



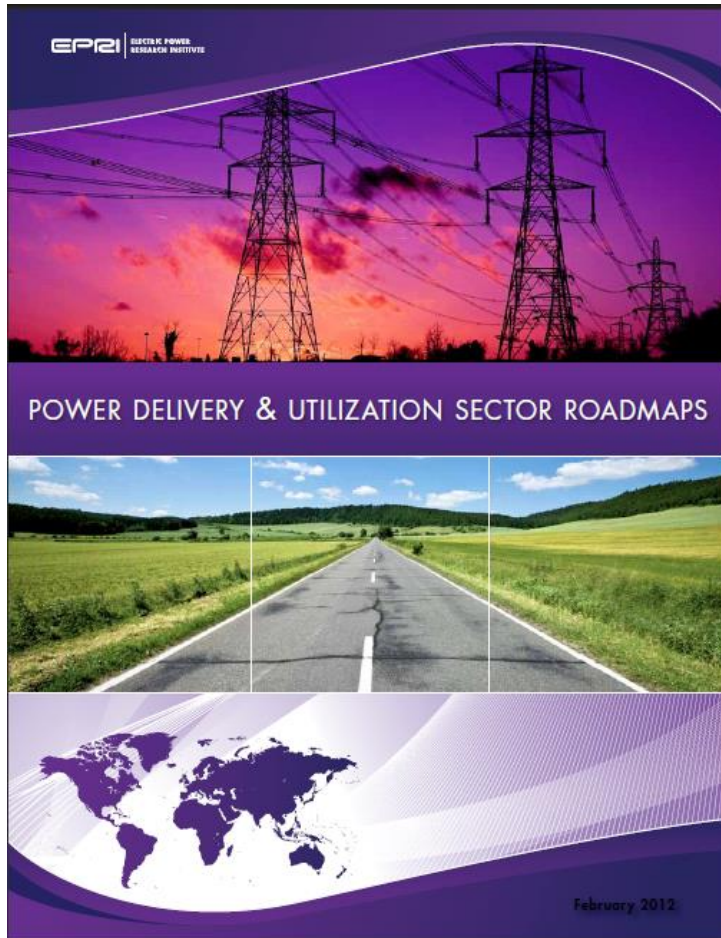
# **The Imperative for Innovation**

## *Creating the Next Generation Power System*

Mark McGranaghan  
Vice President, Power Delivery and Utilization  
EPRI

***USEA Annual Membership Meeting***  
***May 30, 2013***

# Developing the roadmap



Public Interest Energy Research (PIER) Program  
FINAL PROJECT REPORT

## CALIFORNIA UTILITY VISION AND ROADMAP FOR THE SMART GRID OF 2020

Prepared for: California Energy Commission  
Prepared by: EPRI

EPRI | ELECTRIC POWER  
RESEARCH INSTITUTE

JULY 2011  
CEC-500-2011-034



The Modern Grid Strategy

## A VISION FOR THE SMART GRID

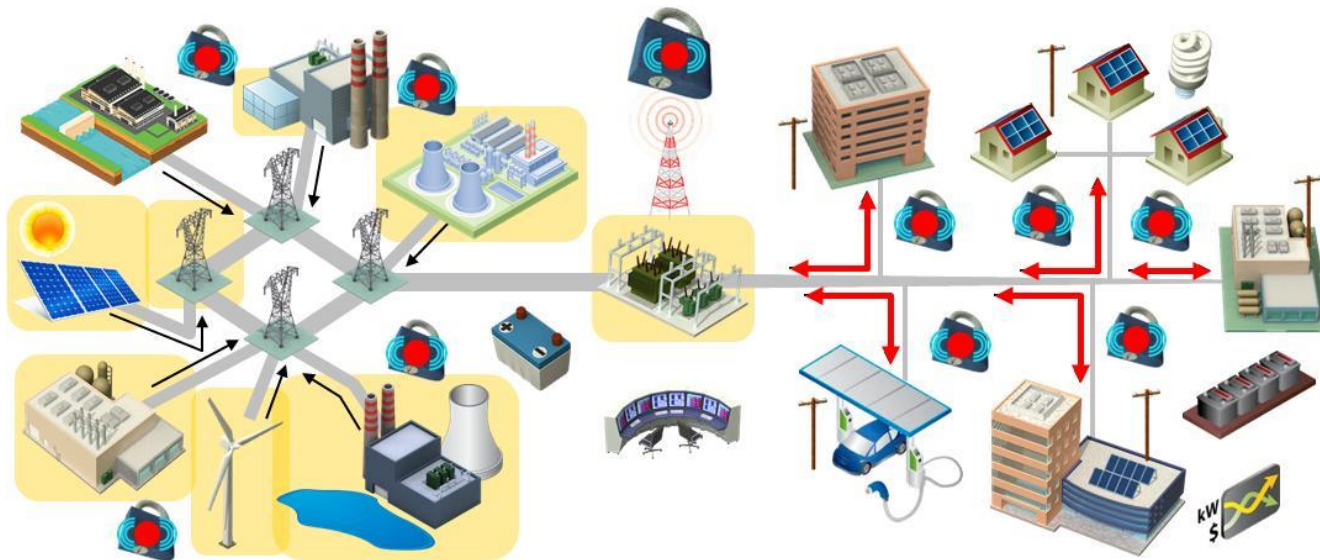
Developed for the U.S. Department of Energy  
Office of Electricity Delivery and Energy Reliability  
by the National Energy Technology Laboratory  
June 2009



v2.0 A Vision for the Smart Grid

# Innovation Challenges

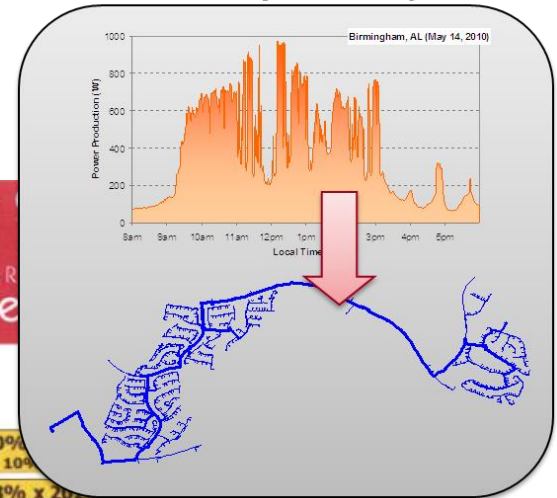
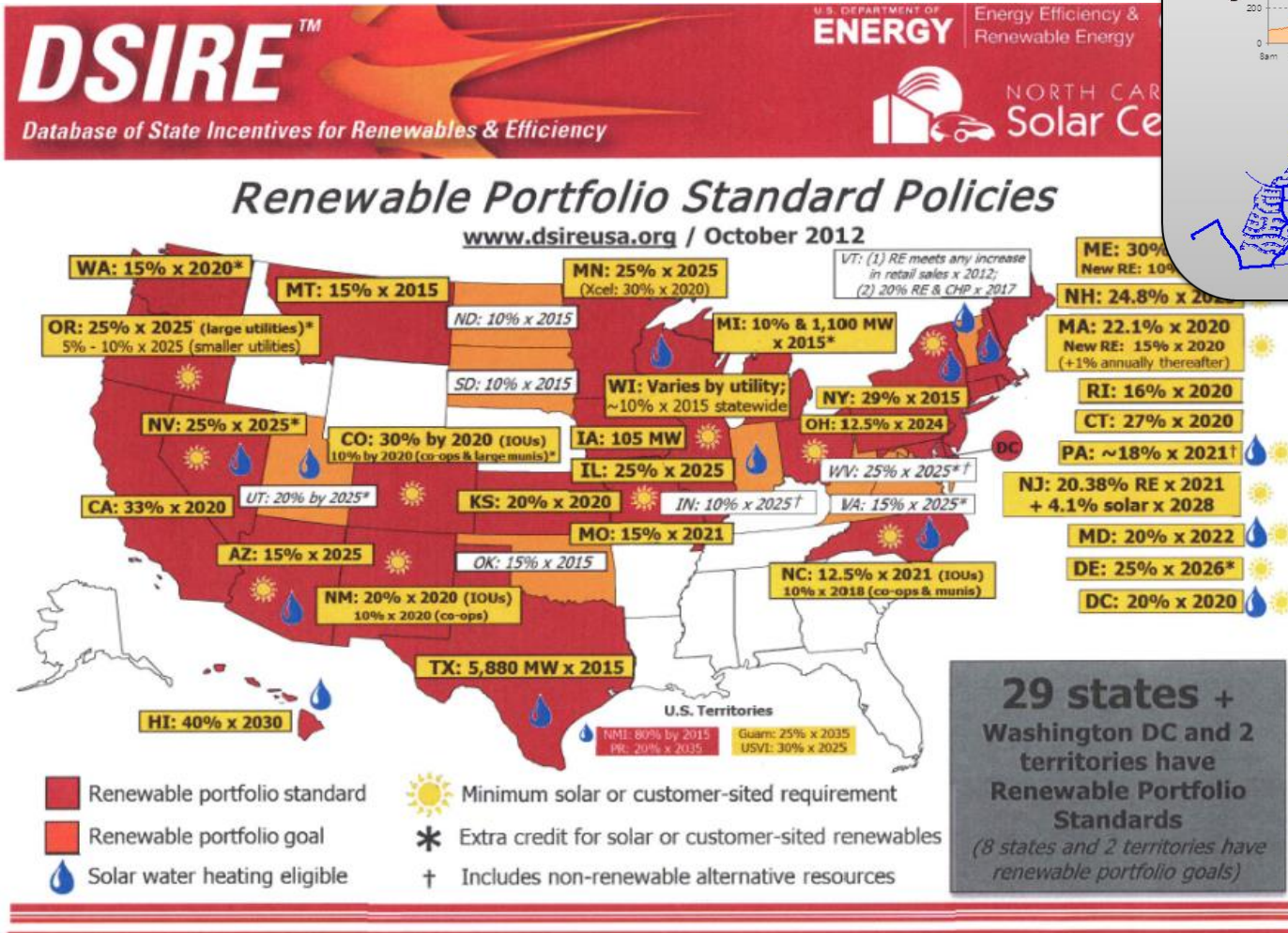
1. Where is the generation?
2. The delivery infrastructure
3. Integrating the customer





# Where is the generation? – Role of renewables

## Feeder Impact Analysis



# Where is the generation? – Distributed generation and storage

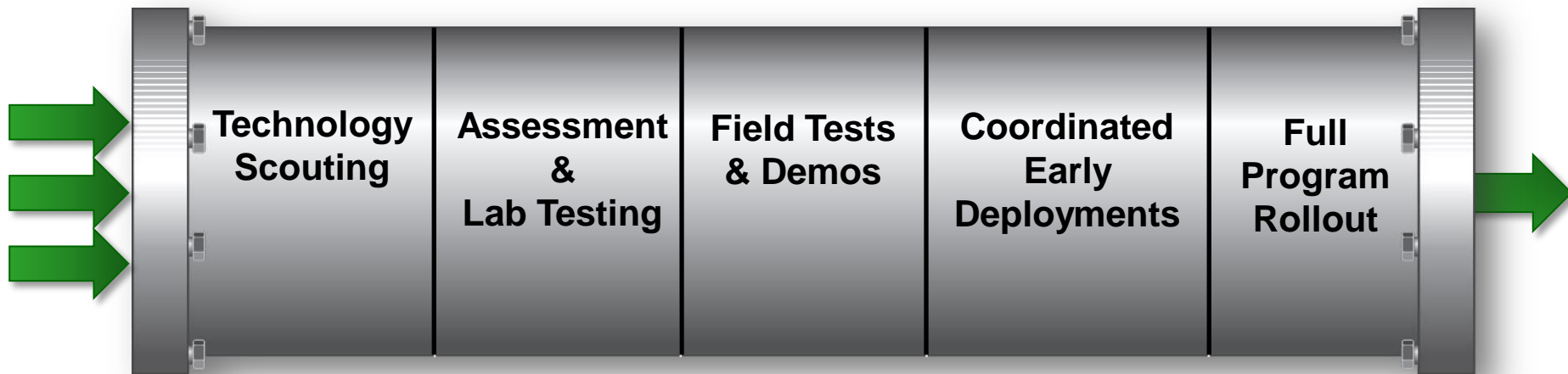


Fuel Cell installed at Whole Foods in  
Fairfield, CT  
Source: Whole Foods



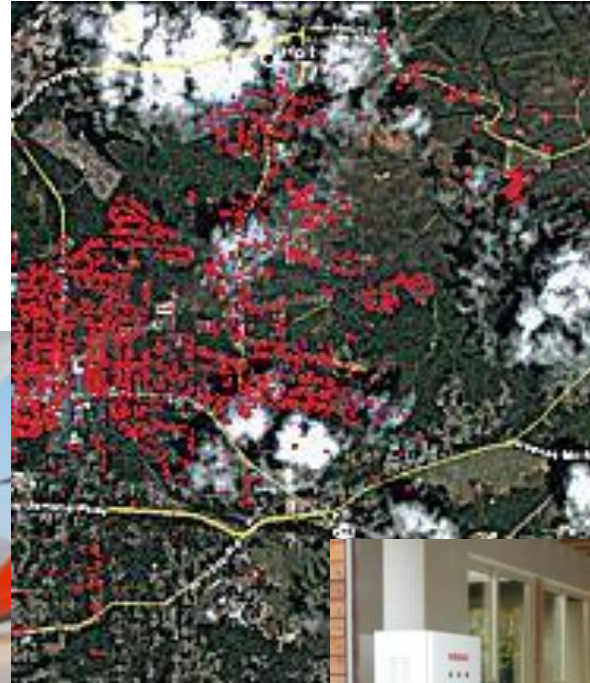
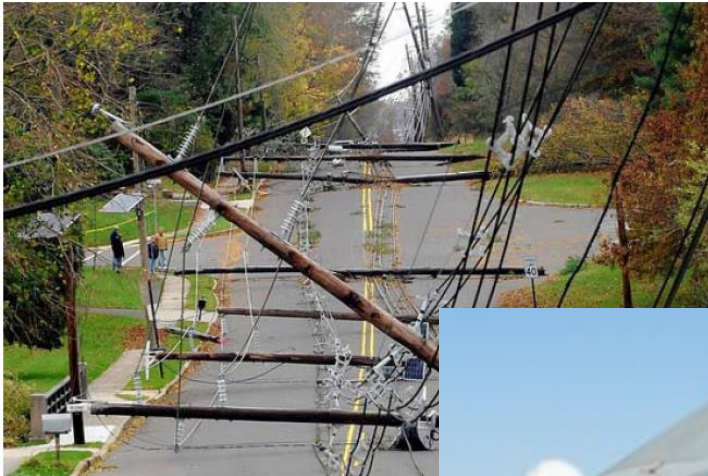
Source: ClearEdge Power

# Where is the generation? – Energy efficiency and demand response



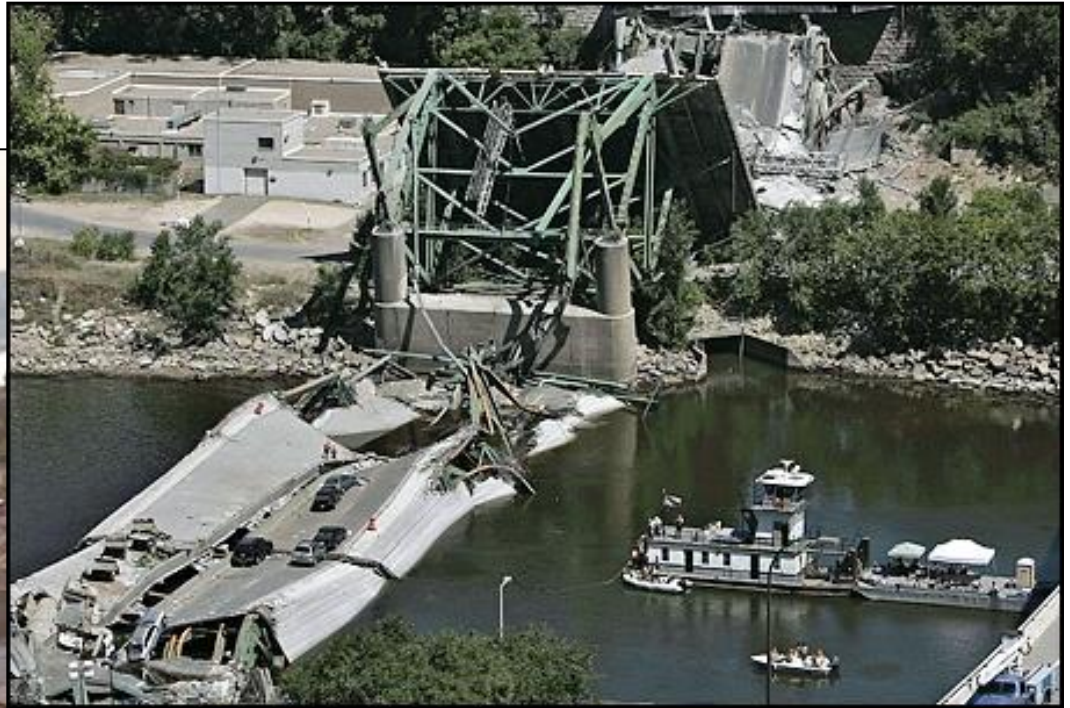


# The delivery infrastructure – Reliability and resilience



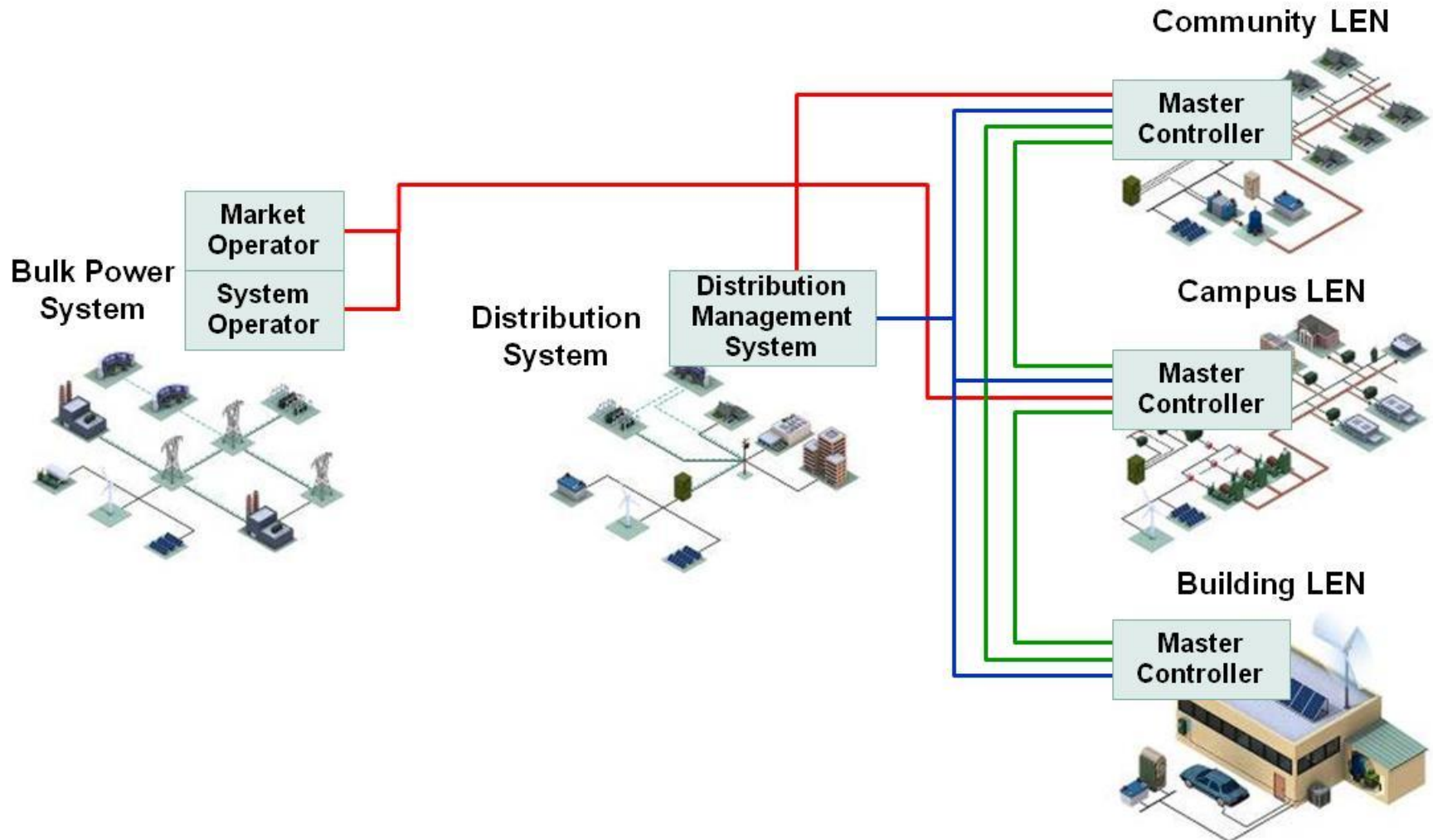
**Key to Resiliency: Prevention, Recovery, Survivability**

# The delivery infrastructure – It is aging!

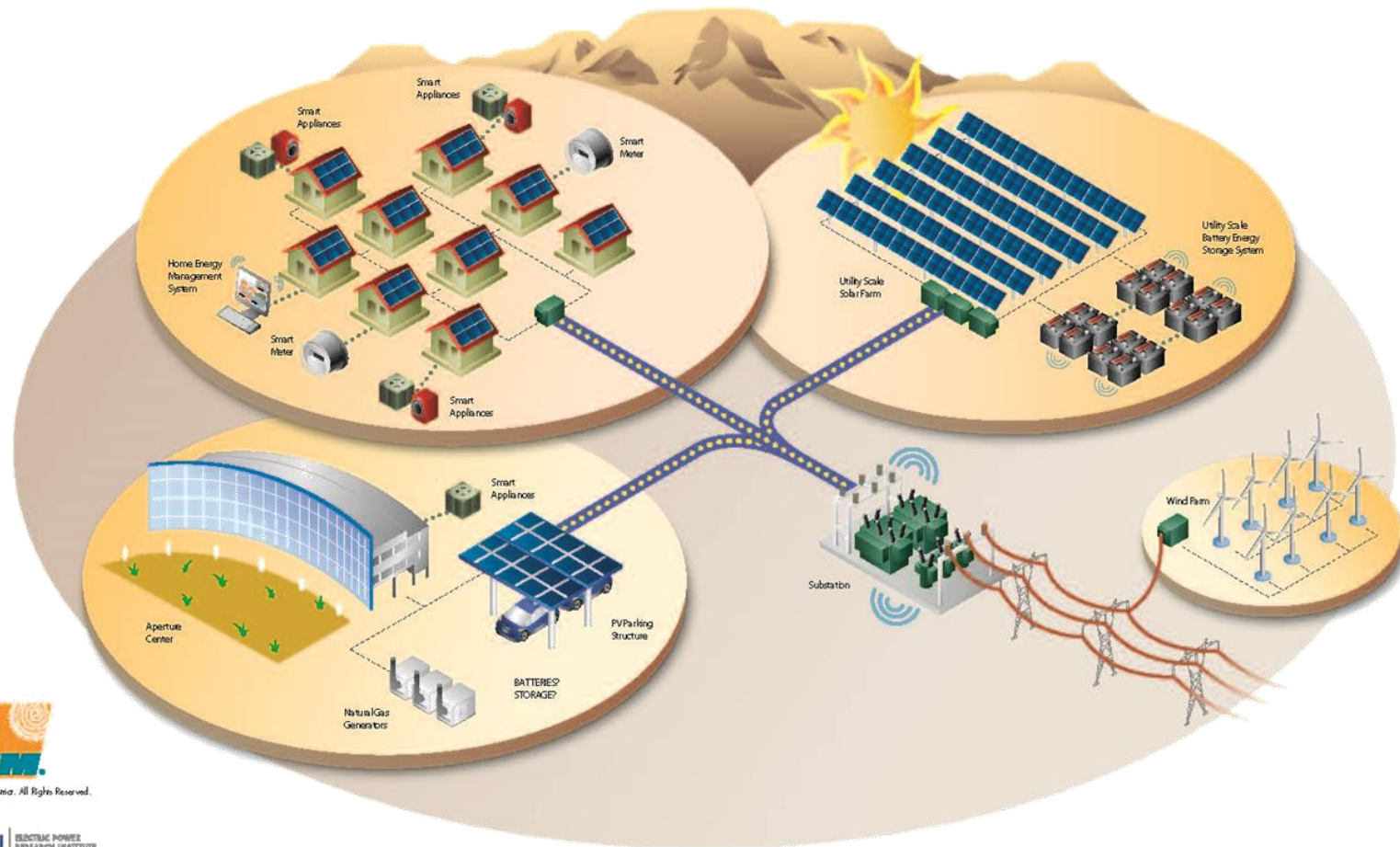




# The delivery infrastructure - The challenge of controlling the grid



# The delivery infrastructure – Making it “smart”



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# Integrating the customer – The “smart” customer

## Advanced Meters

- Energy Mgmt
- Security

## Gateways

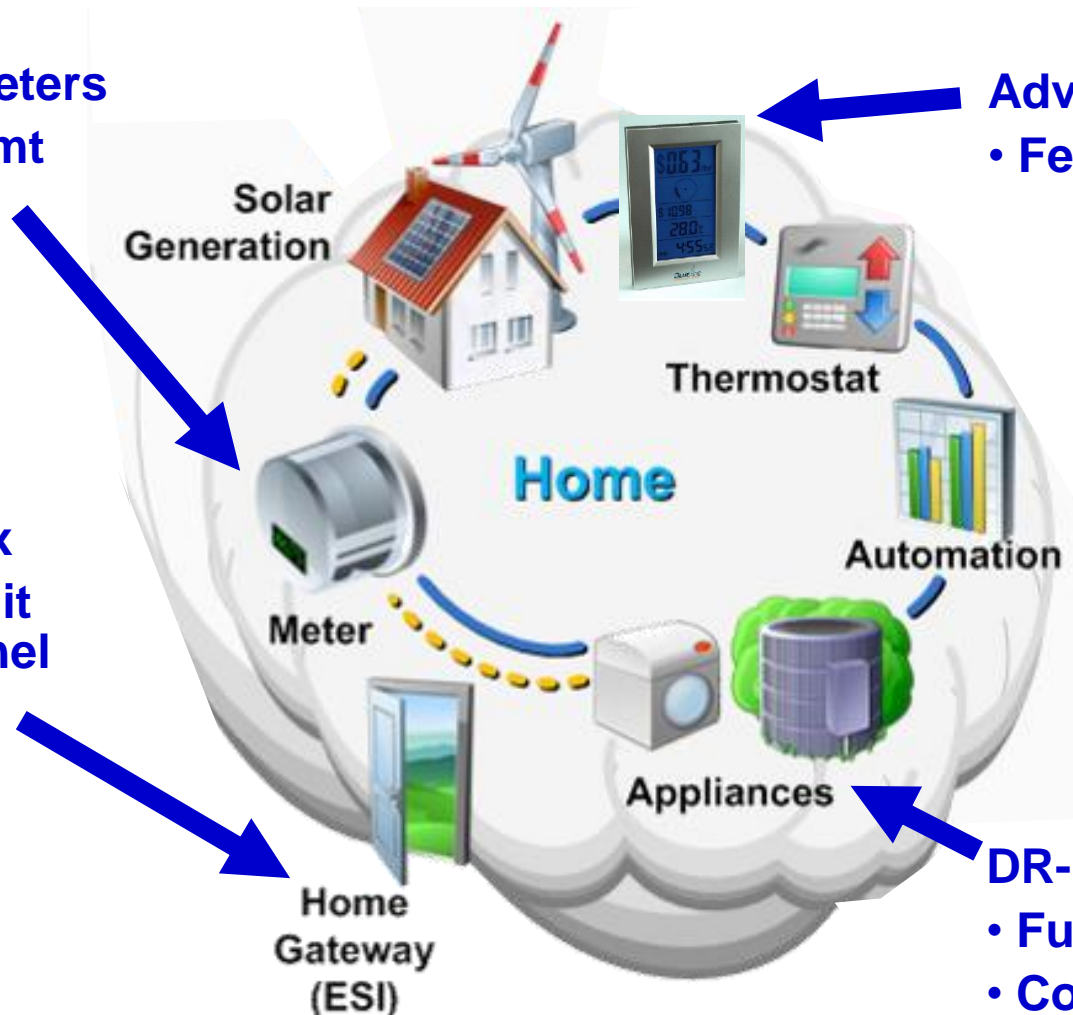
- Custom Box
- Smart Circuit Breaker Panel
- PC/Router

## Advanced Interfaces

- Feedback Effect

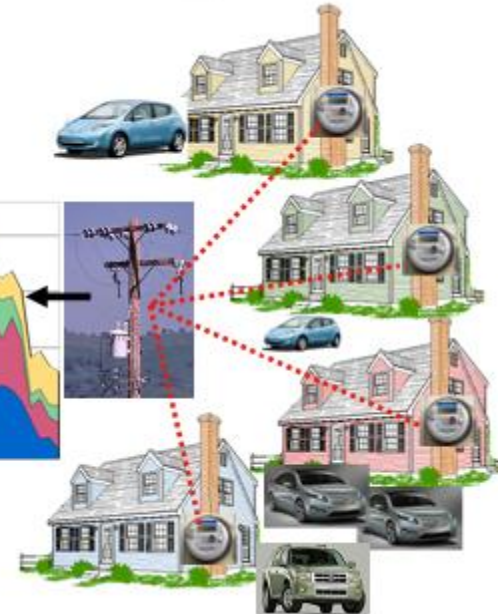
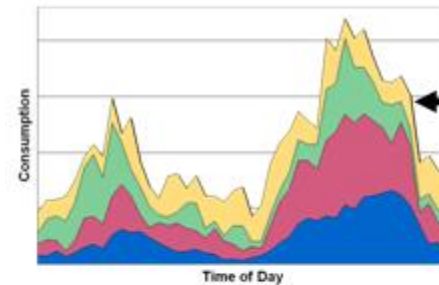
## DR-Ready Appliances

- Functional Specs
- Communications





# Integrating the customer – New loads

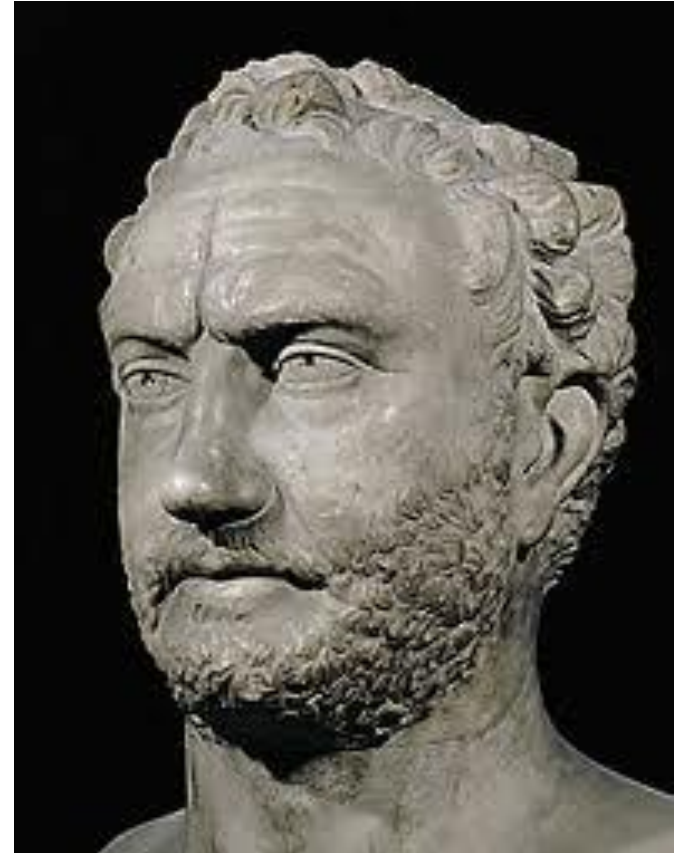


# Integrating the customer – It's all about the app!



# Thucydides (430 BC)

**“The bravest are surely those who have the clearest vision of what is before them, glory and danger alike, and yet notwithstanding, go out to meet it.”**





# Together...Shaping the Future of Electricity