

E-100, Sub 147

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OCT 19 2017

Clerk's Office
N.C. Utilities Commission

Duke Energy Carolinas AMI

October 10, 2017

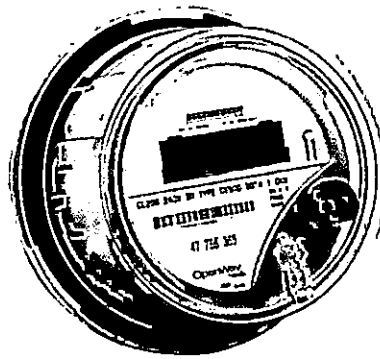


Overview

- AMR / AMI Technology
- Radio Frequency
- Current Status of DEC AMI Project
- Project Governance Process
- Pictures of Theft
- Commission Questions

Automated Meter Reading (AMR) vs. Advanced Metering Infrastructure (AMI)

Automated Meter Reading (AMR) is a metering solution that allows for one-way communication between the meter and back-office systems. Simply an automated drive-by meter reading solution to capture monthly reads. Operates in 900 MHz range – point-to-point.



Advanced Metering Infrastructure (AMI) is a metering solution that allows for two-way communication between the meter and back-office systems, with capabilities of collecting usage data in smaller intervals, capturing system data (voltage, VARs, etc.), sending alerts/alarms (theft, low voltage, etc.), and built in disconnect that can be operated remotely. Operates in 900 MHz range – mesh network.

Duke Energy Carolinas AMR Technology



Meters

AMR meters capture energy usage and send register reads to a data collector located in a vehicle that drives meter reading routes monthly. Meters utilize a 900 MHz RF signal.



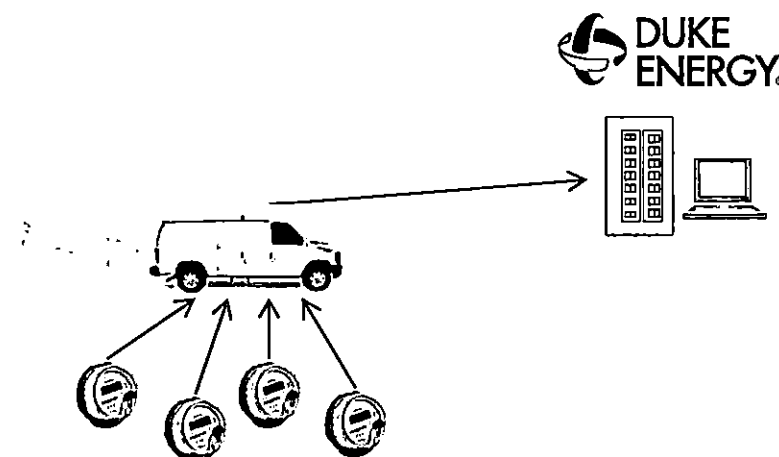
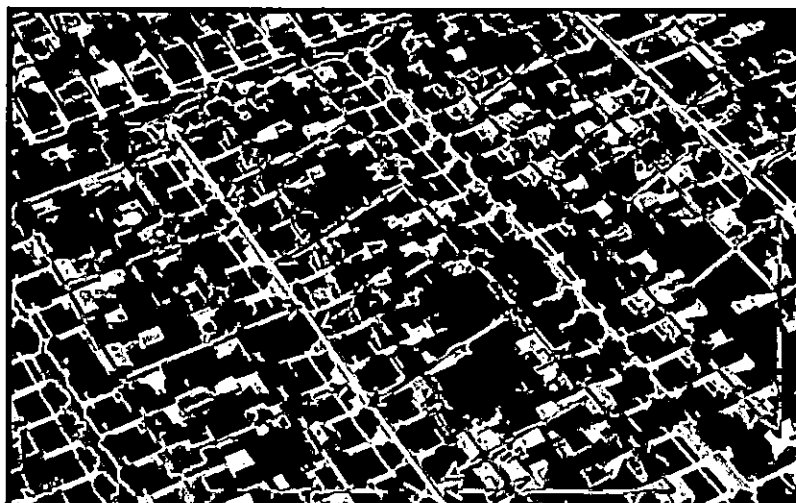
Mobile Collection System

Collection system is located in a vehicle that drives meter routes to collect register reads from AMI meters. System utilizes a 900 MHz RF signal.



Vehicle

Drives throughout streets on meter reading routes using the Mobile Collection System to collect register reads from AMR meters.



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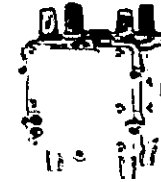
Meters

Mesh meters capture energy usage and send it to other meters to form a mesh network utilizing a 900 MHz RF signal. In remote areas, the meter has built-in cellular to communicate.



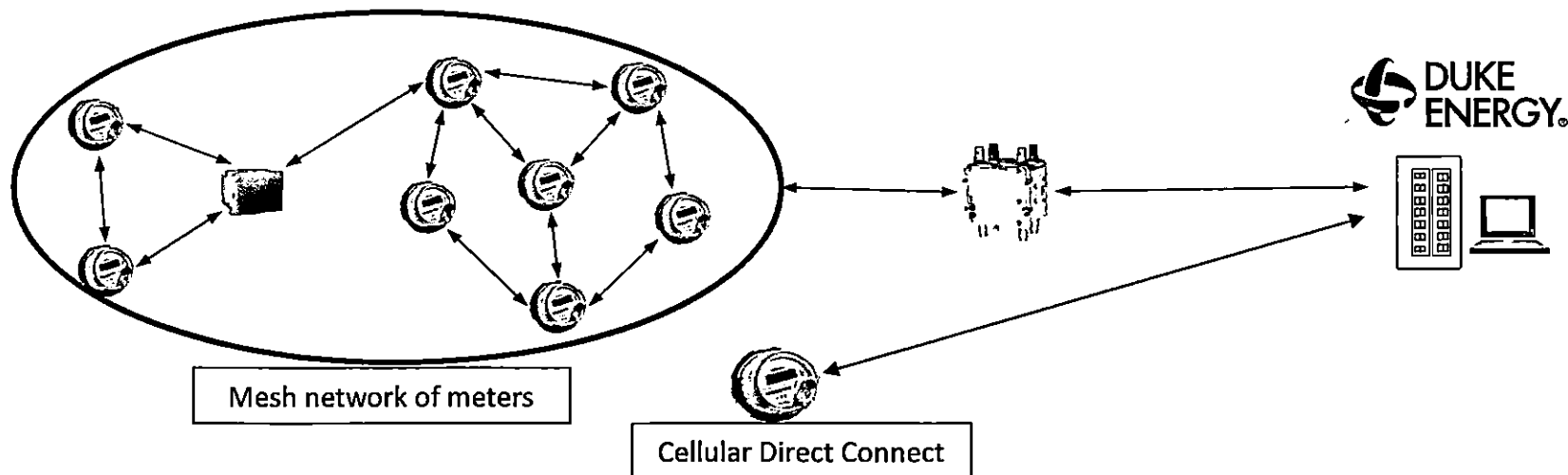
Range Extender / Relay

Extends the 900 MHz RF signal to allow meters to communicate that would have normally been outside the RF mesh network.



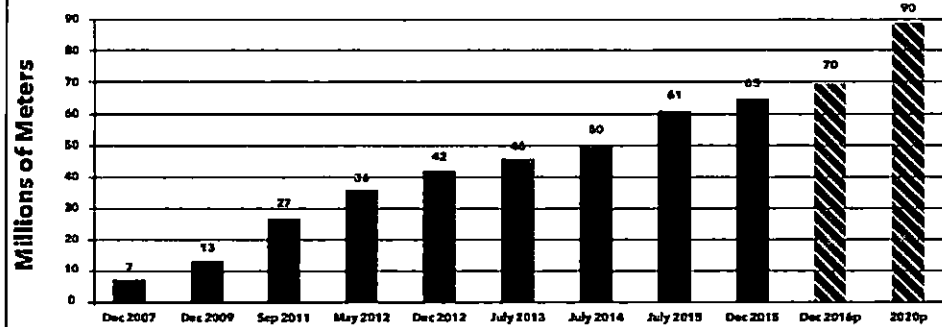
Grid Router / Access Point

Receives meter readings from the mesh and transmits to back office systems via a cellular backhaul.



Smart Meters are Becoming the Standard in the United States

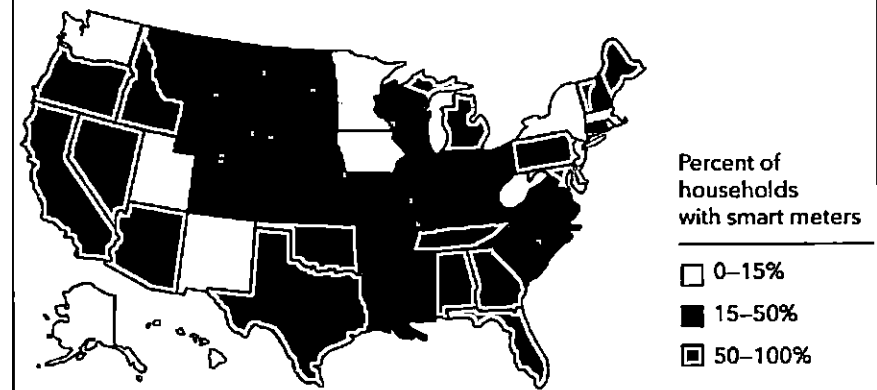
Figure 1: Smart Meter Installations in the U.S. Approach 70 Million; Projected to Reach 90 Million by 2020



- Electric companies had installed 65 million smart meters, covering more than 50 percent of U.S. households, as of year-end 2015.¹
- Deployments are projected to reach 70 million smart meters by the end of 2016 and 90 million by 2020.¹

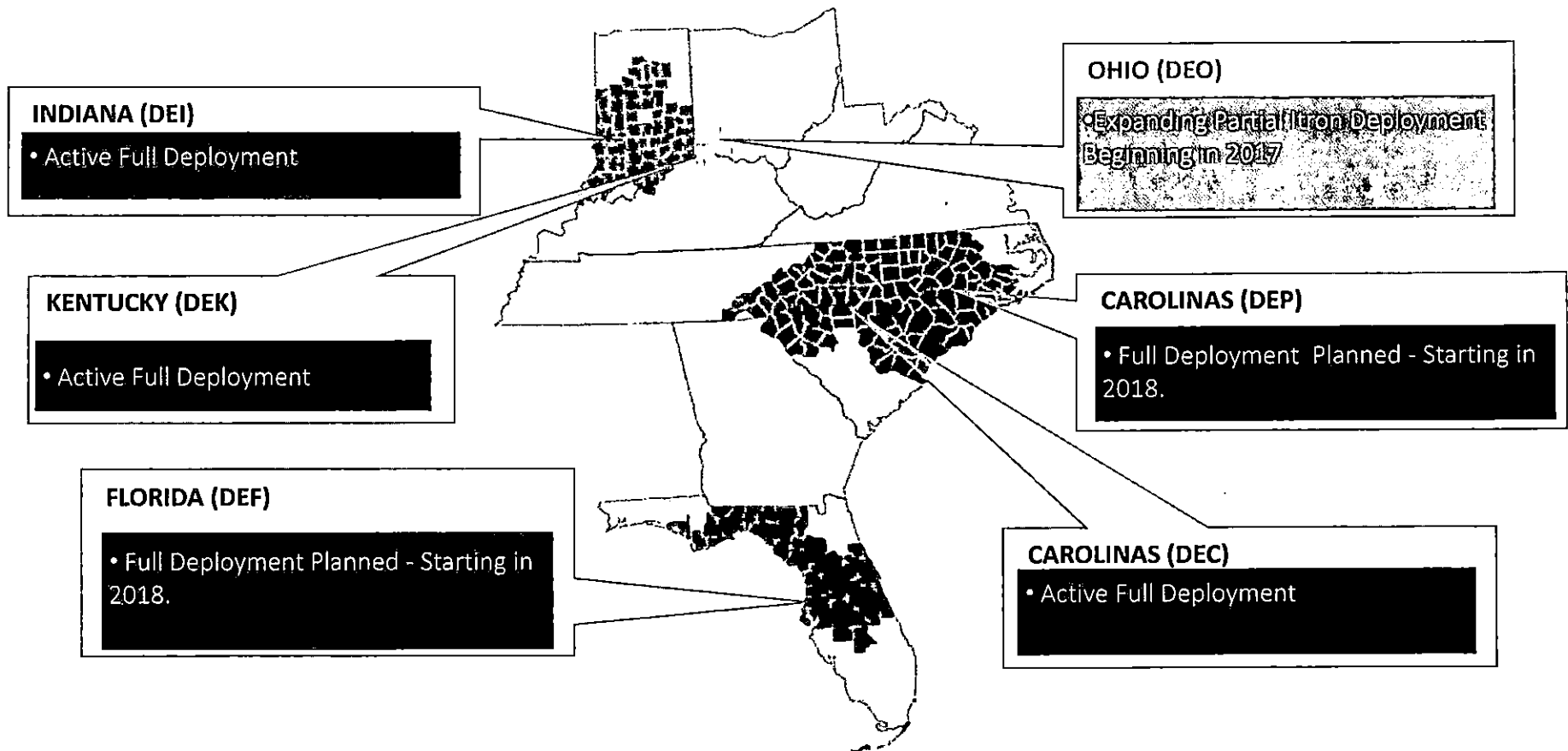
"Smart meters are the new business as usual."¹

Figure 2: Smart Meter Deployments by State 2015³

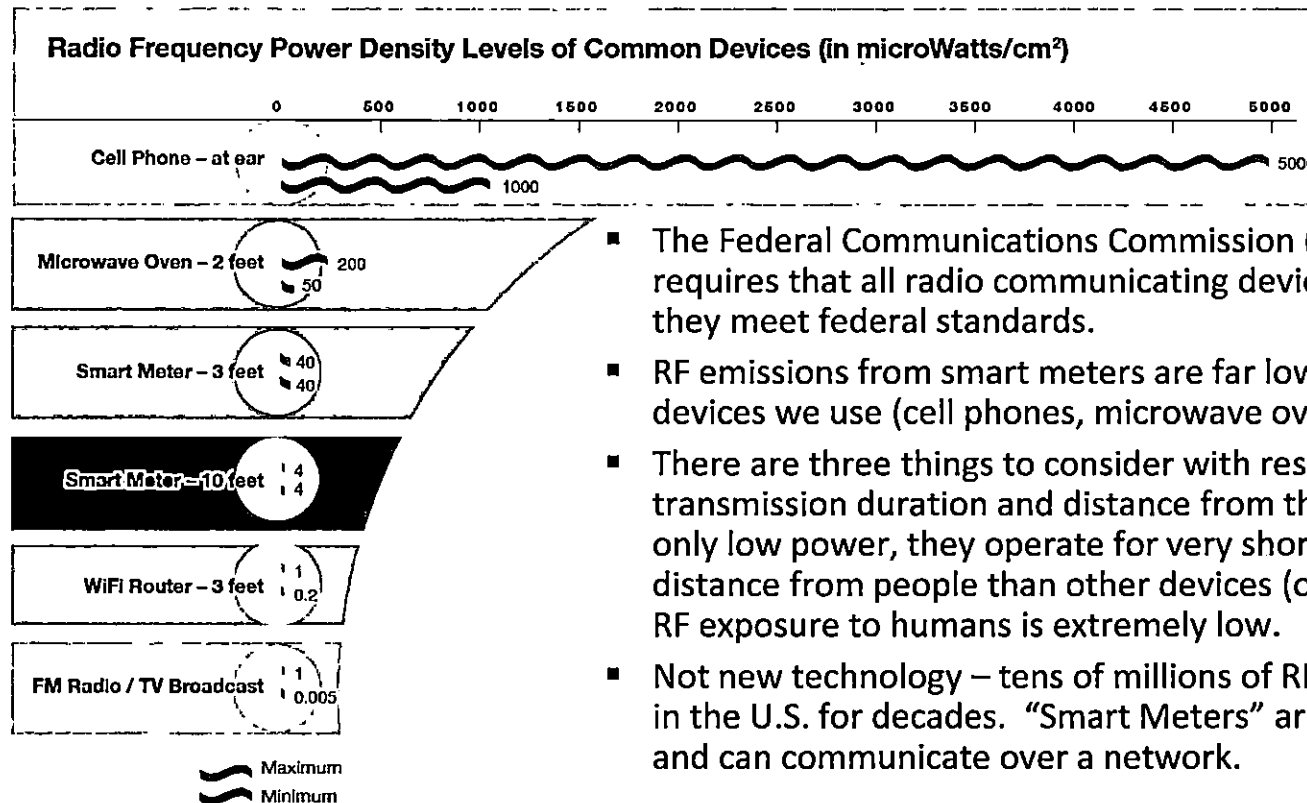


1. The Edison Foundation, Institute for Electric Innovation: October 2016: Electric Company Smart Meter Deployments: Foundation for A Smart Grid

Itron AMI Solution is the Duke Energy Enterprise Standard



Customer Concerns – Radio Frequency Exposure

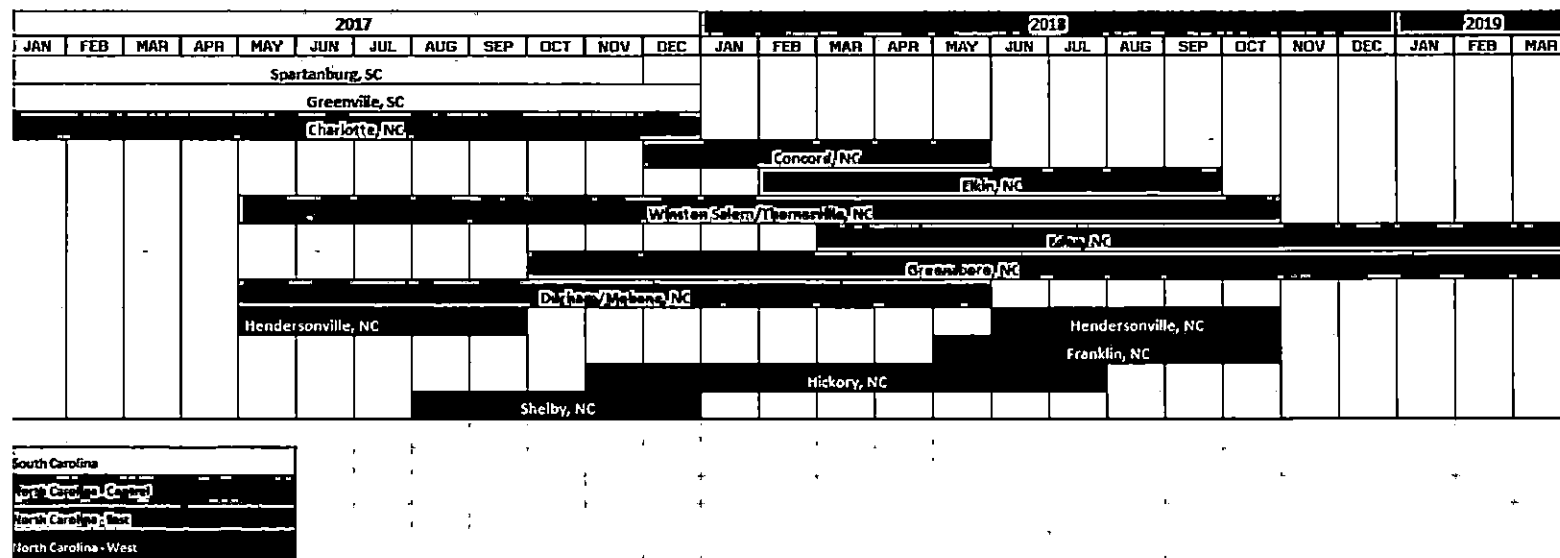


- The Federal Communications Commission (FCC) sets RF limits and requires that all radio communicating devices be tested to ensure that they meet federal standards.
- RF emissions from smart meters are far lower than other every day devices we use (cell phones, microwave ovens, etc.)
- There are three things to consider with respect to RF: signal strength, transmission duration and distance from the source. AMI meters are not only low power, they operate for very short periods and at much greater distance from people than other devices (outside of home). As a result, RF exposure to humans is extremely low.
- Not new technology – tens of millions of RF meters have been operating in the U.S. for decades. “Smart Meters” are more advanced technology and can communicate over a network.

Graphic Source: Smart Grid Consumer Collaborative: Radio Frequency and Smart Meters <http://3593f84chf852yw5d4c5emoe.wpengine.netdna-cdn.com/wp-content/uploads/2012/01/SGCC-Radio-Frequency-Fact-Sheet.pdf>

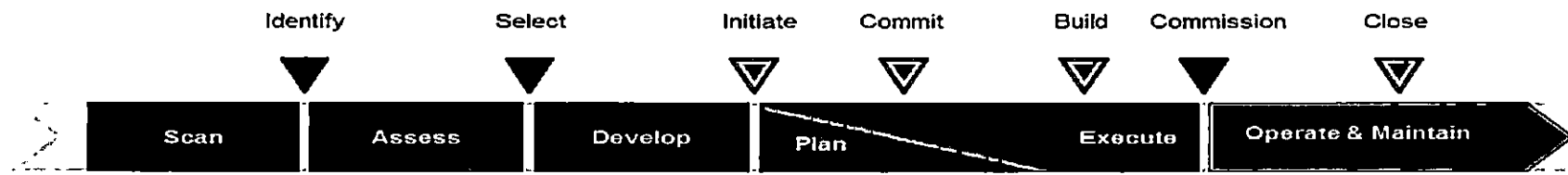
DEC AMI Project Installation Status

- Total number of AMI meters installed in DEC NC as of Sept 28 2017 = 904,654
- Estimated number of meters remaining to be installed in DEC NC = 1,065,197
- Currently deploying in Charlotte, Winston Salem, Durham, Hendersonville, Shelby, Concord
- Estimated Project Completion Date = Mid-2019



Project Governance

- The Grid Solutions Department follows guidelines set-forth by the Duke Energy Enterprise Project Management Center of Excellence (PMCoE) using project stage gate authorization points (identified below) for major projects.
- A major project is not committed to moving forward until it passes the Commit gate and funds are authorized by the appropriate level of Company leadership.



Red gates are required
Blue gates are optional unless deemed necessary by the Project Manager

Commission Questions



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