

Overview of Austin Energy's Advanced Metering Infrastructure (AMI)

Community Technology and
Telecommunications Commission

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Overview

- Safety Moment
- Summary of Austin Energy's Power Delivery System
- Overview of AE's Strategic Goals and Grid Modernization Strategy
- Overview of AE's AMI
 - Benefits
 - Scope
 - History
 - Roadmap & Initiatives
 - Highlight of a few Applications



Technology Driving Safety

Remote communication and control of T&D assets



Means reduced truck rolls

Reduced exposure



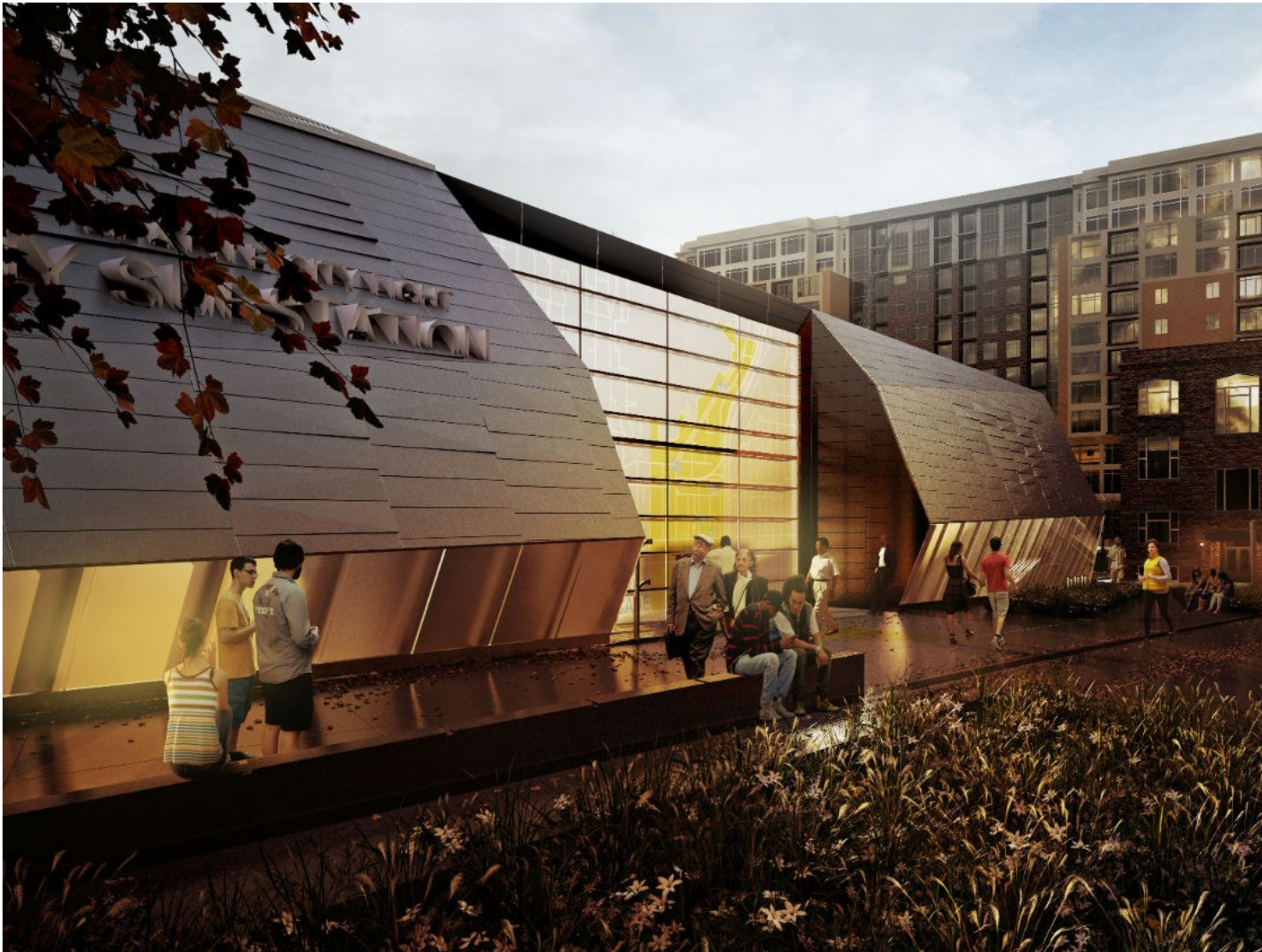
AE's Power Delivery System



- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none"> • ERCOT Market | <ul style="list-style-type: none"> • 623 miles of Transmission Lines | <ul style="list-style-type: none"> • 2 Community Solar Farms | <ul style="list-style-type: none"> • 480,000 Customers |
| <ul style="list-style-type: none"> • ~ 72,000 MWs generation | <ul style="list-style-type: none"> • 75 Substations | <ul style="list-style-type: none"> • 2 Energy Storage Systems (SHINES Project) | <ul style="list-style-type: none"> • 8,800 Solar Generating Customers |
| <ul style="list-style-type: none"> • 4,834 MWs Austin Energy owned and contracted generation | <ul style="list-style-type: none"> • 4,938 miles Overhead Distribution Lines • 6,652 miles Underground Distribution Lines • 80,000 Distribution Transformers • 180,000 Distribution Poles | <ul style="list-style-type: none"> • 30 MW Local Solar | <ul style="list-style-type: none"> • 380,122 homes • 926,426 people • 596 schools, hospitals • 23 police, fire stations • 56,879 of businesses |



Electric Service Delivery's Vision



Enriching the lives of our **customers** and **communities** by being their trusted energy **provider**, **platform**, and **partner**



Grid Modernization Strategic Goal

STRATEGIC GOALS

FINANCIAL HEALTH

Long-term financial resiliency that ensures cost recovery, provides market competitiveness, delivers operational excellence and creates value for customers and the Austin community.

CUSTOMER COLLABORATION

New heights in customer satisfaction through increased collaboration, varied and high-quality services, programs, and delivery methods and competitive pricing that strengthen customer loyalty.

GRID MODERNIZATION

Innovative two-way grid utilizing customer and company infrastructure to deliver superior reliability and customer experience at the lowest reasonable cost.

EMPLOYEE ENGAGEMENT

Employees are safe, healthy and engaged and equipped with tools and training to effectively perform their work.

BUSINESS EXCELLENCE

Best Managed Utility culture where customer needs are thoroughly and efficiently achieved through optimal use of resources.

ENVIRONMENT

Minimized environmental footprint throughout Austin Energy's value chain.

VISION: Drive customer value in energy services with innovative technology and environmental leadership.

Goal: Innovative two-way grid utilizing customer and company infrastructure to deliver **superior reliability** and **customer experience** at the **lowest reasonable cost**.

Measure: Achieve top decile T & D reliability indices (SATLPI, SAIDI, SAIFI, CAIDI) and above average JD Power customer satisfaction index for residential and commercial customers

Current State: Top quartile reliability indices; Bottom quartile customer satisfaction index

Opportunities/Challenges: Resources (personnel/knowledge/funding), Analytics, Solution Selection



Grid Modernization Strategy



Austin Energy Strategic Goals



Grid Modernization



Advanced Metering Infrastructure



Grid Automation



Distributed Energy Resource Integration



Asset Management



The Benefits of AMI

- **Customer Collaboration**

- Enhanced Outage Communication
- Increased Availability of Energy Usage Information
- Alternative Rate Offerings

- **Financial Health and Business Excellence**

- Enhanced revenue detection and protection
- Remote monitoring and alarming
- Over the air programming and remote service operations results in less field activities
- Increased revenue modeling
- Streamlining Complex Metering Operations
- Operational efficiencies and cost savings

- **Grid Modernization**

- Expanded system monitoring for Conservation Voltage Reduction, Fault Location Isolation & Service Restoration, micro grid, and other grid optimization applications

- **Environment**

- Reduced Truck Rolls decreasing carbon footprint

- **Employee Engagement**

- Increased personnel and public safety through alarming and monitoring and reduced truck rolls

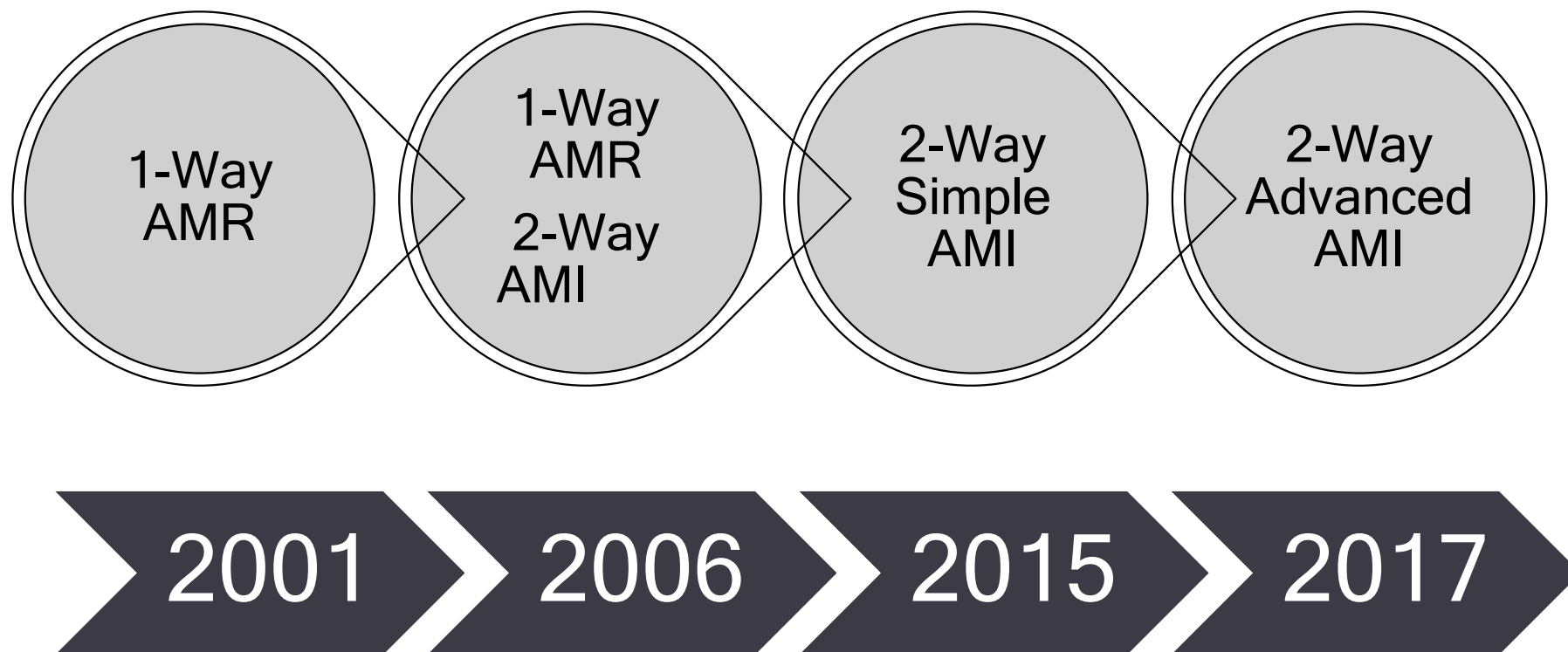


Scope of AMI at AE

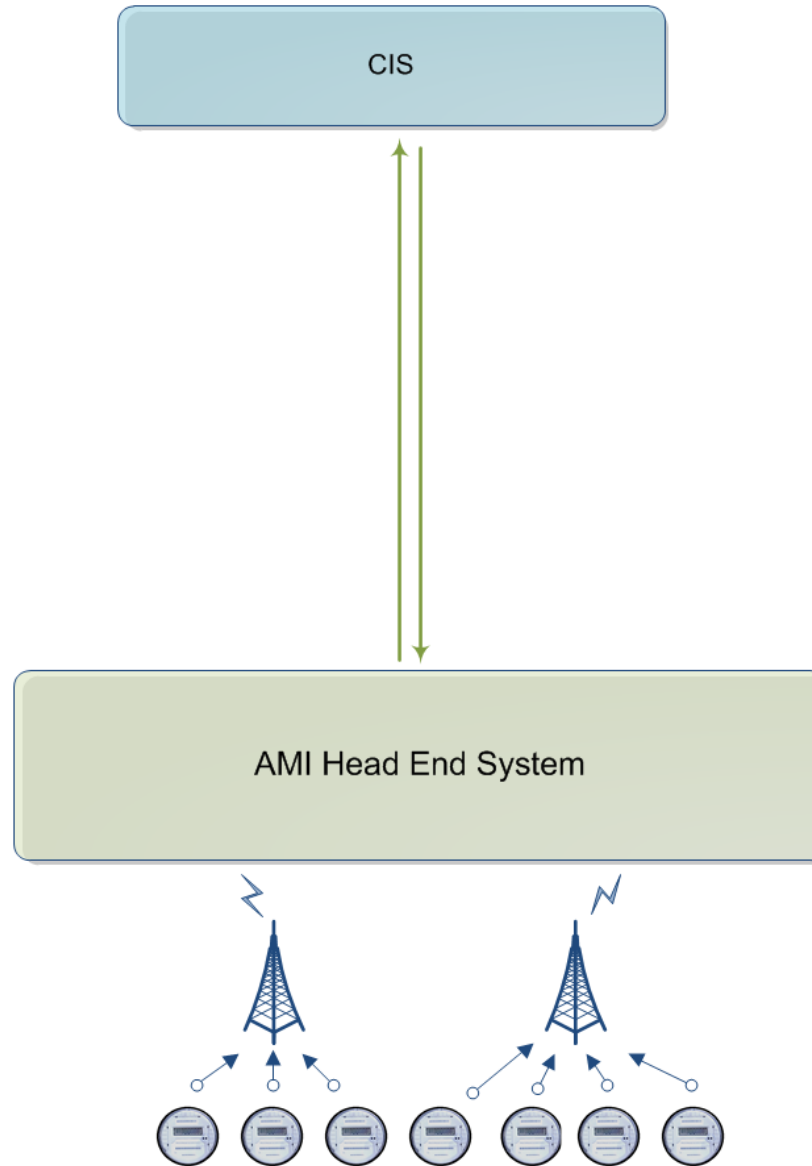
- RF network spanning 437 square miles of service territory
- Managed Service provided by Landis + Gyr
- Over 490,000 Electric Meters in the AE Service Territory ...and growing ...
 - ~65k C&I meters
 - ~425k Residential Meters
 - 215k 'Simple' Two-Way Meters
 - 210k Two-Way Meters with IDR, Service Disconnect capability
- AMI at AE is the meter, the network, the systems that facilitate access



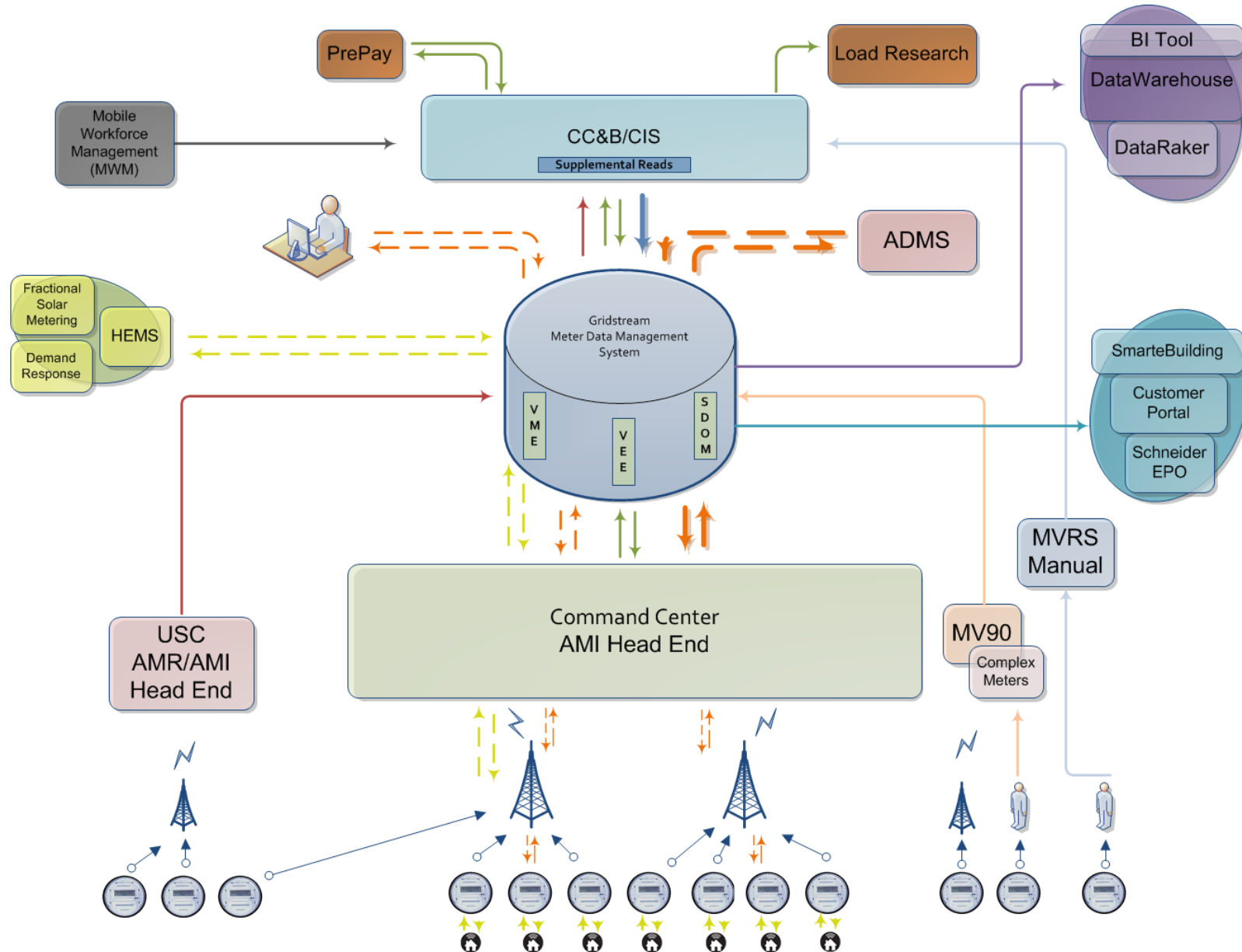
History of AMI at Austin Energy



AMI in 2013



AMI in 2018



AMI Data Flood

2013



Daily Reads = 1/day
Alarms/Events/Flags = 4

2018



Daily Reads = 1/day
Interval Reads = 96/Day
Alarms/Events/Flags = 137/600

Commercial & Residential Meter Upgrades

Commercial Meter Replacement Project

- 48,000 GE and Elster meters to be exchanged
- Planned completion FY 2019
- 30% complete
- Installation contractor

Residential Meter Replacement Project

- 245,000 residential meters to be exchanged
- Planned completion FY 2022
- 10% complete
- Revenue Measurement and Control



Leverage/Optimize Advanced Metering Infrastructure

Head End System Upgrade

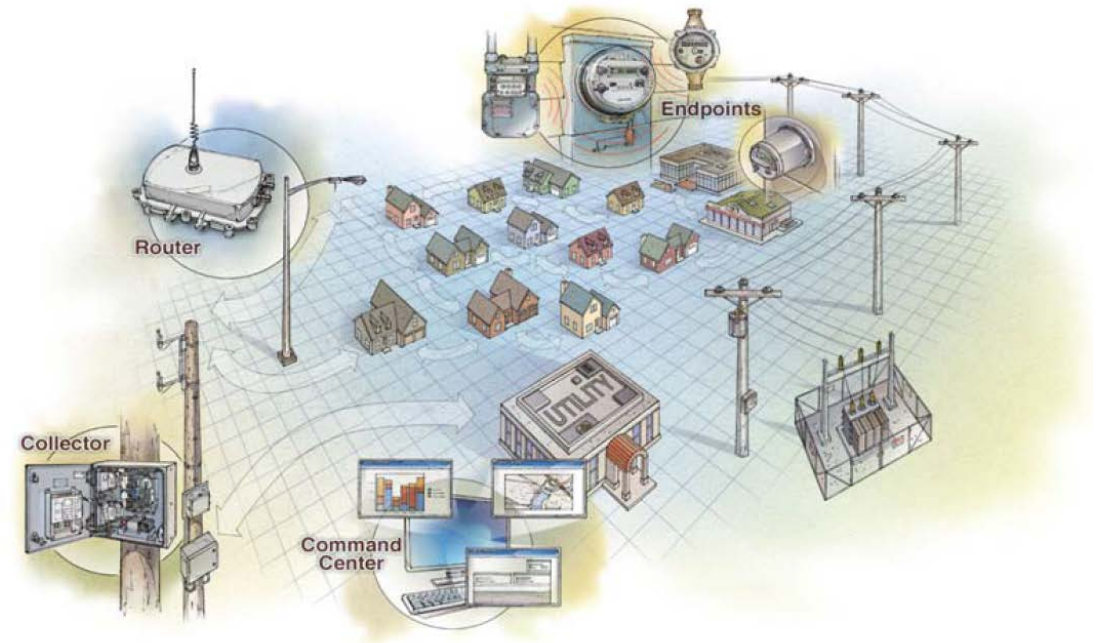
Remote Connect/Disconnect

ADMS Integrations

- Instantaneous voltage underway
- Automated outage/restoration events to MDMS>ADMS
- On Demand voltage requests from ADMS

Other Initiatives

- Thermostat and Home Energy Management System (HEMS) ZigBee integration proof of concept
- Proposed pilot of IP based metering communication protocol



Meter Data Management System Upgrade

Phase II Upgrade

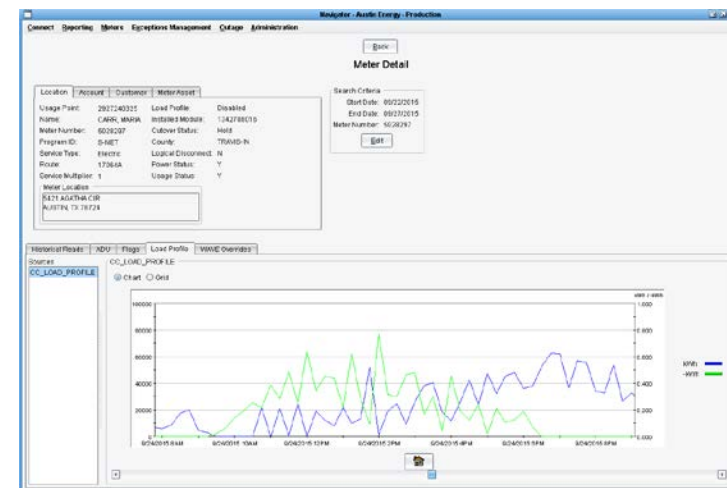
- Upgrade to Version 4.0
- Planned completion Q1 FY 2020

ADMS Integrations

- Automated outage/restoration events to ADMS
- On Demand Voltage requests from ADMS
- Monthly and Annual load profile data for all AMI reporting meters to support load flow estimates in ADMS

Totalized and Fractional Metering

- Using MDMS Virtual Metering Engine

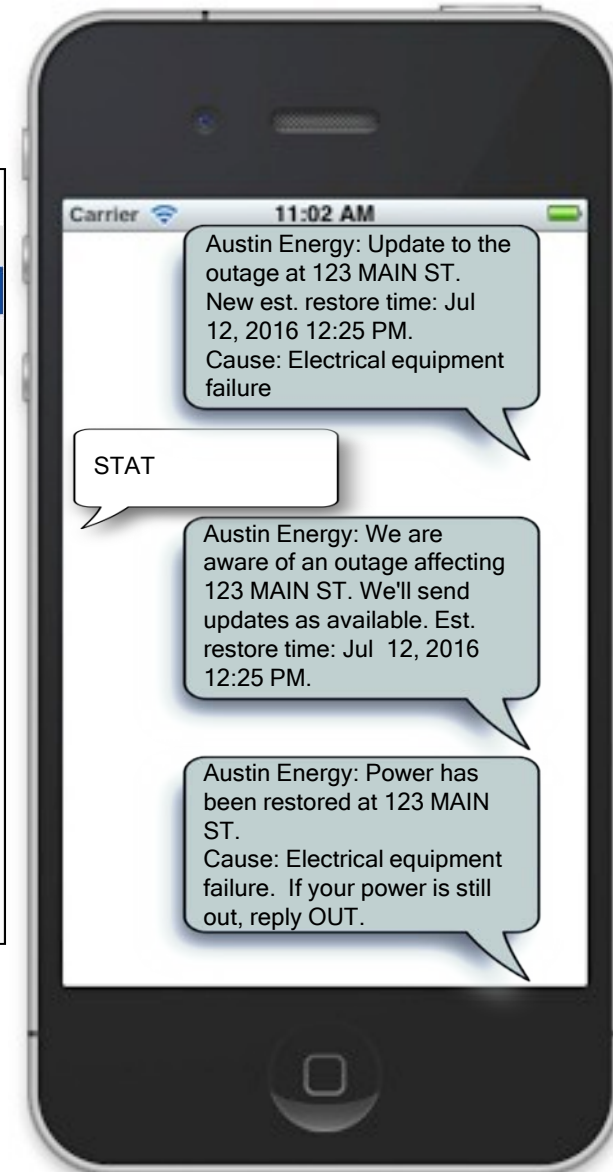
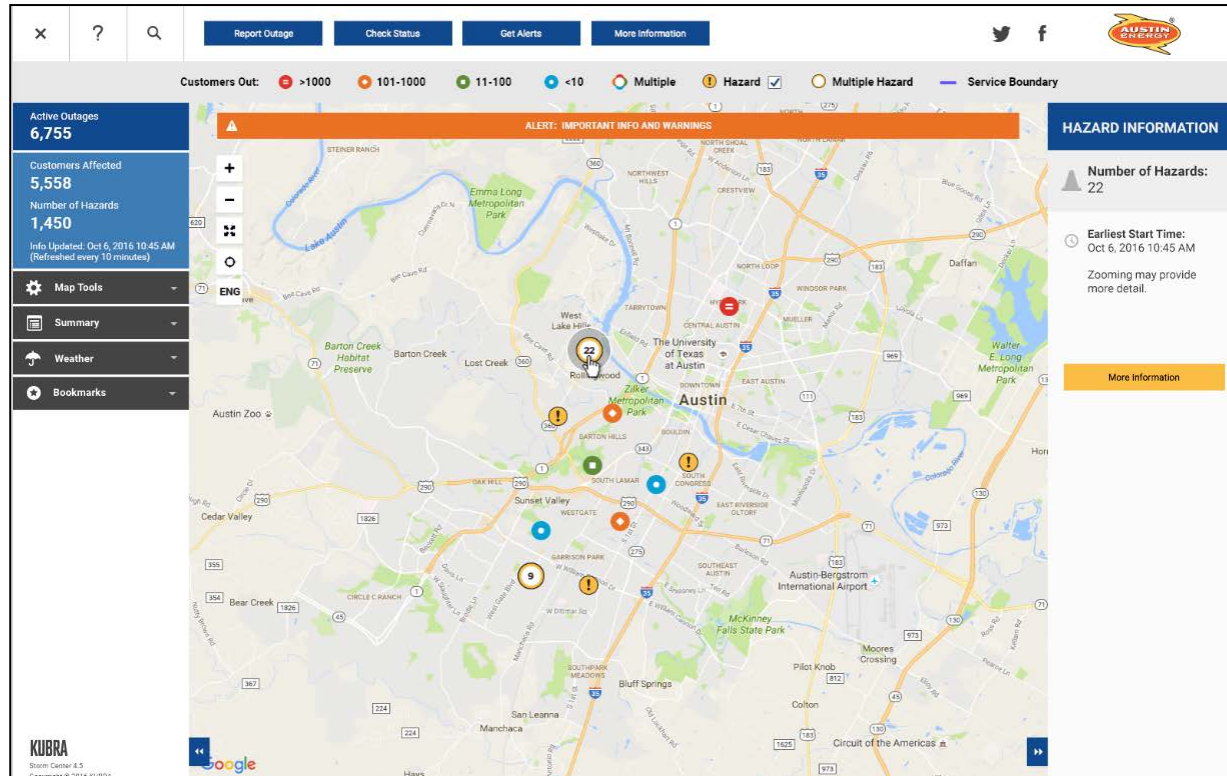


The screenshot shows the 'Meter Detail' window for a specific meter. It includes a 'Search Criteria' section with fields for Start Date, End Date, and Meter Number. Below this is a 'Historical Reads' section with tabs for 'ADU', 'Flags', 'Load Profile', and 'VAVS Overrides'. The 'ADU' tab is selected, displaying a table of historical meter reads. The table has columns for Entry Date, Meter ID, Module ID, Source, Read Time, Read Status, VAVS Status, Demand, Time of Use, kWh Read, Daily kWh Usage, Read Status, Daily Peak Dmd, and Daily Peak Dmd T.

Entry Date	Meter ID	Module ID	Source	Read Time	Read Status	VAVS Status	Demand	Time of Use	kWh Read	Daily kWh Usage	Read Status	Daily Peak Dmd	Daily Peak Dmd T
10/01/2015 00:00	5028297	1342708016	CC_METER_READS	10/01/2015 00:00					22194.149	23.02.0			
09/30/2015 00:00	5028297	1342708016	CC_METER_READS	09/30/2015 00:00					22171.129	32.441.0			
09/29/2015 00:00	5028297	1342708016	CC_METER_READS	09/29/2015 00:00					22138.688	19.248.0			
09/28/2015 00:00	5028297	1342708016	CC_METER_READS	09/28/2015 00:00					22119.44	31.325.0			
09/27/2015 00:00	5028297	1342708016	CC_METER_READS	09/27/2015 00:00					22088.115	23.595.0			
09/26/2015 00:00	5028297	1342708016	CC_METER_READS	09/26/2015 00:00					22064.72	22.912.0			
09/25/2015 00:00	5028297	1342708016	CC_METER_READS	09/25/2015 00:00					22041.808	20.812.0			
09/24/2015 00:00	5028297	1342708016	CC_METER_READS	09/24/2015 00:00					22035.956	27.904.0			
09/23/2015 00:00	5028297	1342708016	CC_METER_READS	09/23/2015 00:00					21993.092	28.73.0			
09/22/2015 00:00	5028297	1342708016	CC_METER_READS	09/22/2015 00:00					21984.362	36.688.0			
09/21/2015 00:00	5028297	1342708016	CC_METER_READS	09/21/2015 00:00					21927.874	23.58.0			
09/20/2015 00:00	5028297	1342708016	CC_METER_READS	09/20/2015 00:00					21904.094	26.349.0			



Customer Outage Communication



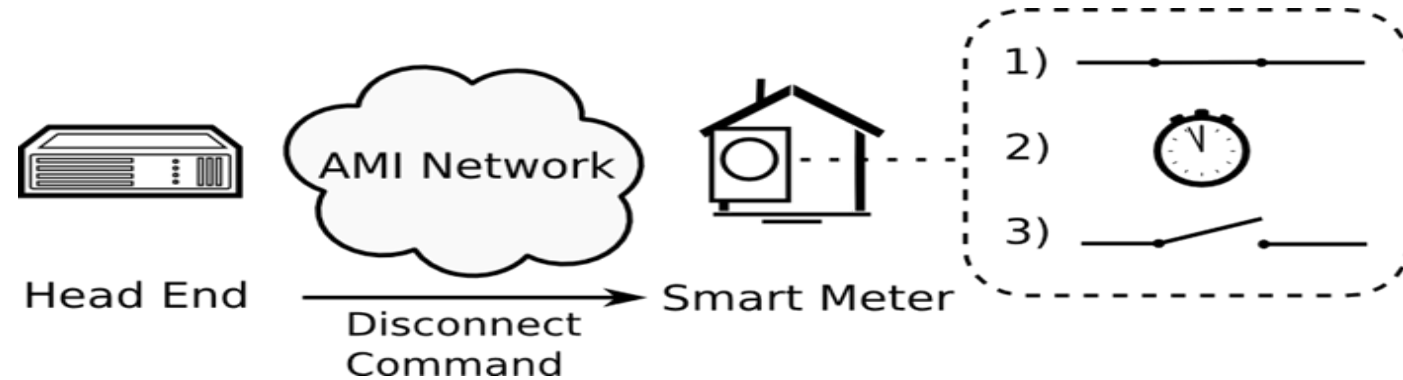
Automated Remote Service Switching

Remotely Connecting and Disconnecting Customer Service

Meter can *Open* or *Close* with a command sent OTA

Customer Requested Disconnect
or
Disconnect for non-payment

Enables Prepay program



Manual process today
Reduces
~50 Truck Rolls/Day

Automated process tomorrow
Reduces
~300-500 Truck Rolls/Day



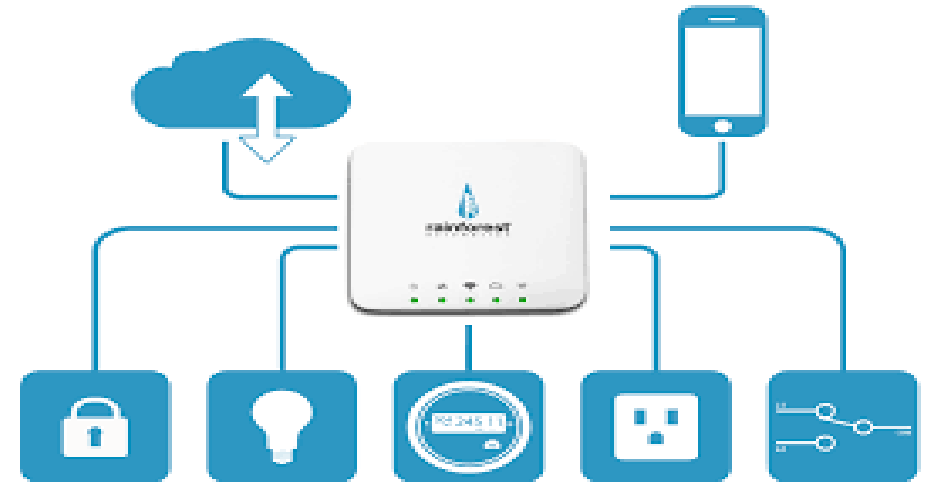
Zigbee Pairing

Pairing our AMI Meters with Home Energy Devices

Meter is provisioned to accept a connection request from a specific device

Device will “read” the register of the meter

Customers have the ability to better understand their energy consumption



Shared Solar

One Meter, Many Customers

Allows landlords to offer solar credit to tenants

PV consumption from one meter is broken out into specified fractions within MDMS

Tenants receive credit from consumptive values on 'virtual meter' in CC&B





**Customer Driven.
Community Focused.SM**



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