

ETI ALPHADIRECT MANAGEMENT SERIES

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IN FOCUS: BALLARD POWER SYSTEMS' STRATEGY IN CHINA

This interview focuses on Ballard Power Systems Inc. (BLDP), its China Joint Venture and China growth strategy.



Source: www.alphadirectadvisors.com

THE ALPHADIRECT INSIGHT

The China fuel cell market presents a tremendous growth opportunity and the country has one of the world's most aggressive plans to eliminate fossil fuel-powered vehicles and pollution. We believe that Ballard is well positioned with its strong competitive advantages, including high-performance and durable products, which is demonstrated by Ballard's ~66% market share of the 3,600 fuel cell electric vehicles currently deployed in China. This momentum and dominance in China is likely to be strengthened further by its strategic collaboration with Weichai Power. Weichai Power has Tier 1 relationships with many of the vehicle OEMs in China and is one of the world's largest suppliers of diesel engines for heavy-duty trucks. As part of this agreement Ballard expects its joint venture with Weichai to be commissioned by the end of 2019. In the interim Ballard recently announced the closing of a \$44M sales agreement with the JV, with delivery anticipated to start during Q4. The components will be assembled in China to meet a portion of Weichai's initial commitment to power at least 2,000 fuel cell electric vehicles by 2021. In summary, we believe China will remain the largest market in the world for fuel cell electric vehicles in the years to come and Ballard looks to be very well positioned to leverage this growth opportunity.

BLDP Business Snapshot

Founded: 1979

Headquarters: Burnaby, Canada

Ticker: BLDP (NASDAQ/TSX)

Stock Price: USD\$4.01*

Market Cap: USD\$934.3M*

Website: www.ballard.com

*As of June 7, 2019



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Participants

Alfred Wong **Managing Director, Asia Pacific** **Ballard Power Systems**

Mr. Alfred Wong is the Managing Director of Asia Pacific at Ballard Power Systems Inc. Currently based in China. Mr. Wong is responsible for management and oversight of the company's subsidiary and joint ventures at three operating locations in the country, as well as the development of emerging opportunities in the rest of the APAC region. In his 19 years at Ballard Mr. Wong has held leadership positions in R&D, technology development, sales, business development and general management. He is a licensed Professional Engineer (Canada), and holds B.A.Sc. and M.Eng. degrees in Mechanical Engineering from the University of British Columbia, an MBA degree and has completed executive education training at Stanford University.

Mr. Shawn Severson **Founding Partner** **alphaDIRECT Advisors**

Mr. Severson is the Founding Partner of *alphaDIRECT* Advisors (ADA), a division of EnergyTech Investor, LLC (ETI). He has over 20 years of experience as a senior research analyst covering the technology and cleantech industries. Prior to founding *alphaDIRECT* Advisors, he led the Energy, Environmental and Industrial Technologies practice at the Blueshirt Group. Mr. Severson 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.

ABOUT BALLARD POWER SYSTEMS

Ballard a Canadian public company headquartered in Burnaby, British Columbia and is listed on both NASDAQ and the Toronto Stock Exchange under the ticker BLDP.

The Company provides clean energy products – utilizing fuel cell technology – that reduce customers' costs and risks, and helps customers solve difficult technical challenges or address new business opportunities.

For further information please visit www.ballard.com.



Alfred Wong, Managing Director, Asia Pacific
Source: www.ballard.com

Shawn Severson: First, I would like to thank you, Alfred, for taking the time to speak with us today. The last time that we spoke with Ballard Power Systems, we discussed the evolution of the European Market for fuel cells. Today, our focus will be on your strategy for one of the biggest addressable fuel cell markets, namely China. Before we get started, could you give us a brief introduction of yourself and what brought you to Ballard?

Alfred Wong: Sure, thanks for having me here today, Shawn. My name is Alfred Wong and I am the Managing Director, Asia Pacific for Ballard Power Systems. I have been at Ballard for 19 years now and originally started as an engineer in the technology R&D department, after which I moved into business development in 2008. I relocated to China in 2017 to start our first foreign Ballard office there. When I started this initial China market entry 11 years ago, things were very different and with very little awareness for the fuel cell technology. However, I knew that over time our technology would have tremendous potential, and I've been fortunate to have the opportunity to lead the growth of this business from zero to one of our most strategically important markets today.

Shawn Severson: Thank you, Alfred. Firstly, we know that the China market is a great growth opportunity and as an introduction to this discussion, can you talk a bit about China's development plan to eliminate fossil fuel-powered vehicles?

Alfred Wong: China has one of the world's most aggressive plans to eliminate fossil fuel-powered vehicles and it all started back in 2017 when Beijing first announced their plans to eventually phase out petrol vehicles across the national in favor of NEVs, or New Energy Vehicles, which include fully electric,

hybrid, and fuel cell vehicles. In January 2019, China stopped allowing new fossil-fueled vehicle factories to be built by banning investments into new companies that only make such vehicles and imposed strict restrictions and conditions on existing factories that are looking to increase production capacity.

At a regional level, city governments of Shenzhen, Foshan, amongst others have put plans in place to use only zero emission public transit buses powered by battery electric or fuel cell electric technologies going forward. The province of Hainan took that one step further by becoming the first region to announce that it will completely ban sales of all fossil-fueled vehicles starting in 2030. I expect we will see an accelerated pace to such announcements going forward as more provincial and local governments, including Shandong, Guangdong and Shanghai, introduce their own initiatives to address air quality and other emission related issues.

Shawn Severson: So, Ballard is now in about 66% of the 3,600 fuel cell electric vehicles (FCEVs) deployed in China. Can you discuss your FCEV strategy and business model for the China market?

Alfred Wong: So, let me start by addressing the first part of your question regarding our China FCEV strategy. Consistent with the rest of the world, we will continue to focus initially on the heavy and medium duty vehicle segments – namely buses, trucks, rail, and marine – where the value proposition of PEM fuel cells is the strongest under use-cases requiring long-range, fast-refueling, full route-flexibility, and heavy-payload capacity. These are also the same use cases that typically involve centralized depot refueling and represent a disproportionate amount of greenhouse gas emissions and air pollutants.

Ballard has a very strong competitive advantage in these applications where requirements for high-performance and durability are needed to compete with incumbent technologies. We now have multiple fleets of buses and commercial trucks in the field with our partners and expect to see more growth ahead. Later this year we expect to see the world's first fuel cell powered light-rail tram by CRRC put into commercial public service, which is a highly anticipated event in the industry. Beyond heavy and medium duty vehicles, we are also seeing early demonstration activities for passenger vehicles and expect that market to expand in the coming years.

Something that is not well understood yet is the fact that fuel cells and batteries can be used in a complementary fashion – rather than as substitutes – with the fuel cell effectively charging a battery while the vehicle is in operation. This hybrid configuration extends the vehicle range and this design is very popular in China.

From the business model side, our strategy in China has evolved over the years along with the early-stage and high-growth nature of the market. Not unlike other technology companies entering into China, we initially started with direct exports from Canada, and moved into license manufacturing arrangements when volumes started to pick up, and then into joint ventures with increasing ownership as we gained additional insights on the market opportunities and understanding of risks.

In all cases, we have put a strong emphasis on protecting our core IP, namely the membrane electrode assembly, or MEA, which is the core component of any fuel cell system. At Ballard, we will continue to innovate, manufacture and supply MEAs to our joint ventures, which would then

produce stacks for integration into complete fuel cell systems and powertrains by specialized integrators or vehicle OEMs.

Shawn Severson: Let's talk about your strategic collaboration with Weichai Power and the transaction that closed in November of last year. Can you discuss the three key elements of the collaboration and how it relates to Ballard's growth and developments in the China market?

Alfred Wong: Sure Shawn. There are three key elements to our collaboration with Weichai, which closed in Q4 2018. First, Weichai made a strategic equity investment in Ballard in the amount of \$163.6 million for 19.9% interest in the company. Second is the establishment of a joint venture company in Shandong Province for the production of Ballard's next generation LCS fuel cell stack and LCS-based power modules for the bus, commercial truck, and forklift markets in China. The JV will pay \$90 million to Ballard for the technology transfer of related technologies. And, third is supply of certain products and components by Ballard to Weichai to support an initial 2,000 fuel cell electric vehicle deployment. All combined, this program will allow Ballard to accelerate our product development, improve supply chain localization, enable closer powertrain integration, and widen our market access through the strength of Weichai.

Shawn Severson: What do you think makes Weichai a strong partner for Ballard? What specifically does it bring to the table for you?

Alfred Wong: What makes Weichai a unique partner is the complementary strengths it can bring to Ballard in many different functional areas, from commercial to technical and operational.

On the commercial side, as the largest supplier of diesel engines for heavy-duty trucks in China, Weichai already has strong sales and service relationships with most of the vehicle OEMs in China looking to develop fuel cell product offerings. We are also engaging in opportunities to work more closely with their vertically integrated bus and truck companies, including Zhongtong, Asiastar, Sinotruk, and Shannxi Heavy Duty Trucks. We see similar opportunities beyond China as well, where we could for example leverage Weichai's relationship with the KION Group in Germany, which is the world's 2nd largest forklift company, to access the material handling market.

On the technical side, Weichai has invested heavily over the years in the development of engines and new energy vehicle powertrain and components, as well as infrastructure for testing and analysis. We expect to benefit from having an opportunity to work closely together at the engine design, powertrain and vehicle integration levels to improve our product offerings. We also expect Weichai to bring strong capabilities for design for volume manufacturing.

Lastly, on the operational side, we expect Weichai to bring tremendous knowledge on high volume production and quality processes and systems, as well as strength in supply chain management. These elements are critically important to us as we look to drive scale and reduce cost in the large China market.

Shawn Severson: How is the work going to establish the joint venture and when do you anticipate production to begin there?

Alfred Wong: Getting the joint venture up and running has been a priority for both Ballard and Weichai since the end of 2018 and we're making good progress so far.

Any time you put a new entity together there is a lot of work that goes into organizing the people, the facilities, and the business systems.

Our initial focus has been on getting the first batch of JV technical staff trained through our technology transfer program and on planning and procuring capital equipment for manufacturing and development. In Q3 of this year we expect to move into our new facility which is currently under construction on the Weichai campus in Weifang, Shandong. We anticipate our stack and module production lines to be ready near the end of 2019 with full commissioning in early 2020.

Shawn Severson: Growth in China was somewhat slower than anticipated during 2018 – do you see the hydrogen fueling infrastructure issue being addressed in a timely fashion?

Alfred Wong: Yes, I do. The expansion of hydrogen refueling infrastructure has been one of the key pacing items on growth of this industry. In the last few years, we have seen certain obstacles in this area related to insufficient industry standards, which has led to issues on technical requirements, safety regulations, site restrictions, and confusion over responsibility and authority between government bodies. As a result, we have seen slow application approval and licensing as well as increased project costs.

Now, the good news is that many of these challenges are currently well recognized, and in the most recent NEV policy update in March, the government has emphasized that it will increase coordinated effort and support specifically on this subject. A number of regions within Guangdong, Shanghai / Jiangsu, Shandong and Wuhan, amongst others have already announced

specific hydrogen fueling station policies and plans to address prior concerns and to facilitate accelerated build out of new stations.

Shawn Severson: What about the subsidy regime – is that going to be impediment to further market penetration in China? I understand that battery electric vehicle subsidies are expected to be reduced and some improvements are expected to be announced for FCEV subsidies, effective end-June this year.

Alfred Wong: I believe it is important to remember that government subsidies are meant to act as a stimulus to help accelerate the commercialization of an industry. Ultimately, we should expect to see a subsidy reduction over time with increasing market scale and cost reduction. We have seen this play out in the wind and solar industries and are now seeing the same for battery electric vehicles. We are not there yet with the hydrogen and fuel cell industry and I believe the government recognizes that strong support is still needed at this time.

Although the details of the upcoming FCEV subsidy revisions are currently unknown, we anticipate the updates to cover a number of key themes, including the possibility of higher technical requirements, more focus on hydrogen refueling infrastructure, and increased coordination between the different key regions. I believe the new initiatives will be designed to support further systemic and sustained growth of the market rather than to impede on further penetration.

Shawn Severson: You are currently supporting Broad-Ocean's subsidiary "Shanghai EDrive", which is a licensed fuel cell engine assembly operation in Shanghai.

You previously announced that this operation would be up and running by the end of 2018. Can you provide us with an update?

Alfred Wong: The Shanghai E-Drive MD30 assembly operations in Shanghai has actually been up and running since the end of 2017. In 2018, the facility completed the assembly and commissioning of over 600 modules that have subsequently been integrated into 7.5 ton logistics trucks for use in cargo delivery. Both parties have learned tremendously from that program.

Shawn Severson: What is the current situation with respect to the Broad-Ocean Motor relationship and where do you see that going over time?

Alfred Wong: We have always had a very strong relationship with Broad-Ocean Motor and expect that to continue for a long time. Broad-Ocean committed to remain as a 9.9% shareholder of Ballard with an additional capital contribution at the closing of our Weichai transaction in Q4 last year, which speaks volumes to its belief in and commitment to our strategic direction. On the commercial side, we continue to seek opportunities to deploy 9SSL-based licensed products in the market, as well as to collaborate on product line expansion and improvements.

Shawn Severson: You also have a second joint venture facility in China. Can you briefly talk about the joint venture with Guangdong Synergy in Yunfu and the most recent strategic developments since the facility officially opened in September of 2017.

Alfred Wong: We are continuing to support our JV with Guangdong Synergy on the production of current generation 9SSL fuel cell stacks. The factory there has been

operating for the past year, producing high quality Ballard-designed stack products for the Chinese market.

Alfred Wong: Thank you very much Shawn.

We expect the 9SSL product line to co-exist with the LCS product for a number of years to meet the demands from system integrators that have invested in great product designs around that platform. Products produced from the Yunfu factory are now powering hundreds of vehicles that operating in China today.

Shawn Severson: Thank you very much, Alfred. We look forward talking more with Ballard in the near future.

SHAWN SEVERSON FOUNDING PARTNER

Mr. Severson founded *alphaDIRECT* Advisors (ADA), a division of EnergyTech Investor, LLC 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. Previously, he was Managing Director at the Blueshirt Group where he was the head of the Energy, Environmental and Industrial Technologies practice. Prior to the Blueshirt Group, 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. Before joining 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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