

Sandia National Laboratories Energy Storage Projects

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Presentation Outline



- SNL Thrust Areas for Grid Challenges
- SNL Capabilities
- Ongoing Projects

Five Sandia Thrust Areas to Meet Grid Challenges



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- **Materials and Systems Development**
 - Leading the **development** of next-generation technologies
 - Improving current **technology** (flow batteries, flywheels, etc.)
- **Power Electronics**
 - **Developing** and testing new wide-bandgap power-electronic devices
- *ES Systems Demonstrations and Testing*
 - *Laboratory testing and analysis from individual cells to 1MW systems*
 - *Field deployments*
 - *State-Initiated Demonstration Project Development*
- **Grid Analytics and Policy**
 - Providing **assessments** of the impact of storage placement
- **Outreach** - Leading publications and meetings to **help** educate the Grid Energy community

Nanoscopic



Macroscopic



Energy Storage System Project Technical Support

- Conduct analysis, perform modeling, and provide data on applications, ES sizing, and technologies that best solve the client's problem.
- Assist in developing and reviewing a client's request for Information and Proposals (RFI & RFP).
- Assist in the design, procurement specifications, and construction of ESS'.
- Assist in the design of Data Acquisition Systems (DAS).
- Assist in developing the ESS commissioning plan.
- Analyze operational test data and develop system optimization algorithms.

SNL Industry Acceptance Capabilities (Contd.)



ES Testing and Analysis

- Cell and module analysis, up to 48 VDC 2000 A within a controlled environment (chamber)
- Spectral impedance measurement
- Test ESS up to 1.0 MW 480 V, 3-phase AC
- On-site (Vendor) acceptance testing support
- Safety evaluations

Industry Outreach States' Program

- <http://www.cesa.org/webinars/>

DOE-OE Industry Acceptance and ESS Demonstration Program: Ongoing Projects



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State Projects (CESA):

- Alaska – Cordova Electric Co-Op
- Connecticut DEEP
- Massachusetts DOER/CEC – Sterling Power, Cape and Vineyard, Holyoke
- NYSERDA
- Oregon Dept. of Energy/Eugene Water & Electric Board
- Vermont – GMP, Burlington Electric
- New Mexico – EMNRD, PNM

California/Hawaii:

- California CEC
- HECO
- HELCO
- NELHA
- Sunpower
- UCSD

Other Projects:

- DCICON (DoD)
- Group Nire, TX
- Los Alamos County

Industry Support

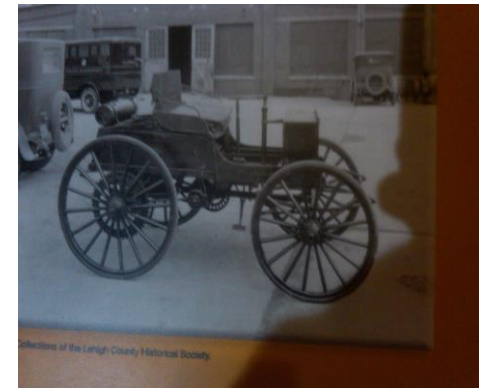
- GS Yuasa
- Helix
- Primus Power
- UET
- Transpower
- East Penn/ECOULT
- Aquion Energy
- MegaAmp (S. Africa)

International support:

- Pacific Rim
- WEICan (Canada)



Innovation : Something to Consider



One of the first gasoline powered cars ~1891 by Henry Nadig of Allentown, Pa.

Courtesy of American Automobile Museum, Allentown, Pa.

Innovation: Something to Consider

*Quotes about the Nadig in 1891**

- Blasted as a “**dangerous device**” – backfiring caused fires
- Car **not allowed** on the **streets** during the day as it “frightened” the horses
- Constable served notice; drivers/operators could be **arrested** for creating a “**public nuisance**”
- “Shouts of ‘Get a horse!’ were followed by the grand insult of the day – “**Cabbages**” that were thrown at the hapless Nadig.”

** Whelan, Frank “Did Auto Age First Dawn in the Valley? Allentown Mechanic Built One of Country’s First Gas-powered Cars” Sept, 14, 1989 The Morning Call*

Innovation:
Something to consider

Working in this Nascent Industry, and
being pragmatic, I ask myself daily:

“Am I a cabbage-thrower?”

Mention of our SNL Sponsor – DOE/OE -
Grid Energy Storage Program, managed by
Dr. Imre Gyuk

Thank You!

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