Desert DERT

DER Technology in the Desert from Design to Reality
Arizona Resource Needs are Changing

Value of energy saved is **not** the same for all hours of the year

High Value DSM

→ Decision No. 75679 “In its 2018 and future DSM Implementation Plans, further increase the focus on peak demand reductions (MW) from EE, DR, energy storage, and load management programs that reduce customer energy demand during the period of system peak demand”
Low Demand for Electricity During the Day Results in Renewable Curtailment
Rewards Programs

- DERs can have strategic value for customers and can help mitigate operational challenges on the distribution system such as voltage excursions.
- DERs can provide the following **values** for customers and the grid:
  - Demand Response (Peak Reduction)
  - Load Shift
    - Peak demand reduction
    - Solar sponge
  - Feeder congestion relief
  - Voltage support
  - Bill savings through modern rates
  - Enrollment rewards when customers sign up for any of the Rewards programs, and annual participation awards for the Cool Rewards DR program.
Storage Rewards Program (RESS)

- **Program**
  - APS owned and operated batteries
  - Customer and utility share capacity

- **System Benefits**
  - Help customers shift energy usage and manage peak demand
  - System peak reduction and other grid operational benefits
  - Time of battery charging will be modifiable throughout year
Reserve Rewards Program

• **Program**
  • Water Heaters (Thermal Energy Storage)
  • Customer owned water heaters operated by APS
  • Shift morning usage into solar production period (while maintaining customer hot water)

• **System Benefits**
  • Reduce system peak
  • Load management benefits by shifting demand
  • Installed on targeted feeders
Cool Rewards Program

• **Program**
  • Thermostat Demand Response
  • ~6,000 smart thermostats
  • Up to 20 call events during the summer months
  • Customer receive annual participation award

• **System Benefits**
  • Demand response load reductions during system peak events
  • Participating customers can override events without penalties
  • Pre-cooling strategy will shift load into hours of high solar production
Technology Use Cases

- Each technology has specific measurable benefits to improving utility operations and reliability

<table>
<thead>
<tr>
<th>Use Cases</th>
<th>T-Stat DR</th>
<th>GIWH</th>
<th>RESS</th>
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<tbody>
<tr>
<td>Reduce system peak via demand response events</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Reduce system peak via daily scheduled load shift /</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Provide feeder congestion relief</td>
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<tr>
<td>Solar sponging / duck curve management</td>
<td>✓</td>
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<tr>
<td>Customer peak demand charge management</td>
<td>✓</td>
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Implementation: Where the Rubber Meets the DERT Road

Key insights & learnings

• spotlight
• strategic partners
• innovative procurement
Implementation: Where the Rubber Meets the DERT Road

REWARDS Contracts Overview
Rev 4 3/13/19

- Statement of Work (scope, schedule, pricing)
- Pricing = hardware + installation + NOP fees
- Cybersecurity
- SaaS (APS standard requirements)
- O&M as applicable
- SLAs

Multiple vendors

APS

EPC
SA
O&M

Equipment Suppliers

Service Agreements (SA)
- BYOT DR Customer T&Cs
- SOW
- Requirements Matrix (based on 8760)
- SLAs
- Deployment Schedule
- Pricing
- SaaS
- Cybersecurity
- NOP IAs (API + SLA sections)*

Integration Agreements (IA)
- T&C – EH confidential
- SOW – EH confidential pricing
- API Functionality (informed by Requirements Matrix in EH SA + data flow needs)
- SLAs

*EnergyHub-executed SLAs with equipment suppliers attached to all APS Rewards initiative contracts
Implementation: Where the Rubber Meets the DERT Road

S.M.A.R.T. implementation

There are some things you learn best in calm, and some in storm.
—Willa Cather
Anatomy of a water heater
Getting into hot water

Source: EnergyHub
Rate complimenting load control

Cooling Event Activity #5976

*Baseline and load activity include estimated load for devices that are missing data (Alarm Panel) or offline.*
Coordination is key
Capstone

Where We’re Going
How’s the Market Adapting?
General Q&A
Thank you!

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