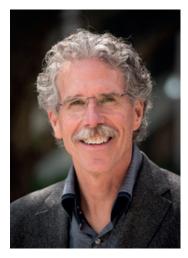# DR. KEITH HARDY

Keith Hardy is the Program Lead for Interoperability and Grid Integration at Argonne National Laboratory, managing the vehicle-grid integration activities and facilitating global cooperation on harmonization of EV-grid connectivity. He has over 40 years' experience with electric and hybrid vehicle R&D in government and industry, including NASA's JPL, DOE's INL and GM.

## PRESENTATION

*Vehicle-Grid Integration – Programmatic Direction, Issues and Enabling Technologies*

## ABSTRACT

The 2021 Federal Government's budget resolution includes a specific congressional directive to the US Department of Energy (DOE) to address vehicle-grid integration (VGI), including:

- Establishing an RD&D program for VGI,
- Quantifying VGI opportunities, challenges, and standards,
- Analysis and research to evaluate EVs role to support grid reliability,
- Strategies to limit infrastructure upgrades via smart charge management
- Research on the standards for VGI, including communications systems, protocols, and charging stations
- Cybersecurity challenges
- Establishing testing capabilities at the National Laboratories to evaluate, prototype, and optimize enabling technologies

The directive intends to provide the data needed to address barriers to VGI, i.e., interoperability, communication requirements/standardization for smart charge management (SCM) and the value proposition of SCM. The presentation will summarize the joint National Lab approach to address the barriers, show examples of VGI implemented at Argonne and pilots of enabling technologies in the public sector.

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