monitoring of networks and systems, hiring of experts, employee training and security policies for employees, we may face difficulties in anticipating and implementing adequate preventative measures and remain potentially vulnerable. We must rely on our own safeguards as well as the safeguards put in place by our suppliers, customers and partners to mitigate the threats. Our internal systems are audited for cybersecurity vulnerabilities by third party security firms to ensure we are prepared for new and emerging threats. Our suppliers, customers and partners have varying levels of cybersecurity expertise and safeguards, most have yearly compliance audits that are available upon request.

An IT System failure or non-availability, cyber-attack or breach of systems security could disrupt our operations, cause the loss of, corruption of, or unauthorized access to sensitive,

confidential or personal data or information or expose us to regulatory investigation, litigation or contractual penalties. Our customers, partners or governmental authorities may question the adequacy of cybersecurity processes and procedures and this could have a negative impact on existing business or future opportunities. Furthermore, given the highly evolving nature of cybersecurity threats or disruptions and their increased frequency, the impact of any future incident cannot be easily predicted or mitigated, and the costs related to such threats or disruptions may not be fully insured or indemnified by other means.

Global macro-economic conditions are beyond our control and may have an adverse impact on our business, our joint ventures, our key suppliers, and/or customers.

Current global economic conditions, including volatility in China, may adversely affect the development of sales of our products, and thereby delay the commercialization of our products. Customers and/or suppliers may not be able to successfully execute their business plans; product development activities may be delayed or eliminated; new product introduction may be delayed or eliminated; end-user demand may decrease; and some companies may not continue to be commercially viable.

We currently face and will continue to face significant competition, and many current and future competitors may have significantly more resources.

As fuel cell products have the potential to replace existing power products, competition for our products will come from current power technologies, from improvements to current power technologies, and from new alternative energy technologies, including other types of fuel cells. Each of our target markets is currently serviced by existing manufacturers with existing customers and suppliers. These manufacturers use proven and widely accepted technologies such as internal combustion engines and batteries as well as coal, oil and nuclear powered generators.

Additionally, there are competitors working on developing technologies other than PEM fuel cells (such as other types of fuel cells and advanced batteries) in each of our targeted markets. Some of these technologies are as capable of fulfilling existing and proposed regulatory requirements as the PEM fuel cell.

Within the PEM fuel cell market, we also have a large number of competitors. Across the world, corporations, national laboratories and universities are actively engaged in the development and manufacture of PEM fuel cell products and components. Each of these competitors has the potential to capture market share in each of our target markets.

Many of our competitors have substantial financial resources, customer bases, manufacturing, marketing and sales capabilities, and businesses or other resources, which give them significant competitive advantages over us.

We could lose or fail to attract the personnel necessary to operate our business.

Our success depends in large part on our ability to attract and retain key management, engineering, scientific, marketing, manufacturing and operating personnel. As we develop additional manufacturing capabilities and expand the scope of our operations, we will require more skilled personnel. Recruiting personnel for the fuel cell industry is highly competitive. We may not be able to continue to attract and retain qualified executive, managerial and technical

personnel needed for our business. Our failure to attract or retain qualified personnel could have a material adverse effect on our business.

Public policy and regulatory changes could hurt the market for our products and services.

Changes in existing government regulations and the emergence of new regulations with respect to fuel cell products may hurt the market for our products and services. Environmental laws and regulations have driven interest in fuel cells. We cannot guarantee that these laws and policies, including subsidies or incentives associated with the adoption of clean energy products, will not change. Changes in these laws and other laws and policies, or the failure of these laws and policies to become more widespread, could result in manufacturers abandoning their interest in fuel cell products or favouring alternative technologies. In addition, as fuel cell products are introduced into our target markets, governments may impose burdensome requirements and restrictions on the use of fuel cell products that could reduce or eliminate demand for some or all of our products and services.

Government budgetary constraints could reduce the demand for our products by restricting the funding available to public transportation agencies and militaries. We cannot guarantee that current government direct and indirect financial support for our products will continue.

We are dependent on third party suppliers for the supply of key materials and components for our products and services.

We have established relationships with third party suppliers, on whom we rely to provide materials and components for our products. A supplier's failure to supply materials or components in a timely manner, or to supply materials and components that meet our quality, quantity or cost requirements, or our inability to obtain substitute sources for these materials and components in a timely manner or on terms acceptable to us, could harm our ability to manufacture our products. In addition, to the extent that our product development plans rely on development of supplied materials or components, we cannot guarantee that we will be able to leverage our relationships with suppliers to support these plans. To the extent that the processes that our suppliers use to manufacture the materials and components are proprietary, we may be unable to obtain comparable materials or components from alternative suppliers, which could adversely affect our ability to produce viable fuel cell products or significantly raise our cost of producing such products.

Exchange rate fluctuations are beyond our control and may have a material adverse effect on our business, operating results, financial condition and profitability.

We report our financial results in United States dollars. Our operating expenditures are particularly affected by fluctuations in the exchange rate between the Canadian dollar and the United States dollar. We generate the majority of our revenues in United States dollars while the majority of our operating expenditures are incurred in Canadian dollars. As a result, any increase in the value of the Canadian dollar, relative to the United States dollar, increases the amount of reported operating expenditures in excess of any corresponding increase in revenues and gross margins. Exchange rate fluctuations are beyond our control, and the Canadian dollar may appreciate against the United States dollar in the future, which would result in higher operating expenditures and lower net income. In order to reduce the potential negative effect of a

strengthening Canadian dollar, we occasionally enter into various hedging programs. Regardless, if the Canadian dollar increases in value, it will negatively affect our financial results and our competitive position compared to other fuel cell product manufacturers in jurisdictions where operating costs are lower.

Commodity price fluctuations are beyond our control and may have a material adverse effect on our business, operating results, financial condition and profitability.

Commodity prices, in particular the price of platinum and palladium, affect our costs. Platinum and palladium are key components of our fuel cell products. Platinum and palladium are scarce natural resources and we are dependent upon a sufficient supply of these commodities. While we do not anticipate significant near or long-term shortages in the supply of platinum or palladium, such shortages could adversely affect our ability to produce commercially viable fuel cell products or significantly raise our cost of producing such products. In order to reduce the impact of platinum price fluctuations, we occasionally enter into various hedging programs.

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

Our business exposes us to the risk of harmful substances escaping into the environment, resulting in personal injury or loss of life, damage to or destruction of property, and natural resource damage. Depending on the nature of the claim, our current insurance policies may not adequately reimburse us for costs incurred in settling environmental damage claims, and in some instances, we may not be reimbursed at all. Our business is subject to numerous laws and regulations that govern environmental protection and human health and safety. These laws and regulations have changed frequently in the past and it is reasonable to expect additional and more stringent changes in the future. Our operations may not comply with future laws and regulations, and we may be required to make significant unanticipated capital and operating expenditures. If we fail to comply with applicable environmental laws and regulations, governmental authorities may seek to impose fines and penalties on us, or to revoke or deny the issuance or renewal of operating permits, and private parties may seek damages from us. Under those circumstances, we might be required to curtail or cease operations, conduct site remediation or other corrective action, or pay substantial damage claims.

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.

Merger and acquisition activities are disruptive to management and the expected benefits of a merger or acquisition transaction are subject to numerous risks, including the disruption of our day-to-day operations, a failure to realize projected revenue gains, achieve expected cost savings within the assumed timeframe, and integration costs being higher than expected.

In addition, the actual integration may result in additional and unforeseen expenses, and the anticipated benefits of the integration plan may not be realized. An inability to realize the full extent of, or any of, the anticipated benefits of a merger or acquisition transaction, as well as any delays encountered in the integration process, could have a material adverse effect on our business and results of operations.

Our products use flammable fuels and some generate high voltages, which could subject our business to product safety, product liability or other claims.

Our business exposes us to potential product safety, product liability and similar claims that are inherent in electrical products, and in products that use hydrogen or hydrogen-rich reformate fuels. High-voltage electricity poses potential shock hazards, and hydrogen is a flammable gas and therefore a potentially dangerous fuel. Any accidents involving our products or other hydrogen-based products could materially impede widespread market acceptance and demand for our fuel cell products. Involvement in litigation could result in significant expense to us, adversely affecting the development and sales of our products, and diverting the efforts of our technical and management personnel, whether or not the litigation is resolved in our favour. In addition, we may be held responsible for damages beyond the scope of our insurance coverage. We also cannot predict whether we will be able to maintain our insurance coverage on acceptable terms.

ADDITIONAL INFORMATION

Additional information regarding Ballard may be found on SEDAR at www.sedar.com. In particular, additional information regarding directors' and officers' remuneration and indebtedness, principal holders of our securities and securities authorized for issuance under security compensation plans is contained in our information circular for our most recent annual meeting of securityholders that involved the election of directors. Additional financial information is provided in our financial statements and Management's Discussion and Analysis for the most recently completed financial year.

Copies of this Annual Information Form and the documents incorporated by reference herein, our comparative financial statements (including the auditors' report) for the year ended December 31, 2019, each interim financial statement issued after December 31, 2019, our management proxy circular and our Annual Report may be obtained upon request from our Corporate Secretary, 9000 Glenlyon Parkway, Burnaby, British Columbia, V5J 5J8, or on our website at www.ballard.com.

APPENDIX "A"

AUDIT COMMITTEE MANDATE

The Board has established an Audit Committee (the "**Committee**") to assist the Board in fulfilling its oversight responsibilities regarding the integrity of the Corporation's accounting and financial reporting, the Corporation's systems of internal controls over financial reporting, the independence and performance of the Corporation's external and internal auditors, the identification and management of the Corporation's risks, the Corporation's Whistleblower Reporting processes, the Corporation's financial policies and the review and approval of related party transactions, as further described below.

In this Mandate, the "**Corporation**" means Ballard Power Systems Inc. and a "**director**" means a member of the Corporation's board of directors (the "**Board**"). "**CGCC**" means the Corporation's Corporate Governance & Compensation Committee.

Composition and Eligibility

A) The Committee will have a minimum of three members, including the chair of the Committee. Following each annual meeting of shareholders of the Corporation the Board, upon the recommendation of the Corporate Governance & Compensation Committee, will appoint the members of the Committee, including the Committee chair. Any member may be removed or replaced at any time by the Board and will cease to be a member upon ceasing to be a director of the Corporation. Each member will hold office until the close of the next annual meeting of shareholders of the Corporation or until the member resigns or is replaced, whichever occurs first.

B) Each member of the Committee will be an independent director as set out in applicable securities laws, rules and regulations, and standards of the stock exchanges on which the Corporation's securities are listed.

C) All members of the Committee will be financially literate, as defined in accordance with applicable securities laws, rules and regulations, and standards of the stock exchanges on which the Corporation's securities are listed.

D) At least one member of the Committee must be an audit committee "financial expert" as defined by applicable securities laws, rules and regulations.

E) Any member of the Committee who serves on more than three public company audit committees must inform the Chair of the Board, so that the Board may consider and discuss with such member any issues related to his or her effectiveness and time commitment.

Meetings & Quorum

A) The Committee will meet at least quarterly and otherwise as necessary. Any member of the Committee may request additional meetings.

B) Notice of the time and place of each meeting will be given to each member of the Committee either by telephone or other electronic means not less than 1 week before the time of the meeting. Meetings may be held at any time if all Committee members have

waived or are deemed to have waived notice of the meeting. A Committee member participating in a meeting will be deemed to have waived notice of the meeting.

C) The Board Chair will attend meetings of the Committee as an*ex officio* member. The Board Chair will be considered as a Committee member for purposes of establishing quorum and will be entitled to vote on matters considered at the meeting. Unless the Committee chair determines otherwise, any other directors who are not members of the Committee will not be allowed to attend meetings of the Committee.

D) The CEO, CFO, Controller and internal auditor will have direct access to the Committee and any of them may request a meeting of the Committee be called by notifying the chair of the Committee. They will receive notice of every meeting of the Committee and will normally be requested to attend, other than in cases where the Committee wishes to meet in-camera. Other executives or employees of the Corporation will attend at the request of the Committee Chair.

E) Meetings will be chaired by the Chair of the Committee, or if the Chair is absent, by a member chosen by the Committee from among themselves.

F) A majority of Committee members constitute a quorum necessary for the transaction of business at Committee meetings. A quorum once established is maintained even if members of the Committee leave the meeting prior to conclusion.

G) The Corporate Secretary or his or her nominee will act as Secretary to the Committee.

H) All decisions made by the Committee may be made at a Committee meeting or evidenced in writing and signed by all Committee members, which will be fully effective as if it had been made or passed at a Committee meeting.

I) As part of every regularly-scheduled meeting, the Committee will hold in-camera sessions with: (1) the external auditors and the internal auditors; (2) with the external auditors only; and (3) of the Committee itself, without management or management directors present. The Committee may also hold other in-camera sessions with such members of management present as the Committee deems appropriate.

J) The Committee will report to the Board on its meetings and each member of the Board will have access to the minutes of the Committee's meetings, regardless of whether the director is a member of the Committee.

Duties and Responsibilities

A) Financial Reporting Control Systems

The Committee is responsible for monitoring the quality and integrity of the Corporation's accounting and financial reporting process through discussions with management, the external auditors and the internal auditors.

In discharging this responsibility, the Committee will review:

(i) with management and the external auditors, the Company's significant accounting policies, including the impact of alternative accounting policies, and any proposed

changes thereto; and key management estimates, risks and judgments that could materially affect the financial results;

(ii) emerging accounting issues and their potential impact on the Company's financial reporting;

(iii) with management any significant changes in financial risks facing the Corporation;

(iv) management's report assessing the adequacy and effectiveness of the Corporation's disclosure controls and procedures and systems of internal control; and

(v) the evaluation by either the internal or external auditors of management's internal control systems, and management's responses to any identified deficiencies or weaknesses.

Prior to public disclosure, the Committee will review and approve (where authority has been delegated by Board to the Committee) or recommend to the Board for approval:

(i) the audited annual consolidated financial statements and unaudited interim condensed consolidated financial statements of the Corporation;

(ii) the interim and annual management's discussion and analysis of financial condition and results of operations (MD&A) of the Corporation; and

(iii) all other material financial public disclosure documents of the Company and those of its subsidiaries that are reporting issuers, including prospectuses, material press releases with financial results, the Annual Information Form and management information circular.

B) External Auditors

The external auditors will report directly to the Committee and the Committee will:

(i) recommend to the Board and the Corporation's shareholders the appointment of external auditors; determine their compensation; and monitor and evaluate their qualifications, resources, performance and independence;

(ii) oversee the work of the external auditors and review and approve the annual audit plan of the external auditors, including the scope of the audit to be performed, and performance against the audit plan;

(iii) pre-approve all audit, audit-related and non-audit services to be provided to the Corporation or any of its subsidiaries, by the external auditors (and its affiliates), in accordance with applicable securities laws, rules and regulations;

(iv) discuss with the external auditors the quality and acceptability of the Corporation's accounting policies, including:

a) all critical accounting policies and practices;

b) all alternative treatments of financial information that have been discussed with management, implications of their use and the external auditors' "preferred treatment";

c) any other material written communications between the external auditors and management;

(v) review reports of the external auditors;

(vi) review the quarterly and annual representation letters given by management to the external auditors;

(vii) at least annually, obtain and review a report by the external auditors describing:

a) the firm's internal quality-control procedures;

b) any material issues raised by the most recent internal quality control review, or peer review of the firm, or by any inquiry or investigation by governmental, regulatory or professional authorities, within the preceding five years, respecting one or more independent audits carried out by the firm, and any steps taken to deal with such issues; and

c) all relationships between the external auditors and the Company;

(viii) annually assess and confirm the independence of the external auditors and require the external auditors to deliver an annual report to the Committee regarding its independence, and hold discussions with the external auditors as to any relationship or services that may impact their objectivity or independence;

(ix) ensure that the audit partners representing the external auditors meet the rotation requirements set out by applicable securities laws, rules and regulations, and standards of the stock exchanges on which the Corporation's securities are listed; and

(x) review and approve hiring policies regarding partners, employees and former partners and employees of current and former external auditors in accordance with applicable securities laws, rules and regulations and the Corporation's policies.

C) Monitoring Internal Auditors

The internal auditors will report quarterly to the Committee on the results of internal audit activities and will also have direct access to the chair of the Committee when the internal auditors determine it is necessary. The Committee will:

(i) annually approve the appointment of the internal auditor (or persons responsible for the function);

(ii) review the scope of responsibilities and effectiveness of the internal audit team, its reporting relationships, activities, organizational structure and resources, its independence from management and its working relationship with the external auditors;

(iii) oversee the work of the internal auditors including reviewing and approving the annual internal audit plan and updates thereto; and

(iv) review the reports of the internal auditors on the status of significant internal audit findings, recommendations and management's responses and review any other reports of the internal auditors.

D) Financial Management

The Committee will at least annually:

(i) review with management and approve, or make recommendations to the Board to approve, the Corporation's capital structure strategy; financial policies and investment policies, including debt and equity components; current and expected financial leverage, interest rate and foreign exchange exposures; taking in consideration current and future business needs (including the Annual Operating Plan), capital markets and the Corporation's credit rating; and

(ii) review compliance with financial policies.

E) Risk Management and Internal Controls

The Committee will:

(i) at least annually, review the Corporation's risk assessment and risk management policies, including the Corporation's insurance coverage, and management's compliance with them;

(ii) review with management, the external auditors and legal counsel, as necessary, any litigation, claim or other contingency, including any tax assessment, that could have a material effect upon the financial position or operating results of the Corporation and the appropriateness of the disclosure thereof in the documents reviewed by the Committee;

(iii) review and recommend to the Board for approval of the Corporation's delegation of financial authority;

(iv) while ensuring confidentiality and anonymity, ensure management has established procedures for the receipt, retention and treatment of complaints received by the Corporation regarding accounting, internal accounting controls or auditing matters or employee concerns regarding accounting or auditing matters or breaches of the Corporation's ethics policies ("Whistleblower Reporting");

(v) review quarterly reports on any Whistleblower Reporting complaints received by the Corporation;

(vi) at least annually, review management's compliance with the Corporation's ethics and Whistleblower Reporting policies;

(vii) at least annually, review the Corporation's ethics and Whistleblower Reporting policies, and recommend changes to the Board for approval;

(viii) review management's approach for safeguarding corporate assets, data and information systems, the adequacy of staffing of key financial functions (including succession plans for the Corporation's CFO and Controller) and their plans for improvements;

(ix) review the appointment of the financial senior executives of the Corporation, prior to recommendation by the CGCC to the Board;

(x) assist the Board with the oversight of the Corporation's compliance with applicable legal and regulatory requirements; and

(xi) review other risk management matters from time to time as the Committee may consider suitable or the Board may specifically direct.

F) Related Party Transactions

A related party transaction is defined as a transaction or a series of transactions in which the Corporation or any of its subsidiaries is to be a party, which involves an amount exceeding U.S. $120,000 in aggregate and in which any of the following persons have a direct or indirect material interest:

- a director or executive officer of the Corporation;
- any nominee for election as a director of the Corporation;
- any security holder of the Corporation known by the Corporation to own (of record or beneficially) more than 5% of any class of the Corporation's voting securities; and
- any member of the immediate family of any of the foregoing persons.

In carrying out its responsibilities in reviewing and approving related party transactions, the Committee will:

(i) receive details of all related party transactions proposed by the Corporation, and actual and potential conflicts of interest relating thereto, to verify their propriety and that disclosure is appropriate;

(ii) if a valuation or fairness opinion is required by any applicable statutes or regulations, supervise the preparation of such valuation or fairness opinion; and

(iii) if approval of the Board of directors is necessary, provide a recommendation to the Board of directors with respect to the related party transaction.

G) Other

The Committee will:

(i) annually review the audit of the expense reports of the Chair of the Board of Directors and the CEO;

(ii) review the minutes of the Corporation's Disclosure Committee; and

(iii) evaluate, at least annually, the adequacy of this Mandate and the Committee's performance, and report its evaluation and any recommendations for change to the Board.

Authority

A) The Committee is authorized to request the presence, at any meeting, of senior management, legal counsel or anyone else who could contribute substantively to the subject of the meeting.

B) The Committee is empowered to investigate any activity of the Corporation and all employees are to co-operate as requested by the Committee. The Committee may retain outside advisors having special expertise to assist it in fulfilling its responsibilities, and determine the appropriate level of remuneration for such outside advisors.

C) The Committee may form and delegate authority to Committee members or subcommittees.

D) Nothing contained in the above mandate is intended to assign to the Audit Committee the Board's responsibility to ensure the Corporation's compliance with applicable laws or regulations or to expand applicable standards of liability under statutory or regulatory requirements for the directors or the members of the Audit Committee.

Certification Pursuant to Section 302
of the Sarbanes-Oxley Act of 2002

I, **R. Randall MacEwen,** certify that:

1. I have reviewed this annual report on Form 40-F of Ballard Power Systems Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the issuer as of, and for, the periods presented in this report;

4. The issuer's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the issuer and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the issuer, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the issuer's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the issuer's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect the issuer's internal control over financial reporting; and

5. The issuer's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the issuer's auditors and the audit committee of the issuer's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the issuer's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the issuer's internal control over financial reporting.

Date: March 5, 2020

By: /s/ R. Randall MacEwen
Name: R. Randall MacEwen
President and Chief Executive Officer

Certification Pursuant to Section 302
of the Sarbanes-Oxley Act of 2002

I, **Anthony Guglielmin,** certify that:

1. I have reviewed this annual report on Form 40-F of Ballard Power Systems Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the issuer as of, and for, the periods presented in this report;

4. The issuer's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the issuer and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the issuer, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the issuer's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the issuer's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect the issuer's internal control over financial reporting; and

5. The issuer's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the issuer's auditors and the audit committee of the issuer's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the issuer's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the issuer's internal control over financial reporting.

Date: March 5, 2020

By: /s/ Anthony Guglielmin
Name: Anthony Guglielmin
Vice President and Chief Financial Officer

Section 906 Certification

Certification Pursuant to
18 U.S.C. Section 1350

As Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

In connection with the Annual Report on Form 40-F of Ballard Power Systems Inc., a corporation organized under the laws of British Columbia (the "Company"), for the period ending December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned officers of the Company certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a) or 78o(d)); and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: March 5, 2020

/s/ R. Randall MacEwen

R. Randall MacEwen

President and Chief Executive Officer (principal executive officer)

Dated: March 5, 2020

/s/ Anthony Guglielmin

Anthony Guglielmin

Vice President and Chief Financial Officer (principal financial officer)

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Consent of Independent Registered Public Accounting Firm

The Board of Directors
Ballard Power Systems Inc.

We, KPMG LLP, consent to the use of our reports, each dated March 4, 2020, with respect to the consolidated financial statements and the effectiveness of internal control over financial reporting included in this annual report on Form 40-F. Our report on the consolidated financial statements refers to changes in accounting policies for leases in 2019 due to the adoption of IFRS 16 – *Leases* (IFRS 16*)*.

We, KPMG LLP, also consent to the incorporation by reference of such reports in the Registration Statements No. 333-225494, No. 333-161807 and No. 333-156553 on Form S-8 and No. 333-225493 on Form F-10/A of Ballard Power Systems Inc.



Chartered Professional Accountants

March 4, 2020
Vancouver, Canada

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.