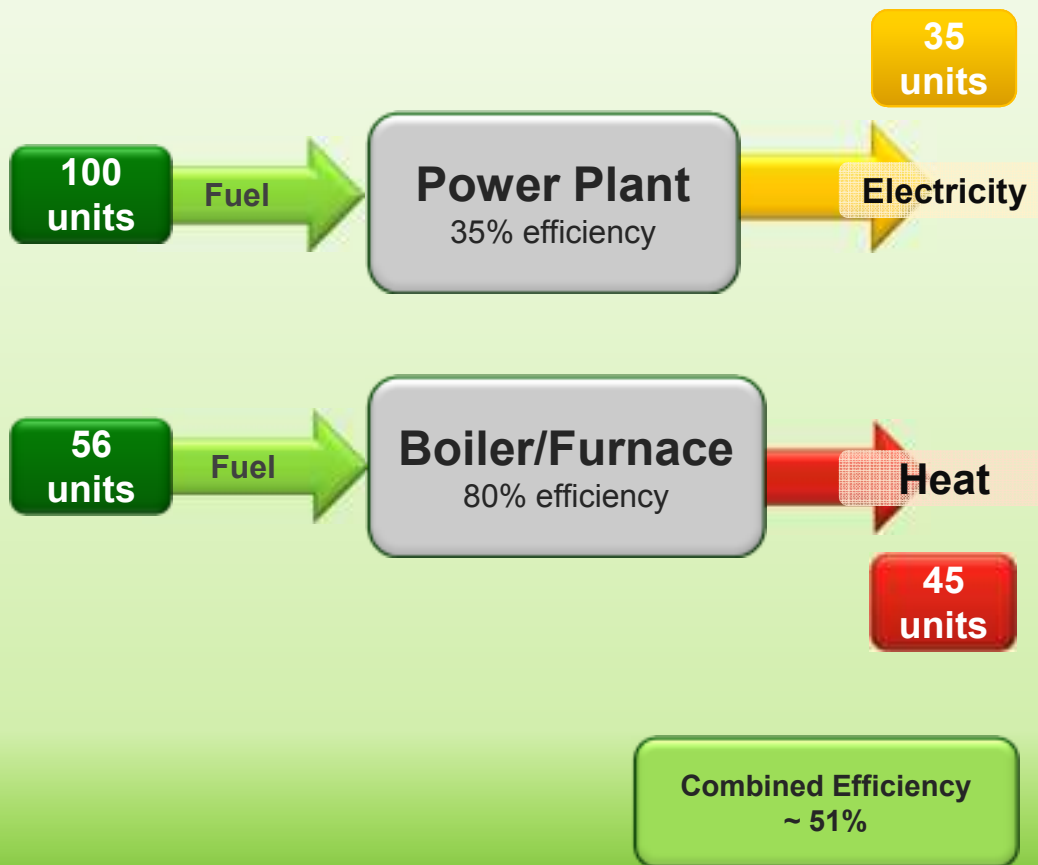


Introduction to Combined Heat & Power (CHP) and Waste Heat Recovery (WHR) Technologies

Congressional Educational Briefing
November 17th, 2011

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Energy Resources Center
University of Illinois at Chicago

Traditional Energy Systems



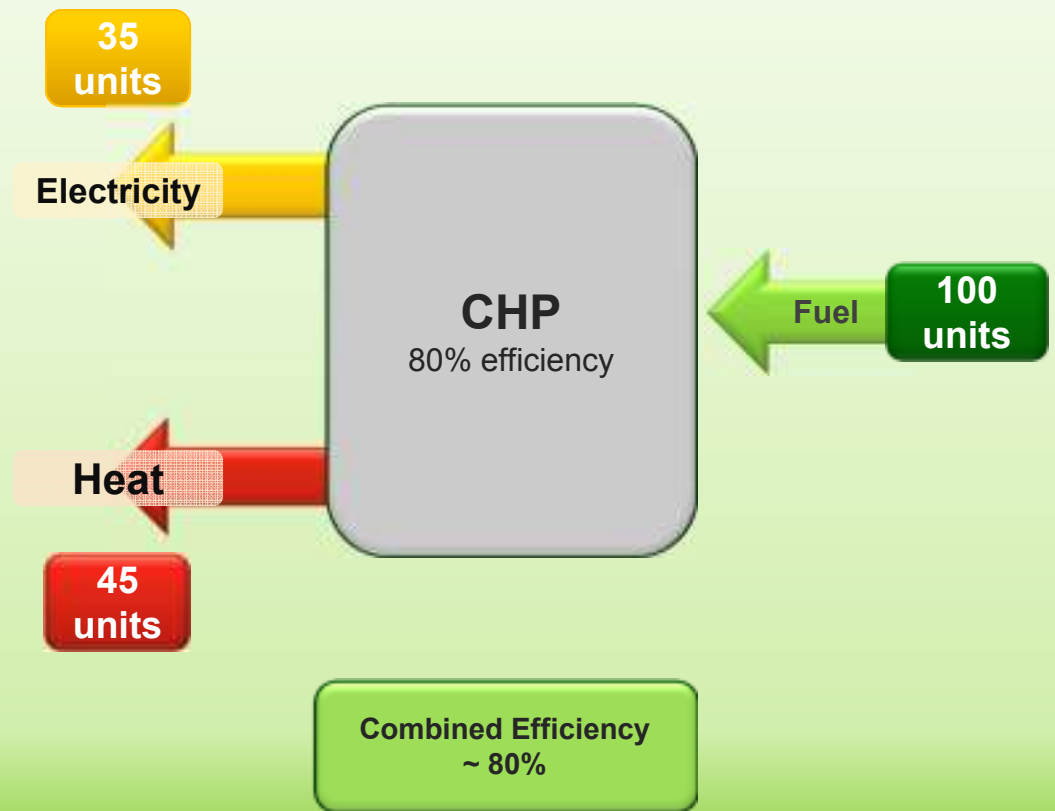
Combined Heat and Power

Conventional CHP

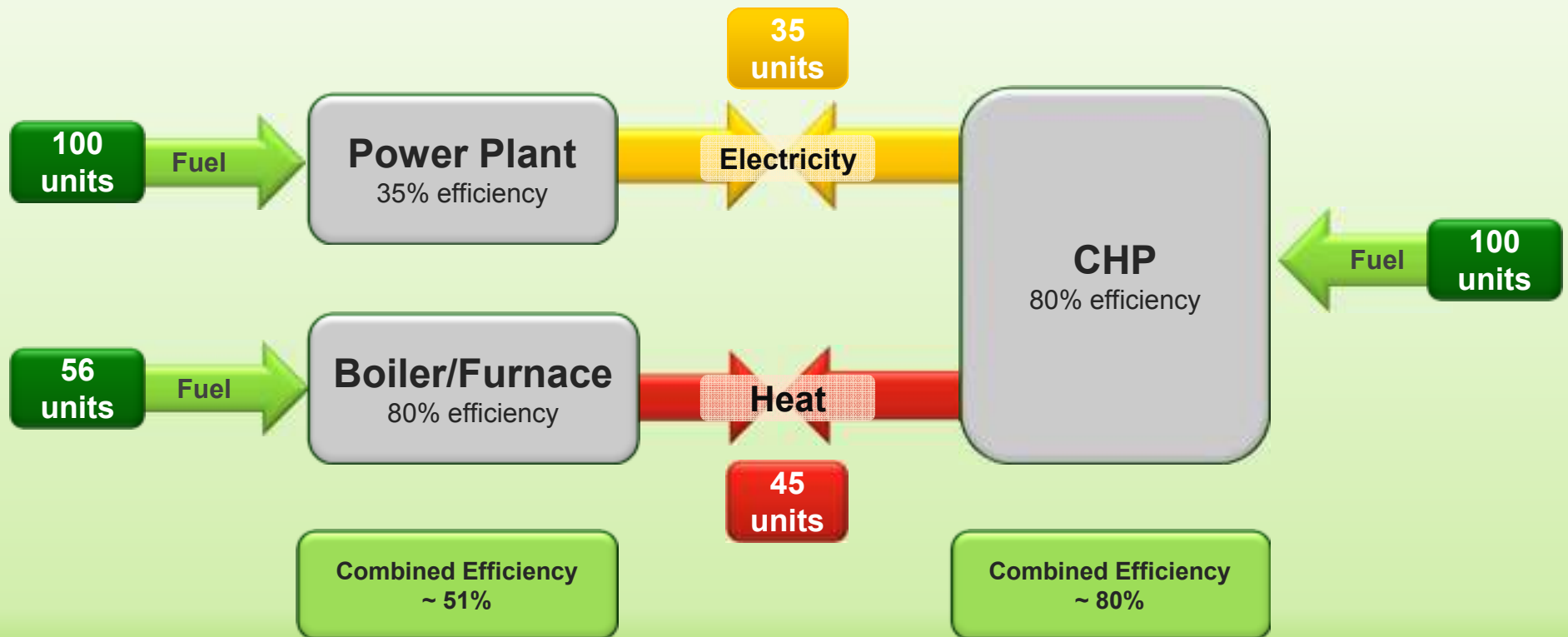


The onsite sequential production of useful electric and thermal power from a single dedicated fuel source

Conventional CHP System



Traditional Energy System vs. Conventional CHP System



Combined Heat and Power

Conventional CHP



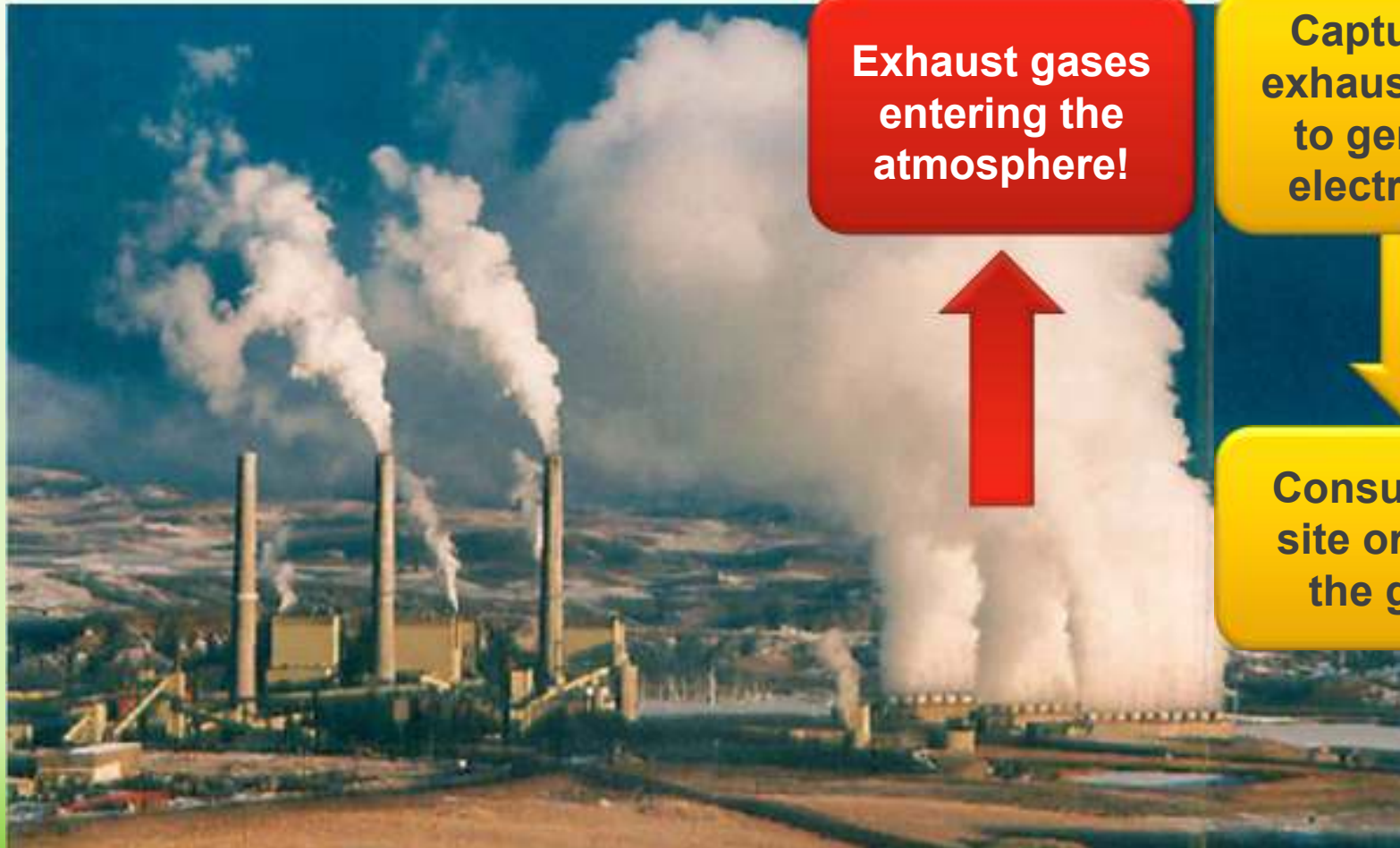
The sequential production of useful electric and thermal power from a single dedicated fuel source

Waste Heat Recovery



Captures heat otherwise wasted in an industrial / commercial process and utilizes it to produce electric power.

Another Form of CHP = Waste Heat Recovery



**Exhaust gases
entering the
atmosphere!**

**Capture the
exhaust gases
to generate
electricity!!!**

**Consume on-
site or sell to
the grid...**

Positive Impacts and Benefits

- **Enhance U.S. energy security** by reducing our national energy requirements and help businesses weather energy price volatility and supply disruptions
- **Improve business competitiveness** by increasing energy efficiency and managing costs (maintain jobs)
- **Increase resiliency of U.S. energy infrastructure** by limiting congestion and offsetting transmission losses
- **Diversify energy supply** by enabling further integration of domestically produced and renewable fuels
- **Improve energy efficiency** by capturing heat that is normally wasted

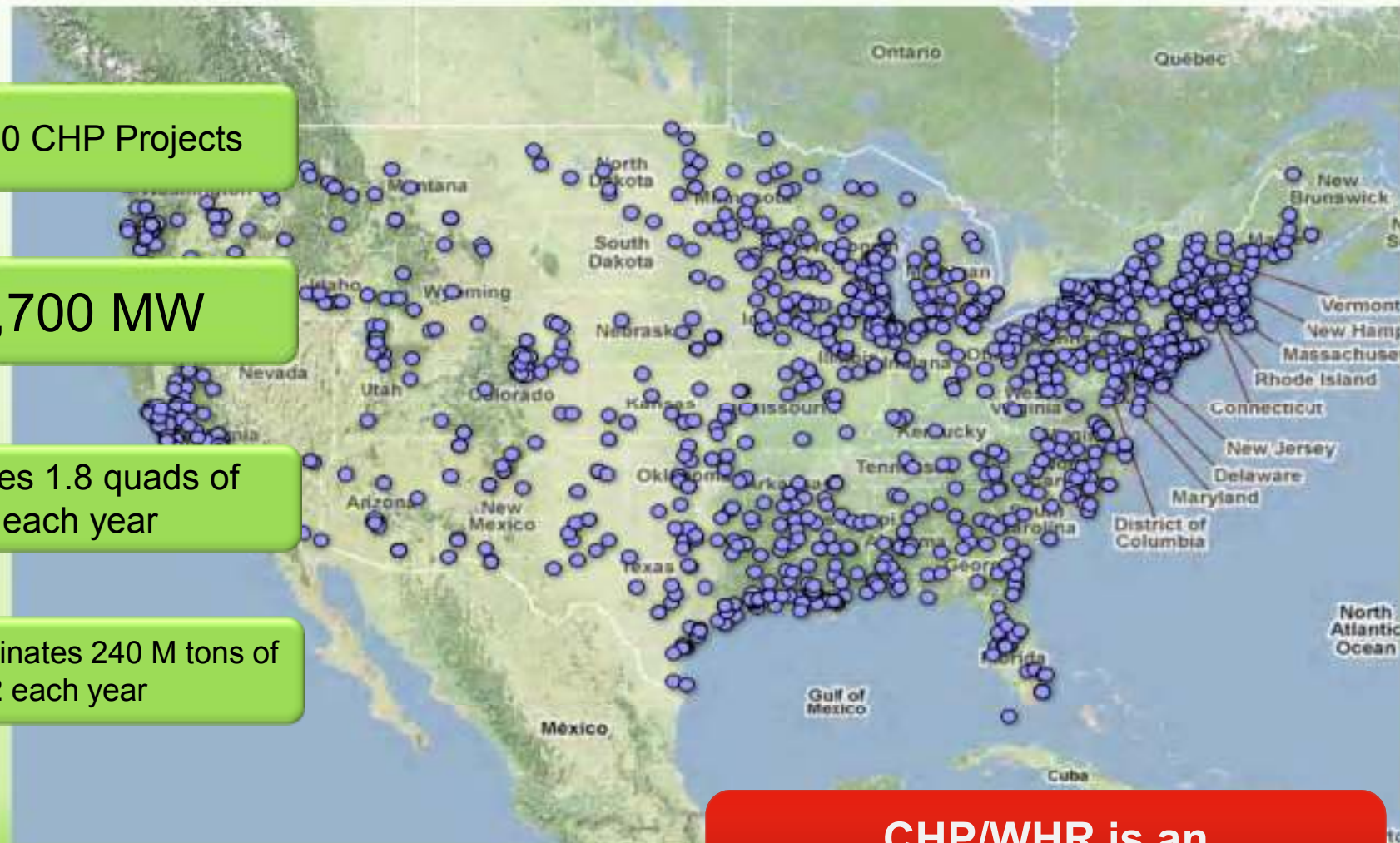
CHP Is Used at the Point of Demand

3,700 CHP Projects

81,700 MW

Saves 1.8 quads of fuel each year

Eliminates 240 M tons of CO₂ each year



CHP/WHR is an Underutilized Resource!!!

What if CHP Represented 20% of US Generating Capacity in 2030?

Historical CHP Capacity and Growth Needed to Achieve 20% of Generation



- \$234 billion private sector investment
- Nearly 1 million new jobs
- Reduces fuel use and CO₂ emissions

	2010	2030
CHP Capacity	81.7 GW	241 GW
Annual Fuel Savings	1.8 quads	5.3 quads
Total Annual CO ₂ Reduction	240 MMT	848 MMT
Cars Taken off Road (Equivalent)	42 million	154 million

Getting to 20% by 2030

- Good Federal Policies
- Favorable Recognition at the State Level
- Accepted (Tolerated) by Electric Utilities
- Educating End Users & Federal/State Representatives
- Technology Advancements

Thank You

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