Thematic Research

Energy Storage: The Missing Piece for the Energy Transition

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All figures in USD unless otherwise stated

Canadian Companies	
Electrovaya Inc.	EFL
Spark Power Group Inc.	SPG
Eguana Technologies Inc.	EGT
Jericho Energy Ventures Inc.	JEV
RE Royalties Ltd.	RE
Fuelpositive Corporation	NHHH
ReVolve Renewable Power Corp.	REVV
GBLT Corp.	GBLT
Braille Energy Systems Inc.	BES

Median Peer Group Statistics	
2023E EV/Sales	3.5x
2024E EV/Sales	1.5x
Sales CAGR (2022-2024E)	95%
2024E EBITDA Margin	11%

Please refer to the applicable disclosures on the back page
Source: Atrium Research, CapitalIQ, FactSet, Company Documents

What you need to know:

- Due to the fluctuating levels of energy produced on an hourly basis by renewable energy sources, energy storage is required to smooth out supply and demand
- The grid is becoming increasingly unstable due to its old age and extreme weather conditions, and is not set up to accommodate a net-zero system
- Small and mid-cap players in the space are down over 60% since 2021, making today's valuations a great entry point

Why Do We Need Energy Storage?

Intermittent Supply from Renewables

Solar and wind energy cannot produce energy 24/7 since there is not constant sunshine or wind in most regions. The levels of energy generated in a given hour vary based on weather, time of day, and the season. Thus, for the renewable energy transition to progress forward, we need to find solutions that can effectively store energy into the future (both short-term and long-term) in order to smooth out supply and demand. A typical energy consumption and generation pattern can be seen in Figure 1 below; ideally, grids can store excess energy during the lowest consumption hours and deploy (discharge) it in the higher consumption hours. The Fraunhofer Institute of Solar Energy estimates that if the grid transitioned to 80% renewables, about one month of energy would need to be stored at all times for stability (rising to two months at 90%).

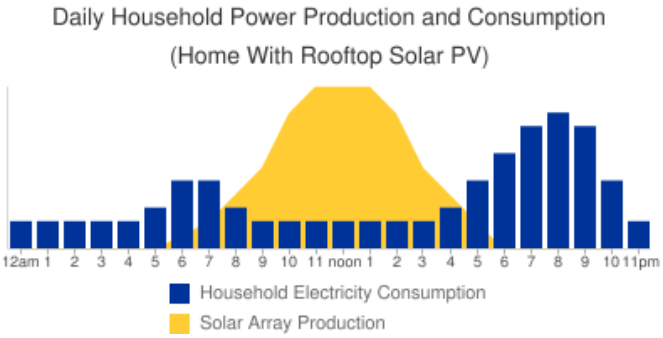

Figure 1: Daily Solar Energy Production & Consumption (Source: Institute for Global Self-Reliance)

Outages & Cost Savings

Furthermore, energy storage is needed to provide backup power in the event of an outage or emergency (i.e., for critical infrastructure, hospitals, and data centres) if the globe insists on moving away from fossil fuels. Lastly, energy storage can reduce the overall cost of energy by reducing energy generated during peak hours.

Adoption of Renewable Energy

While the adoption of renewable energy has been slower than most expected, the transition is inevitable over the coming decades as costs to deploy renewable projects continue to decrease. The IEA estimates that 95% of the increase in global power over the next five years will come from renewable sources. While we think peak fossil fuel demand will likely occur into the 2030s/2040s, the globe needs to set up its energy systems to accommodate for the intermittent supply as outlined above. The energy transition simply cannot occur without adequate energy storage; BloombergNEF estimates that the globe will install 411 GW of energy storage by 2030, a 15x from current levels (Figure 3).

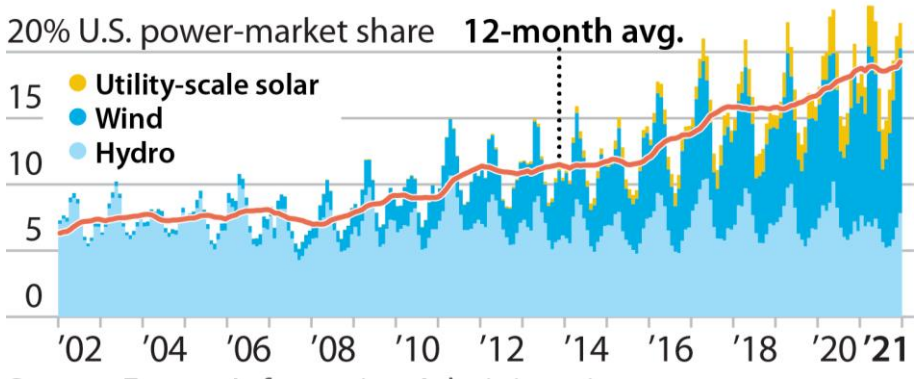

Figure 2: Renewable Energy Adoption (Source: Energy Information Administration)

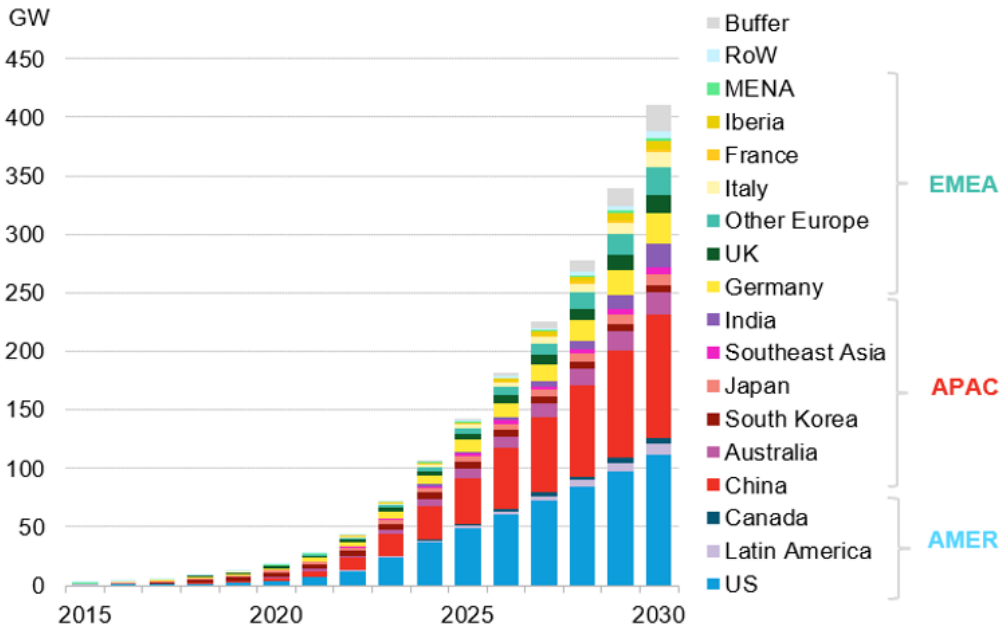

Figure 3: Global Cumulative Energy Storage Installations (Source: BloombergNEF)

Grid Stability

Large sustained electrical outages are occurring with increased frequency around the world. In 2000, less than 12 major grid disruptions occurred in the U.S., comparing to over 180 in 2020, while the hours of power interruptions doubled from 2013 to 2020 (source: WSJ). This is mainly due to the old age of the U.S. grid system, with the transmission system (long-distance) constructed 80 years ago and the distribution system (short distances) constructed multiple decades ago. The American Society of Civil Engineers found that 70% of transmission and distribution lines are well into the second half of their expected 50-year lifespans. While upgrades and maintenance are starting to ramp up, it is estimated that the U.S. will need to spend over $200B by 2029 to strengthen the grid (Figure 4). Climate change and extreme weather have exacerbated this trend. Furthermore, with the adoption of renewable energy over the coming decades, the current grid will not be compatible with the constantly fluctuating supply, and thus require energy storage solutions and more flexible grid upgrades.

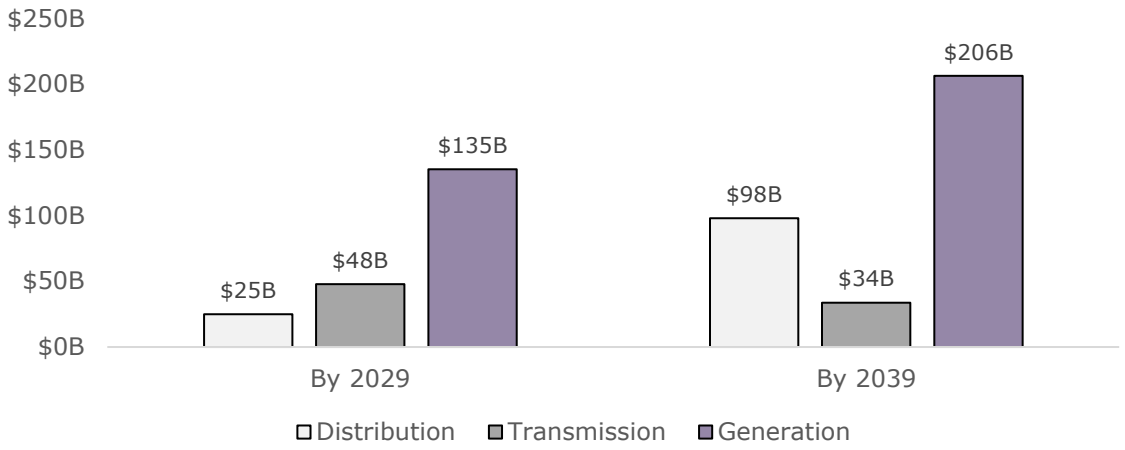

Figure 4: Investment Gap to Strengthen the U.S. Grid (Source: WSJ)

What Are the Different Types?

Electrochemical Storage (Batteries)

Various battery technologies are capable of storing electricity including lithium-ion, lead-acid, NaS batteries, and flow batteries. In a battery, chemical energy is stored in the form of charged ions, which are separated by a material called an electrolyte. When the battery is discharged, the ions move through the electrolyte and interact with electrodes, releasing their stored energy. Recharging the battery involves reversing this process, by applying an external voltage that moves the ions back to their original positions. Lithium-ion batteries and their various chemistries have taken hold as the market leader due to their high energy density.

Mechanical Storage

Mechanical storage technologies can store electricity using gravitational energy, kinetic energy, or compressed energy. In practice, air or water is stored and then released when needed, rotating a turbine and generating electricity. The most common types of mechanical storage include pumped-hydro and compressed air. Pumped-hydro involves pumping water to a higher elevation when excess energy is available and releasing it when needed. Similarly, compressed air systems store and compress ambient air or another gas in an underground container, then when energy is required, the pressurized air is heated and expanded in an expansion turbine. Flywheels are also another form of mechanical storage which uses kinetic energy; when energy is needed the flywheel is slowed down, releasing its stored energy. Flywheels are typically used for short-term storage.

Thermal Storage

Thermal energy storage involves using electricity to heat a material, then storing and insulating the material until the energy is needed and then converted back to electricity through a conversion device. Thermal is crucial for integrating multiple energy systems, making it possible to separate heating and cooling demand. This category also includes ice storage, where excess energy is used to freeze water that can later be melted to provide cooling.

Chemical Storage

Chemical systems store energy by creating chemical bonds of a material; when the material is later used, the stored chemical energy is released in the form of heat, light, or electricity. This includes power-to-hydrogen-to-power and power-to-syngas-to-power.

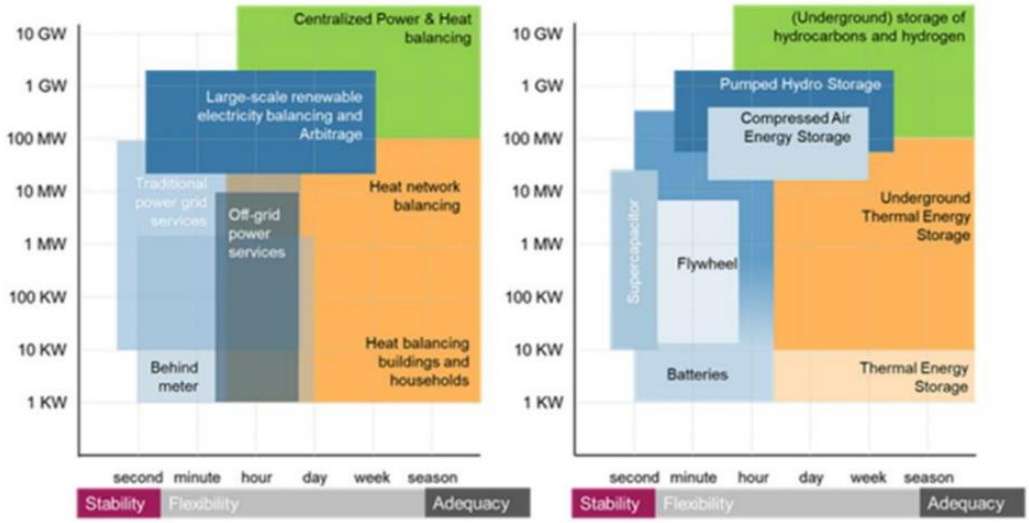

Figure 5: Energy Storage Systems (Source: EASE)

Short-Duration vs. Long-Duration

Both short-duration and long-duration energy storage (LDES) are needed in the future in order to ensure grid stability. Short-duration solutions are required to store electricity for time periods ranging from a few seconds to a few hours, aiming to manage unexpected energy demand as well as outages. There are numerous solutions for short-duration storage (i.e., batteries) and we expect their costs to decline significantly over the coming decades. However, long-duration solutions have not seen the traction that their short-term counterparts have, but we believe there is plenty of time to develop the technology. LDES systems are needed to smooth out energy production during winter months when there is less sunlight/wind (for example). The current LDES available are compressed air, pumped hydro, thermal, and hydrogen (outlined above).

Developments in Canada

Canada is targeting net zero emissions by 2050 with the electricity sector required to be 90% non-emitting by 2030 and fully zero emission by 2035. This will require 8-12GW of energy storage by 2035 (Source: Power Advisory).

Ontario

The government of Ontario has procured 1,500-2,500MW of energy storage capacity, with most of that supply coming by 2027. Recently, the Governments of Canada and Ontario announced plans to build the Oneida Energy Storage project, the largest battery storage project in the country (250 MW) in partnership with the Six Nations of the Grand River Development Corporation, Northland Power, NRStor, and Aecon Group. The federal government will provide C$50M of funding and Ontario has entered into a 20-year contract with the entity.

Alberta

In 2019, the Alberta Electric System Operator (AESO) released an energy storage roadmap where it is now currently in Phase 2 (long-term implementation). In May 2022, Alberta passed Bill 22, amending legislation to specifically recognize energy storage in the Hydro and Electric Energy Act. As per the AESO's last meeting in September 2022, there are four energy storage projects connected to the grid in Alberta currently with 37 projects on the connections list. This includes a 10MW battery energy storage solutions project called Windcharger, owned by Transalta in partnership with Tesla and the 8MW Drumheller Solar and Battery Storage Project.

Quebec

In 2020, Hydro-Quebec launched EVLO, to serve as its energy storage subsidiary. Since then, EVLO has developed a 4MW storage system using lithium-ion phosphate battery technology, a 2MW solution as part of a solar generation station, and a 9MW system in France.

Others

- Saskatchewan is building a utility-scale battery storage energy system capable of powering 20 megawatts (MW) of load for up to 1 hour
- the Yukon is currently developing a 7MW facility in Whitehorse, aiming to reduce the communities' reliance on diesel

Small-Cap Canadian Players

Spark Power Group (SPG:TSX)
Spark Power is a leading independent provider of end-to-end electrical contracting, operations, maintenance services, and energy sustainability solutions. Its segments include electrical & power projects, on-site facility services, renewable asset services, power equipment, and sustainability solutions. Its business is quite diversified but includes a battery storage systems segment that enhances power systems and shifts power loads off-the-grid during peak demand. The Company is a consolidator, completing 10 acquisitions across electrical construction, equipment retail, renewable energy construction/maintenance, and engineering field services. SPG is expected to post C$35M in EBITDA in 2022, implying 5x EBITDA.

Eugana Technologies (EGT:TSXV)
Eugana Technologies designs and manufactures high-performance residential and commercial energy storage systems using technology developed over two decades. Its systems have the ability to produce solar power during the day, store it onsite, and discharge at night. Its products' key advantages include PCS technology, remote commissioning, auto-recovery, chemistry agnostic, factory integration, and modular capacity. The Company is primarily focusing on residential markets in California, Hawaii, Germany, and Australia. Eguana utilizes third-party manufacturing and has key distribution partners across its markets.

RE Royalties Ltd. (RE:TSXV)
RE Royalties acquires revenue-based royalties on renewable energy facilities and technology by providing non-dilutive funding. The Company has over 100 royalties on solar, wind, hydro, battery storage, energy efficiency, and RNG projects across North America and Europe. 29% of RE's investments have been made in energy storage projects, including a C$7.4M investment in Switch Power Ontario Battery Operations Corp. (21MW of battery storage in Ontario), a C$1.9M investment in ReVolve Renewable Power (3MW of battery storage across three energy storage projects in Mexico), and a C$7.5M investment in NOMAD (7MW of commercial and industrial-scale mobile energy storage in the U.S.). The Company posted C$470K in net income in Q3/22 and offers a 5.4% dividend yield.

ReVolve Renewable Power Corp. (REVV:TSXV)
ReVolve engages in the development of renewable energy generation projects in the United States and Mexico across wind, solar, and battery storage. The Company operates ten utility-scale projects representing over 2,350MW of capacity which are delivered from greenfield to ready-to-build and then sold. REVV's U.S. exposure includes a 150MW solar & battery storage project in Utah, a 50MW battery storage project in Utah, a 100MW solar & battery storage project in Colorado, a 50MW wind project in Colorado, a 225MW solar & battery storage project in New Mexico, and a 200MW solar & battery storage project in New Mexico. REVV's Mexico exposure includes four wind projects ranging from 100MW to 400MW. REVV also has a distributed generation business with 2.85MW of operating projects and 6.2MW in construction, aiming to create long-term recurring revenue.

GBLT Corp. (GBLT:TSXV)
GBLT designs, manufactures, and supplies mobile storage and battery solutions. Its mobile storage systems are recharged with solar power, serving as an alternative to emergency gasoline generators with applications including outdoor activities, disaster recovery, mobile charging stations, and construction site energy supply. GBLT is the official licensee for AGFAPHOTO for manufacturing and distributing branded disposable batteries, in addition to its private-label disposable batteries. GBLT has significant presence in the EMEA market with plans to expand in the Americas and Asia. GBLT also has a solar energy division and a healthcare products division.

Braille Energy Systems Inc. (BES:TSXV)
Braille Energy Systems holds an 89.95% equity interest in Braille Holdings which owns 100% of Braille Battery. Braille Battery is a battery manufacturing and energy storage company, supplying batteries to the professional motorsport industry. Braille recently formed Electrafy, focusing on designing and manufacturing integrated back-up power systems and stand-alone energy storage systems; leveraging its proven Braille Energy lithium iron phosphate battery. In December, BES acquired the exclusive rights to 3iFirebulk Fire Detection and Suppression Technology, providing a competitive advantage to its energy storage offering. The Electrafy ESS Lithium Battery Module is expected to be commercially available in May 2023, followed by the Home Back-Up Power System.

Company	Ticker	Share Price (C$)	Mkt Cap (C$M)	EV (C$M)	EV/Sales 2022E	EV/Sales 2023E	EV/Sales 2024E	Sales CAGR (2022-2024E)	EBITDA Margin (2024E)
Exro Technologies Inc.	EXRO	2.56	378	371	N/A	23.7x	3.4x	N/A	5%
Electrovaya Inc.	EFL	1.17	193	209	7.7x	3.5x	2.0x	95%	12%
Spark Power Group Inc.	SPG	0.60	55	179	0.6x	0.6x	0.6x	2%	11%
Eguana Technologies Inc.	EGT	0.25	101	103	15.9x	2.0x	1.0x	297%	11%
Jericho Energy Ventures Inc.	JEV	0.29	66	69	N/A	N/A	N/A	N/A	N/A
RE Royalties Ltd.	RE	0.74	32	45	N/A	N/A	N/A	N/A	N/A
Fuelpositive Corporation	NHHH	0.13	44	38	N/A	19.9x	N/A	N/A	N/A
ReVolve Renewable Power Corp.	REVV	0.65	36	35	N/A	N/A	N/A	N/A	N/A
GBLT Corp.	GBLT	0.11	12	6	N/A	N/A	N/A	N/A	N/A
Braille Energy Systems Inc.	BES	0.08	6	5	N/A	N/A	N/A	N/A	N/A
Average					**8.1x**	**10.0x**	**1.8x**	**131%**	**10%**
Median					**7.7x**	**3.5x**	**1.5x**	**95%**	**11%**

Figure 6: Peer Group Analysis (Source: CapitalIQ)

Performance

Our Canadian energy storage universe has performed poorly over the last two years, with the average stock being down 61% since March 2021. While financial results have not been what the street once expected, the sector continues to press on with the inevitable transition to clean energy and the upcoming need for energy storage as outlined through this report. This has brought down valuations to quite cheap levels, both relative to historical metrics as well as by absolute standards.

Figure 7: 2-Year Stock Performance

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RATING	COVERED COMPANIES
BUY	3
HOLD	0
SELL	0

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