Combined Heat and Power

National Overview

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Don’t Get Siloed

Source: *The New Yorker*

U.S. Energy and Electricity Consumption

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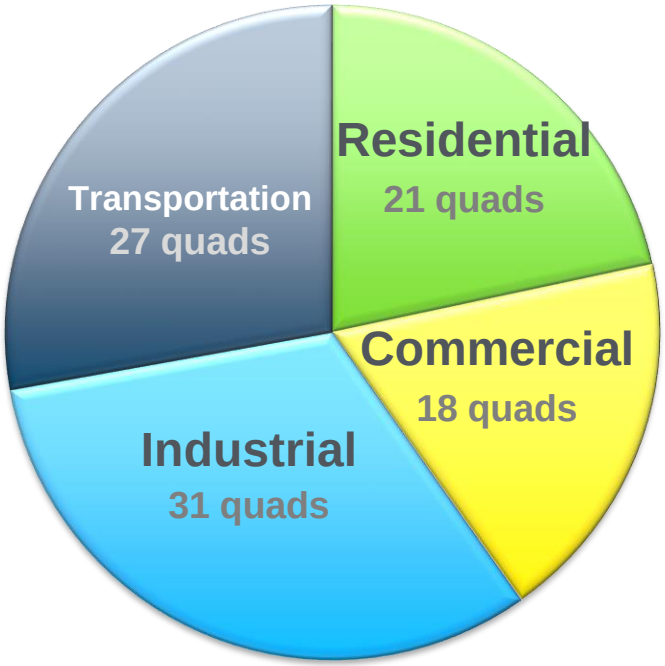
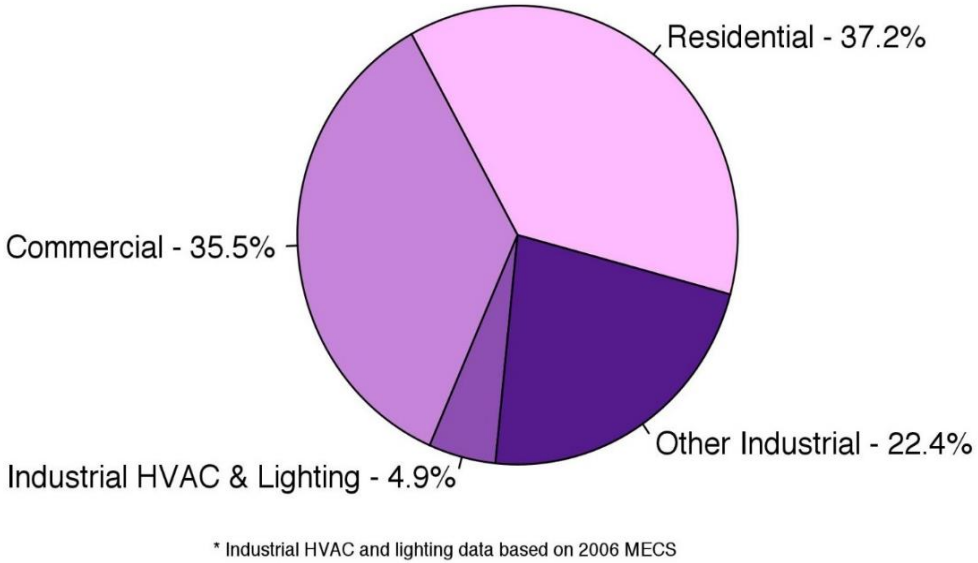
Energy Use



Electricity Use

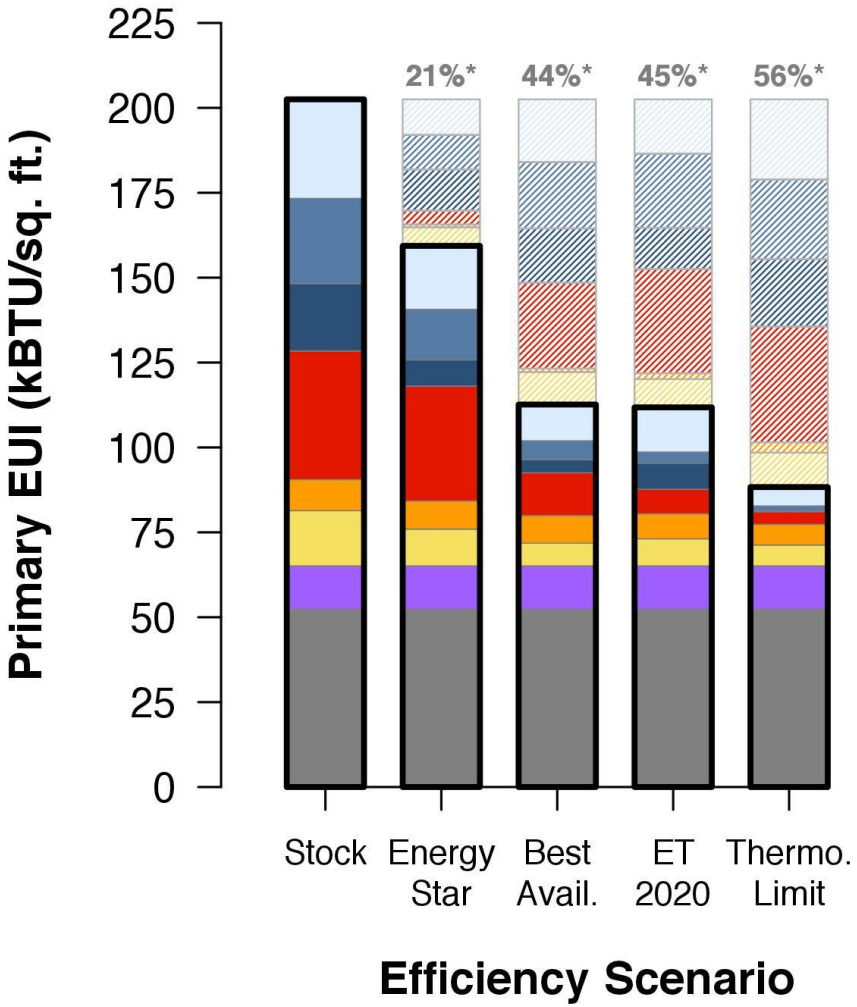


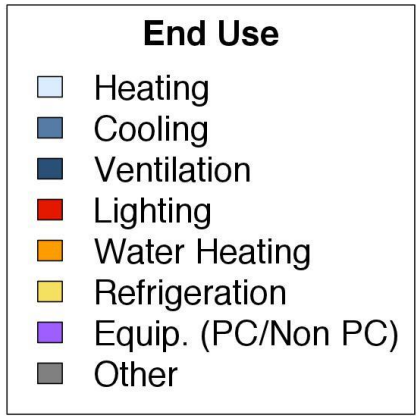
* Industrial HVAC and lighting data based on 2006 MECS

Buildings Energy Use: 40% of U.S. total
Buildings Electricity Use: 76% of U.S. total
U.S. Building Energy Bill: $410 billion per year

Potential Opportunities of Commercial Building Energy Efficiency

Commercial Energy (Composite, All Regions)





Lighting shows LARGE potential for efficiency improvement

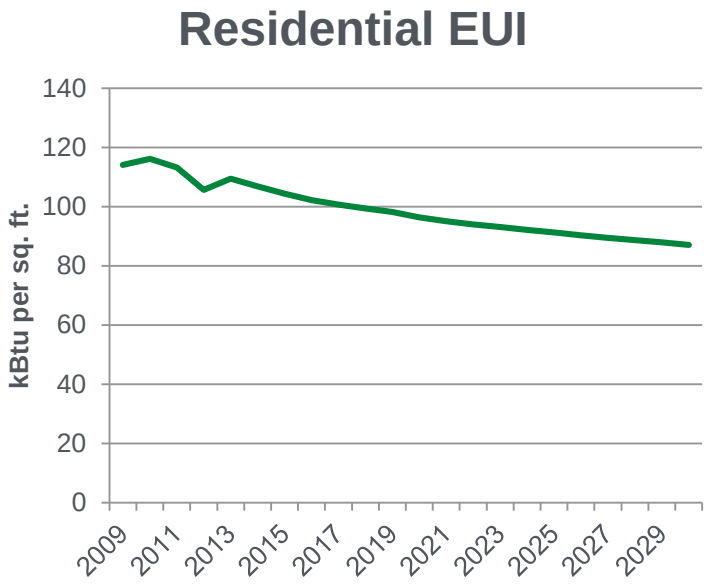
*Energy Savings %

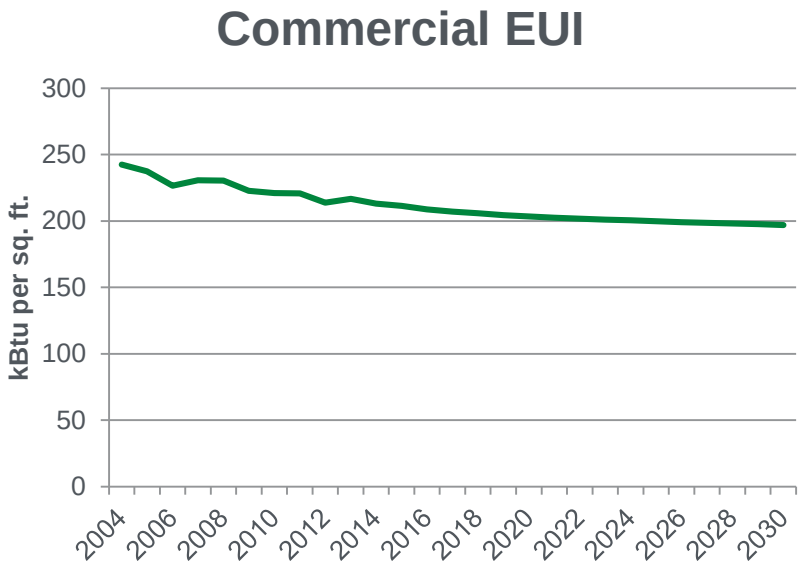
"Other" dominates in the future: Small electric devices, heating elements, outdoor grills, exterior lights, pool/spa heaters, etc.

Best available does not consider cost

ET 2020 includes cost effectiveness

Goal: Reduce Building Energy Use by 30% by 2030





2030 sector-wide goal: reduce energy use 30% per sq. ft.

Long term goal: reduce energy use 50% per sq. ft.

Metric: energy use intensity (EUI)

Baseline: 2010

Rationale: allows comparisons across fuel types, building types, building sectors, end uses, that are more internationally relevant.

Building Technologies Office (BTO)

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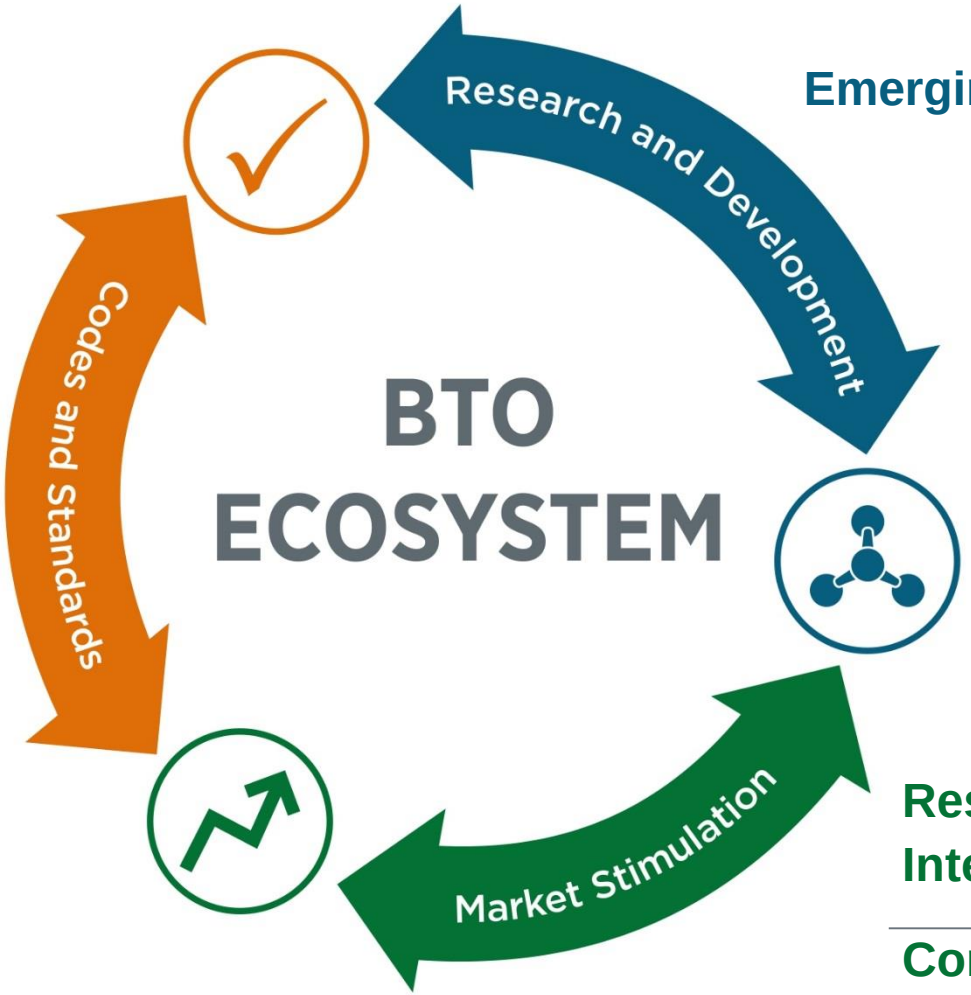
Building Codes

Appliance Standards



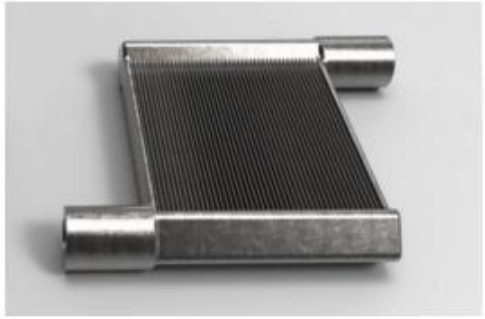
Emerging Technologies

Residential Buildings Integration

Commercial Buildings Integration

Some Recent Successes

3D-Printed Heat Exchanger



Rooftop Unit Adoption

Manufactured Homes

Low-E Storm Windows

Electrochemical Water Heater

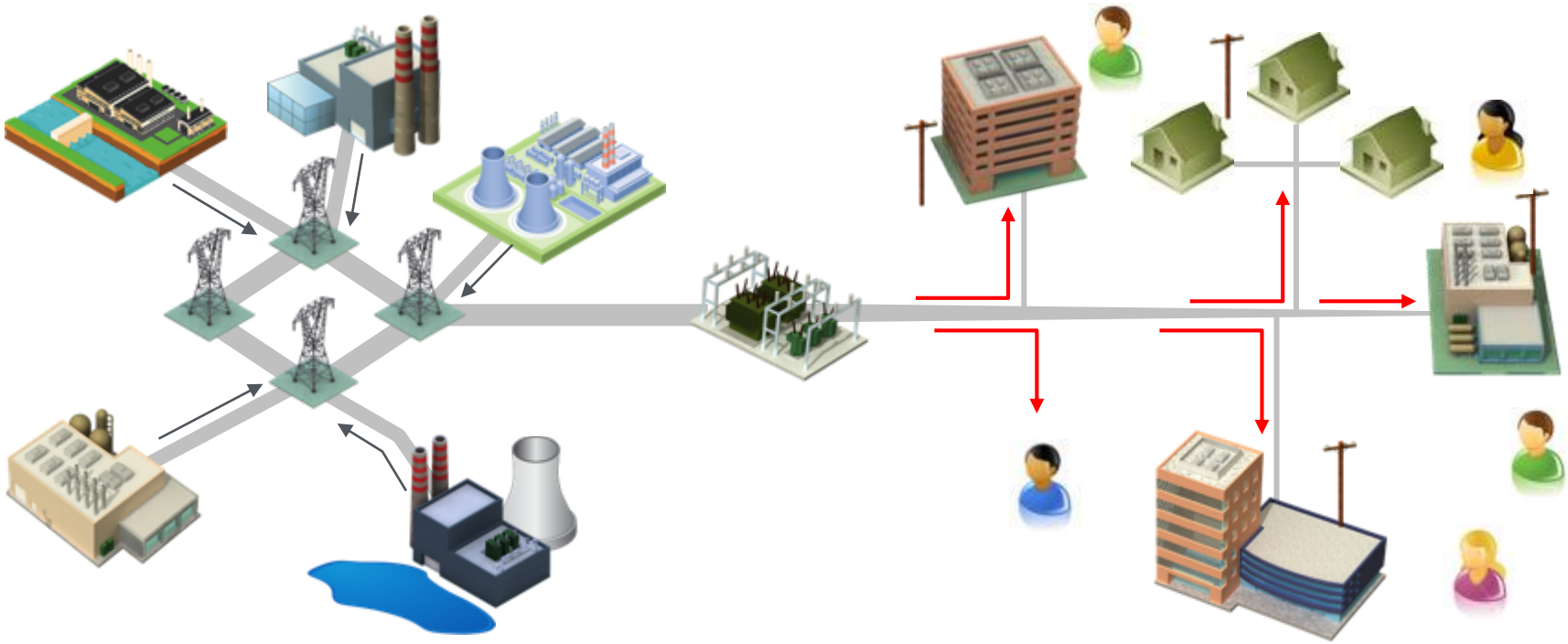
Low-GWP Refrigerant

Advanced Air Sealant

Low-GWP Refrigerator

Lighting Breakthroughs

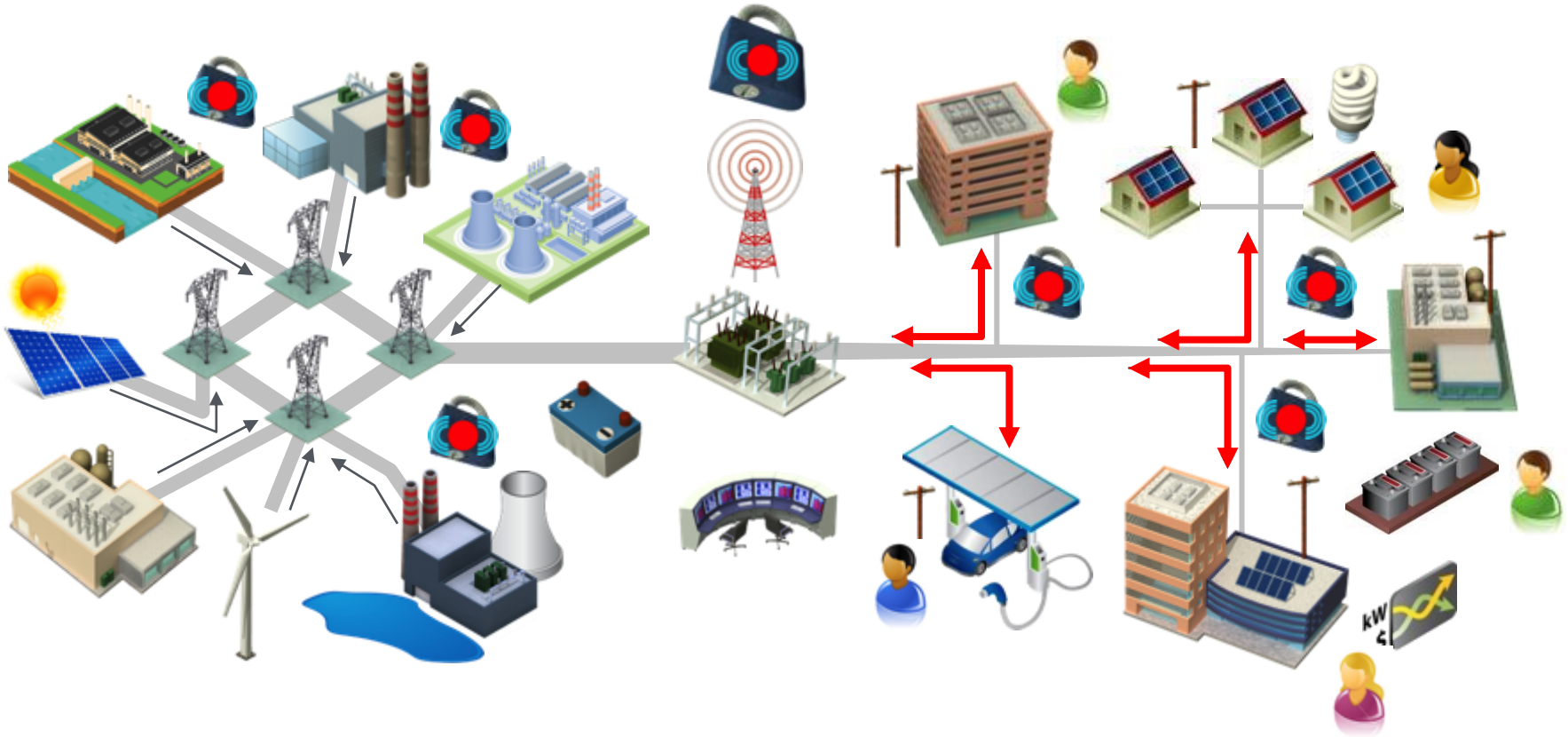
The Grid of the Past



Generation **Delivery** **Customer**

Source: EPRI, 2009

The Grid of the Future



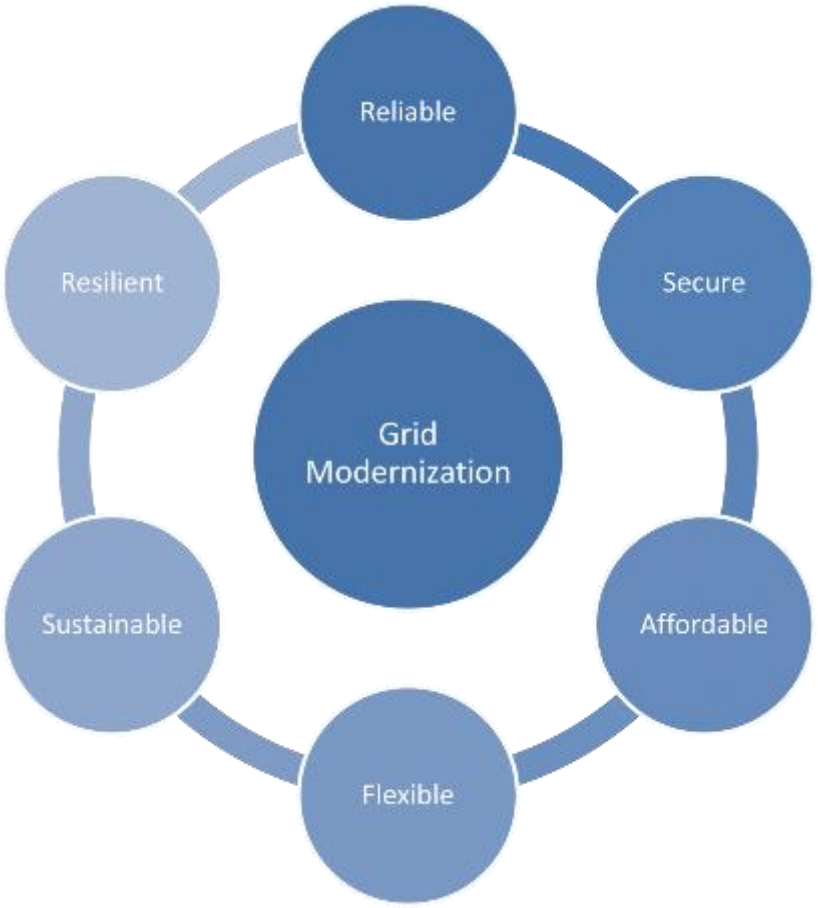
Generation **Delivery** **Producing consumers**

Source: EPRI, 2009

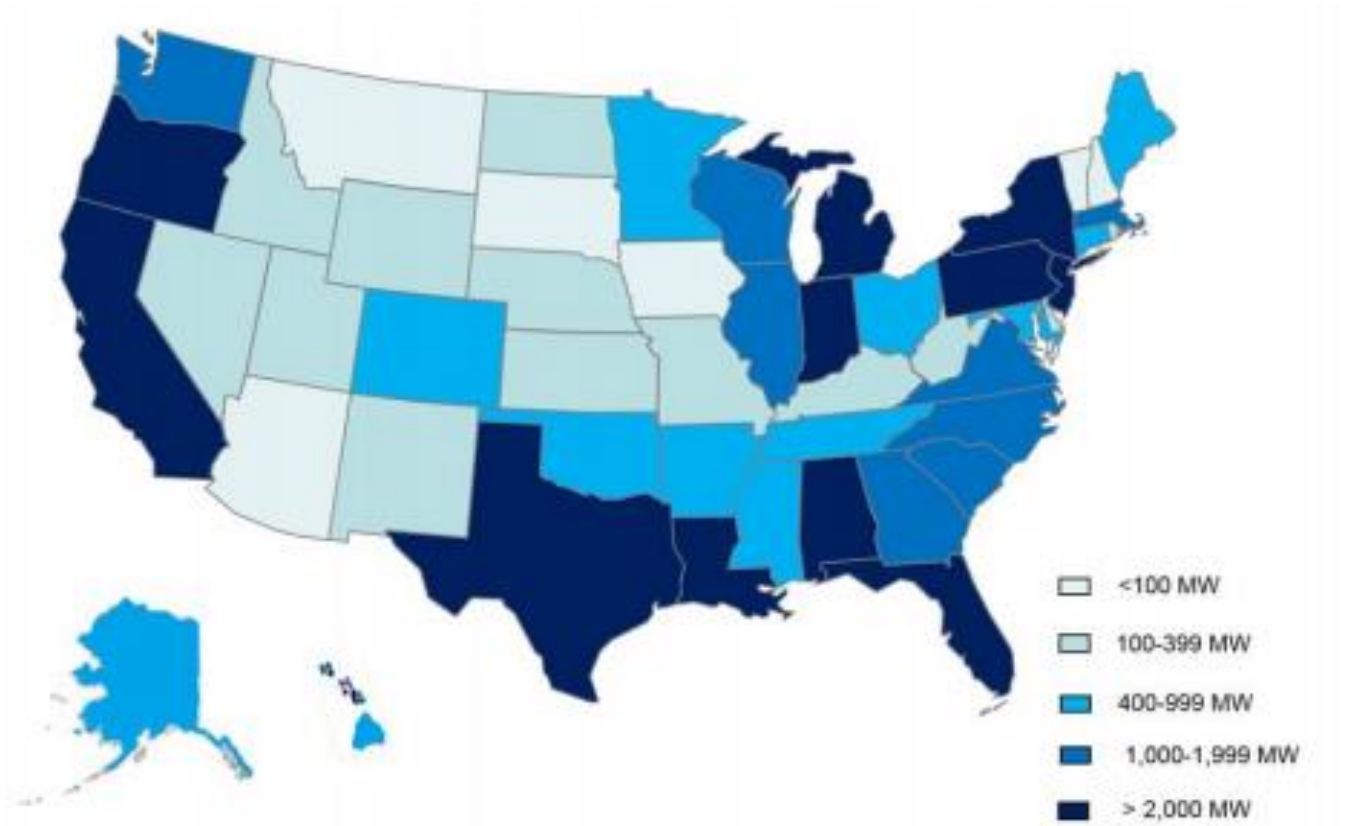
Grid Modernization Initiative

The vision of DOE's Grid Modernization Initiative (GMI) is:

- A future grid that will solve the challenges of seamlessly integrating conventional and renewable sources, storage, and central and distributed generation.
- The future grid as a critical platform for U.S. prosperity, competitiveness, and innovation in a global clean energy economy.
- A future grid that will deliver **resilient, reliable, flexible, secure, sustainable,** and **affordable** electricity to consumers where they want it, when they want it, how they want it.



Existing CHP Capacity by State

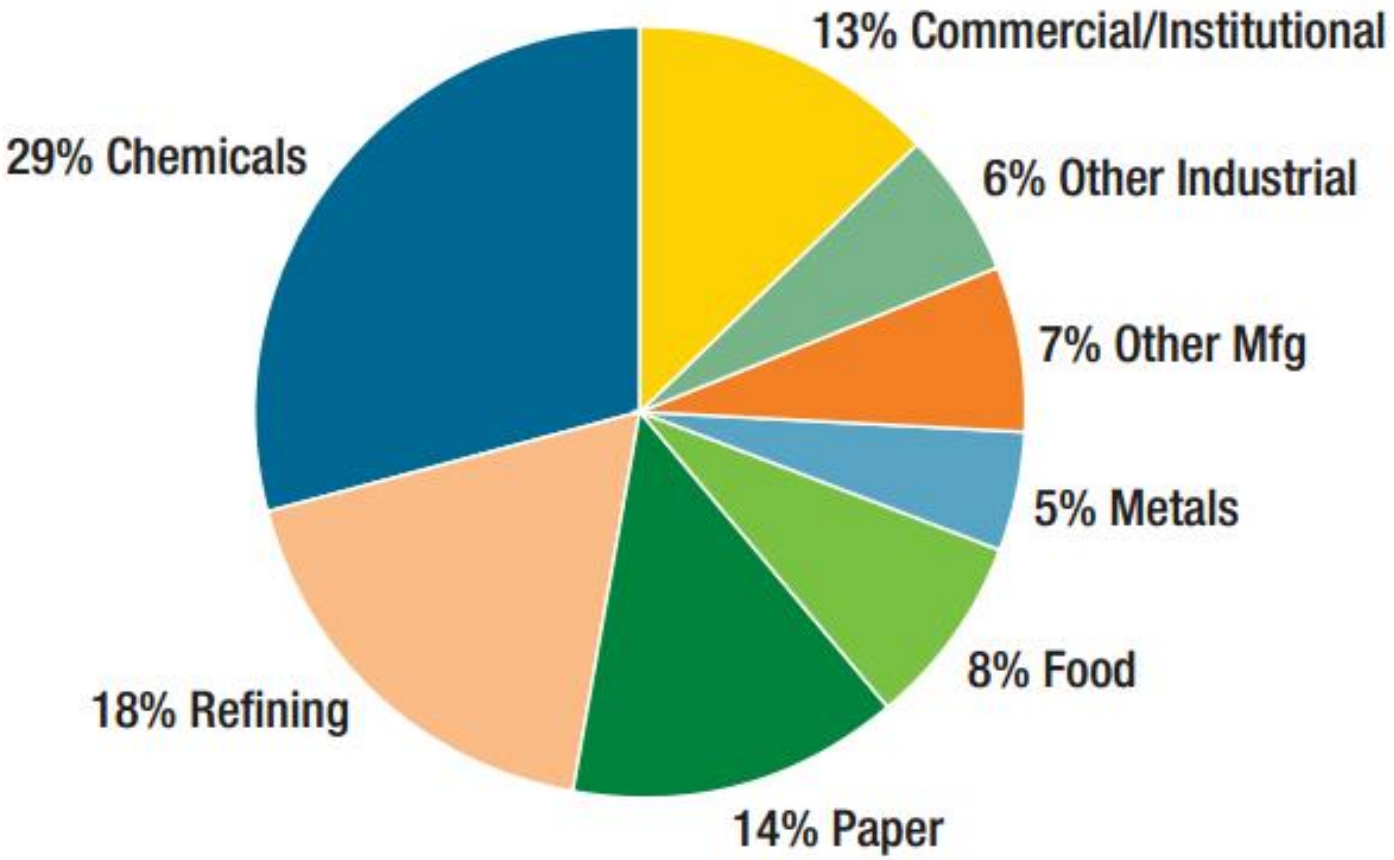


Source: DOE CHP Installation Database (U.S. installations as of December 31, 2014)

CHP Sites in the U.S.

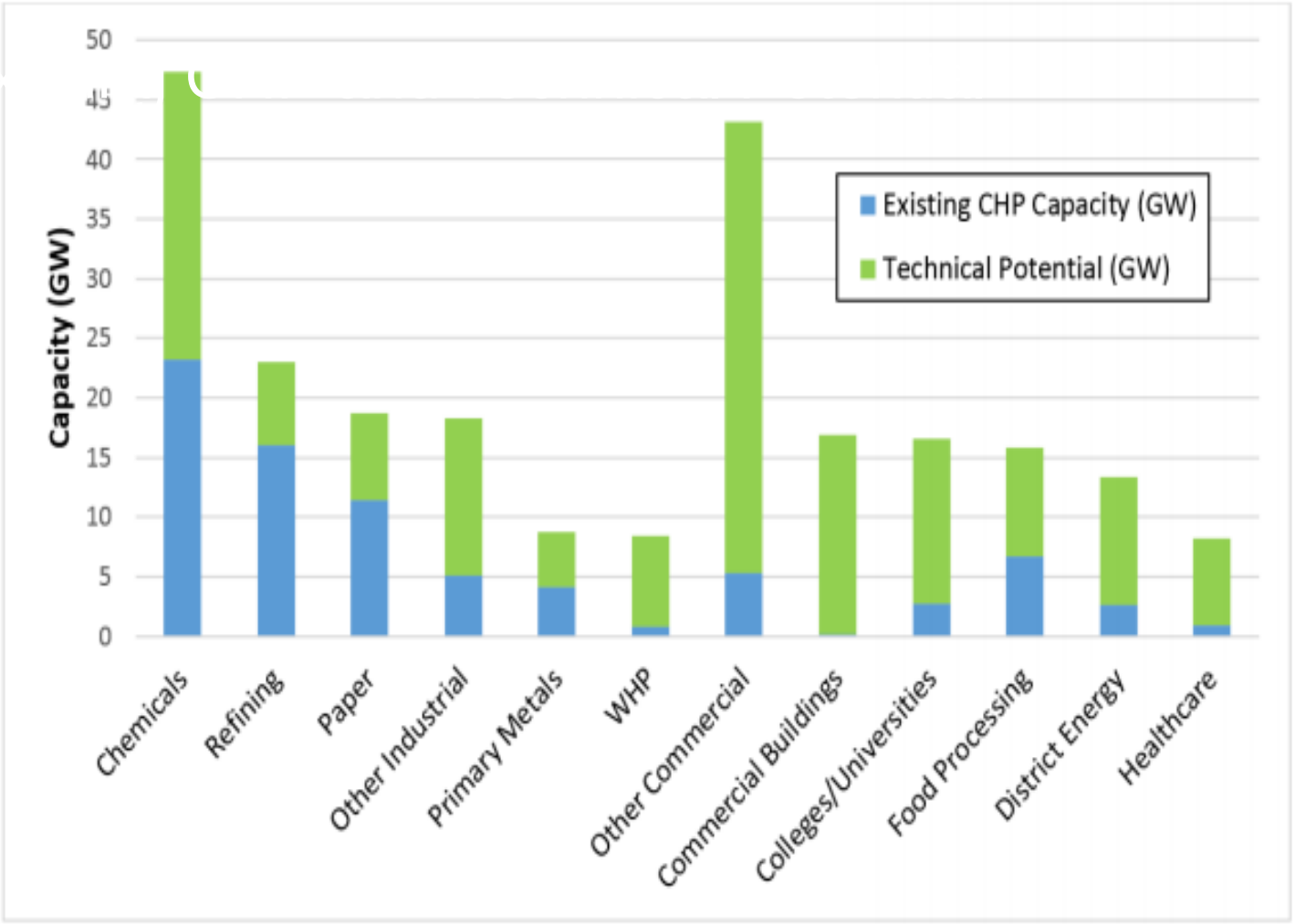
Source: CHP Installation Database, ICF International

Existing CHP Capacity by Facility Type



Source: DOE. “CHP: A Clean Energy Solution.” (Aug. 2012)

Existing CHP and Technical Potential



Source: DOE. “CHP Technical Potential in the U.S.” (March 2016)

Louisiana CHP Technical Potential

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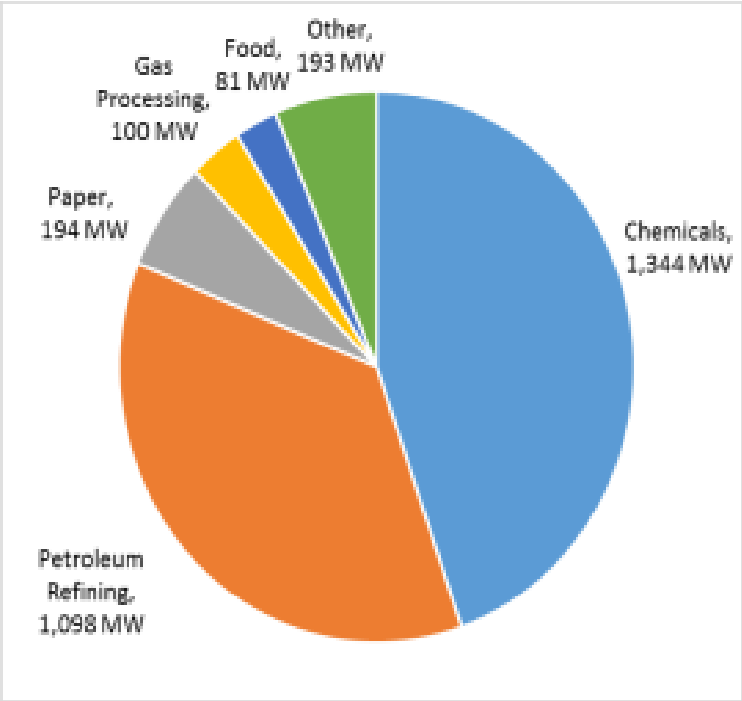
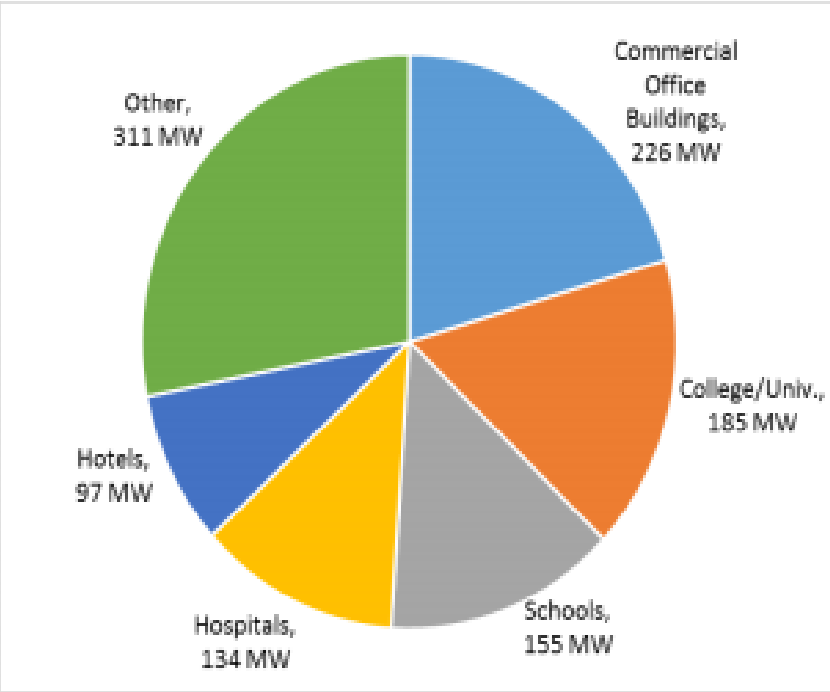
Industrial CHP Potential



Commercial CHP Potential



Source: DOE. “CHP Technical Potential in the U.S.” (March 2016)

CHP System at Frito Lay Facility

Photo courtesy of Energy Solutions Center