

CHP in the Clean Power Plan

American Chemistry Council

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Vice President
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1. Why consider CHP in context of CPP
2. Treatment of Affected Units
3. CHP at unaffected units
4. Outstanding issues

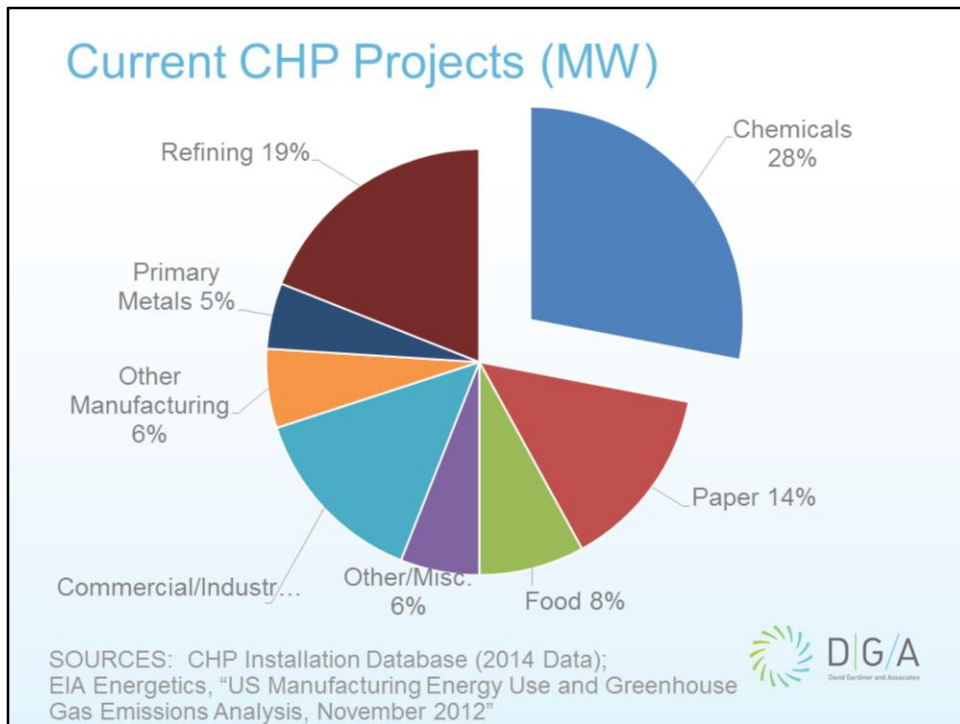
Current CHP Projects



CHP Installation Database. ICF International. 2014.



There are 4,300 existing CHP installations.



When we talk about “treatment of CHP in the rule,” we’re really talking about two different things:

1. Treatment of large-scale CHP that is directly regulated by the rule (“affected units”) and
2. Treatment of off-site projects that can help affected units meet their targets.
 - The rule includes provisions that will benefit CHP in both categories.
 - EPA identifies <10% of existing units as potentially affected units in the rule (only a fraction of those will actually be regulated).

Affected Units

- Constructed before 2014
- Sell more than 25 MW & more than 1/3 of their output 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 most efficient units



The rule limits the universe of affected units:

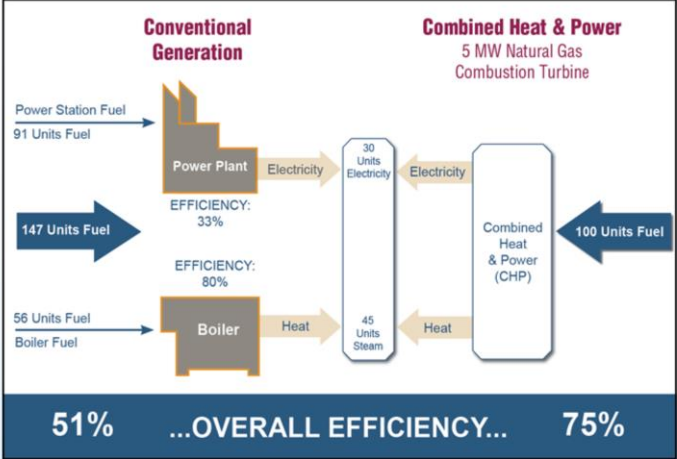
- Excludes biomass systems
- Excludes combustion turbines that aren't connected to pipelines
- Excludes units that limit electric sales to the product of the overall design efficiency and potential electric output.

Treatment of Remaining Affected Units

1. 100% thermal credit
2. 5% line loss credit (see excerpt below for recognition of line-loss benefits)
3. Guidance about how to measure emissions from these units
4. No additional monitoring or accounting is required for CHP at affected units – EGUs already do it. (at 1149)

“Reductions of electricity line losses incurred from the transmission and distribution system between the points of generation and the points of consumption by end-users allow the same overall demand for electricity services to be met with a smaller overall quantity of electricity generation. Such reductions in generation quantities would tend to reduce generation by affected EGUs, thereby reducing CO2 emissions. The opportunity for improvement is large because, on average, line losses account for approximately seven percent of all electricity generation.” (at 493)

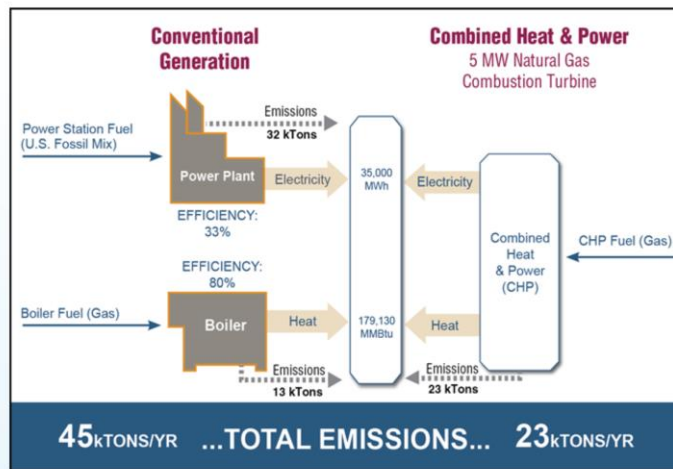
CHP is a Clean, Efficient Method of Providing Energy Services



Source: EPA CHP Partnership - 2012



...That Efficiency Generally Results in Lower Emissions



Source: EPA CHP Partnership - 2012



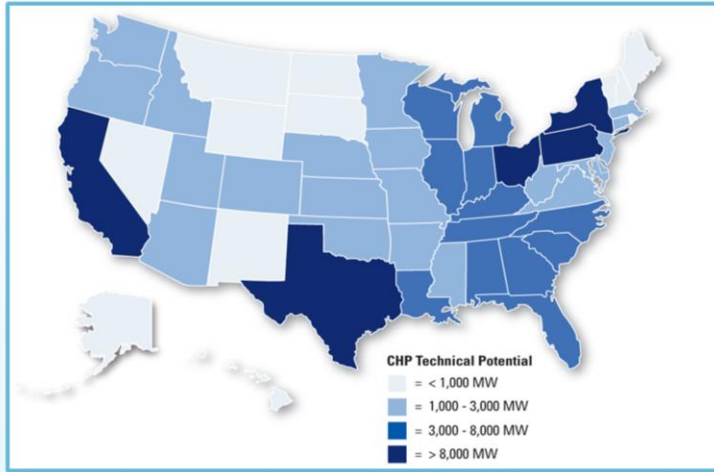
NB: CHP can produce electricity with $\frac{1}{4}$ the emissions of conventional generation (450 to 600 lbs/MWh for NG-fired CHP vs. 2000 to 2200 lbs/MWh for coal).

Treatment of Unaffected CHP

- CHP is an available compliance option:
 - “All of the measures described in this section will substitute for generation from affected EGUs or avoid the need for generation from affected EGUs, thereby reducing CO₂ emissions. This includes RE measures included in the EPA’s determination of the BSER, as well as other measures that were not included in the determination of the BSER, such as other RE resources, demand-side EE, CHP, WHP, electricity transmission and distribution improvements, nuclear energy, and international RE imports connected to the grid in the contiguous U.S., as discussed elsewhere in this preamble” (at 1209)
 - “Electric generation from non-affected CHP units may be used to adjust the CO₂ emission rate of an affected EGU” (at 1248)
- Units installed after 2012 can be credited
- Model trading rule includes details on measuring CHP benefits
- Up to 6% line loss credit
- Offers to provide training/ guidance to states (“In particular, the states requested training on how to use programs such as combined heat and power ... to reduce carbon emissions. The EPA will continue to work with

states to tailor training activities to their needs” (at 218))

CHP Technical Potential

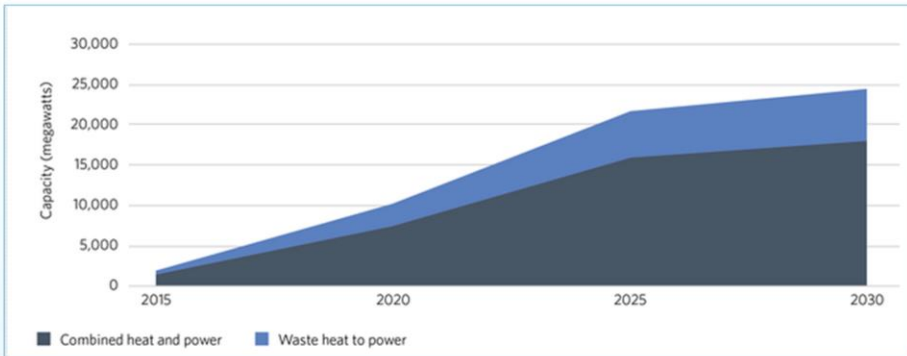


Source: ICF Internal Estimates 2013



- Technical Potential of 120+ GW (Industrial 60 GW; Commercial/Institutional 63 GW) (DOE-EPA 2012)

CHP/ WHP Market Penetration under CPP (2015-2030)

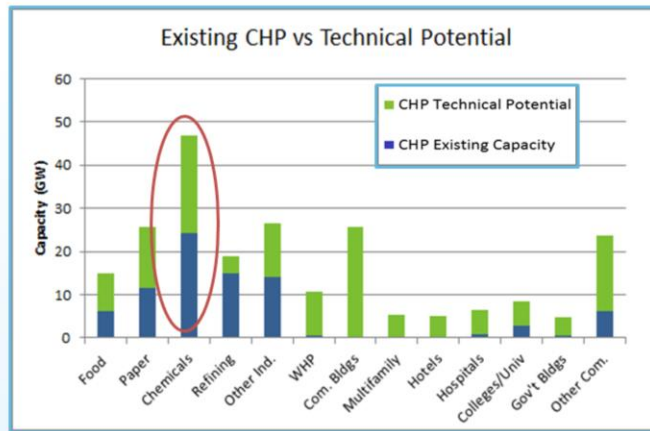


SOURCE: ICF International, Pew Charitable Trusts 2015



Proposed rule could increase CHP/ WHP deployment by 24 GW (33% over today
<http://www.pewtrusts.org/en/research-and-analysis/analysis/2015/07/31/industrial-energy-efficiency-as-a-compliance-tool-for-states-to-reduce-carbon-emissions>

Remaining Potential for CHP



SOURCE: DOE-EPA 2012

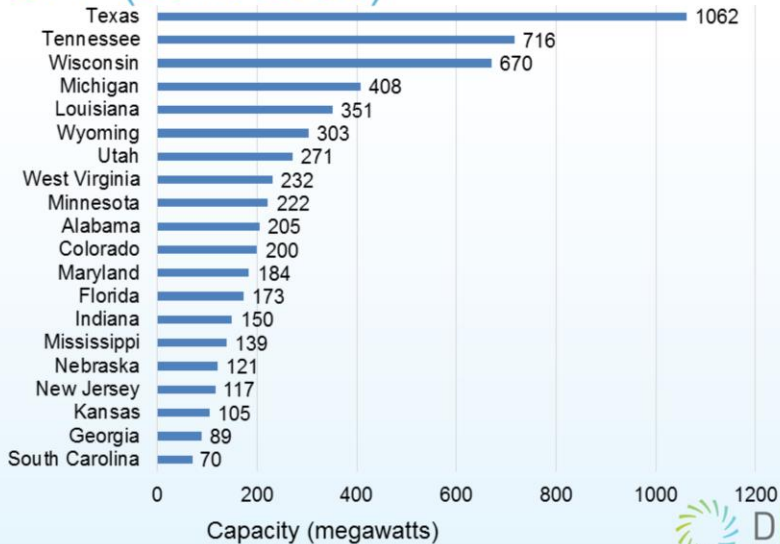


SOURCE:

http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_clean_energy_solution.pdf at 13

- Technical potential for industrial is 65-130 GW (larger number achievable if excess electricity sold off site)
- Must be installed after 2012 to get credit for reduction (and credits output after 2022)

CHP/ WHP Market Penetration under CPP (2015-2030)



SOURCE: ICF International, Pew Charitable Trusts 2015



<http://www.pewtrusts.org/en/research-and-analysis/analysis/2015/07/31/industrial-energy-efficiency-as-a-compliance-tool-for-states-to-reduce-carbon-emissions>

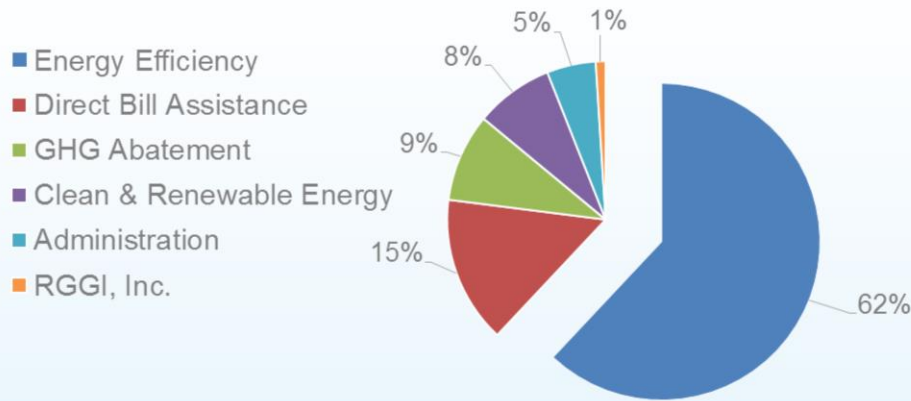
Rate-based Approach	Mass-based Approach
<ul style="list-style-type: none"> • Based on emissions-rate targets (e.g., lbs / MWh) • CHP systems generate electricity at a lower effective emissions rate • Incentive derived from lower emissions rate 	<ul style="list-style-type: none"> • Based on overall emissions targets (e.g., tons of CO₂) • When properly accounted for, CHP systems should yield fewer total emissions • Incentive derived from fewer total emissions & allowance set-aside



- Under a rate-based approach these non-affected CHP units would be able to receive emission reduction credits (ERCs) that can then be used to reduce an affected unit's emissions rate
- Under a mass-based approach eligible non-affected CHP units could receive emissions allowances for the electricity they generate

Revenue Can Be Directed to Efficiency

RGGI Investment by Category (2008 - 2013)



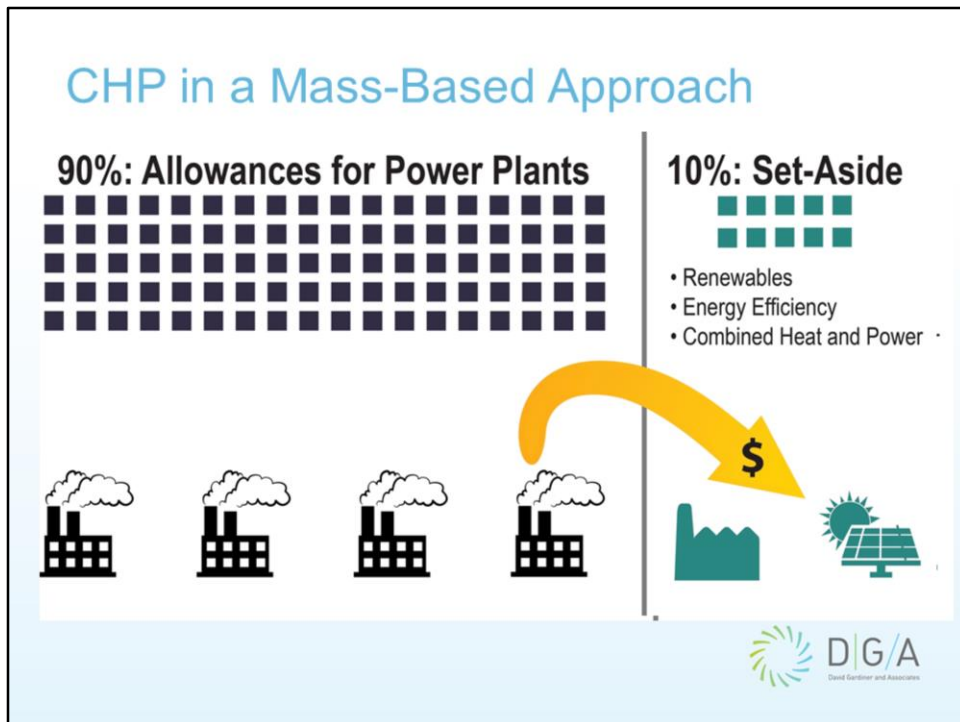
SOURCE: RGGI 2013 Investment Report



- 22 RGGI auctions from 2008-2013, with revenue totaling about \$1.6-billion.
- \$1.01 Billion was invested in 2008-2013 (with the remainder invested in state general funds or future projects).
- 62% (\$630-million) invested in EE

Source: RGGI 2013 Investment Report

(<https://www.rggi.org/docs/ProceedsReport/Investment-RGGI-Proceeds-Through-2013.pdf>)



- Clean energy will not receive credit for this contribution absent a set-aside (otherwise there would be double counting).
- High-emitting electricity sources will need more allowances than less carbon-intensive generation
- If thermal emissions are considered, covered CHP units will need fewer allowances than other covered sources.
- GHG allowances earned from set-aside are sold back to covered sources (these are from within the cap)
- Because CHP emits GHGs it may have to deduct its on-site emissions from the allowances that it can sell to covered units.
- CHP hosts will not be subject to federal law (e.g., citizen suits); merely contracts with EGUs/ state law

Recognizing CHP Savings

- Electric and thermal output
- Displace on-site boilers and central generation
- Potential for increased fuel use on-site
- Avoided line losses



Outstanding Issues

- Measurement of prorated MWh of a CHP system
- Line-loss credit?
- Treatment in Clean Energy Incentive Program
- State engagement
 - Include CHP
 - Assess the opportunity
 - Advocate for set asides and ERCs



Questions?

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