



OHIO CONFERENCE ON

Clean/ Renewable Energy

AND ENERGY EFFICIENCY

**Workshop I – Revolutionizing
Energy Storage**

INTRODUCTIONS

① **Moderator: Joe Rohan, BRITE**

Program Manager



② **Neil J. Kidner, Adena Power**

President and Founder



③ **Robert Lane, Acculon Energy**

Chief Administrative Officer





ADENA
POWER

is dedicated to the commercialization of our new sodium solid-state battery. We are proud to be on the cutting edge of new technologies that provide safer, longer duration and lower-cost energy storage. Adena Power is founded on two key strengths, unrivaled market access to stakeholders throughout the stationary energy storage ecosystem and world-class ceramic manufacturing.



acculonTM

energy

Your future is our business. In a constantly accelerating, energy-driven world, we propel our clients' battery programs forward, faster. Our advanced battery expertise, testing and prototyping facilities, and engineering resources are ready to handle your complex energy storage challenges.

Forbes

EDITORS' PICK

Electric Vehicle Batteries Will 'Dwarf' The Grid's Energy-Storage Needs

Jeff McMahon Senior Contributor

From Chicago, I write about climate change, green technology, energy.

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Jan 29, 2020, 12:00am EST

APRIL 29, 2022

Battle of the batteries: EVs vs grid storage?

Who will 'win' the intensifying competition for finite lithium ion batteries, in a world that is hindered by shortages of lithium, graphite, nickel and cobalt in 2022-25?

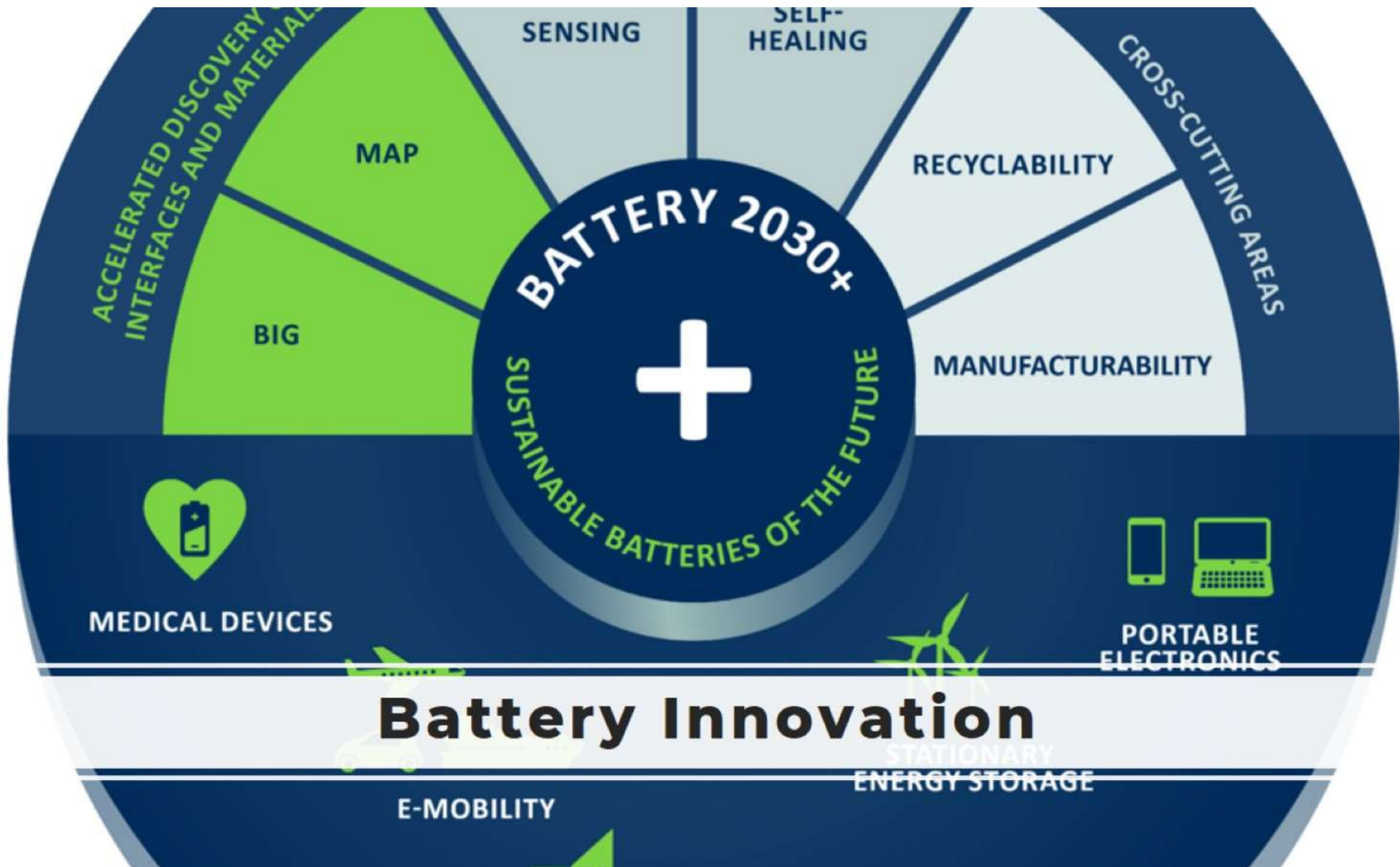
EVs could provide entire global short-term grid storage needs by 2030, study finds

JANUARY 20, 2023 · 35 COMMENTS · 3 MINUTE READ · DANIEL BLEAKLEY



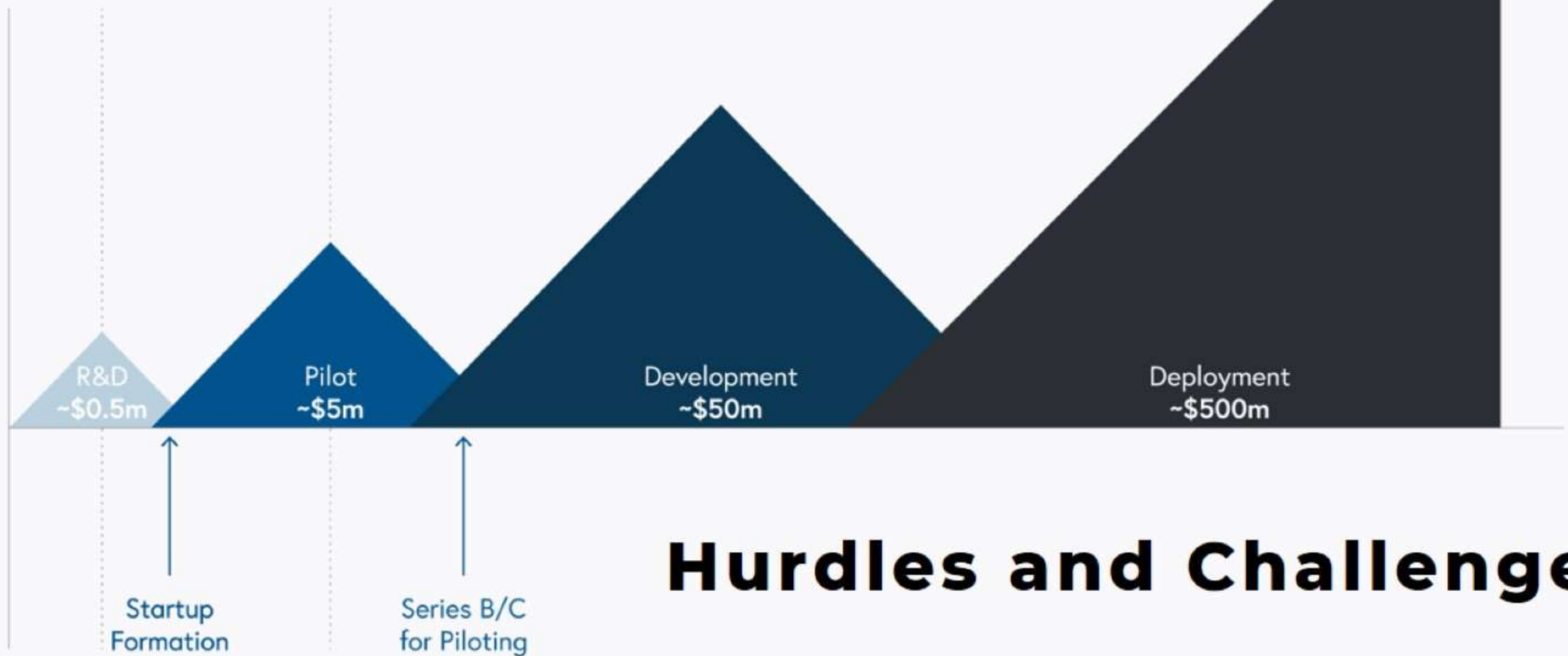
EV vs Stationary

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CLIMATE TECH LIFECYCLE

ClimateTech companies must be able to raise capital at each stage of the company's lifecycle, from R&D to pilot to development to deployment.

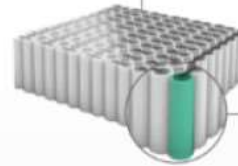


Economics and Cost Drivers

What makes up the cost of lithium-ion cells?



EV CHASSIS



A **battery pack** consists of multiple interconnected modules, and each module is made up of hundreds of individual cells.

\$101/kWh
Avg. Cell Cost In 2021



The **cathode** material determines the capacity and power of a battery, typically composed of lithium and other battery metals.



The largest EV battery **manufacturers** are all headquartered in Asia.

80% of all cell manufacturing occurs in China.



The **anode** is the negatively-charged electrode, typically made of graphite.



Separators prevent electric contact between the cathode and the anode.



The **electrolyte** is the medium that transports lithium ions from the cathode to the anode.

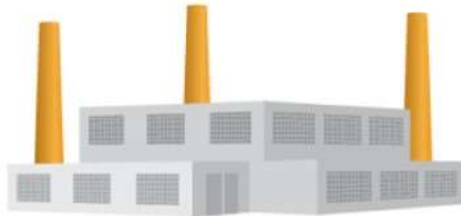


Battery housings are cases that contain and protect battery packs, usually made of steel or aluminum.

Big Savings from Vehicle-Grid Integration (VGI)

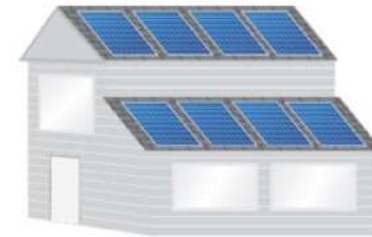


The U.S. electrical grid lacks the ability to store energy. Battery-powered electric cars could store excess energy from the grid, and return it as needed.



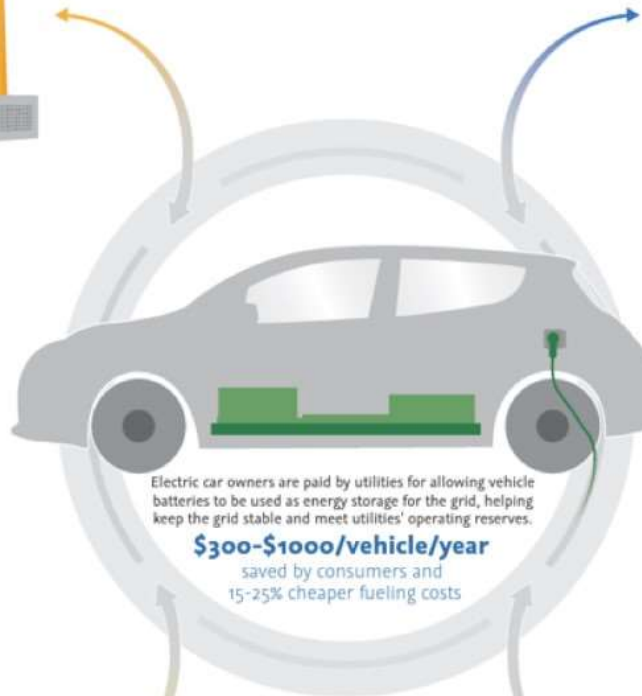
Grid operators can use EV batteries to smooth "peak" highs and "valley" lows in energy demand and avoid use of expensive polluting peaker plants.

\$150 million per year in avoided emissions costs for California alone and up to **\$3 billion** in emissions savings nationwide



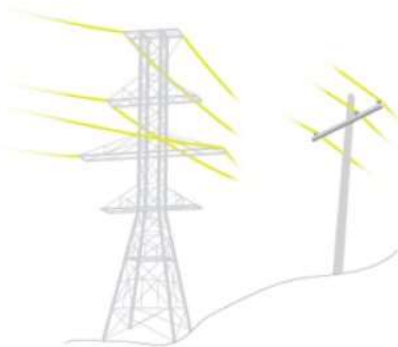
Energy from rooftop solar can be stored in EV batteries, instead of being fed into the grid. EV owners can use this "free" fuel for driving or as a supply of home energy.

Up to **\$1000/vehicle/year** saved by consumers



Electric car owners are paid by utilities for allowing vehicle batteries to be used as energy storage for the grid, helping keep the grid stable and meet utilities' operating reserves.

\$300-\$1000/vehicle/year
saved by consumers and
15-25% cheaper fueling costs



EV battery storage can buffer peak demand and reduce energy losses, preventing damage or excessive wear of expensive transformers and wires. Fewer transformers are needed, even as demand grows.

\$300 million to \$1.6 billion in annual grid system value



EV owners can schedule charging to occur when renewable energy is most plentiful. This helps the grid stay balanced, green, and safe.

Up to **\$4 billion** in annual benefits for renewable energy

1 HOUR
ELECTRIC
VEHICLE
CHARGING
CVC #22511



Misconceptions





An innovation-first ecosystem advancing the transition to a clean energy economy. Our mission is to accelerate the transition to a clean energy economy through our ecosystem of purpose-driven partners and cleantech innovation. Our vision is to unleash the energy revolution across Ohio



Newsletter



THANK YOU

REFERENCES:

Inventing the Sustainable Batteries of the Future

<https://battery2030.eu/wp-content/uploads/2023/09/B-2030-Science-Innovation-Roadmap-updated-August-2023.pdf>

RMI: The EV Battery Supply Chain Explained

<https://rmi.org/the-ev-battery-supply-chain-explained/>

The case for grid-connected electric vehicles

<https://blog.advancedenergyunited.org/the-case-for-grid-connected-electric-vehicles>

Eight lessons from the first climate tech boom and bust

<https://www.bvp.com/atlas/eight-lessons-from-the-first-climate-tech-boom-and-bust>

Biographical Information

Joseph Rohan, Program Manager
BRITE Energy, Warren
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Joe Rohan is a business launcher, energy tech advocate and rock drummer. His entrepreneurial journey started in music, leading to digital and web-based technologies and eventually to his Portland-based software company 360 Enterprises that he co-founded in 2015. He has spent the last five years supporting and launching startups across multiple industry sectors and developing accelerator programs for early-stage businesses. In 2022, Joe joined BRITE to support their energy tech startup programs.

Robert Lane, Chairman and CAO
Acculon Energy Inc., Columbus
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Robert Lane is a serial entrepreneur with businesses in healthcare, lithium battery manufacturing, enterprise innovation, testing and engineering services, and human capital management. Acculon Energy is an advanced battery design, engineering and manufacturing company that focuses on the electrification programs of Industrial and Commercial OEMs. Acculon just announced a new 2 GWH battery module and pack manufacturing facility, which will be located in the Midwest. In a prior life, Robert was a corporate executive with several Fortune 500 companies, including Du Pont , Nortel Networks, GE, and Cable & Wireless Communications. Mr. Lane is also Executive Director of Transitus, a non-profit which focuses on issues with sustainability, healthcare and food access, and workforce development.

Dr. Neil J. Kidner, Co-Founder and Chief Scientific Officer
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Dr. Neil J. Kidner is a co-founder and Chief Scientific Officer of Adena Power and is responsible for the commercial development of Adena's sodium solid-state battery technology. With more than 15 years of process development and manufacturing scale-up, Dr. Kidner has a proven track record of commercializing new technologies and monetizing IP. Dr. Kidner holds a Ph.D. in Materials Science and Engineering from Northwestern University and an M.Sc. in Materials Science from the University of Cambridge.