ELECTROVAYA, INC.
(OTCMKTS:EFLVF TSX: EFL)

Two Key Battery Platforms to Drive Growth in Commercial Scale Lithium-Ion and Solid-State Batteries (SSBs) On The Horizon

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KEY POINTS

- Dr. Raj DasGupta talks about Electrovaya's breakthrough technology, target market, competition, financial expectations, and more.
- The company holds over 100 patents for its technology and processes, focusing on two disruptive tech platforms, i.e., Infinity and Solid State.
- Infinity is based on lithium-ion ceramic technology. It offers industry-leading safety and the highest longevity without compromising energy and power versus competing for lithium-ion technologies. The second focus is next-generation solid-state batteries (SSB), which are still in the nascent stage but are a natural evolution.
- The Infinity platform is a proven technology that has already been installed in around 20,000 Mercedes Smart automobiles and thousands of material-handling (MH) vehicles, many of which are produced by Raymond, a Toyota group subsidiary.
- Electrovaya targets applications that need one or two recharge cycles daily (MH vehicles, e-buses, and e-trucks). MH is on top of that list, and the company has made a very strong entry into that segment, potentially a $20 billion addressable market.
- The company intends to displace the lead-acid battery technology and internal combustion engines on vehicles of end-users who resist adopting the transition to electric because of very high cycling rates.
- The company reiterated its revenue guidance of ~$27 million for FY22 and foresees immense opportunity in the retrofit market. It expects to achieve positive adjusted EBITDA in fiscal year 2022.
- Electrovaya does not expect any capacity constraints for the next two years and is trying to localize the supply chain by keeping it in North America to shorten lead times for better control.
- Our prior content on EFL can be accessed HERE.

KEY STATISTICS

Price*	$0.68
52-Week Range	$0.55 - $1.78
Avg. Daily Vol. (30 day)	54,719
Shares Out (MM)	146.31
Market Cap ($MM)	$99.48
Enterprise Value ($MM)	$103.52
Revenue TTM ($MM)	$8.45
Fiscal Year End	September

Source: YCharts, as of March 9, 2022

OUR INSIGHTS

The Opportunities

Electrovaya is uniquely positioned to leverage the rapid growth in lithium-ion battery demand. Demonstrating the company's progress and technology are its strategic relationships with major OEMs, including Raymond and Toyota. In addition, Electrovaya batteries are being used by major material-handling customers, including Walmart, Mars, Home Depot, and a large online retailer. Additionally, there is also a robust opportunity to retrofit existing lithium-ion units from lead-acid batteries. The company believes there are additional opportunities in buses and Class 3 trucks, and recently inked a supply agreement with Vicinity Motors. Solid-state batteries represent the second stage of growth and are a sea change technology under development, with 2023 targeted for launch.

The Obstacles

The company has successfully pivoted from e-passenger cars to material handling and commercial vehicles. However, there is still execution risk as the company grows its commercial presence. Furthermore, the performance and commercial viability of the company's SSB platform is still unknown.

COMPANY OVERVIEW

Electrovaya is a leading manufacturer of safe and long-lasting lithium-ion batteries with differentiated performance and safety attributes, according to the company. The company has two primary battery platforms: Infinity and Solid State. The Infinity battery platform targets commercial vehicles, including lithium-ion e-forklift, e-bus, and e-trucks. This product has been launched commercially through global partners, including Toyota, Raymond, and Walmart. To date, Infinity sales have been primarily to the material handling industry, where lithium-ion batteries are replacing lead-acid batteries and, to some degree, fuel cells. The company's batteries can also be used in larger grid-scale energy storage. The Solid State platform (SSB) is under development and targeted to launch in 2023, focusing on creating the lowest initial $/energy (kWh) and highest energy density. The target market for SSB will be e-passenger cars where a low initial cost (sticker price) is required. Electovaya sells its battery solutions through two primary channels: OEM strategic supply agreements and a direct sales force. It primarily utilizes strategic partners for battery sales into new equipment or vehicle production and its direct sales force for the retrofit market. In addition to the two battery platforms, Electrovaya also develops cells, modules, battery management systems, software, and firmware necessary to deliver the systems. Electrovaya has substantial intellectual property in the lithium-ion battery sector and continues to carry out research and development activities in lithium-ion batteries, with over 100 patents in their portfolio. In June 2021, a new operating division named Electrovaya Labs was formed to focus on the R&D and commercialization of other disruptive technologies, including next-gen solid-state cells and a unique patented electrode processing technology. Electrovaya Inc. was founded in 1996 and is headquartered in Mississauga, Canada.

The Technology

Infinity Battery Platform: According to Grand View Research, the global lithium-ion battery market was valued at $53.6 billion in 2020 and is expected to cross $216.5 billion by 2028, representing a CAGR of 19%. The Infinity lithium batteries are based on proprietary ceramic technologies, allowing improved safety and longevity without compromising energy and power. The EV-44 is Electrovaya's primary lithium-ion ceramic cell and meets the most stringent safety, energy density, cycle life, and performance standards. In addition, Electrovaya's battery systems are designed to be scaled through a modular approach, which provides flexibility for an application's specific capacity requirements.

Solid State Platform: According to Grand View Research, the global solid-state battery market was valued at $590.9 million in 2020 and is expected to cross $5.3 billion by 2028, representing a CAGR of 36%. Electrovaya believes it is well-positioned for this next-generation battery technology. Its division, Electrovaya Labs, focuses on developing solid-state battery technology, among others, and has targeted 2023 for the debut of its solid-state battery platform.

Battery Management Systems: Electrovaya's fifth-generation BMS provides the highest levels of cell balancing, IoT functionality, and safety. Reviewed and certified by UL to UL991 and UL1998 for specific applications, it is available for both low voltage and high voltage battery systems. Electrovaya's hardware and firmware engineering team keep advancing and improving this technology to keep up with the increasing demands of the e-mobility industry. Electrovaya has launched a cloud-based battery analytics system for recurring revenues with a subscription model. The system monitors battery health, utilization, and charging to provide customers with optimized fleet and charging management. Furthermore, the system improves the capability and efficiency of troubleshooting and maintenance. Several customers have started using this analytics system.

The Markets

Material Handling: The material handling industry is undergoing a massive sea change from lead-acid batteries to alternative power sources, including lithium-ion and fuel cells. Electrovaya is having notable success in penetrating the material handling market as management believes it has arguably the highest performing battery solution in the market today. In addition, the company's customers have proven meaningful RIOs in material handling when compared to lead-acid, showing paybacks as short as a month, opening a significant opportunity for new units sold, as well as retrofits.

E-Mobility: In October. 2021, Electrovaya announced a strategic supply agreement with e-bus and e-truck manufacturer Vicinity Motor Corp. for EV buses and fully electric VMC 1200 Class 3 trucks. Management believes this is opening a new market for their batteries, and it is targeting further development and commercialization in this market. The company's solid-state battery platform will also target this market, with an expected launch date in 2023.

EXECUTIVE DISCUSSION

Executives in Focus: Dr. Raj DasGupta has been with Electrovaya since 2009 and serves as COO.

Shawn Severson: Let's begin, Raj, with a little background on yourself and Electrovaya.

Raj DasGupta: I am the COO of Electrovaya and have been with the company since 2009, after earning a Ph.D. in lithium-ion batteries from Cambridge University, and studying at MIT and Imperial College, researching lithium-Ion batteries. Electrovaya has been in the lithium-ion space. We have a lot of key IPs and are an extremely nimble player. We have always bet on new technology and banked on improvements in our existing technology when going against much larger, better-funded competitors. That is a testament to our team and our sound business direction.

Shawn Severson: So Electrovaya has been a technology company from the beginning that focuses on a couple of key areas of research.

Raj DasGupta: For sure. We have over 100 patents and focus on two disruptive technology platforms. The first, called the Infinity platform, is a recent technology breakthrough based on lithium-ion ceramic technology. This offers industry-leading safety and the highest longevity for lithium-ion technologies versus the competition without compromising energy and power. Our second focus is next-generation solid-state batteries (SSB).

Shawn Severson: You are working on SSB through Electrovaya Labs, your R&D unit. Do you have some commercial targets for that?

Raj DasGupta: Yes, but first our lithium-ion ceramic technology is called Infinity because batteries made from it can go on forever. It's a validated technology that has already been deployed in about 20,000 Mercedes smart cars and several thousand material-handling vehicles, many of which are manufactured by Raymond, a Toyota group company. The latter is a focus area for us. The technology is based on a full ceramic separator membrane combined with specialized electrolyte and cell design. This enables a super long lifecycle and way more safety than typical lithium-ion batteries. We target the heavy-duty vehicle market, such as material-handling vehicles, electric buses, and electric trucks.

The second platform, which is not well-known, is coming out of Electrovaya Labs. Because we have quite a bit of know-how about separator and electrolyte designs, this has been a natural evolution for us. It is a semi-stealth operation now, but we plan to make it better known in the coming weeks—lots of patents being filed, keeping our patent attorneys fully employed.

Shawn Severson: Talk a bit about your sales and target markets. Where is this today, and where do you see it in the future. Could you give us a roadmap?

Raj DasGupta: So the first thing is that we always ensure good gross margins from our products. We are not into capturing market share at the expense of losing money. The Infinity platform focuses on applications where the end-users or customers will get a significant return on investment, which is why we are focusing on heavy-duty and commercial vehicles that will cycle the batteries extensively. Cycling is about battery throughput. EVs are typically not very heavily used; they go through one battery cycle once or twice a week. We are targeting applications that need one or two cycles per day. Material handling is on top of that list, and we have made a very strong entry into that segment, plus it is potentially a $20 billion addressable market. We have partnered with the largest OEM out there. Our clients are among the largest end-users of material-handling vehicles. There are still early days, but we are making a good land grab there. Our higher cycling technology gives customers the lowest cost of ownership.

Shawn Severson: What are you displacing in the market? And why is your particular battery a good replacement solution?

Raj DasGupta: For the most part, we are displacing the lead-acid battery technology, but that's not the only one. A truck would have three lead-acid batteries swapped after every shift in a typical distribution operation. This is the normal operating expense. We replace that with a single battery and sometimes with a much lower ratio of chargers. We can do this because the battery cycles for much longer, and we can also charge it rapidly.

Second, we are also displacing internal combustion engines. Some end-users could not switch to electric because their energy throughput was so high that even

three lead-acid batteries couldn't make their operations work. We have managed to do those work.

Shawn Severson: All this creates an ROI for users, right?

Raj DasGupta: Yes, we provide a very good ROI on these solutions, even though the capital expenditure can be quite a bit higher compared with incumbent lead-acid technologies. That is because of higher energy efficiency and better operational efficiency—there is no need to switch batteries, and the performance of vehicles is better, along with longevity. Walmart has been using our batteries for over four years now, with no degradation in performance or capacity.

Shawn Severson: Raymond Toyota, the largest material-handling equipment company, uses your technology. Can you tell us more about that relationship—how it came about and what it means for your investor.

Raj DasGupta: Raymond is the premium electric brand and is a 100% subsidiary of the Toyota material handling group, and it makes only electric forklifts. In a sense, they are one of the largest EV manufacturers. They know batteries through and through.

Partnering with them involved a long process of due diligence. They tested our battery systems in their labs, and they outsourced some testing to external third parties. Then there were extensive safety requirements. We became their partner by proving that we are superior to the competition in safety and performance. Material handling companies are very sensitive to safety because their vehicles operate within buildings. A fire can burn the whole place down. Many of these warehouses will have over 200 EVs operating inside. So safety is key to their selection process and requirements. Raymond/Toyota could have used batteries from any global supplier; they decided instead to sign a strategic supply agreement with Electrovaya

Shawn Severson: What is Electrovaya's competitive environment?

Raj DasGupta: In terms of safety and lifecycle, no one to my knowledge comes close to us in the lithium-ion battery segment. There are some great competitors in the material-handling space, such as Plug Power. But Plug is not a lithium-ion battery manufacturer but into fuel cells. They derive a majority of revenue from the material-handling industry. We look at them as market makers for next-generation technology in that industry. As for other lithium-ion battery makers, most focus on increasing energy density. We have this great breakthrough technology that provides superior safety and lifecycle. A good comparison would be Microvast, which focuses on higher safety levels in their technology. They are, of course, quite a bit larger than us—something we are hoping to change with time.

Shawn Severson: This will be a huge market, and you have a clear advantage in the material-handling space over competitors because of customers such as Raymond Toyota.

Raj DasGupta: Yes, the lithium-ion battery space will be enormous. There will be many applications, but there will be one dominant player. Our next-generation SSB technology will also stand out. We have seen very good results and are very excited.

Shawn Severson: You have reiterated your $27 million revenue number. Please help us understand what your order book looks like and the reason behind the confidence in your guidance.

Raj DasGupta: A vast majority of the revenue comes from the material-handling segment and a little bit from batteries going into automated guided vehicles, or AGVs. The $27 million is a combination of purchase orders in hand and visible indications about demand in 2022 from Raymond and another key end-user. Our production planning is set for that goal.

Shawn Severson: Are there specific milestones that investors should track for the calendar of 2022?

Raj DasGupta: On the technology front, one milestone to look out for is our progress on SSB. As for our core, Infinity platform will be steady growth in output and therefore financials. We will try to communicate that effectively as it grows.

Shawn Severson: You have pretty good visibility on orders. Should we be looking for sudden surges or pullbacks? Are your orders predictable across, say, 12 months?

Raj DasGupta: They are becoming much more predictable. In 2021, a lot of customers were trialing our technology. Many of those customers have now given us clear forecasts of what they want. The timing of the

actual purchase is hard to predict, but we do know there is demand. We have a strong order backlog as well.

Shawn Severson: What execution and customer risks are you facing?

Raj DasGupta: The past 24 months have been a roller-coaster concerning the operating landscape, the supply chain, and the pricing. Everything was thrown into the air. That said, we have been extremely nimble with our battery management systems and the electronic circuit boards that control the batteries. Chipsets, of course, have become hard to come by, but our engineering team has ensured our boards are at a point where we can change the chips relatively quickly. So we have minimized our risks with regards to that. Of course, commodity prices are volatile and quite high right now. But our supply-chain team has been very effective in mitigating some of that volatility. There are risks with the world in 2022, but we are running the boat rather well. As for the product, we have produced in the thousands already, so we don't see any significant technology or product risks.

Shawn Severson: What are you doing to broaden your customer base for lithium-ion ceramic batteries? What about marketing and investor awareness? Some other companies have been pretty active with investors relative to Electrovaya.

Raj DasGupta: We have done a very good job in the material-handling products space. Those batteries are going to Fortune 500 names. We want to repeat that success in the heavy-duty truck and bus segments, so we have developed a good high-voltage battery system, which is being marketed to those customers now. We hope to see very positive results later this year.

On the investor side, we need to do a little bit better. As a technology-focused company, we have paid little attention to investors, and we are making the effort, thanks for your help, Shawn. Some of that has to do with adding good people to our team, which we are doing. You will also see more activity on the marketing front in the coming months.

Shawn Severson: Raymond produces approximately 150,000 new forklift trucks per year. How much of that is expected to be powered by your lithium-ion ceramic solution? What is your share of the Raymond business?

Raj DasGupta: We won't provide batteries for the very small Raymond forklifts, their walkies. We are focused on medium- and large-sized vehicles and provide the lithium-ion ceramic solution to those. This is a relatively new product line. Raymond has been very supportive of going lithium, which can be seen from their website and senior management being closely involved with their energy division. I can't comment on how large they will get, but they are a substantial player.

Shawn Severson: The retrofit market seems gigantic for the existing lead-acid battery forklifts out there. What is your strategy there? Could that market become bigger than the one you have with OEMs?

Raj DasGupta: It can, but these need not be mutually exclusive. We can work on retrofits with our OEM partner, and we are doing so. Retrofits have always been a key part of our offering. For instance, the multiple Walmart distribution centers that we have outfitted thus far have been retrofits for the most part. And this year, a significant percentage of our deliveries will be retrofit. This year, one of our largest end-users will have a mix of retrofits and new sites.

Shawn Severson: What are your capacity expansion and capex plans?

Raj DasGupta: In 2021, we invested in some tooling at our contract manufacturing sites to increase capacity. We don't have any capacity constraints for this year and probably next year. But we are looking into it, especially localizing the supply chain by keeping it in North America to shorten lead times for better control.

Shawn Severson: Can you drill down that $27 million revenue number and talk about profitability.

Raj DasGupta: As I mentioned earlier, we provide outstanding value and demand high margins for our research. Our goal is never to sell these products at a low margin. Through our technology advantage, we provide a lower cost of ownership to customers. As a result, we are the lowest-cost solution over the product's life, and that's how we keep our margins healthy. For the fiscal year 2022, we are expecting to break even at the EBITDA level and turn positive for the fiscal year, despite significant headwinds such as rising input costs.

ABOUT THE ANALYST

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Shawn Severson is President & Co-Founder of Water Tower Research and is a member of the Board of Managers. Prior to co-founding Water Tower Research and previously founding predecessor firm alphaDIRECT Advisors, Shawn spent over 20 years as a senior equity research analyst covering the Technology and ClimateTech sectors, including senior positions at JMP Securities, ThinkEquity, Robert W. Baird (London), and Raymond James.

Shawn started his career as an Equity Research Associate at Kemper Securities. Shawn was frequently ranked as a top research analyst, including one of the Wall Street Journal's "Best on the Street" stock pickers and a StarMine Analyst Awards Top 3 stock picker. Shawn holds a BA in Finance and Economics from Augustana College.

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