



**Jeff Morris**

Senior Director  
Schneider Electric North America



# NASEO-NARUC Virtual Workshop: Engaging States in Development of the U.S. DOE Microgrid Multi-Year Program Plan

Life Is On

**Schneider**  
Electric

# Schneider Electric U.S.

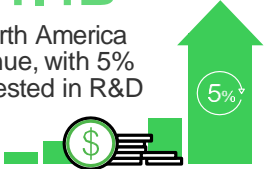
For over 100 years, Schneider Electric has maintained a strong, steady presence in the United States. Many of the organization's core brands: Square D, APC, ASCO, Andover Controls, Foxboro, and Modicon originated on U.S. soil.

**20,000**  
U.S. employees

**26**  
Facilities in  
Industrial Footprint

**5**  
Innovation Labs,  
Hubs, and  
SmartFactories

**\$11.4B**  
in North America  
revenue, with 5%  
reinvested in R&D



**100+** years  
of U.S. operations

**\$440M**

Announced investments in enhancing resilience in our United States supply chain between 2020 and 2024

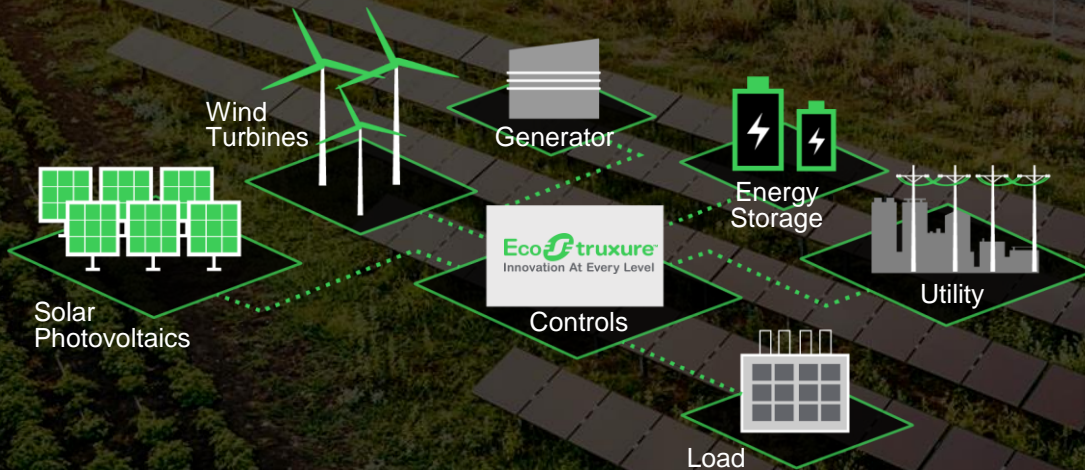


**Lexington, KY**

One of the world's most advanced manufacturing sites, per the World Economic Forum.

# Microgrids enable the New Energy Landscape and deliver integrated outcomes

A microgrid provides a decentralized, digitized & decarbonized alternative...



... delivering integrated outcomes.



## Brookville Bus Depot

Montgomery County, Maryland



Sustainable, efficient,  
reliable bus charging  
via microgrids

**62%** fewer CO<sub>2</sub> emissions

## MCAS Miramar

San Diego, California



Powering resilience,  
safety, grid support, and  
efficiency

**100**

Mission critical  
buildings and the  
flight line powered

## Port of Long Beach

Long Beach, California



Energy security and zero  
emissions via microgrids  
and battery storage

**100%** resilient energy

# Barriers to Microgrids and Energy Independence

No tools exist for Distributed Energy Resources (DERs) that are organized by microgrids to deliver distribution grid services that benefit other customers on the same neighborhood circuit..



- Untapped ability for microgrids to assist managing grid problems from the ground up instead of the top down.

Direct utilities or regulators to develop a tariff compensating organized DERs for delivering distribution grid services that benefit other customers on the same circuit by a date.

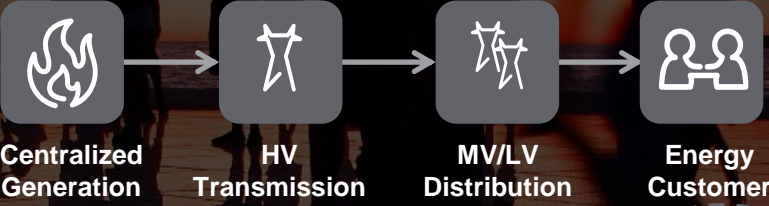
The initial scope of the tariffs could focus on the 200 annual hours (five days) of peak demand on each utility's distribution system.

# Two views across the Customer Distribution Utility Interconnection for Microgrids

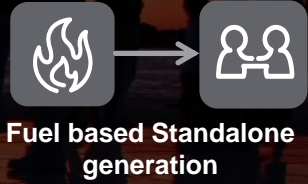
- USA distribution utilities are trying to adopt digital technology to reduce the standard metrics of outage duration (SAIDI) and outage frequency (SAIFI), locate outages more accurately, and restore power faster.
- Customers use other metrics to measure results through the adoption of digital technology by design in microgrids to power critical operations, grid-interactive buildings, and other organized DER deployments.

# What has Changed?

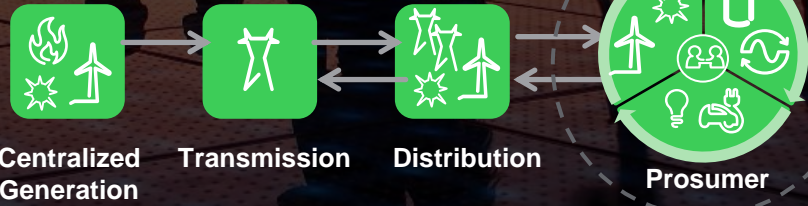
## Historical Energy Value Chain



or



## The New Value Chain



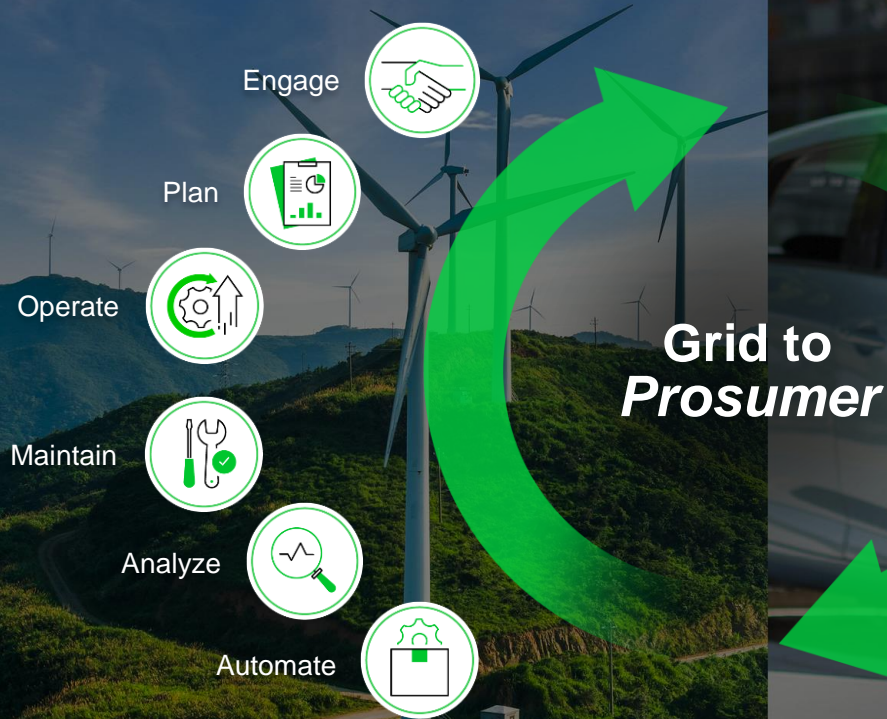
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# Requiring new ways to optimize supply and demand

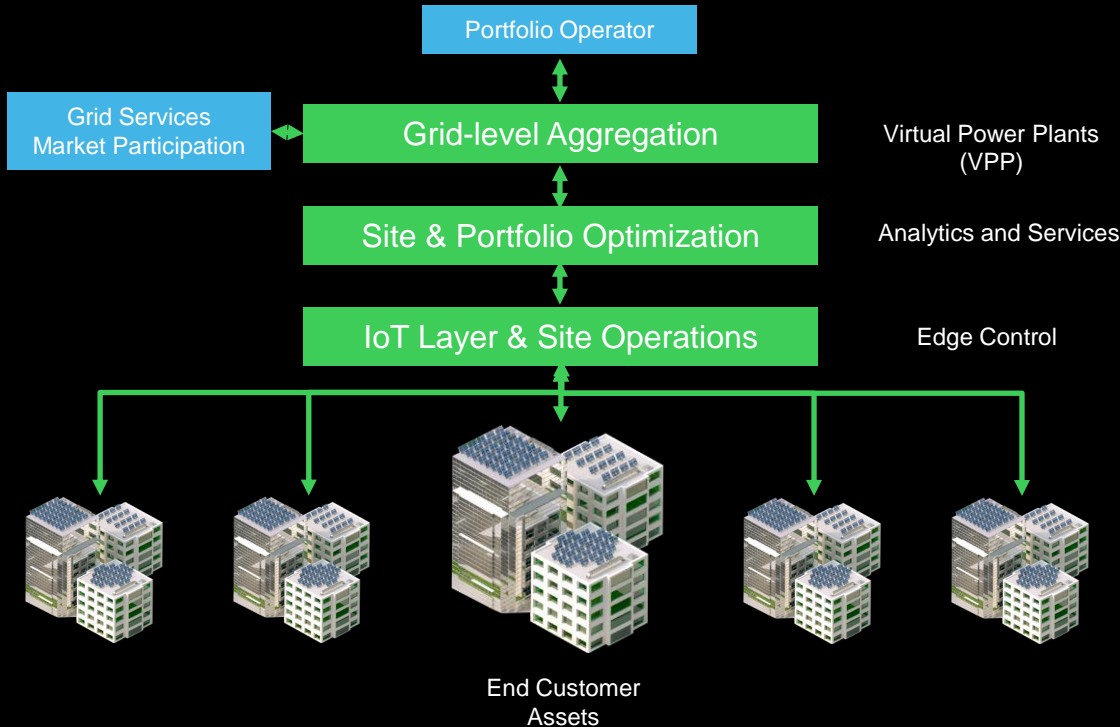


# The future of Microgrids + other Organized DERs will interconnect with the grid and be a good neighborhood steward



# Technology Partner for Prosumers

## Delivering Site and Portfolio-Level Benefits



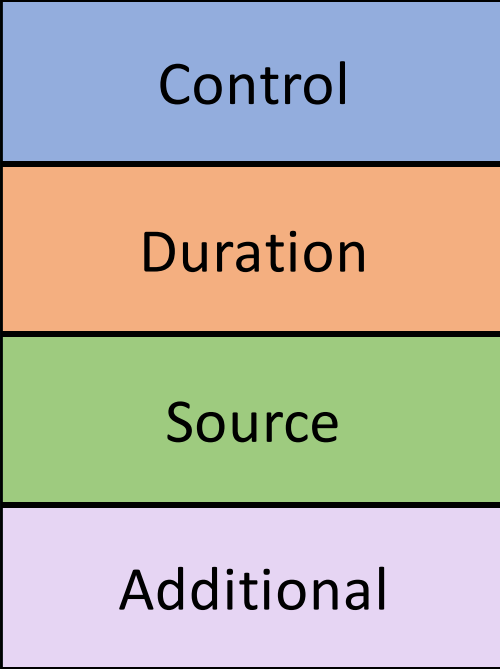
### Site Value Streams:

- Time of Use/Tariff Management
- Demand Charge Management
- Demand Response
- Local Energy Self Consumption

### Portfolio Optimization Benefits:

- Increased Capacity
- Greater Flexibility Availability
- Reduced Risk to Delivering on Grid Services and Market Commitments

# Evolution of Onsite Valuation Metrics



# Evolution of Onsite Valuation Metrics Behind the Meter

Control

Duration

Source

Additional

## Control

- During an outage, what option below best describes the transition type to island mode?
- What options below best describe the type of load management at your facility?
- Do you have a load prioritization schedule in place?

## Duration

- What percentage of your load and for what duration can onsite generation support it during island mode?

## Source

- Do you have more than one asset that can serve as the anchor resource
- Are there cybersecurity measures in place?

## Additional

- During an outage, which reputational impacts listed below could potentially occur?

# Barriers in Front of the Meter

## **Total outage time seen by end-users is made up of:**

- Unplanned outages: electrical faults within the distribution circuits
- Planned outages: maintenance, retrofit
- Major events: flooding, storm, typhoon

## **The most relevant indicators for network availability assessment are:**

- Long interruption  $\geq 3\text{min}^*$ : SAIFI, SAIDI, ASAI, ENS
- Short and transient interruption  $< 3\text{min}^*$ : MAIFI

\*This is a typical value. The threshold can vary from one electricity company to another.

Each utility has its own rules for monitoring, accounting, and reporting network availability. Reporting quality and accuracy depend on the observability in the network (Digitization) and workforce management.

# Evolution of Valuation Metrics in Front of the Meter

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## Reliability & Resilience

### Offers

ESSENTIAL	STANDARD	PROGRESSIVE	ULTIMATE
<ul style="list-style-type: none"> <li>✓ Advanced Outage Management</li> <li>✓ Single Pane of Glass HMI</li> <li>✓ Templated Model Management</li> <li>✓ ICCP</li> <li>Advanced Switching Management</li> <li>Real-time Field Client</li> <li>Web Control Center (WebCC)</li> <li>WebDMD</li> <li>CRM &amp; IVR Integration</li> <li>AMI Integration</li> <li>Outage Status &amp; Reporting Integration</li> <li>AVL Integration</li> <li>FLISR</li> <li>AAA Outage Notifications</li> <li>Fire Mitigation</li> <li>LV Network Model Visibility</li> <li>Outage Portal Integration</li> <li>Workforce Management Integration</li> <li>Automatic FLISR</li> <li>Automatic Fire Mitigation</li> </ul> <p><a href="#">Available addons</a> ArcFM Data Exporter</p>	<ul style="list-style-type: none"> <li>✓ Advanced Outage Management</li> <li>✓ Single Pane of Glass HMI</li> <li>✓ Templated Model Management</li> <li>✓ ICCP</li> <li>✓ Advanced Switching Management</li> <li>✓ Real-time Field Client</li> <li>✓ Web Control Center (WebCC)</li> <li>✓ WebDMD</li> <li>✓ CRM &amp; IVR Integration</li> <li>✓ AMI Integration</li> <li>✓ Outage Status &amp; Reporting Integration</li> <li>✓ AVL Integration</li> <li>FLISR</li> <li>AAA Outage Notifications</li> <li>Fire Mitigation</li> <li>LV Network Model Visibility</li> <li>Outage Portal Integration</li> <li>Workforce Management Integration</li> <li>Automatic FLISR</li> <li>Automatic Fire Mitigation</li> </ul> <p><a href="#">Available addons</a> Site Notes Integration</p>	<ul style="list-style-type: none"> <li>✓ Advanced Outage Management</li> <li>✓ Single Pane of Glass HMI</li> <li>✓ Templated Model Management</li> <li>✓ ICCP</li> <li>✓ Advanced Switching Management</li> <li>✓ Real-time Field Client</li> <li>✓ Web Control Center (WebCC)</li> <li>✓ WebDMD</li> <li>✓ CRM &amp; IVR Integration</li> <li>✓ AMI Integration</li> <li>✓ Outage Status &amp; Reporting Integration</li> <li>✓ AVL Integration</li> <li>✓ FLISR</li> <li>✓ AAA Outage Notifications</li> <li>✓ Fire Mitigation</li> <li>✓ LV Network Model Visibility</li> <li>✓ Outage Portal Integration</li> <li>Workforce Management Integration</li> <li>Automatic FLISR</li> <li>Automatic Fire Mitigation</li> </ul> <p><a href="#">Available addons</a> Switching Management Integrations</p>	<ul style="list-style-type: none"> <li>✓ Advanced Outage Management</li> <li>✓ Single Pane of Glass HMI</li> <li>✓ Templated Model Management</li> <li>✓ ICCP</li> <li>✓ Advanced Switching Management</li> <li>✓ Real-time Field Client</li> <li>✓ Web Control Center (WebCC)</li> <li>✓ WebDMD</li> <li>✓ CRM &amp; IVR Integration</li> <li>✓ AMI Integration</li> <li>✓ Outage Status &amp; Reporting Integration</li> <li>✓ AVL Integration</li> <li>✓ FLISR</li> <li>✓ AAA Outage Notifications</li> <li>✓ Fire Mitigation</li> <li>✓ LV Network Model Visibility</li> <li>✓ Outage Portal Integration</li> <li>✓ Workforce Management Integration</li> <li>✓ Automatic FLISR</li> <li>✓ Automatic Fire Mitigation</li> </ul>

# Improving the Decision Process for Investing in Digitization

An era of change – Is now the time for TOTEX?

A new Metric - lowering TOTEX.

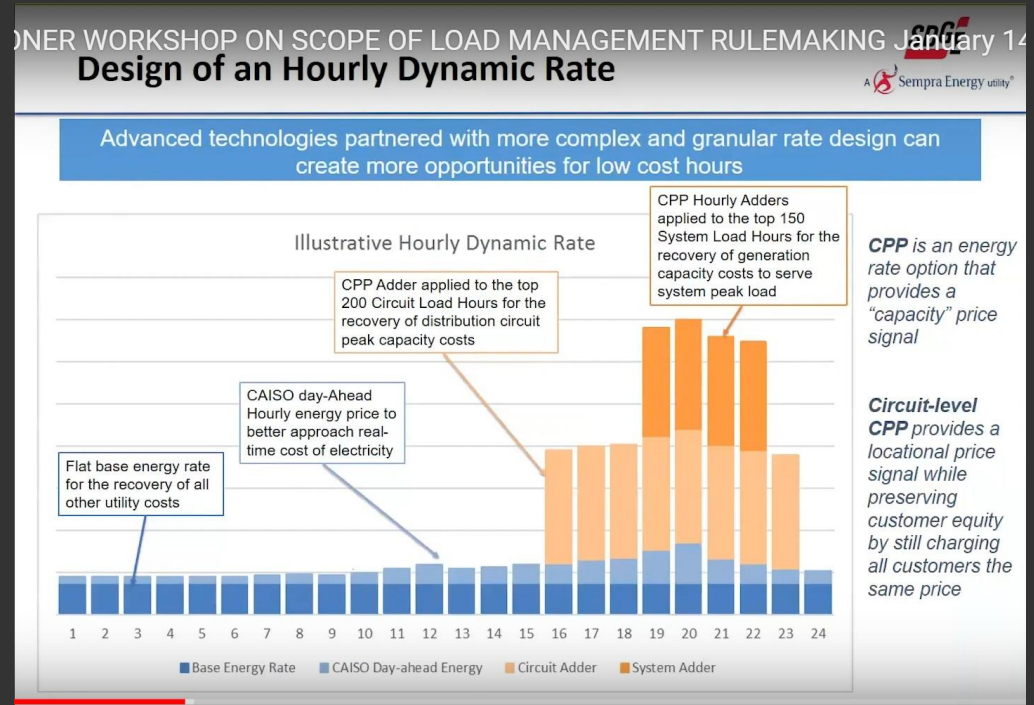


Historically the approach is to think of capital spend (CAPEX) and operational spend (OPEX) as separate buckets, without necessarily tying these together in a whole-of-life total expenditure (TOTEX) view. The TOTEX (CAPEX and OPEX) approach looks at the total cost of expenditure, over the long-term operating life of the



# Policy Considerations for removing barriers to Microgrid

- San Diego Gas and Electric (SDG&E) has digitized their distribution system and can see the value for microgrids and DERs at locations on circuits used in their “Power Your Drive” demand pricing pilot. CEC workshop 1/14/2020
- Circuits below substations are unique, do not align with overall capacity issues on distribution system and offer more value than wholesale markets.



# MCAS Miramar “Top Gun” Site San Diego, CA

Innovative Resiliency Solution



## Customer Challenge

- Ensure resilient power at the base to support over 100 mission critical buildings and the flight line

## The Solution

- Construct a system to power mission-critical and support facilities throughout Marine Corps Air Station Miramar in the event of an outage.
- Manage electricity use at the base during peak times when the system is connected to a utility grid thru use of diverse energy sources including 3.2MW landfill gas, 1.6 MW solar photovoltaic, and energy storage systems

## Customer Benefits

- Provide support services to the central grid
- Manage overall energy load
- Enhance renewable energy deployment
- Bolster cybersecurity practices base-wide
- Help the installation reduce its utility demand charges
- Facilitate demand response programs

**“Our microgrid delivers capabilities that will make MCAS Miramar one of the most energy-forward defense installations in the nation.”**

— Col. Charles B. Dockery, MCAS Miramar commanding officer

<https://www.marines.mil/News/News-Display/Article/2242294/mcas-miramar-microgrid-passes-significant-milestone-in-microgrid-commissioning/>

New system to **power mission-critical facilities** in the event of outage

EcoStruxure™  
Innovation At Every Level

Apps,  
analytics,  
and services

EcoStruxure  
ADMS



Edge  
control

OsSys SCADA



Power Control  
System  
Microgrid  
Control



Connected  
products



BLACK & VEATCH

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Schneider  
Electric

5.3%

3 **Measure** and **monitor** energy and carbon



PME



PowerLogic



Smart Panel

10.2%

8 **Install** onsite **renewables** and **microgrids**



Microgrid Flex

21.4%

5 **Purchase** offsite **renewables** and **offsets**

CleanTech  
Advisory™

77%

7.5%

7 **Upgrade** building systems and **infrastructure**



AccuSine

39.6%

4 **Reduce** energy and carbon with **automation**



EBO



EcoCare



Connected rooms

# Barriers to Microgrids and Energy Independence

Clearly define in State law what a microgrid is and that is not a utility.

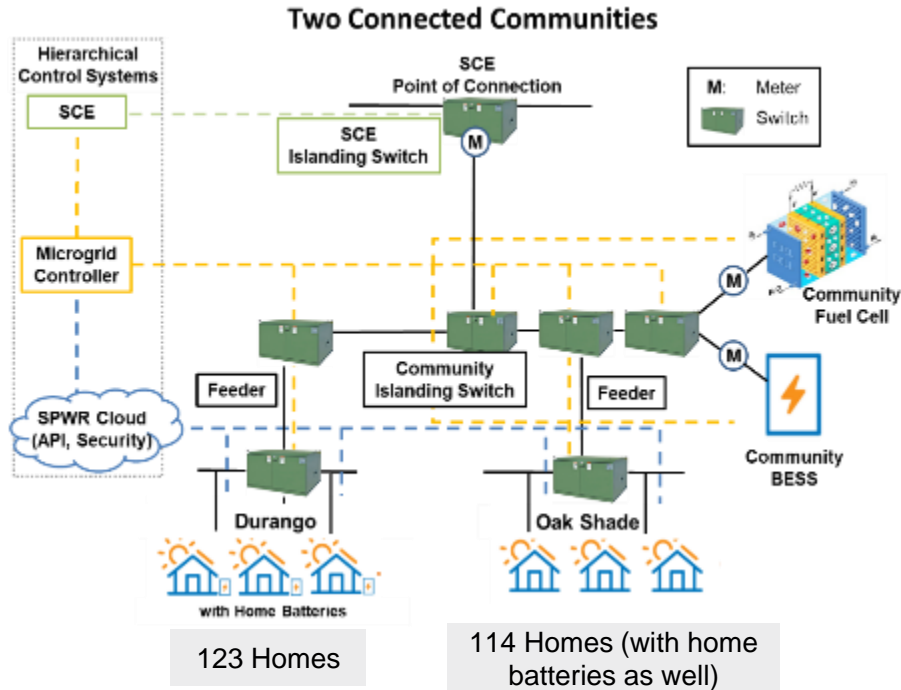


- Creates work around solutions that drives bureaucratic costs.
- Keeps Energy as a Service (EaaS) out of microgrid toolbox.

“A group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and that connects and disconnects from such grid to enable it to operate in both grid-connected or island mode.” US DOE

- Standard transparent process and design will accelerate microgrid growth
- Allows straight forward private Power Purchase Agreements (PPA's)

# KB Homes – Connected and Resilient Communities



## Project Highlights :

- Collaboration between Schneider Electric, SunPower, KB Homes and University of California – Irvine – Advanced Power and Energy Program.
- Schneider providing: Microgrid controller, Energy Center smart electrical panels, controllable relays, and smart wiring devices.
- In event of outage Sunpower Sunvault will seamlessly transition to the homes own battery and energize critical loads in the home. The Schneider microgrid controller will communicate to the community BESS to begin initialize community start-up. If stable, each Sunvault system will communicate to the Energy Center smart panels and enable larger 240V loads to be energized via our smart relays. This will enable “whole home” backup via a combination of community BESS and Sunvault/Energy Center configuration.
- As of 1/18/24: Almost all homes have been built. Community microgrid development ongoing. BESS vendor being evaluated. SCE cyber review in progress. Completion ~ Mid - 2025.

# Project Title: Enhancing Community Energy Resilience Through Supplemental, Resilient and Renewable Energy Systems Deployment

**Requested DOE Funds: \$39,220,442**

**Proposed Applicant Cost Share:  
\$40,286,769**

**Key Idea:** Demonstrate proof-of-concept for a supplemental energy utility (SEU) in three strategic deployments. The SEU will be:

- Innovative, first-of-its-kind
- 100% renewably powered
- Resilience-focused
- Community-owned
- Creator of local, good paying jobs
- Co-designed with community

A) Current Scenario, No Outages



In this scenario, most residents receive their power from DTE, while some supplement that power with renewable energy like solar.

B) Current Scenario with DTE Outages



In this scenario, most residents are without power when DTE's infrastructure fails, while some keep the lights on using renewable energy like solar, paired with battery storage.

C) SEU Scenario, No Outages



In this scenario, most residents receive their power from DTE and supplement that power with the SEU's renewable energy, dispersed through microgrids. Some residents only receive power from DTE.

D) SEU Scenario with DTE Outages



In this scenario, most residents retain power through the SEU's renewable energy, dispersed through microgrids and stored in batteries. Residents reliant on DTE lose power when DTE's infrastructure fails.

# Transforming homes to be sustainable, safe, efficient

**32%** Energy consumption savings with efficient temperature control

**÷4-10** Carbon Emissions (kgCO2/y)

**÷2-3** Total Energy Demand (kWh)

**\$0** Fossil Fuel Spend

Impact on CO<sub>2</sub> Emissions

**25%**

**Save**

- Energy monitoring, control & efficiency
- Temperature Control
- Lighting control
- Shutter control

**25%**

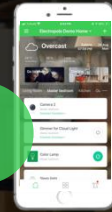
**Electrify**

- EV charging solutions
- Heat Pumps
- Cooking

**50%**

**Decarbonize**

- Renewable power supply management



**WiFer™**

# Grid-to-plug to drive resiliency, efficiency and comfort



Square D™ Energy Center

Square D™ Connected CAFE Breaker



Wiser Energy monitor



Square D™ Connected CAFE Breaker



APC™ Surge Products

# Barriers to Microgrids and Energy Independence

No tools exist for Distributed Energy Resources (DERs) that are organized by microgrids delivering distribution grid services that benefit other customers on the same circuit (neighborhood).

- Untapped ability for microgrids to assist managing grid problems from the ground up instead of the top down.



Direct utilities to develop a tariff that compensates DERs for delivering distribution grid services that benefit other customers on the same circuit.

- The initial scope of the tariffs could focus on the 240 annual hours (ten days) of peak demands on each utility's distribution system.

# Barriers to Microgrids and Energy Independence

Support clear, published and standard interconnection rules.

- Despite years of data showing safe microgrid operation on and off the grid, utilities are still allowed to require costly and time-consuming interconnection studies and limit, without transparency, the amount of distributed generation on their power lines.
- The biggest risk for a digitized microgrid is the day it interconnects with an older analog distribution circuit.



A state standard for interconnection speeds up deployment and reduces bureaucracy costs in driving individual boutique engineered solutions, training costs for installers, and inspections.

- State legislatures should direct all utilities to have clear, published, and transparent expedited interconnection guidelines and a clear process with timelines to review applications outside of the standard requirements.

# Ready to Partner

## Innovation Hub Andover Highlights

**1 of 5**

Schneider Electric Global Design  
Centers

**18,000+**

visitors annually

**53,000 sq. feet**

of research and development  
space

**41**

labs on premise

**\$14M USD**

Schneider Electric solutions  
installed throughout facility

**200-person**

capacity for a single meeting,  
event, training

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# Remove barriers and go for 10X



## Financing of efficiency & electrification

Public, but also Private funding



## Regulation & Codes

Simplified and fit for future



## Building Design

Integrated, with Digital



## Incentives for Efficiency

Measure and reward progress as well as relative performance



## Incentives for Demand Response

Emerging topic but will accelerate, key opportunity on demand side



## Education & Training

Massive skilling plan

# Thank you!



## Jeff Morris

Senior Director, State Government Relations  
Schneider Electric North America  
[jeff.morris@se.com](mailto:jeff.morris@se.com)

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