SHINES Kickoff Meeting 2016

Austin SHINES Project

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A bit about Austin Energy
Austin Energy 2025 Goals

55% renewable energy

900 MW of savings from energy efficiency and demand response

950 MW

200 MW local solar, 100 MW customer-sited, 10 MW local storage

All City of Austin facilities, operations and fleet carbon neutral

Subject to Affordability Goals
Customer-Sited & Community Solar

May 2015 solar: shown below
May 2016 solar: ~34 MW

Austin Energy
Solar Locations

- Commercial 10.9 MW
- Residential 16.2 MW
- Community Solar 2 MW (est.)

Key Project Locations

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The Austin SHINES Solution

• **Open standards** based Distributed Energy Resource (DER) management platform

• Includes the **integration and optimization of DERs** at the utility distribution level

• Enables **diverse strategies/business models** for both utility and customer owned resources; to include direct, third-party, and autonomous resource management of DERs

• Integrates more than 3 MW of **distributed PV and energy storage** with 31 **smart inverters** and includes more than 700 PV customers
Austin SHINES Partnerships

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Project Structure and Timeline

39-month project with phases
System Boundary Definition
System Levelized Cost of Energy (LCOE)

Economic modeling centers around the **System LCOE to Serve Load** metric

\[
\text{System LCOE to Serve Load (\$/kWh)} = \left(\frac{\text{Capital cost of all equipment within system (\$)}}{\text{All load served within the system (kWh)}}\right) + \left(\frac{\text{Operating costs of all equipment within system (\$)}}{\text{All load served within the system (kWh)}}\right) + \left(\frac{\text{Cost of energy, capacity, and services imported to system (\$)}}{\text{All load served within the system (kWh)}}\right) - \left(\frac{\text{Value of energy, capacity, and services exported from system (\$)}}{\text{All load served within the system (kWh)}}\right)
\]

Creating additional value for utility and customers by deploying and managing DERs in an optimal manner
Innovation - SHINES includes multiple levels of control to achieve DER optimization

**DERO**
- Provides bulk power system (BPS) control
- Connects directly into ADMS; inputs include market signals, forecasts, grid data

**1E-IC**
- Provides local control for a single energy storage site
- Tries to make as many decisions as it can locally
Comparison of System LCOEs

<table>
<thead>
<tr>
<th>System LCOE to serve load ($/kWh)</th>
<th>Load served by local solar (% kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td><img src="image" alt="Graph" /></td>
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<tr>
<td>- No new SHINES assets installed</td>
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<tr>
<td><strong>Baseline + All Assets</strong></td>
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<tr>
<td>- No controls</td>
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<td><strong>Baseline + All Assets</strong></td>
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<tr>
<td>- Autonomous controls</td>
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<tr>
<td><strong>SHINES Solution</strong></td>
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<tr>
<td><strong>Baseline + All Assets + Holistic Controls</strong></td>
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Conceptual Network Architecture

ILLUSTRATIVE
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Residential Components

*Market transactions in the SHINES project will be simulated only and included in LCOE analysis.
Commercial Components

**3rd Party Aggregator Sites – 400kW**
- 5x – 30kW
- 2x – 125kW

**Dispatch Priority:** Customer value propositions

**Direct Utility Control Sites – 155kW**
- 1x – 30kW
- 1x – 125kW

**Dispatch Priority:** Utility reliability needs

*Market transactions in Austin SHINES will be simulated only and included in LCOE analysis.*
Grid-Scale Components
Key Benefits

• Advance utility’s local storage and solar goals

• Discover best way to maximize DER value for AE and the customer

• **Strategic approach** leverages AE work and state funds to obtain external funding
  • Ultimately reducing the overall cost for the customer

• Project designed to **engage customers** to develop new programs and consumer options

• **Modular approach** allows utilities across the country to adopt the scale and use-cases right for them
Thank You

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