Item 12

Austin SHINES Project Update

William Kelly
Distribution Process Manager – Advanced Grid Technologies

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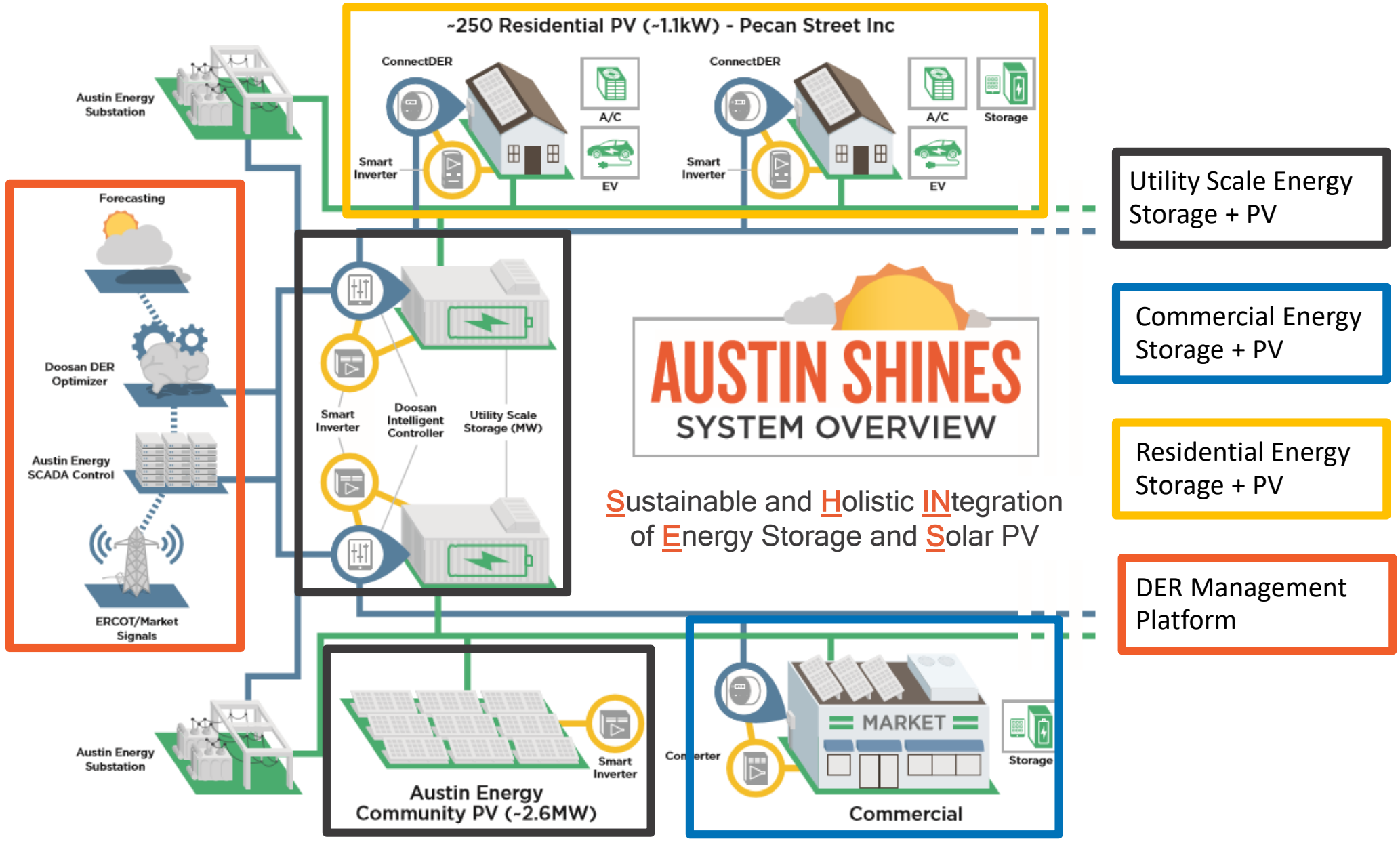
Project Description

The Austin SHINES Concept



Austin SHINES Assets

Grid Scale

- Kingsbery Energy Storage System
- Mueller Energy Storage System
- La Loma Community Solar Farm

Commercial Scale

- 3 Aggregated batteries + existing solar PV

Residential Scale

- 6 Aggregated batteries + existing solar PV
- 1 Electric Vehicle installed as Vehicle-to-Grid (V2G)
- 12 Utility-Controlled PV Smart Inverters
- 6 Autonomously-Controlled Smart Inverters

DER Value Strategies

Value Streams	Use Case	
Energy Market	Utility Peak Load Reduction	*Lower transmission cost obligation*
	Day-Ahead Energy Arbitrage	*Realize economic value through price differential*
	Real-Time Price Dispatch	*Realize economic value from real-time price spikes*
Grid Reliability	Voltage Support	*Reduce losses and increase solar generation*
	Distribution Congestion Management	*Increase local grid reliability*
Utility Customer	Demand Charge Reduction	*Lower customer bills and realize system benefit*

SHINES Asset 'Value Stack'

	DERO Application (application benefit)	Kingsbery ESS (grid-scale)	Mueller ESS (grid-scale)	Agg. PV/ESS (commercial)	Agg. PV/ESS (residential)	Solar PV (residential)
ECONOMIC	**Utility Peak Load Reduction** (Lower transmission cost obligation)			☀	☀	
ECONOMIC	**Day-Ahead Energy Arbitrage** (Realize economic value through price differential)	☀	☀	☀	☀	
ECONOMIC	**Real-Time Price Dispatch** (Realize economic value from real-time price spikes)	☀	☀	☀	☀	
RELIABILITY	**Voltage Support** (Reduce losses and increase solar generation)	☀	☀		☀	☀
RELIABILITY	**Distribution Congestion Management** (Increase local grid reliability)	☀	☀		☀	
CUST	**Demand Charge Reduction** (Lower customer bills and realize system benefit)			☀		

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Findings To Date

Technical Lessons

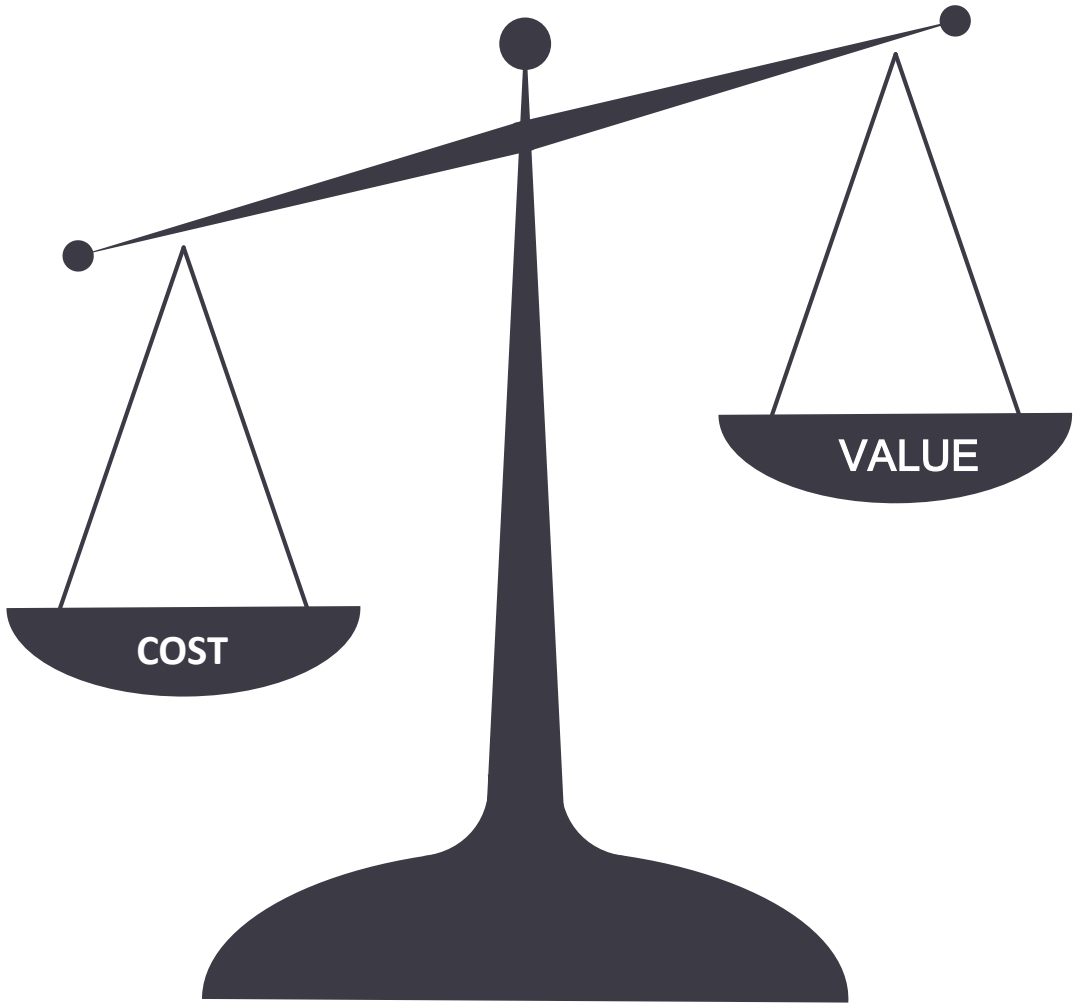
INTEROPERABILITY: Lack of industry wide standards for communication & system integration protocols

SIZING: Optimal system design highly dependent on value application and grid location

SITING: Building codes & permitting processes unable to keep pace with DER

SAFETY: Development & deployment of emerging technologies can outpace present day safety measures

Economic Lessons



HOLISTIC CONTROL: "Value stacking" is possible but prioritization of use cases is critical

RELIABILITY: Highly dependent on location and the underlying characteristics of the interconnected grid

COST vs VALUE: The value of battery storage does not yet outweigh the costs

LOAD MANAGEMENT: Load management can be impacted utilizing DER, but may not be economical

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Tipping Points

Investing at scale in DER and DER Integration

Economic Imperative

A primary determinant

Deployment costs decrease

Deployment value increasing

Many combinations of variables

Technical Requirements

A wide range of technology benefits

Should be considered compared to traditional alternatives

Policy Imperatives

Regulatory changes may dictate that storage is the best option

Market changes

Mandates or Incentives

IN THE MEANTIME: Maintain readiness through continued research

Where Do We Go From Here?

Safety Guidelines

Comm Standards

Intentional Islanding

Market Development

DERMS Integration

Reliability Value

DER Roadmap

Vendor Partnerships

Cyber Security

Austin SHINES Grant Reporting

https://austinenergy.com/ae/green-power/austin-shines/final-deliverable-reports

1. System Levelized Cost of Electricity (System LCOE) Methodology
2. Software Platform Product Description
3. Optimal Design Methodology
4. Ownership and Operation Models for DER System Performance
5. Economic Modeling and Optimization
6. Fielded Assets

DER Whitepaper

https://austinenergy.com/ae/about/reports-and-data-library/generation-resource-planning-update/euc-resource-planning-working-group

- Written in September 2019
- Used in development of Austin Energy's 2019 Generation Resource Plan update
- Summarizes lessons learned & next steps based upon the to date completed SHINES work
- Will serve as an input to DER Roadmap for Austin Energy