# Promoting Industrial Energy Efficiency, CHP, & WHP in CPP Implementation

## Electricity Consumers Resource Council – Spring Workshop

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# Agenda

- Energy efficiency offers significant benefits
- CHP is a valuable compliance option under the CPP
- EPA treats CHP well in the final CPP
- States will need to develop plans that take advantage of this opportunity
- Next steps

# ArcelorMittal (Indiana)

- Energy recovery and reuse 504 boiler project
- $63.2 million total project cost
- $31.6 million DOE grant
- $20 million in annual energy savings
- Payback (with DOE grant): 1.58 years
- Generates 90 MW
- Provides 20% of energy needs

# Sikorsky Aircraft (Connecticut)

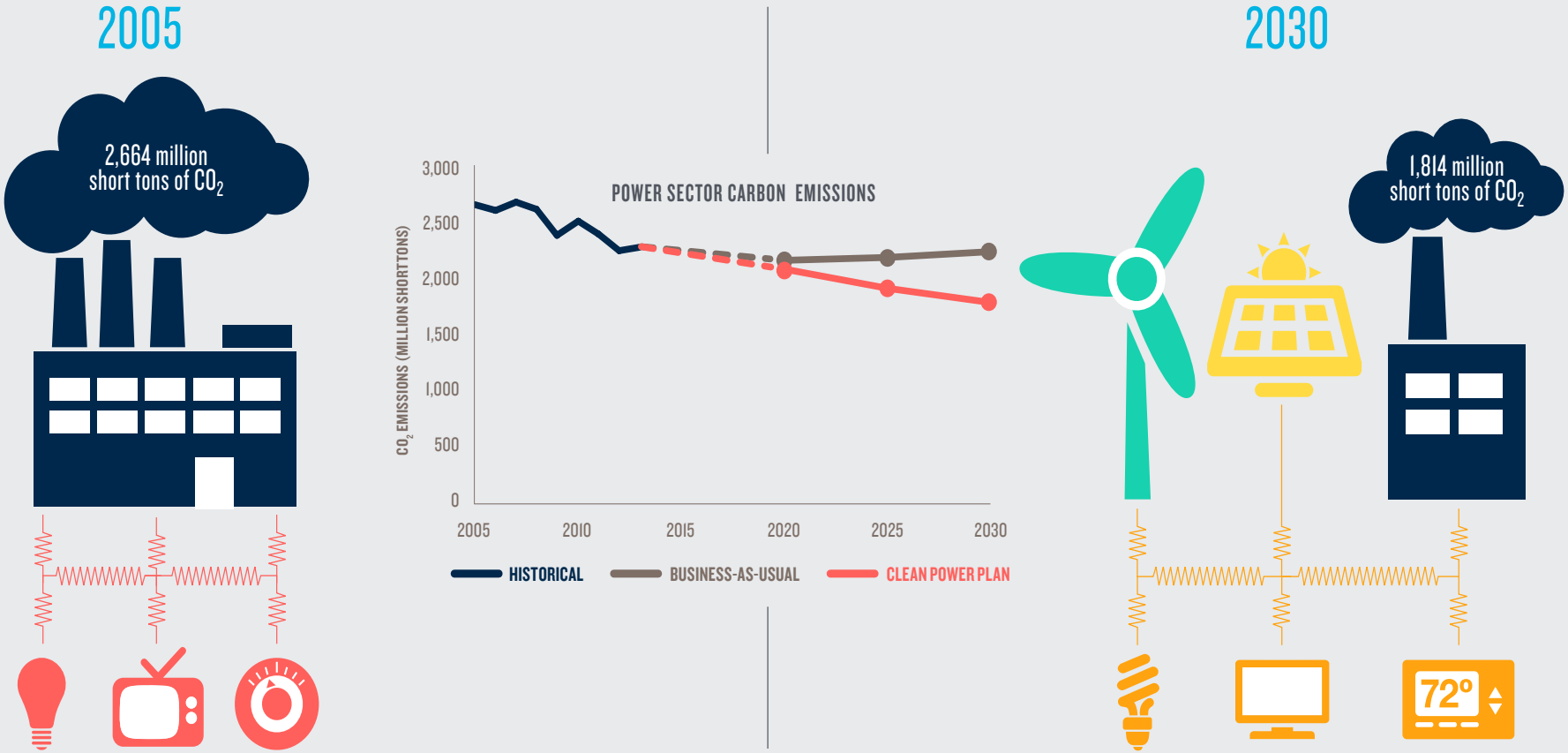
- $30.6-million installed costs
- $4.66-million state grant
- $6.5-million in annual energy savings
- Generates 10 MW
- Provides 85% of energy needs
- Enhanced reliability

# Nissin Brake (Ohio)

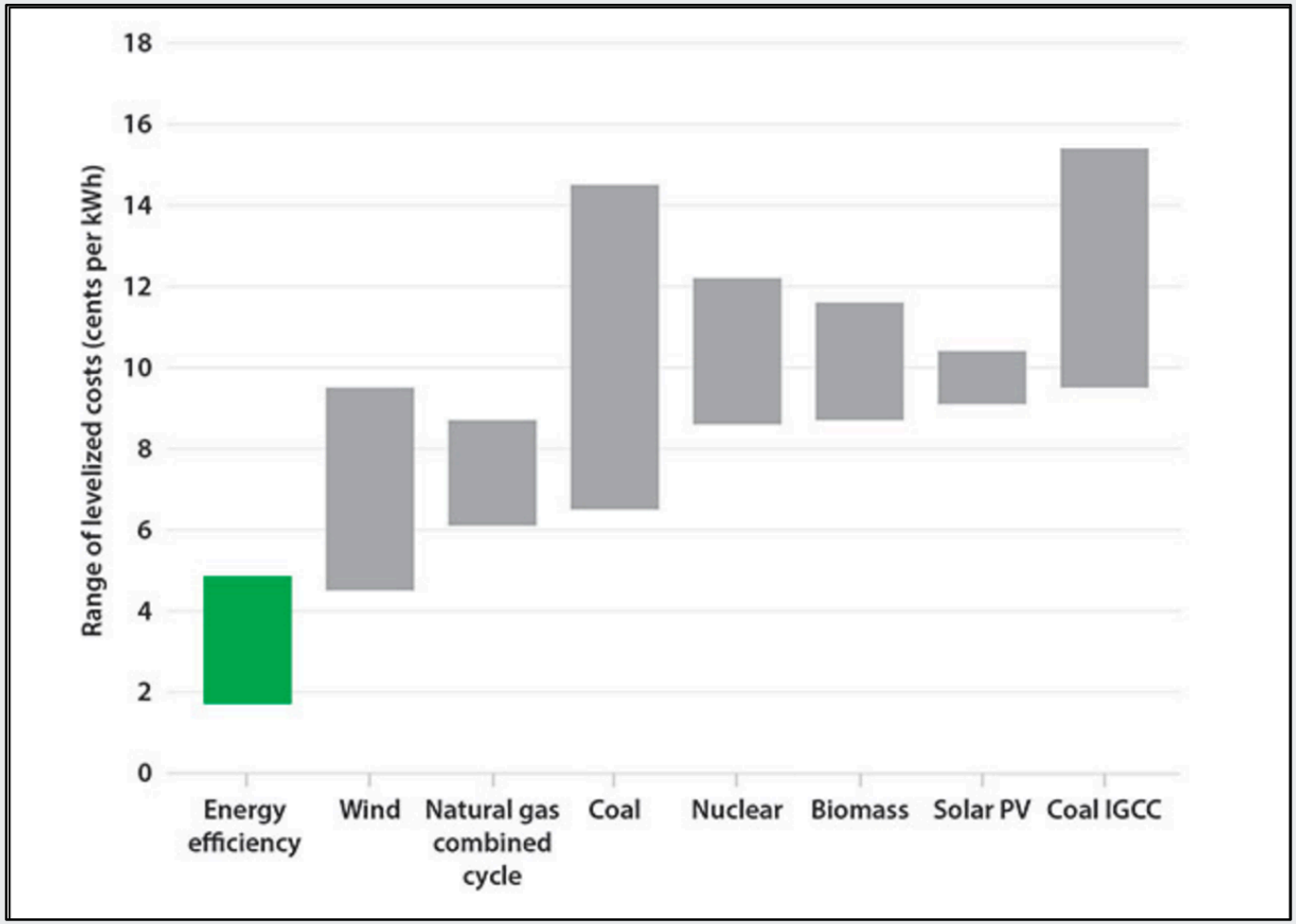
- Air compressor controls, air drying, lighting
- $185,322 total project cost
- $58,012 total incentives paid
- Payback period without AEP incentives: 2.8 years
- Payback period with AEP incentives: 1.9 years
- 801,921 kWh in annual energy savings

# POWER SECTOR CARBON EMISSIONS

## The Clean Power Plan should reduce power plant carbon pollution 32% below 2005 levels in 2030.

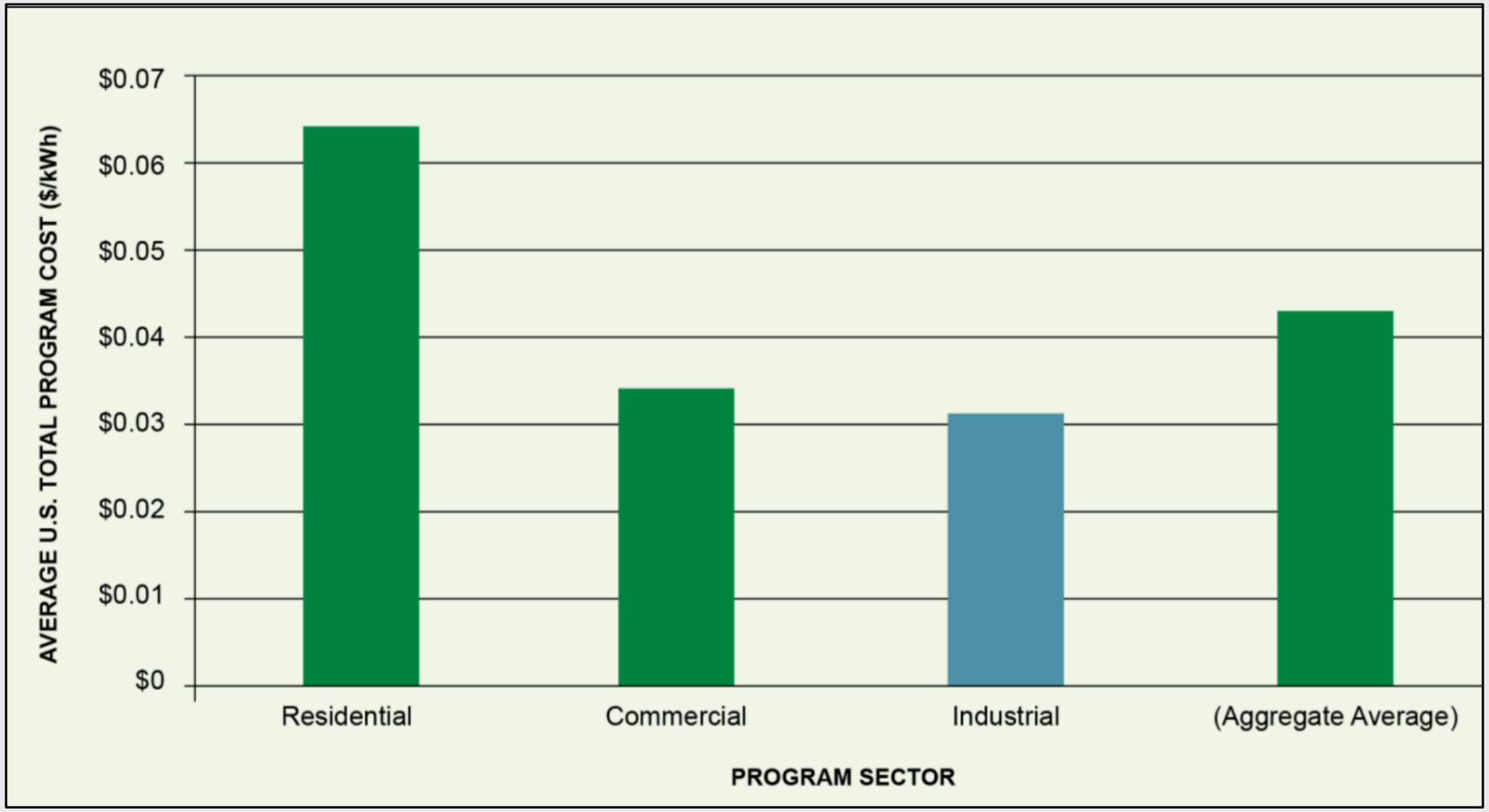


# Energy Efficiency Keeps Bills Down



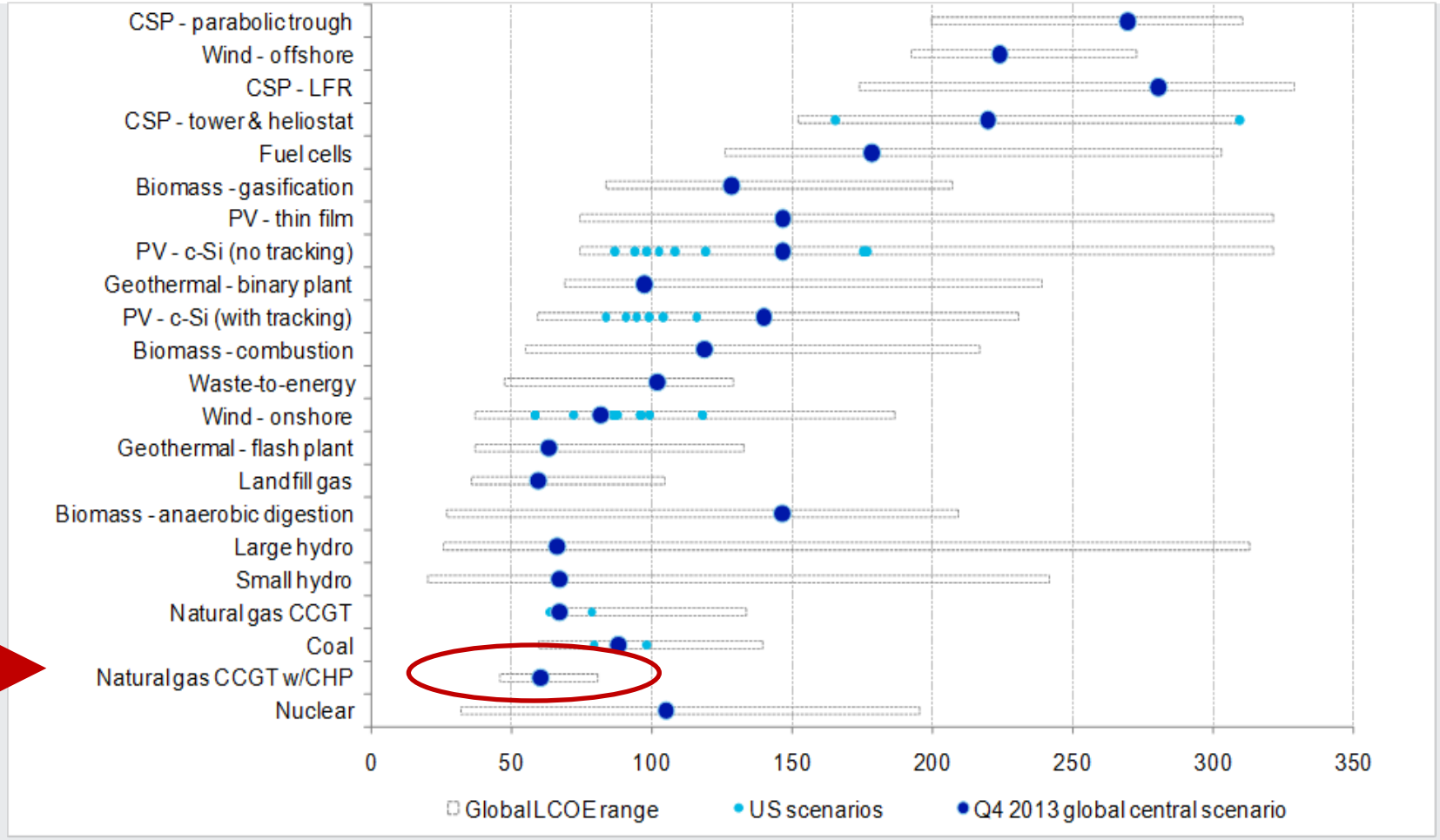

Source: ACEEE 2014

# Industrial Efficiency Is the Cheapest Source of Efficiency




Source: Aden et al. 2013

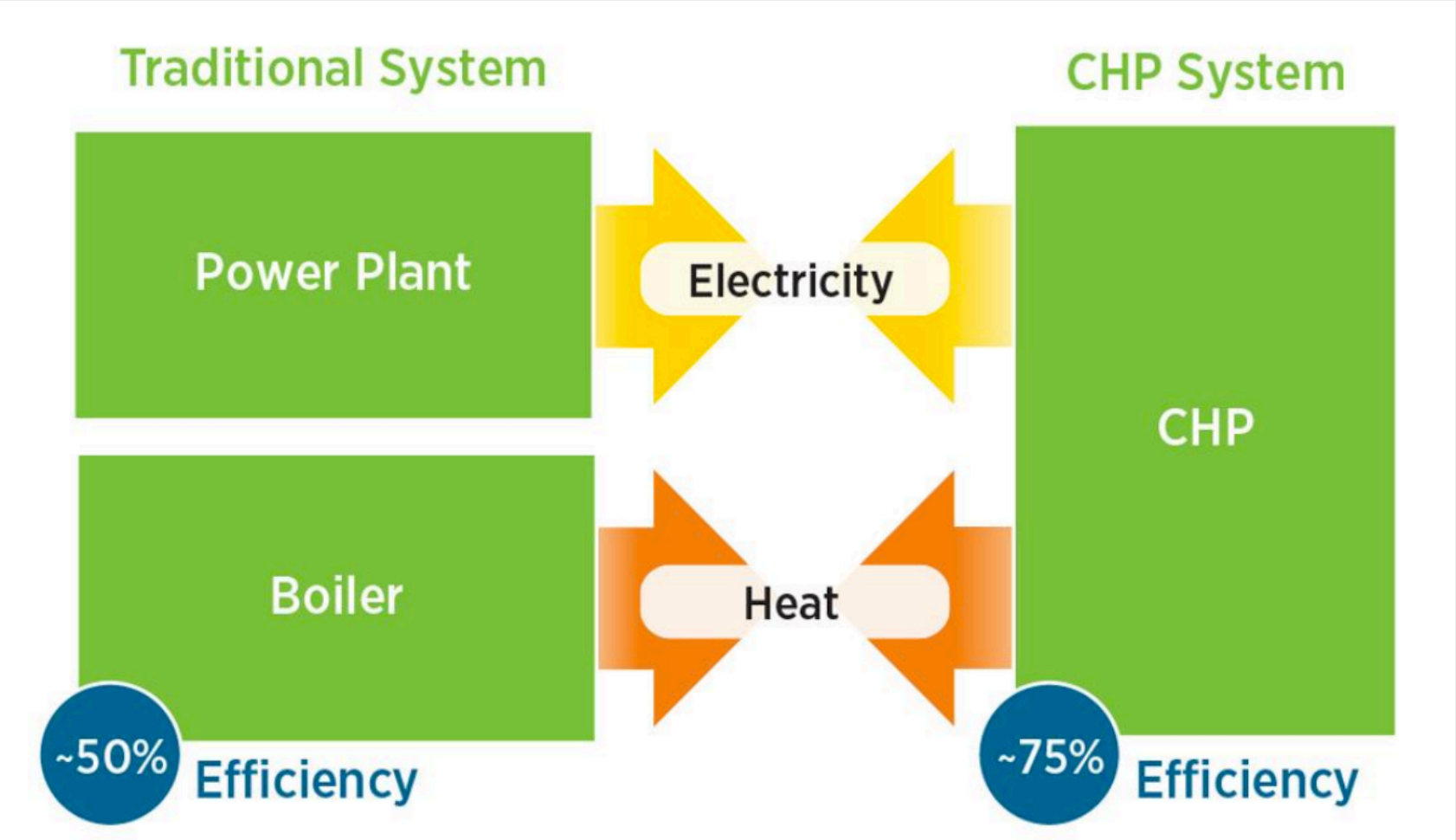
# CHP Is Cost Effective



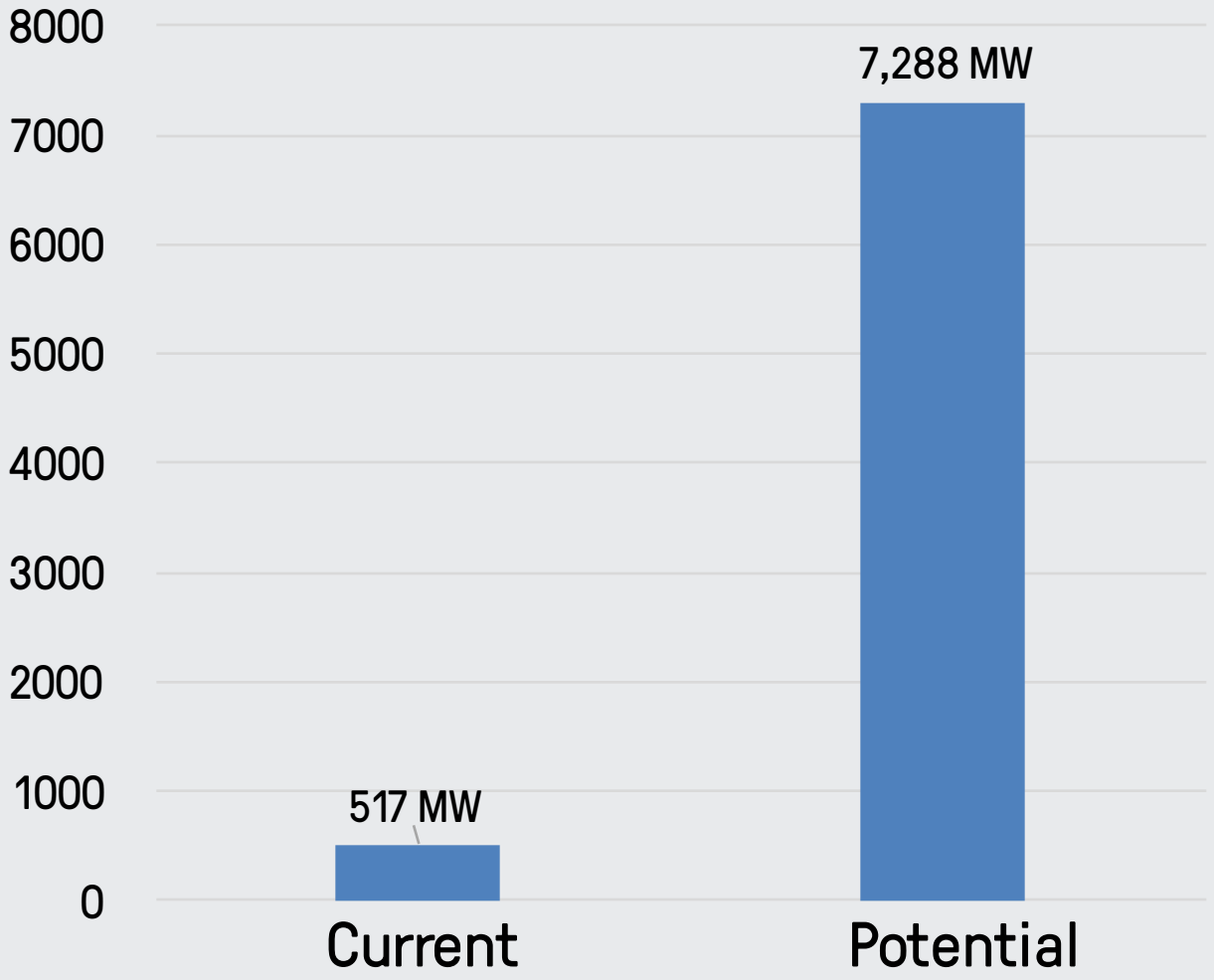

Levelized Costs of Energy across Power Generation Technologies, Q4 2013 ($/MWh)

Source: BCSE 2014

# CHP Is an Efficient Way to Produce Power .... And Lower Emissions

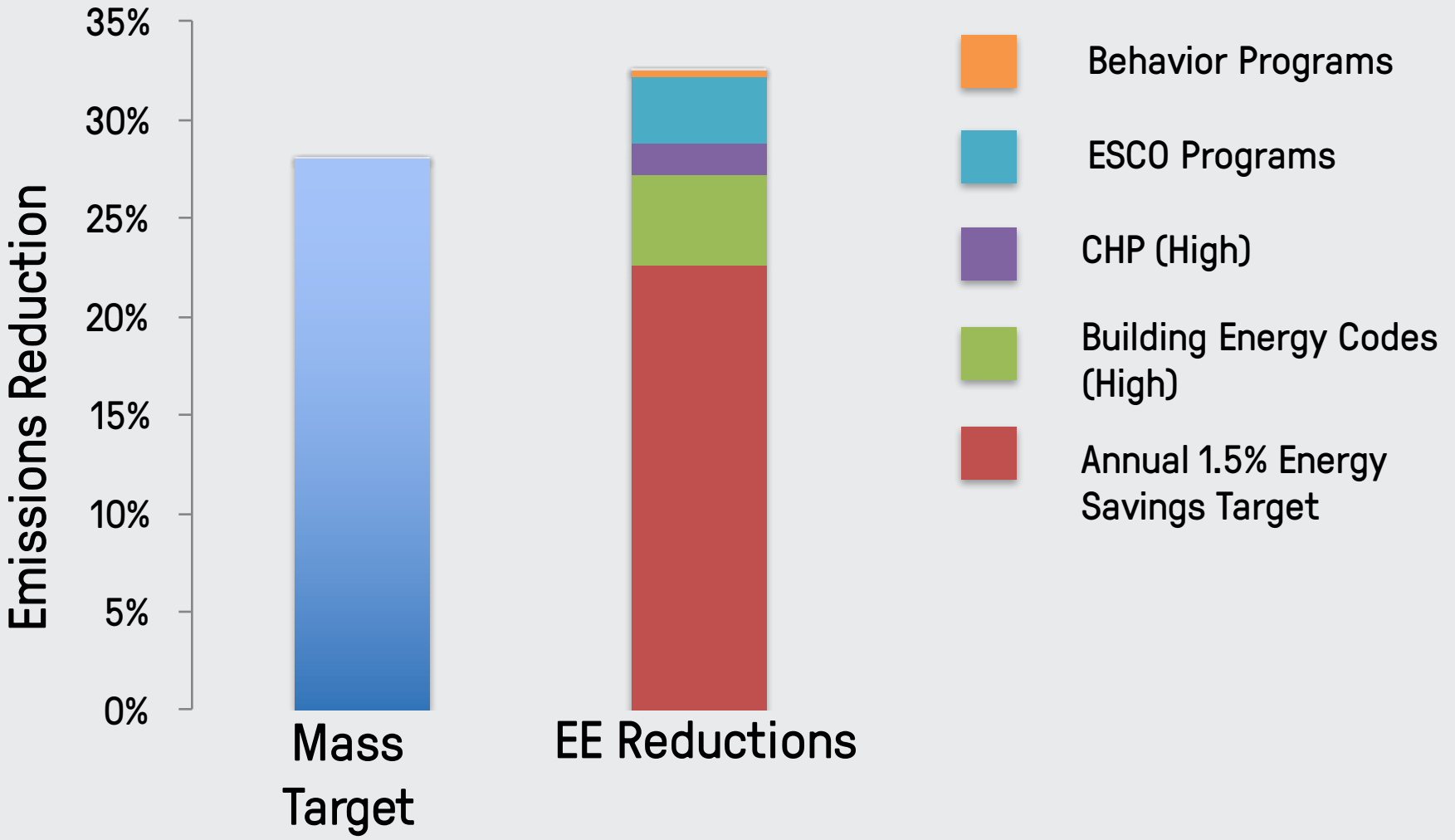


# Ohio CHP Potential



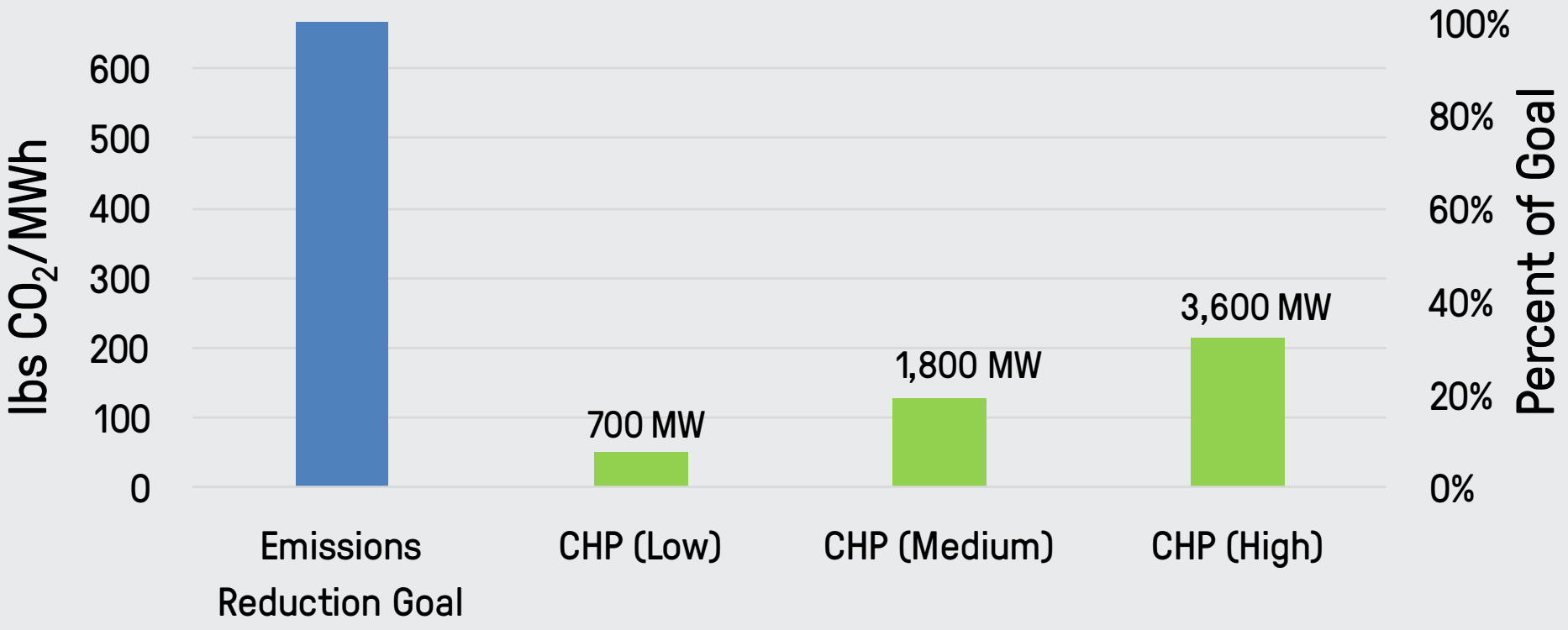

Source: "CHP Technical Potential in the United States", DOE-ICF, March 2016

# Energy Efficiency Helps Ohio Achieve CPP Targets




Source: ACEEE's SUPR-2 Calculator

# Impact of CHP on Ohio's CPP Targets




Source: ACEEE's SUPR-2 Calculator

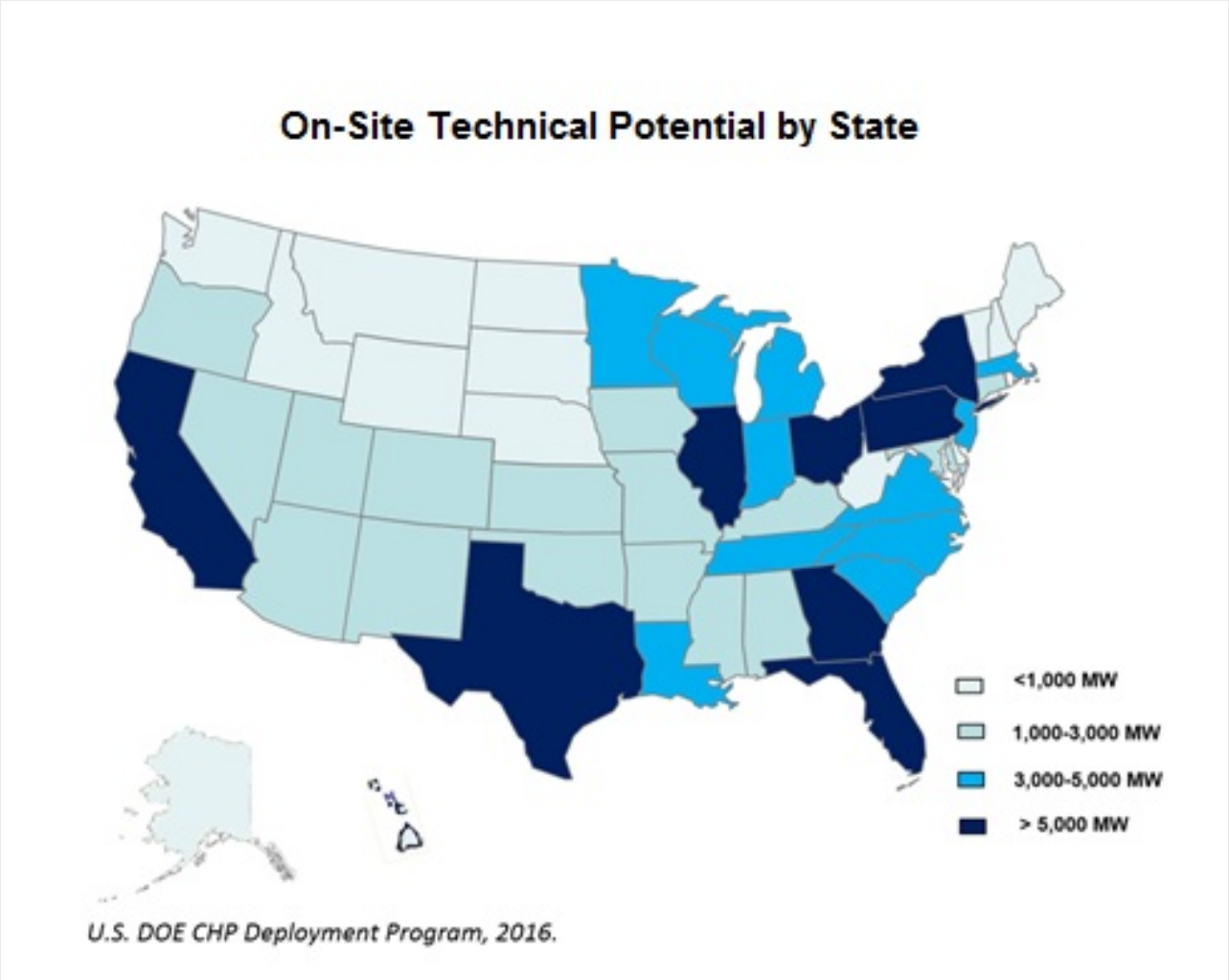
# Current CHP Projects


Source: CHP Installation Database, March 2014

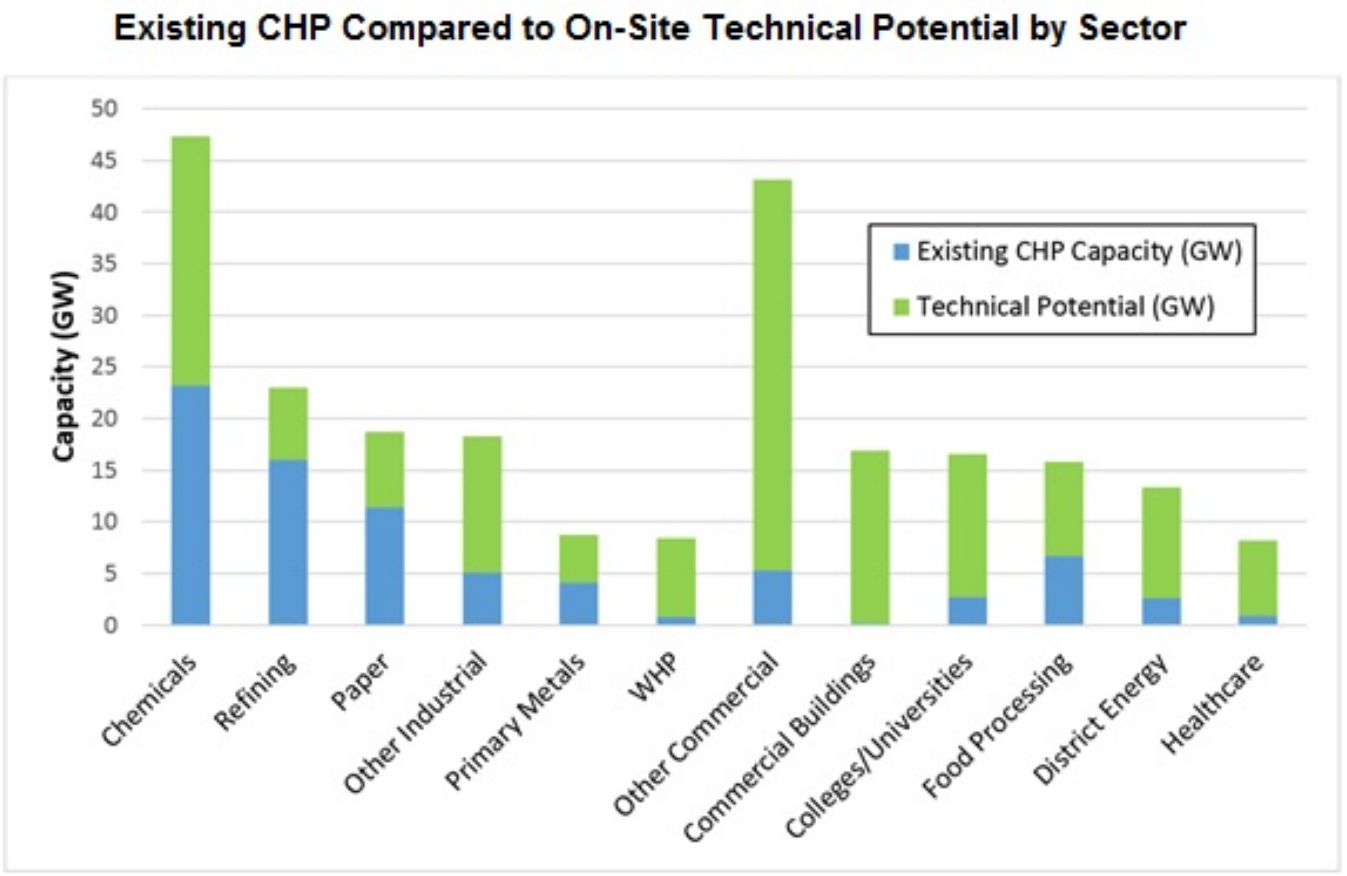
# Affected Units

- Constructed before 2014
- Sell more than 25 MW to the grid
- **Excludes** units that sell < 25 MW or < 1/3 power to the grid
- **Excludes** units which have historically limited fossil fuel use to < 10% capacity factor
- **Excludes** units that are not connected to natural gas pipelines
- **Excludes** highly efficient units

# CHP Technical Potential



# Remaining Potential for CHP




*U.S. DOE CHP Deployment Program, 2016.*

# CHP as a Compliance Option

- Installed after 2012 (post-2022 generation)
- Non-affected units
- Eligible under a rate or mass-based approach

"Electric generation from **non-affected CHP units may be used to adjust the $CO_2$ emission rate** of an affected EGU, as CHP units are low-emitting electric generating resources that can replace generation from affected EGUs."
- 80 Fed. Reg. at 64902

# Two Compliance Approaches

## Rate

$$\text{Target} = \frac{\text{CO}_2 \text{ emitted (lbs)}}{\text{Generation + ERCs (MWh)}}$$

e.g., 1,190 lbs/MWh in 2030 (Ohio)

*CHP may earn Emission Rate Credits (ERCs)*

## Mass

$$\text{Target} = \text{CO}_2 \text{ emitted (tons)}$$

e.g., 73,769,806 tons in 2030 (Ohio)

*CHP may earn Allowances or other incentives*

# How Could it Work in Practice?

- Manufacturer Installs a 10 MW CHP system

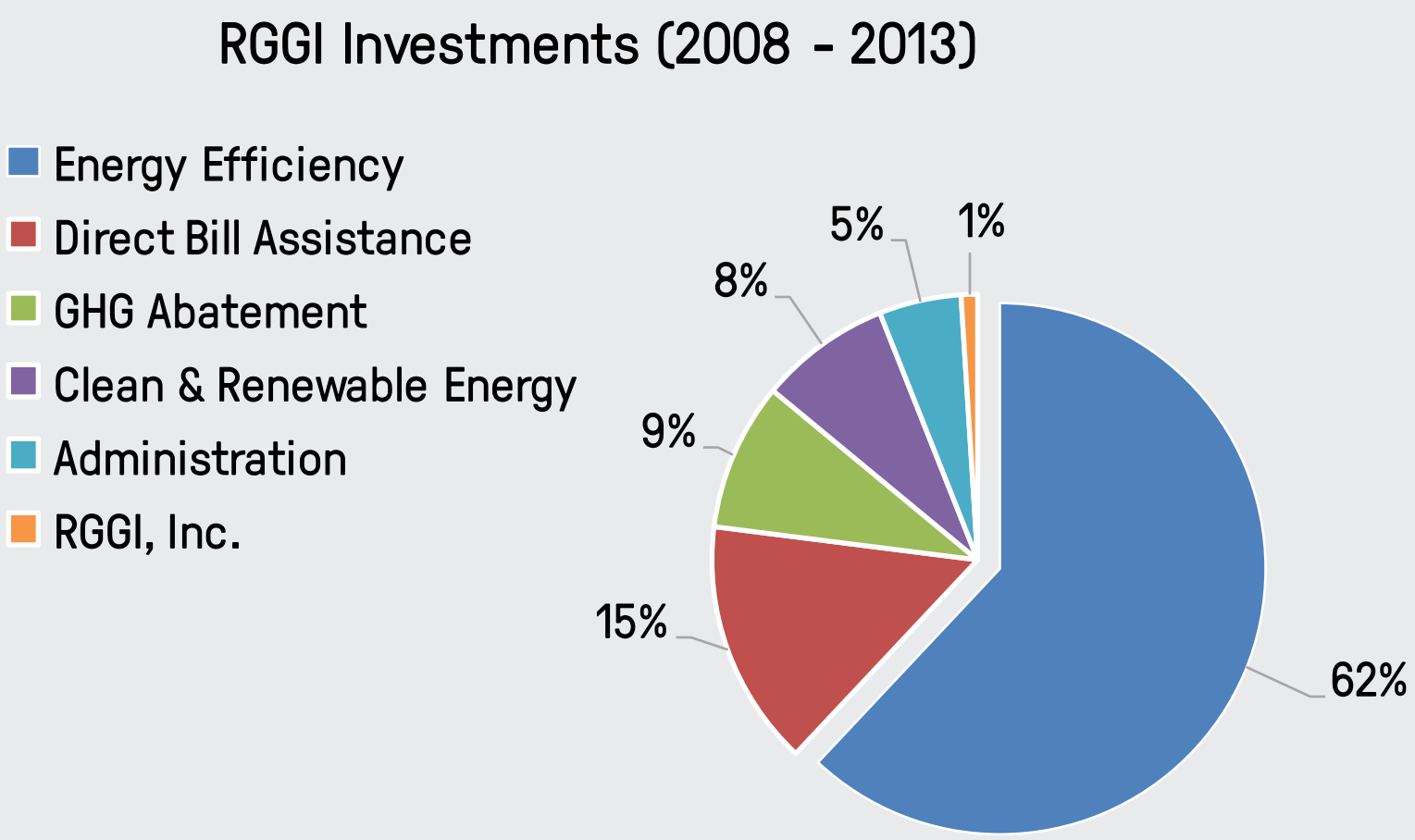
**Rate**
**lbs/MWh**

- Estimate MWh savings
- Verify savings (registry)
- Earn ERCs
- Sell ERCs

**Mass**
**tons CO2**

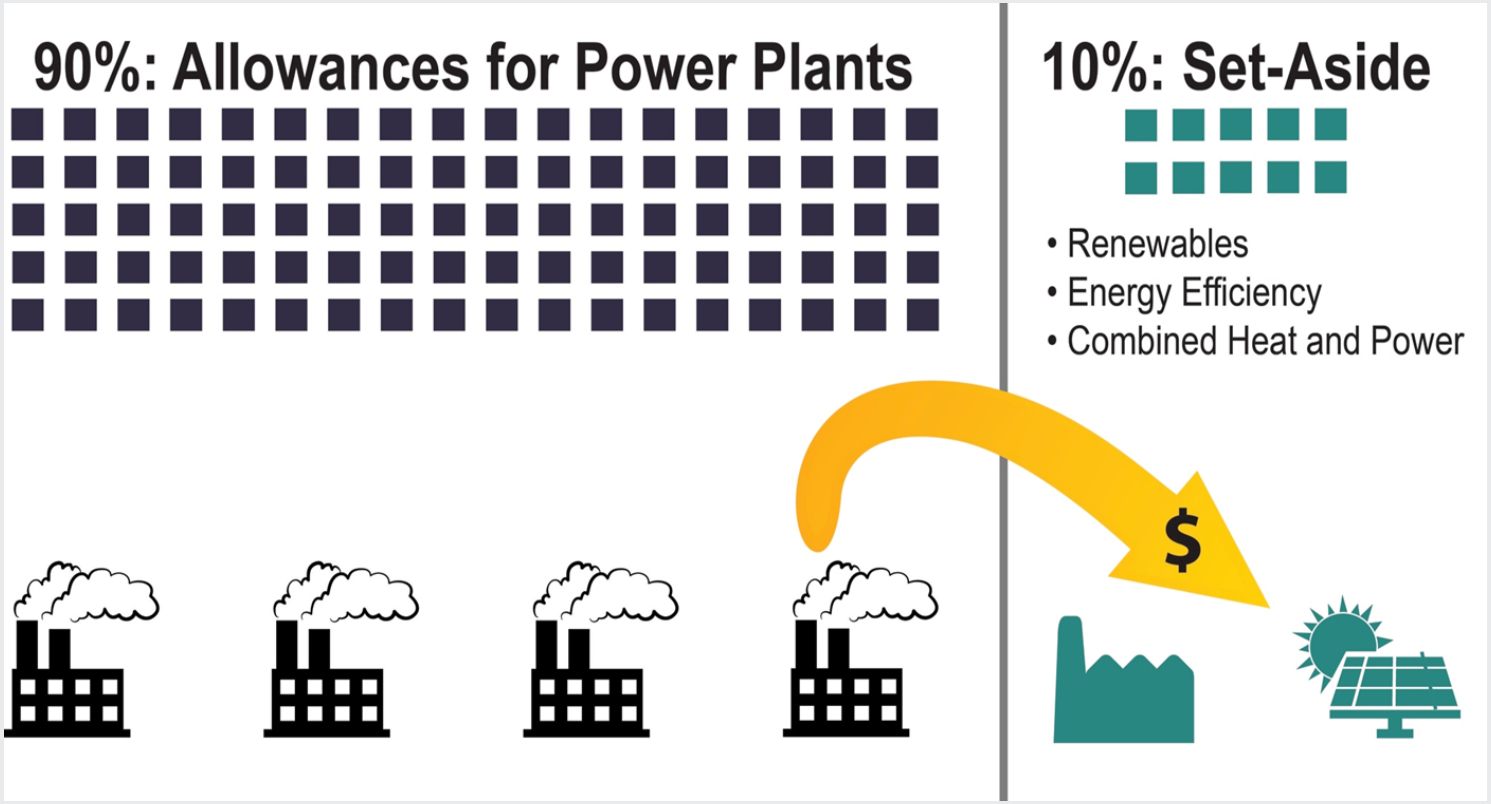
- Reducing $CO_2$ from grid *implicitly* contributes to state compliance
- State may fund with auction proceeds
- Allocate allowances to CHP

# Invest Auction Revenue in Energy Efficiency

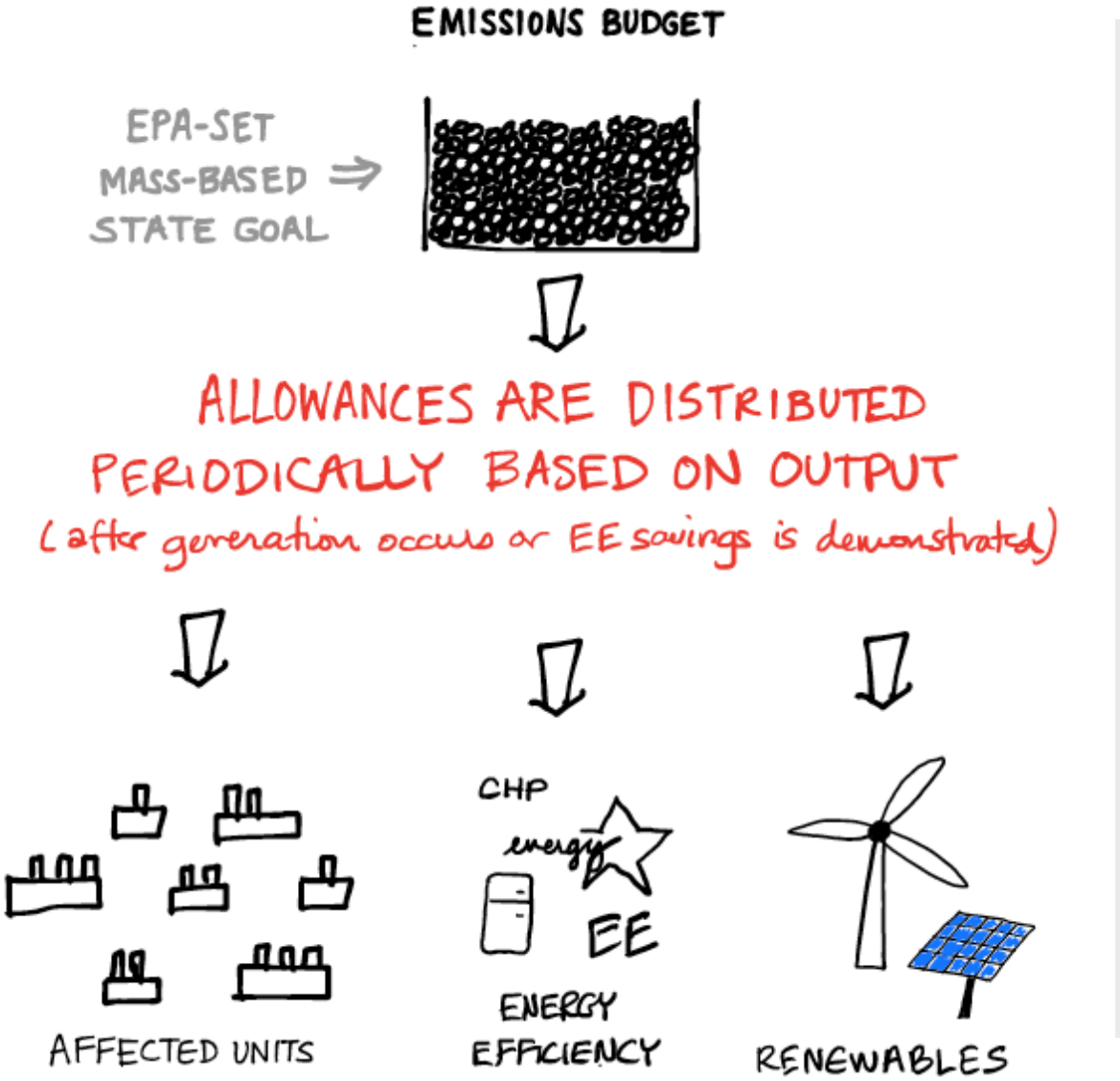



Source: https://www.rggi.org/docs/ProceedsReport/Investment-RGGI-Proceeds-Through-2013.pdf

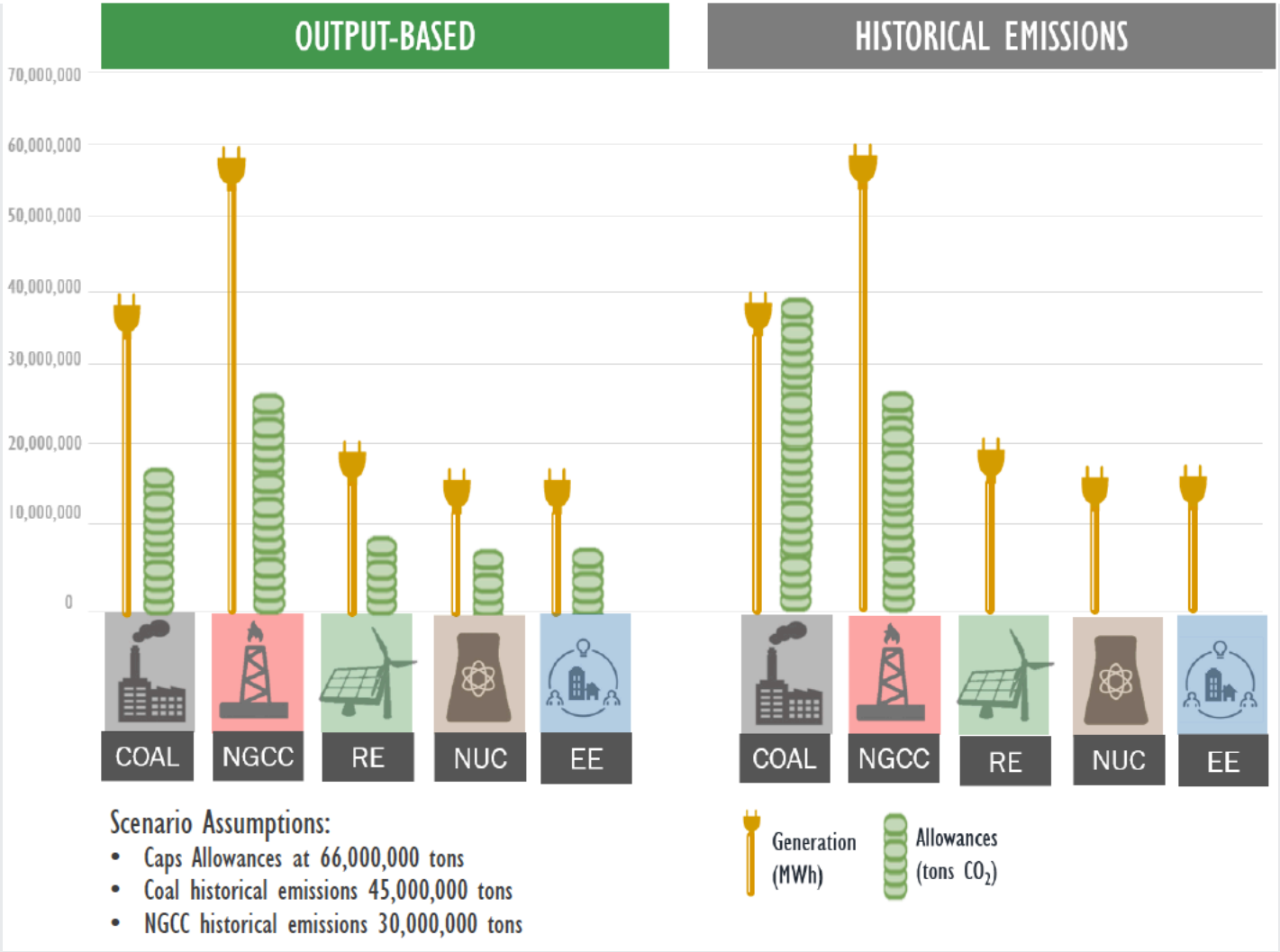
# Direct Allocation



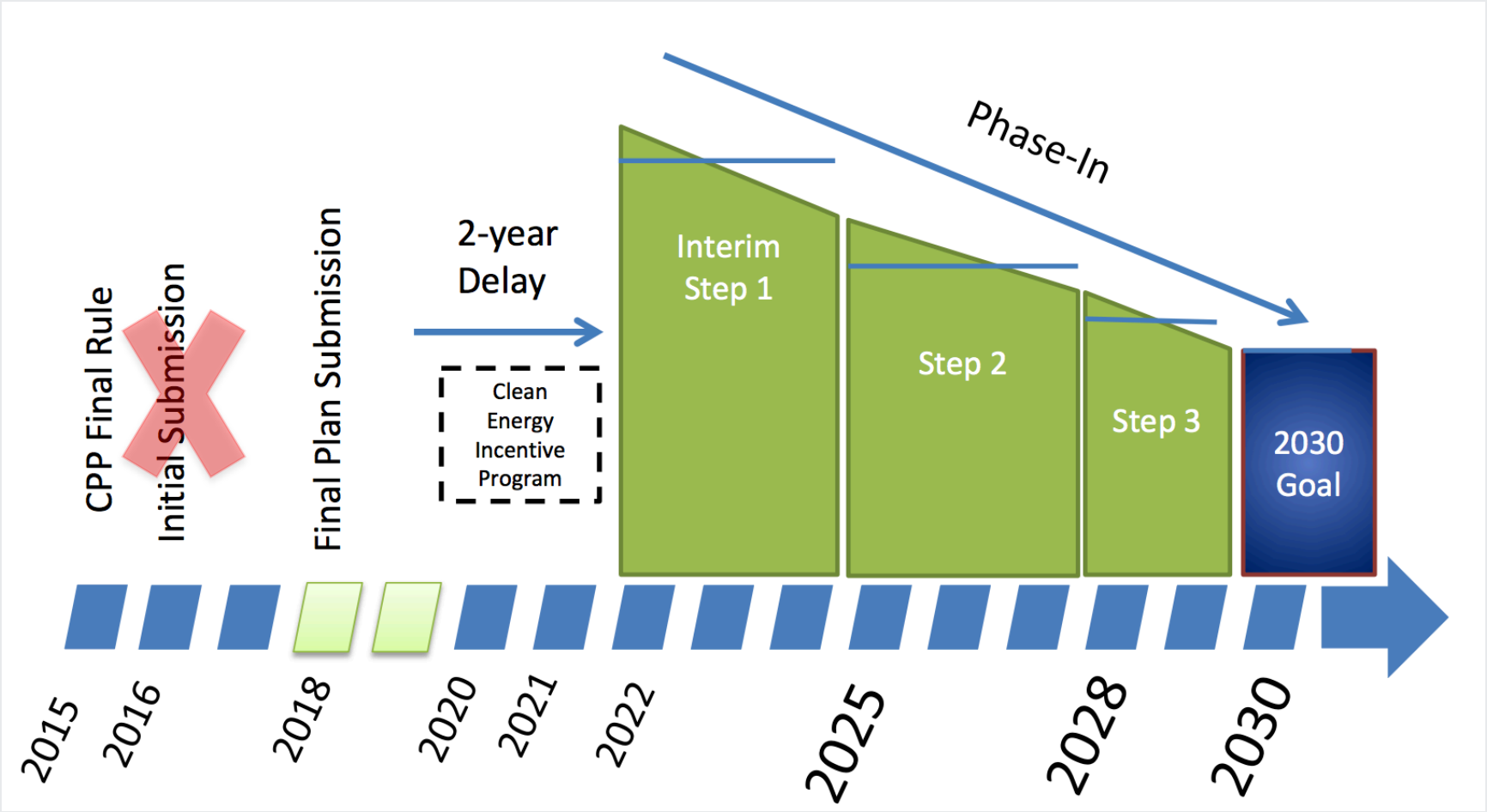
# Output-Based Direct Allocation

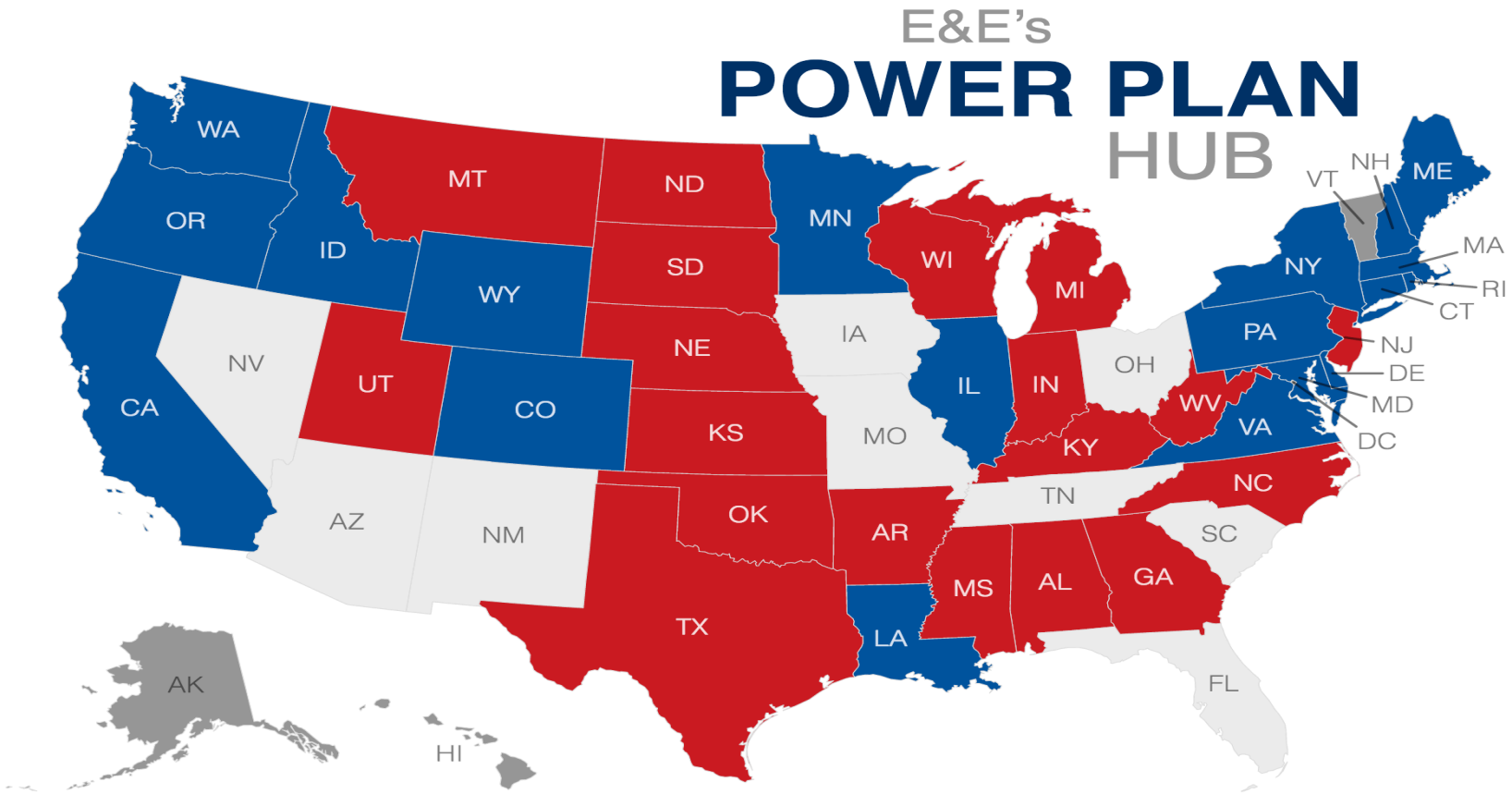


# Output-Based v. Historical Emissions



# CPP Timeline






## Supreme Court Stay Response

| Continuing Planning | Assessing Planning | Suspending Planning | Exempt |
|---|---|---|---|
| 19 states | 9 states | 19 states | 4 states |

Source: E&E News, Clean Power Plan Hub

# Conclusions

- CHP and energy efficiency are a huge opportunity
- The CPP creates an even bigger opportunity
- CHP is treated well in the rule
- Potential for payment to manufacturers is big
- Biggest barrier is persuading states to move forward

# Next Steps: Seize the Opportunity

- Invest in energy efficiency at your facilities
- Work with utilities to design programs that benefit your company
- Work with state air agencies to include efficiency in their state compliance plans
- Form a working group to engage in key states

ALLIANCE

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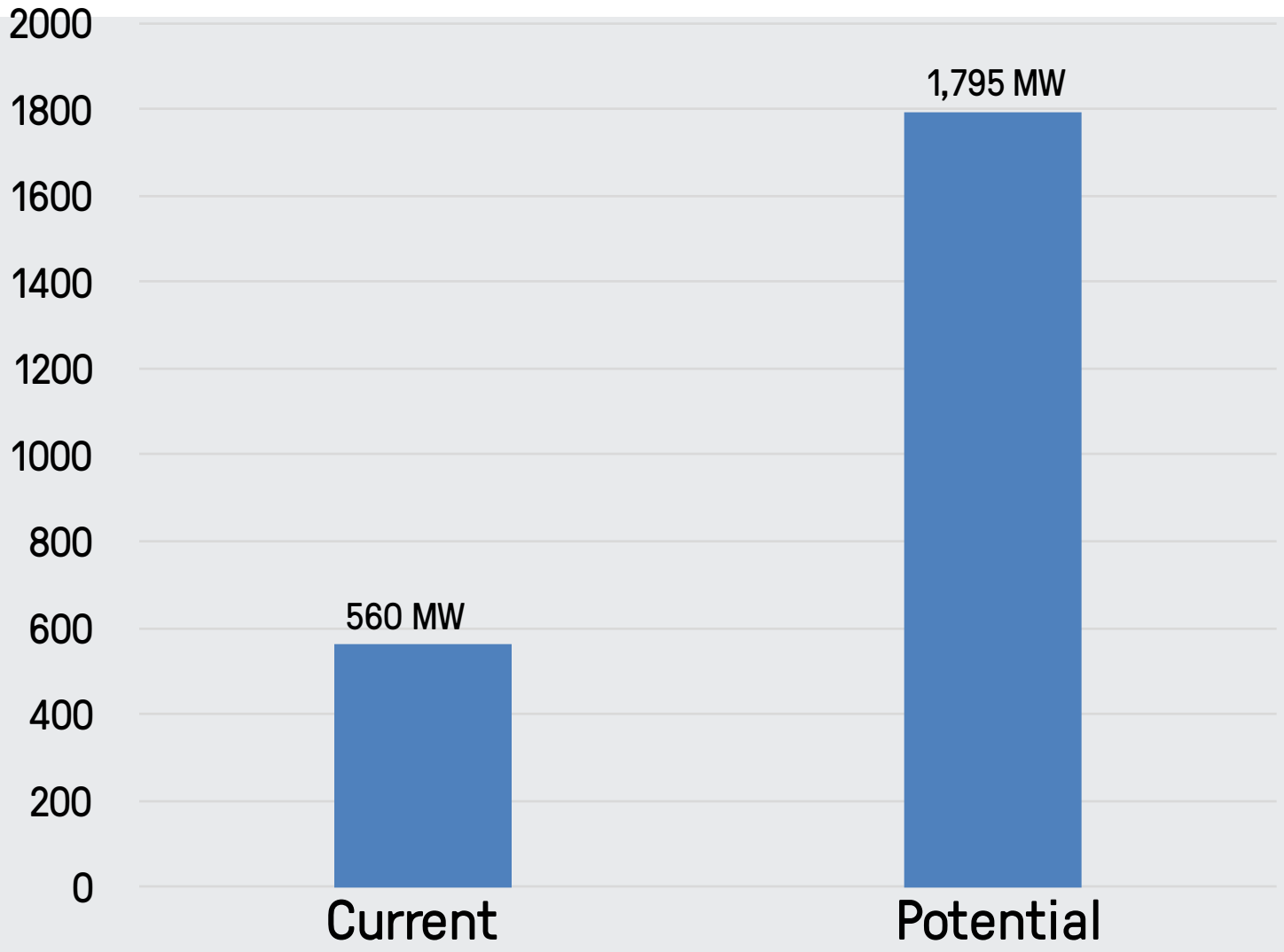
# Appendix

# Arkansas CHP Potential

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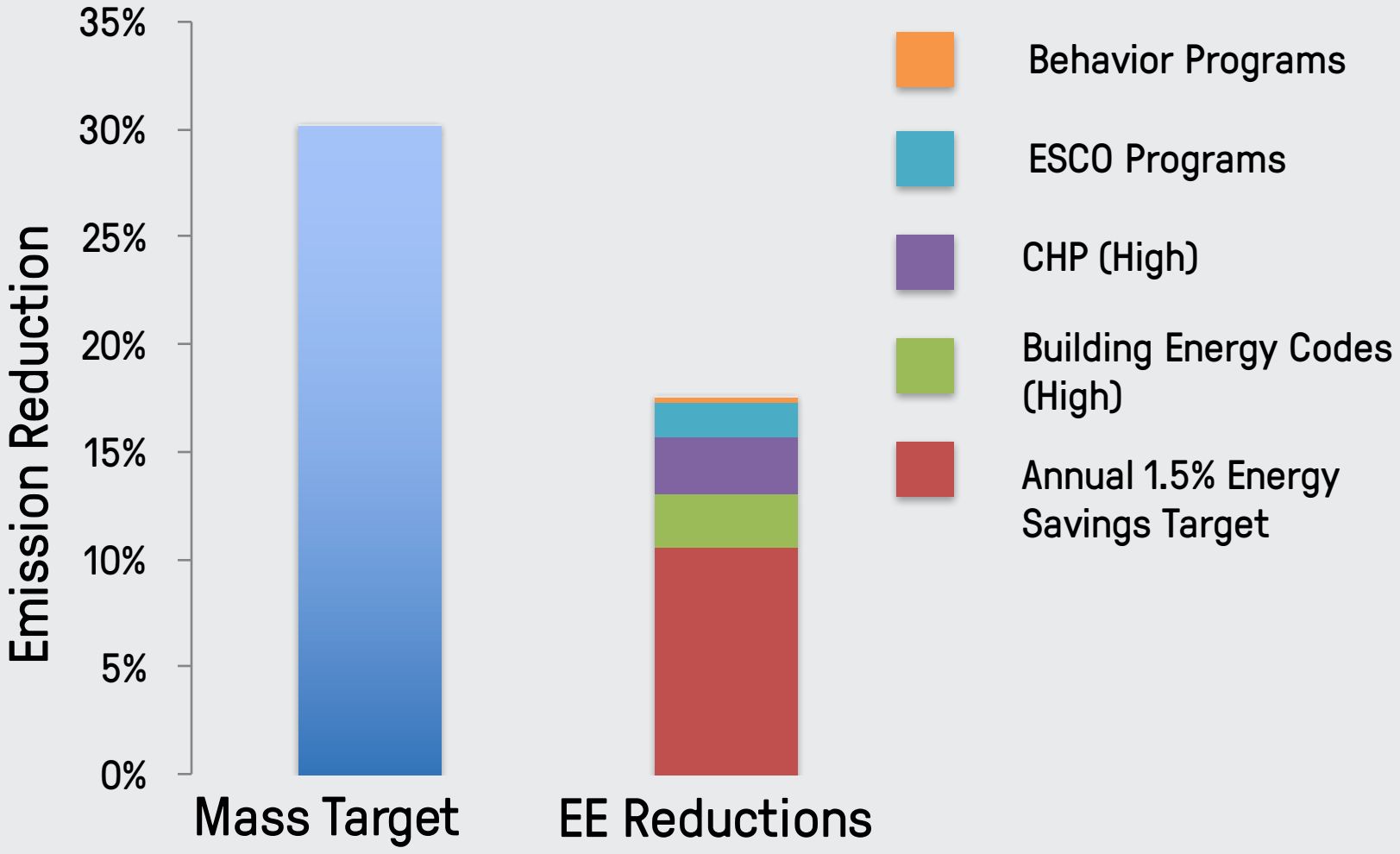
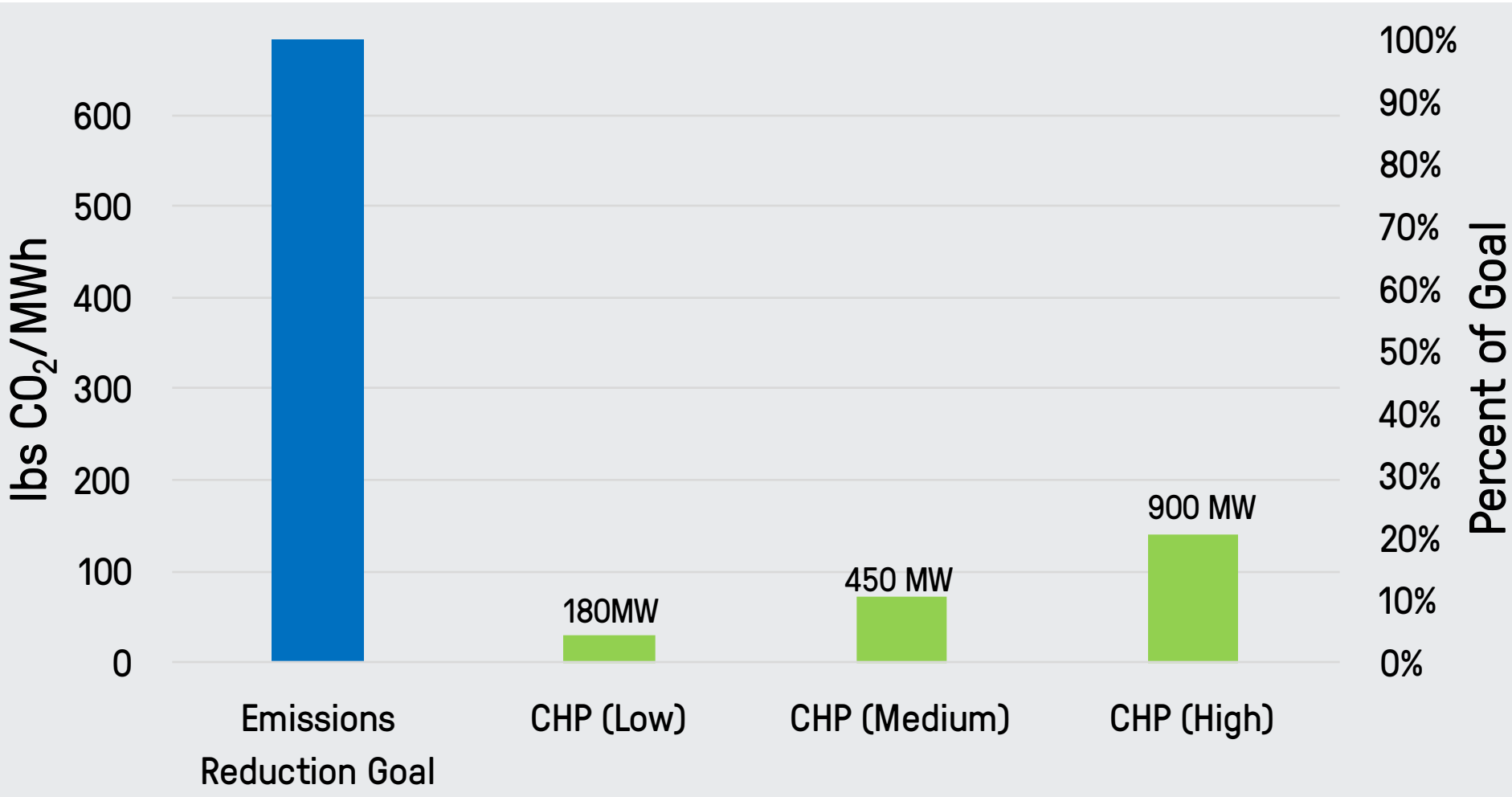


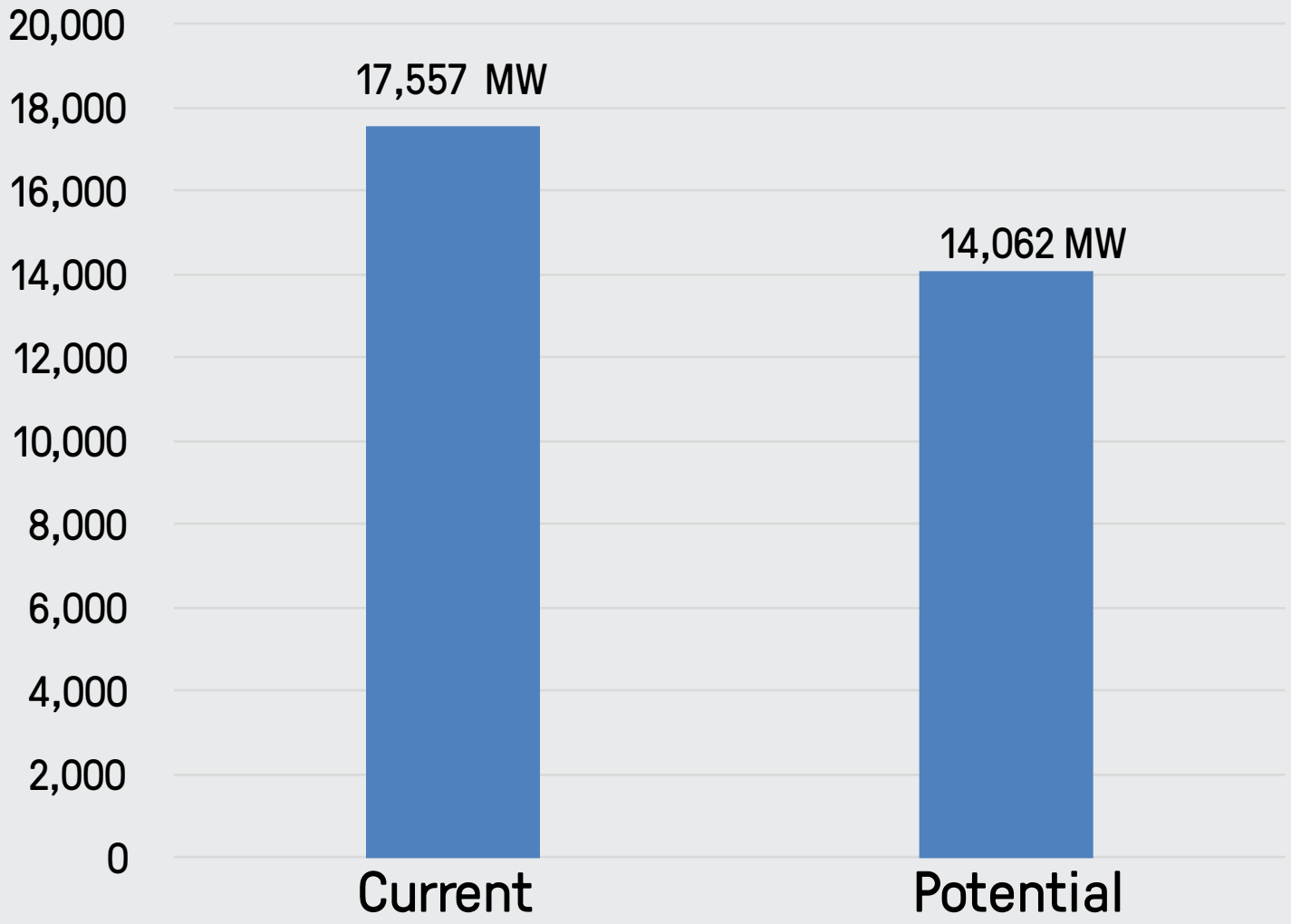

Source: ACEEE's SUPR-2 Calculator

# Impacts of CHP on Arkansas' CPP Targets




Source: ACEEE's SUPR-2 Calculator

# Texas CHP Potential

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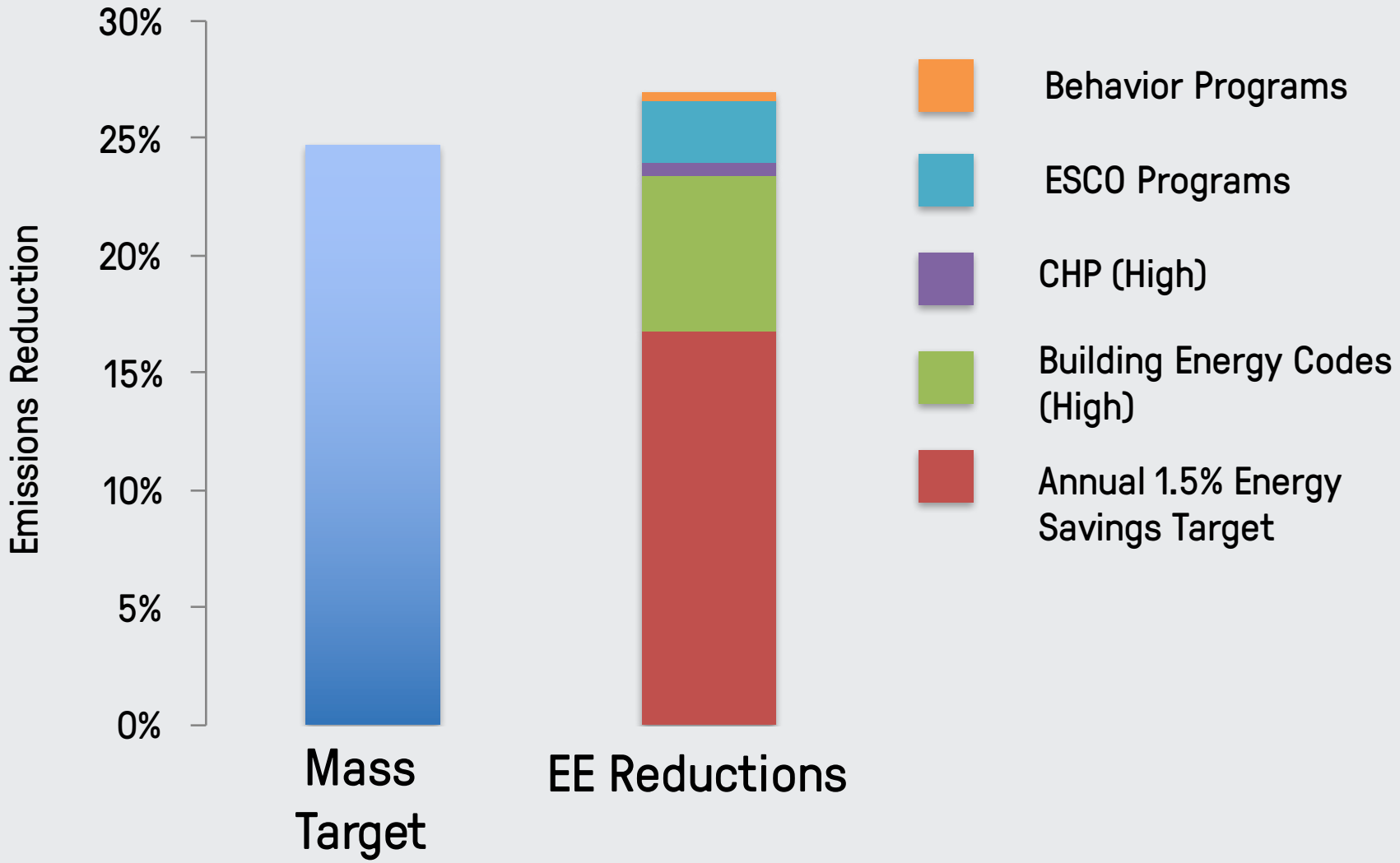


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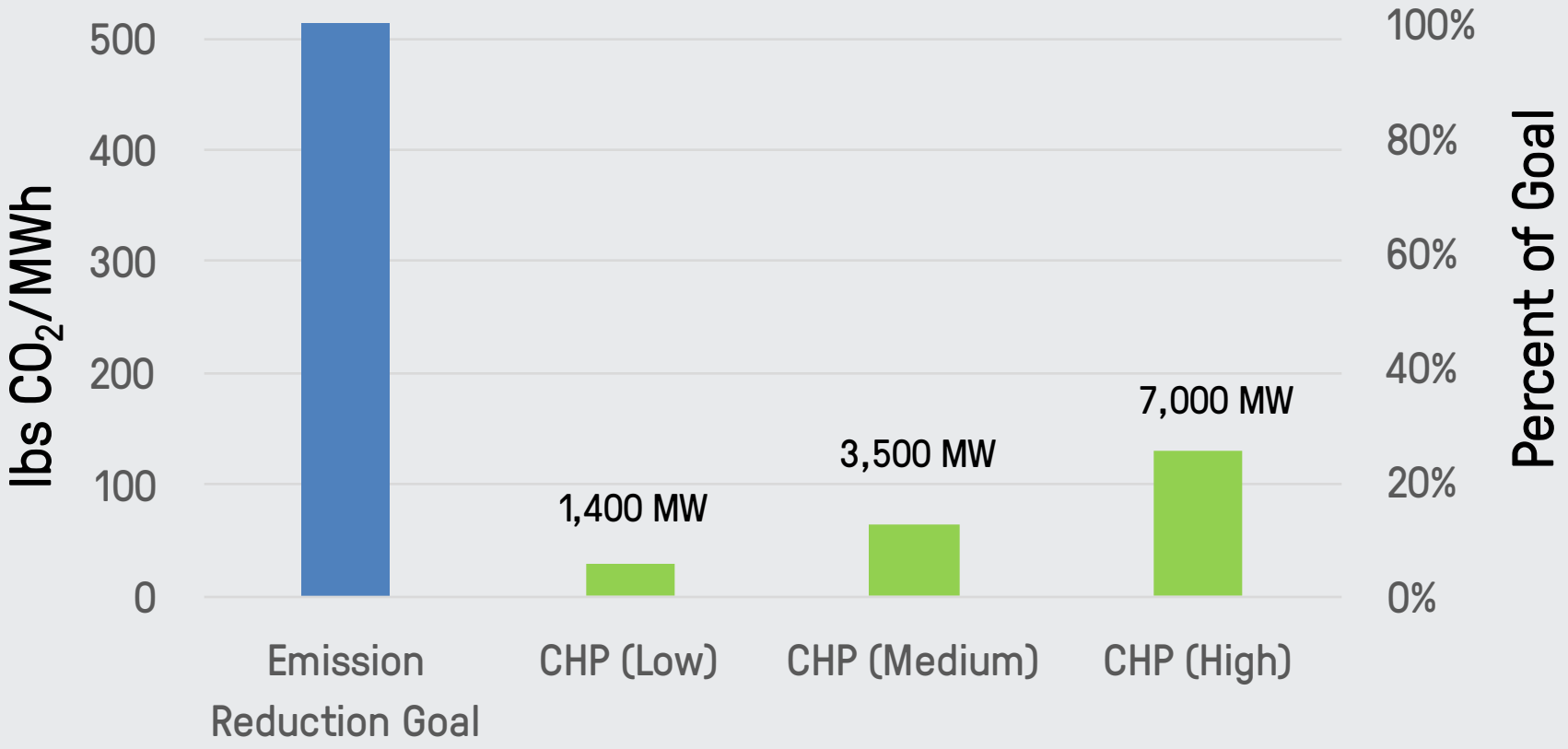


Source: ACEEE's SUPR-2 Calculator

# Positive Governor & Utility Comments

- "Despite the Supreme Court's decision, National Grid still strongly supports EPA's Clean Power Plan."
  *Dean Seavers, President of National Grid*
- "While the Court's temporary stay is disappointing, it does nothing to diminish our resolve in Minnesota to keep moving forward on clean energy initiatives, including the development of our state's Clean Power Plan."
  *Governor Dayton, Minnesota*
- "While we're still reviewing the implications of the Supreme Court's decision, we remain committed to having the cleanest air in the nation. We'll continue to build upon the great strides we've made as a state…."
  *Governor Hickenlooper, Colorado*