TEXAS ADVANCED ENERGY BUSINESS ALLIANCE

DISTRIBUTED ENERGY RESOURCES IN TEXAS: RESILIENCE AND RELIABILITY IN THE TIME OF COVID

Suzanne L. Bertin
Managing Director
June 17, 2020

TAEBA is the Business Voice of Advanced Energy in Texas

Our mission is to raise awareness among policymakers and the general public about the opportunity offered by all forms of advanced energy for cost savings, electric system reliability and resilience, and economic growth in the state of Texas.

What is Advanced Energy?

Advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting energy needs today and tomorrow. Among these are **energy efficiency, demand response, energy storage, natural gas electric generation, solar, wind, hydro, nuclear, electric vehicles, biofuels and smart grid**.

It's all the innovations that make the energy we use more secure, clean, reliable and affordable.

What are Distributed Energy Resources (DERs)?

SMALLER

Rely on aggregation of multiple smaller resources rather than large central units

DISTRIBUTED

Located in load centers and typically connect to distribution grids or sub-transmission lines

MODULAR AND FLEXIBLE

Can be added in smaller increments, built faster, and do not typically lead to 50+ year investments

TWO-WAY

Includes resources that can inject power locally or reduce local peak demand,

ARRAY OF SERVICES

Affect all aspects of the electric grid's infrastructure, including electricity generation, transmission, and delivery infrastructure.

DERS include a broad range of technologies : distributed solar, battery storage, thermal storage, customer-owned generation, connected devices, electric vehicles, demand response, energy efficiency, etc.

Value of Integrating DERs in Texas

$2.45 Billion

Savings over 10 years by prolonging use of existing utility T&D infrastructure

$3.02 Billion

Savings in electricity costs over 10 years for consumers
due to better wholesale market integration

$5.47 Billion

Total savings over 10 years for Texans
if DERs are better integrated and allowed to fully compete

Today's Presenters

Suzanne Leta

Senior Manager, Global Market Strategy, **SunPower**

Mona Tierney-Lloyd

Head, U. S. Public Policy, **Enel X**

Jeff Morris

Director, State Government Relations, **Schneider Electric**

Tom Lyons

Vice President - Asset Development, **Ameresco**

SUNPOWER®

Texas Advanced Energy Business Alliance Legislative Education Webinar

Suzanne Leta
Senior Manager, Global Market Strategy

JUNE 17, 2020

TEXAS ADVANCED ENERGY BUSINESS ALLIANCE LEGISLATIVE EDUCATION WEBINAR

SunPower Corporation Overview

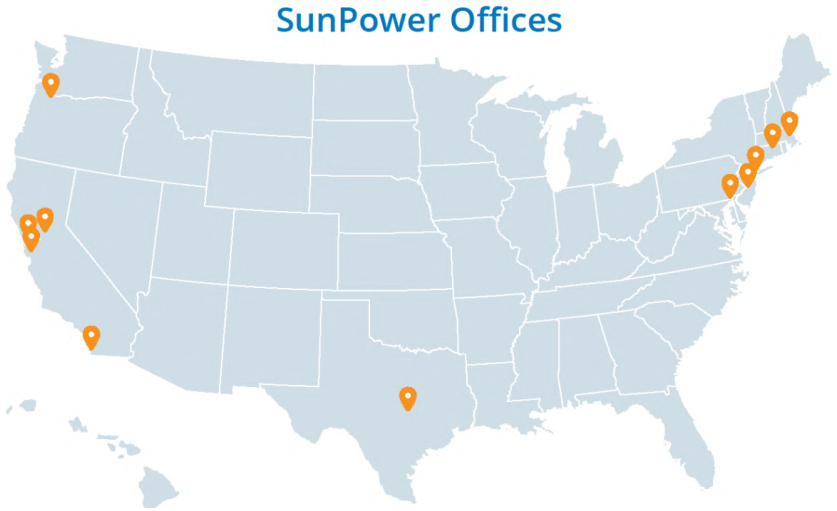
Since 1985, SunPower has helped homeowners reduce their electric bills and better the planet with the most efficient, powerful and reliable solar available.

35+ Years
Industry experience

13.2 Gigawatts Installed
Equivalent to powering 7.5M homes per year

NASDAQ: SPWR
Publicly traded company

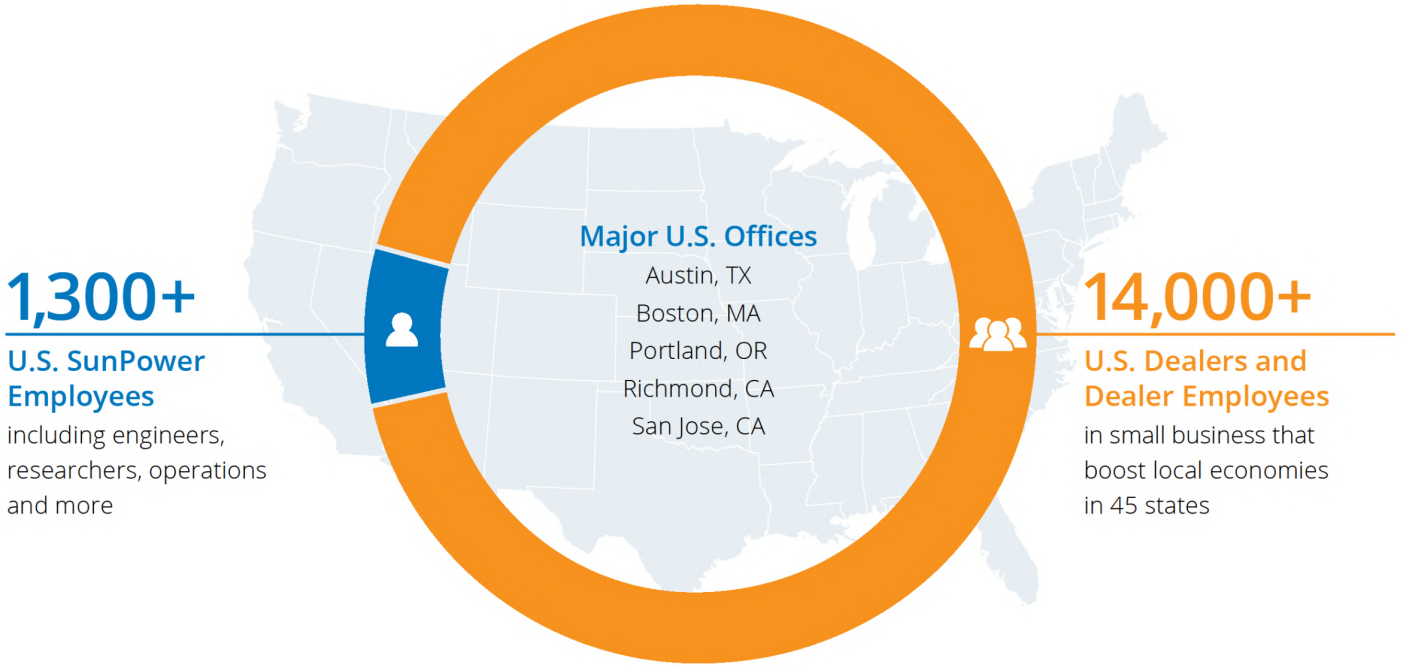
Record-Breaking Performance
Go-to choice of solar pioneers



SUNPOWER®

Powering the U.S. Economy

SunPower supports thousands of jobs and injects billions of dollars into the American economy.



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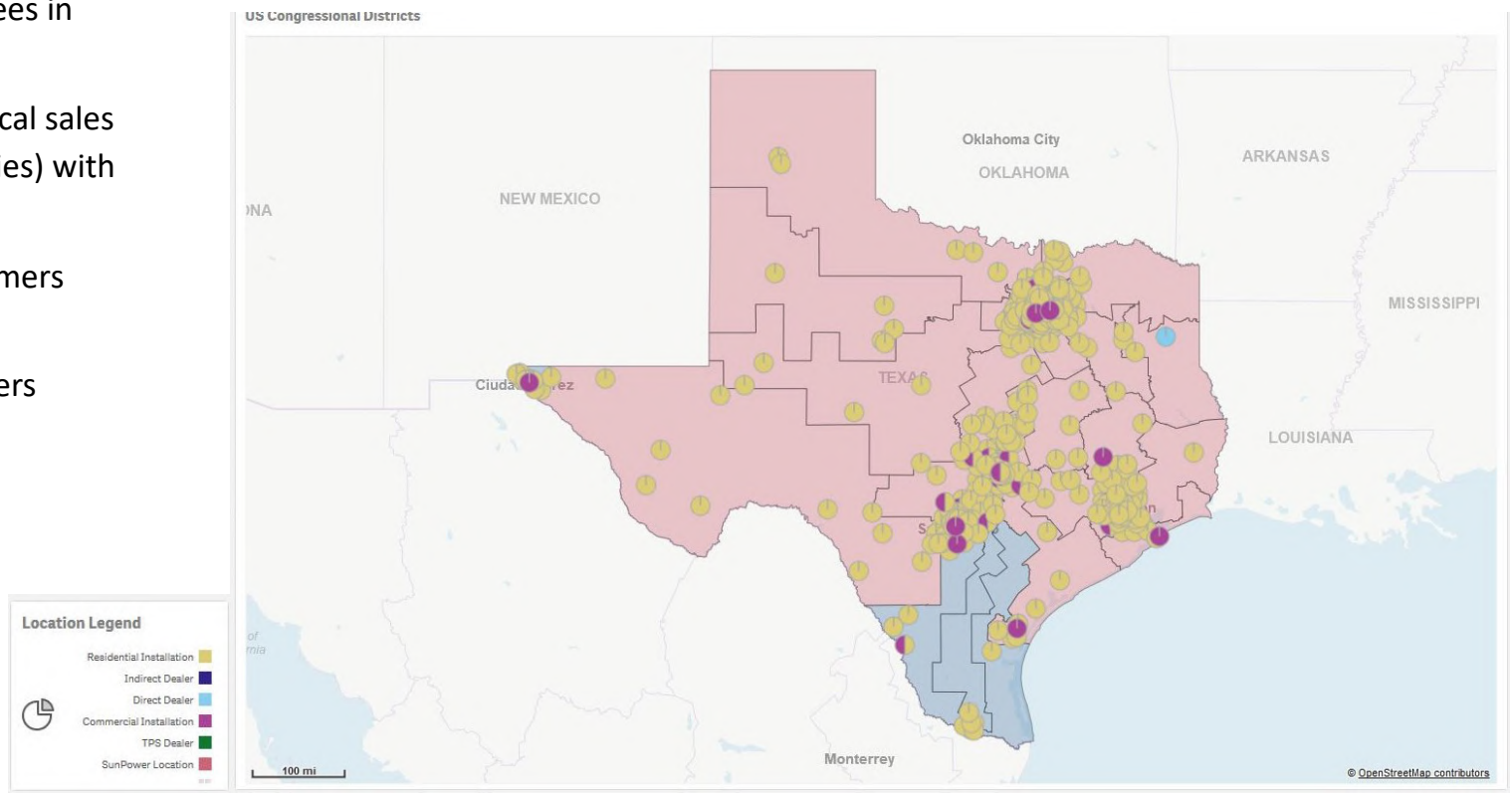
Employees and Customers in Texas

- ~300 SunPower employees in Austin
- 23 SunPower dealers (local sales and installation companies) with ~500 employees
- >3,700 residential customers totaling >30 MW
- 137 commercial customers totaling 26.7 MW



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TEXAS ADVANCED ENERGY BUSINESS ALLIANCE LEGISLATIVE EDUCATION WEBINAR

Case Studies of Texas Residential Projects

Pruitt Household, Arlington

Quick Facts

14.3 kW
Total System Size

$223/month
Estimated Electricity Bill Savings

74%
Expected Electricity Bill Offset

$43,417
Projected 25-Year Savings (assumes 20-year loan @ 5.49% APR)

Espinoza Household, Fort Worth

Quick Facts

10.1 kW
Total System Size

$177/month
Estimated Electricity Bill Savings

95%
Expected Electricity Bill Offset

$37,634
Projected 25-Year Savings (assumes 20-year loan @ 5.49% APR)

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Case Studies of Texas Commercial Projects

Toyota Motor North America, Plano and San Antonio

Quick Facts

12 MW
Total System Size

Rooftop and Garage Top Carport
Installation Type

33%
Expected Energy Offset (Plano, TX)

LEED® Platinum Status
Sustainability Achievement (Plano, TX)

Save The World Brewery, Marble Falls

Quick Facts

48.6 kW
Total System Size

Rooftop
Installation Type

$230,000
Projected 25-Year Savings

82%
Approximate Electricity Offset

Rehme Steel, Spicewood

Quick Facts

81.6kW
Total System Size

$338,883
Estimated Savings over 25 Years

100%
Projected Energy Offset

3.8 years
Estimated Payback Time

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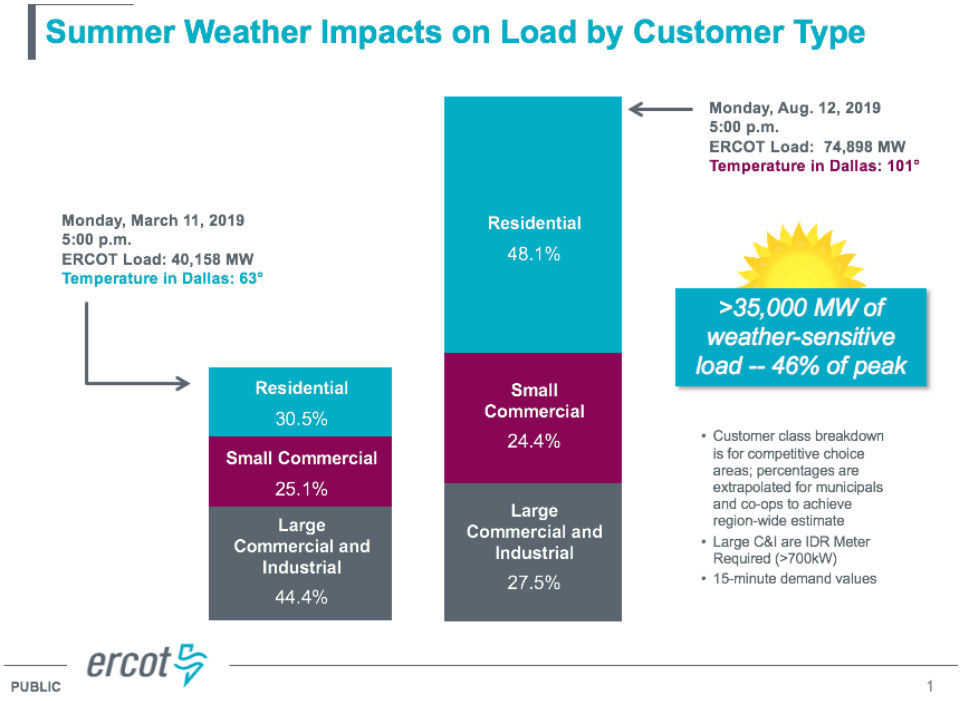
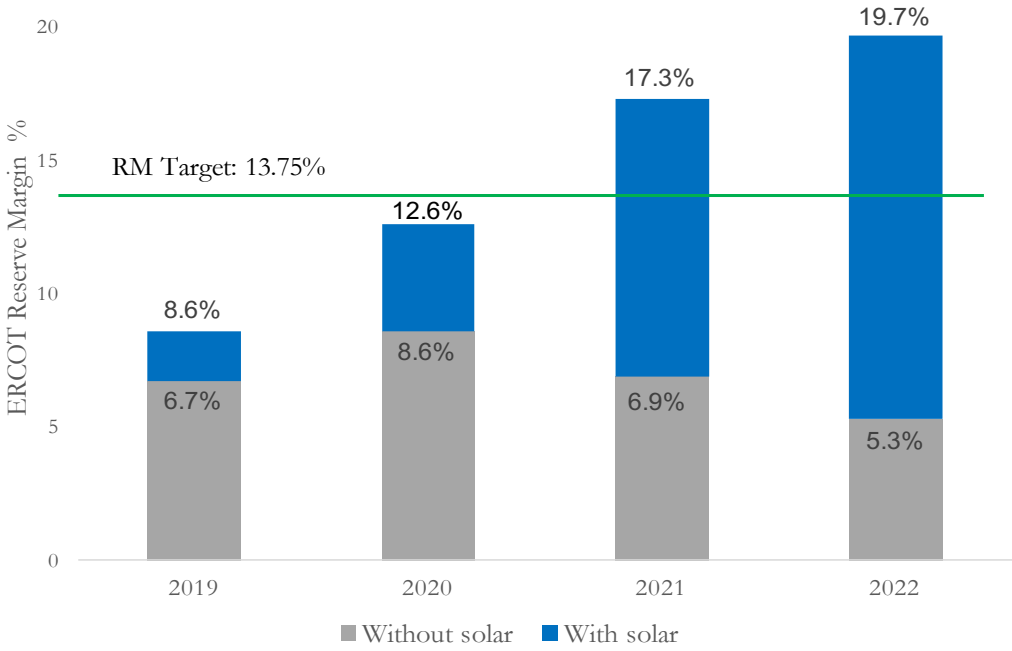
Saving Customers Money, Improving Grid Reliability

- Residential air conditioning use drives peak electricity load and is coincident with solar generation
- Rooftop solar reduces peak electricity load and utility-scale solar boosts power generation reserves





Source: ERCOT Capacity, Demand, Reserves report May 2020

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TEXAS ADVANCED ENERGY BUSINESS ALLIANCE LEGISLATIVE EDUCATION WEBINAR

2021 Legislative Session: Keep Solar Strong

- Protect residential and commercial solar customers' rights
  - Prevent cities and HOAs from permitting requirements that effectively block customers from installing solar on their home or business
  - Prevent utilities from enacting discriminatory fees on customers who install solar

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TAEBA Leglislative Briefing

Mona Tierney-Lloyd, Head, U. S. Public Policy, Enel NA
mona.tierney-lloyd@enel.com
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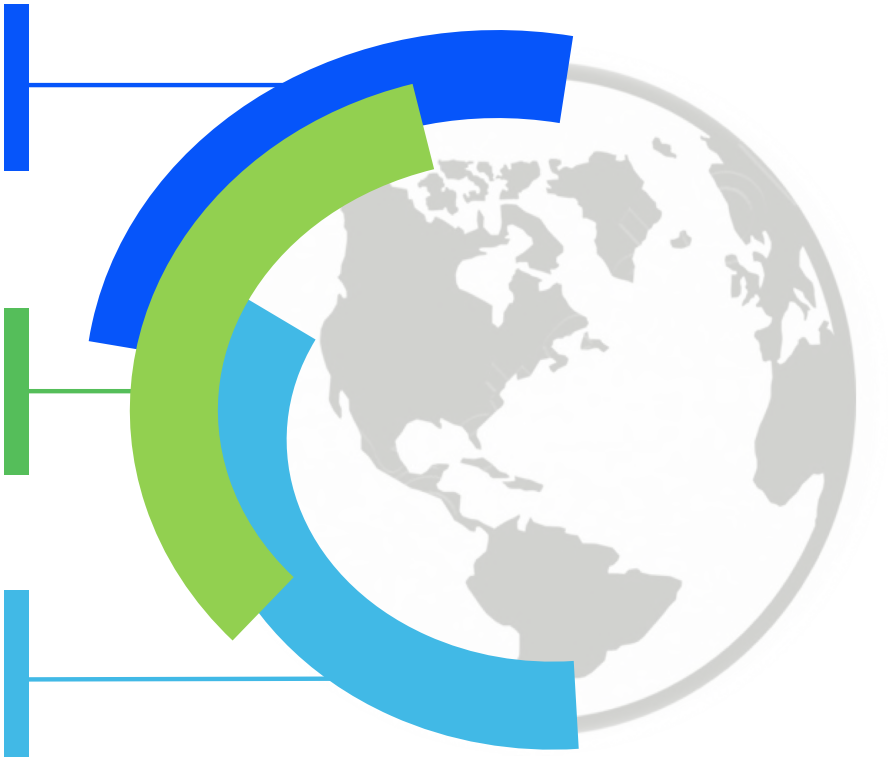
The Enel Group

A leader in the new energy world

1st **network** operator[1]

World's largest private player[2] in **renewables**

Largest retail **customer** base worldwide[3]



- 73 M End Users
- 46 GW Renewable capacity
- 6.3 GW Demand Response
- 33 Countries, 5 continents
- 69,000 Employees

1. By number of end users. Publicly owned operators not included
2. By installed capacity. Includes managed capacity for 3.4 GW
3. Including customers of free and regulated power and gas markets

Enel North America

Business Lines

Renewable Energy and Energy Storage Development

No. of Plants: 67 Hydro, wind, solar and geothermal energy

Total GW: 5.7 Installed capacity

Corporate Partners: 15

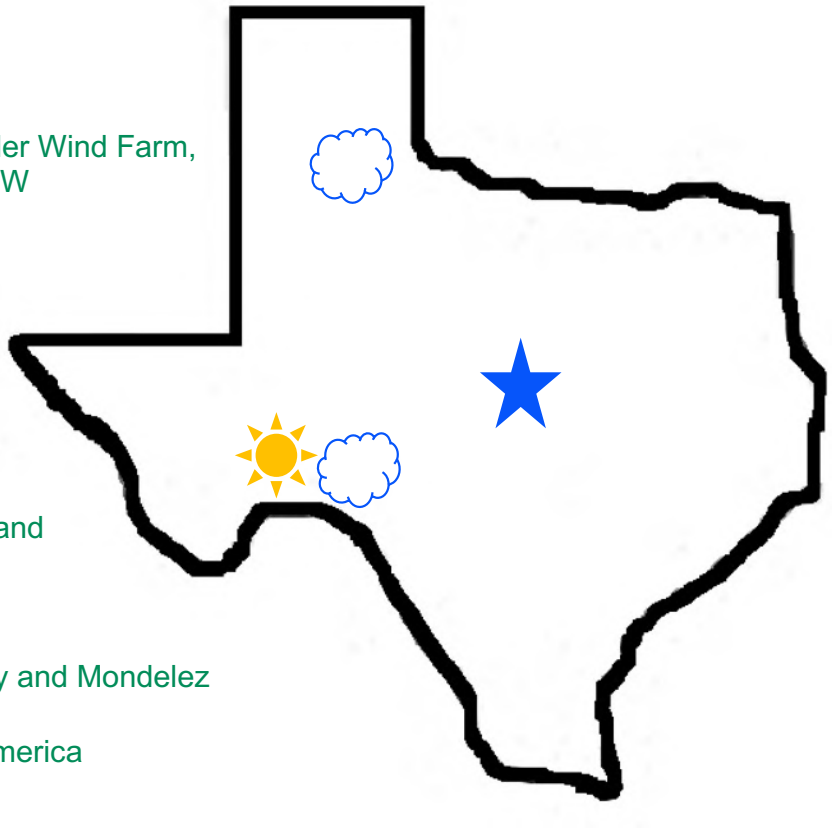
Customers: 4,500
Sites: 10,000
Capacity: 4.7 GW

Storage: 70 Projects

E-Mobility: 50,000 charging sites

Enel in Texas

Enel Green Power[/1] and Enel X[/2]



Snyder Wind Farm,
63 MW

Roadrunner Solar
and BESS 497 MW

High Lonesome Wind and
BESS 450 MW

Partners in TX
Roadrunner: The Clorox Company and Mondelez International
High Lonesome: Danone North America

Participates in ERCOT Emergency Response Service (ERS) for over 10 years

Participates in Responsive Reserve Service

Participating in Battery Energy Storage Integration into ERCOT

Participating in PUC Project on electric vehicle charging.

Giving commercial and industrial customers tools to manage electricity costs and to provide grid services.

/2 Enel%20X%20Case%20Study_leggett-platt.pdf

/1 enel%20green%20power%20-%20texas%20-%20fact%20sheet.pdf

Value of Distributed Energy Resources

Customers

- Tools to manage energy consumption and spend
- Use savings to improve facilities, retain employees, etc.
- Lowers operating costs
- An opportunity to earn money in the market
- Educates consumers

Electricity Grid

- Provides grid operators with new(er) technologies to balance supply and demand
  - Batteries and some customer sites can reduce demand quickly (fractions of a second)
- Fast to market; modular, build what you need
- They are local in nature, so can respond to local grid conditions
- Reduce the likelihood of system-wide outages

Product Line

JuiceBox
32, 40, 48, 80 Amp
(Residential)

JuiceBox Pro
32, 40, 48, 80 Amp
(Workplace,
Destination, Fleet)

JuiceStand

JuicePedestal

(Workplace, Destination, Fleet)

JuicePump DCFC
(Public)

Microgrids, Resiliency & Delivering Energy-as-a-Service: Decentralized, Digitized, Decarbonized

Business Model Innovation in the New Energy Landscape

Jeff Morris
Director State Government Relations
Schneider Electric North America

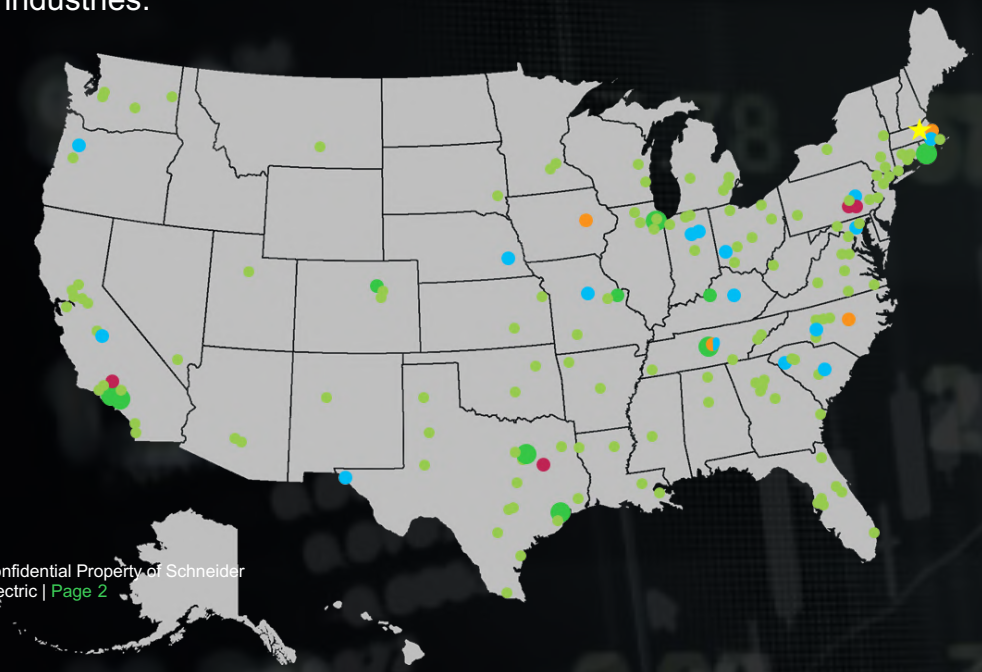
Texas Advanced Energy Business Alliance legislative education webinar

"Embracing Digital Transformation to deliver economic value to your business"

Life Is On Schneider Electric

Schneider Electric in the US

Leading the digital transformation of energy management and automation in homes, buildings, data centers, infrastructure, and industries.



- Corporate offices
- Manufacturing facilities
- Distribution centers
- R & D centers
- Field / sales offices
- ASCO facilities

Schneider Electric USAHeadquarters
800 Federal St, Boston ONE Campus
Andover, MA 01810 se.com/us

$7.7B in revenues, 2018 ~19,000 employees

Major U.S. sites
Dallas, TX (2223 Employees) Boston, MA; Nashville, TN; West Kingston, RI; Lake Forest, CA;

Habitat for Humanity National Partner
$36.7M in equipment donations since 2000, largely from our Lexington, KY facility

#24 of companies that are changing the world, Fortune 2016

#12 of Global 100 Most Sustainable Corporations

Acknowledged in CDP's "Global Climate 500 Performance Leadership Index" and "Dow Jones Sustainability Index"

Life Is On Schneider Electric

About Schneider Electric

We provide energy and automation digital solutions for efficiency and sustainability

What we do

- Manufacturing
- Software
- Services
- Solutions
- R&D

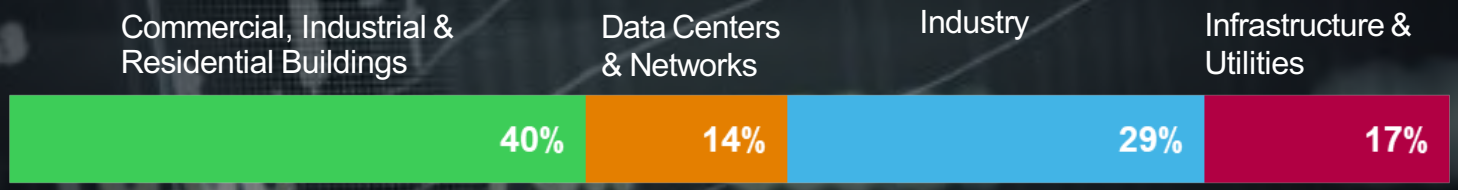
Years
182

Publicly traded
SU.PA

Employees
140,000

FY Revenue
$28.5 Billion

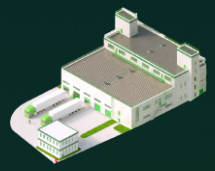
Four end markets



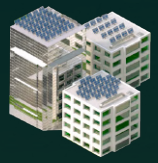
Microgrid introduction and applications

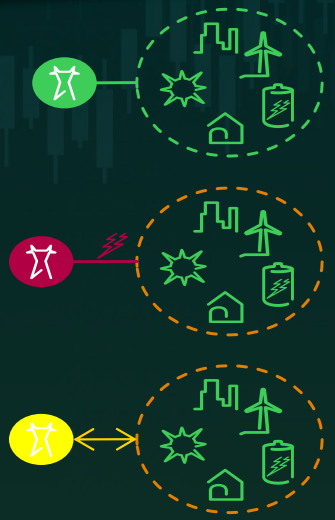
Small-scale power grid integrating decentralized, interconnected and local Distributed Energy Resources

Any industrial facilities: Factories, plants, warehouse …



Campus / Buildings





Grid-tied

Optimize electrical bill & sustainability footprint

Island-able

Manage blackouts while optimizing your electrical bill

Transitioning Between States

Design and engineering of successful transition to and from on and off grid.

"Embracing Digital Transformation to deliver economic value to your business"

Oncor Electric Delivery

Customer Challenge

- Oncor, a regulated electric utility, needed to demonstrate the benefits of a utility microgrid showing how integrated distributed generation can supplement the overall utility load from wholesale market.

The Solution

- Build a demonstration microgrid to illustrate complex interactions between multiple distributed energy resources.
- The microgrid consist of (4) autonomous and dynamic zones of control, and the following DER:
  - 120 kW PV Array
  - 6 kW PV Array
  - 200 kW Tesla Battery Energy Storage System
  - 65 kW Capstone Microturbine
  - (3) diesel backup generators
  - (1) propane backup generator

Customer Benefits

- Proved that a utility could supplement their wholesale market load with renewable, distributed resources.

The Results: Life is On with...

- One of the most technically advanced microgrids built in 2016.

"Oncor invested in this microgrid to better understand how microgrids and distributed energy resources can make the grid better. Not only are they looking at the technical aspect of this, but also the economic and regulatory side."

EcoStruxure™
Innovation At Every Level

Apps, analytics, and services	EcoStruxure Microgrid Advisor 
Edge control	Microgrid Controller  SCADA
Connected products	LV & MV Equipment Power Monitoring

Life Is On | Schneider Electric

General Services Administration Buildings

Project at a Glance

- 14 buildings in 8 Region 7 Texas cities
- Building Automation System integration
- Central Plant updates
- Data center controls update
- Lighting and controls retrofit
- Water conservation measures
- Irrigation system controls
- ~ 1 MW solar PV installed across five (5) different sites

Investment: **$17,934,397**
Annual savings: **$1,031,290 / year**

Accomplished through energy and water savings + renewable generation (PV)

Life Is On Schneider Electric

Example of new Business Model: Energy-as-a-Service

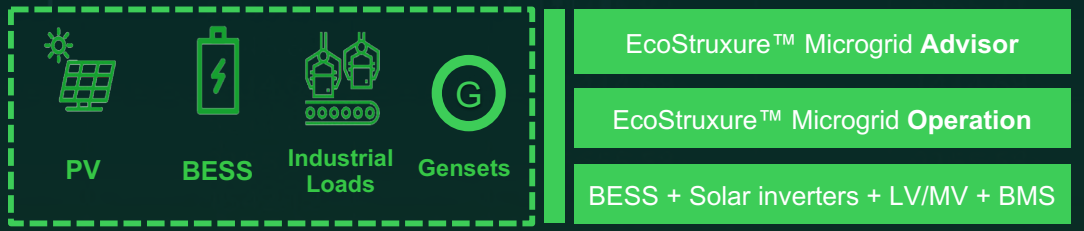
Microgrid: Montgomery County, MD
Customer: Public Safety HQ and Correction
Microgrid type: Facility, islandable
Location: Maryland, USA
Capacity: 1.2 MW

Customer pain point
Aging infrastructure with resiliency challenges, budget challenges with no capability to perform upfront investment, aggressive sustainability goals

Solution
Energy as a service business model with Duke Energy, delivering solutions with no upfront cost

"Upgrades to critical facilities improve the county's resilience, so we can keep residents safe and provide needed services even in the event of prolonged power outages."

Isiah Leggett, County Executive, Montgomery County

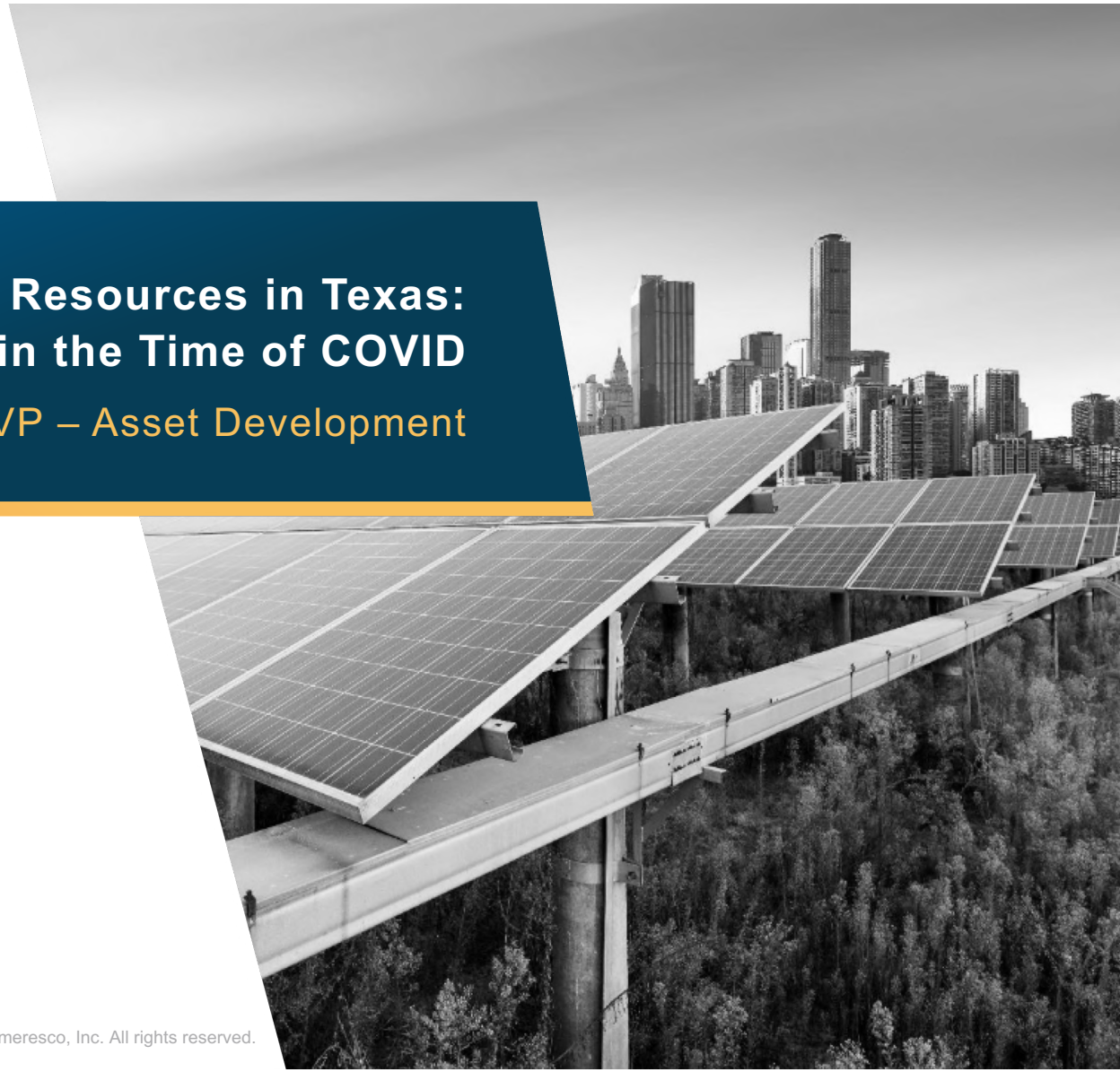


Some Considerations for Texas Policymakers

- FEMA is creating a resilience program – BRIC. To maximize resiliency Texas needs to develop a resiliency plan that hardens multiple pieces of critical infrastructure in cities and counties with microgrids.
- Establish clear rules for third party microgrids and allow public private partnerships for microgrids. Utility microgrids usually require rate-basing a larger community that may not see the benefits. Third party microgrids are competitive since EaaS can be financed outside of that framework.
- Resolve right of way issues for microgrids. RIGHT of WAY is currently a big impediment to growth.
- Direct all utilities to have established public diagrams for interconnection of all DERs. Standard transparent process and design will accelerate economic growth.
- Direct regulators to modernize outdated energy efficiency rebate programs for equipment/appliances that can communicate as system for Grid interactive Efficient Buildings.

Distributed Energy Resources in Texas: Resilience & Reliability in the Time of COVID

Thomas Lyons, VP – Asset Development



AMERESCO
Green • Clean • Sustainable

ameresco.com

About Ameresco

Ameresco (NYSE:AMRC) is a leading energy services company with a comprehensive portfolio of energy efficiency and renewable energy solutions.

Founded in 2000 | Public in 2010

Advanced Technology Portfolio

Objective approach and in-house technical expertise delivers the most advanced technologies to meet the unique needs of each customer. Majority of projects are budget-neutral, funded by energy cost savings.

$6 Billion+ in energy solution projects, 255 MWe of Owned Assets in Operation

Customer Driven

8,000+ customers across Federal & Municipal Governments, Higher Ed, K12, C&I, Public Housing, Healthcare, Airports. Market reputation across North America & Europe for excellence in customer satisfaction.

In 2019, our renewable energy assets and customer projects delivered a carbon offset equivalent to 11,167,978 metric tons of CO_2

Why Ameresco?

Innovative

Ameresco (NYSE:AMRC) is an innovative technology integrator with a comprehensive portfolio of energy efficiency and renewable energy solutions.

Experts

We deliver a broad and deep solution portfolio within a single energy partner. From design and development to financing and construction, our in-house technical expertise sets us apart.

Independent

Our objective approach enables us to implement the most advanced technologies to meet the unique needs of each customer.

Addressing Resilience & Critical Infrastructure While Meeting Sustainability Goals

Resiliency
The ability to serve critical energy loads during a multi-day outage.

Weather Related Outages
Between 2003 and 2012, an estimated 679 widespread power outages occurred due to severe weather disrupting the lives of millions of Americans.

Value of Resiliency
Between 2003 and 2012, weather-related outages are estimated to have cost the U.S. economy an inflation-adjusted annual average of $18 billion to $33 billion.

Baseload Fuel
In most cases, fossil fuel is necessary to serve critical energy loads during a multi-day outage.

*Data from 2013 report prepared by the President's Council of Economic Advisers and the U.S. DOE's Office of Electricity Delivery and Energy Reliability, with assistance from the White House Office of Science and Technology

The Case for Energy Resiliency

20 Houston Hospitals
Forced to close during Hurricane Harvey in 2017

$27 Billion
Annual U.S. business losses due to power outages

196
Electrical grid disturbances in the US in 2018 (up from 23 in 2002)

State & Municipal Government

San Antonio Water Systems, TX

First-of-its-kind biogas project in nation; capable of processing approximately 1,000 standard cubic feet per minute

Federal Government

Joint Base San Antonio, TX

18.5 MW of solar PV, 4 MW of gas fired generation combined with 4MW/8MWh lithium-ion battery energy storage system and 585kW of CHP at mission critical facilities

Promote Health and Safety Amid the COVID-19 Pandemic

- The global health crisis brought on by COVID-19 has introduced a heightened awareness around the **importance of healthy, safe, resilient working environments**.

- Building owners can make critical health-focused, energy-efficient upgrades to their facilities often at zero upfront cost: a win-win for promoting health and safety with a focus on energy optimization.

What energy conservation measures can you implement in your re-opening strategy that support the CDC guidelines?

- Lighting
- Water
- HVAC
- Controls
- Cooling
- Building Envelope
- Microgrid & Demand Control
- Certifications

For More Information about TAEBA

www.texasadvancedenergy.org

- Download our reports/fact sheets
- Follow us on Twitter: @TXAdvEnergyBiz

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