



# Moving Towards the Integrated Home

Connected, Interactive,  
Interoperative, AND Efficient

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New Orleans, LA

# Agenda

- ▶ Overview of the Shifting Program Landscape
  - Alice Rosenberg, Consortium for Energy Efficiency
- ▶ Southern Company – Snapshot and Goals
  - Jim Leverette, Southern Company
- ▶ Georgia Power Smart Neighborhood - Altus at the Quarter
  - Tim Carter, Georgia Power
- ▶ Alabama Power Smart Neighborhood – Reynolds Landing
  - Shon Richey, Alabama Power
- ▶ Q&A and Discussion



# The Shifting Voluntary Program Landscape



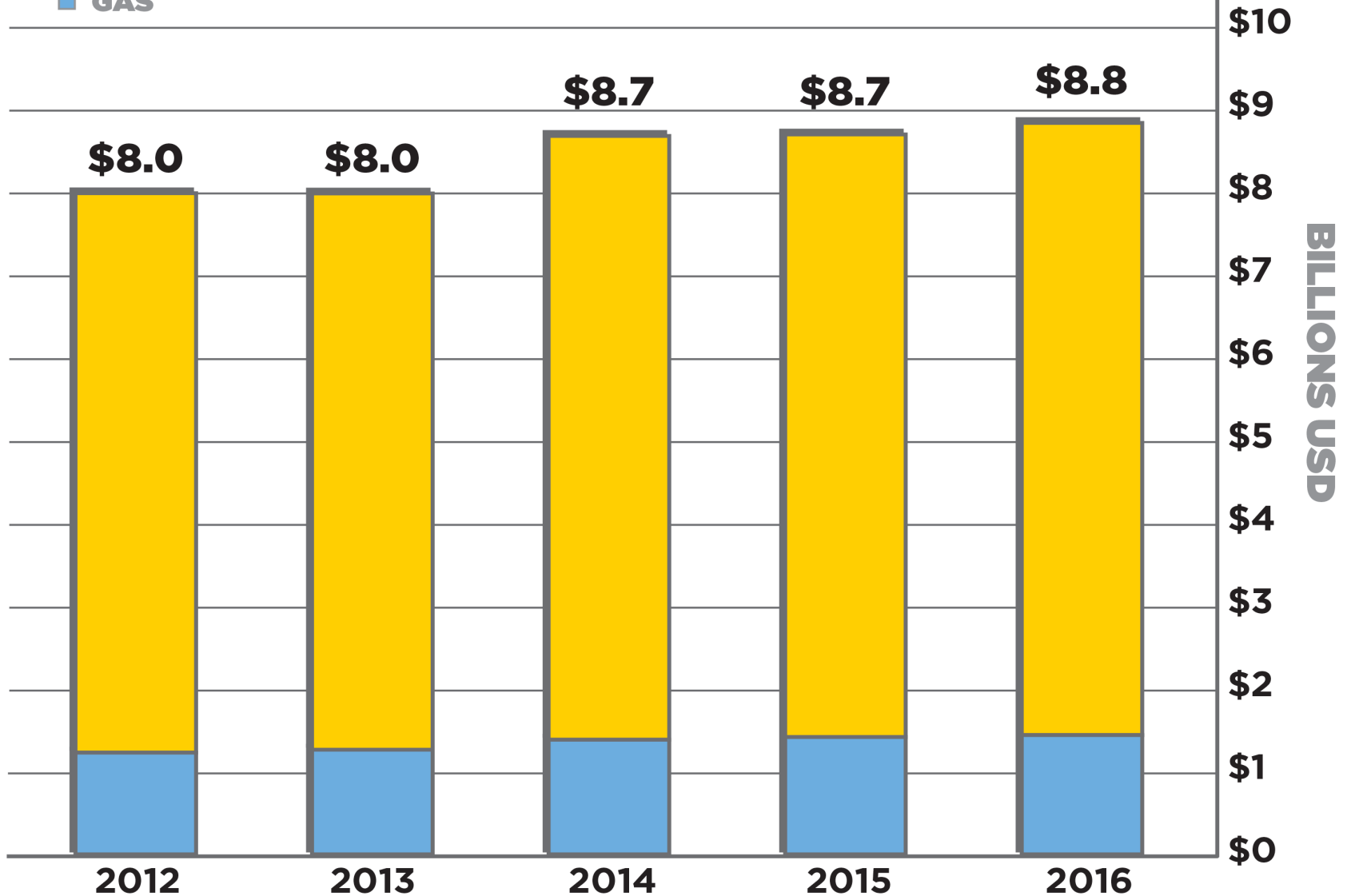
## CEE MISSION

As the Consortium for Energy Efficiency, United States and Canadian efficiency program administrators develop cutting-edge strategies to accelerate commercialization of energy efficient solutions to benefit gas and electric customers, utility systems, and the environment.

- ▶ CEE brings together 100 program administrators serving all or part of 45 states and 7 provinces
- ▶ CEE is a member-driven nonprofit, governed by a Board of Directors from member organizations
- ▶ Program administrators formed CEE to reach binational markets and accelerate market uptake of efficient products and services, which achieves lasting public benefit of energy efficiency

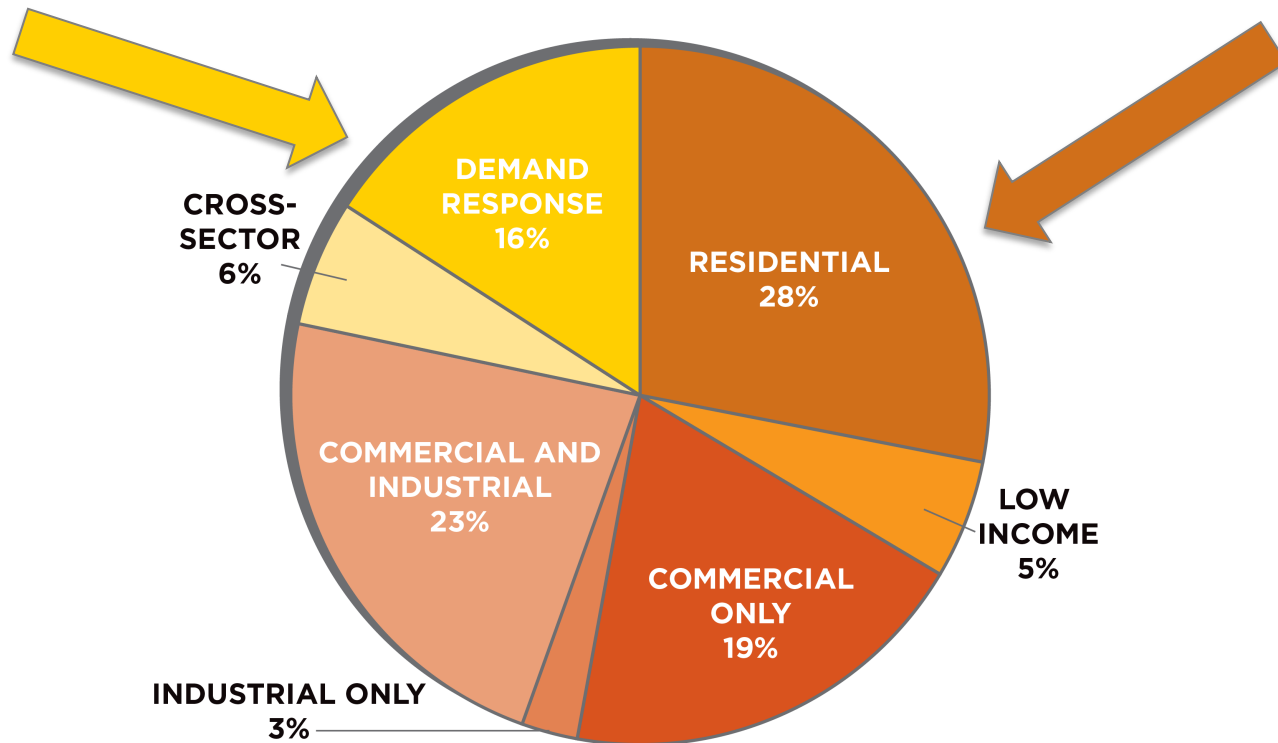
# US and Canadian DSM Program Expenditures—Gas and Electric Combined 2012–2016

■ ELECTRIC  
■ GAS



# Investment in Load Management

## US Electric DSM Expenditures By Customer Class



“In 2016 US electric demand response (DR) expenditures totaled **over \$900 million** from ratepayer funded sources only”

# the EVOLUTION of ENERGY

## NEXT 25 YEARS

First power plants



1890 – 1920s

Cities and homes lit by electricity

Electric appliances becoming commonplace

More reliable service

Nuclear and hydro scale up



1950s

Rates remain stable, cleaner air

More efficient plants built

Scrubber technology to reduce emissions introduced



1970s – 1980s

Natural gas shortage contributed to higher energy prices

Greater awareness of energy conservation measures

Installation of scrubbers on some older units

Increase in renewables (wind and solar)

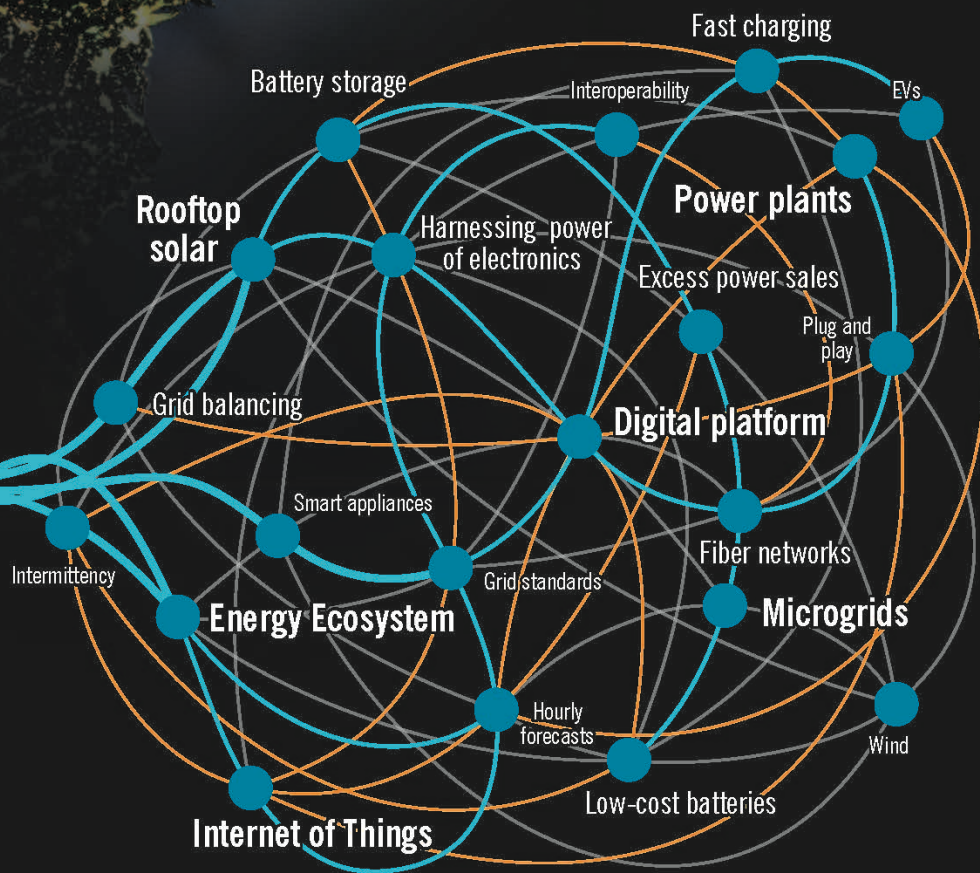
Increase in natural gas combined-cycle generation



2000s – present

Environmental stewardship and energy conservation became mainstream

Reduction in air emissions: sulfur dioxide about 90%; nitrogen oxides about 80%



# Some Dynamics Utilities Face

## Declining Electric Load Growth

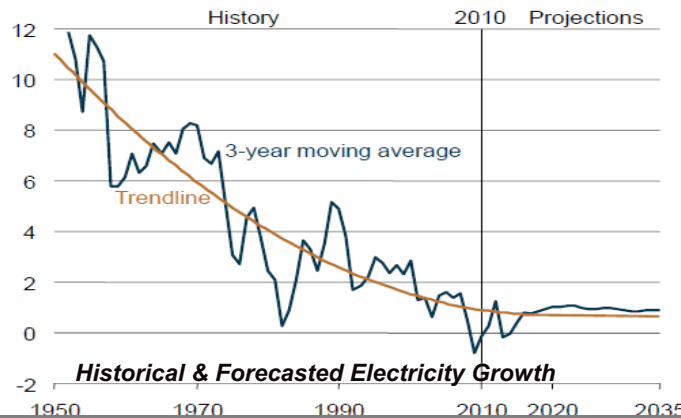
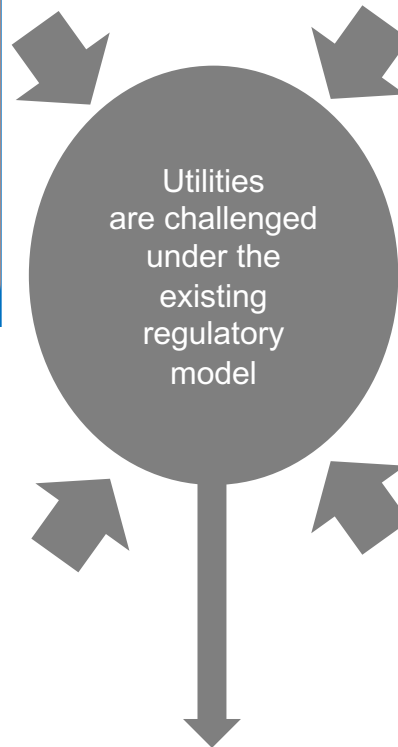
- Energy efficiency and conservation have become a part of the general culture
- Growth of customer self-generation

## Need for Increased Investment

- Customer desire greater reliability/resiliency (post Superstorm Sandy, etc.)
- General aging infrastructure
- Usage control technologies (Smart Grid)
- Cybersecurity

## Disruptive Technologies

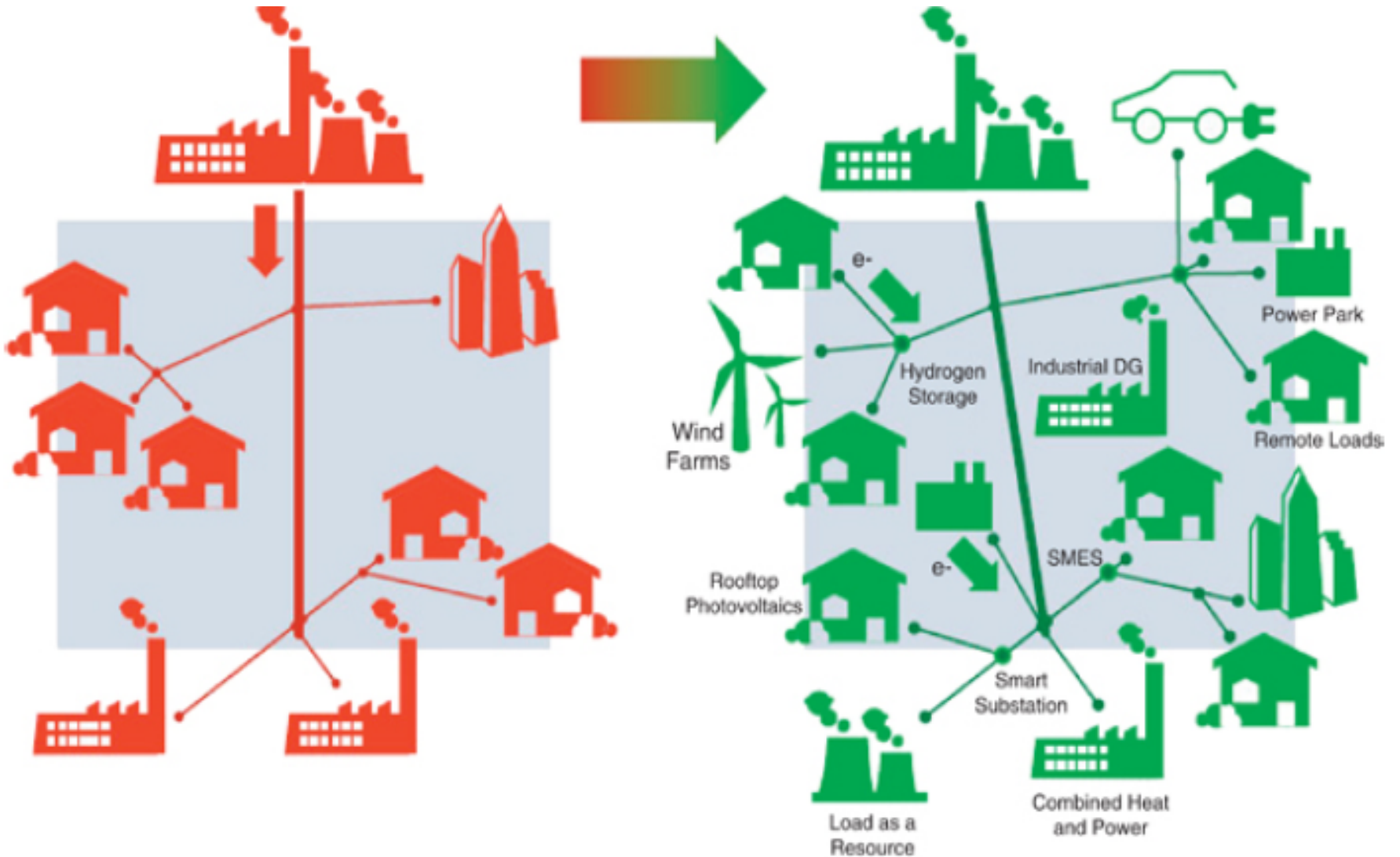
- Greater Distributed Generation
- Battery storage evolving and being piloted
- Electric vehicle penetration is increasing



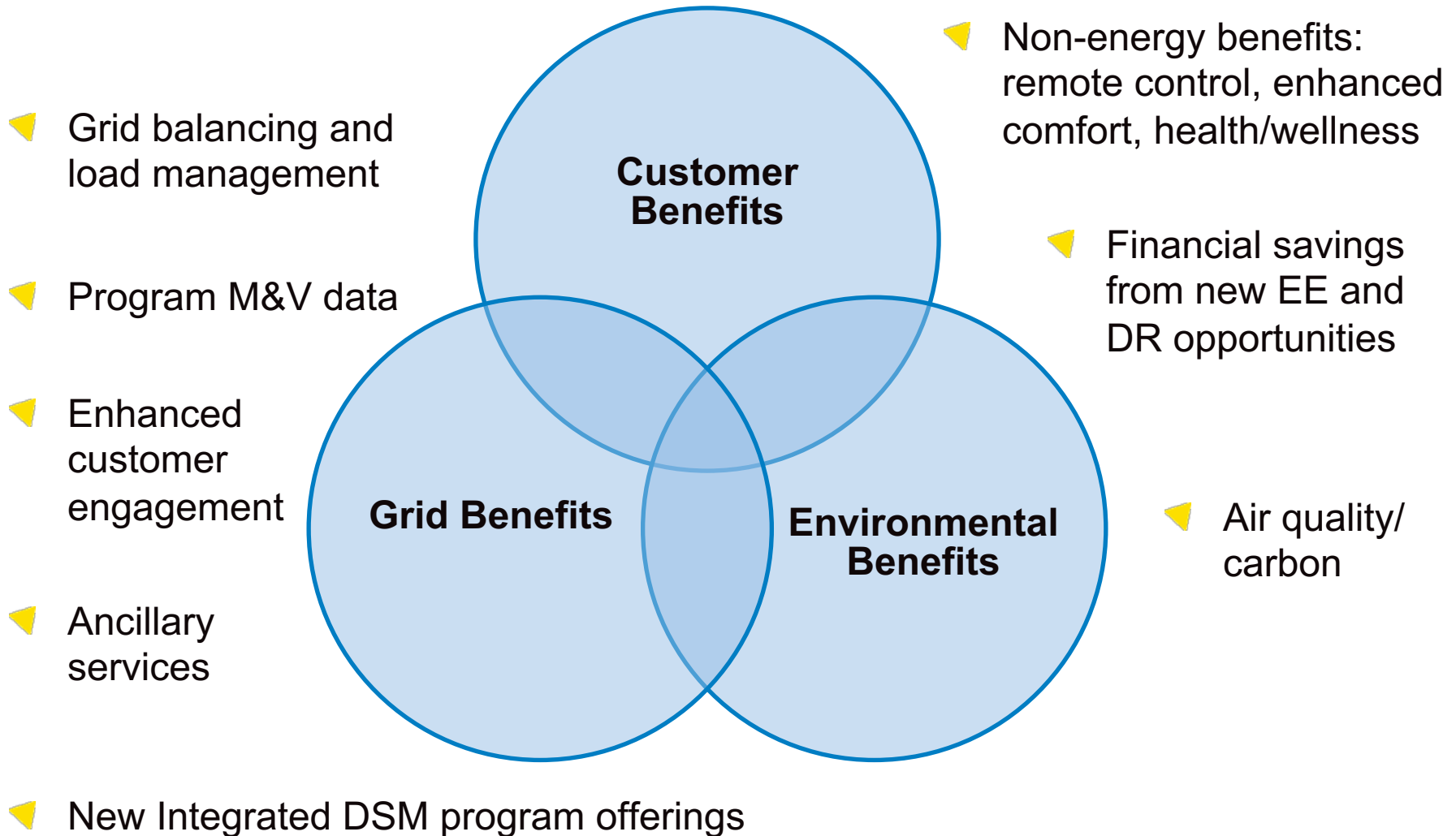
Grid Quality    Credit Quality



# Utility of the Future: In Concept

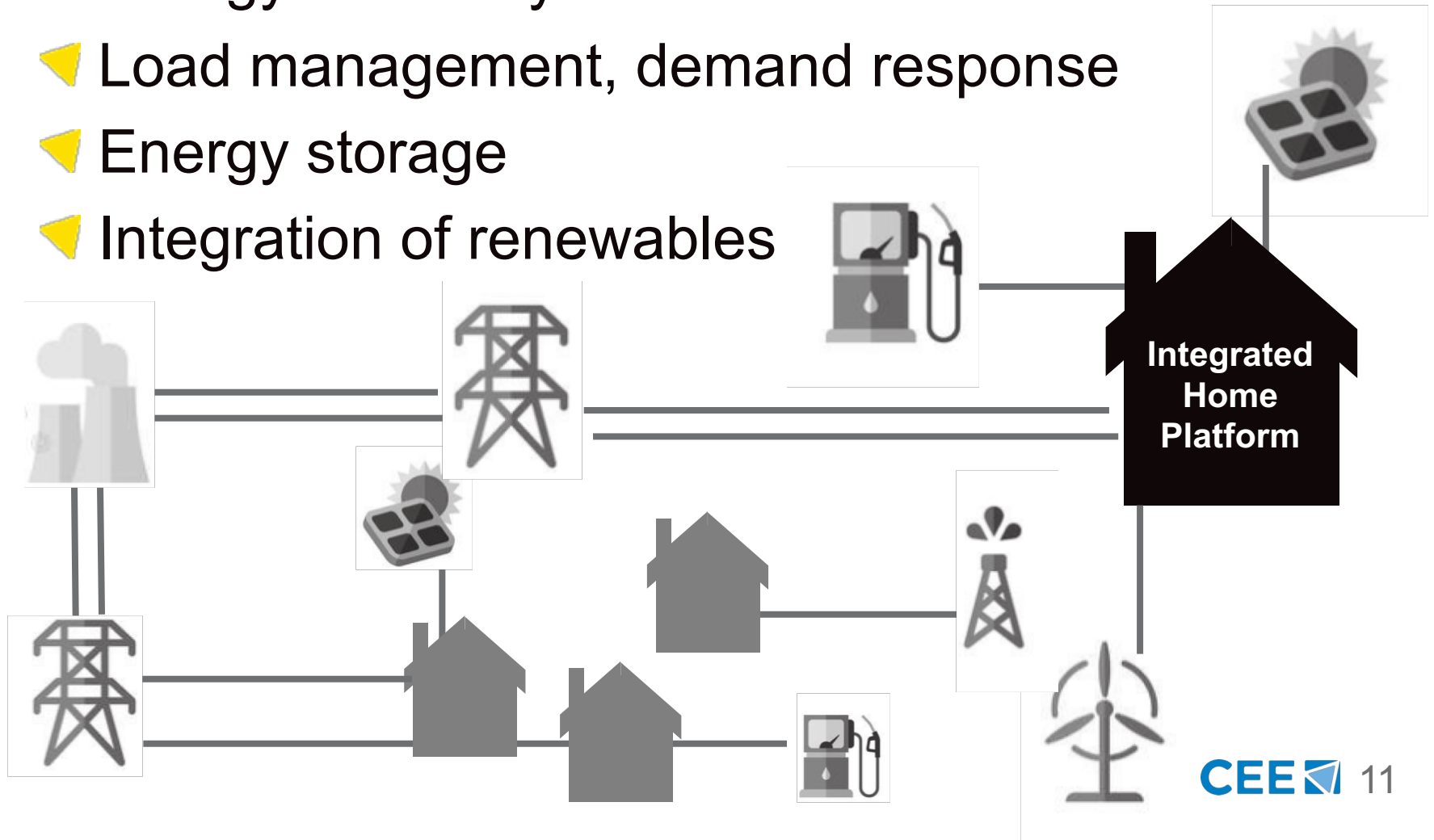


# Potential Benefits of Connected



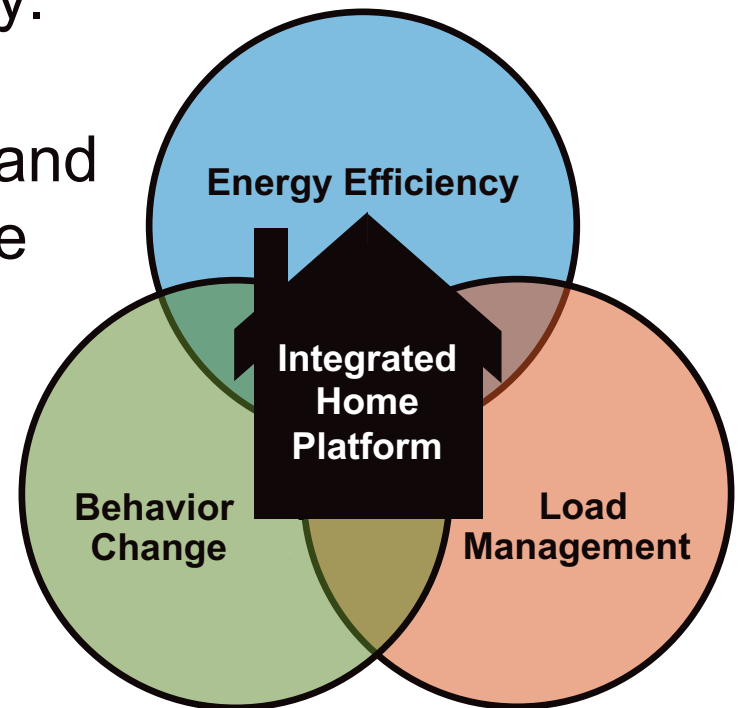
# The Integrated Home as a DER

- ▶ Energy efficiency
- ▶ Load management, demand response
- ▶ Energy storage
- ▶ Integration of renewables

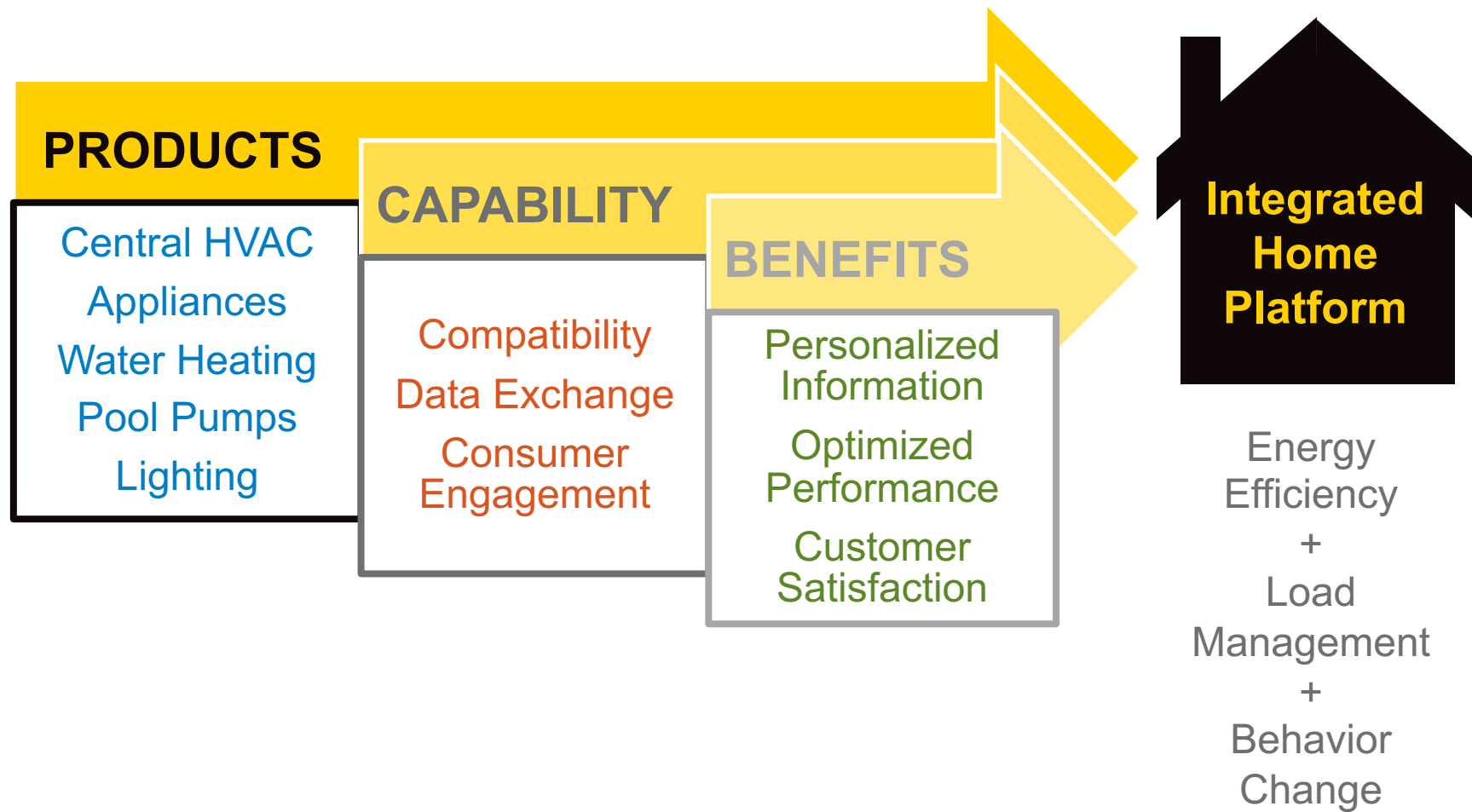


# Defining Characteristics

- ▶ Portfolio of residential initiatives that can be bundled together to deliver energy efficiency, load management, and behavioral customer benefits beyond those that can be achieved individually.
- ▶ These connected technologies and communicating capabilities have the potential to optimize the performance of the home through individual products and systems and drive improved energy management.



# Integrated Home Platform



# Potential Program Application

**PRODUCTS**

**CAPABILITY**

**BENEFITS**

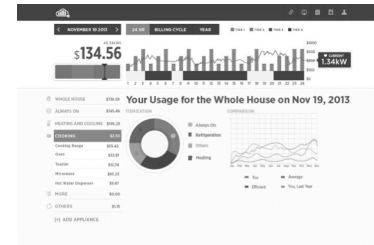
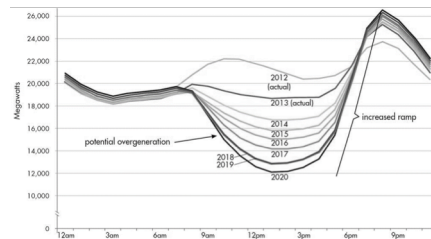
**Integrated Home Platform**



**Energy Efficient and Connected Specifications**

## Demand Response

- Direct Load Control
- Behavioral Price Signals or Messages



## Energy Management Dashboards

- Consumer Engagement

Energy Efficiency  
+  
Load Management  
+  
Behavior Change

# Fundamental Components

- ▶ **Cyber Security and Privacy Concerns**
  - Minimum features
- ▶ **Connectivity and Multiple Pathways**
  - Interoperability across products and manufacturers
  - Locational, direct line of site
- ▶ **Assurance of Desired Amenities**
  - Third party certification; laboratory ratings or other
- ▶ **Data Exchange Capabilities**
  - Secure provision of minimal information required
- ▶ **Enablement of Innovation and Flexibility**
  - Cost-effective solutions that meet customer needs

# Scope

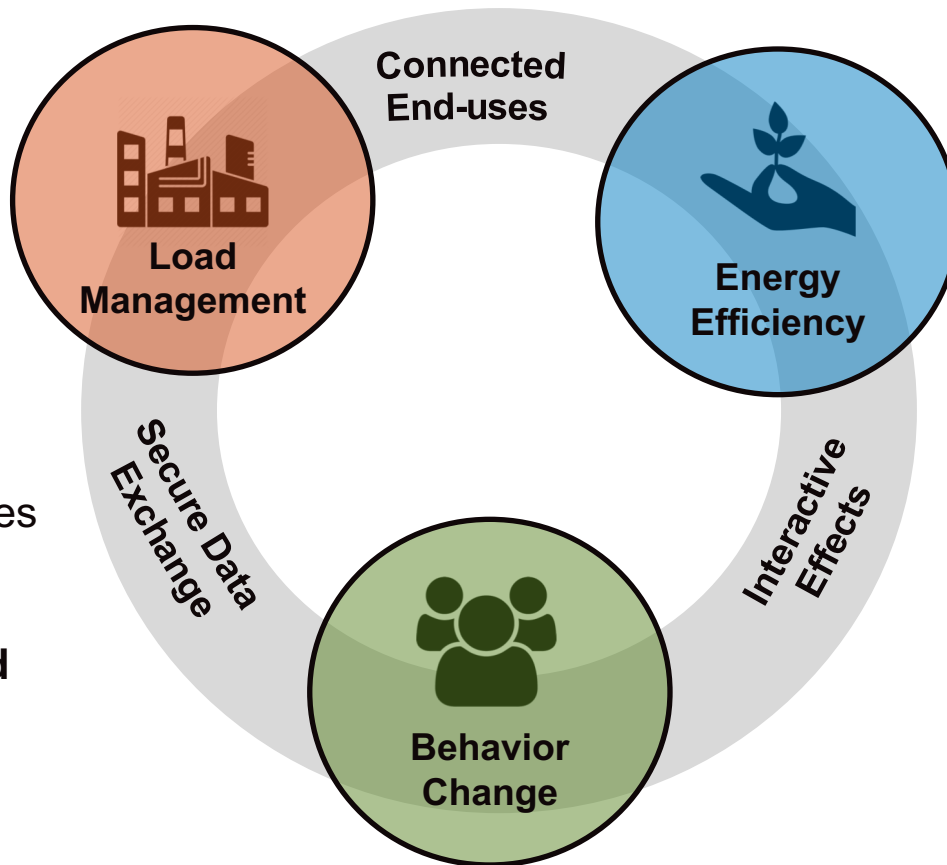
- ▶ **Services, hardware, or software** that serves to optimize overall energy use of a home
- ▶ **Fuel types** that delivers these objectives, including:
  - Electric
  - Natural Gas
  - Other
- ▶ **Application levels** that can achieve these benefits:
  - Product
  - System
  - Whole House





# Consensus Principles of Connected

Contingent upon **individual measures working together** effectively to enable potential benefits



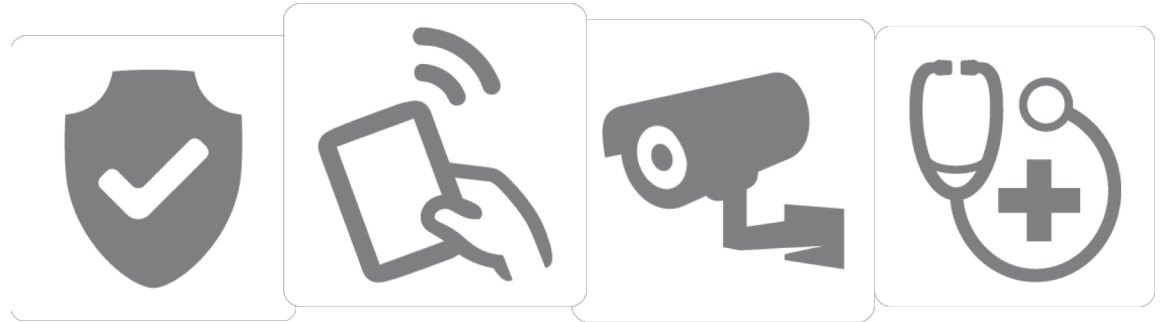
Provides possibilities for **enhanced consumer engagement and EM&V**

Relies on **interoperability and interactive effects** between products and systems

# Opportunities for the Consumer

## ▼ Non-energy impacts and amenities

- Health
- Security
- Comfort
- Entertainment
- Safety
- Environment



## ▼ Money saving potential

## ▼ Control of personal products and data

## ▼ Voice control features and capabilities

# Opportunities for Manufacturers

- ▶ Higher margin for connected products
  - Added value to consumers for connected features
  - Potentially greater volume of sales
- ▶ Long-term engagement with customers
  - Ability to offer additional services to the customer
- ▶ Enhanced product design cycles
  - Diagnostics and remote maintenance
  - Informing features for future improvements

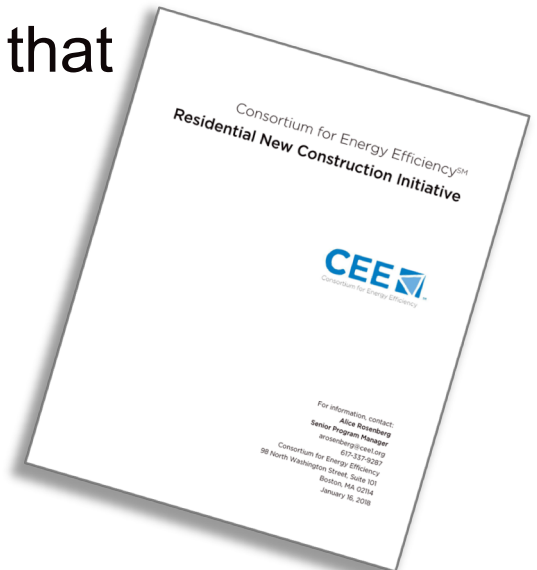
# Opportunities for Programs

- ▶ **New grid balancing and benefit capabilities**
  - Ability to leverage locational and time dependent valuation
- ▶ **Enhancement of evaluation and verification**
  - Access to enhanced, real-time energy usage
  - Greater disaggregation of data at interval levels
- ▶ **Incorporation of behavior change and savings**
  - Application of, and credit for, behavioral tools and insights that leverage connected capabilities
- ▶ **Customization and targeting capacities**
  - Ability to personalize homeowner recommendations
  - Access to diagnostic and maintenance

# CEE New Construction Initiative

## Specification Components

- Establish performance-based tiers that reference the ANSI/RESNET/ICC 301-2014 Energy Rating Index
- Include minimum quality assurance for all tiers
- Offer optional features and elements that members may adopt where relevant:
  1. Nonenergy Benefits/Building Science
  2. Renewables
  3. Connectivity
  4. Minimum Prescriptive Requirements



# CEE New Construction Initiative

## 3. Connectivity

Members may determine that there is merit to promoting connected requirements for a variety of potential grid, program, and customer benefits. Connected capabilities have the potential to achieve increased efficiency gains, optimize equipment and building performance, add market value to the home, enable greater consumer engagement and amenity, and enable load management opportunities such as demand response, energy storage, and peak load shifting. For programs interested and able to include connected requirements in their offerings, CEE offers the following two strategies for consideration:

- Any products or equipment installed in the house meet the connected requirements outlined in the respective ENERGY STAR or CEE specifications, where available.
- CEE connected criteria advocate for multiple pathways to connect, including a direct, on-premise open standards connection option to ensure consumers realize benefits.

# Contact

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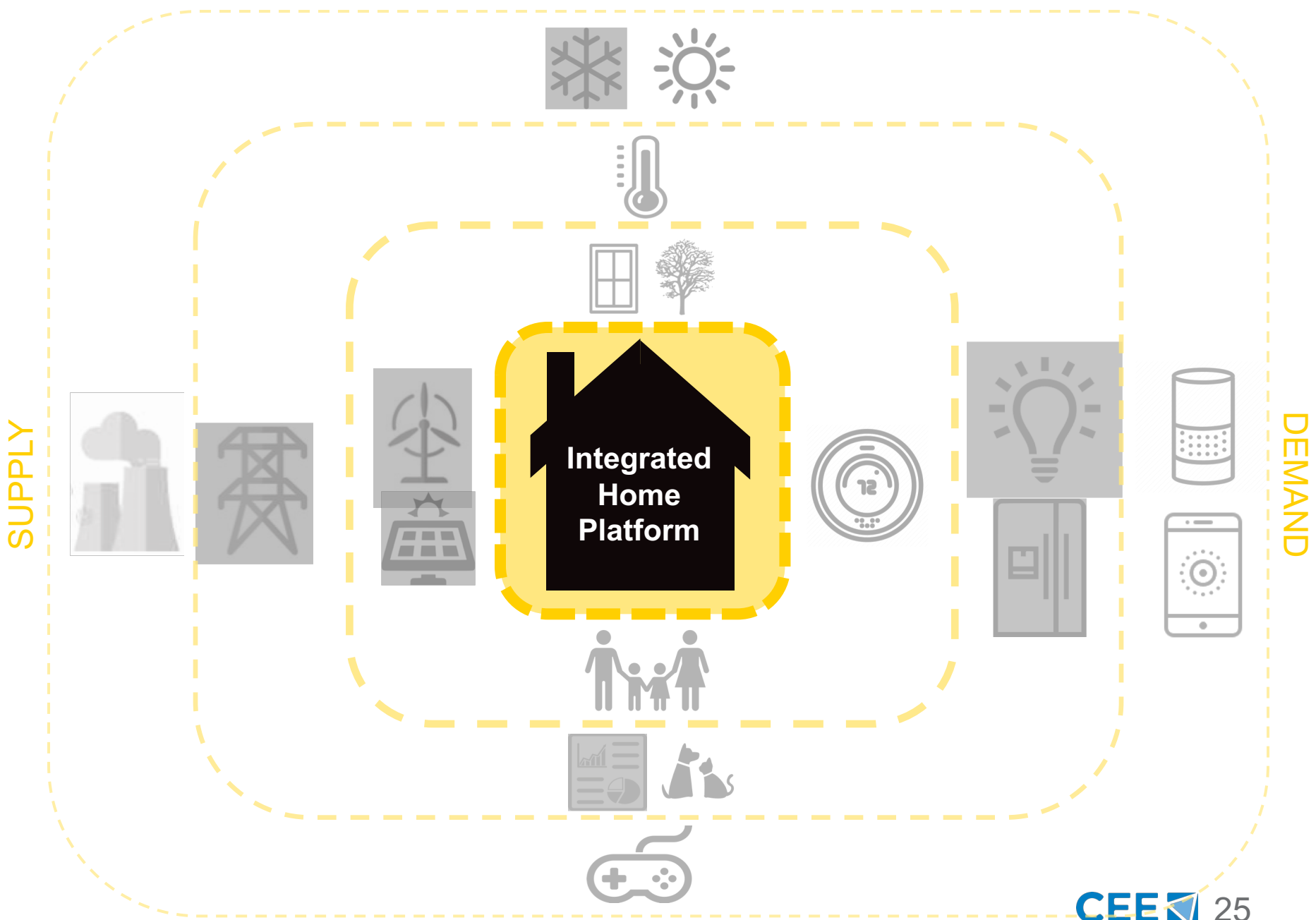
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# Additional Slides



# ASSETS

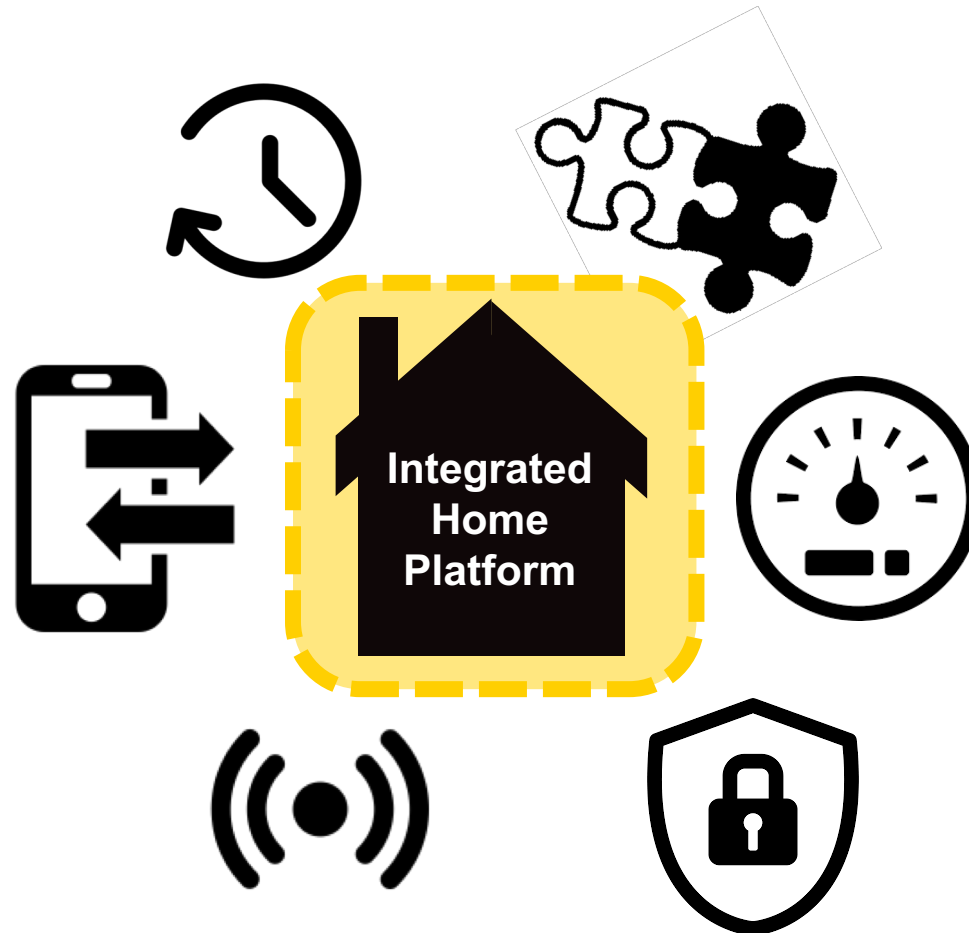


SUPPLY

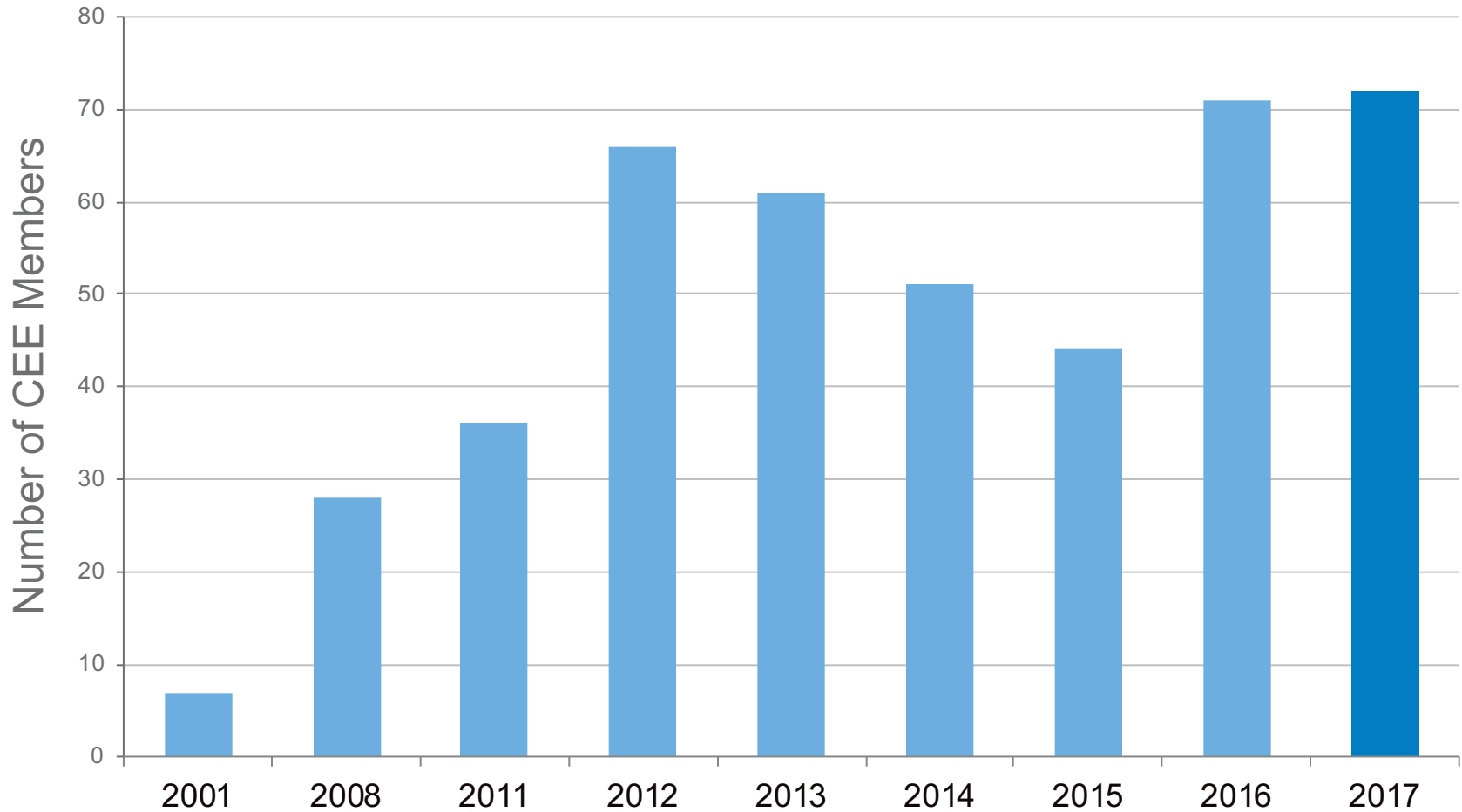
DEMAND

OPERATIONS

# Fundamental Elements



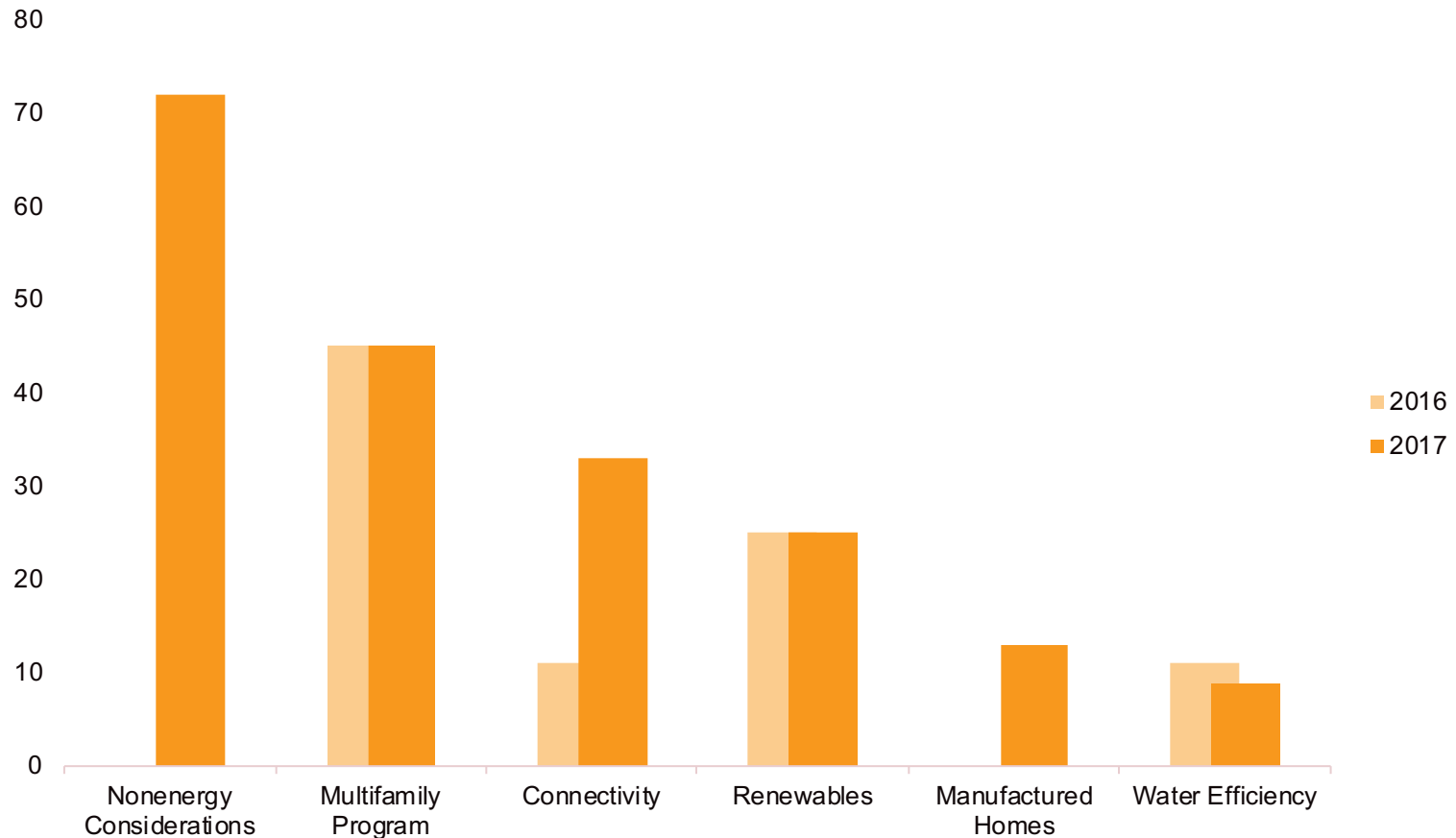
# 2017 Program Summary Results



CEE New Homes Program Summary

# 2017 Program Summary Results

## Additional Components of Programs



# Common Themes

## ▶ Rising Codes, Baselines, and Savings Goals

## ▶ Move Towards Zero Net Energy

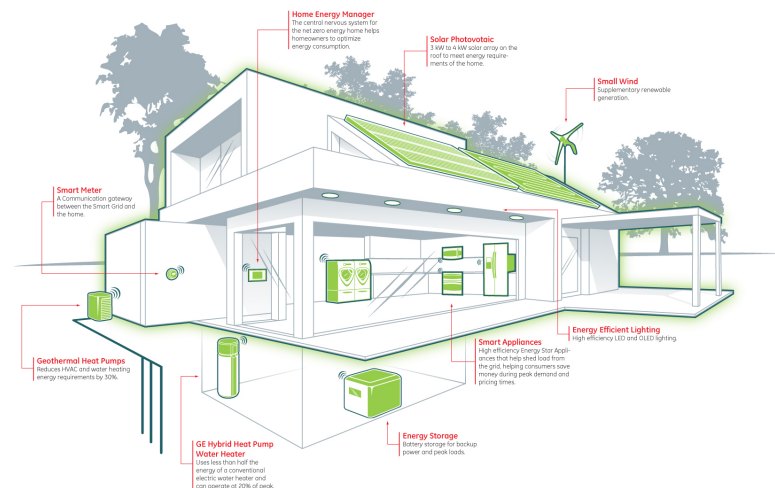
- Definitions vary, gas vs. electric
- Efficiency, then renewables

## ▶ Tiered Incentive Structures

- Multiple offerings and levels
- Pathways to Zero Net Energy
- Performance-based programs

## ▶ Statewide Coordination

- Connecticut, Massachusetts, California, New Jersey
- Gas and electric partnerships



# Emerging Trends

## Connectivity and Smart

- Smart meters and smart thermostats
- Integrated demand side management



## Engagement with Real Estate Industry

- Relations with lenders, mortgagers, realtors, appraisers
- Trainings, education, tradeshow, meetings
- Green Addendum, MLS

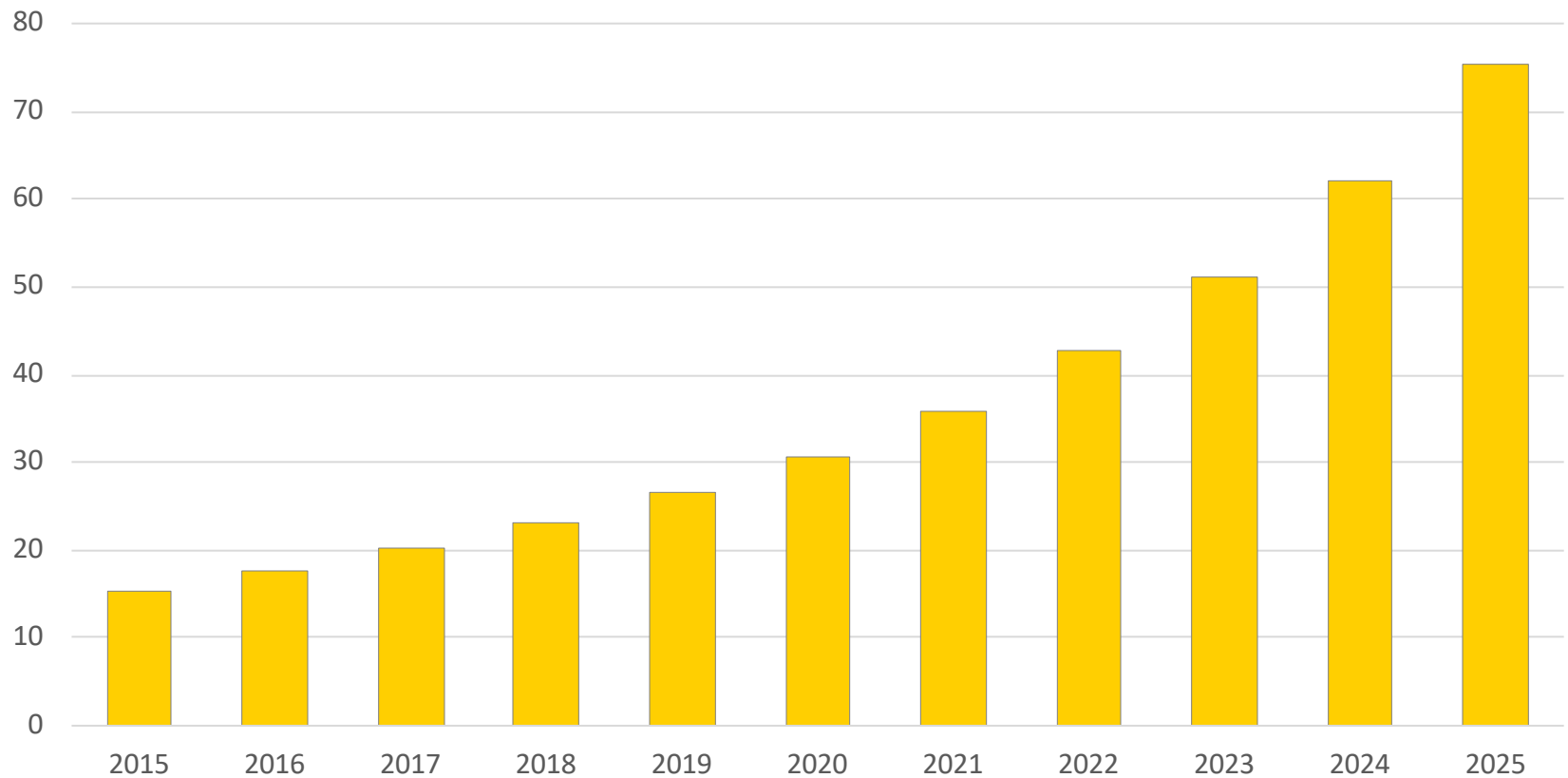
## Emphasis on Nonenergy Features

- Air quality, health, durability, etc.
- Quantifiable and marketable



# A Growing and Evolving Market

Internet of Things Connected Devices Installed Worldwide from 2015 to 2025 (in billions)

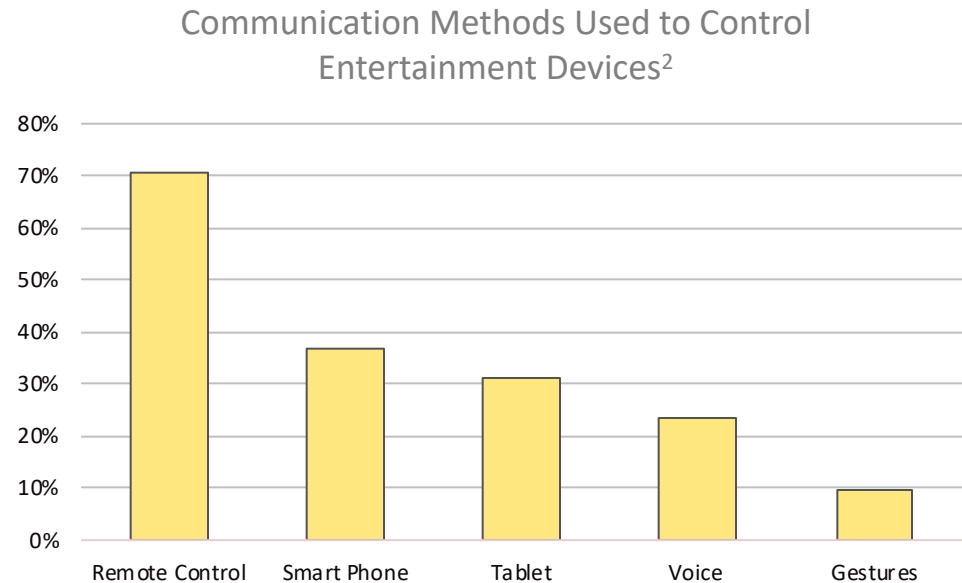


# Voice Control as a User Interface

▶ Another means through which consumers can interact and engage with their homes

- Projected 1 billion devices in homes by 2021<sup>1</sup>
- Interface is promising, though still nascent
- Players in the market:

- Amazon
- Google
- Apple
- Iris
- Microsoft
- Athom
- Intel
- Insteon
- Alarm.com
- Vivint
- Comcast
- Device manufacturers





# Stakeholders in a Complex Space

- ▶ Niche players form creative new value propositions
- ▶ Diverse offerings across a broad residential suite

