



Distributed Energy Storage White Paper

Smart Grid & Energy Storage
Subcommittee's Joint Effort

Update

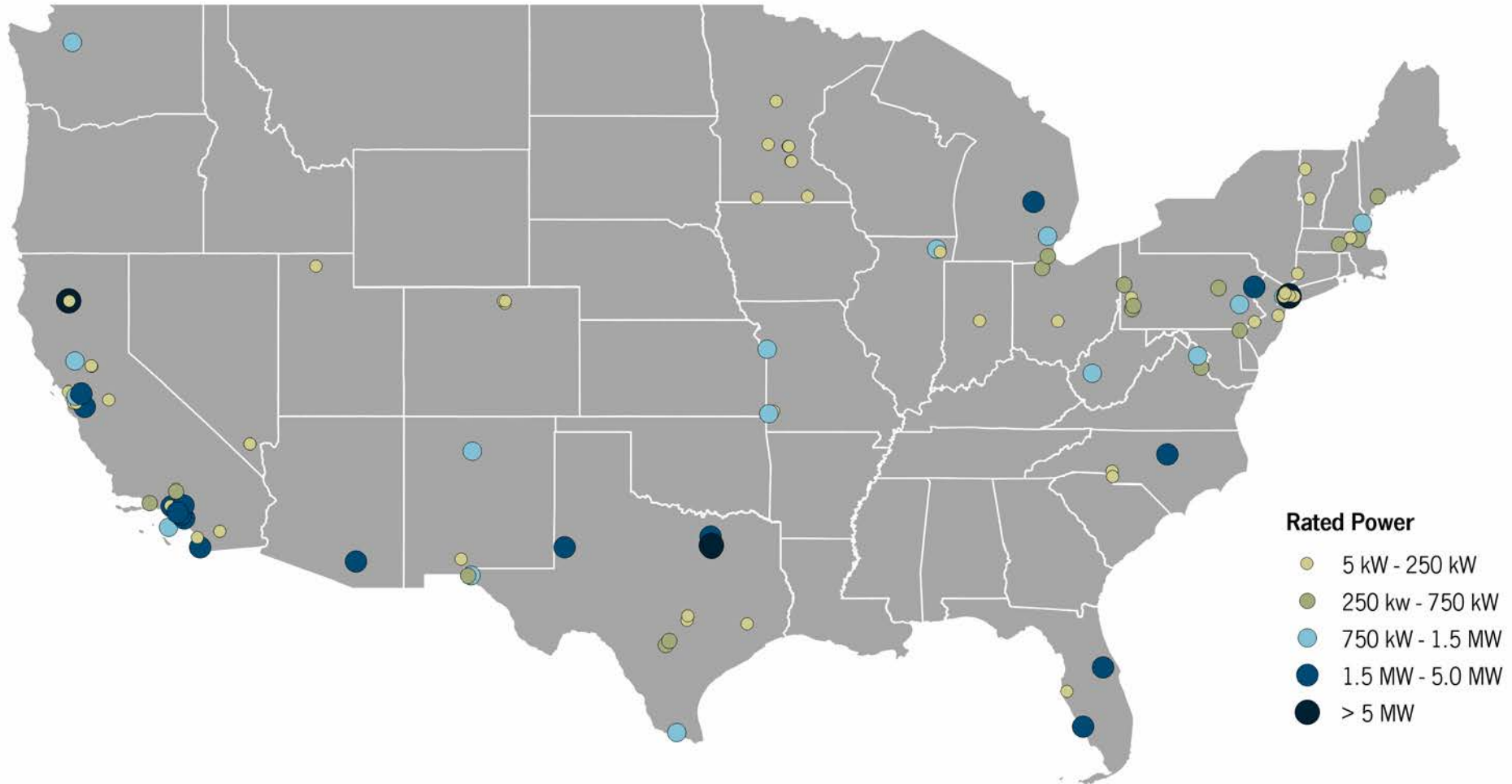


DES WP Update

- **Definition**
 - Energy Storage that is located at or down stream of Distribution Sub Stations
 - Includes Behind the Meter Applications
 - Thermal Energy Storage
 - Micro Grids
- **Scope**
 - Market
 - Regulatory & Interconnect
 - Technology & Applications
 - Benefits
 - Codes & Safety
 - DR Appendix
- **Purpose/Goal**
 - Identify Gaps & Provide Recommendations to DOE



Distributed Energy Storage (DES) Projects Map (9/14) (to be updated)





Recent DES News

- **Oncor**
 - \$5B+ Proposal to ERCOT for DES
 - Balancing the Bulk System using DES
 - Addressing Majority of System Contingencies w/ DES
 - Providing Better Service to Customers w/ DES
- **Tesla**
 - DES Product Offering
 - Partnership w/ Solar City and Other Major Utilities
 - Majority of Giga Battery Factory Capacity to DES



DES Expert Interviews

| DES Expert Interviewee | Affiliation | Interview Completion Date |
|------------------------|--------------------------|---------------------------|
| Willem Fadrhonc | STEM | 10/20/2014 |
| Tom Weaver | AEP | 11/10/2014 |
| Melicia Charles | CPUC | 10/23/2014 |
| Tom Bialek | SDG&E | 12/15/2014 |
| Fred Fletcher | Burbank Water and Power | 10/30/2014 |
| Dan Ton | DOE | 10/9/2014 |
| Imre Gyuk | DOE | 10/9/2014 |
| Paul De Martini | Newport Consulting Group | 10/9/2014 |
| Erich Gunther | Enernex | 10/6/2014 |
| Barry Mather | NREL | 10/9/2014 |
| Bob Rudd | Solar City | 11/14/2014 |
| Jeff Anderson | CalCEF | 1/12/2015 |

Topics Not Covered in Interviews: EV's & Thermal Storage



DES Expert Interview

Observations/ Recommendations

- Market Developing/Evolving Quickly
 - Recent News
- DES Market Models & New Market Mechanics
 - Rate Base and/or Open Market
- DES Physical Models
 - Advanced Power Electronics & Controls
- DR & DES Control Models & Advanced Control Development
 - Local vs Central (DES vs Bulk)
 - Interface Control System Between Distribution & Bulk System
- DES Codes & Standards
 - Risk Based Codes & Standards
 - Accelerate Code Adoption by State & Local Governments
- DES Interconnect Standards/Open Access
 - Plug & Play for Behind the Meter
 - Simplify Interconnect Process for Other Interconnects thru Codes/Standards
- Micro Grid Development/Advancement
 - Substation to Behind the Meter Micro Grids



DES WP Work Plan & Status

- WP Outline Draft
- DES Panel EAC June 2014 Meeting
- Expert Interviews (Complete)
- Draft Recommendations June 2015
- Draft White Paper July 2015
- Target Completion Date – September 2015