



What is AMS?

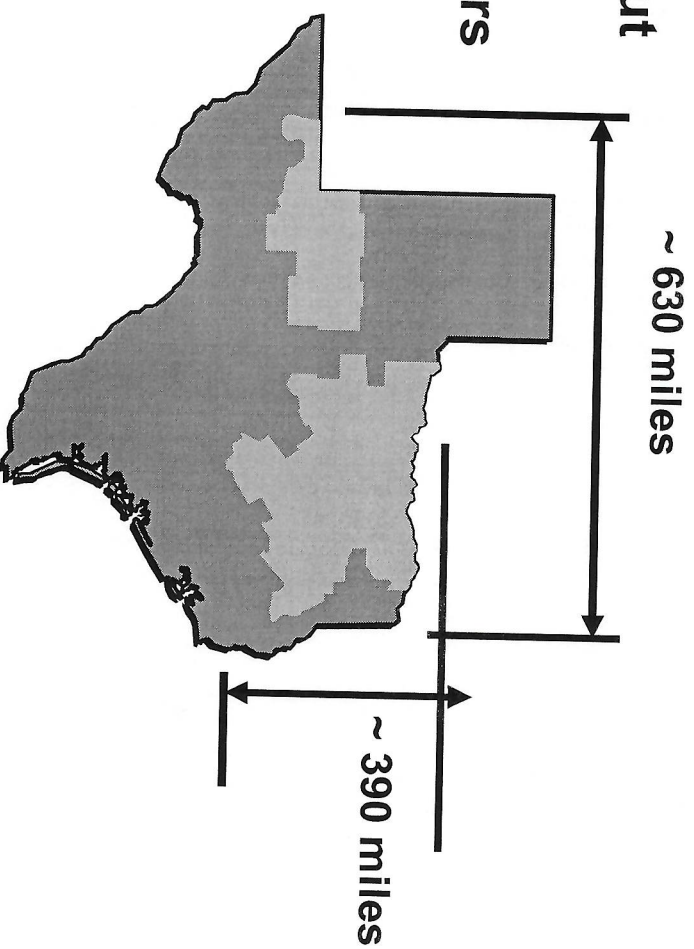
**An Overview of Oncor's Advanced
Metering System (AMS)**

Oncor Electric Delivery

AMS Deployment Profile

Advanced meters are being installed by geographic region over a four-year period:

- Up to 3.2 million meters by 2012
- 27,000 square miles of territory
- 104 REPs
- Average installation rate is about 75,000 meters per month
- More than 1.6 million AMS meters installed as of March 2011



Smart Texas Overview

Smart Texas is Oncor's initiative to transform Texas's electric transmission and distribution network into the most technologically advanced grid in the nation by 2012.

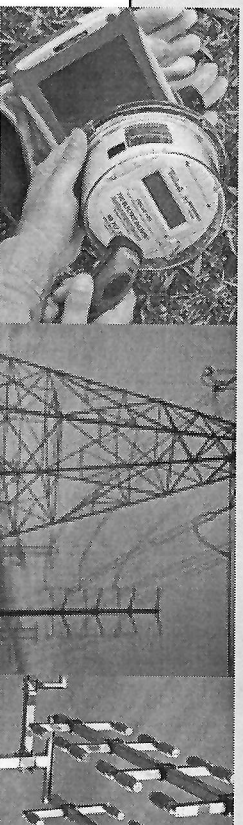
Smart Grid

- **Definition:** Transmission and distribution of electricity using a robust network of two-way communications, advanced sensors, and distributed computers
- **Purpose:** Improve the efficiency, reliability, and safety of power delivery

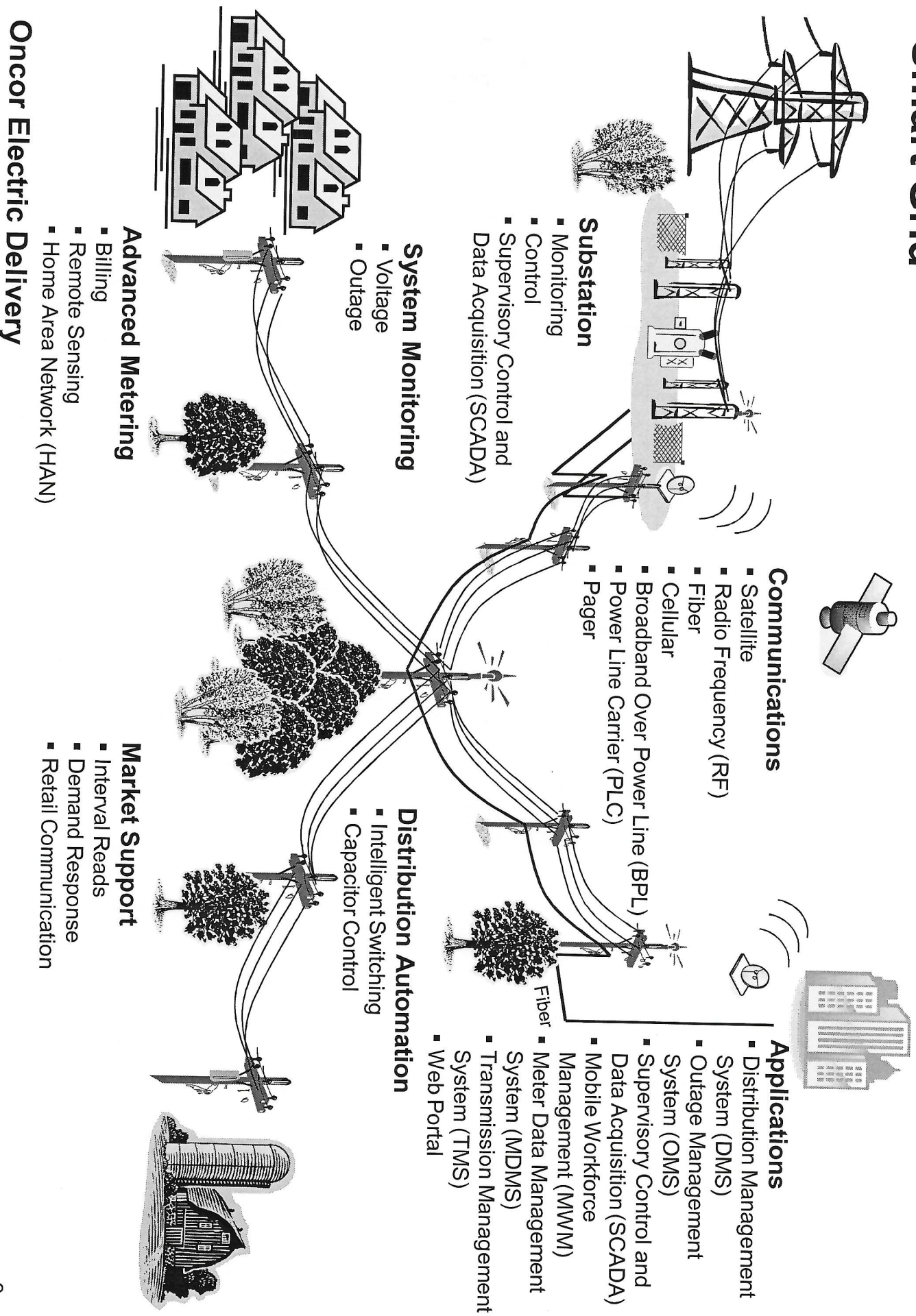
AMS

- **Definition:** Advanced meters and the associated hardware and software, communications systems, and information technology systems
- **Purpose:** Provide timely access to consumption data, enabling consumers to make informed choices about energy use and reduce their energy costs

Providing "actionable information" to the operator



Smart Grid



AMS Background

Oncor's AMS initiative has evolved as a result of PUC regulations:

“... put information and control into the hands of the consumer, with integrated technologies that enable individuals to obtain timely information on energy use, manage their own consumption patterns and reduce costs.” – PUC

2005

Oncor launches its automated meter reading initiative and begins replacing traditional meters with automated meters.

2007

The Public Utilities Commission of Texas (PUC) adopts its advanced meter ruling, including specific technical and functional requirements for meters.
Oncor's automated meters are not compliant with the PUC's new regulations and as a result, Oncor revises its *automated* meter reading initiative to become an *advanced* metering system that is PUC-compliant.

2008

The PUC approves Oncor's AMS program filing, including a surcharge to recover implementation costs.

PUC Requirements for Advanced Meters

Provide remotely activated disconnects and reconnects on all residential meters

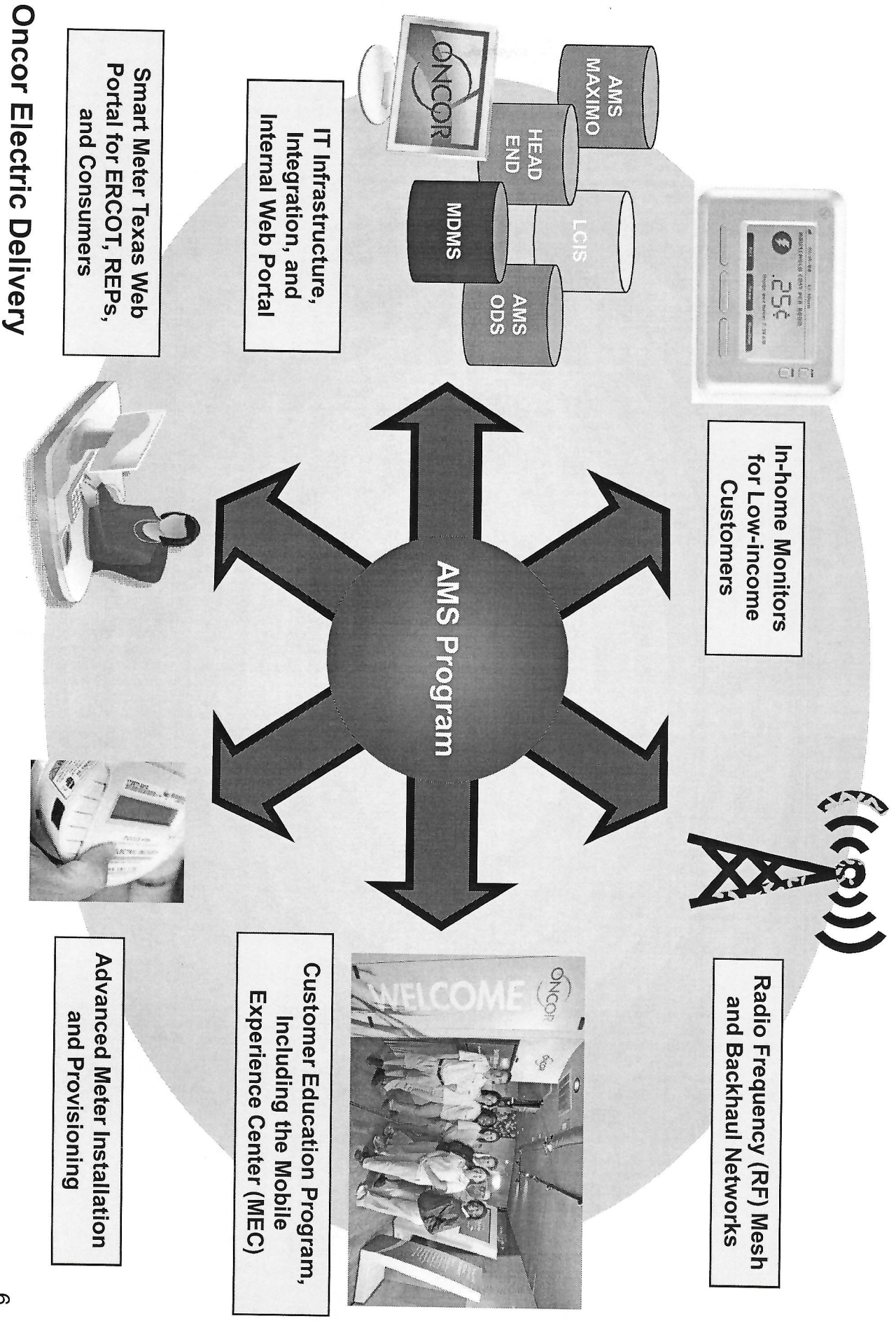
Provide 15-minute interval data, which equates to almost 3,000 reads per month per meter versus the historical one read per month

Provide consumption data to HAN and communicate with HAN devices, such as in-home energy monitors

Give REPs ability to directly interact with the consumer's meter, including getting on-demand reads and sending messages and control signals

Provide market-defined Web portal functionality

AMS Program Components



AMS Benefits

AMS:

- **Supports energy conservation strategies with increased system functionalities**
- **Provides an environment for consumers to make informed decisions about their energy consumption**
- **Improves the overall reliability and efficiency of our system**
- **Creates new opportunities for consumers and REPs**
- **Delivers an infrastructure that facilitates the partnership with REPs in providing customer choice and a high-quality service standard by which others are measured**

AMS Features and Benefits

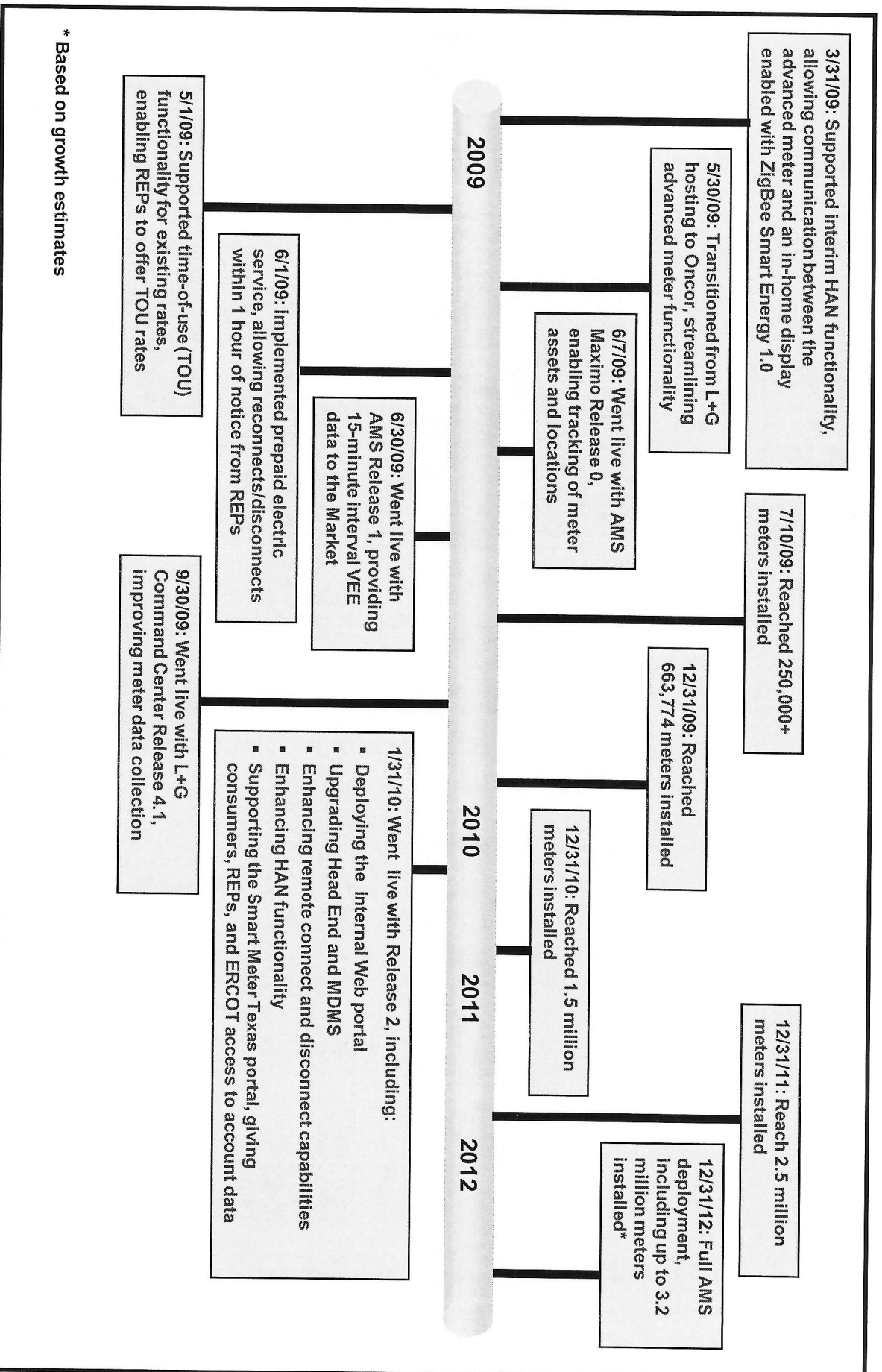
Once fully deployed, AMS offers numerous benefits to consumers, REPs, and Oncor:

Feature	Benefits
<p>Advanced meters automatically read and record meter data at 15-minute intervals.</p>	<ul style="list-style-type: none"> ▪ Offers consumers nearly 3,000 meter reads per month rather than one historic read, allowing more timely adjustments to energy use ▪ Increases REP billing options, including time-of-use rates, rates that foster demand response, and prepaid services, giving consumers new avenues for controlling their energy costs ▪ Eliminates the need to send a person to read and record meter data, reducing vehicle emissions and reducing vehicle accidents
<p>Advanced meter disconnects and reconnects can be performed remotely.</p>	<ul style="list-style-type: none"> ▪ Eliminates the need to send a person to manually perform service orders, reducing employee safety issues and reducing vehicle emissions ▪ Provides the ability to initiate selective load reduction without impacting sensitive or critical loads, improving response to emergency curtailment operations ▪ Enables prepaid retail pricing, allowing consumers and REPs to have pricing plans that meet their needs

AMS Features and Benefits (cont)

Feature	Benefits
Advanced meters provide power loss signals.	<ul style="list-style-type: none"> ▪ Provides the ability to detect outages faster and pinpoint quickly where on the system the outage has occurred, enabling faster outage restoration
Advanced meters can be read on-demand.	<ul style="list-style-type: none"> ▪ Provides the ability to read meters on an as-needed basis, improving efficiencies with move-ins, move-outs, and other requests that require a meter reading ▪ Eliminates the need to send a person to read and record meter data, enabling real-time diagnostic capabilities and reducing vehicle emissions
Advanced meters automatically send meter data to the consumer's HAN.	<ul style="list-style-type: none"> ▪ Enhances visibility of energy consumption to consumers via in-home monitors, allowing more choices about energy use ▪ Provides demand response and load control signals, allowing consumers to take advantage of off-peak and time-of-use rates ▪ Communicates with smart appliances, offering consumers control of selected appliances using ZigBee Smart Energy (SE) 1.0
Smart Meter Texas Portal will be available for consumers, REPs, and ERCOT.	<ul style="list-style-type: none"> ▪ Streamlines Oncor's operational efficiencies by providing a self-service portal ▪ Gives consumers, REPs, and authorized third parties access to consumption data, offering self-service account maintenance

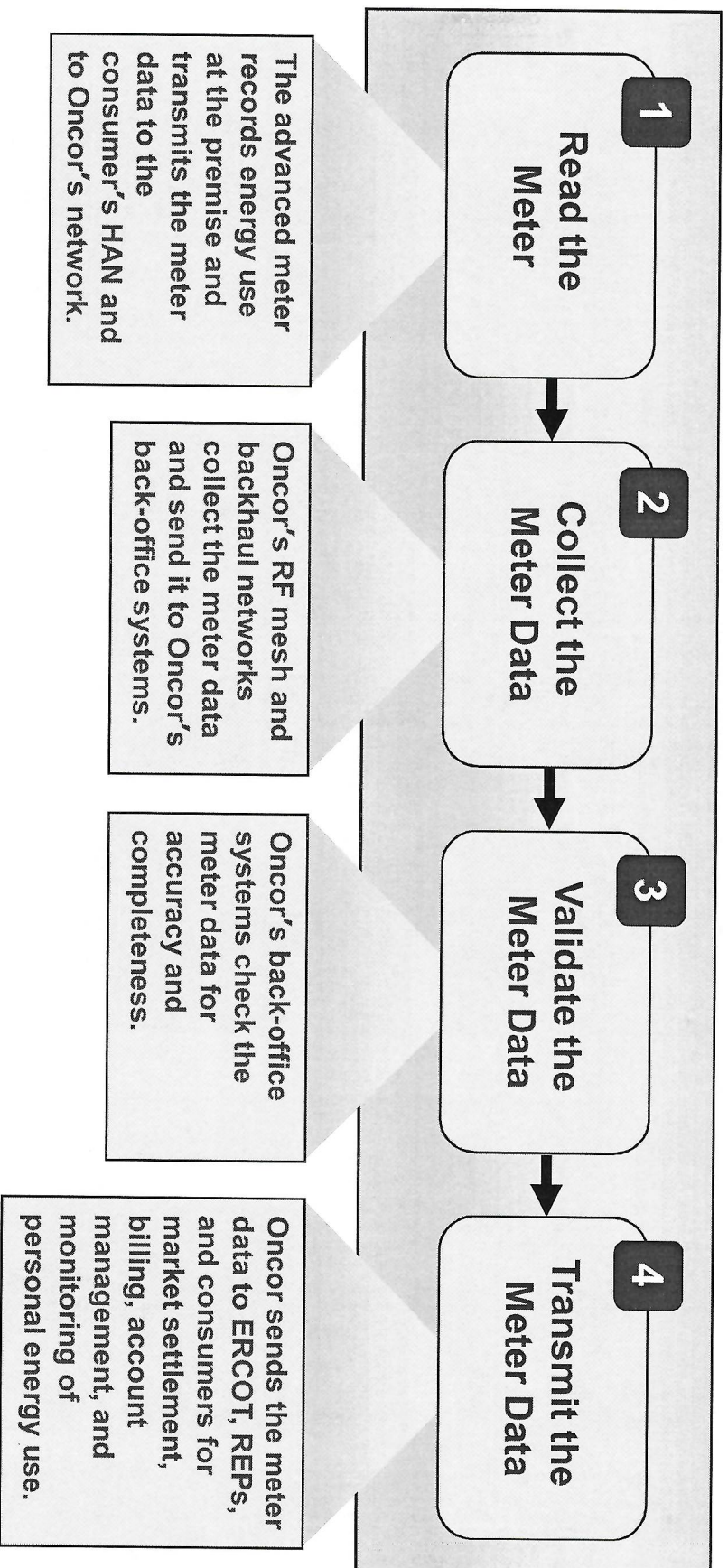
Key AMS Milestones



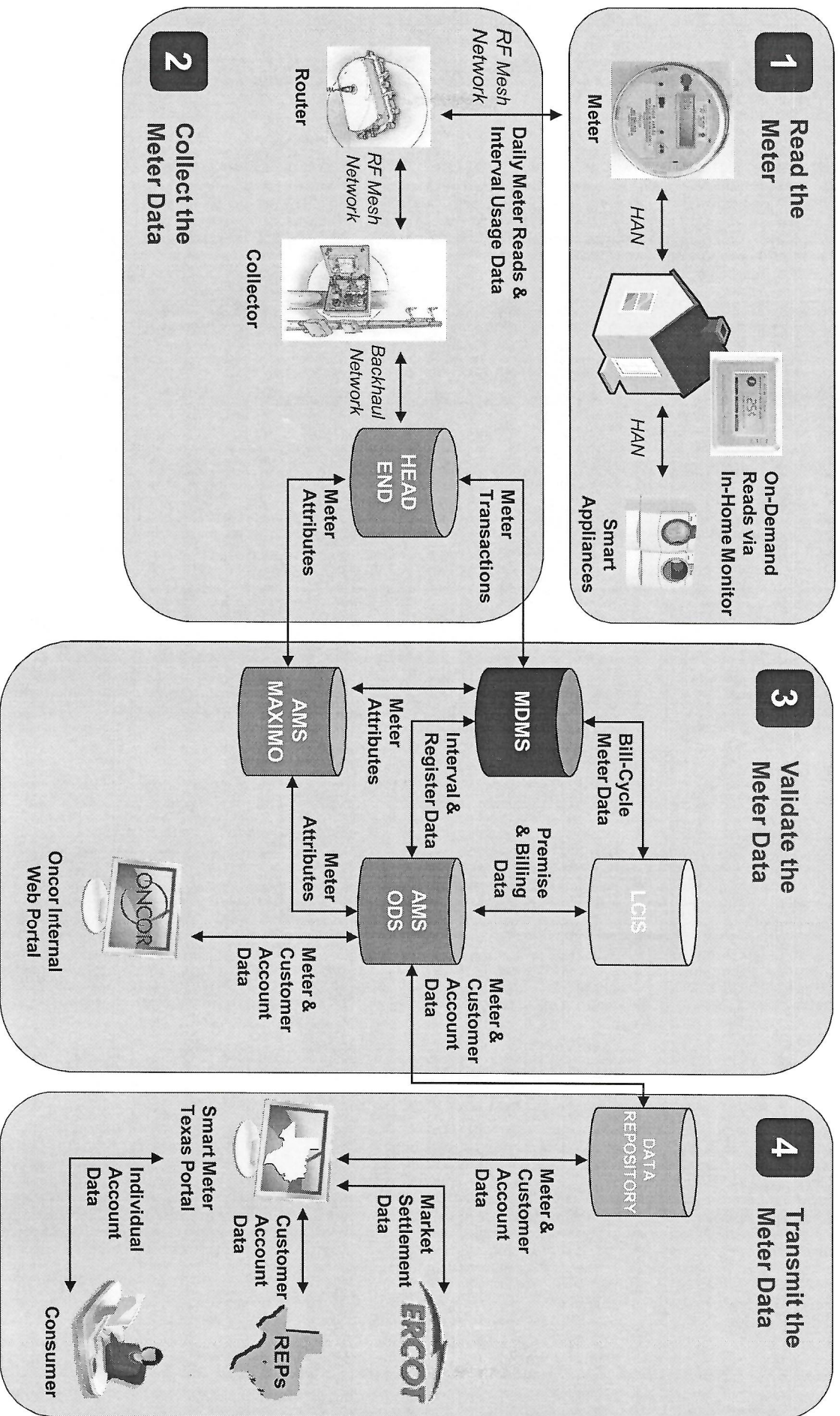
* Based on growth estimates

AMS Process

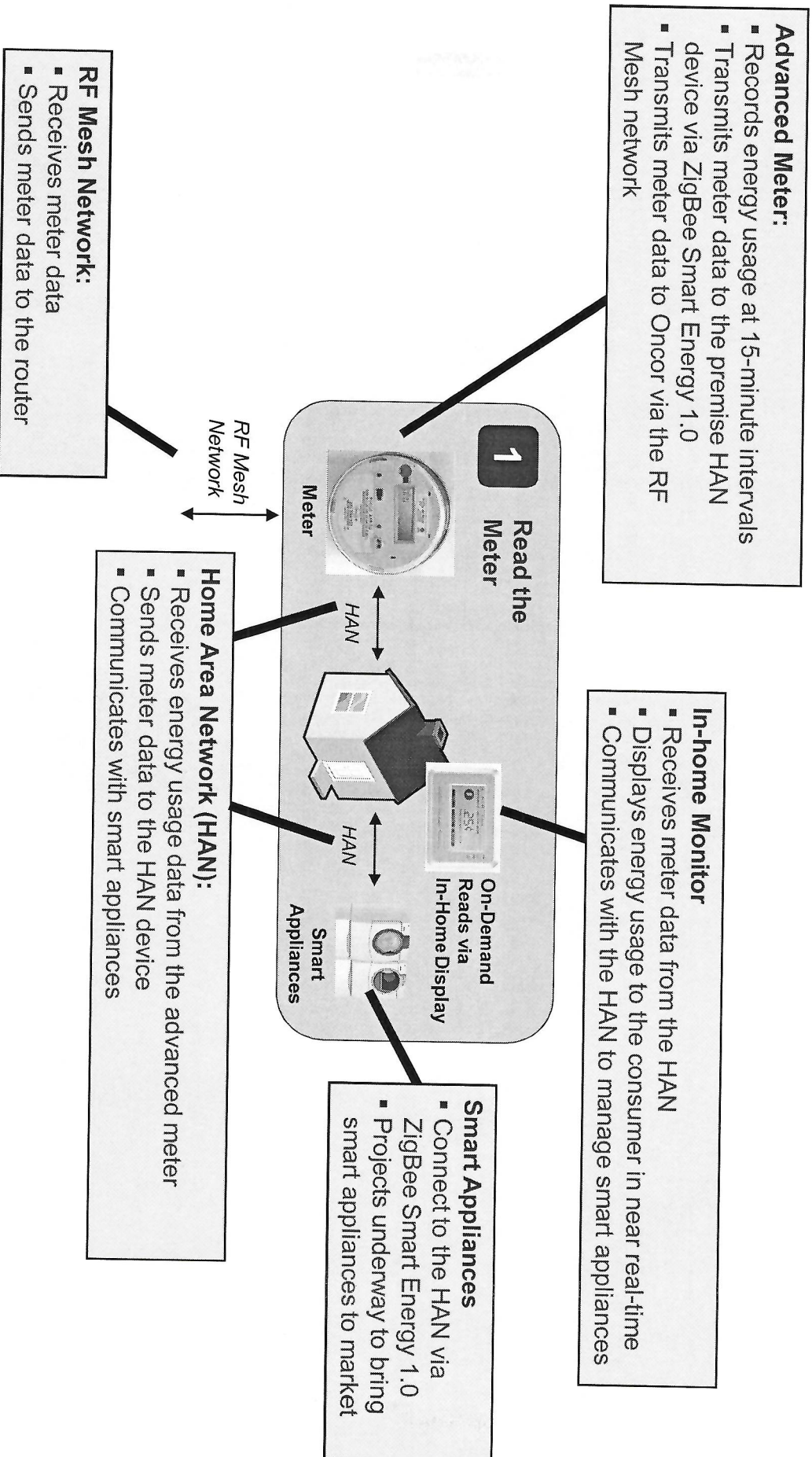
A cohesive, four-step business process frames the complex AMS infrastructure of advanced meters, hardware, software, communications systems, and meter information networks.



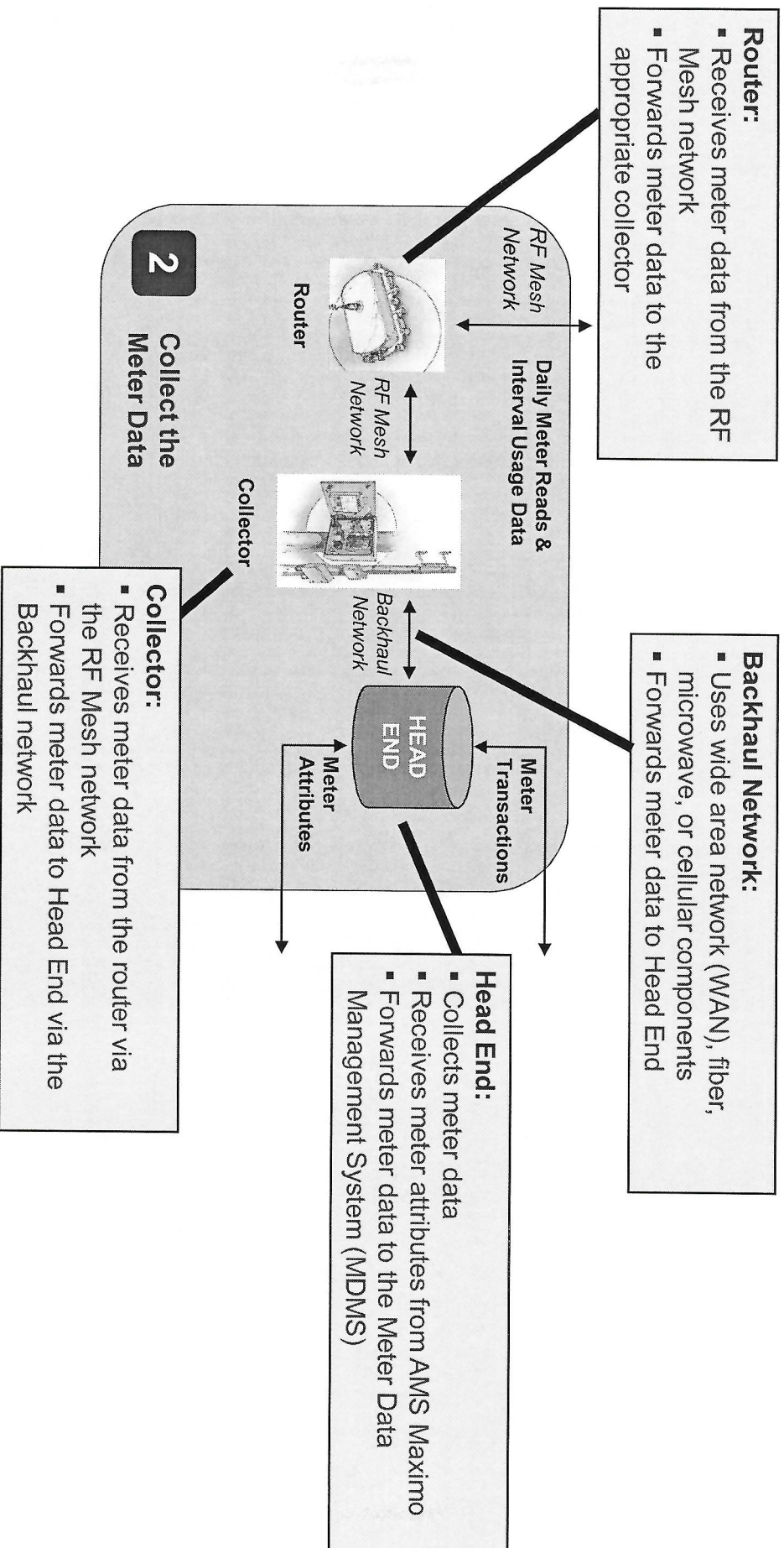
Meter Data Flow



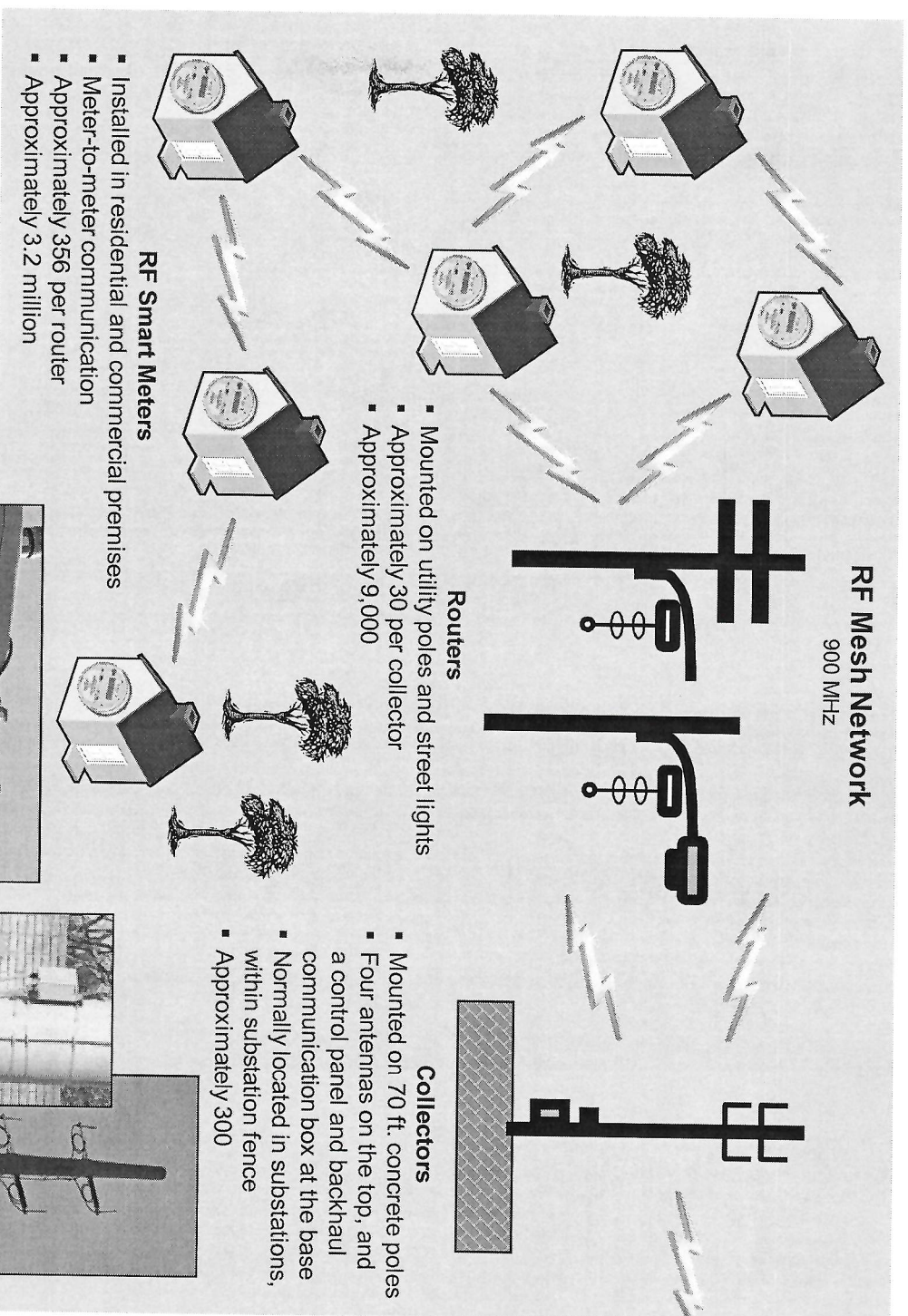
Meter Data Flow – Read the Meter



Meter Data Flow – Collect the Meter Data



RF Mesh and Backhaul Two-Way Communication Networks



RF Mesh Network
900 MHz

Routers

- Mounted on utility poles and street lights
- Approximately 30 per collector
- Approximately 9,000

RF Smart Meters

- Installed in residential and commercial premises
- Meter-to-meter communication
- Approximately 356 per router
- Approximately 3.2 million

Collectors

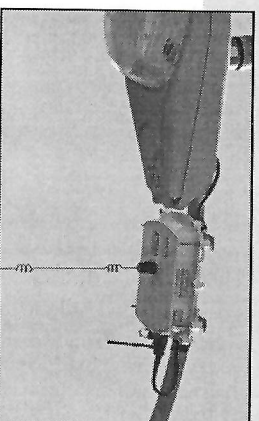
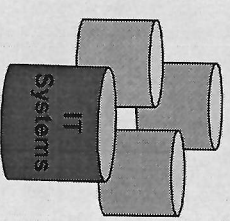
- Mounted on 70 ft. concrete poles
- Four antennas on the top, and a control panel and backhaul communication box at the base
- Normally located in substations, within substation fence
- Approximately 300

Backhaul Network

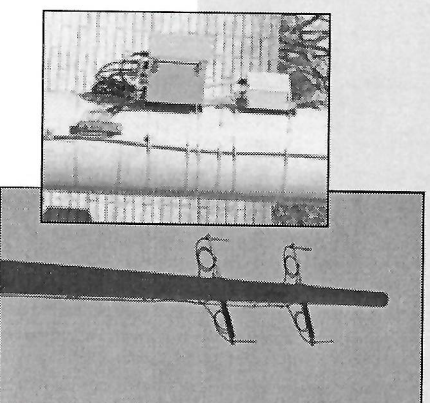
Satellite, microwave, cellular, fiber, and wide area network

Back Office

ONCOR



Router



Collector

Meter Data Flow – Validate the Meter Data

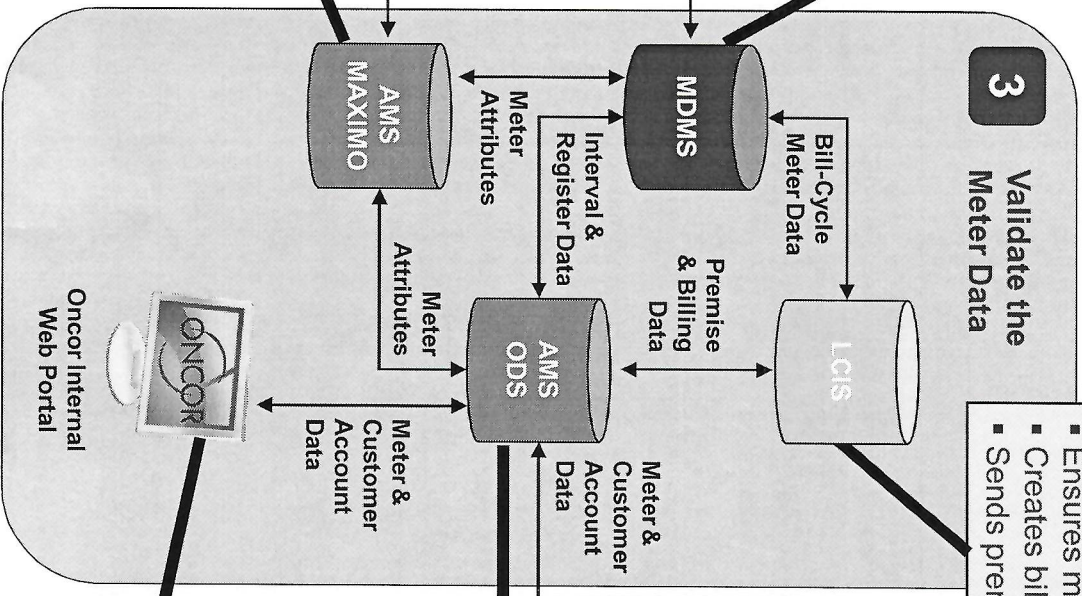
- Meter Data Management System (MDMS):**
- Receives the meter data from Head End
 - Receives meter attributes from AMS Maximo
 - Validates the accuracy and completeness of the meter reads through the process of validation, estimating, and editing (VEE)
 - Provides estimates for any missing interval data
 - Creates billing-quality data
 - Sends bill-cycle meter data to LCIS
 - Sends interval and register data to the AMS ODS database

3 Validate the Meter Data

- Legacy Customer Information System (LCIS):**
- Receives bill-cycle meter data from MDMS
 - Receives meter attributes from AMS Maximo
 - Ensures meter data complies with business rules
 - Creates billing files
 - Sends premise and billing data to AMS ODS

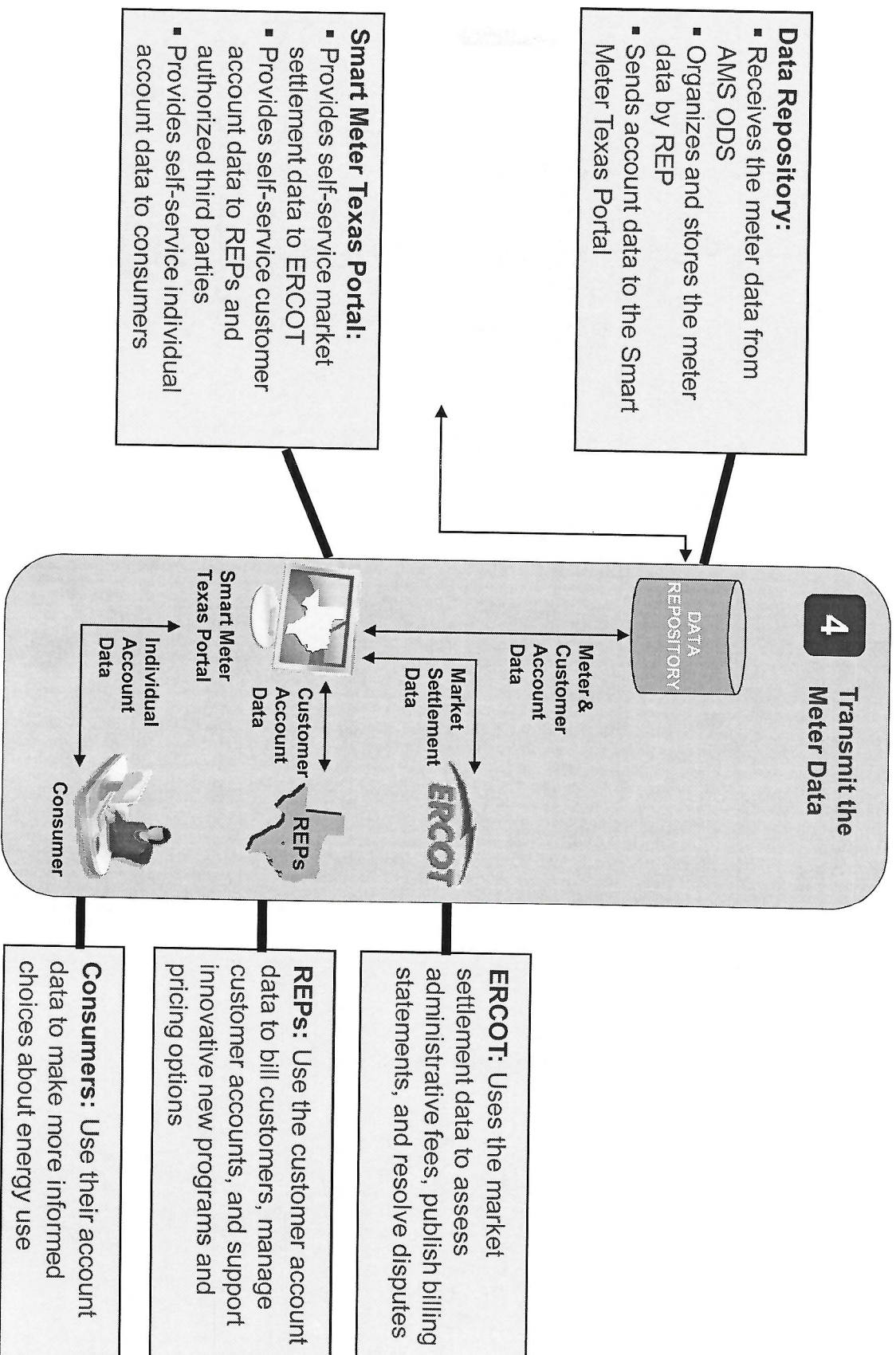
- AMS Operational Data Stores (ODS):**
- Receives interval and register data from MDMS
 - Receives premise and billing data from LCIS
 - Integrates interval data and billing data to make analysis and reporting easier
 - Sends meter and customer account data to the internal Web portal and the data repository

- AMS Maximo:**
- Maintains asset information and associated equipment
 - Sends meter attributes to MDMS and AMS ODS

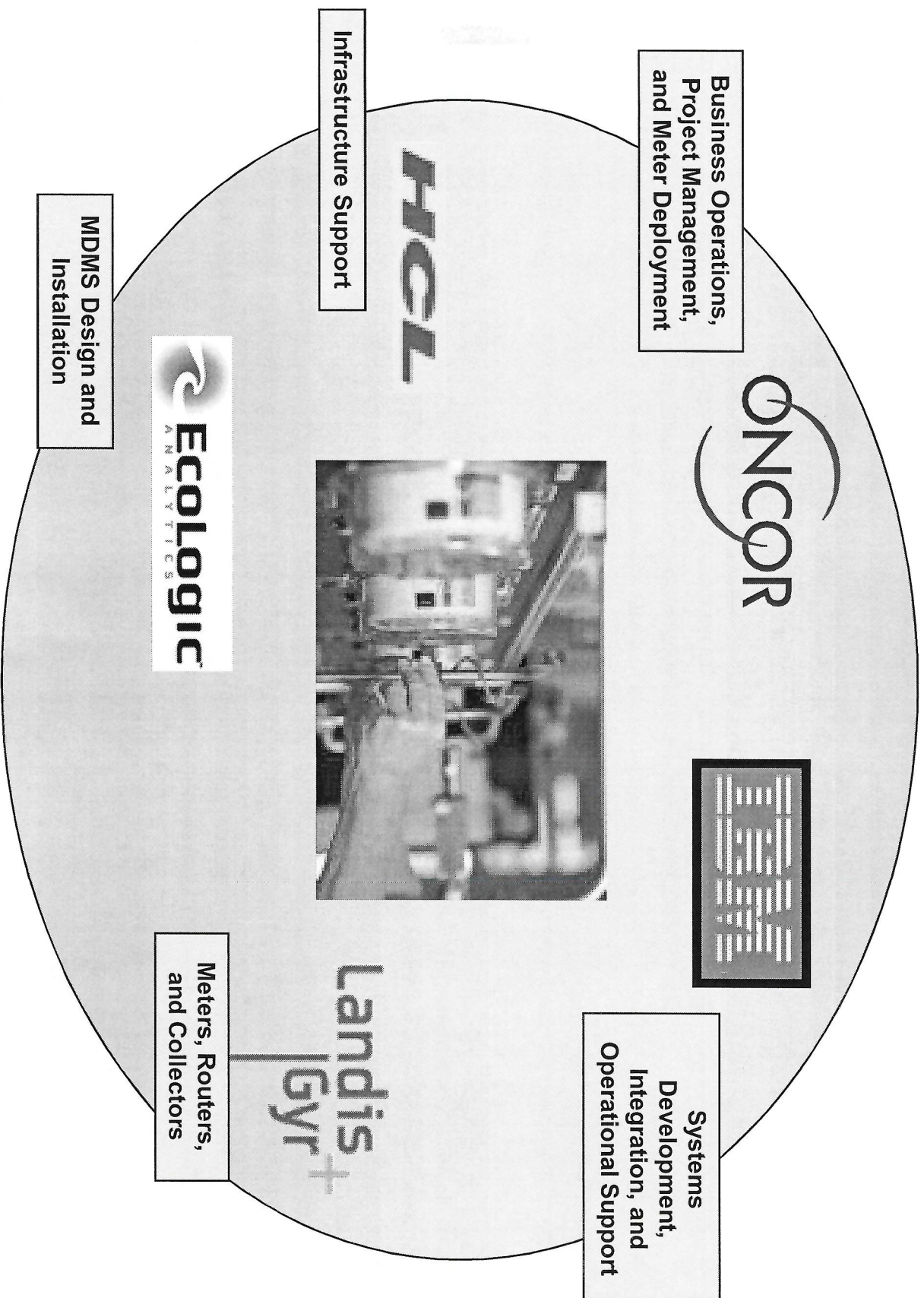


- Oncor Internal Web Portal:**
- Receives the meter data from AMS ODS
 - Provides data for internal reporting and analysis

Meter Data Flow – Transmit the Meter Data to REPPS, ERCOT, and Consumers



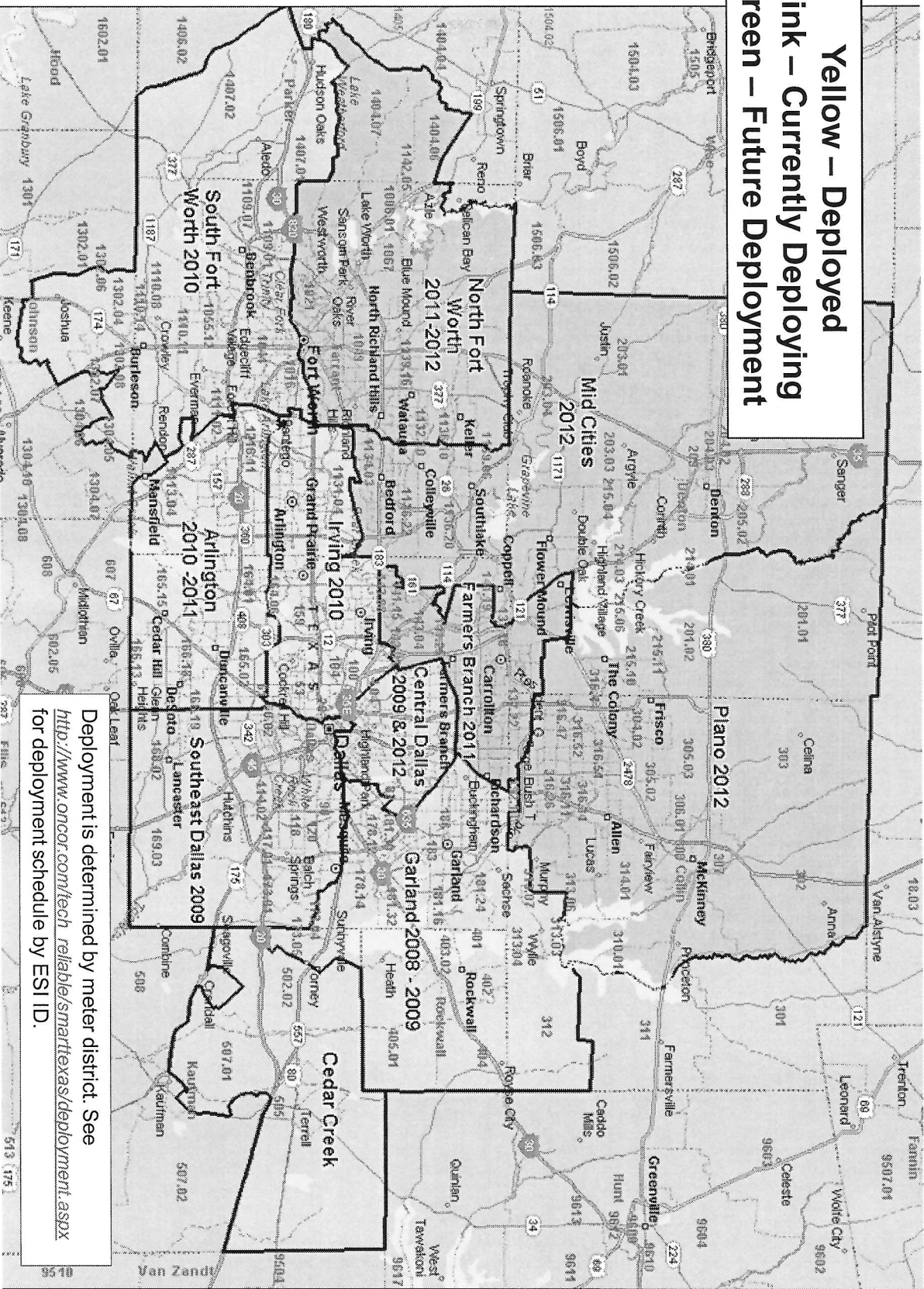
AMS Implementation Partners



Oncor Electric Delivery

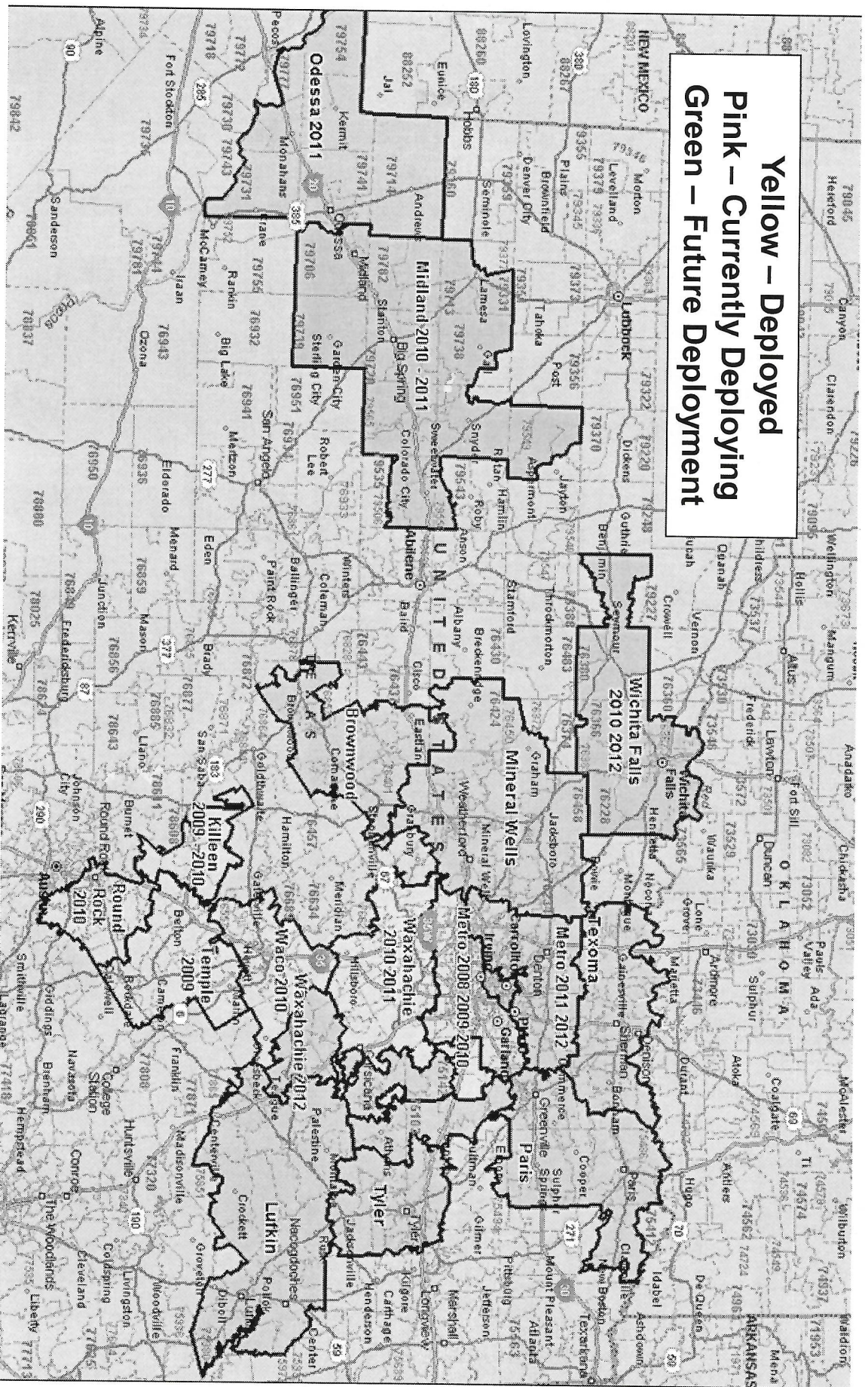
AMS Deployment – Metropolitan Area (as of April 2011)

Yellow – Deployed
Pink – Currently Deploying
Green – Future Deployment



Deployment is determined by meter district. See http://www.oncor.com/tech_reliable/smarttexas/deployment.aspx for deployment schedule by ESI ID.

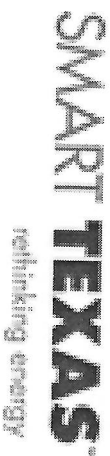
AMS Deployment – Non-Metro (as of April 2011)



For More Information



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Or email AMS Project in Outlook