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

<table>
<thead>
<tr>
<th>DES Expert Interviewee</th>
<th>Affiliation</th>
<th>Interview Completion Date</th>
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<tr>
<td>Willem Fadrhonc</td>
<td>STEM</td>
<td>10/20/2014</td>
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<td>Tom Weaver</td>
<td>AEP</td>
<td>11/10/2014</td>
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<td>Melicia Charles</td>
<td>CPUC</td>
<td>10/23/2014</td>
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<td>Tom Bialek</td>
<td>SDG&amp;E</td>
<td>12/15/2014</td>
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<td>Fred Fletcher</td>
<td>Burbank Water and Power</td>
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<td>Dan Ton</td>
<td>DOE</td>
<td>10/9/2014</td>
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<td>Imre Gyuk</td>
<td>DOE</td>
<td>10/9/2014</td>
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<td>Paul De Martini</td>
<td>Newport Consulting Group</td>
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<td>Erich Gunther</td>
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<td>Barry Mather</td>
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<td>Bob Rudd</td>
<td>Solar City</td>
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<tr>
<td>Jeff Anderson</td>
<td>CalCEF</td>
<td>1/12/2015</td>
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**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