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IN FOCUS: BLDP- FUEL CELLS AND THE GROWING OPPORTUNITY IN THE MASS TRANSPORTATION MARKET IN CHINA

This issue focuses on Ballard Power Systems, Inc. (BLDP) and their advanced PEM Fuel Cell Technology and the Urban Mass Transportation Market in China.

Source: www.ballard.com

ABOUT BLDP

Ballard Power Systems Inc. engages in the development and commercialization of proton exchange membrane fuel cells worldwide. The company is primarily involved in the design, development, manufacture, sale, and service of fuel cell stacks, modules, and systems for various applications. Ballard also provides engineering services for various fuel cell applications. The company offers its fuel cell products for various applications, including heavy duty motive – i.e. buses and trams - portable power and material handling. Ballard Power Systems Inc. was founded in 1979 and is headquartered in Burnaby, Canada.

BLDP Business Snapshot

Founded: 1979
Headquarters: Burnaby, Canada
Nasdaq Ticker: BLDP (NASDAQ)
Toronto Exchange: BLD (TSX)
ETI Sector: Emerging EnergyTech
Website: www.ballard.com

BALLARD®

About EnergyTech Investor

EnergyTech Investor is a strategic advisory firm providing a broad portfolio of innovative investor content designed to leverage modern digital communication platforms. EnergyTech Investor was founded by Wall Street veteran Shawn Severson after seeing a fundamental shift in the investment community with the result being a shrinking knowledge base, a lack of awareness and less fundamental research being conducted on small and micro-cap companies.

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Participants

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President and CEO
Ballard Power Systems, Inc.
Mr. MacEwen has been the President and CEO as well as a member of the Board of Directors of Ballard since October 2014. Mr. MacEwen has held executive roles in clean energy companies for over 15 years. For example, Mr. MacEwen was the Founder and Managing Director of NextCleanTech LLC, a Ceantech consulting firm, he served as the President and CEO of Solar Integrated Technologies, Inc., a commercial rooftop solar company and he was the Executive Vice President of Corporate Development of Stuart Energy Systems Corporation, a leading supplier of hydrogen generation systems.

Mr. Shawn Severson
CEO and Editor-In-Chief
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Mr. Severson founded EnergyTech Investor in 2016 after seeing a significant communication and information gap developing between small and micro-cap companies and the financial community. Mr. Severson has over 20 years of experience as a senior research analyst covering the technology and cleantech industries.

Ballard Heavy Duty Fuel Cell Bus Module.

Mr. Severson: For investors that are new to Ballard, could you give us a brief description of what a fuel cell is and how it works?

Mr. MacEwen: Certainly – a fuel cell is a solid state device that, in the case of proton exchange membrane technology, combines hydrogen with ambient air to create electrical power. There are only a couple of by-products, one of which is heat and the other being water. Essentially, it's a zero emission technology. There are four different types of fuel cell technology. Ballard focuses on PEM, or Proton Exchange Membrane fuel cells. The uniqueness and value of PEM is that it's applicable for both stationary and motive applications – and, it's the only fuel cell technology that is adaptable to both types of application.

Mr. Severson: Fuel cells have been around for a number of years. What recently brought them into commercial light over the last five or so years?

Mr. MacEwen: Interestingly enough, I think two fundamental things: one is the performance and durability of PEM technology, which has improved significantly as technical design work has proceeded. They perform very competitively relative to other incumbent technologies against which we compete. The second major improvement in the last five or six years, is product cost reduction. In the case of Ballard's products, since 2009 our product costs have come down more than 60%.

Mr. Severson: When you look at the fuel cell opportunities or target markets, what are the real applications that are short-term and commercially viable?

Mr. MacEwen: We look at our business as really being built on two growth platforms: the first one is what we call Power Products. Within Power Products, there are several different commercial application areas that we sell products for. One of these is Heavy Duty Motive uses, particularly for buses and urban trams. The second Power Product area is Portable Power. Through Protonex – a Ballard subsidiary – we sell small, portable power manager devices to the military market – in fact, at the beginning of June Protonex received its largest ever order for 5.8 million dollars in

power manager products for the U.S. Army. We also see opportunities in the UAV market for which Protonex has developed a unique fuel cell that is currently being tested as a substitute for batteries and other power sources. The third Power Product area is Material Handling, where we provide power for forklift trucks and unmanned vehicles that run through distribution centers and warehouses.

We have a second growth platform that we call Technology Solutions, which involves the bundling or packaging of our market leading intellectual property portfolio, along with Ballard's intellectual capital. We sell these packages to customers to help them accelerate their own fuel cell programs, including global automotive companies, such as Volkswagen and Audi as well as companies in other verticals, such as the aerospace and rail industries.

Mr. Severson: Our focus today is on applications in the transportation sector, specifically vehicles in China. The transportation market for commercial vehicles is divided into two principal categories: internal combustion and electrification. Can you explain to investors what technologies could come together to create a fuel cell powered vehicle?

Mr. MacEwen: Let's focus the discussion on the Heavy Duty Motive market that we are aggressively selling into in the China market, as opposed to the car market. In terms of the Heavy Duty Motive side of things, including mass transit buses, what's required to be able to play in this space is to operate as part of a consortium of companies that bring all the right capabilities to the table. You need to deliver a functional, purpose-built design in the bus, and you need to execute as part of an effective consortium in order to do that.

The first player in the consortium is a bus OEM that is willing and able to design a purpose-built fuel cell bus, including the frame, suspension and coach. The second player needs to be a system integrator able to design and integrate an electric drive system. A third player is the hydrogen provider, or the gas provider that builds and installs the hydrogen refilling infrastructure for a bus or a fleet of buses and would deliver hydrogen to power the bus fleet. And of course, the fourth and critical component is a company that can provide the fuel cell technology. Ballard has been developing fuel cell technology for the bus market for many years now.

Mr. Severson: Can you help us understand the difference between a fuel cell powered bus and the diesel hybrid bus? Both technologies offer cleaner alternatives to traditional diesel internal combustion engine, but what is the difference between them?

Mr. MacEwen: While both the fuel cell and diesel hybrid bus use an electric drive system, the fundamental difference is the power plant. The fuel cell bus is a zero emission solution, whereas the diesel hybrid, while cleaner than a pure diesel bus as it combines batteries with a diesel engine, is of course not zero emission as it still uses a diesel engine. It is worth noting too that a fuel cell bus is in fact, typically a hybrid - it utilizes battery technology or ultra-capacitors to provide additional power for rapid acceleration of the bus. It's a good example of where fuel cells and batteries actually operate in a complementary way, as opposed to a competitively.

In terms of costs, a diesel hybrid which has been around now for over a decade and enjoys high volumes, today is typically less expensive than a fuel cell bus. However, the gap in terms of the cost differential has been closing pretty significantly over the last number of years for fuel cell buses where over the last five or six years, the cost of a fuel cell bus has come down by about 50%. Our latest generation fuel cell power module for buses, which we rolled out in the middle of 2015, is our 7th generation product and represents a 30% cost production from our 6th generation fuel cell module. And there are significant reductions in cost by all the players in the value chain.

Mr. Severson: Let's get back to the opportunity in China. I am sure that investors are interested in why this is an important market opportunity for Ballard. Could you talk a bit about the target applications in the commercial bus side and how this fits into Ballard's long-term strategy?

Mr. MacEwen: China has become extremely keen on addressing their quality issues, and they are the world's largest polluter. China contributes 27% of global greenhouse gas emission and that has become a serious issue. Many of us have seen photographs and images in the newspaper and on TV showing what happens during a Red Alert for example. A Red Alert represents the worst level of air quality. Last December, there were ten different cities in China under Red Alerts at the same time and many others at severe pollution levels. You can combine

that problem with the fact that urbanization is happening at a tremendous scale in China – a very large number of vehicles are being purchased and used in cities, and it means that the move to cleaner mass transit is an absolute imperative. At the same time, the market for buses in China is the largest anywhere in the world. In 2015, China manufactured more than 300,000 buses, which included more than 20,000 electric buses - a significant investment in cleaner technology. Compare that to just 5,000 new buses in a typical year in North America - so it's a very large addressable market with a very real problem.

It's also worth noting too that China is focusing on a wider range of bus sizes than just the typical North American 40-foot bus, and is also looking at using fuel cells for both prime power as well as range extension. Ballard has responded to this by developing in the last year alone new power modules in the 30kW and 60kW size, in addition to the current 85kW module typically used in North America and Europe for transit buses. So we are well positioned to participate in the full range of buses also and commercial vehicles beyond buses.

Mr. Severson: Based on your answer, it is safe to say that the driver in China is more oriented around emissions control in the regulatory environment versus relative cost to diesel. Is this an emissions issue, not a cost of fuel issue?

Mr. MacEwen: You know, it's a good question, it's actually both. On the one hand, I think they feel that they absolutely have to do something about introducing cleaner mass transit, but they are not going to do it at a higher cost than they think is reasonable.

Mr. Severson: How much revenue does Ballard currently have in transportation applications in China so we better understand your starting point?

Mr. MacEwen: During 2015, we have signed transportation-related contracts in China that have a value of 48 million dollars. In 2015, Ballard as a company did total revenue of about 56.5 million dollars. As you can see, it is a very significant series of contracts that we signed in China during 2015. The contracts contributed to a record order book by early 2016 of 58 million dollars, all for delivery during 2016. That order book includes the largest fuel cell bus deal that has ever been announced anywhere in the world for 300 buses. It also included two deals worth 9 million dollars related to urban trams, which is an interesting part of the solution in China as well. As a result of our contracts in China, we saw a 91% year-on-year increase in our Heavy Duty Motive revenue level in Q1 this year, to 3.3 million dollars.

Mr. Severson: So, this is not something that is way out in the future - this is real business today and real commercial activity for Ballard. Can you discuss what brought that together over the last 12 months - were there changes in subsidy programs in China or what was the convergence that drove that business in 2015 and into 2016?

Mr. MacEwen: Ballard has been involved in the China market for several years now and the success was not an overnight sensation; it's been a lot of hard work for the last several years in terms of building relationships. What is really helping fuel cells break into the mass transportation market in China are a couple of things. One is absolutely the introduction of national and regional subsidies for fuel cell buses, which today put the price of a fuel cell bus at parity, or even lower than, a diesel bus in China. And the subsidy for hydrogen fueling stations covers about 50% of that cost, as well.

In addition to that, in March the 13th five-year plan was released in China, which has put even more focus on a cleaner environment. The five-year plan includes some very specific goals. For example, reduction in emissions per unit of GDP in the range of 40-45% by 2020, compared to 2005 levels. Also, the plan calls for an increase in the share of non-fossil fuel energy to 15% by the year 2020. These are some of the targets that each of the provinces in China are being asked to address and deliver.

Mr. Severson: On a slightly different topic, Ballard recently announced that China's Guangdong Province made a special visit to your headquarters in Burnaby, Canada. Could you talk a bit about your relationship with the Guangdong Province and how you are planning to develop and enter this market?

Mr. MacEwen: Ballard has a number of good working relationships with players in the Guangdong Province, including both industrial as well as government officials. Guangdong is the most populous province in China – it has over 100M people. It also accounts for about 25% of China's international trade, so the Province represents a tremendous opportunity. To have the Party Secretary visit our premises and sign a letter of intent to do more business with us is very exciting. We already have a robust relationship with a

company called Guangdong Synergy and we have done a number of commercial transactions with them. Synergy is very well-placed in terms of their downstream transportation OEM relationships with system integrators and relationships with the government.

We know that Guangdong province is keen to localize assembly and manufacturing and that's part of their strategy to reduce cost. What Ballard has done in terms of the way we are approaching the market is to structure deals that involve licensing the IP to enable local assembly of our fuel cell modules for buses. While we would retain manufacture and supply of the fuel cell stacks in our British Columbia facility, we would help customers in China to ramp up using our intellectual property so they can assemble the product locally. While they can acquire some of the balance of plant components locally at lower cost, and can use local labor at lower cost, Ballard will still retain control of the intellectual property that resides within our fuel cell stack.

Mr. Severson: To continue on the same topic, let's talk about the progress in China. As we know, China is one of the largest markets for new energy heavy-duty motive vehicles in the world, including urban trams. Could you tell us a bit about the agreement that you have in place for different applications and also how this could affect your revenues during 2016?

Mr. MacEwen: We have fuel cell module contracts that are in place to support the deployment of more than 330 buses in China. In addition, we signed two contracts in 2015 related to trams with a company called CRRC, which is China's largest train OEM. As a result of those contracts, we are in the process of developing a fairly large 200-kilowatt fuel cell engine that will be used to power trams. In fact, Ballard recently powered a tram as part of an initial demonstration of a fuel cell tram in China, which was a very successful event that occurred, again in Guangdong Province.

We have not provided revenue guidance for 2016 so I can't really give you specifics around revenue that we expect with the China market, but I can tell you that we anticipate a milestone here in terms of Heavy Duty Motive revenue, which will primarily be the result of our work in China.

Mr. Severson: Understood. Let's address some of your longer term strategic initiatives in China. What deliverables should investors be expecting to track your progress in China?

Mr. MacEwen: I think the first deliverable investors should be looking for are the successful delivery of modules, parts kits and fuel cell stacks necessary to fulfill the contracts that Ballard has signed in 2015 and 2016. The second thing to look for is the delivery of the prototype fuel cell engines that I just referred to for urban trams, which will be an important first step in opening that application area and will be a very new and interesting application for fuel cells. Thirdly, investors should look for announcements of further contracts. Ballard is in discussion with a number of potential partners and customers in China, which should lead to further business and continue to fill the sales pipeline.

Mr. Severson: What additional investments need to be made to execute your strategy in China at this point?

Mr. MacEwen: Currently, there is nothing of any significance that is needed in order for us to execute on the strategy. As mentioned before, we do intend to produce fuel cell stacks at our headquarter facility in British-Columbia and we have available capacity in that facility so there are not any significant capital investments that will be required for some time yet. Of course, we are going to be investing in additional people to provide support and to deliver products to the customers in China.

Mr. Severson: I think it's pretty clear that you see the China commercial transportation market as a tremendous opportunity for Ballard. How would you address the concerns people have about the profitability of this market in China and the mass transportation and the margins in that market?

Mr. MacEwen: The key to being successful in China for us is going to be two things: finding creative ways to support localization; and working with the right partners that have the strong relationship networks, that have deep enough pockets to support the venture, and that are truly motivated to get the products to market. We are doing both of those pretty well today.

Localization of course means it is going to be a key to cost reduction from the Chinese perspective, in terms of both securing component parts locally in addition to lower labor costs. That is going well and that's going to help to drive down the production cost in

China. We could potentially utilize these relationships to manufacture fuel cell modules for buses that we could ship to other parts of the world which would lower our costs for global delivery. Our strategy has positioned Ballard to be the major fuel cell player in the world's largest mass transit market, which is going to drive compelling topline and bottom line results. Again we haven't given guidelines on breakeven or on revenue, so I can't really be specific about the numbers.

Mr. Severson: Understood. Thank you very much, Randy. It's a very exciting story and we look forward to catching up with you again in the near future for an update.

Mr. MacEwen: Great, thank you Shawn.

SHAWN SEVERSON
CEO AND EDITOR-IN-CHIEF

Mr. Severson founded EnergyTech Investor in 2015 after seeing a significant communication and information gap developing between small and micro-cap companies and the financial community. Mr. Severson has over 20 years of experience as a senior research analyst covering the technology and cleantech industries. Previously, he was Managing Director at the Blueshirt Group where he was the head of the Energy, Environmental and Industrial Technologies practice. The Blueshirt Group is a leading Investor Relations consulting firm focused on growth companies. Mr. Severson was at JMP Securities where he was a Senior Equity Research Analyst and Managing Director of the firm's Energy, Environmental & Industrial Technologies research team. Prior to JMP, he held senior positions at ThinkEquity, Robert W. Baird (London) and Raymond James. He began his career as an Equity Research Associate at Kemper Securities. He was frequently ranked as a top research analyst including one of the Wall Street Journal's "Best on the Street" stock pickers and multiple awards as Starmine's top three stock pickers.

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