SunShot
U.S. Department of Energy

SHINES Kickoff Meeting 2016

Austin SHINES Project

Lisa Martin, SHINES Project Manager
Program Mgr, Smart Grid & System Operations, Austin Energy

A bit about Austin Energy

Austin Energy 2025 Goals

55%

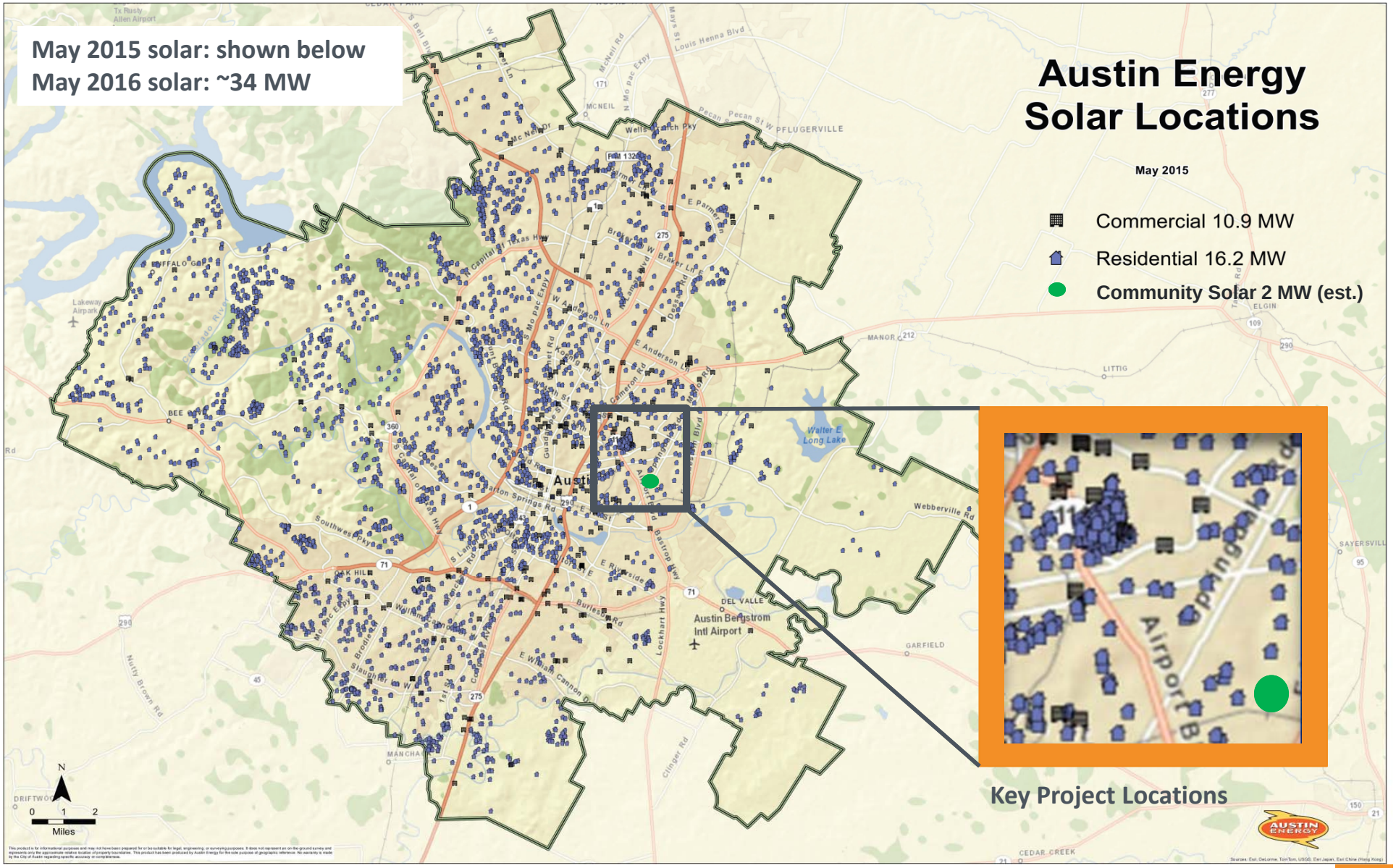
900 MW +

950 MW +

55% renewable energy	900 MW of savings from energy efficiency and demand response	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

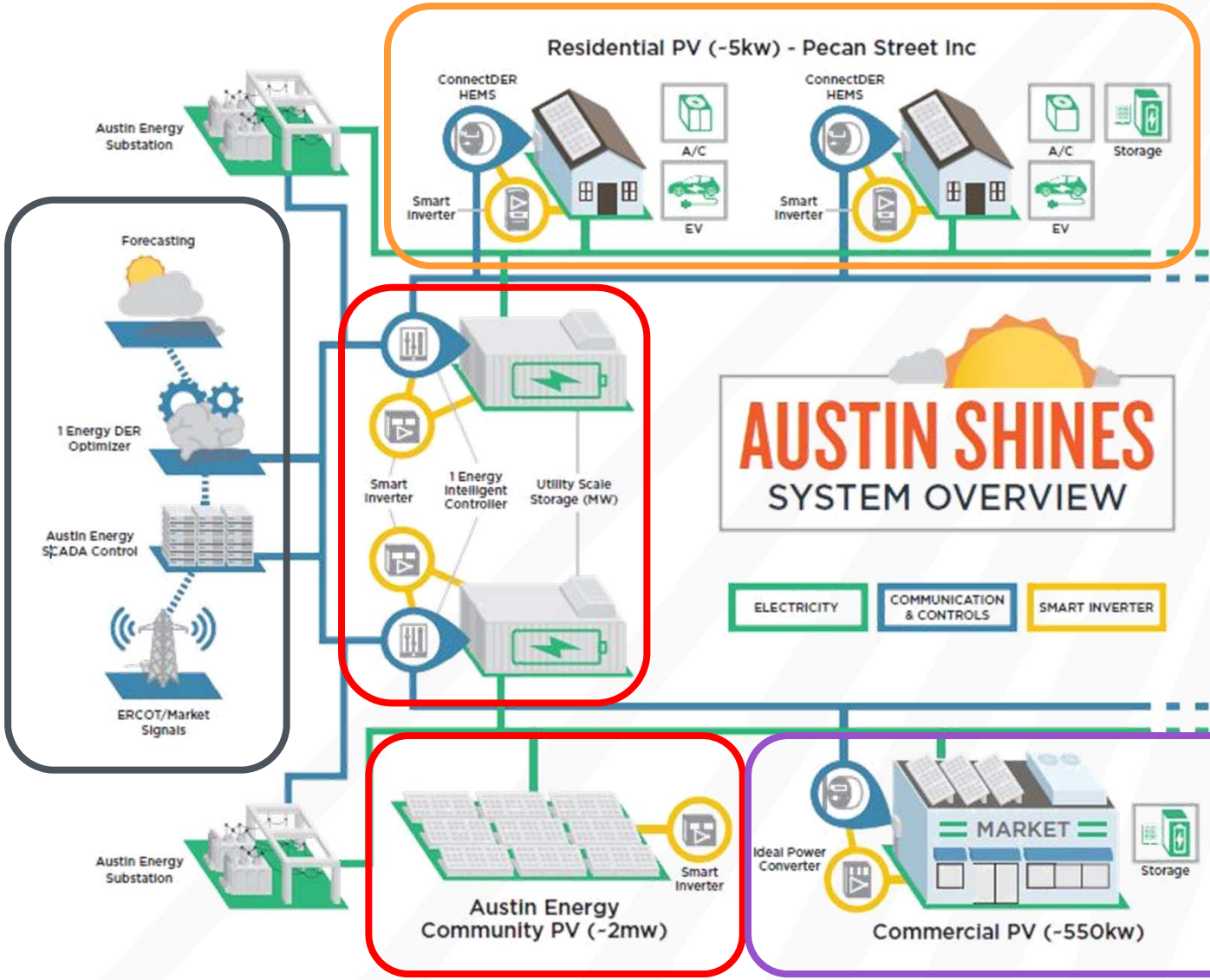
Customer-Sited & Community Solar



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 Conceptual Overview



Utility Scale Energy Storage + PV

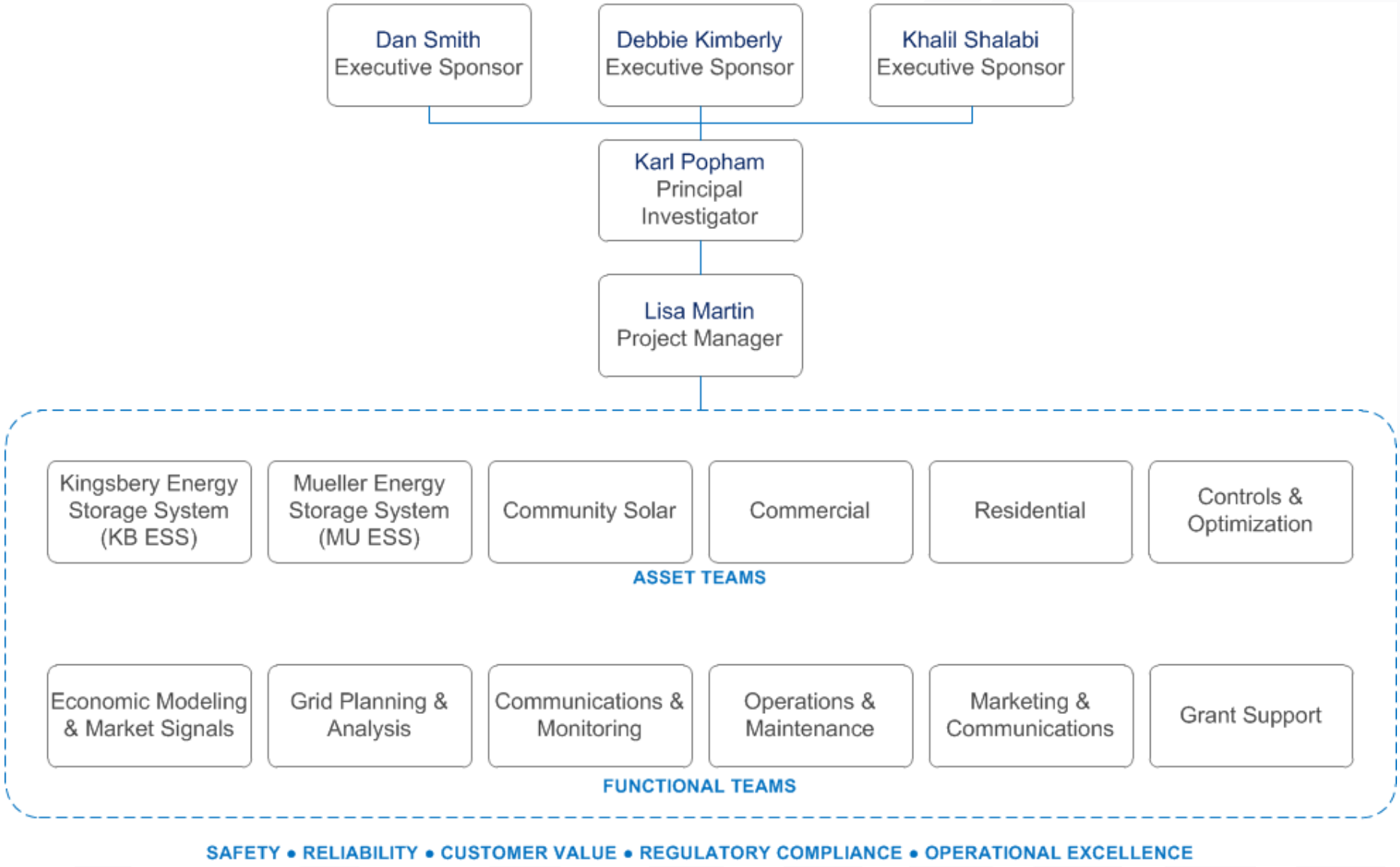
Residential Energy Storage + PV

Commercial Energy Storage + PV

DER Management Platform

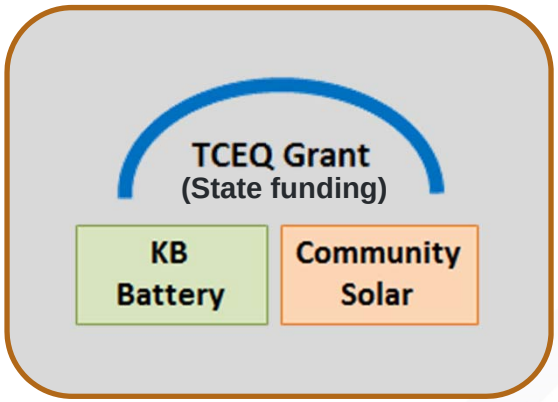
Illustrative

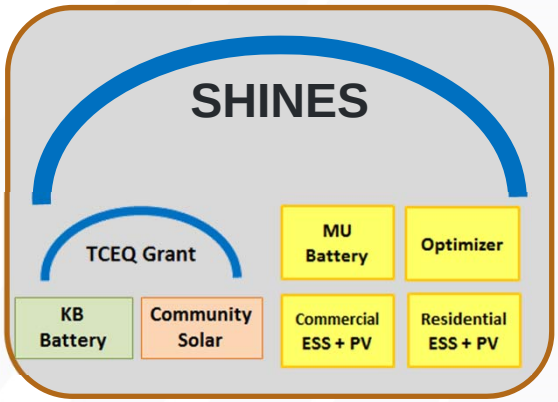
Austin SHINES Project Org Chart

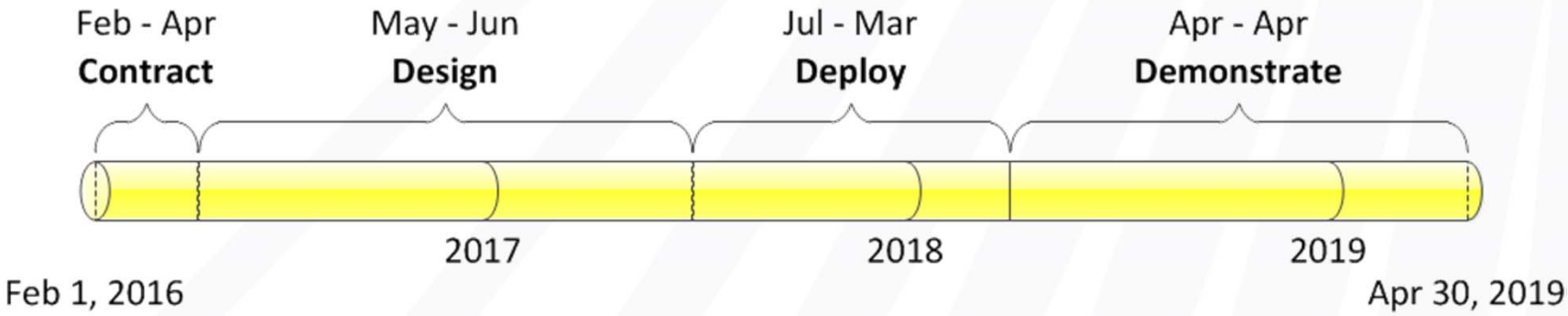


Austin SHINES Partnerships

Project Structure and Timeline

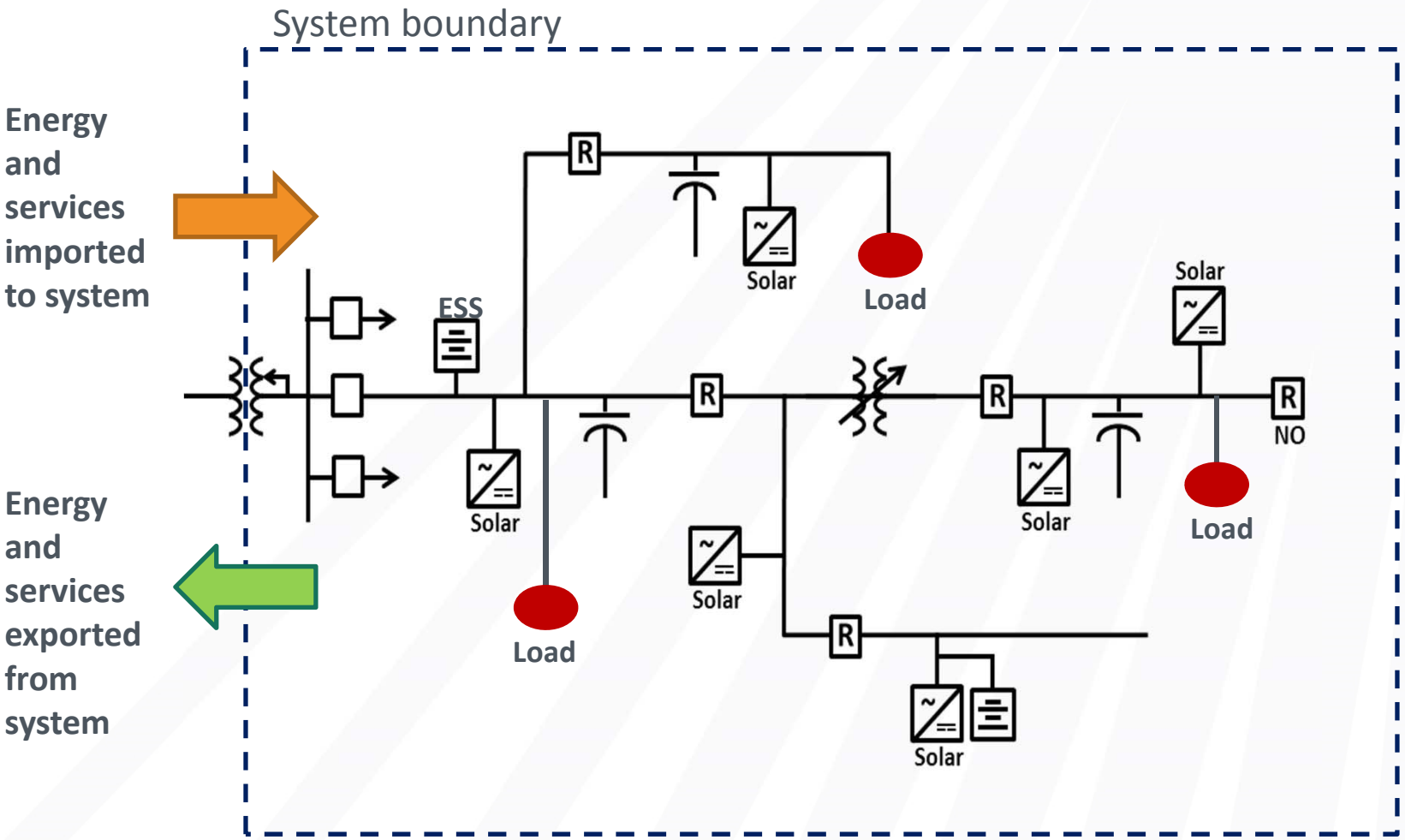






39-month project with phases

System Boundary Definition



System Levelized Cost of Energy (LCOE)

Economic modeling centers around the
System LCOE to Serve Load metric

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

Creating additional value for utility and customers by deploying and managing DERs in an optimal manner

System Controls

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

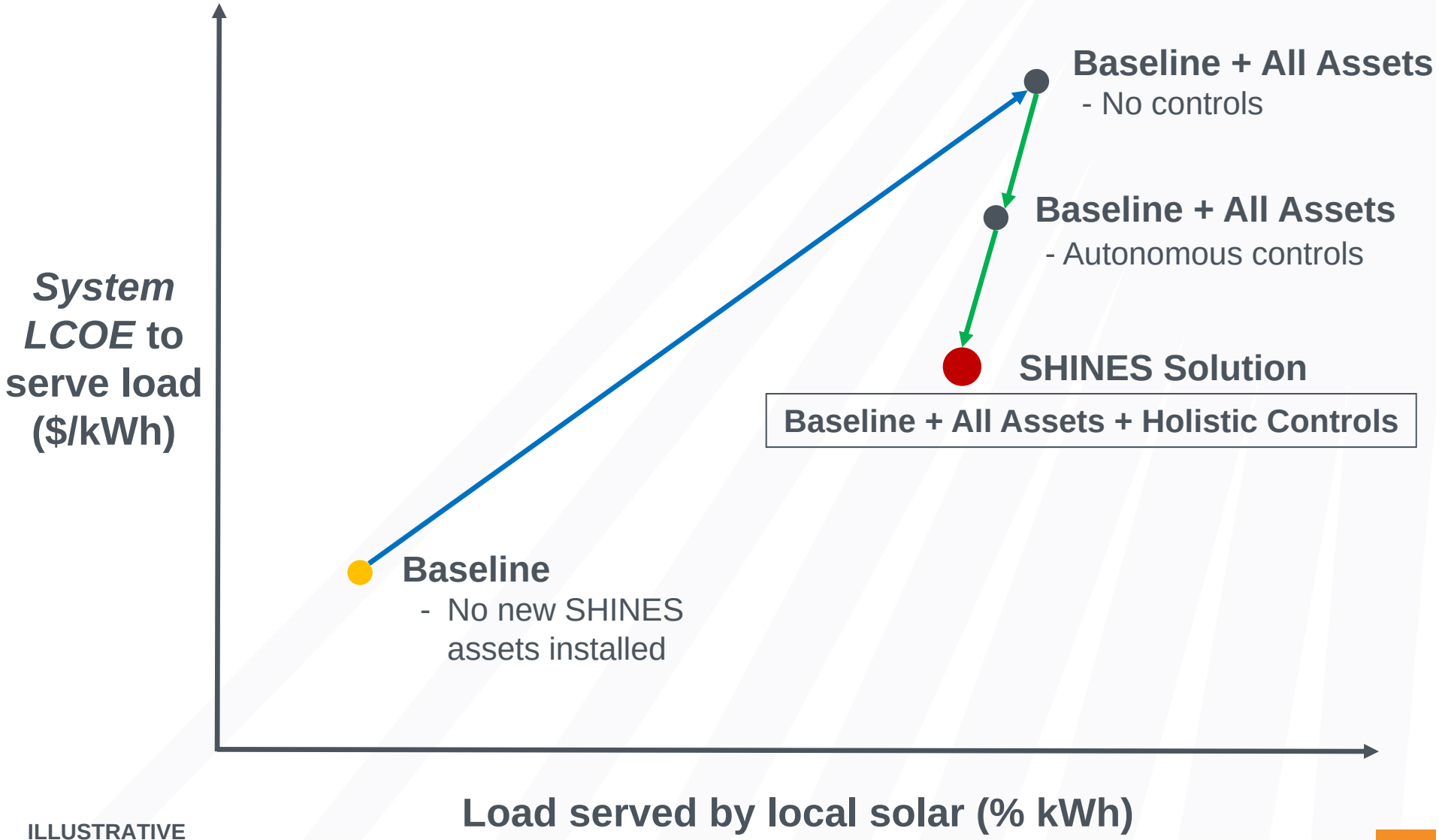
DER Optimizer

1E-IC

- Provides local control for a single energy storage site
- Tries to make as many decisions as it can locally

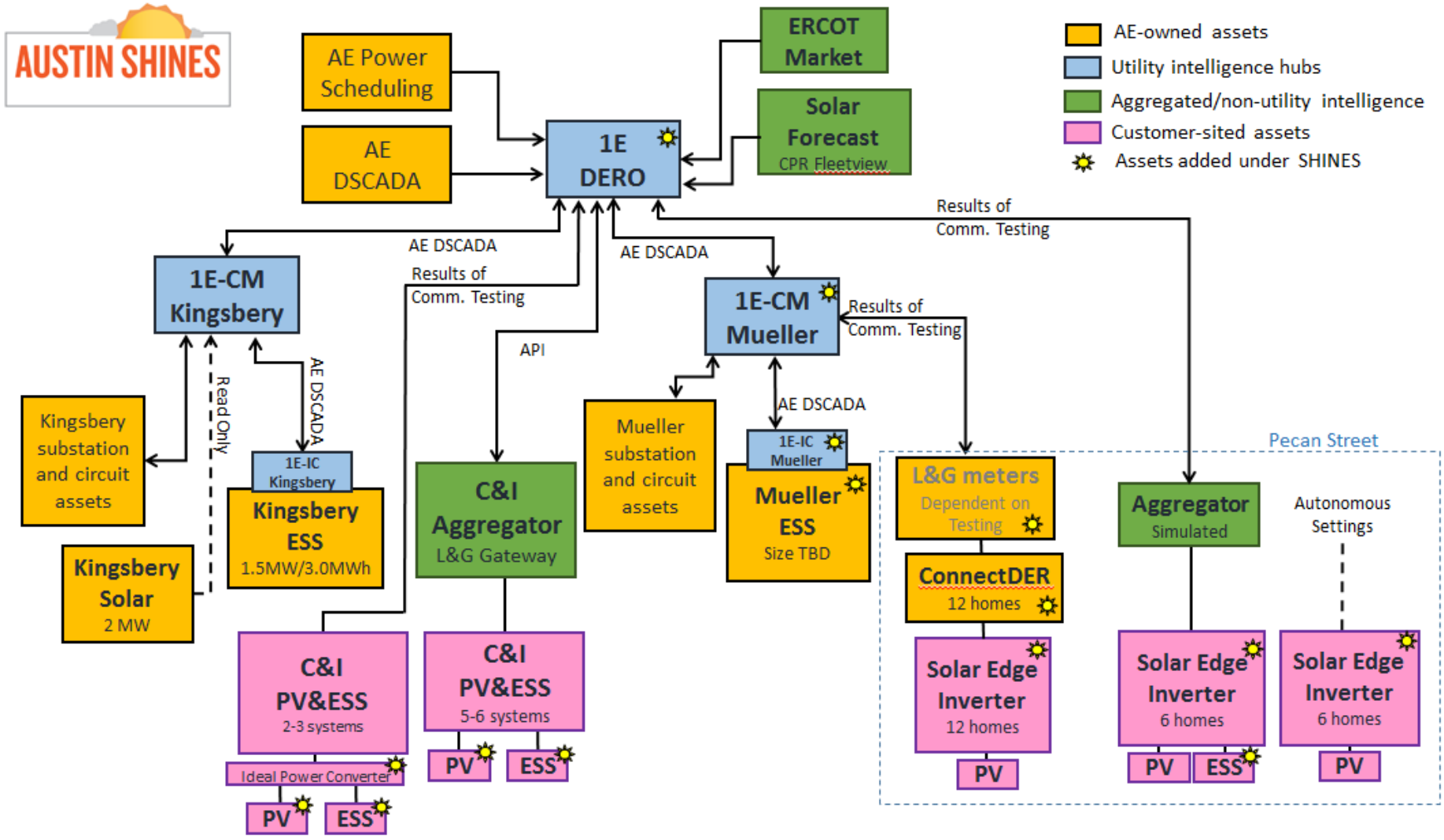
1Energy Intelligent Controller

Comparison of System LCOEs



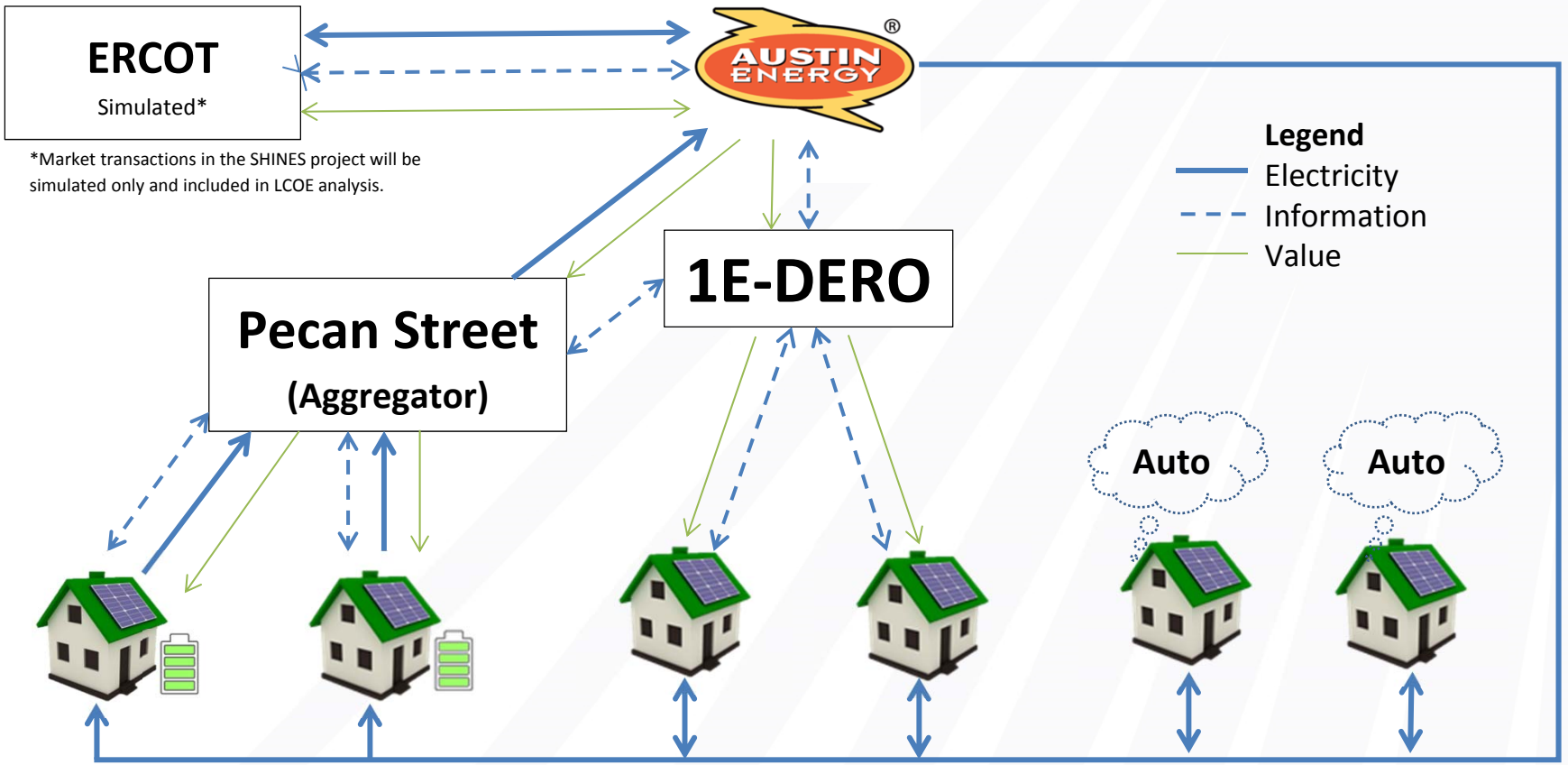
ILLUSTRATIVE

Conceptual Network Architecture



ILLUSTRATIVE

Residential Components

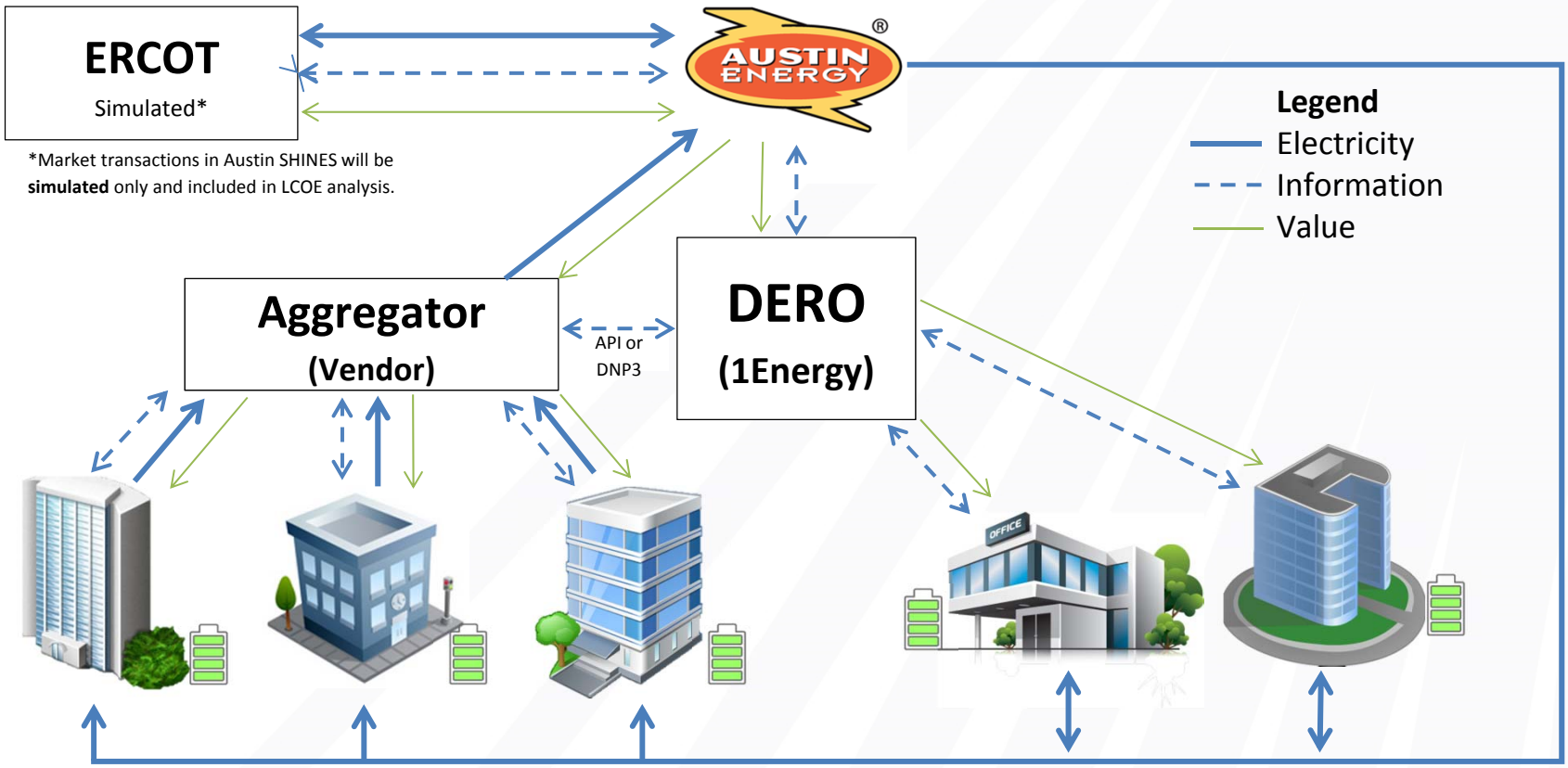


Pecan Street Aggregator
Sites x6
PV and ESS

Direct Utility Control
Sites x12
PV only

Autonomous
Sites x6
PV only

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

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

Info: austinshines@austinenergy.com