

# What We Do:

**Support communities, state energy offices, utilities, academia, and the overall ES industry to demonstrate and validate the use of resilient and secure energy storage systems on and off the grid through demonstration projects.**

**Sandia's work in innovative demonstration projects advance DOE's goals of facilitating decarbonization of the grid by improving acceptance and understanding of energy storage systems and serving communities by enabling equitable clean energy access.**



# Sandia Demonstrations Support Academia

Santa Fe Community  
College, Santa Fe, New  
Mexico



# Sandia Demonstrations Support Utilities

Cordova Electric  
Cooperative, Cordova,  
Alaska



# Sandia Demonstrations Supports Communities

Navajo Tribal Utility  
Authority, Dilkon,  
Arizona

# Sandia Demonstrations Support Resilience



Poudre Valley Rural Electric Assoc., Red Feather Lakes, Colorado

# Why Are Sandia's Demonstration Projects Important?



We facilitate the early adoption of energy storage technologies in support of DOE's goals of an equitable, clean, resilient and secure grid of the future

1

**Act as a bridge  
between R&D and  
commercialization**



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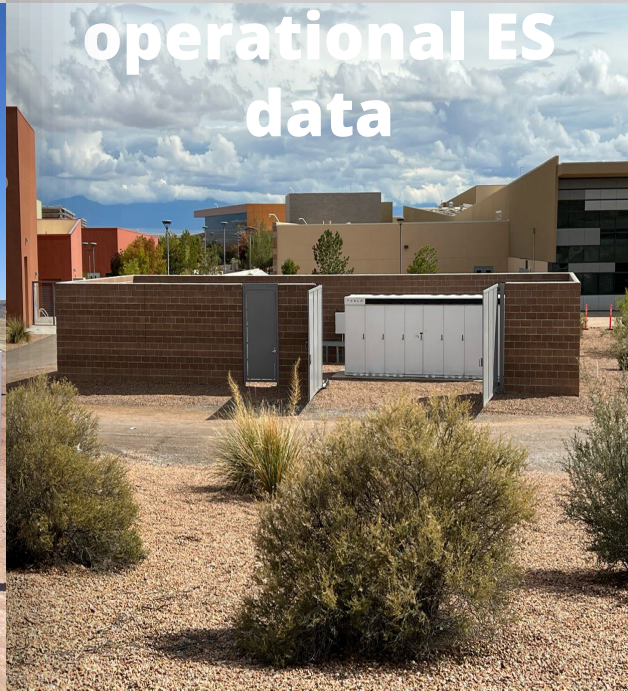
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**Act as a bridge between R&D and commercialization**



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**Validate technical models through collection of operational ES data**







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**Inform Codes, Standards, & Regulations (CSRs) development and installation best practices**



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4

Increase public confidence by demonstrating ES and showcasing its range of benefits



# Demonstration Projects Compliment Other ES Capabilities

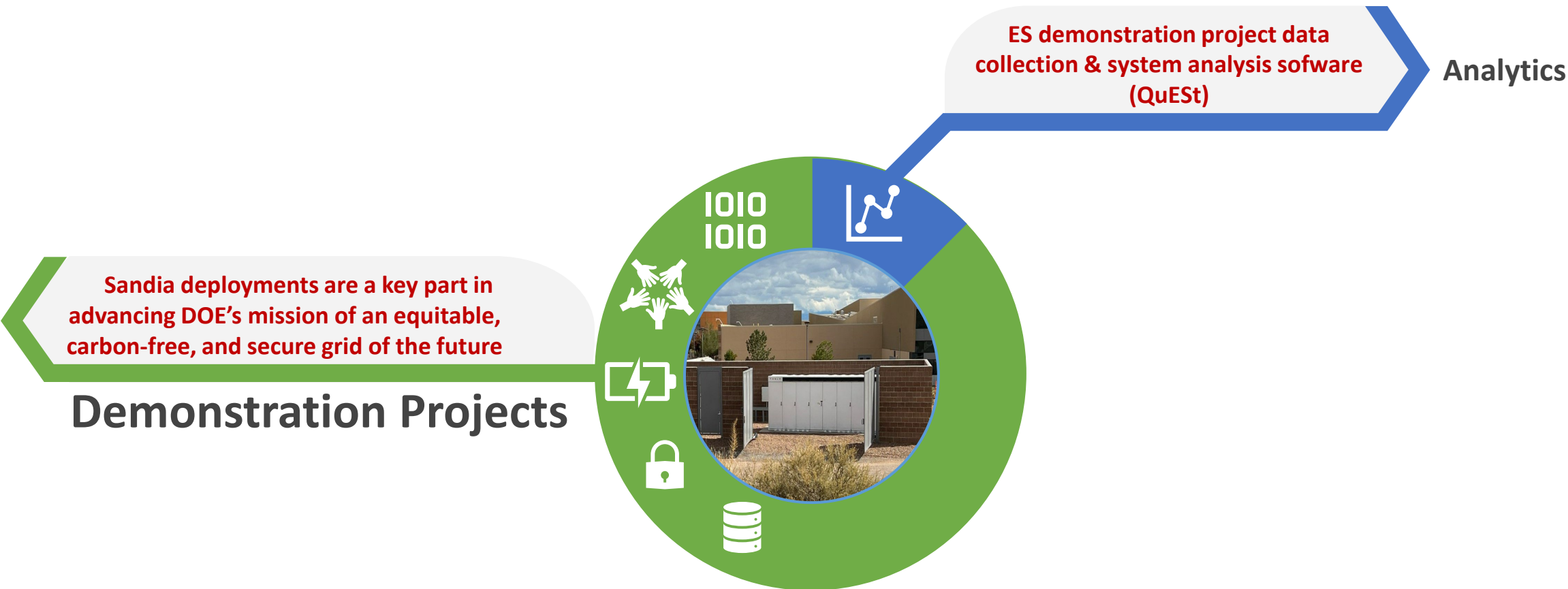


Sandia deployments are a key part in advancing DOE's mission of an equitable, carbon-free, and secure grid of the future

Demonstration Projects



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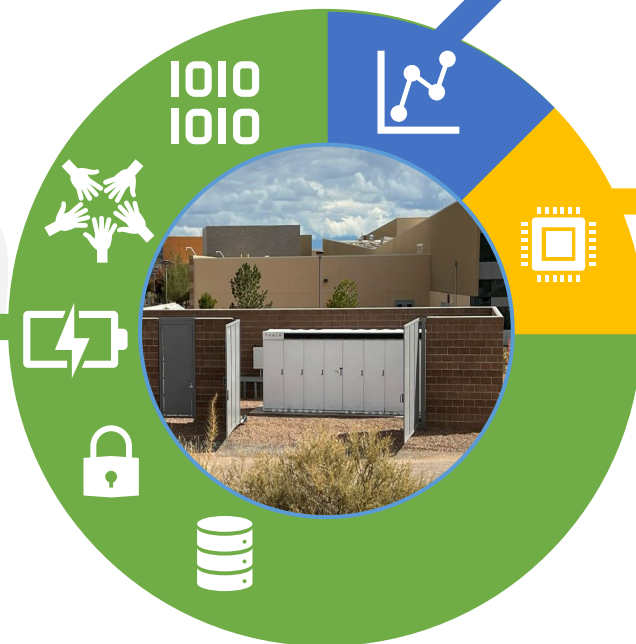


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**Demonstration Projects**



ES demonstration project data collection & system analysis software (QuEST)

**Analytics**

Dedicated labs for development of future, lower cost, better performing ES electronics

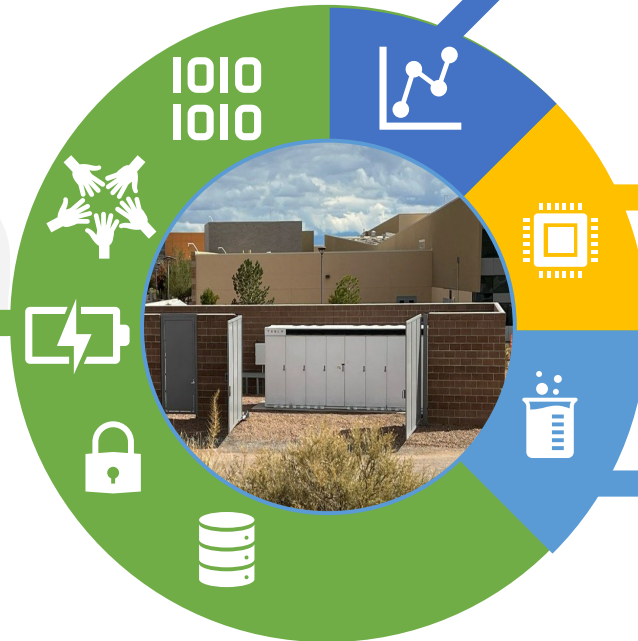
**Power Electronics**

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Cost Competitive Materials

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Cost Competitive Materials

Safety research on batteries  
Fire safety for fielded systems

Safety & Reliability

# Demonstration Projects Are a Foundational Element of the DOE/SNL ES Program



Long Duration Energy Storage

Community based projects

ES data & analytics

**1985** - Exxon Research & Engineering Co. Zn/Br flow battery (Z30-A) successfully powered an experimental EV at Ford Motor Company



**1986** - GNB sealed lead acid battery system test interfaced with wind turbines, Solar Energy Research Institute (SERI), Rocky Flats, CO

**2005** - AEP/SNL cost-shared deployment of the first 'DESS'



**2000's** - SNL performs characterization/life-cycle studies on Li-ion

**2009** - SNL/CEC PIER program flywheel ES demonstration project for 'rapid response' frequency regulation

Major growth in the deployment of both FTM and BTM ES

Mid-1970's - 1980's

1990's

2000 - 2010

2010 - 2020

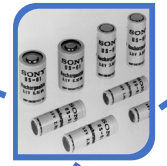
2020 - Future

Energy Storage Program early years, first use of cost-share development projects to advance technologies

Growth period for ES on utility systems with new technologies being piloted

Demonstrate and validate the equitable use of resilient, and secure energy storage systems on and off the grid through deployment projects

**1992** - Cooperative Agreement placed by DOE/SNL to support the design, fabrication, and testing of the first modular "AC Battery" - PQ2000  
*R&D 100 Award in 1997*



**1994** - 4-yr, \$2.8M, cost-share deployment program for VRLA battery improvement with GNB

**1992** - SNL performs specialized evaluation of flooded lead acid batteries (C&D Charter Power Systems) in a 20MW BESS used for frequency regulation and spinning reserve in PR (PREPA).

**2013** - SNL in partnership with Base Camp Integration Lab (BCIL-US Army) preforms functional testing on multiple ESS being evaluated for use in military FOB's



Microgrid projects grow in scale and scope with several deployments in rural and remote communities including Alaska and Hawaii

**2017** - Sterling Municipal Light Dept. installs first utility scale ESS and largest system in New England.  
*-2017 Grid Edge Award winner by Greentech Media -Finalist for the 5th Annual Energy Storage North America (ESNA) Innovation Awards*



# Current Energy Storage Demonstration Projects





- Sandia has a signed MOU with the CEC and working on signing a CRADA (Cooperative Research and Development Agreement)
- CEC has committed \$6M in funding for the Sandia awarded \$10M DOE OCED National Labs LDES Demonstration Project
- Sandia support for CEC ES Activities:
  - Sandia has performed due diligence site visits of CEC funded LDES deployments and manufacturers facilities
  - CEC ES staff training by Sandia
  - Technical support in responding to legislative/public questions regarding ES
- Sandia has a signed MOU with NYSERDA
- Sandia (and PNNL) are supporting NYSERDA with the NY Governor's inter-agency fire safety task force to ensure the safety and security of energy storage systems across the state

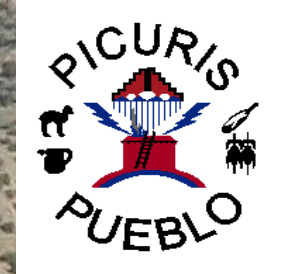
<https://www.governor.ny.gov/news/governor-hochul-convenes-inter-agency-fire-safety-working-group-following-fires-jefferson>

- Sandia support for NYSERDA ES also includes:
  - Technical assistance for developing Long Duration Energy Storage (LDES) markets, policies, and demonstration projects



- Sandia has an MOU with ITC Holdings
  - ITC is sharing data with Sandia on a long running hybrid Li-ion/Flow battery system that they operated for multiple years (flow battery decommissioned in 2022)
  - Intent is to perform analytics on available data as there were documented system failures. Understanding precursors or other indicators to failure helps advance ES technologies adoption, safety & reliability, and life cycle improvements
- Sandia contributes to Codes, Standards, & Regulations (CSRs) and other energy storage bodies of knowledge
  - Sandia lead and provided input to two EPRI Energy Storage and Integration Council (EPRI ESIC) publicly available guides; 1) "**Electrical Energy Storage Data Submission Guidelines, Version 3**", and 2) "**ESIC Energy Storage Commissioning Guide**"
  - IEEE P3232 - Guide for the Project Development, Facility Design, Installation, Operations and Maintenance (O&M) for Grid Connected Energy Storage Systems (ESSs)
  - Invited to provide feedback on the first set of Public Inputs (PI's) for the energy storage commissioning and decommissioning sections of the first draft revision of the 2026 edition of NFPA 855.

# What Are You Going to Hear About?



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**Sandia  
National  
Laboratories**

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**This work was Directed by Dr. Imre Gyuk through the Department of Energy Office of Electricity Delivery and Energy Reliability (DOE-OE) Stationary Energy Storage Program**



# Sandia's Energy Storage Demonstration Team



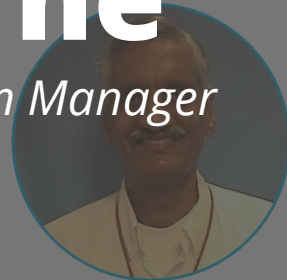


# Sandia's Energy Storage Deployment Team



**Ray Byrne**

*Energy Storage Program Manager*







# Sandia's Energy Storage Deployment Team



**Henry Guan**

*Electrical Engineer/Project Engineer*





# Sandia's Energy Storage Deployment Team



**Tim Wilcox**

*Data Scientist/Mechanical Engineer*



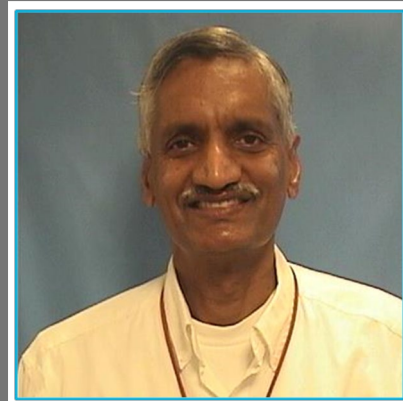


# Sandia's Energy Storage Deployment Team



**Ramesh Koripella**

*Materials Scientist*





# Sandia's Energy Storage Deployment Team



**Waylon Clark**

*Energy Storage Demonstration Team Lead*

