



The Electric Cooperative Model: The PEC Story and the Future of the Utility Industry

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UT Energy Week 2017, Austin, TX

U.S. Electric Cooperative Territory

Over 900 electric cooperatives

Serve nearly 42 million members in 47 States

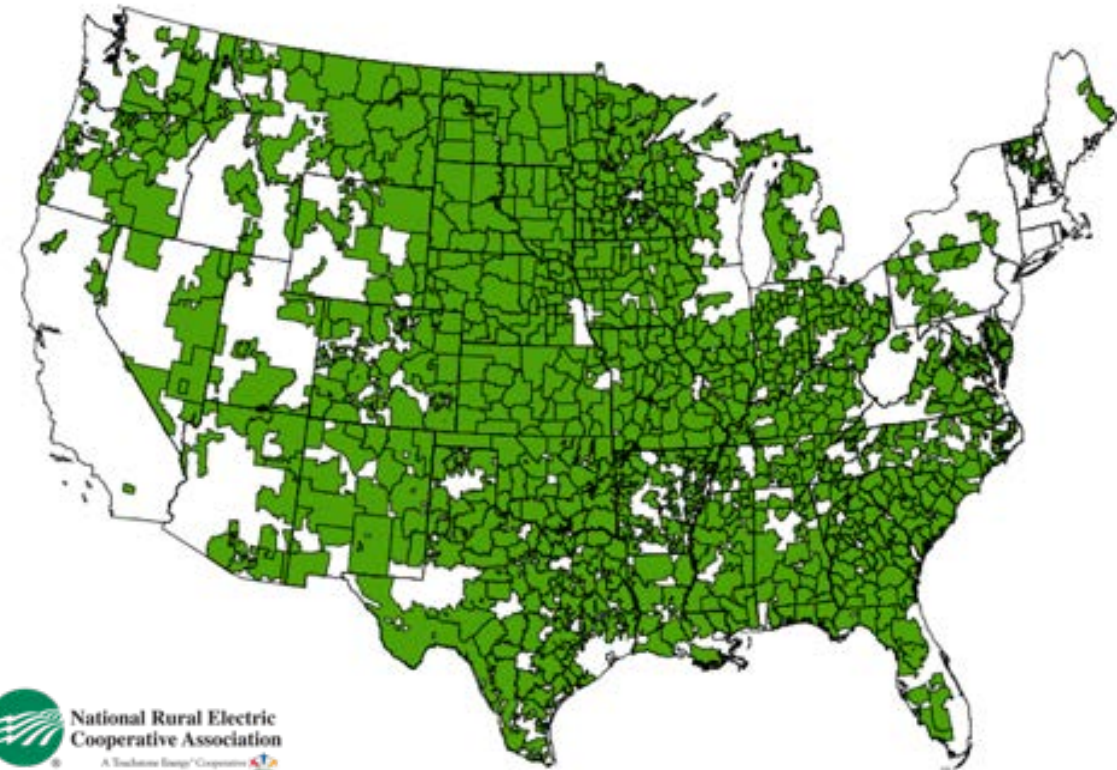
Cover ~75% of nation's land mass

Own 42% of all distribution lines

Totals 2.6 million line miles

Generate ~5% of total electricity produced in the U.S.

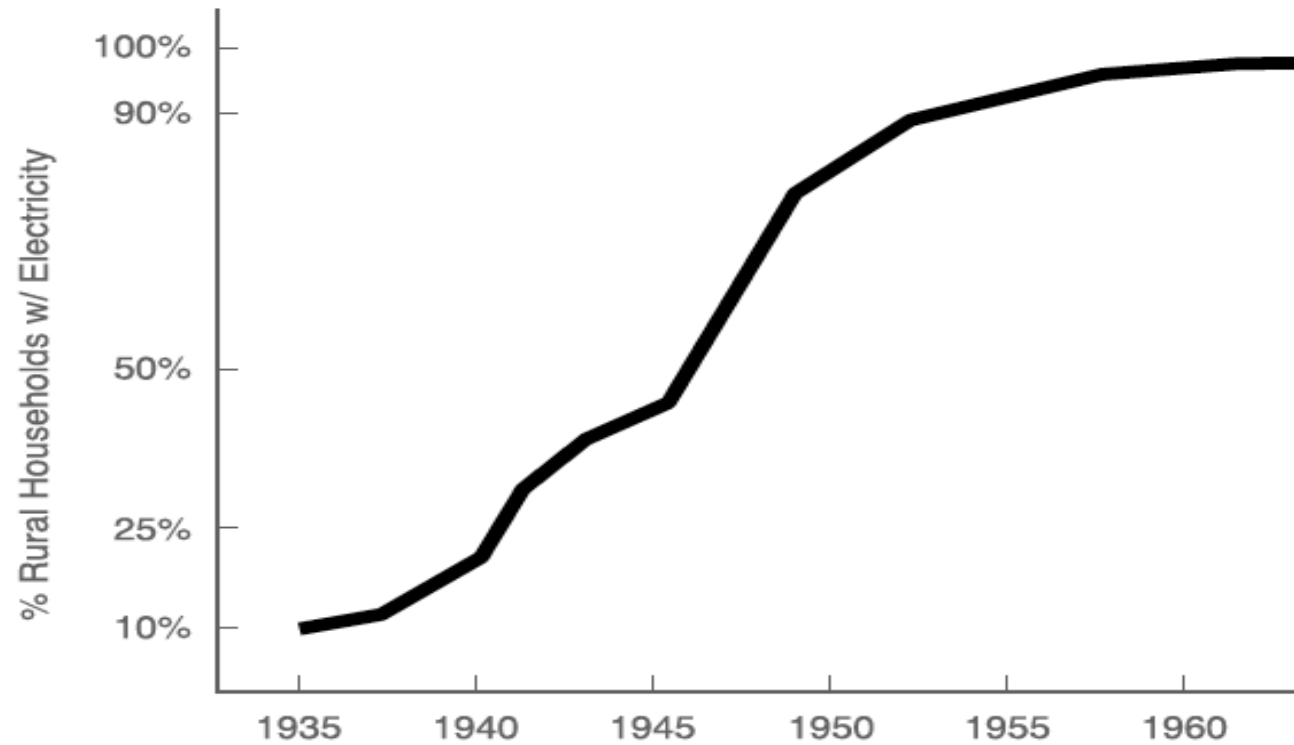
Deliver ~11% of kWhs sold in the U.S. annually



Not for Profit, Consumer Owned, Consumer Controlled



Rural Electrification Growth



Cooperative Principles

Voluntary & Open Membership

Democratic Control

Member's Economic Participation

Autonomy & Independence

Education, Training, & Information

Cooperation Among Cooperatives

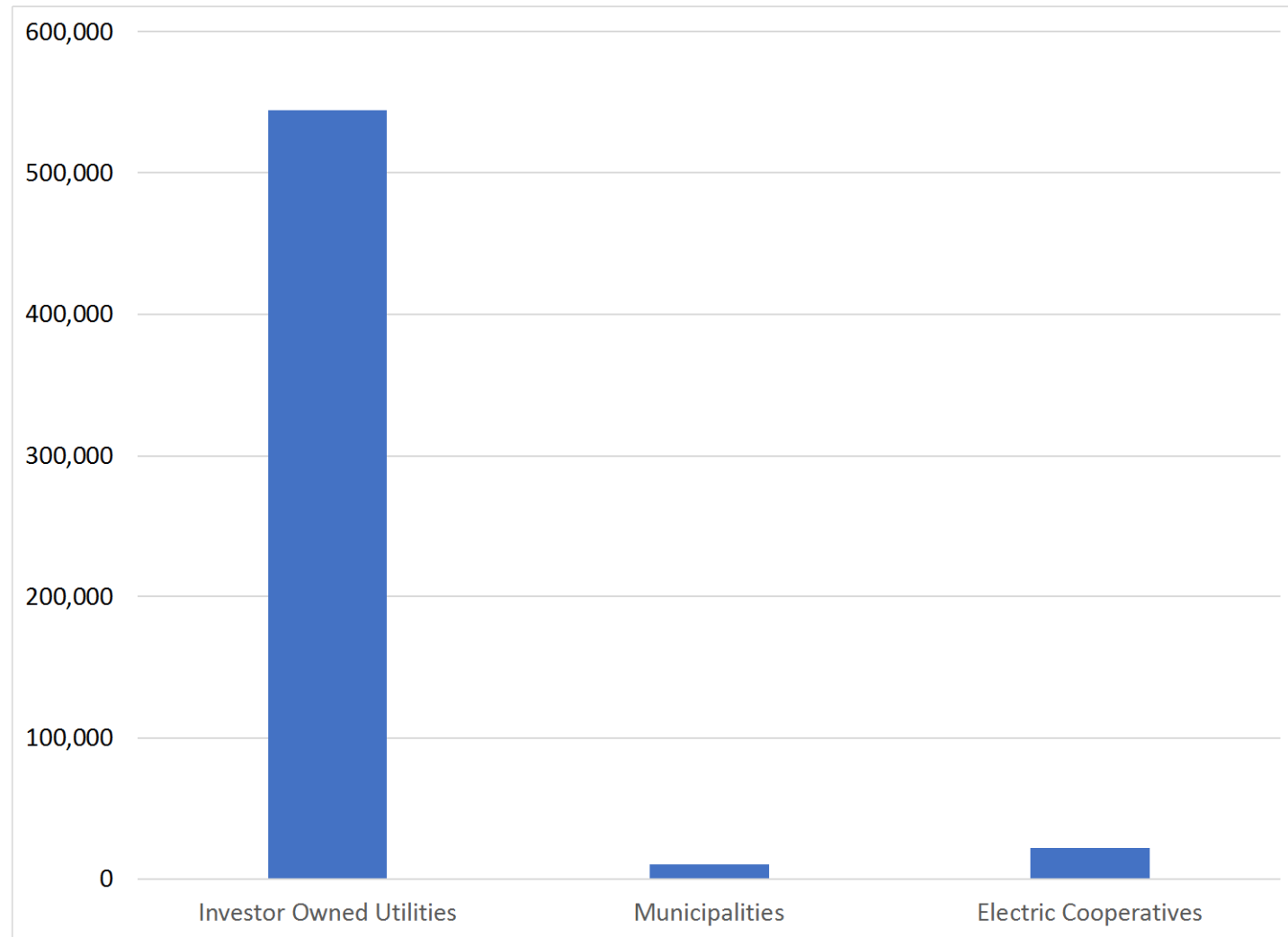
Concern for Community



how do electric cooperatives
compare with other utilities?



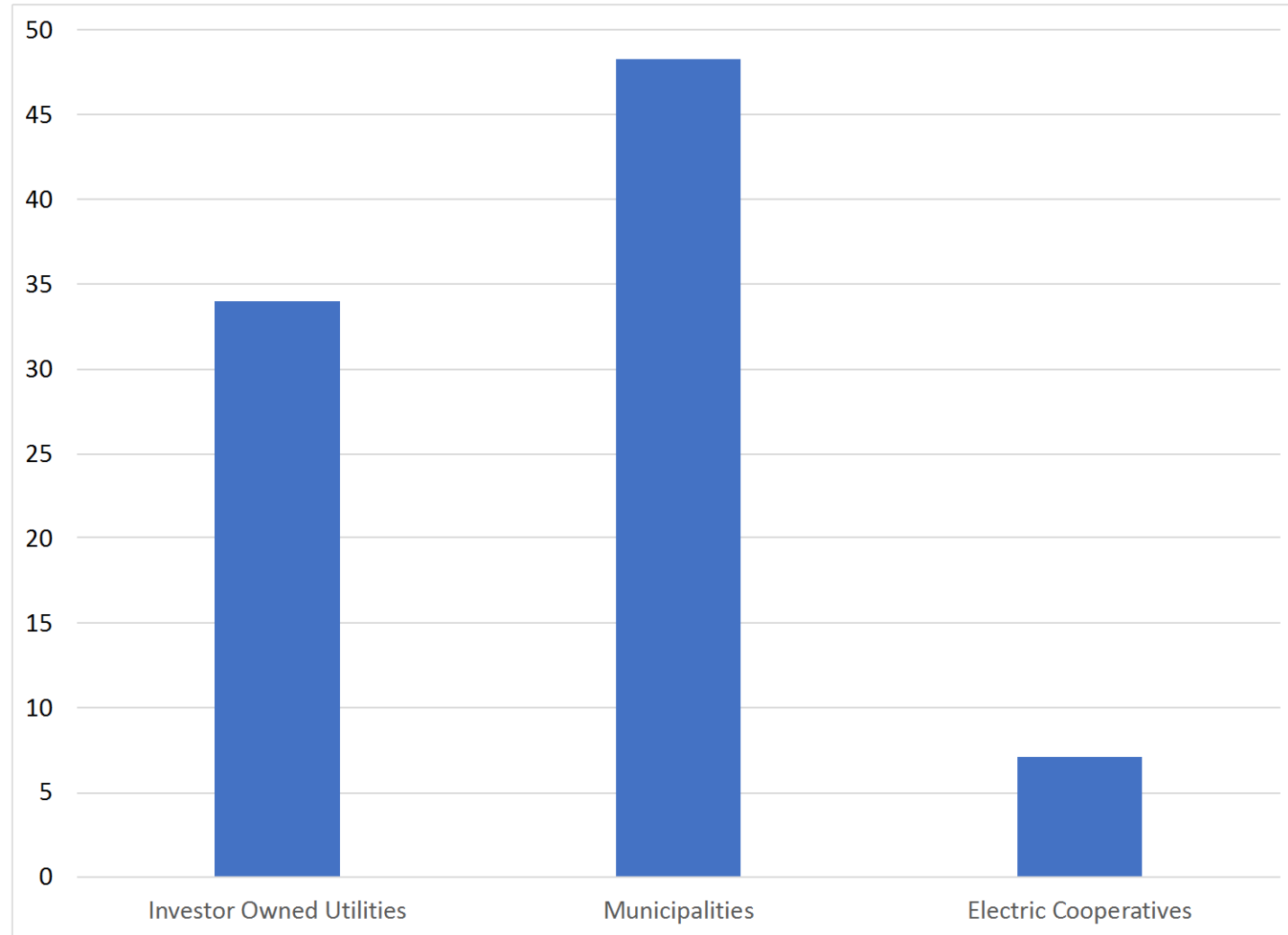
Average Consumers Served



Data Source: National Rural Electric Cooperative Association



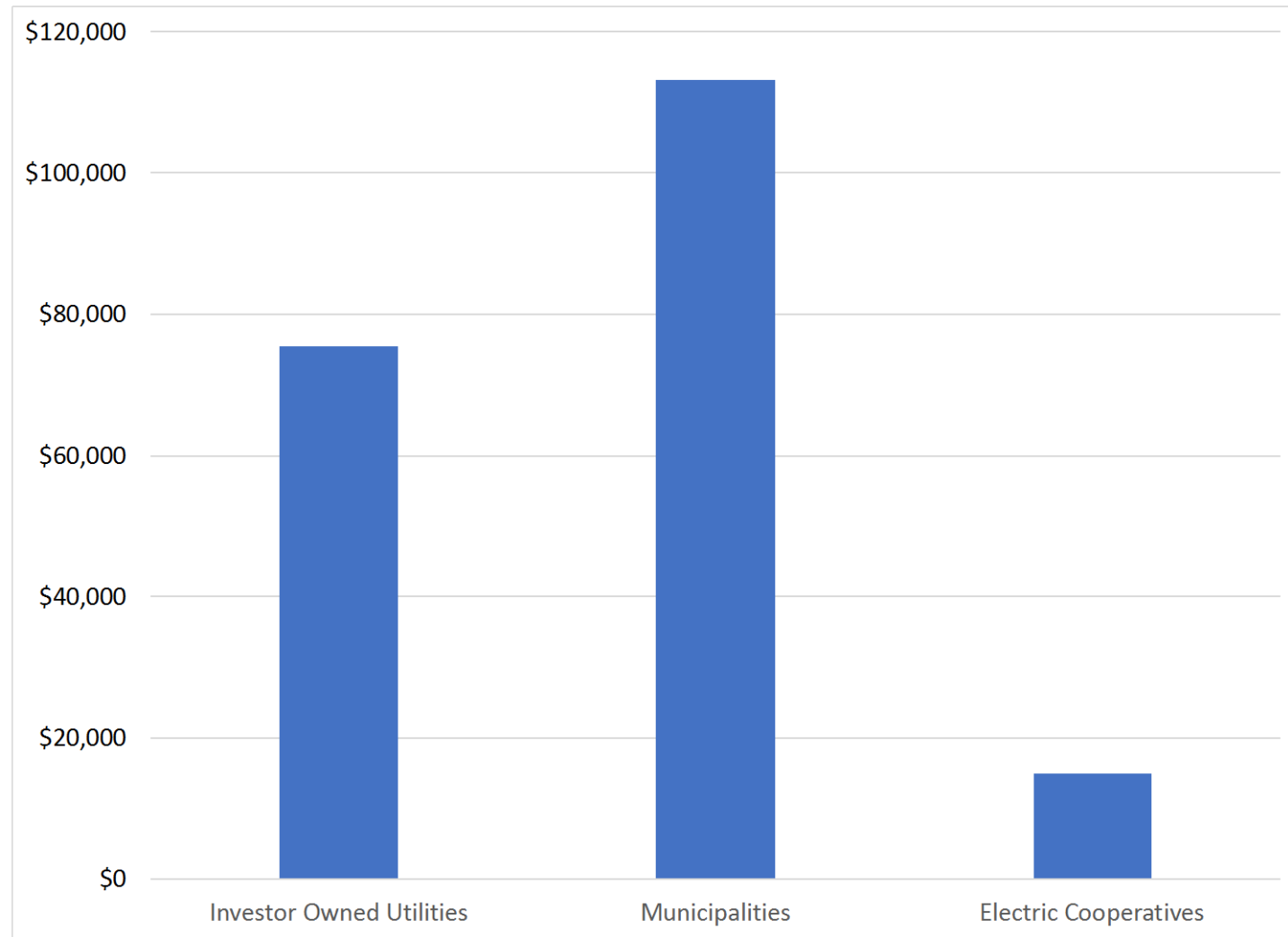
Consumers per Mile



Data Source: National Rural Electric Cooperative Association



Revenue per Mile

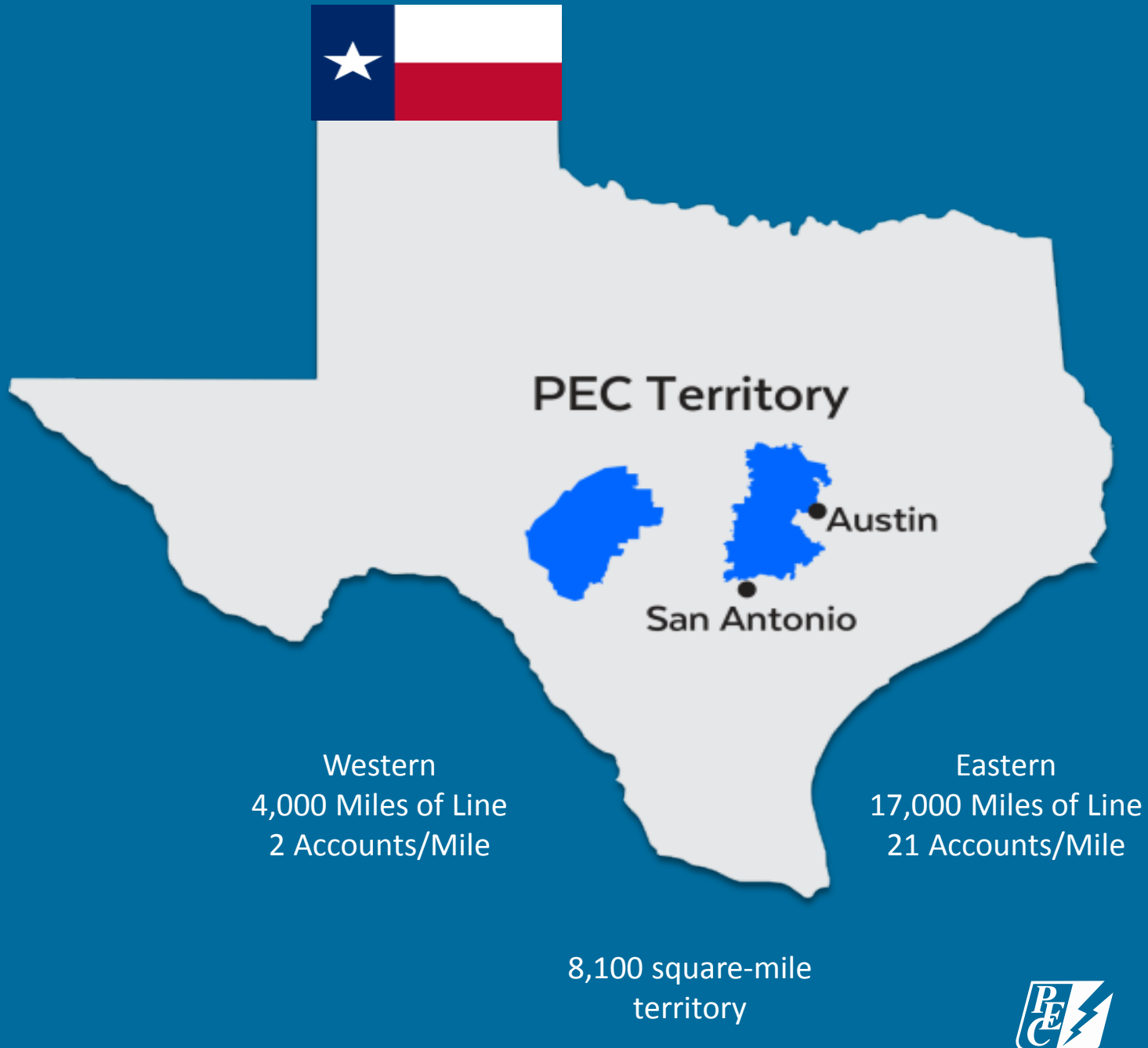


Data Source: National Rural Electric Cooperative Association



about PEC

Cooperative Territory



Cooperative snapshot

As of Dec. 31, 2016

287,422

Active Accounts

12,140

Total Meter Growth
(2016)

\$56M

2016 Margin (EST)

38%

2016 Equity (EST)

723

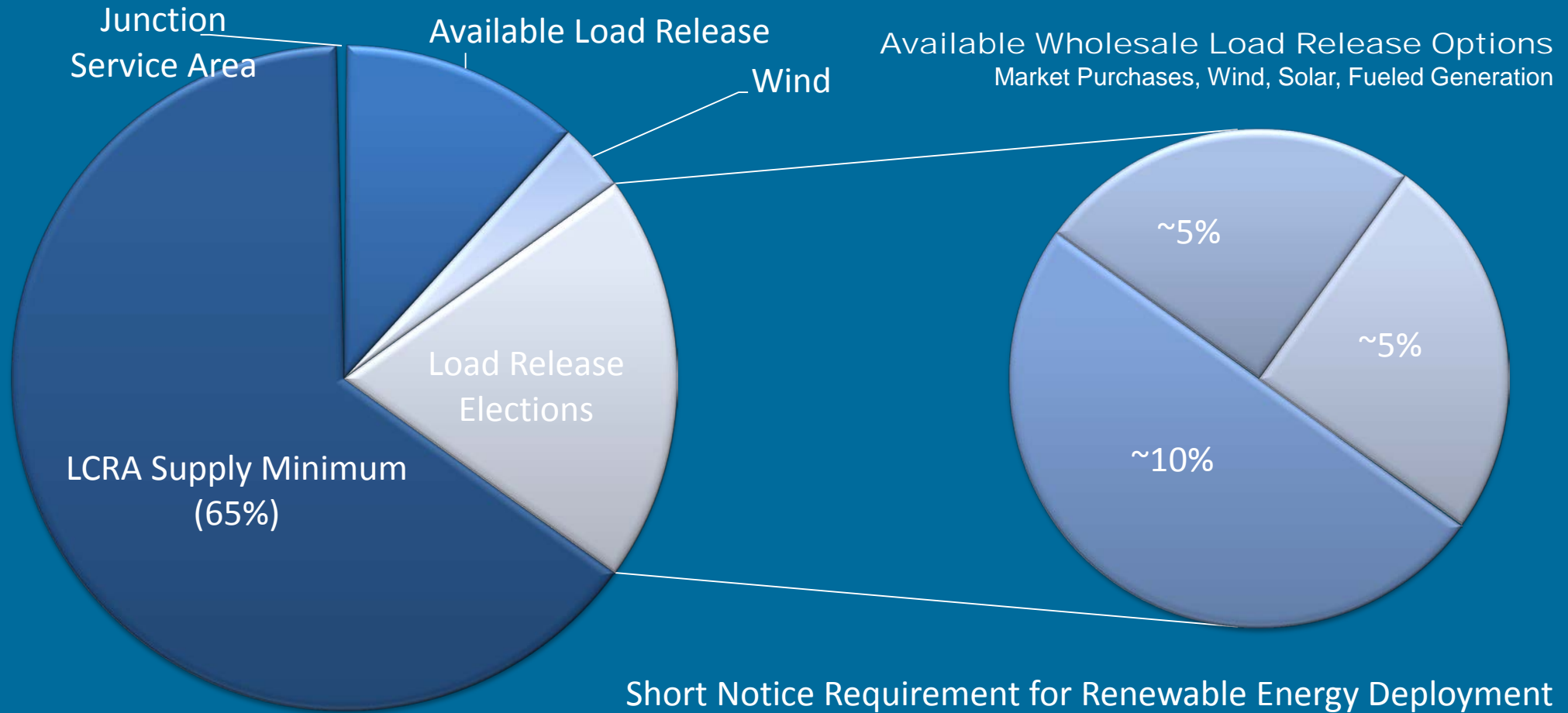
Employees

> 6 Billion

kWh sold



Power Supply Diversity



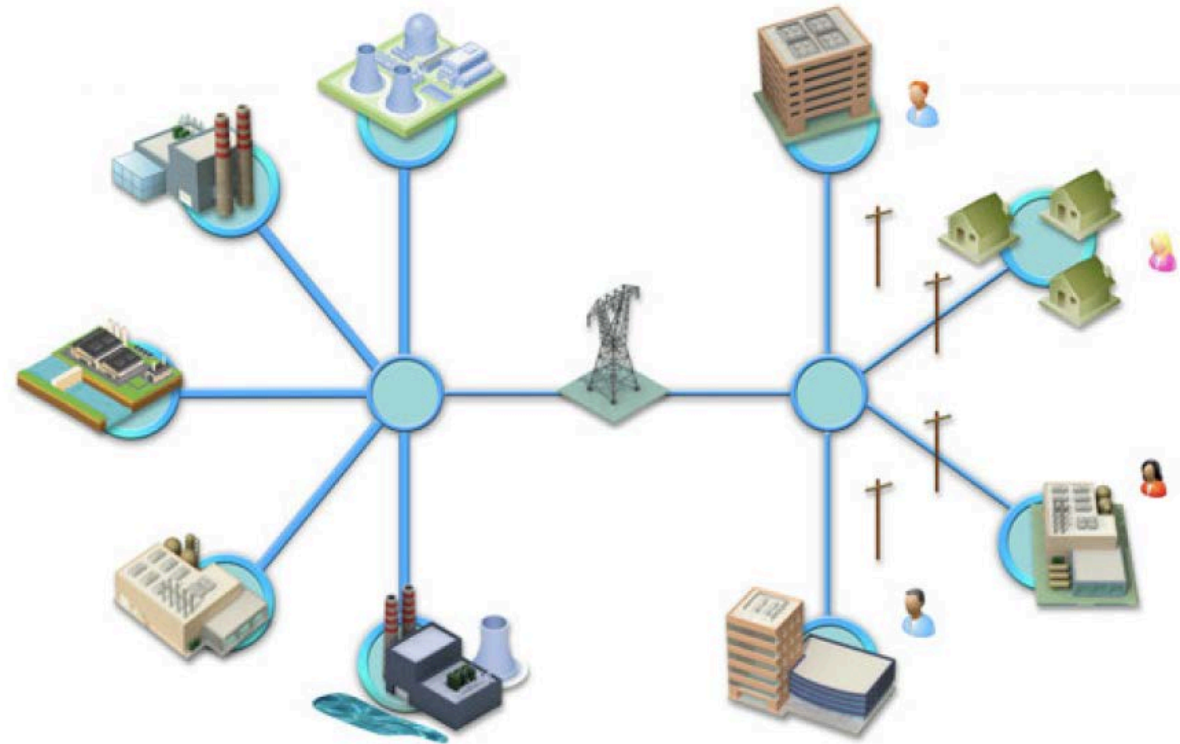
LCRA: Lower Colorado River Authority



Everything has changed....
nothing has changed

-Unknown

Today's Power System

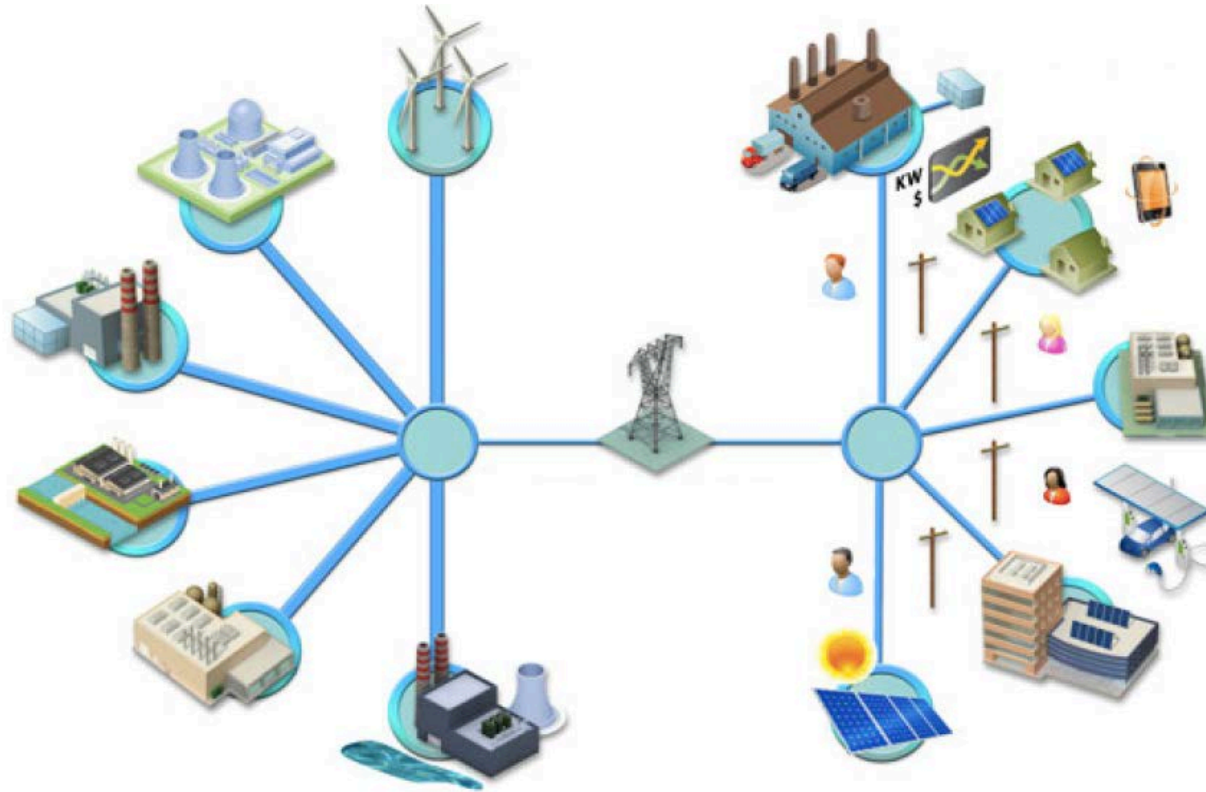


Core Mission – Today

1. Safe
2. Reliable
3. Affordable
4. Environmentally Responsible

Source: Electric Power Research Institute

Integrated Power System



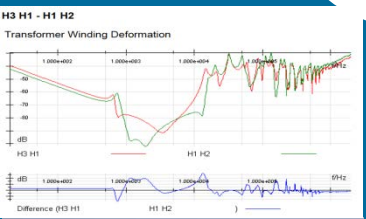
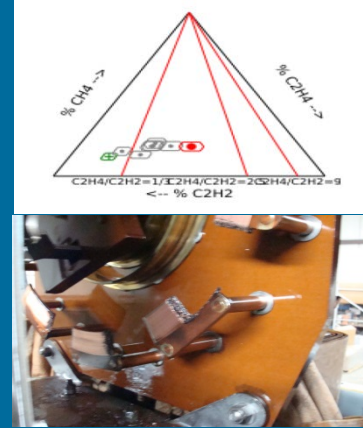
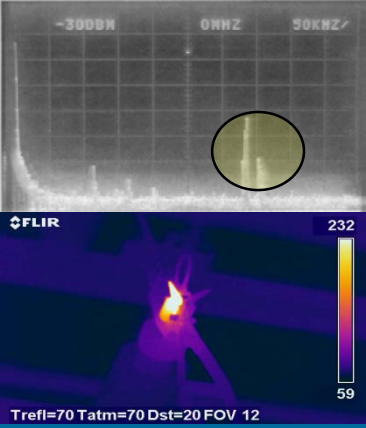
Core Mission – Future

1. Safe
2. Reliable
3. Affordable
4. Environmentally Responsible

5. *Flexible*
6. *Resilient*
7. *Connected*

Source: Electric Power Research Institute

advancing technology...



Operational Efficiencies & Advanced Maintenance

Optimizing the Grid and Operations

Specialized Staffing

Enterprise Software Overhaul

Massive Investment in New Tools

New GIS Inventory >500,000 Nodes

Full Device Connectivity & Analysis

New Outage Management System

Advanced Volt/VAR Optimization

Distribution Fault Anticipator

Mobile Re-Fueling & Maintenance

Ushering In LOWER Rates/Options



Can storage
provide value?

PROJECT HIGHLIGHTS

Power-energy 2.0 MW - 4.0 MWh	Cost-effectiveness \$787/kWh	Emissions displacement ↓ 85,815,296 lbs. CO ₂ 36,927 lbs. NO _x 7,400 lbs. Particulate 86,787 lbs. SO ₂
Duration 2 hours	Cost per lifetime energy \$0.0580/kWh	
Implementation cost \$3,147,454	No. cycles to 80% 6,000	
Grant request \$1,500,000 (47.7%)	Project life 20 years	Roundtrip efficiency 90.9%



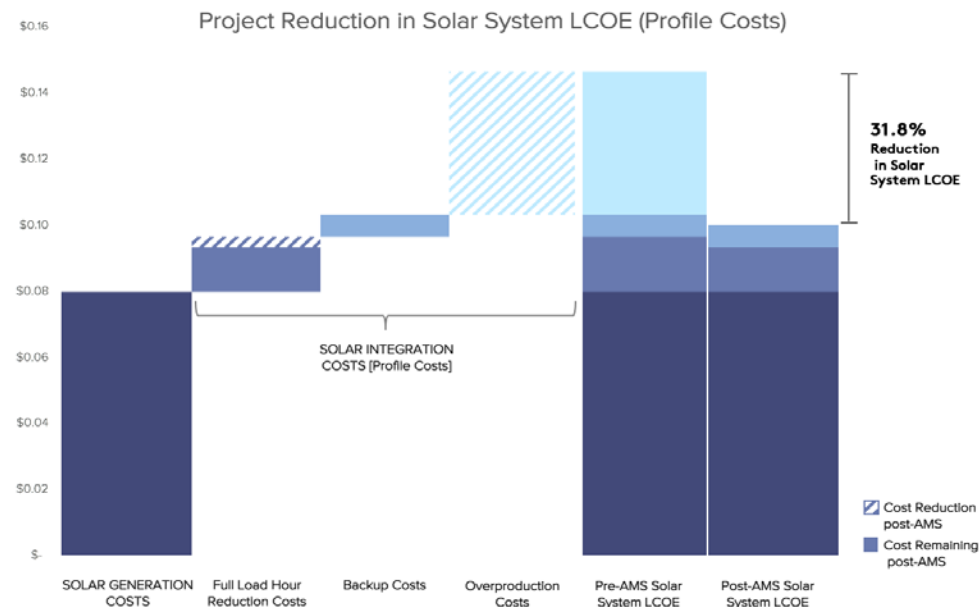
Security Constrained Economic Optimization of PV and Other Distributed Assets



Build a microgrid as an intelligent network node, co-optimizing PV, storage, EV charging and building loads

Enhance grid system layer with real-time distribution system situational awareness and advanced analytics.

Solution will enable cost effective integration of high penetrations of distributed PV in the power grids of the future, while meeting the objectives of reliability, resiliency and affordability.



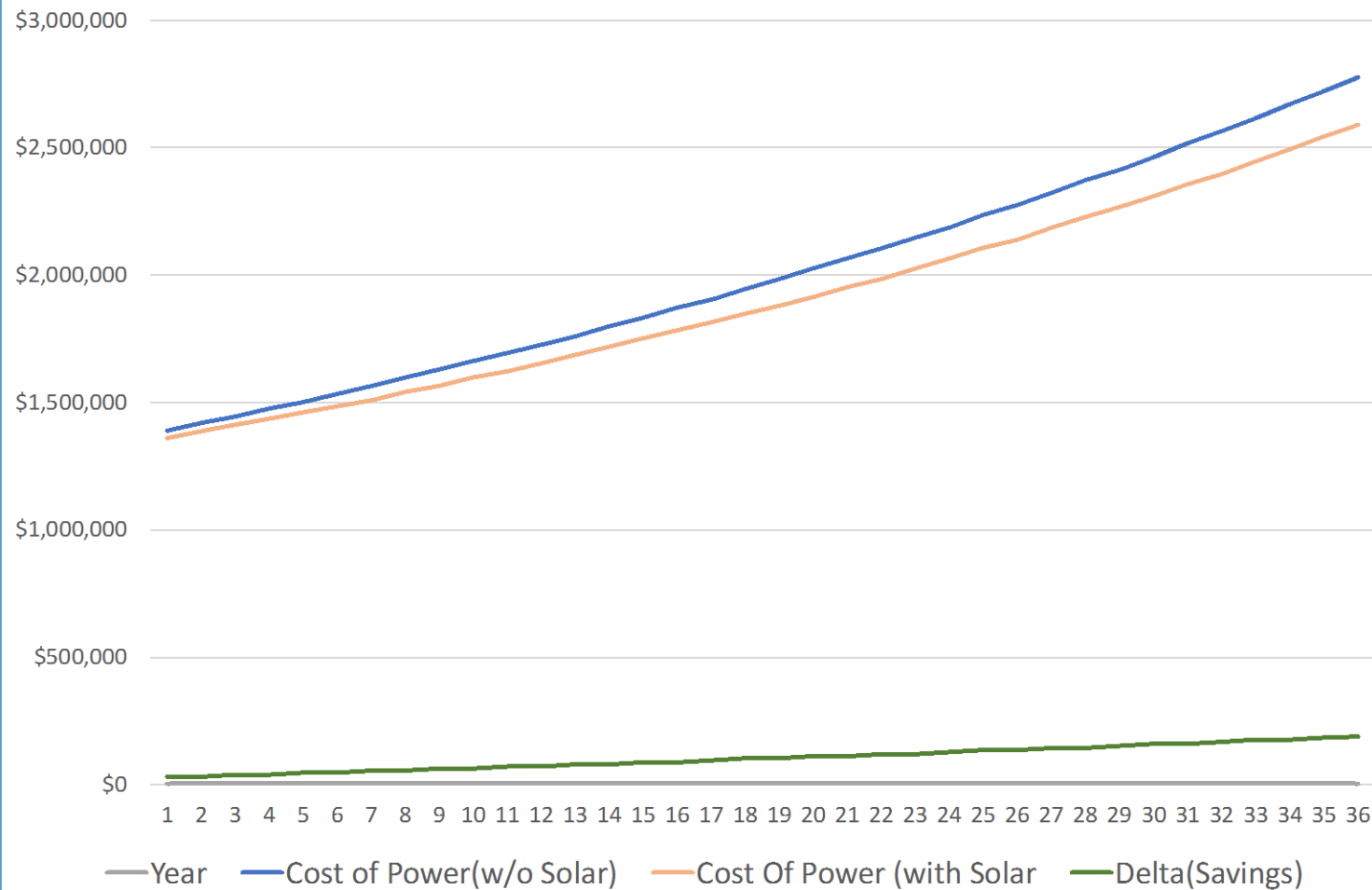
Advanced Microgrid Solutions



service innovation...

is solar cost effective?

Cost of Power: With Solar and Without Solar

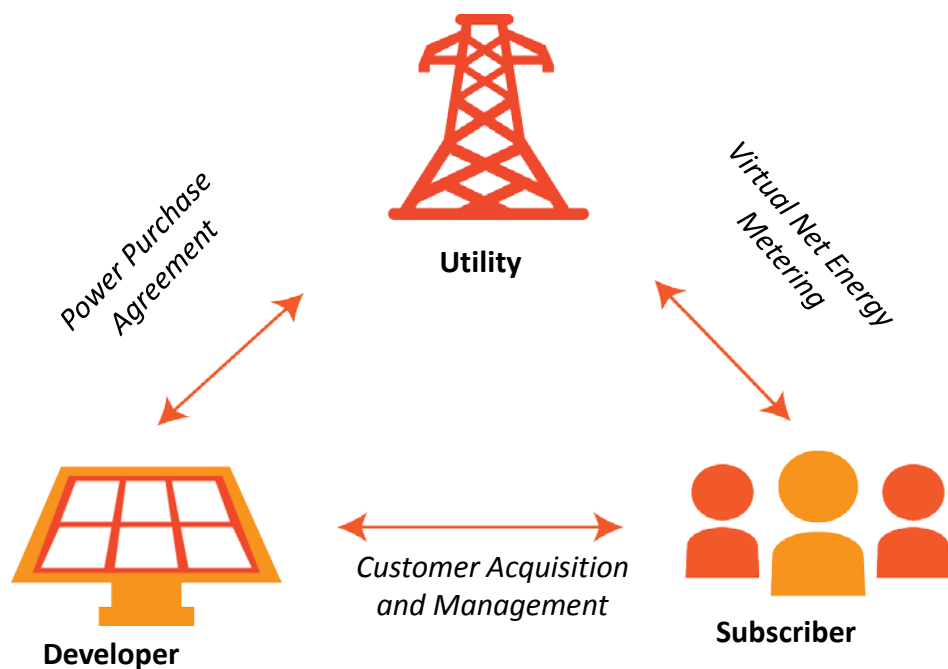


Assumptions

- Large C&I Consumer
- 1.2MWdc System
- Single Axis Tracking
- Installation Cost: \$1.90/W
- Solar Degradation: 0.5% annually
- DC to AC Size Ratio: 1.1
- Capacity Factor: 20.6%

Community Solar Solution

~ 1MW



Multiple locations – up to 15MW

Strategically located within PEC territory

Consider anchor-tenants – C&I could commit to 50% of the output, reduces risk of low subscriptions

Provides system benefits

Lease-Space Solar Solution

250kW – 1MW



Partnering with PEC members

Installing on member owned properties

Increased power quality

PEC will own the generation



financing...

Empower Loans

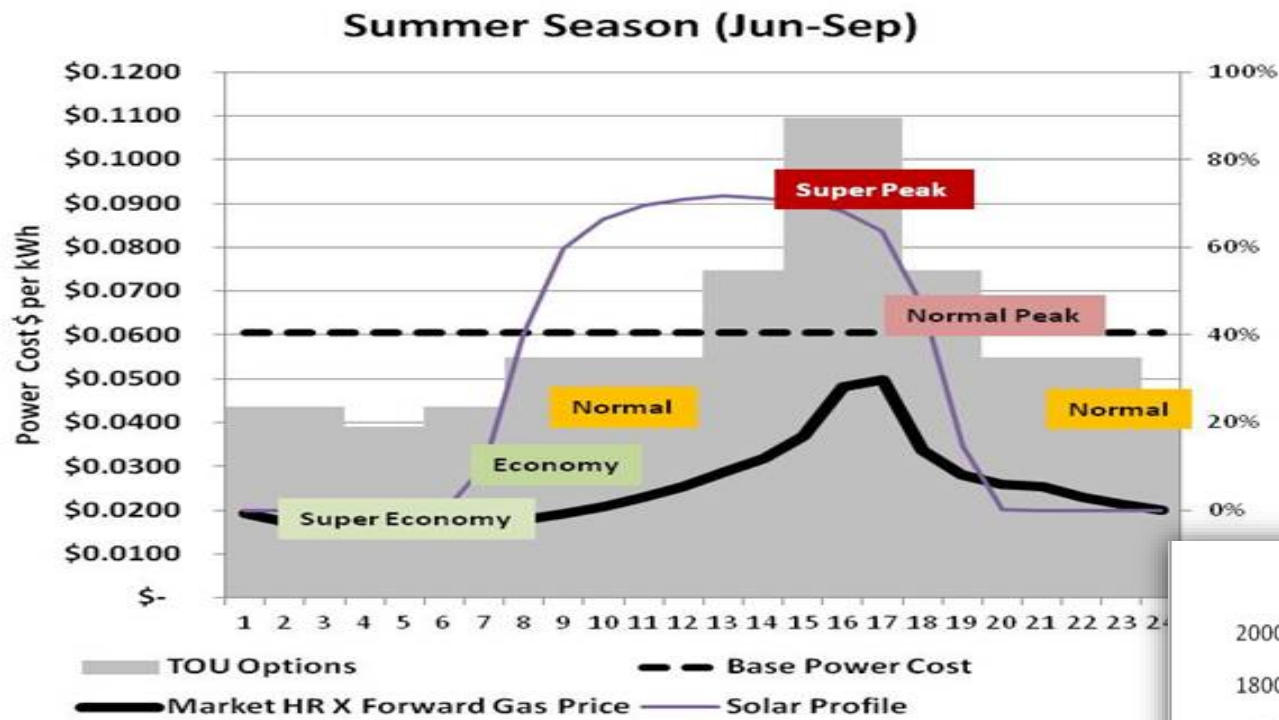
Up to 10-year loan on the face of the bill (max \$20K)

USDA Rural Utilities Service - Energy Efficiency Conservation Loan Program (low interest rates)

Available for solar and storage (batteries)



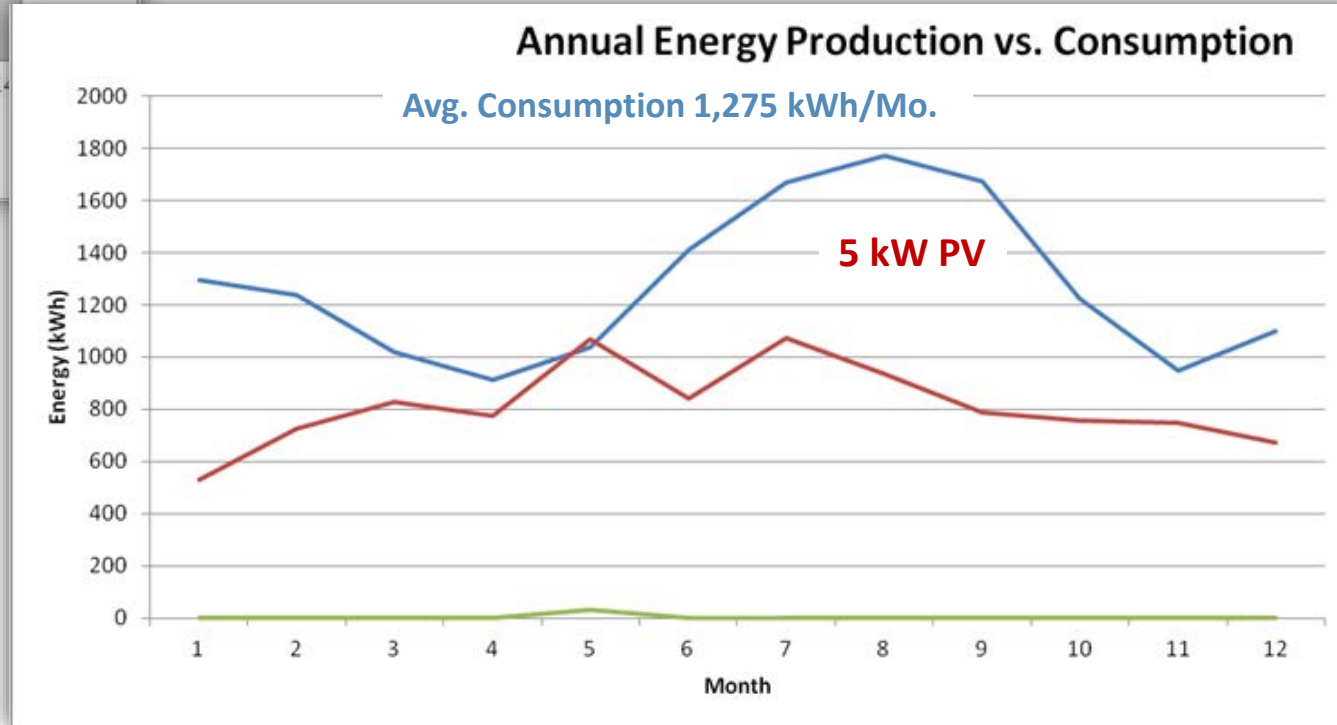
Empower Loans



Annual Margin Reduction due to
Loss of Incremental Sales **\$41**

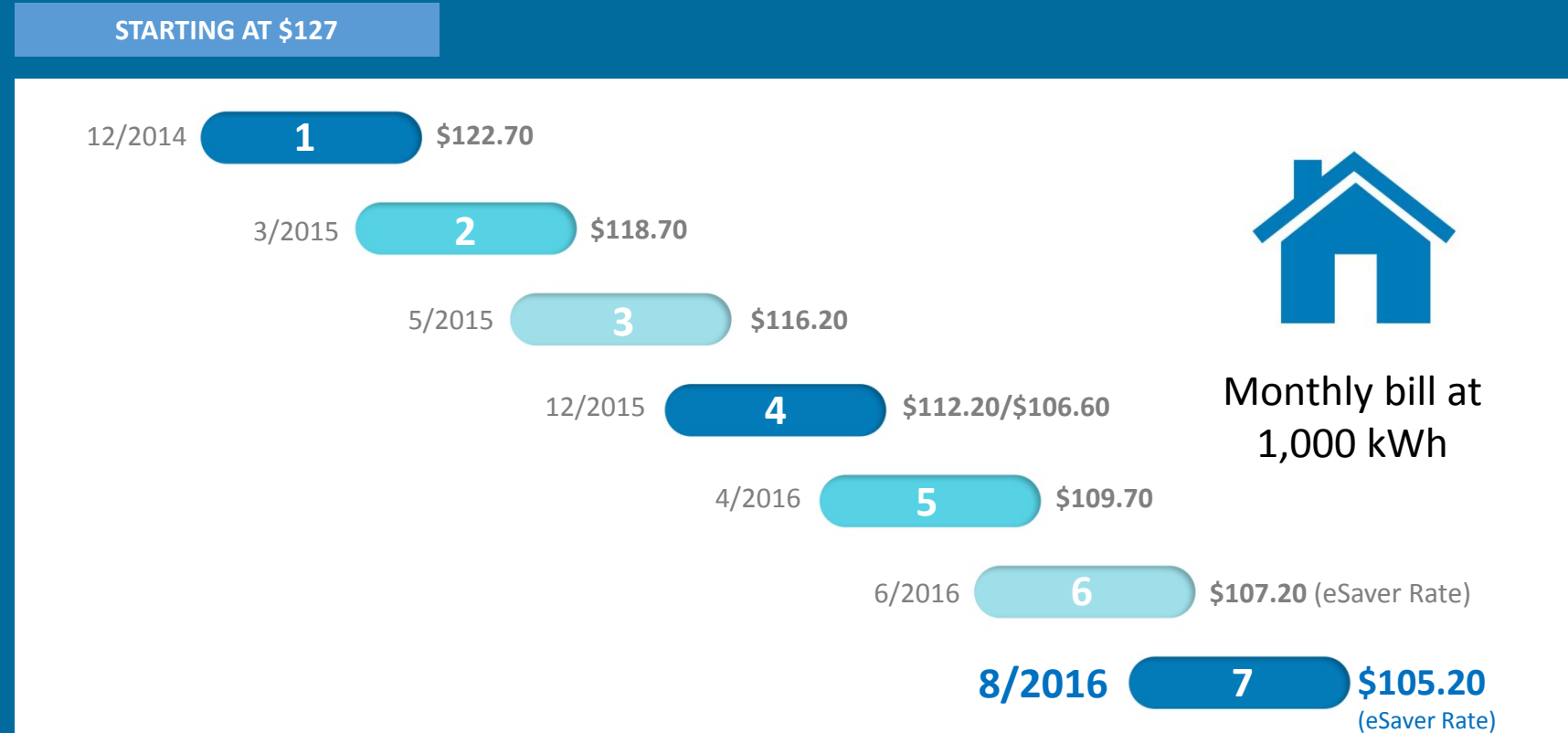
Financing Premium **1%**

Annual Financing Margin Contribution **\$80**



consumer engagement...

Rate Reductions



Also in December 2016, PEC Distributed **\$8.9 Million** in Capital Credits and Invoked **Revenue Adjustment Factor** Saving Members **\$6 Million**



Residential and Farm/Ranch

eSaver

\$20

monthly service
availability charge

eDraft

\$21

monthly service
availability charge

eBilling

\$21⁵⁰

monthly service
availability charge

Conventional

\$22⁵⁰

monthly service
availability charge

- Paperless billing
- Automatic bank draft

- Automatic bank draft

- Paperless billing

- Paper billing

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Water Well

Small Power

Large Power

Renewable Energy Rider


Interconnection Net Metering Up to 50 kW

Area Lighting

Rate Options




Energy Services Support



COMFORT
HEALTH & SAFETY


HOME Energy Report

EFFICIENCY
INVESTMENT



Prepared for:
Ingmar Sterzing
6530 Needham Lane
Austin, TX 78739

Prepared by:
Brian Curtsinger
PEC
Phone:
Email: brian.curtsinger@pecitest.com
201 Ave F
Johnson City, TX 78636

Brought to
you by:


Ingmar Sterzing's Report


Dear Ingmar Sterzing,
Thank you for the opportunity to visit your home. I've performed a thorough assessment of your home to test for overall energy performance and to address your primary concerns.
As always, if you have any questions please feel free to contact me.
Brian Curtsinger

In This Report

- Solutions for your home
- Estimated Savings
- Solution Details
- Health & Safety Issues

TAKE THE NEXT STEP >>>

Call Brian Curtsinger at



Audit Date: 8/21/2014

Estimated Energy Savings

\$392

Est. Total Project Cost

\$2,500

Est. Total Rebate

\$90

Fuel	Cost	Est. Savings
Electric	\$1,250	\$90
Gas	\$1,200	\$302
other		


Recommended Improvements with Available Rebates


Improvements	First Year Savings	Cost
Reduce Duct Leakage for Ducts	\$207	\$600
Electric Water Heater 0.94 Energy Factor (40-gal tank) (1.0)	\$10	\$900
Reduce the house air leakage from 3600 CFM50 to 2700 CFM50.	\$115	\$1,000

Improvements Installed During Audit

Improvements	First Year Savings
Kitchen Aerator (1.0)	\$28
Interior Compact Fluorescent Fixture 13W (5.0)	\$20
Smart Strip (1.0)	\$9

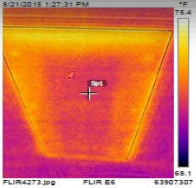
COMPASS






Measurements
Sp1 71.9
Parameters
Emissivity 0.95
Ref. Temp. 75 °F
Note
Weatherstrip and insulate attic access to reduce heat transfer. Install attic access later to further reduce air infiltration at attic access.

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New energy assessment tools provide members with direct ways to evaluate and improve the way they use energy

PEC Hill Country Solar Tour

Installer Fair/Exhibits

- Consumer Education
- Local Installers
- PEC Energy Advisors
- Solar Car Workshop
- Texas Solar Energy Society

Home Exhibits

- PV Home Sites
- Homeowner, solar installer and PEC Staff at each location
- Engage & Collaborate



Economic Development Strategies



corporate citizenship...



Community Engagement

Promoting the
Power of Change

\$22,000+ in contributions
from over 6,800 participants

Heart to Heart campaign
launches Feb. 1

College Scholarships



\$10K - 1

\$5K - 3

2.5K - 10

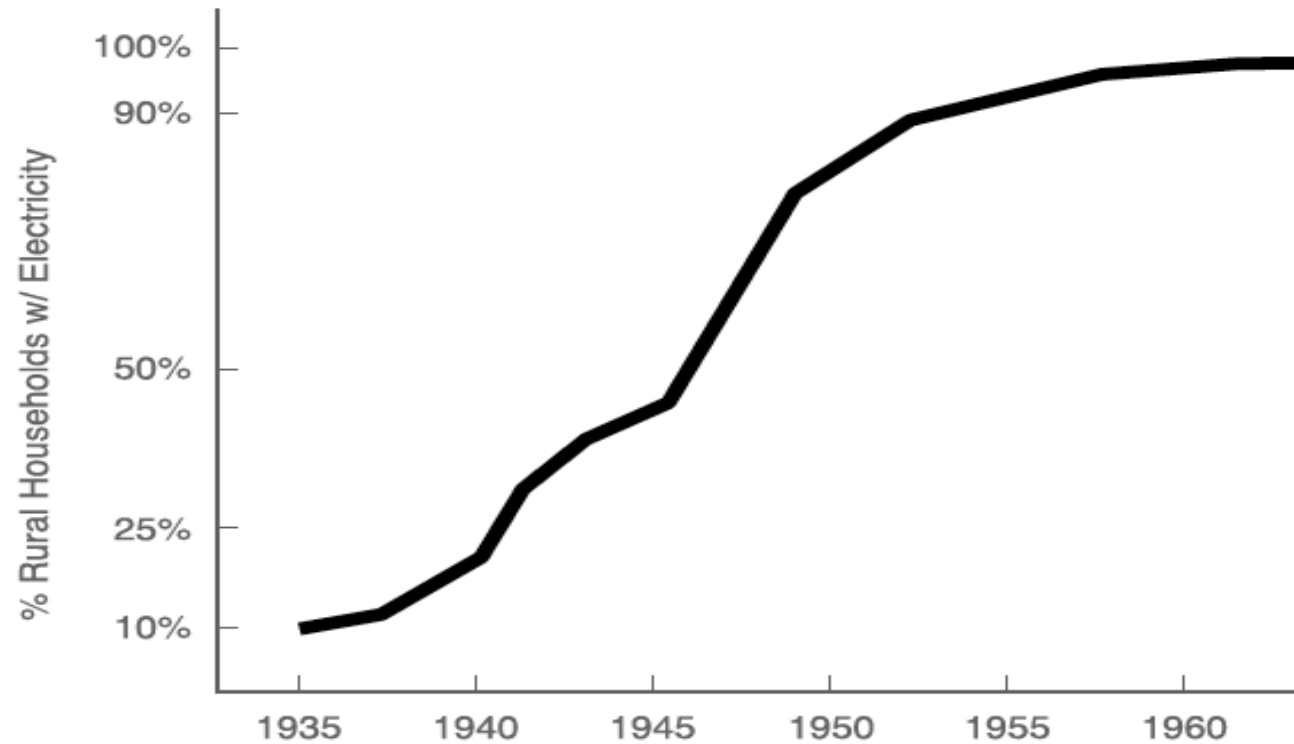
2017 Scholarship increased to \$100K

the future?

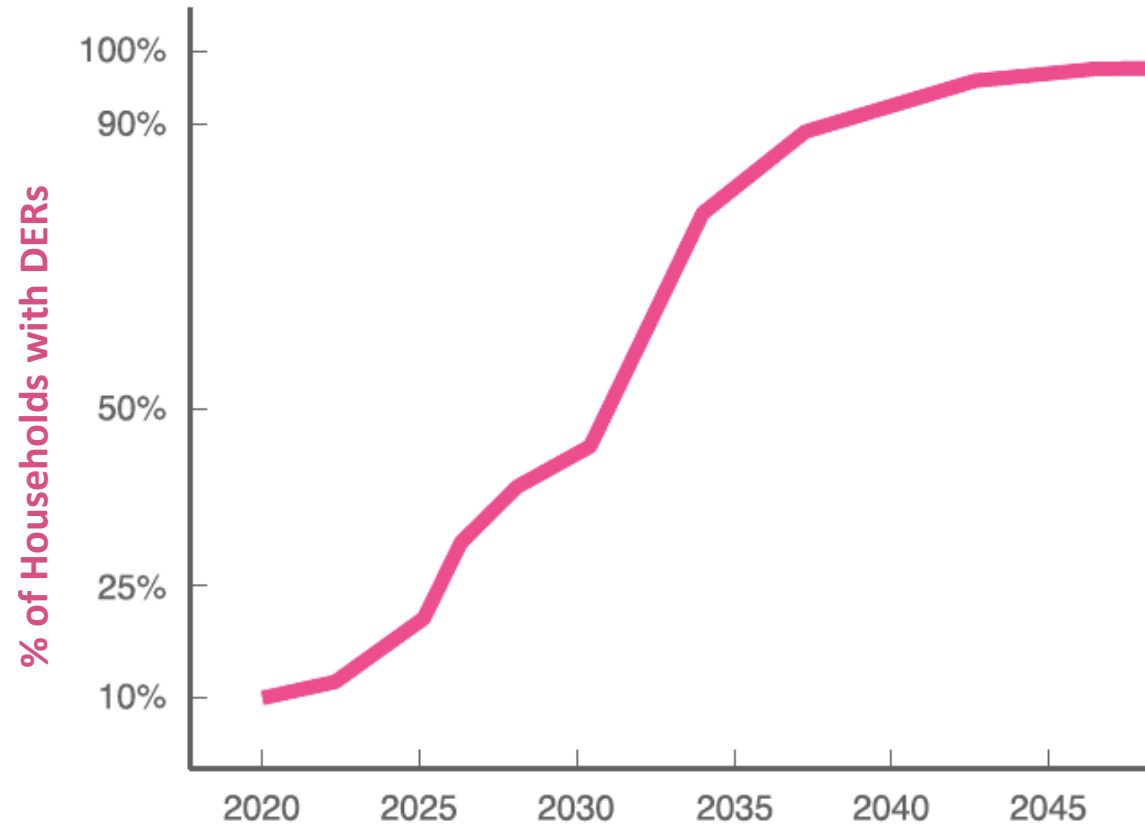
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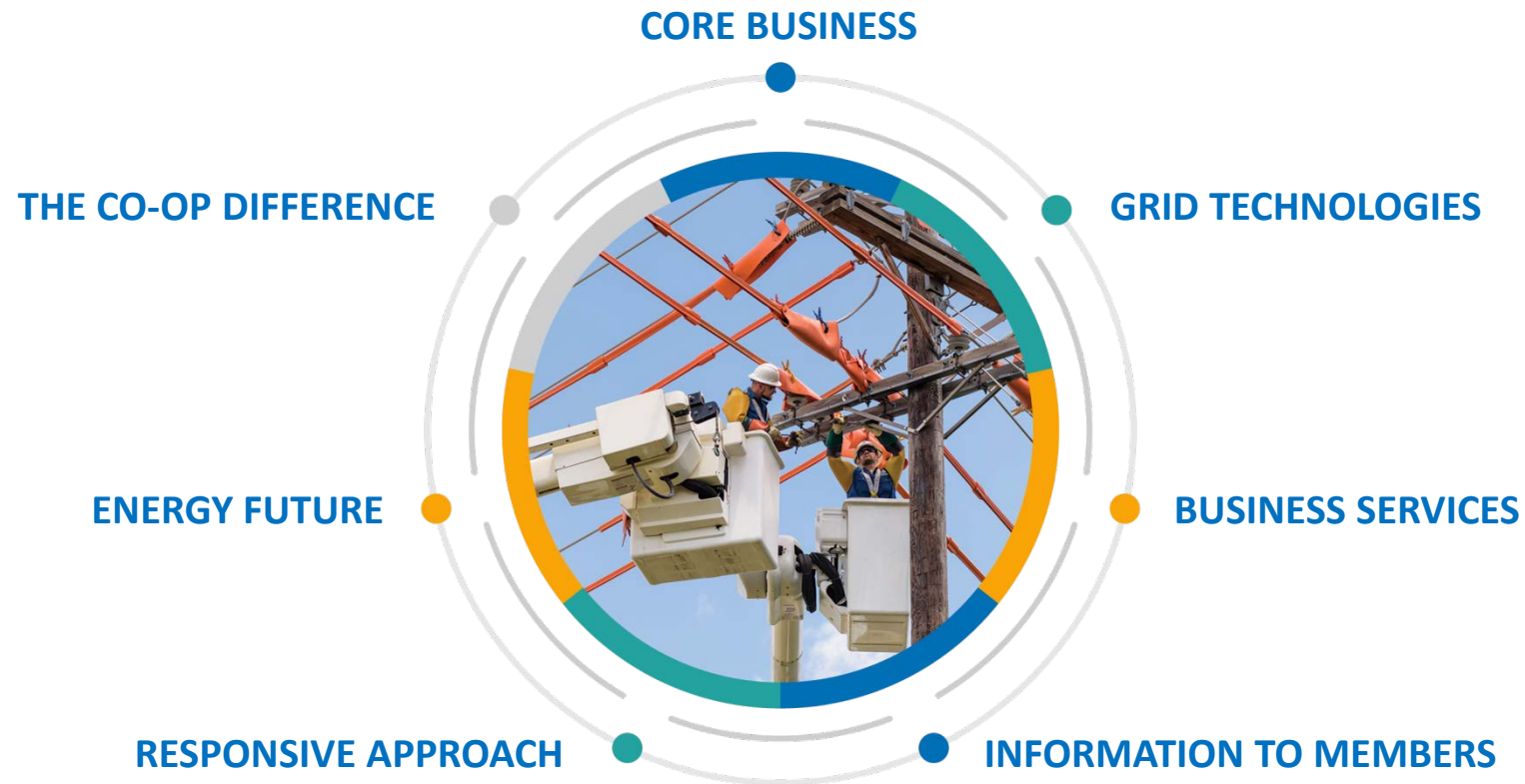
Today's Electric Cooperatives



Tomorrow's Electric Cooperatives?



Innovation, Excellence, Service



FLEXIBILITY



The secret of getting ahead
is getting started.

-Mark Twain



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