DOE Grant Update
&
2010 Advanced Technology Corporate Goal

Board Reliability Committee
October 13, 2009
Chantal Hendrzak
PJM's DOE Grant Involvement

- Lead
- SubAwardee
- Support
Proposed Substations for Phasor Measurement Unit Installations
Eastern Interconnection Planning Collaborative

- Rolls-up regional plans
- Coordinates with Canada, Western Interconnect and Texas
- Receives stakeholder input and holds public meetings
- Performs studies of various transmission alternatives against national, regional and state energy/economic/environmental objectives
  - Identifies gaps for further study

Publishes Annual Interconnection Analysis

States
- Regional Policy recommendations
- State energy policies

Annual interconnection analysis

ISO / RTOs & Order 890 Entities
- Produce Regional Plan through regional stakeholder process, including state regulatory authorities

Regional Plans

DOE/FERC
- Provides policy direction, assumptions & criteria

Regional/state compliant plans provided as input

Study gaps relative to national, regional and state policy

States
- Policy recommendations
- State energy plans

Regional Plans

FERC
- Review/direction
- Order adjustments
- Cost recovery

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Notional Depiction of Interconnect Between Energy Storage and Electric Grid
Interregional Shared Situational Awareness

S2COE solution can solve the key challenges facing WASA

Secure Smart Grid Common Operating Environment (S2COE)

- Client-specific Applications
- Core Applications
- Infrastructure
- Grid Inputs

Boeing Apps
3rd Party Apps
Legacy Systems

Common operating picture
Application programming interfaces (APIs)
Services
Translation protocols

Smart grid hardware and software (AMI, SCADA, EMS, DMS)

IDS – Global Services & Support
Boeing Energy Solutions

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Smart Grid Grants – PJM Support

BOMA/ Chicago - Smart Grid Program

gridSMART
Technologies Implementation

Project Halcyon


Electrification of Utility Transportation

Norton Energy Services – CAES Facility
<table>
<thead>
<tr>
<th>Project</th>
<th>PJM Total Budget</th>
<th>PJM Resources</th>
<th>Externally Funded Resources</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM Phasor Project ($27.8m)</td>
<td>• $4.0 m&lt;br&gt;  – $2.6m (personnel)&lt;br&gt;  – $1.4m HW/SW</td>
<td>• 4.5 FTEs/year</td>
<td>2.25 FTEs/year (DOE)</td>
<td>3 years</td>
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<td>EIPC ($21.7m)</td>
<td>• $860k&lt;br&gt;  – $860k (personnel)</td>
<td>• 2.5 FTEs/year</td>
<td>2.5 FTEs/year (DOE)</td>
<td>4 years</td>
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<tr>
<td>Drexel Energy Storage ($32.9m)</td>
<td>• $530k&lt;br&gt;  – $530k (personnel)</td>
<td>• 1 FTE/year</td>
<td>.5 FTE/year</td>
<td>5 years</td>
</tr>
<tr>
<td>Boeing Wide Area Visualization ($17m)</td>
<td>• $975k&lt;br&gt;  – $897k (personnel)&lt;br&gt;  – $78k HW/SW</td>
<td>• 2 FTEs/year</td>
<td>2 FTEs/year</td>
<td>2 years</td>
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<tr>
<td>Goal</td>
<td>Measurement</td>
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<td>Alternative Technology Resource Pilot</td>
<td>Exceeds – 4 pilots</td>
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<tr>
<td>Implementations</td>
<td>Target – 2 pilots</td>
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<tr>
<td>• Energy Storage</td>
<td>Threshold – 1 pilot</td>
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<td>• Demand Response</td>
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Google
Microsoft
RLtec
Innovative energy solutions
MAGICC
Mid-Atlantic Grid Interactive Cars Consortium
Beacon Power
AEP American Electric Power
gridSMART℠