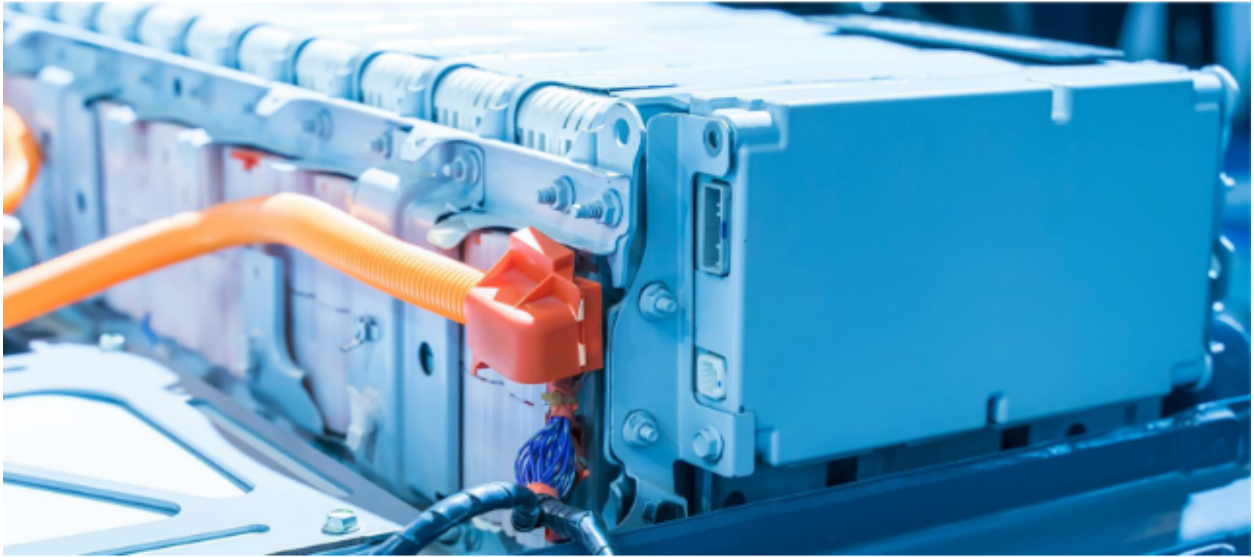


Electric Vehicles and Grid Storage



Electric Vehicles (EVs) can help the power grid and increase reliability by storing renewable energy, balancing supply and demand, reducing costs, and improving grid resilience. Vehicle to grid (V2G) or Vehicle to X (V2X) (i.e. Vehicle to building, battery, grid, etc.) allows EVs to send power from their batteries back to the grid or another receptor when electricity demand is high. This technology enables the energy stored in EVs batteries to be used for other purposes at times of need, which improves the efficiency of electricity usage and overall grid reliability.

Research from the National Renewable Energy Laboratory (NREL) based in Colorado and Leiden University's Institute of Environmental Sciences in the Netherlands evaluated if vehicle-to-grid (V2G) bidirectional charging programs could offer short-term grid storage opportunities, and concluded short term demand for storage could be met as soon as 2030. This result can only be achieved, though, by increasing participation rates in V2G

or V2X markets, which is more likely with higher capacity batteries and state incentives.

The importance of expanding grid resiliency through expanded use of EVs bidirectional batteries is exemplified during extreme weather events and power loss. U.S. electricity consumption tends to follow predictable demand cycles that do not always coincide with energy supply. For example, solar panels generate electricity from sunlight, but energy demand—particularly during winter's shorter days and colder nights—tends to rise in the evenings when it is dark. While utility companies have introduced time-of-use rate structures that charge consumers more during peak consumption periods, V2G and V2X offer a more skillful instrument to manage grid demand. Energy stored in fully charged EV batteries could offer a distributed network of backup power, using V2G programs to supplement power to homes and communities during periods of peak demand, while then resuming EV charging during lower peak demand.

RECOMMENDATIONS

Create a market based framework allows and incentivizes Vehicle to Grid (V2G) and Vehicle to X (V2X) energy storage solutions

- Develop a market framework for V2X that will improve resiliency, provide grid services, and allow for value creation for EV owners, which will, over time, reduce the need for public subsidies

Integrate solar, storage, and EV charging equipment (EVSE) throughout energy policy

- Eliminate the current siloed approach to solar generation, battery storage, and EVSE, which when combined are more than the sum of their parts and offer significant benefits to all ratepayers
- Implement a more holistic approach to energy production and storage, that also considers the benefits EVs can provide through V2X, across clean energy programs to speed up and facilitate the process of interconnecting distributed energy resources to the grid and improve resiliency

Accelerate grid readiness, focusing on integration of solar and storage in strategic locations

- Deploy solar generation and storage in strategic locations for the grid in order to prepare for the anticipated load growth and provide time to develop additional distributed energy resources (DERs) that will be needed
- Use strategically placed solar generation and storage, including V2X, to spread out the cost of electrical grid upgrades that are necessary to accommodate more DERs, which will benefit ratepayers without sacrificing reliability



ACKNOWLEDGEMENTS

Jersey Renews wants to thank all of the contributors with whom this platform would not have been possible to produce. The information, insights, and significant time they dedicated to this effort is reflected in each one of the pages. Thank you to Alec Meltzer for his work in design and layout. A special thanks to Debra Coyle and Drew Tompkins for NJ Work Environment Council and Doug O'Malley from Environment New Jersey, who help coordinate Jersey Renews and provided significant input to the policy platform.

We also want to thank the foundations and other financial supporters that help make the work of Jersey Renews possible. Thank you to the NJ Work Environment Council Board of Directors and the Jersey Renews Steering Committee for their regular guidance and help in developing this platform from the beginning.

Finally, we want to thank all the readers and decision-makers who we hope to work with moving forward to make the policies in these pages a reality in order to increase our energy supply, electrify our transit system, modernize our grid, and create good paying jobs in New Jersey.