

# American Electric Power gridSMART<sup>®</sup> Projects

2011 National Town Meeting on  
Demand Response and Smart Grid

July 14, 2011

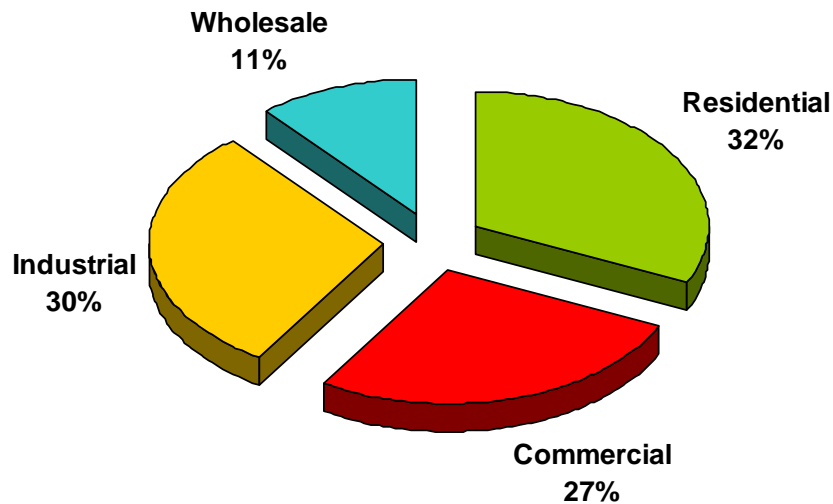
Teri Berliner  
Director, Consumer Programs

# Agenda

- American Electric Power (AEP) Overview
- South Bend Indiana gridSMART® Pilot Results
- AEP-Ohio gridSMART® Demonstration
- Public Service of Oklahoma gridSMART® Pilot
- AEP-Texas gridSMART® Meter Deployment

# American Electric Power Overview

- Customers: 5.3 Million
- Employees: 18,700
- Companies: 7
- States: 11
- Gen Capacity: 38,000 MW
- 2010 Sales: 206 Million MWH
- 2010 Rev: \$14.4 Billion



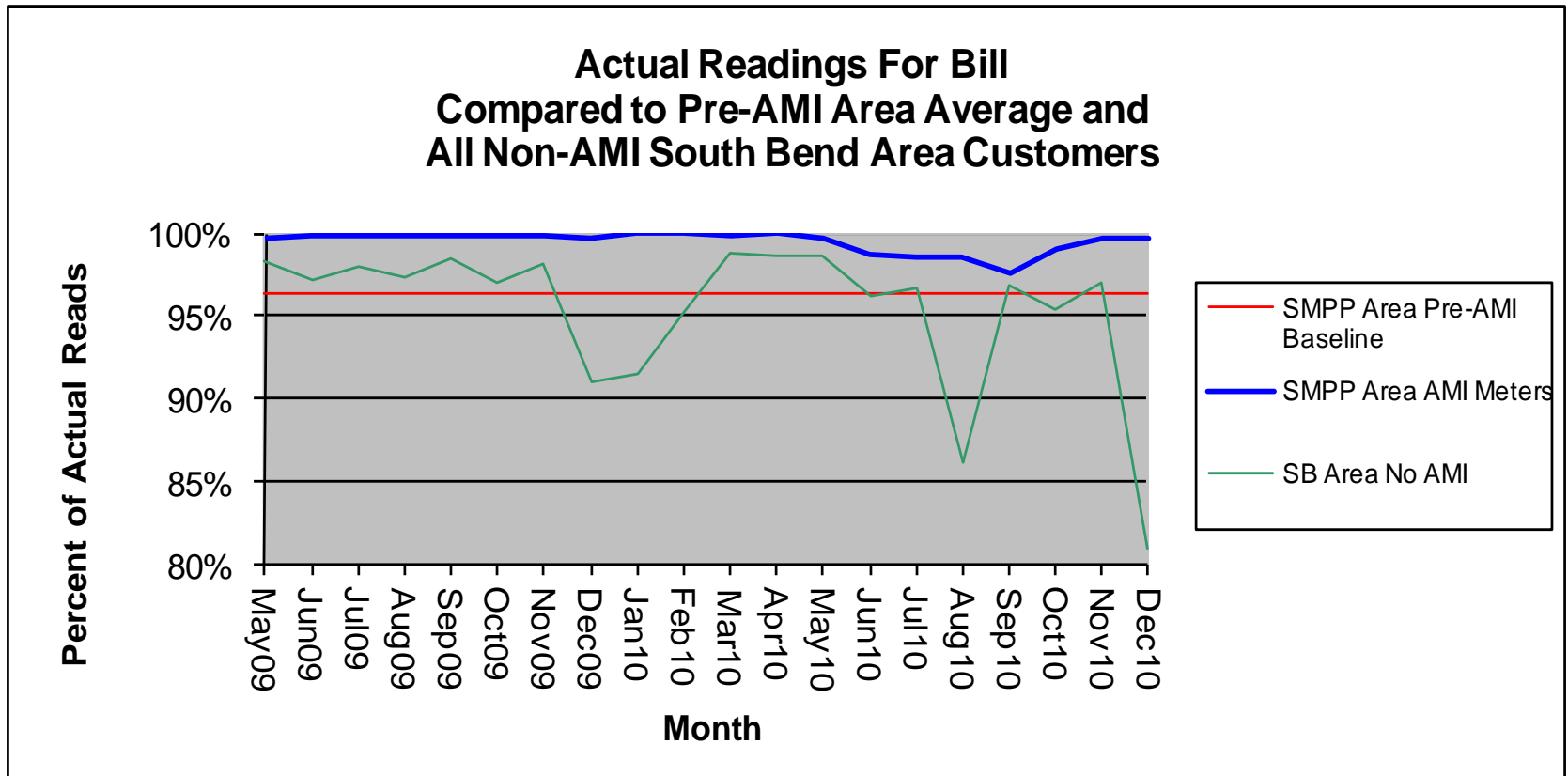
# South Bend (SB) gridSMART® Pilot

- 10,000-meter AMI pilot program in South Bend, Indiana
- Distribution automation
- Two-tiered, two-season time-of-use tariffs
- Web portal displaying 15-minute interval data up to previous day
- Field testing direct load control using programmable communicating thermostats



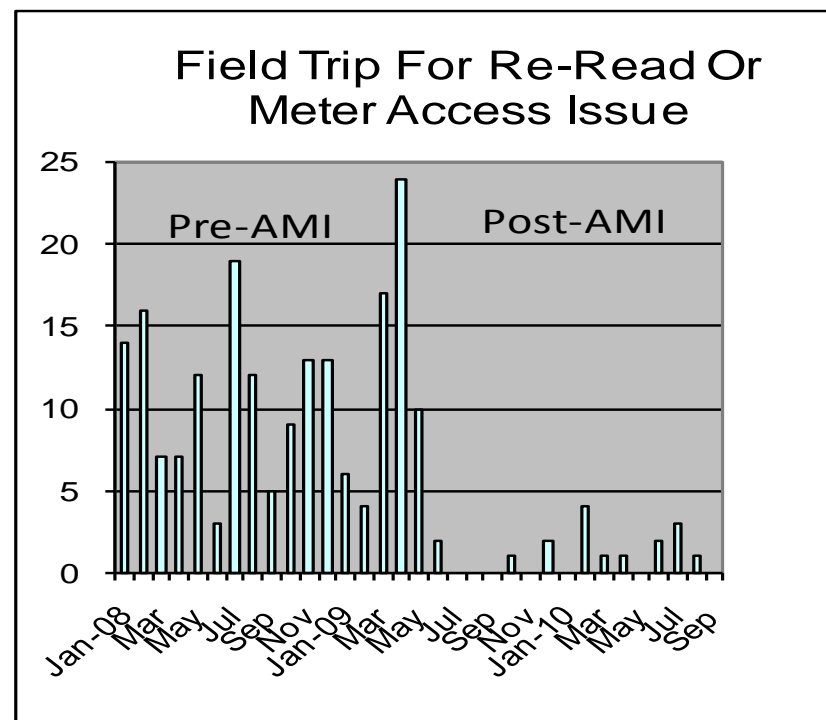
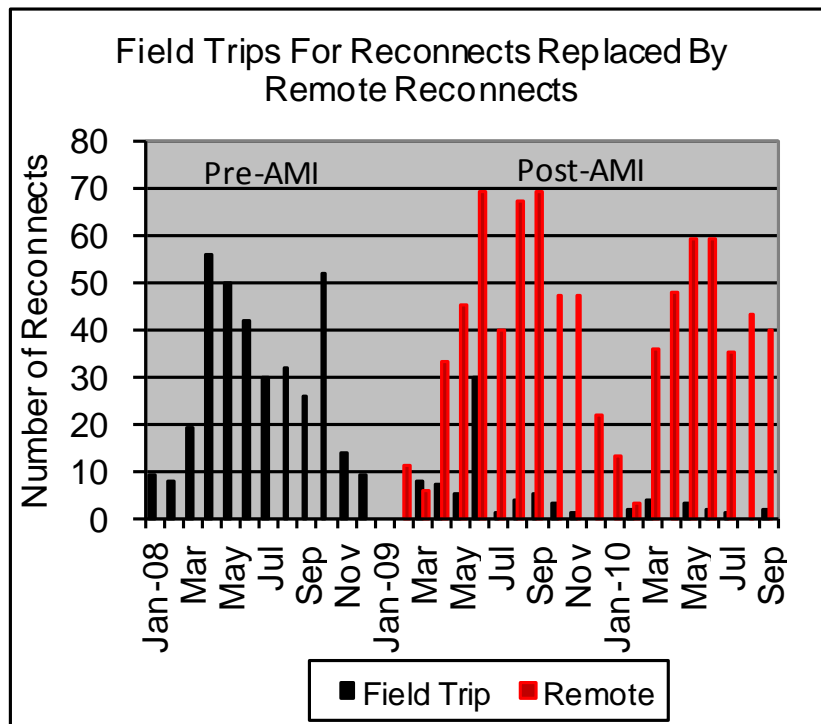
# SB- Business Process Impacts

The AMI technologies had a significant impact on meter reading success, significantly reducing bills based upon estimated readings.



# SB - Business Process Impacts

The AMI technologies had a significant impact on **field trips** to re-connect customer service as well as field trips resolve meter reading issues.

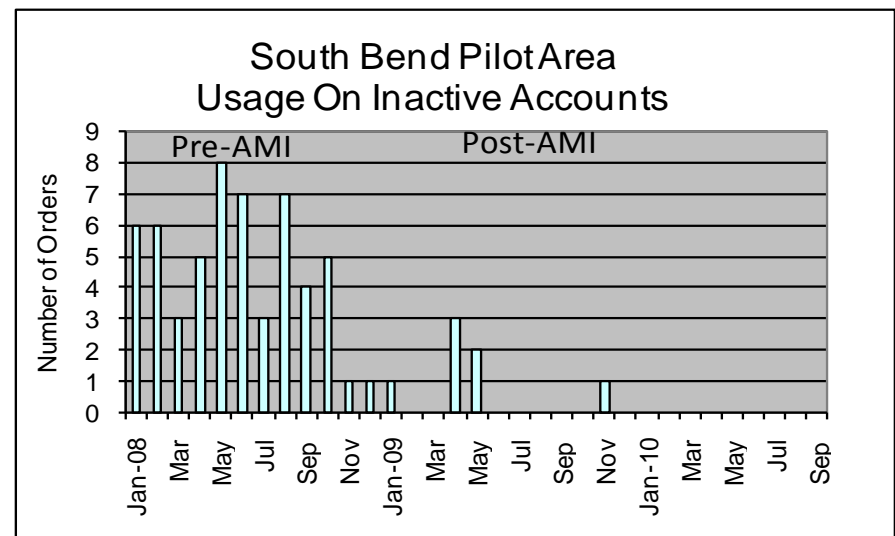
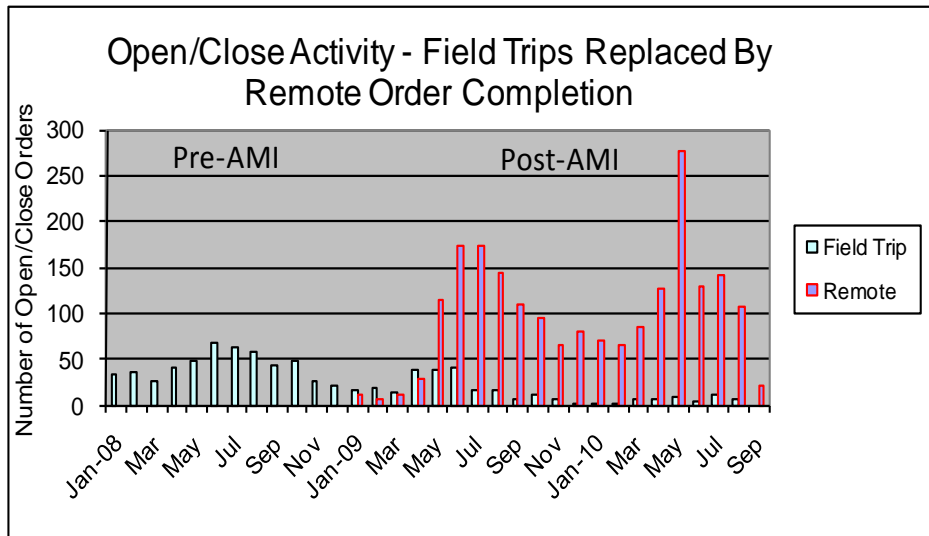


- Reconnect orders are automatically executed remotely.

- Field visits for customer re-read requests dropped by 73%.
- Field related to safety and access issues dropped by 96%.

# SB - Business Process Impacts

The AMI technologies had a significant impact on **open and close processes**.



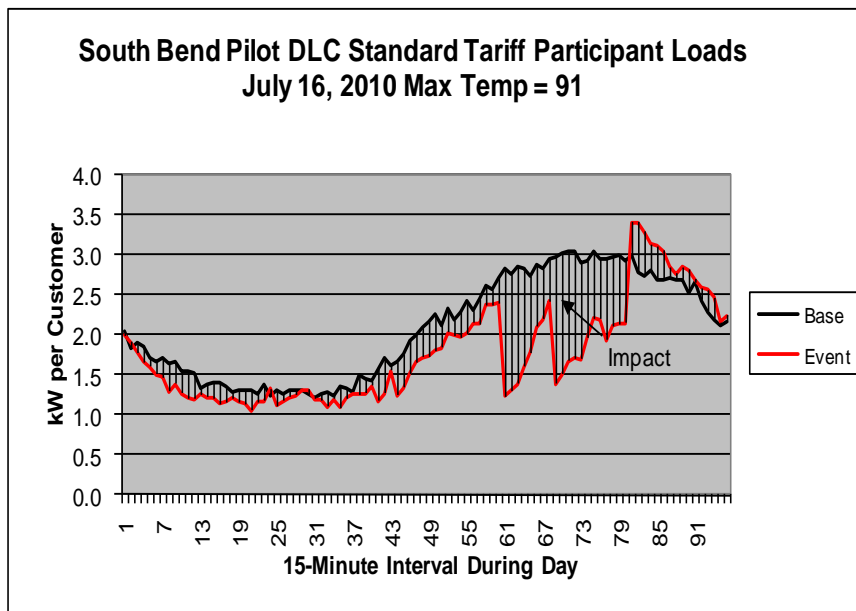
- Field trips to perform open / close activity were reduced. 98% of open / close orders were executed automatically and remotely.

- Service which was previously left active on a close is now automatically disconnected with a resulting elimination of “usage on inactive accounts.”

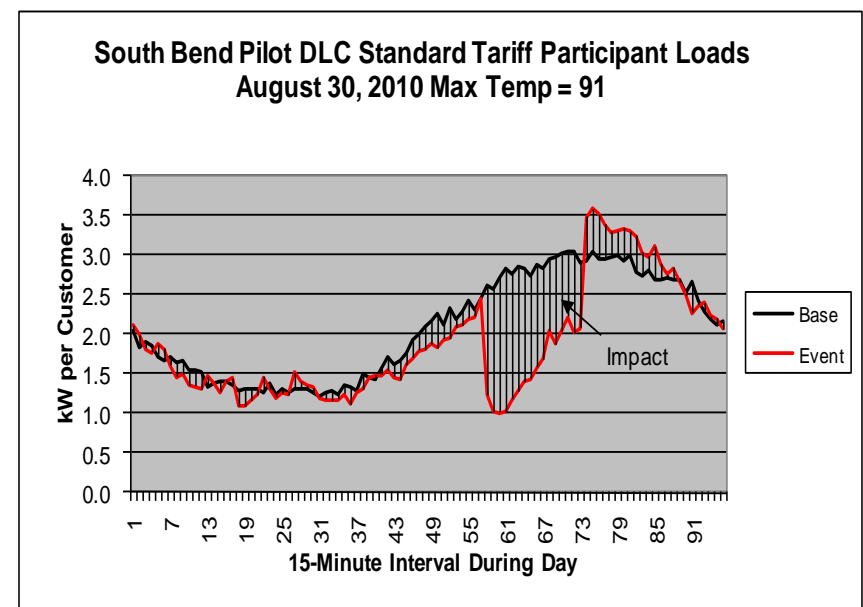
# SB - Central Cooling Direct Load Control

The AMI technologies allowed a successful central cooling **direct load control program** using programmable controllable thermostats (PCTs).

- 118 customers enrolled (3.4% participation rate), and all participated in all twelve events.
- Overrides 16% first year versus 8% in year two. (Disincentive added for over-riding).
- Average load reduction was 1.2 kW/customer ( ~45% reduction); average kWh reduction was 4.0 kWh/cust/event.
- \$150/participant marketing cost.
- 88% satisfied or very satisfied. 6% reported a negative impact on daily life.



*2-degree adjustment followed by an additional 2-degree adjustment.*

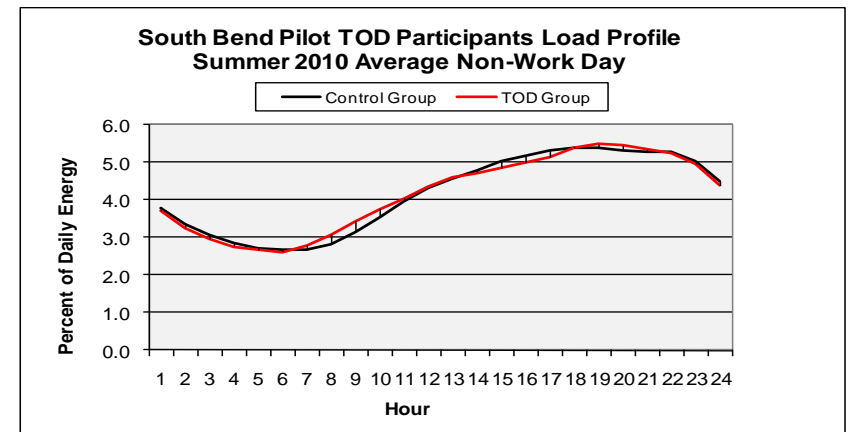
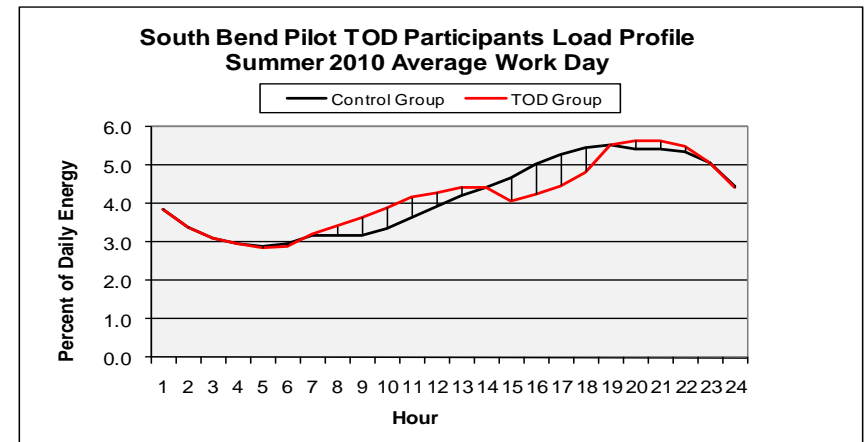
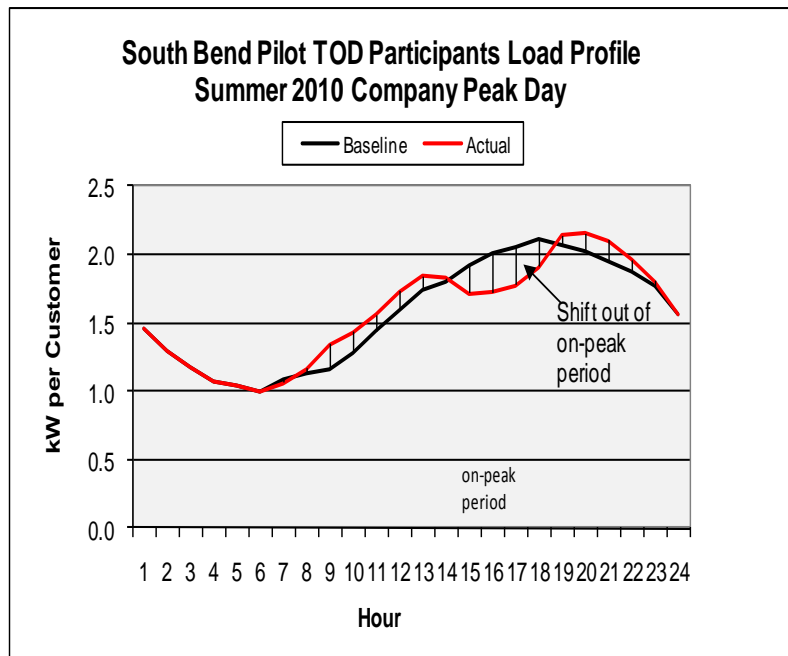


*One-time, 4-degree adjustment.*

# SB - Experimental Time-of-Day Rate Program

Analyses showed that participants transferred usage out of the on-peak period.

- 140 customers enrolled (2% participation rate).
- Average load reduction was 0.21 kW/cust ( ~11%).
- Average annual kWh reduction was 50 (1.5%).
- 83% satisfied or very satisfied.



# Four Major Take-Aways

1. Communication between the AMI system and the customer (the In-Home Display) needs serious development.
2. Customer participation in gridSMART® tariffs was very low (2.2%). Generally speaking, during the first year of the pilot, customer interest in gridSMART® technology was low.
3. Following correction of early technology problems, the AMI system from the meter up to and including the back office systems worked well.
4. Distribution automation can improve reliability by reducing customer outage minutes during fault and planned outages.

# Other Lessons Learned

- Home Area Network technologies are still immature, limiting widespread deployment.
- Customers will save money on advanced programs if they shift behavior.
- If customers are allowed to override load control programs without limitation or energy cost penalties, many will do so which significantly reduces achievable demand savings.
- One-on-one marketing approaches that used direct mail and email were most cost effective for the limited area deployment.
- Less than 2% of pilot area customers viewed their usage data on the web more than once.
- Low customer response to consumer programs indicates challenges to achieve high enrollment percentages in such programs.

# AEP-Ohio gridSMART® Demonstration Project

- PUCO-Approved 110,000 AMI deployment in NE Central Ohio
- Selected by DOE as a Smart Grid Demonstration Project for \$75 million in federal funding, 42-month deployment/evaluation
- Partnering with Battelle
- Full suite of distribution grid management technologies on over 70 distribution circuits
- Advanced technology deployment (Energy storage, PHEVs)
- Enhanced time-of-use tariffs, including a field trial of real time pricing
- Home area networks & grid-friendly appliances



# Public Service of Oklahoma gridSMART® Pilot

- Scope is 13,500 meters in Owasso
- Received \$8.75 million low interest loan from OK Department of Commerce (ARRA source)
- Additional \$2 million/yr included in base rates to repay loan and cover O&M expenses
- Grid management technology including DA and IVVC
- Potential Programs: TOD rate, Critical Peak Pricing, Direct Load Control via PCT, and Pre-Pay
- Web Portal



# AEP-Texas gridSMART<sup>®</sup> Meter Deployment

- Legislature-enabled and commission-directing TDSPs to deploy advanced metering
- Enables REPs to innovate around electricity pricing and consumer technologies
- Received approval from PUCT for 4-year deployment of 1 million meters, \$300 million project
- AEP Texas to collect a surcharge over 11 years
- Includes some in-home displays for low income customers



# Thank you!

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