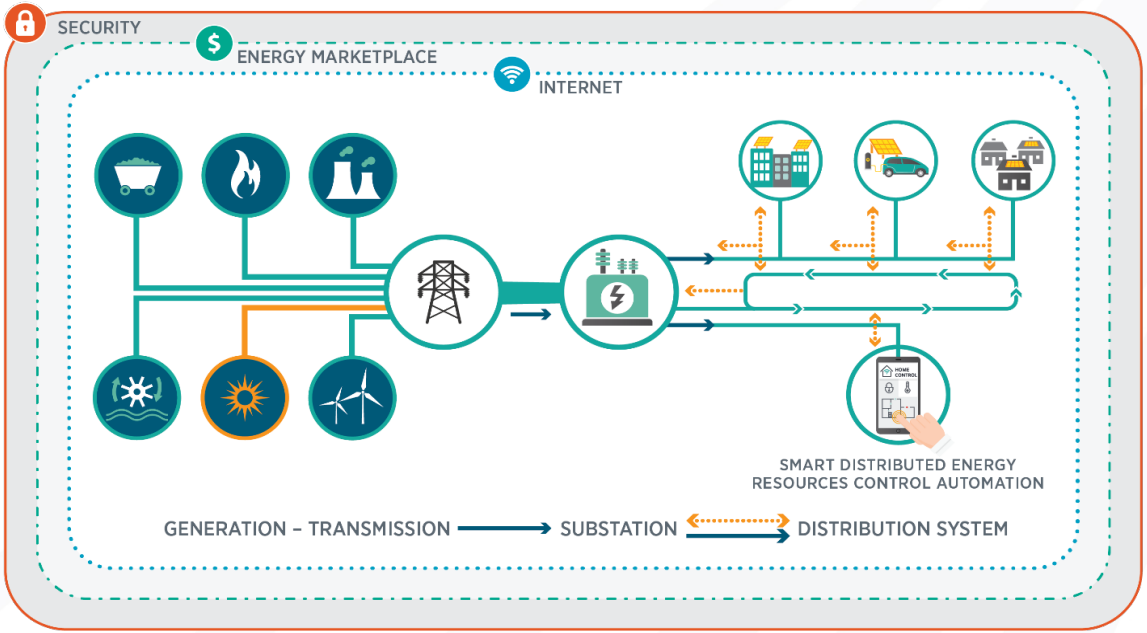
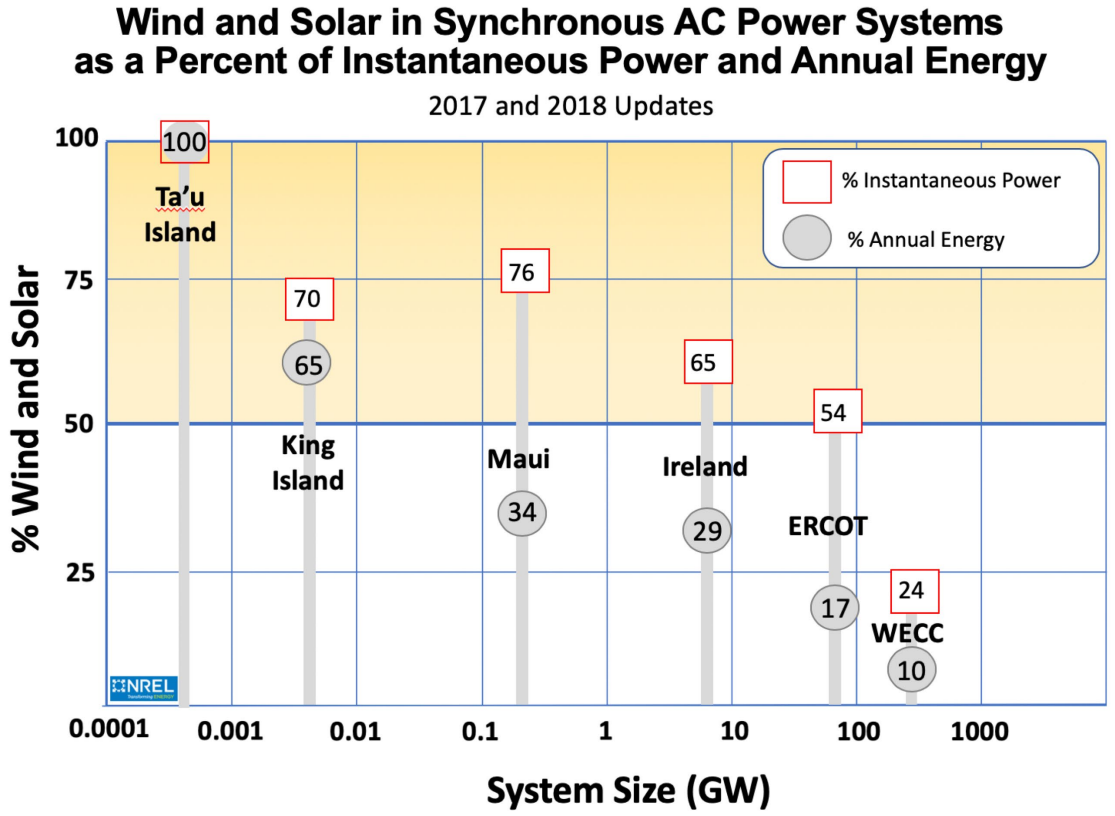
SETO Systems Integration (SI) Program

The Systems Integration (SI) subprogram supports early-stage research, development, and field validation for technologies and solutions that advance the reliable, resilient, secure and affordable integration of solar energy onto the U.S. electric grid.



Total SI budget
~ $50M/Yr
~ 80 active projects

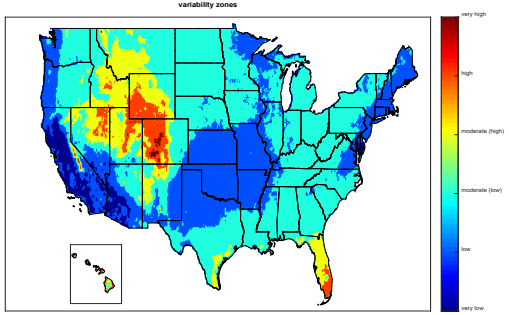
Addressing Near- and Long-Term Technical Challenges for High Penetration of Solar



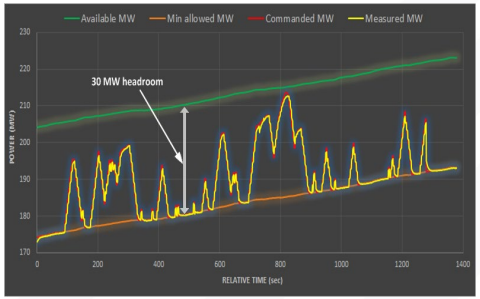
Ben Kroposki / NREL

A System Approach for Solar Grid Integration Research

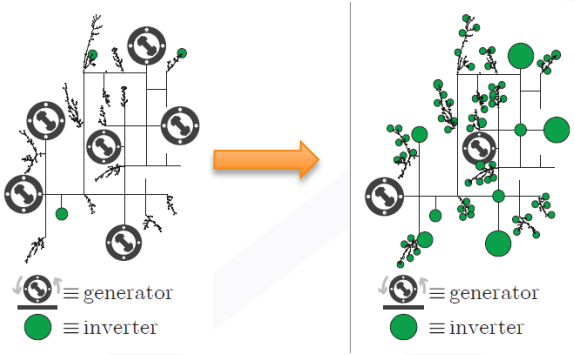
Solar Resource Data: NSRDB



Grid Services: AGC following

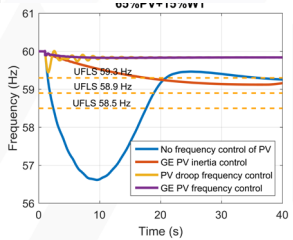


Advance Control: Grid Forming Inverters



System Modeling: Frequency Control

ERCOT



ERCOT

Focus Areas

- *PV and Power System Modeling*
- *Integration with Energy Storage*
- *Power Electronics*
- *Solar Forecasting*
- *Situation Awareness*
- *Grid Services*
- *Cybersecurity*
- *Resilient Distribution and Microgrid*
- *Long-Term Resource Planning*
- *Real-Time Operation and Control*
- *Codes and Standards*
- *Stakeholder Collaboration*

DOE Grid Modernization Initiative

EERE, OE, FE, NE, CESER

MYPP → GMLC Lab Call (2016) → Resilient Distribution System (2017) → GMLC Lab Call (2019)

Focus Areas:
- Devices and integrated systems
- Sensing and measurement
- System operations and control
- Design and planning tools
- Security and resilience
- Institutional support

Multi-Lab Collaboration:
- $220M
- 88 projects
- Foundational
- Program specific
- Regional partnerships

Multi-Lab Collaboration:
- $32M
- Resilient distribution systems
- 6 field validation projects
- 1 valuation analysis team
- Utility and industry partners
- Focus on DERs

Multi-Lab Collaboration:
- pending