Introduction
Kate Charlton, VP Corporate Finance & Strategy
Forward Looking Statements

This document contains forward-looking statements concerning anticipated markets and customers for our products, revenue and margin expansion, operating costs, implementation of government policy initiatives, planned manufacturing capacity expansion, product cost reduction activities and planned investments. These forward-looking statements reflect Ballard’s current expectations as contemplated under section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Any such statements are based on Ballard’s assumptions relating to its financial forecasts and expectations regarding its product development efforts, manufacturing capacity, and market demand. For a detailed discussion of the factors and assumptions that these statements are based upon, and factors that could cause our actual results or outcomes to differ materially, please refer to Ballard’s most recent management’s discussion & analysis.

Other risks and uncertainties that may cause Ballard’s actual results to be materially different include general economic and regulatory changes, detrimental reliance on third parties, successfully achieving our business plans and achieving and sustaining profitability. For a detailed discussion of these and other risk factors that could affect Ballard’s future performance, please refer to Ballard’s most recent Annual Information Form. These forward-looking statements are provided to enable external stakeholders to understand Ballard’s expectations as at the date of this document and may not be appropriate for other purposes. Readers should not place undue reliance on these statements and Ballard assumes no obligation to update or release any revisions to them, other than as required under applicable legislation.
Agenda

1. Opening Remarks
2. Commercial Update
3. TCU
4. Technology Development & Cost Reduction (Stack)
5. Technology Development & Cost Reduction (Module)
6. Global Manufacturing
7. People, Culture & ESG
8. Financial Outlook
9. Closing Remarks
Opening Remarks
Randy MacEwen, President & CEO
Recent milestones – 30 years

- **June 8th, 1993** – Ballard debuted world’s first fuel cell bus
- **June 9th, 1993** – Ballard listed on the TSX
Ballard’s business model

Core fuel cell MEA, bipolar plates, stack & module IP developed over 40+ years

Leveraged over six medium & heavy-duty end markets

Driving scale & efficiency across key markets in Europe, North America & China leading to cost advantages, gross margin expansion & EBITDA growth with volume scale

1 See Slide Notes
# Key Updates from 2020 Investor Day

## 2020 – Key Priorities

<table>
<thead>
<tr>
<th>Priorities</th>
<th>2023 – Status Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand &amp; execute on partnerships</td>
<td>Significantly increased number of customer platform wins &amp; supplier partnerships</td>
</tr>
<tr>
<td>Develop new stacks &amp; modules</td>
<td>Launched 8th &amp; 9th generation modules w/ next gen stacks; 10th generation module w/ HPS stack launching in 2023</td>
</tr>
<tr>
<td>Drive product cost reduction</td>
<td>On track with stack cost reduction program (3x3)</td>
</tr>
<tr>
<td>Invest in advanced mfg &amp; capacity expansion</td>
<td>Installed MEA &amp; process improvement at facilities in Canada, commissioned WBJV in China, FCwave in Denmark &amp; established Oregon facility</td>
</tr>
<tr>
<td>Drive improved financial performance</td>
<td>Delayed China demand materially impacted growth &amp; masked underlying strength in PP in EU &amp; NA; GM pressures and increased investments in T&amp;PD and AM</td>
</tr>
</tbody>
</table>

Ballard has been working with customers & partners to accelerate fuel cell adoption, while investing in technology and product development, cost down initiatives, and capacity expansion.

1 See Slide Notes
Increasingly Constructive Policy Context

- **30** countries with national strategies (23 more proposed)
- **100-200 B** USD in dedicated H₂ funding
- **>160 GW** deployment by 2030 in policy targets

- IRA PTC for low-carbon H₂ up to USD 3/kg
- RED III renewable H₂ target for industry & member country actions
- USD 2B incentive for electrolyzer projects & H₂ in industry
- USD 15B Green Innovation Fund with H₂ CfDs
- H₂ alliance goal of 100GW installed by 2030
- USD 1.5B to support H₂ export

- Adopted national H₂ strategy
- Announced national H₂ strategy
Availability of low cost, low carbon hydrogen is on the way – a key unlock for fuel cell demand

Evolving Landscape: H₂ production & availability

Announced H₂ Investments (US$B)

- Europe: 240
- North America: 320
- China: $29B committed

30% y/y increase in H₂ investment

70% in N.Am

Announced Hydrogen Production Capacity (Mtpa)

- China: 1.1 (40% committed) / 2025
- China: 2025
- North America: 9.3 (20% committed) / 2025
- North America: 2025
- Europe: 13 (5% committed) / 2025
- Europe: 2025

Global Installed Hydrogen Refueling Stations (HRS)

- APAC: 650
- EMEA: 275
- N.Am: 115
- Total: 1,070

$29B committed investments → 70% in N.Am

2x global increase in 3 years in 3 years

1, 2 See Slide Notes
Current state of the hydrogen and fuel cell industry

Growth indicators

- Increasingly favorable H₂ policy landscape
- Consensus view where fuel cells offer the highest value: HD mobility → Ballard’s markets
- Fuel cell validation with growing field deployments (80k FC vehicles)
- Strong interest from end-users (fleet operators) driven by ESG
- Deeper pools of capital being attracted to H₂ and FC market opportunities
- Investments in capacity across the value chain

Risk indicators

- Significant complexity for the transition to a new energy system
- Current limited availability of low-cost, low-carbon hydrogen and HRS
- Limited number of vehicle platforms
- Challenges with scaling, including matching supply and demand
US Market Update & Strategy

Growth indicators

• Robust federal policy support for low-carbon H₂ production, including IRA PTCs
• Highest level of committed H₂ production investments
• Strong support for domestic fuel cell manufacturing
• Aggressive state-level policies for HD vehicle decarbonization (ACT & ACF)
• Increased realization of difficulty in scaling BEV fleets due to grid limitations / timelines

Risk indicators

• Federal agency implementation of IRA is incomplete, with some H₂ rules still in-progress
• Increased cost of capital pressuring decarbonization solutions with high up-front costs
• Strong interest in bridge technologies such as biofuels, renewable diesel, etc.
European Market Update & Strategy

Growth indicators

• Comprehensive commitments to decarbonize transportation and eliminate fossil fuel imports, including in marine

• First region to translate H$_2$ policy into funds flowing to project developers

• EU-level agreement on green H$_2$ definition expected to unlock power investments for electrolysis

• Policy support across production and distribution portions of H$_2$ value chain, including AFIR, which is expected to translate into 650 new HRS for HD trucking

Risk indicators

• Implementation of policy from EU-level to Member States lacks clarity vs. US

• Large sections of EU’s economy relate to the production of ICE vehicles

• Divergent interests of EU Members states re: power generation, funding available to decarbonize, and appetite to invest in domestic energy production

• Lowest level of committed investments relative to announced investments
China Market Update & Strategy

Growth indicators

• Strategic importance of energy security and addressing GHG emissions
• Massive investment in renewables
• Significant investments in electrolysers and low carbon hydrogen production
• Fuel cell supply chain is developing & material costs are coming down
• China continues to have the most ambitious fuel cell vehicle & H₂ production targets; 1m FCEVs (HD truck and bus) and 1,000 HRS by 2030
• National level policy supported by local governments and SOEs

Risk indicators

• Geopolitical tension at highest level in decades
• Local governments are cash constrained post-COVID
• No clear indicators of step change in fuel cell demand in next 2-3 years due to H₂ supply challenges, refuelling stations, storage tank regulations, & local government FCEV funding
• Highly competitive fuel cell market with new entrants expected to increase; intense fight for market share leading to crimped profitability
• High level of policy uncertainty
Where is Ballard going & what to expect

Order Backlog Growth

New customer platforms in key verticals & customers maturing in fuel cell adoption

Product Revenue Execution

Increasing product driven revenue as fuel cell adoption scales

Cost Reduction

Product design evolution, advanced manufacturing, & volume scale

Revenue & Margin Expansion

Top line revenue growth, achieving cost down targets & economies of scale
Commercial Update
David Mucciacciaro, CCO
Power Products revenue mix by vertical

- Change in revenue segmentation to better highlight market adoption & customer evolution
- **Increasing revenue diversification** in recent years & expected to continue
- Illustrates business model resilience by leveraging core technology across multiple markets

*Increased fuel cell revenue diversification* across market verticals

![Pie charts showing revenue mix by vertical from 2019 to 2025](chart.png)
Regional shift in revenue following policy movement

- Multi year **shift in geographic revenue mix** expected to continue in near to mid-term
- Policy support & zero emissions targets driving significant European & North American growth
- Challenging subsidy schemes have throttled fuel cell demand in China

*See Slide Notes*
Backlog shows shift to more diverse customer base

- In two years, Ballard has more than doubled its diversified customer backlog
- **Substantially diversified backlog to drive results** going forward

>60% CAGR since last CMDay in diversified customer backlog growth

1 See Slide Notes
Backlog growth highlights shift in fuel cell demand\textsuperscript{1}

- Power Products backlog has more than doubled since end of Q1’22
- **Large TS contracts** have historically supported the backlog & masked shift in fuel cell demand growth over past 18 months

\textsuperscript{1} See Slide Notes

Total backlog (US$M)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q4-20</th>
<th>Q1-21</th>
<th>Q2-21</th>
<th>Q3-21</th>
<th>Q4-21</th>
<th>Q1-22</th>
<th>Q2-22</th>
<th>Q3-22</th>
<th>Q4-22</th>
<th>Q1-23</th>
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<tbody>
<tr>
<td>TS</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>130</td>
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<tr>
<td>PP</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>10</td>
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<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>PP % of Total</td>
<td>50%</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>20%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Power Products account for ~75% of total corporate backlog
Ballard’s 3D Approach to Customer Platforms

- Customers develop vehicle platforms for serial production around specific components, including a fuel cell
- Once a platform is developed, OEMs need to re-engineer platforms to switch parts, such as a fuel cell
- **By supporting customers at the platform development phase, Ballard positions itself as a highly-integrated partner for volume production of fuel cell vehicles**

<table>
<thead>
<tr>
<th>Developing</th>
<th>Demonstrating</th>
<th>Deploying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Cell platform maturity</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Level of FC integration in platform</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Duration</td>
<td>~0 – 12 months</td>
<td>~1 – 5 years</td>
</tr>
<tr>
<td>Qty FC ordered</td>
<td>Single digits</td>
<td>Double digits</td>
</tr>
<tr>
<td>BLDP Gross Margin expectation</td>
<td>Zero – Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Platform development is a multi-year effort for Ballard & customers

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1 See Slide Notes
Ballard’s 3D Customer Platforms: 2020

Developing

Demonstrating

Deploying

1 See Slide Notes
Ballard’s 3D Customer Platforms: **Today**

1. **Developing**
   - European Tier 1 Truck OEM
   - European Tier 1 Truck OEM
   - Stationary Power Customer
   - North American Vehicle Integrator
   - AMOBY
   - KARSAN
   - HEXAGON
   - DORAN

2. **Demonstrating**
   - Stationary Power Customer
   - European Bus OEM
   - European Bus OEM
   - APAC Bus OEM
   - NORLED
   - CAT
   - QANTRO
   - PORTRAY

3. **Deploying**
   - European Bus OEM
   - APAC Bus OEM
   - Stationary Power Customer
   - FIRST NOSE
   - SIEMENS
   - SOLARIS
   - VAN HOOL
   - NEW FLYER
   - ALEXANDER DENNIS
   - WEICHAI

1. See Slide Notes

- New customer platform after 2020
- Existing platform in 2020
Ballard’s 3D Evolution: **Solaris**¹ (Bus)

1x70-100kW Module per bus
Ballard’s 3D Evolution: **Siemens**¹ (Rail)

2x200kW Module per train

<table>
<thead>
<tr>
<th>Year</th>
<th>Developing</th>
<th>Demonstrating</th>
<th>Deploying</th>
</tr>
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<tbody>
<tr>
<td>2017</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2019</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2020</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2021</td>
<td>1</td>
<td>0</td>
<td>114</td>
</tr>
<tr>
<td>2022</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

¹ See Slide Notes
Ballard’s 3D Evolution: **Anglo American / First Mode**¹ (Off-road)

10x100kW Module per truck

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**Developing**
- 2019: 8
- 2020: 12
- 2021: 7

**Demonstrating**
- 2019: 8
- 2020: 12
- 2021: 7
- 2022: 95

**Deploying**
- 2019: 8
- 2020: 12
- 2021: 7
- 2022: 95
- 2023: 100

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¹ See Slide Notes
Ballard’s value proposition in key markets

<table>
<thead>
<tr>
<th>Any route, any time</th>
<th>No compromise heavy payloads</th>
<th>Long range high-speed travel</th>
<th>Marine type-approved product</th>
<th>Ultra-heavy payloads</th>
<th>Rapid time-to-power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick refueling</td>
<td>Long distance routes</td>
<td>Flexible operation</td>
<td>Modular flexible power solution</td>
<td>High operational capacity</td>
<td>Remote &amp; off-grid locations</td>
</tr>
<tr>
<td>1:1 diesel replacement</td>
<td>Fast recharging</td>
<td>No catenary wire infrastructure</td>
<td>Long range &amp; short refuelling</td>
<td>Steep grades</td>
<td>Resilient &amp; scalable</td>
</tr>
</tbody>
</table>
## 2030E Total Addressable Markets (TAM)

<table>
<thead>
<tr>
<th>Category</th>
<th>BUS</th>
<th>Truck</th>
<th>Rail</th>
<th>Marine</th>
<th>Emerging Markets</th>
<th>Stationary Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Addressable Market (§B)</td>
<td>~$15</td>
<td>~$195</td>
<td>~$7</td>
<td>~$40</td>
<td>~$50</td>
<td>~$0</td>
</tr>
<tr>
<td>Fuel Cell TAM 2030 (§B)</td>
<td>~$2.0</td>
<td>~$7.5</td>
<td>~$0.2</td>
<td>~$0.4</td>
<td>~$1.5</td>
<td>~$4.0</td>
</tr>
<tr>
<td>FC Adoption (2030e)</td>
<td>~10-15%</td>
<td>~2-5%</td>
<td>&lt;5%</td>
<td>`&lt;5%</td>
<td>&lt;5%</td>
<td>~0</td>
</tr>
<tr>
<td>FC Volumes (per year)</td>
<td>50k transit coach buses</td>
<td>LD Truck: 150k MHD Truck: 150k</td>
<td>550 passenger + freight trains</td>
<td>350 ships</td>
<td>25k off-road vehicles</td>
<td>4,100 MW</td>
</tr>
<tr>
<td>BLDP Market Share (2030e)</td>
<td>~15%</td>
<td>~10%</td>
<td>~40%</td>
<td>~20%</td>
<td>~10%</td>
<td>~15%</td>
</tr>
<tr>
<td>BLDP Market Share (2022e)</td>
<td>US &gt;90%</td>
<td>EU &gt;70% China &gt;25%</td>
<td>US &gt;10%</td>
<td>EU &gt;10% China &gt;30%</td>
<td>&gt;40%</td>
<td>~50%</td>
</tr>
</tbody>
</table>

*SAM: Serviceable Addressable Market = zero / low emission market

1, 2, 3, 4, 5 See Slide Notes
Fuel Cell module size by market vertical

**BUS**
Solaris, VanHool, New Flyer, Wrightbus
70kW - 100kW

**TRUCK**
Sinotruk, Wisdom, Quantron | 50kW - 350kW

**RAIL**
Siemens, CPKC, Stadler | combined engine size: 400kW - 1.2MW+

**MARINE**
Amogy, ABB, Norled | combined engine size: <1MW - 7MW+

**OFF-HIGHWAY**
First Mode / Anglo American | combined engine size: 200kW - 1.2MW+

**STATIONARY**
HDF, CAT / Microsoft | combined engine size: 200kW - 1.5MW+
Bus Update

- Added 7 new bus OEM partnerships
- Sales growth in EU & USA based on HD module
- Successful launch of new product (HD+)
- Strong market share
  EU: >70% & US: >90%
Truck Update

- Refined product & cost reduction strategy
- Technical competence recognized by industry & OEMs
- Recognized partner & supplier of FC module to OEMs & invitation to platform RFQs
- EU business with strong dynamics, growing order volume and OEM & integrator interest
Rail Update

- Significant expansion in CPKC project
- Growing interest from locomotive rail OEMs, integrators & end users
- ZEV mandate for California use-case locomotives starting in 2030
Marine Update

- World’s first commercial ferry on PEM FC & liquid H2 operational in 2023
- World’s first DNV Type Approval for FCwave 200kW in 2022
- Key project wins with Flagships, Norled, Future Proof Shipping & Amogy
Emerging Markets Update

- ~10MW modules ordered YTD from First Mode
- Developed first gen mining truck product for field deployment
- Kicked off demonstration projects with construction equipment OEMs & integrators
Stationary Power Update

- Total of 15 MW orders won with scheduled delivery in 2022-2024
- FCgen 200 kW and MW container product launch
- Key project wins with Caterpillar, Microsoft, Vertiv, HDF, Shell, Fraunhofer & FMG
### Competing Technologies (Long haul truck example)

<table>
<thead>
<tr>
<th>Feature</th>
<th>PEM Fuel Cells</th>
<th>Battery Electric</th>
<th>H₂ ICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range &amp; payload comparable to diesel</td>
<td>👀</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>Zero emission</td>
<td>👀</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>Vehicle level TCO</td>
<td>🚗</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>Broad range of available products</td>
<td>🚗</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>CAPEX</td>
<td>🚗</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>Scaled infrastructure availability</td>
<td>🚗</td>
<td>🚗</td>
<td>🚗</td>
</tr>
<tr>
<td>Extreme climate performance</td>
<td>👀</td>
<td>🚗</td>
<td>🚗</td>
</tr>
</tbody>
</table>

1 See Slide Notes
Competitive pricing dynamics

- Strong pricing competition from OEMs & new market entrants
- ~30% market price reduction since 2021
- Tier 1s expected to launch demo product in low volume ~2025 – 2026 with scale production ~2027 – 2028

FC Engine Average Selling Price ($/kW)

Competitive market dynamics driving prices down

1, 2 See Slide Notes
Customer decision making criteria

- **TECHNICAL**
  - Performance, efficiency & durability
  - Power requirements
  - Infrastructure practicality
  - Product form factor
  - Regulatory compliance

- **COMMERCIAL**
  - Price, TCU & Commercial Terms
  - Scope of offering: stack, module, TS, powertrain integration, etc.

- **QUALITATIVE**
  - Product track record & references
  - After sales service & support
  - Balance sheet
  - Brand strength
What is TCO / TCU?

TCU
Total Cost of Use

Average total cost per kilometer driven over vehicle lifetime

Ballard’s multivariable model developed to quantify impact of evolving variables

ex: technical improvements, costs, policy, commodity pricing, customer specific use cases

TCO
Total Cost of Ownership

• Vehicle Capital
• Driver Costs
• Tolls
• Fuel/energy costs
• Maintenance & repair
• Insurance
• Payload losses
• Infrastructure
• Etc.

Use Case
Customer & Route Specific

• Duty Cycle
• Temperature/Climate
• Refueling requirements
• Terrain
TCU is Unique to each case

- Powertrain
- Application
- Region
- Infrastructure
- Duty Cycle
- Policy
- Energy
- Labour costs
TCU Case Study

Long-Haul Truck Fleet, Germany

- 100 Trucks
- Long-haul duty cycle (up to 800km)
- Heavy-duty truck (40t HGV)
- Germany
- 3rd party infrastructure (FCEV & BEV)
- Green hydrogen
- Policy impacts included

Powertrains

- ICE-Diesel
- Battery-Electric
- Ballard Fuel Cell
Average Lifetime TCU Snap Shot

Output = Average Total Cost over lifetime of vehicle when purchased in year 20#

- **Energy**
  - Fuel: Diesel, hydrogen, electricity

- **Application cost**
  - Refueling time
  - Downtime
  - Payload loss

- **Vehicle CAPEX**
  - Base-vehicle & powertrain purchase price

- **Driver OPEX**
  - Annual labor cost for driver

- **Other OPEX**
  - Tolls
  - Insurance
  - Maintenance

- **Infrastructure**
  - Capital to build infrastructure for a fleet, if not utilizing 100% 3rd party infrastructure
TCU Case Study: Long-Haul Truck Fleet, Germany\textsuperscript{1,2}

100-vehicle Long-Haul truck fleet in Germany, 3\textsuperscript{rd} party fueling infrastructure, policy support included, assumes diesel €1.80/L, electricity €0.40/kWh, green H\textsubscript{2} €13/kg in 2023, and €1.01 USD/EUR

1, 2 See Slide Notes

<table>
<thead>
<tr>
<th>Energy</th>
<th>Application Costs</th>
<th>Vehicle CAPEX</th>
<th>Infrastructure</th>
<th>Driver OPEX</th>
<th>Other OPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance &amp; Tolls</td>
<td>Diesel</td>
<td>Electricity</td>
<td>Hydrogen Fuel</td>
<td>Driver OPEX (incl. charging time)</td>
<td>FCEV CAPEX</td>
</tr>
</tbody>
</table>

2023 TCU
- $1.45/km
- ICE-Diesel

2023 TCU
- $1.85/km
- Battery-Electric

2023 TCU
- $2.30/km
- Ballard Fuel Cell
TCU Case Study: Long-Haul Truck Fleet, Germany cont.\textsuperscript{1,2}

- For long-haul trucks, in Germany, \textbf{FCEV / ICE parity} estimated in \textbf{2027}

- Primary drivers between 2023 to 2026 to achieve parity:
  - Improved \textbf{hydrogen pricing} accounts for \textit{\sim2/3}rd of TCU reduction req’d to reach parity
  - Improved \textbf{fuel cell vehicle CAPEX} accounts for \textit{\sim1/3}rd of TCU reduction req’d to reach parity

  Heavily influenced & supported by policy

\begin{itemize}
  \item [2026] FCEV-BEV parity €10/kg green \textit{H}_2
  \item [2027] FCEV-ICE parity €9/kg green \textit{H}_2
  \item €6/kg green \textit{H}_2
  \item Diesel: €1.80/L flat
  \item Electricity: €0.40/kWh flat
\end{itemize}
TCU Case Study: Long-Haul Truck Fleet, Germany cont.\textsuperscript{1,2}

**TCU very sensitive to fuel pricing**

\[ \rightarrow +/-10\% \text{ change in fuel cost moves FCEV/ICE & FCEV/BEV parity 2yrs} \]

TCU (US$/km)

\begin{align*}
\text{Diesel:} & \ 1.80/L \text{ flat} \\
\text{Electricity:} & \ 0.40/kWh \text{ flat} \\
\text{H}_2 & \ 13/\text{kg 2023} \rightarrow 6/\text{kg 2030}
\end{align*}

1, 2 See Slide Notes
TCU Case Study: Long-Haul Truck Fleet, California

100 Long-Haul Class 8 truck fleet in California, 3rd party fueling infrastructure, assumes diesel $1.25/L, electricity $0.17/kWh, & H2 $8/kg in 2023

Policy Support Sensitivity

~1yr parity shift  
FCEV: BEV

~2yr parity shift  
FCEV: ICE

1, 2, 3 See Slide Notes
Leveraging TCU modeling at Ballard

- Know your customers
- Optimize product development to benefit customer value proposition
- World class modeling capabilities
- Target competitive use cases to inform corporate prioritization
Technology Development & Cost Reduction - Stack

Dr. Kevin Colbow, CTO
Breaking down our products

**MEA**
*Heart of a Fuel Cell*

**Key Impacts**
- Reliability & performance

**Future Development**
- Reduced catalyst loading
- Improved efficiency

---

**BPP**
*MEA’s counterpart*

**Key Impacts**
- Power density, durability & TCU

**Future Development**
- Materials engineering, manufacturing efficiency

---

**Stack**
*Fuel Cell Powerhouse*

**Key Impacts**
- Size/fit, cost, durability

**Future Development**
- Engineering design, power density, advanced manufacturing

---

**Module**
*Fuel Cell Engine*

**Key Impacts**
- Efficiency, TCU, fit

**Future Development**
- Standardization, engineering design, adv. manufacturing, cost

---

**BOP**
*Turning a Stack into an engine*

**Key Impacts**
- Cost & manufacturing

**Future Development**
- Standardization, engineering design to reduce part count & size

---

Revenue generating product
MEA: Membrane Electrode Assembly
BPP: Bipolar Plates
BOP: Balance of Plant
MEA: leading performance

- **>40 years of MEA development**, Ballard has refined MEA technology, a core component of fuel cell stacks
- **Power density, fuel efficiency, durability, cost & catalyst loading** are critical qualities
- Continued R&D focused on high performance materials

\[ \sim 15\% \text{ peak MEA areal power density increase since 2019 (W/cm}^2\)\]
Bipolar Plates (BPP): diverse technical experience & expertise

- **BPP designed & manufactured in-house**, focused on optimizing durability & cost efficiency
- BPP base material on-going industry discussion → a single optimal plate material for all applications does not currently exist
- **Two general bipolar plate material categories:**
  - carbon: flexible graphite, sheet molded plate
  - metal: coated stainless steel (SS) or titanium
  → Ballard has experience in both carbon & metal BPPs with promising candidates in both materials identified for future development

*Higher the score = better performing (i.e., strong cost score = lowest cost)*
Stack: proven stack performance & technology

- Stack: MEAs + Bipolar Plates + Hardware / Enclosure
- Ballard’s commercial fuel cell stacks are fully validated in commercial applications with,
  - 670 MW products deployed
  - >150 million km in-service globally

Ballard fuel cell stacks are durable, efficient, & proven with proprietary MEA & BPP design
Update on 3x3 Stack Cost Reduction Program

**2020 – Key Priorities**

Manufacturing
- Manufacturing scale-up & automation
- Materials utilisation improvement
- Process yield improvement

Materials
- Next-generation membrane
- Next-generation GDL development
- Lower cost anode improving MEA durability
- Next-generation flexible graphite plates

Engineering Design
- Power density increase in next-generation stack
- Cathode catalyst loading reduction

**2023 – Status Update\(^1\)**

- Reduced direct labour by ~30%
- Achieving >99% materials utilisation
- Reduced direct materials by ~8%
- Implemented a ~20% thinner membrane
- New GDL now utilized
- Reduced catalyst loading by ~50%
- Reduced materials basis weight by ~40% & moved to lower cost supplier w/higher quality material
- >50% power density improvement through increased operating pressure
- Increased durability chosen over catalyst loading reduction to optimize TCU

---

\(^1\) See Slide Notes
Stack Cost Reduction Achievement & Outlook\(^1,\ 2\)

3x3 program has led to **>60% stack cost reduction to date** with path to **>70% with increased volume in 2024** (at 2018 conditions)

Future cost reductions driven by **new MEA design & advanced manufacturing processes**

~**80% reduction in stack cost from 2018 to 2026**
Example of Future Stack Design Development

Maximizing cell count through stack design changes results in anticipated **improved product elasticity, system efficiency, TCU & product cost**¹

¹ See Slide Notes
Technology Development & Cost Reduction - Module
Dr. Mircea Gradu, CEngO
Driving down cost by **simplifying system design, reducing part count & joint supplier component development**

**Balance of Plant & Design Driven Cost Reduction**

<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>Power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>FCmove-HD</td>
<td>70</td>
</tr>
<tr>
<td>2021</td>
<td>FCmove-HD+</td>
<td>100</td>
</tr>
<tr>
<td>2023</td>
<td>FCmove-XD</td>
<td>120</td>
</tr>
</tbody>
</table>

- ~35% fewer parts
- Significant manufacturing time reduction
- ~20% fewer parts
- ~50% assembly time reduction

1 See Slide Notes
Module Cost Down Outlook\(^1\)

Today’s module cost

**Stack Cost Reduction Program**
- stack accounts for \(~30-50\%\) module cost

**BOP Cost Reduction Program**
- BOP accounts for \(50-70\%\) module cost

\(~70\%\) module cost reduction targeted

**BOP cost reduction critical to significantly reduce module cost**
Module Roadmap: Introduction to Core Products

- **Small Core Product**
  - to replace: FCmove-HD (70kW)
  - WBJV MD45 (45kW)

- **Medium Core Product**
  - to replace: FCmove-HD+ (100kW)
  - FCmove-XD (120kW)

- **Large Core Product**
  - to replace: FCwave (200kW)
  - FCrail (~150kW)
  - FCgen (200kW)

- **2X Large Core Product Manifold**
  - X-Large format fuel cells utilize manifold concept for higher total power requirements

Core product component & design standardization for increased efficiency, vendor purchasing power, & manufacturing optimization.
Increased software sophistication leading to improved performance & features of modules

Improvements in module performance, durability, driveability, & efficiency via software
Strategic investment in product development since 2020

### MEA
**Heart of a Fuel Cell**

**Key Impacts**
Fuel efficiency & durability

**Future Development**
Reduced platinum loading
Improved efficiency

### Stack
**Fuel Cell Powerhouse**

**Key Impacts**
Size/fit, cost, durability

**Future Development**
Engineering design, power density, advanced manufacturing

### Module
**Fuel Cell Engine**

**Key Impacts**
Efficiency, TCU, fit

**Future Development**
Standardization, engineering design, adv. manufacturing, cost

Accelerated investment in module development to deliver turn-key products to customers across our verticals, along with investment in next-generation technology & powertrain integration.
Global Manufacturing
Mark Biznek, COO
Manufacturing: investments to date & near term outlook

- Implemented Engine Pilot Production Line: Q3 2019
- Expanded MEA Production Capacity 6x: Q4 2020
- WBJV Commissioned: Q1 2021
- Fully Automated LIM Sealing: Q4 2022
- Opened USA Engine Assembly Plant: Q1 2023
- Stack & Module FAT Testing: late 2023
- Commissioning of NextGen Plate Line: early 2025

Global Power Output (GW)

1 See Slide Notes
### Manufacturing: Future investments

**Near-term (2023 – 2025) \*detailed planning in-flight**

<table>
<thead>
<tr>
<th>MEA</th>
<th>Invest in sealing capabilities &amp; capacity to enable volume growth (Burnaby)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate</td>
<td>Optimizing WBJV plate production to leverage in Ballard assembled products (WBJV) Developing and applying next-gen plate manufacturing processes for cost reduction (Burnaby)</td>
</tr>
<tr>
<td>Stack</td>
<td>Optimizing stack production capabilities for new &amp; future product lines (Burnaby &amp; WBJV)</td>
</tr>
<tr>
<td>Engine</td>
<td>Supply chain efficiency / cost reduction &amp; maximizing existing production capacity (Burnaby, USA, Denmark)</td>
</tr>
</tbody>
</table>

**Mid-term (2026 – 2027) \*currently being scoped / developed**

<table>
<thead>
<tr>
<th>MEA</th>
<th>Expand global MEA capacity (Local for Local)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate</td>
<td></td>
</tr>
<tr>
<td>Stack</td>
<td>Automated stack assembly (Burnaby)</td>
</tr>
<tr>
<td>Engine</td>
<td>Expand engine assembly capacity in line with demand growth (Local for Local)</td>
</tr>
</tbody>
</table>

1 See Slide Notes
Global & Local Strategy

- Focus capital allocation in strategic locations to support local fuel cell demand growth
- Conducting strategic review of manufacturing options in US & Europe
- Comparative analysis with China MEA localization plan

**Local for Local considerations:**
- Access to low cost, low carbon hydrogen
- Strong market demand for fuel cells
- Access to funding support / alternative sources of capital
- Proximity to customers, suppliers & talent
- Dynamic geopolitical considerations
Local for Local Program\textsuperscript{1}

Prior Capacity Planning Environment

Current Capacity Planning Environment
People, Culture & ESG
Jyoti Sidhu, CPO
Our global team\textsuperscript{1,2}

Headcount distribution by function

- Tech & Prod Dev: 11%
- Operations: 31%
- General & Admin: 10%
- Commercial: 11%

1,300 Total Workforce

48%

Headcount by region

- North America: 18
- Europe: 254
- APAC*: 1,004

1,300 Total Workforce

See Slide Notes
EH&S Performance
Our Goal: Everyone goes home safe at the end of the day

- 160 consecutive days without lost time injury
- 0 injuries 2023 year to date\(^1\)
- Reportable injury frequency rate lower than industry average for past four years\(^2\)
- Expanded health & safety training across the organization resulting in 2,887 cumulative training courses completed by all employees

\(^1\) See Slide Notes
\(^2\) See Slide Notes
Our People Drive our Success

We continue to implement actions that promote diversity, equity and inclusion (DEI)

- Our workforce represents >32 countries
- Established a refreshed DEI strategy in 2022
- Increased women representation at the senior leadership level by 78% since 2019
- Launched global Women’s Coffee Connect Employee Resources Group

Gender Diversity

- 22% Women Directors**
- 32% Women Senior Leaders
- 27% Overall Women at Ballard

Generational Diversity

- 45% Millennials
- 45% Gen x
- 10% Boomers
- 10% Years of Service

20+ years: 9%
15 - 20 years: 2%
10 - 15 years: 3%
5 - 10 years: 14%
1 - 5 years: 43%
0 - 1 year: 30%

1, 2 See Slide Notes
# Our People Drive our Success

## Employee Engagement

**16**
Consecutive years of Employee Engagement Surveys

**>94%**
Participation rate for past four years

### 2022 Results

<table>
<thead>
<tr>
<th>%</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>77%</td>
<td>Would recommend Ballard as a great place to work</td>
</tr>
<tr>
<td>78%</td>
<td>Feel their opinions are valued</td>
</tr>
<tr>
<td>84%</td>
<td>Feel they can count on their co-workers</td>
</tr>
<tr>
<td>82%</td>
<td>Feel they are well supported by their manager</td>
</tr>
</tbody>
</table>

In 2022, we implemented new engagement survey platform to improve benchmarking and ongoing engagement dialogue.

## Employee Retention

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>95%</td>
</tr>
<tr>
<td>2020</td>
<td>96%</td>
</tr>
<tr>
<td>2021</td>
<td>95%</td>
</tr>
<tr>
<td>2022</td>
<td>88%</td>
</tr>
<tr>
<td>2023</td>
<td>96%</td>
</tr>
</tbody>
</table>
Our Future of Work

Invested in Canadian workspaces to enhance collaboration & facilitate hybrid workforce

- Transformed previously static areas for single task work into dynamic & flexible work spaces
- Repurposed large boardrooms into collaboration & training rooms
- Upgraded technology for increased hybrid meetings to reduce travel & carbon emissions while retaining global collaboration
Bus Comparative Life Cycle Assessment\(^1\) (FCmove\(^{\text{TM}}\)-HD)

**Life Cycle Emissions** (tCO\(_2\)e)

<table>
<thead>
<tr>
<th>Conventional Energy</th>
<th>Clean Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>Diesel</td>
</tr>
<tr>
<td>Electric</td>
<td>Electric</td>
</tr>
<tr>
<td>Fuel Cell</td>
<td>Fuel Cell</td>
</tr>
</tbody>
</table>

- **FCEB ~24% lower**
  - GHG emissions vs. electric bus (powered by green H\(_2\) & grid)
- **FCEB ~27% lower**
  - GHG emissions vs. diesel bus (powered by grey H\(_2\))
- **FCEB ~87% lower**
  - GHG emissions vs. diesel bus (powered by green H\(_2\) & grid)

1 See Slide Notes
Ballard’s sustainability impact

Ballard fuel cell technologies are facilitating the energy transition & helping customers achieve important emissions targets

- ‘Cradle to grave’ assessment\(^1\)
  - FCmove™-HD used in bus application has \(~87\%\) lower lifespan carbon footprint, when powered by green hydrogen, than conventional diesel bus
  - Aluminum & platinum account for \(~60\%\) of FC embodied emissions
  - \(~95\%\) of platinum reclaimed in used MEAs
- Mission Carbon Zero: Road to Carbon Neutrality
  - Targeting carbon neutrality of corporate emissions by 2030\(^2\)

In 2022, Ballard powered FCEVs prevented \(~53\) million gallons of consumed diesel\(^3\)

- \(~540,000\) t\(\text{CO}_2\) of emissions
- \(~598\) million pounds of coal burned

Annual carbon sequestered by \(~639,000\) acres of forest

ESG Ratings

\(^1\) \(^2\) \(^3\) See Slide Notes
Commitments for the Planet

**Mission Carbon Zero: Carbon Neutral by 2030**
Plan to achieve carbon neutrality for corporate emissions consists of six goals supporting decoupling of emissions growth from business growth.

<table>
<thead>
<tr>
<th>Key Performance Indicators</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2030 Target¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ emissions in scope 1 &amp; 2 (tCO₂e)</td>
<td>1,680</td>
<td>1,722</td>
<td>1,849</td>
<td>Neutrality by 2030</td>
</tr>
<tr>
<td>CO₂ emissions of corporate² scope 3 (tCO₂e)</td>
<td>2,579</td>
<td>3,224</td>
<td>4,484</td>
<td>50%</td>
</tr>
<tr>
<td>Emissions Intensity (tCO₂e / employee)</td>
<td>6.77</td>
<td>6.92</td>
<td>6.76</td>
<td></td>
</tr>
<tr>
<td>Emissions Intensity (tCO₂e / kW module)</td>
<td>0.34</td>
<td>0.40</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>% carbon free energy (scope 1+2)</td>
<td>72%</td>
<td>73%</td>
<td>72%</td>
<td>100%</td>
</tr>
<tr>
<td>% renewable electricity (scope 2)</td>
<td>96%</td>
<td>98%</td>
<td>98%</td>
<td></td>
</tr>
</tbody>
</table>

¹ See Slide Notes
Financial Outlook
Paul Dobson, CFO
Evolution to product company

- **Strategic evolution into a product company**
- Increased fuel cell sales revenue (absolute & proportion of total revenue)
- Resulting in **shift in cost structure, margin, & capital outlook**

1 See Slide Notes
Mid & long-term revenue outlook

- Annual revenue growth expected, largely **driven by power products growth**
- **Inflection point anticipated in latter half of decade** as H₂ production commissioned & TCU parity reached
Gross Margin analysis & outlook

• Targeting **mid-20s gross margin by 2030**
• Opportunities to expand beyond 2030
• Expansion driven by:
  • Product scaling & commercial volume sales
  • Cost reductions outpacing pricing pressure through evolution to core products & implementation of advanced manufacturing processes
  • Allocation of fixed overhead costs across larger revenue base
Total Operating Expense Outlook\textsuperscript{1,2}

- Total operating expenses expected to stay relatively flat in near-term
- Cost structure anticipated to decrease as a percent of revenue
- 2023 Total Opex Guidance $135 – 155M

\textsuperscript{1, 2} See Slide Notes
Capital Expenditure Outlook\textsuperscript{1,2}

- Incremental capital investment expected for capacity expansion in target markets in line with ‘Local for Local’ strategy
- **Planned capital allocation with some timing flexibility**, dependent upon revenue uptake & policy support opportunities
- ~$300M total capex\textsuperscript{2} anticipated between 2023 – 2027 to deliver forecast, roughly spread evenly per year
- 2023 capex guidance $40 – 60M

1, 2 See Slide Notes
Pathway to profitability

- Top line revenue growth, margin expansion & cost management required to achieve expected EBITDA breakeven in latter half of the decade

1 See Slide Notes
Balance sheet management

• Currently have ~$864M cash, no debt
• Focus on optimizing cash runway & maintaining balance sheet strength
• Organic growth prioritized over inorganic investment opportunities
• Exploring government funding opportunities to support growth plans
Ballard has **substantially grown its customer base** while existing customers have climbed the fuel cell maturity curve.

While **increasing market & regional diversification** with **growing proportion** of revenue & backlog **from power products**.

We have **achieved progress in stack cost reduction** & expect to bring module cost down with BOP components & new designs.

Fuel cell competition has increased, leading to **increased investment in R&D & manufacturing** capabilities to maintain technological leadership, enable cost down & achieve economies of scale.
Where is Ballard going & what to expect

- **Order Backlog Growth**: New customer platforms in key verticals & customers maturing in fuel cell adoption
- **Product Revenue Execution**: Increasing product driven revenue as fuel cell adoption scales
- **Cost Reduction**: Product volume scale, design evolution & advanced manufacturing
- **Revenue & Margin Expansion**: Top line revenue growth, achieving cost down targets & economies of scale
1. All Powertrain cases assume a purchased fleet size of 100 vehicles, a 4-year holding period of the truck, and 3rd party infrastructure for refueling. Majority of model inputs sourced from market/public data; Fuel Cell cost based on Ballard FCMove-XD product line. Energy pricing assumed Diesel $1.25/L flat, Electricity $0.40/kWh flat and green H2 of $13/kg in 2023 decreasing linearly to $6/kg in 2030. Long-haul duty cycle sourced from ICCT Fuel Efficiency Technology in European Heavy-Duty Vehicles.

2. Policy includes zero emission subsidy of 80% of the difference in truck capital cost relative to the equivalent diesel truck capped at €550,000 for trucks whose GVW is above 20 tonnes. 75% road toll exception for zero-emission trucks. Carbon tax burden on diesel is not included.

Slide 46
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Slide 47
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1. Based on company’s current business plans and the current business environment, which are subject to change. Actual results may differ materially. See Forward-Looking Statements.
Corporate emissions includes scope 1, 2 and partial scope 3

Total Operating Expenses refer to the measure reported in accordance with IFRS.

Ballard’s Life Cycle Assessment of City Buses Powered by Electricity, Hydrogenated Vegetable Oil or Diesel (Nordelof, A., Romare, M., Tivander, J. (2019). Life Cycle Assessment of City Buses Powered by Electricity Hydrogenated Vegetable Oil or Diesel. Transportation Research Part D: Transport and Environment, 75, 211-222. https://doi.org/10.1016/j.trd.2019.08.019), since it is a current study that provided a detailed breakdown of emissions for each vehicle type and life cycle stage.

Corporate emissions are defined within the Ballard Carbon Neutral Plan as scope 1, scope 2 and partial scope 3 emissions including employee commuting, business travel and hydrogen purchase for R&D activities. Analysis based on company’s current business plans and the current business environment, which are subject to change. Actual results may differ materially. See Forward-Looking Statements.

Calculation based on ~1,440 buses and ~2,230 trucks in service in 2022. Utilized average annual miles traveled, fuel economy, and fuel consumption as provided by the Federal Highway Administration highway statistics. Assumed all buses are ‘Transit Buses’ and trucks ‘Class 8 Trucks’ for derivation of approximate fuel consumption. Emissions calculations were derived using US EPA emissions equivalency calculation.

As of December 31, 2022; Based on company’s current business plans and the current business environment, which are subject to change. Actual results may differ materially. See Forward-Looking Statements.

As of May 31, 2022

Loan Le retired from the board of directors bringing our current percentage of female representation to 22%, and currently in process of recruiting a replacement.

Looking forward statements may differ materially. See Forward-Looking Statements.

Based on company’s current business plans and the current business environment, which are subject to change. Actual results may differ materially. See Forward-Looking Statements.

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