Illinois Climate Change Advisory Group
Subgroup: Commercial, Industrial, Agriculture
Policy Name: #4 and #14 Efficiency standards for commercial and industrial boilers and incentives for efficiency upgrades and combined heat and power
Policy Type: Regulatory standards
Estimated 2020 Reductions Compared to BAU: 3.6 MM tons CO2e
5/18/07

Affected sectors, subsectors or entities
For example:
Sector: Commercial and Industrial
Subsector:
Entities: Facilities operators and boiler manufacturers

Description

This straw proposal combines two similar policy options under consideration by the CCAG, policy option 4, Energy efficiency incentives, assistance and/or standards for commercial/industrial generators and boilers and policy option 14, Incentives for CHP and boiler construction and upgrades. For this straw man proposal, mandatory commercial and industrial boiler efficiency standards are presented for new installations with financial incentives made available for efficiency upgrades at existing facilities.

It is important to note that emission reductions from this straw proposal would likely overlap with reductions achieved from other proposals that address emissions in the commercial, industrial and electric generation sectors.

Efficiency standards for commercial and industrial boilers

In this straw man proposal a thermal efficiency standard would be applied for commercial and industrial boilers that require a permit from IEPA for operation. A commercial boiler thermal efficiency standard of 80 percent for natural gas and 83 percent for oil fired boilers would be required for all new boilers sold in Illinois. This is approximately 3 percent more stringent than current federal standards. A similar thermal efficiency increase of 3 percent as compared to the average efficiency of currently available models is presented for industrial boilers as well. These options are derived from the American Council for an Energy Efficient Economy (ACEEE) report "Leading the Way: Continued Opportunities for New State Appliance and Efficiency Standards, 2006." All new boilers sold in Illinois would be required to meet these standards. Existing boilers would be unaffected.

In addition, financial incentives in the form of grant and/or rebates would be made available to the owners of existing facilities to upgrade to implement efficiency upgrades including the installation of combined heat and power (CHP) units. Incentives would apply to the costs of siting, safety, equipment and installation. CHP units are far more efficient than traditional boilers as they also generate electricity using waste energy.

CHP units ultimately result in GHG reductions from increased efficiency for heat and steam while also displacing grid electricity. The amount of incentives would be as follows:

- $1.00 per watt of installed nameplate capacity for installations that use renewable fuels.
- $0.50 per watt of installed nameplate capacity for installations the use non-renewable fuels.
- Total incentives payouts would be capped at 10MW though any size installation would be eligible.

Renewable fuel would include biodiesel, vegetable oil, animal fat, recovered methane from landfills and wastewater treatment plants, sustainably harvested biomass and possibly other fuels. Incentive amounts are based on a review of various incentives in other states (see table 1).

Table 1. Selected state CHP incentive programs

STATE	INCENTIVE TYPE	AMOUNT
California	Rebate	*With Renewable Fuels:* • Microturbines and Small Gas Turbines - $1.30/W; • IC Engines and Large Gas Turbines - $1.00/W *With Non-Renewable Fuels*: • Microturbines and Small Gas Turbines - $0.80/W; • IC Engines and Large Gas Turbines - $0.60/W
Connecticut	Grant	$450/kW for baseload projects ($500/kW if sited in southwest CT); $200/kW for emergency generators ($250/kW if sited in southwest CT)
Florida	Tax Credit	$0.01/kWh for electricity produced from 1/1/2007 through 6/30/2010
New Jersey	Rebate	$0.50 per watt (*expired 6/30/2006*)
New York	Tiered Rebates (NYSERDA)	Rebates for purchase/installation, energy savings, and ESCOs.
Ohio	Grant	25% of eligible project costs ($100,000 maximum)
Oregon	Tax Credit	35% of eligible project costs, distributed over five years
Source: Database for State Incentives for Renewable Energy. 2007		

Grants and rebates would only be made available to applicants that meet certain credit, capital, competency and engineering qualifications. Project owners would only be allowed to qualify and receive one type of state incentive per project. For example, a CHP project running on wastewater treatment plant gas could not receive an incentive under this proposal while also receiving an incentive for landfill gas capture and combustion. Project owners could receive additional incentives provided by local utilities or the federal government.

Installation must comply with all federal, state, and local codes. If upgrades trigger Clean Air Act requirements, opportunities

Rough estimate of reductions from BAU in 2020

ACEEE assumes that the new commercial boiler efficiency standards would save approximately 11.4 million therms of natural gas in Illinois as compared to BAU in 2020 (see ACEEE report). By applying Energy Information Administration emission factors to these savings, these standards will reduce GHG emissions by 60,534 metric tons in 2020.

To calculate potential emission reductions from new industrial boiler standards it is assumed that a proportional amount of GHG reductions would be achieved in the industrial sector as is achieved in the commercial sector. 2020 commercial sector emissions are projected to be approximately 13.3 MM tons of CO2e in 2020 while industrial sector emissions are projected to be 39.2 MM tons of CO2e in 2020 (Illinois inventory and projections calculations).

Savings from standards for commercial boiler standards will result in a 0.5 percent reduction from BAU. Applying the same percentage to industrial sector emissions under BAU in 2020 generates GHG savings of 196,000 metric tons of CO2e.

Incentives for upgrades and CHP units could yield significant reductions. According to policies and calculations contained in Environment Illinois' report: "A Blueprint for Action: Policy Options to Reduce Illinois' Contribution to Global Warming" by Elizabeth Ridlington and Rebecca Stanfield, 2007 (see page 61 http://www.environmentillinois.org/reports/energy/energy-program-reports/a-blueprint-for-action-policy-options-to-reduce-illinois-contribution-to-global-warming) if incentives were pursued aggressively reductions could exceed 6.7 MM tons of CO2e in 2020. This assumes that nearly all available opportunities for CHP installations are pursued and implemented by 2020. For this analysis it is assumed that 50 percent of all available opportunities for CHP are pursued and implemented through this straw man proposal. Also, all emission reductions from CHP deployment occur primarily in the electric generation sector as efficient, on site generated electricity displaces grid electricity.

Therefore, the total potential emissions reductions from this straw man proposal are 60,534 + 196,000 + (6,700,000 X 0.50) = 3,606,534 metric tons.

Timetables, duration and stringency

2009 - Incentive programs for CHP and boiler upgrades are implemented.
2010 – Commercial and industrial boiler efficiency standards take effect.
2011-2020 – Projects are completed throughout the decade

Barriers to implementation

New resources would need to be allocated to fund and implement these incentives and establish efficiency standards. Resources could be derived from the CAIR NOx set-aside, from the auctioning of allowances through a cap-and-trade system or other sources