

# Smart Grid in an Urban Environment

## *Advanced Energy Conference*

November 8, 2010

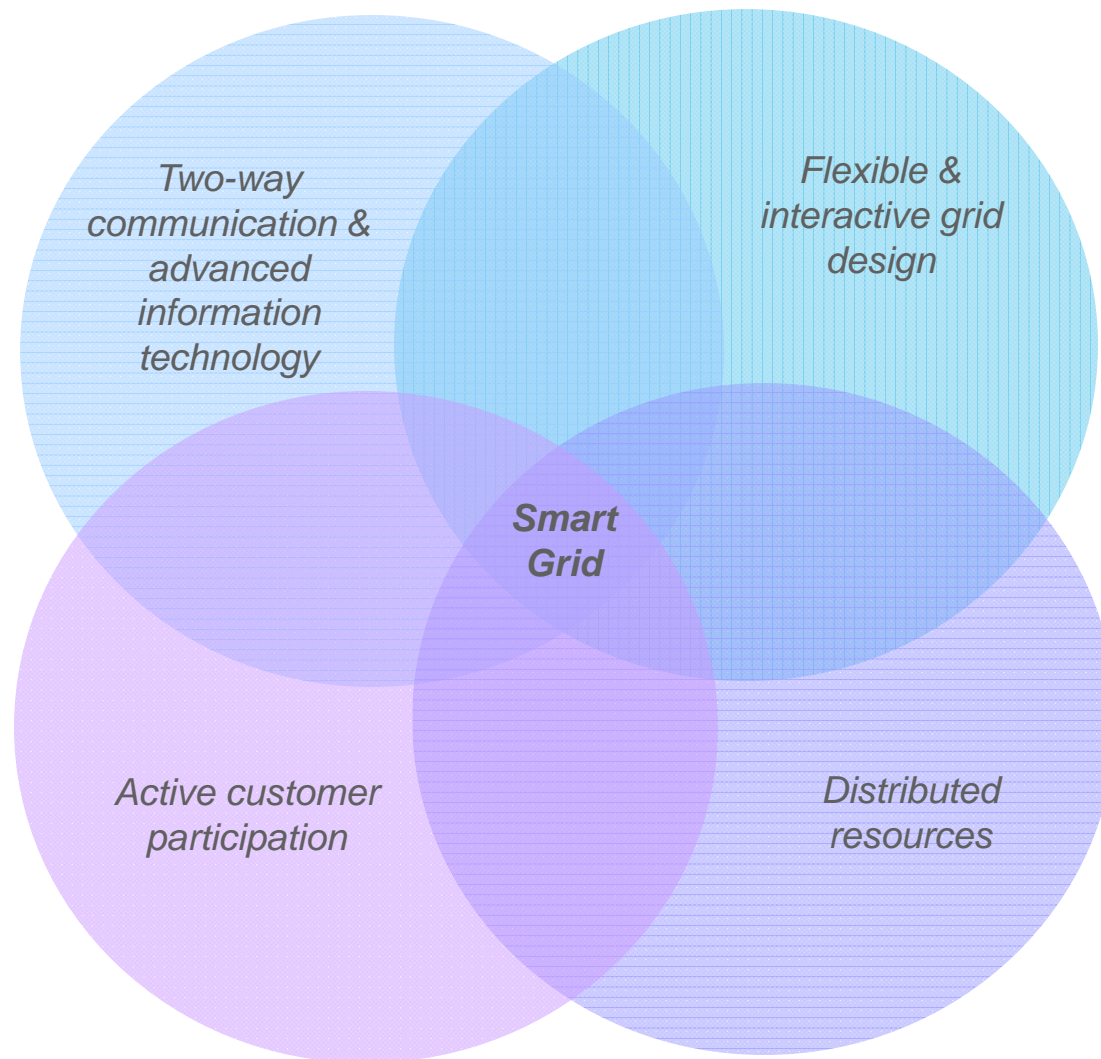
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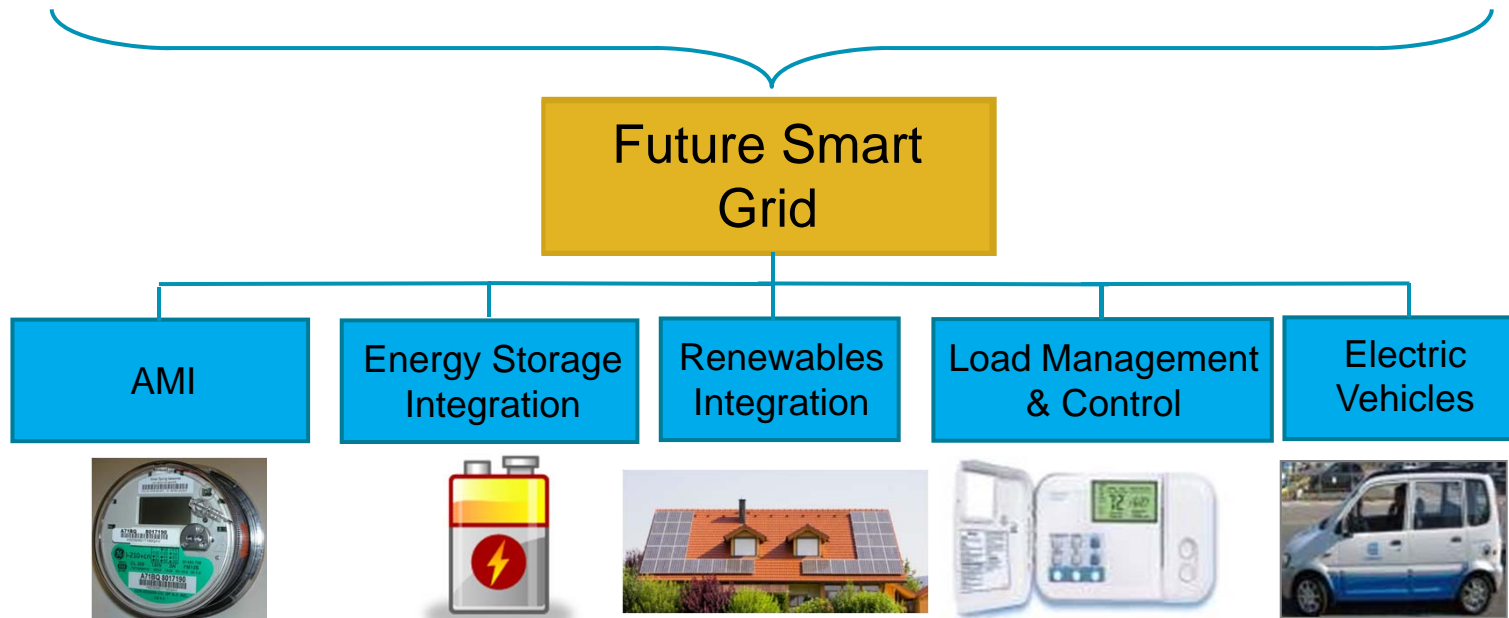
# Agenda

- Smart Grid features and objectives
- Smart Grid challenges
- Con Edison Smart Grid program
  - Communication
  - Underground distribution automation
  - Meters and in-home energy management systems

# Smart Grid Features



# System Wide Smart Grid



# Smart Grid Objectives

- Reduced capital intensity
  - Lower bills for customers
  - Improved asset utilization
- Enhanced grid operation and improved reliability
- Reduced system losses
- Real-time customer participation
- Efficient integration and management of intermittent renewable resources

# Smart Grid Challenges

## Economic

- Cost of smart grid
- Impact on customer bills
- Benefits to customers

## Regulatory

- Rate designs
- Standards (privacy, cyber security, interoperability)

## Technological

- Adoption of new equipment / processes
- Scalability, obsolescence
- Interoperability with legacy systems
- Customer acceptance

## Education

- Customer education
- Utility workforce training

# Smart Grid Deployment

- Transmission: state and regional design
- Distribution: utility specific approach
- Con Edison service territory characteristics:
  - High energy density
  - Underground distribution network
  - High reliability
  - Stringent environmental standards
  - Vast underground transportation system
  - Diverse meter locations: high rises, basements, sub-basements
  - Low residential usage in urban area

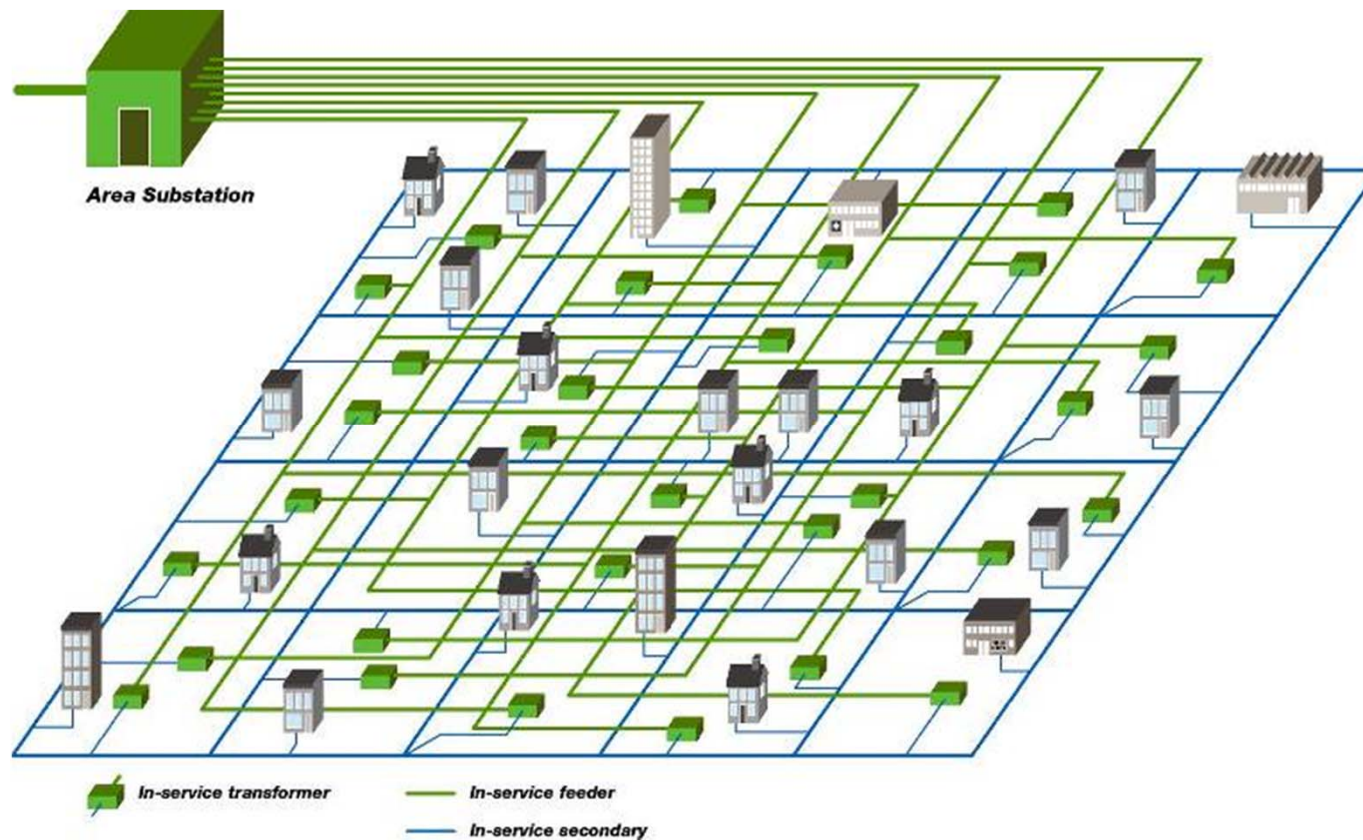
# Con Edison Smart Grid Program

- Comprehensive demonstration in underground distribution network
- Smart Grid Investment Grant
- Smart Grid Demonstration Grant
- NYISO Smart Grid Investment Grant
- Interoperability Demonstration Project

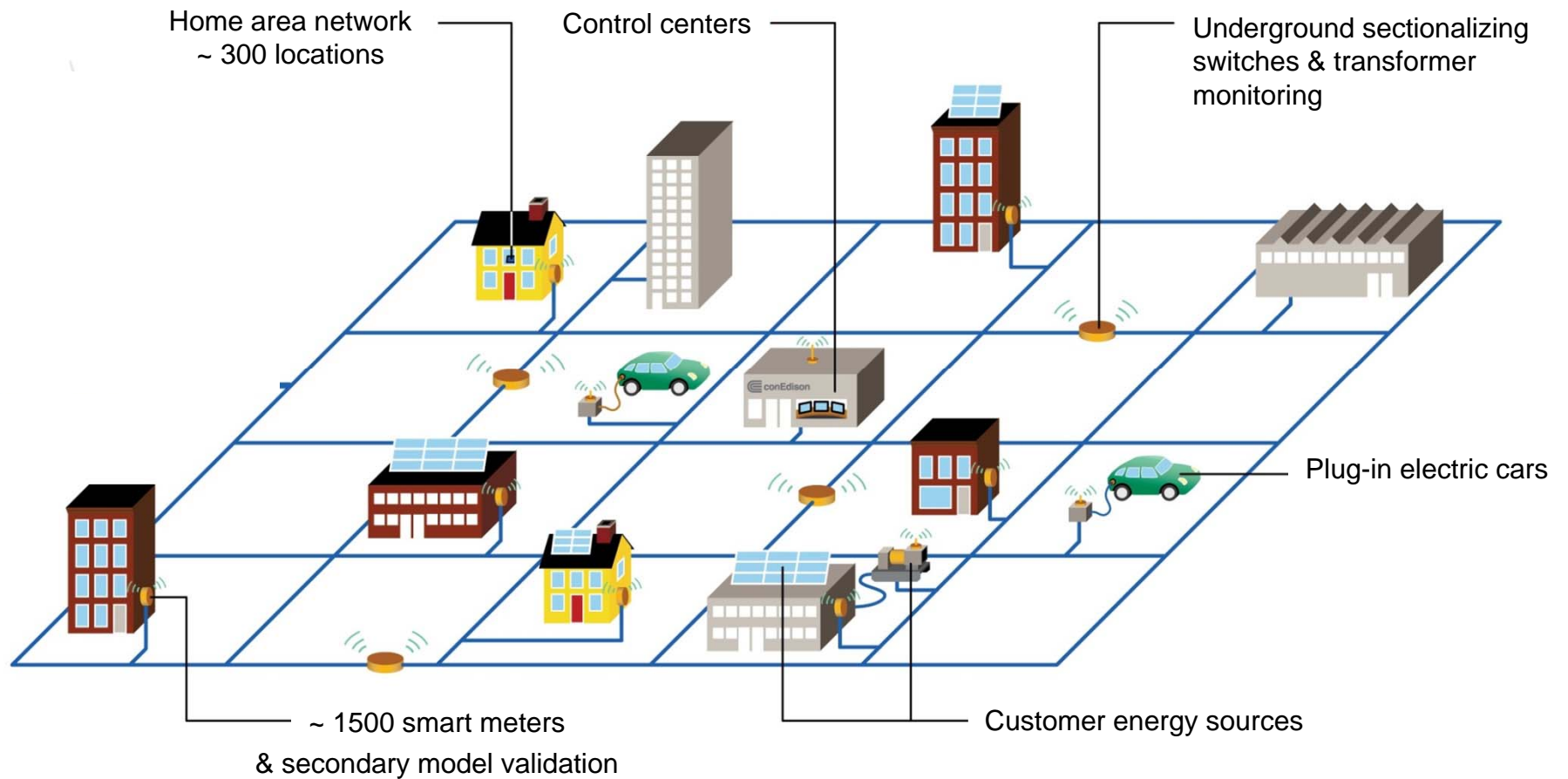


# Smart Grid Demonstration

- Demonstration of key smart grid functionalities in a distribution network



# Smart Grid Demonstration



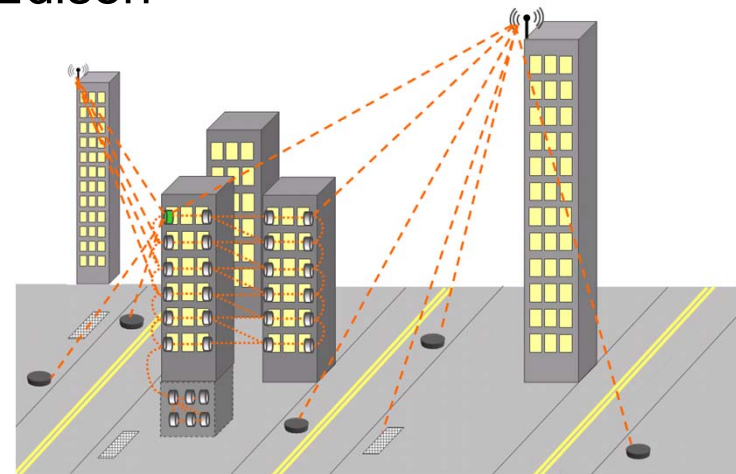
# Smart Grid Communication in Urban Environment

## Comprehensive & Flexible architecture

- Secure & reliable
- Available during emergencies and power outages
- Scalable and maintainable over time

## Last mile solutions under review at Con Edison

- Mesh network
- Wireless carriers
- Private licensed RF frequencies

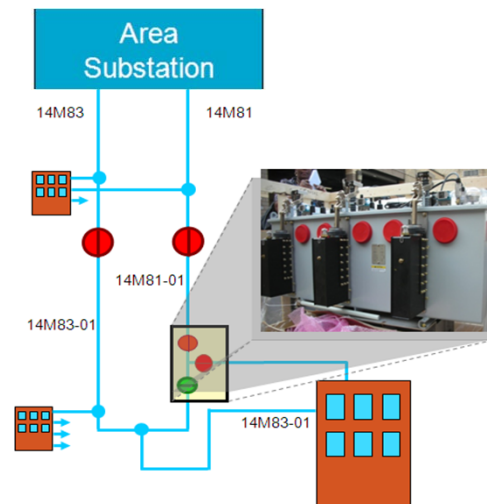
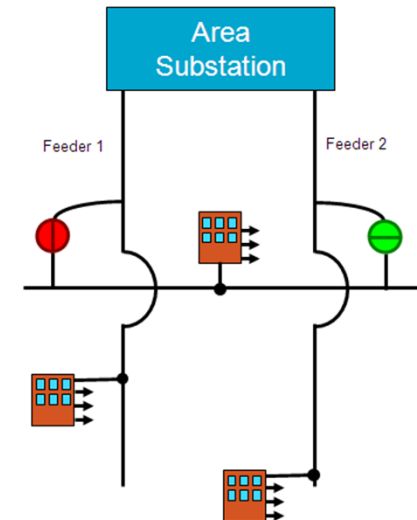


*Mesh Network*

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# Underground Distribution Automation

- Sensors, automation, remotely-operated controls and real-time analytics
- Monitoring & remote control of underground switches
- Monitoring and control of network protectors
- Isolation of faulted feeder section



# Smart Meters

- Operational functions
  - Remote meter reading
  - Automatic outage indication
  - Remote reconnect
- Enables whole-home usage viewing
- Can provide additional information for engineering applications



# In-home Energy Management Systems

- Tools to help customers adopt energy efficient behavior
- Gateway to provide time based prices and actionable suggestions to reduce energy usage and save money
- Helps to make customer behavior changes “automatic”



*Examples of in-home energy management systems*