

Austin SHINES Project Update

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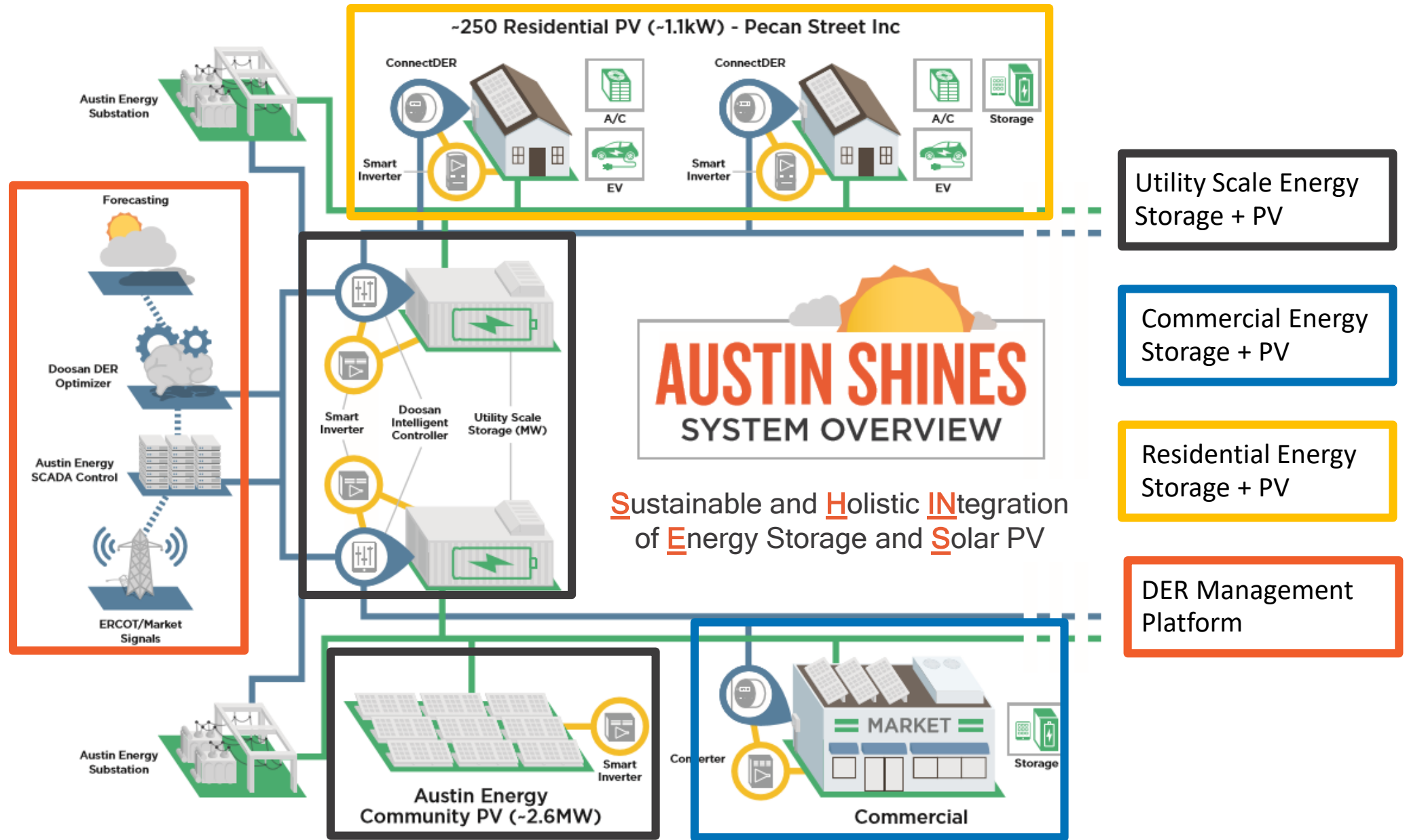
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Project Description



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)					
	Day-Ahead Energy Arbitrage (Realize economic value through price differential)					
	Real-Time Price Dispatch (Realize economic value from real-time price spikes)					
RELIABILITY	Voltage Support (Reduce losses and increase solar generation)					
	Distribution Congestion Management (Increase local grid reliability)					
CUST	Demand Charge Reduction (Lower customer bills and realize system benefit)					

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

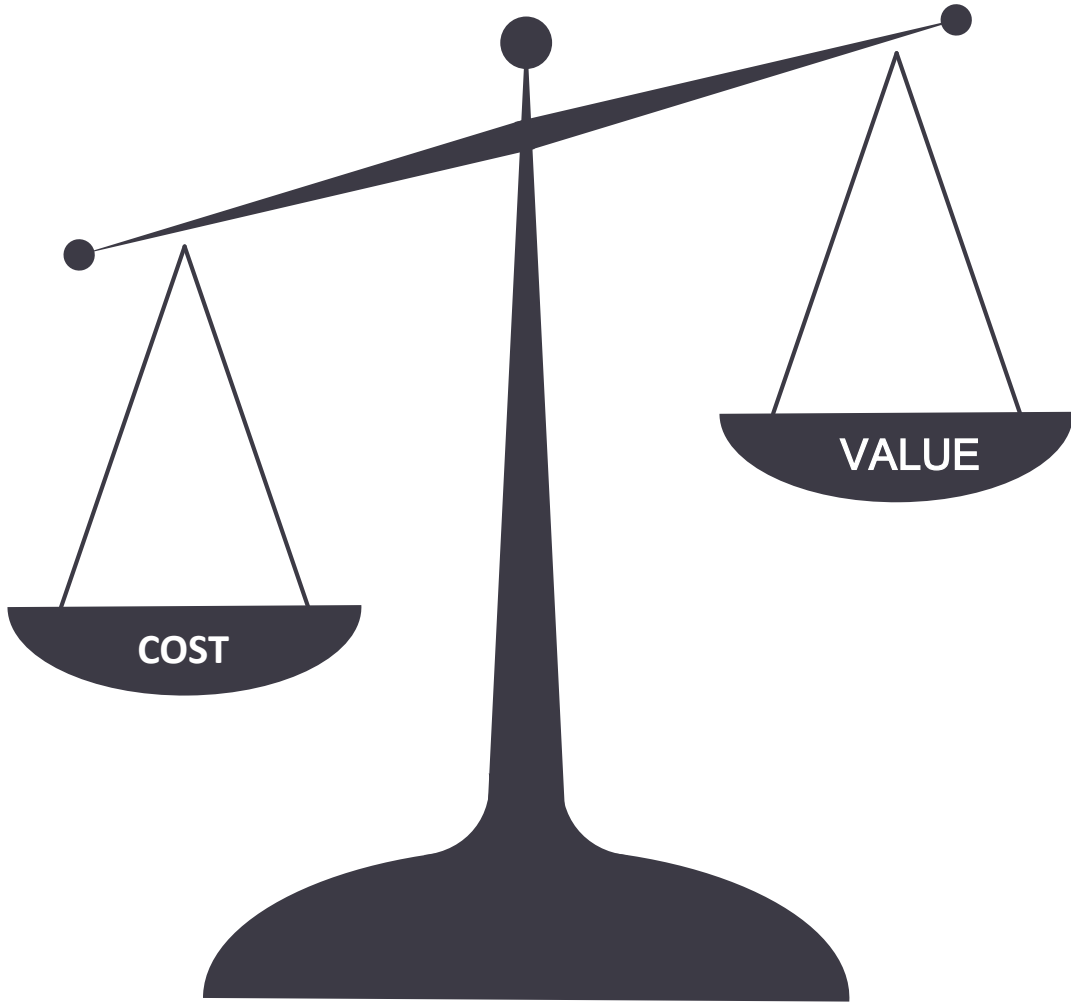


SITING: Building codes & permitting processes unable to keep pace with DER

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

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://austinenenergy.com/ae/green-power/austin-shines/final-deliverable-reports>

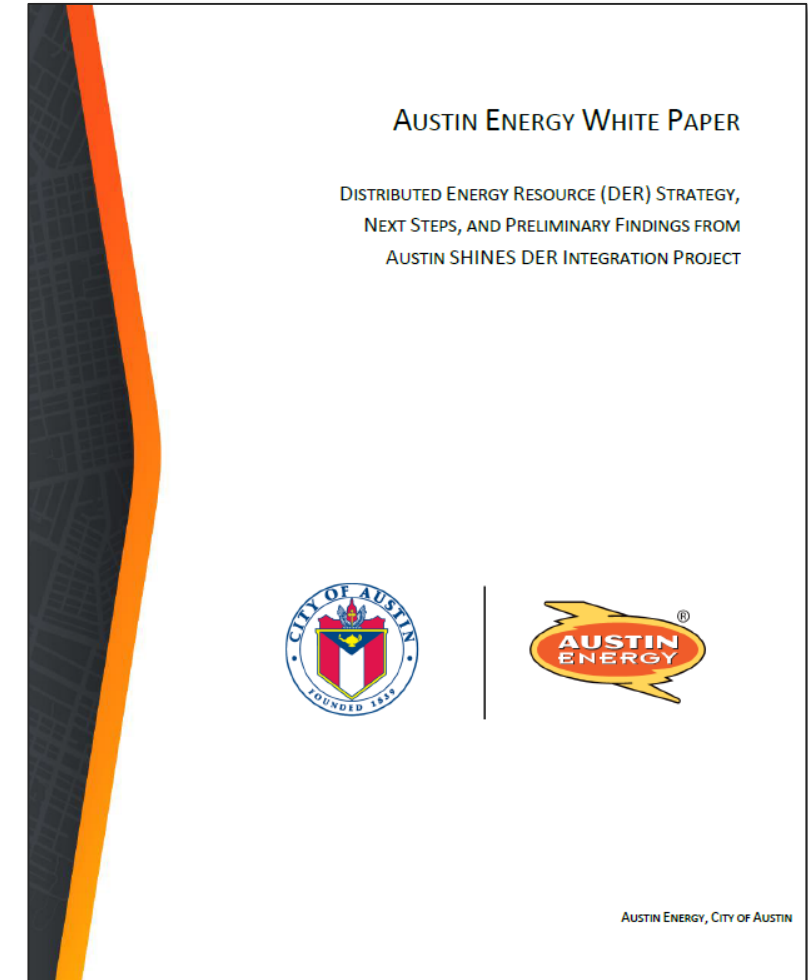
1. System Levelized Cost of Electricity (System LCOE) Methodology
2. Software Platform Product Description
3. Optimal Design Methodology
4. Ownership and Operation Models for DER System Performance
5. Economic Modeling and Optimization
6. Fielded Assets



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





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