

Distributed Energy Storage White Paper

Smart Grid & Energy Storage Subcommittee's Joint Effort



DES WP

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
- DER Appendix

Recommendations

- Recommendations to DOE
- DER WP (Follow-on)

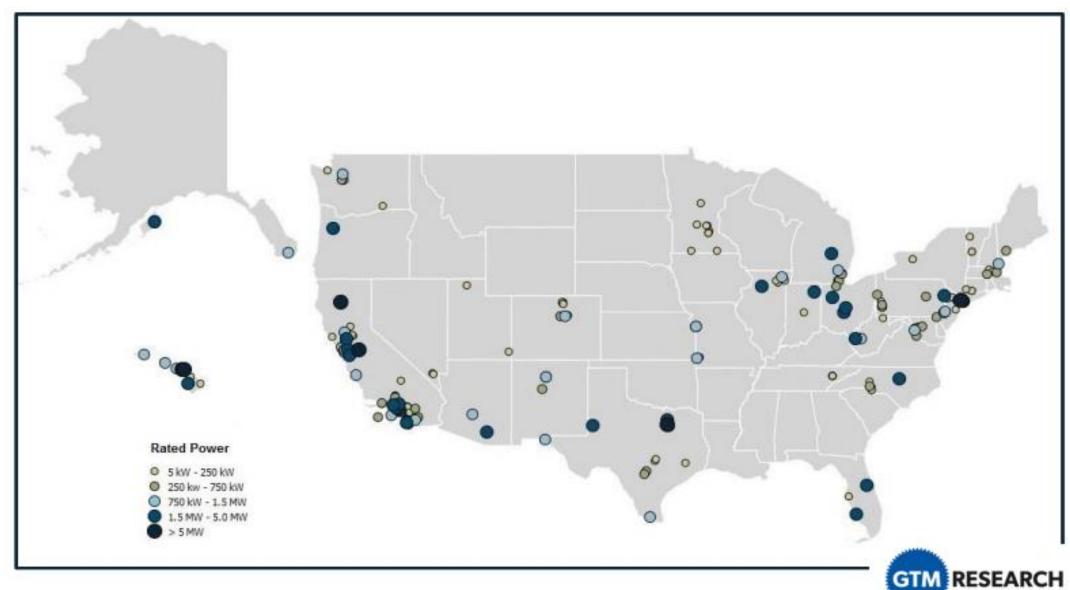


DES WP Authors

- Thanks to DES Co-Authors
 - Clark Gellings
 - Paul Roberti
 - Ramteen Sioshansi
 - Tim Mount



Distributed Energy Storage (DES) Projects Map





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: Thermal Storage OEM's Liability Concerns Regarding Using EV Batteries as DES



Proposed Recommendations

- Access and track lessons learned from projects and market development of DES
- Develop advanced market and cost-based market models for DES
- Develop advanced modern grid physical models for DES
- Develop operational models and verify advanced controls
- Assess the applicability of existing utility-scale codes and standards, and DG codes and standards to smaller-scale distributed storage
- Further leverage the DOE's unique role as an unbiased arbitrator with technical expertise in the deployment of DES
- Assist in the deployment of new standards and codes for DES
- Develop technologies that increase the performance, cost effectiveness and safety factor of DES systems



DES WP – Next Steps

- Recommend Approval of DES WP by EAC
 - Discussion
- Recommend Follow-up WP on DER by EAC