Summary of Proposed Rule

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units

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What has EPA proposed?

- EPA has proposed a New Source Performance Standard (NSPS) regulation under Section 111 of the Clean Air Act that will cover carbon dioxide (CO_2) emissions from new sources in the category defined as new "Electric utility generating units (EGUs)".[1]

What units are covered by the proposed rule?

- EGUs "with a base load rating[2] of more than 73 megawatts (MW) (250 million British thermal units per hour (MMBtu/h))[3] heat input of fossil fuel except" (1) municipal waste combustors; (2) commercial or industrial waste combustors; and (3) "transitional sources" (described below).

- "Electric utility generating unit" is defined as

  any steam electric generating unit[4] or stationary

[1] The proposed regulation will be the new Subpart TTTT of 40 CFR Part 60. According to the preamble of the draft regulation, EPA is combining the units covered under Subparts Da and a subset of the units covered under KKKK. It then excludes some additional units from applicability as described in this summary.

[2] According to the proposed §60.5580, "Base load rating means the maximum amount of heat input (fuel) that a steam generating unit can combust on a steady state basis, as determined by the physical design and characteristics of the steam generating unit at ISO conditions. For a stationary combustion turbine base load means 100 percent of the design heat input capacity of the stationary combustion turbine engine at ISO conditions."

[3] 1 MW equals 3.412 MMBtu/h.

[4] "*Steam electric generating unit* means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam (including fossil fuel-fired steam generators associated with combined cycle gas turbines; nuclear steam generators are not included) plus any integrated device that provides

> combustion turbine[5] that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW net-electrical output to any utility power distribution system for sale.[6]

- The definition brings in any fossil-fuel fired unit that triggers applicability, even if the unit co-fires biomass. If a unit burns exclusively biomass, it would not trigger applicability.

- The draft regulation states that the standards do not apply to simple cycle combustion turbines.[7]

- The proposed regulation applies to new EGUs. Clean Air Act §111(a)(2) defines "new unit" as

> any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source. (emphasis added).

Notwithstanding this definition, EPA states in the proposed regulation that it does not have enough information to regulate modifications[8] or reconstructions[9] of existing EGUs and opts instead to regulate only brand new units. It also states that it will not apply the proposed standard to a "transitional source."

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electricity or useful thermal output to either the boiler or to power auxiliary equipment."

[5] *Stationary combustion turbine* means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), heat recovery system, fuel compressor, heater, and/or pump, post-combustion emission control technology, and any ancillary components and sub- components comprising any simple cycle stationary combustion turbine, any combined cycle combustion turbine, and any combined heat and power combustion turbine based system. Stationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability.

[6] Proposed 40 CFR §60.5580

[7] The Preamble states that "the EPA is not including stationary simple cycle turbines in this rule because they generally operate differently than the other units covered by today's rule. The units covered by today's rule are generally used to serve base load or intermediate demand, while simple cycle turbines are generally used much less often (and thus have lower GHG emissions) and are generally used to meet peak demand rather than base or intermediate load requirements."

[8] Defined at §60.15

[9] §60.15(b) "Reconstruction means the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and (2) It is technologically and economically feasible to meet the applicable standards set forth in this part."

- "Transitional sources" are those proposed sources that commence construction within one year from the date of publication of the proposed rule in the Federal Register and have a valid pre-construction Prevention of Significant Deterioration (PSD) permit on that date.[10]

- The draft regulation states that the standards do not apply to units in Hawaii, Puerto Rico, the Virgin Islands, Guam or the Northern Mariana Islands.[11]

What is the performance standard that new affected units must meet?

- Affected EGUs must meet an emissions rate of "454 kilograms (kg) of CO_2 per gross output in Megawatt-hours (MWh) (454 kg/MWh) (1,000 lb/MWh) on a 12-operating month annual average basis," except for new coal or petroleum coke units.

- For EGUs utilizing coal or petroleum coke that are designed to allow installation and operation of a carbon capture and storage system, the applicable standards are:

  - For the first 10 years of operation, an emissions rate of 816 kg/MWh (1,800 lb/MWh) gross output on a 12-operating month annual average basis; and

  - Beginning in the 11th year of operation, an emissions rate of 272 kg/MWh (600 lb/MWh) gross output on a 12- operating month annual average basis; and

  - Over the entire 30-year average period, an emissions rate of 454 kg/MWh gross output [1,000 lb/MWh] on a 30-year average basis.

- Applicable emissions rates are in force at all times of operation, including start-up and shut-down.

[10] The proposal also considers sources to be transitional sources if they "had an approved PSD permit that has expired and is in the process of being extended, if the sources participating in a Department of Energy CCS funding program."

[11] In the Preamble EPA writes, "This is because non-continental areas do not have available pipeline quality natural gas and, accordingly, a natural-gas-fired plant that could comply with the 1,000 lb CO2/MWh may not be feasible. At present we do not have information to identify what types of new power plants may be constructed in those areas....Our lack of more specific information precludes us from proposing, at this time, a standard for new sources in non-continental areas."

What is the role of averaging or trading?

- Compliance is at the unit level. Affected EGUs cannot comply by averaging their emissions with other EGUs, or through trading programs. This means that an affected EGU must either combust a low carbon fuel, such as natural gas, capture and store carbon pollution, or (where feasible) utilize combined heat and power.

Who is the regulated party subject to enforcement under the proposed rule?

- Owners and operators of covered EGUs.

How does the proposal address combined heat and power units?

- Combined heat and power units are required to meet the performance standard if they meet the applicability criteria, as detailed above.

- The performance standard is based on gross output, which is defined as:

> the gross electrical or mechanical output from the unit plus 75 percent of the useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (i.e., steam delivered to an industrial process).[12]

- In the preamble EPA notes that they "intend to assume a benefit of 5 percent avoided transmission and distribution losses when determining the electric output for CHP facilities. This provision would be restricted to facilities where the useful thermal output is at least 20 percent of the total output."

What is the role of biomass?

- The standard applies only to new units with a base-load rating more than 250 million British thermal units per hour (MMBtu/h))[13] heat input of fossil fuel. Combustion of biomass may allow certain EGUs to stay below that applicability threshold.

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[12] §60.5580

[13] 1 MW equals 3.412 MMBtu/h.

- However, new biomass-fired EGUs capable of burning more than 250 MMBtu/h of any fossil fuel are required to meet the standard.[14]

- The proposed regulations do not treat combustion of biomass as carbon-neutral. Therefore, CO_2 emissions that result from the combustion of biomass are included in the calculation of an affected EGU's annual average emissions rate.

- In the Preamble, EPA notes that

> there may also be other compliance options available that were not considered in this proposal. In the analysis for today's proposal, the EPA did not include unique treatment of CO_2 emissions from biologically-based material, otherwise called biogenic CO_2 emissions."

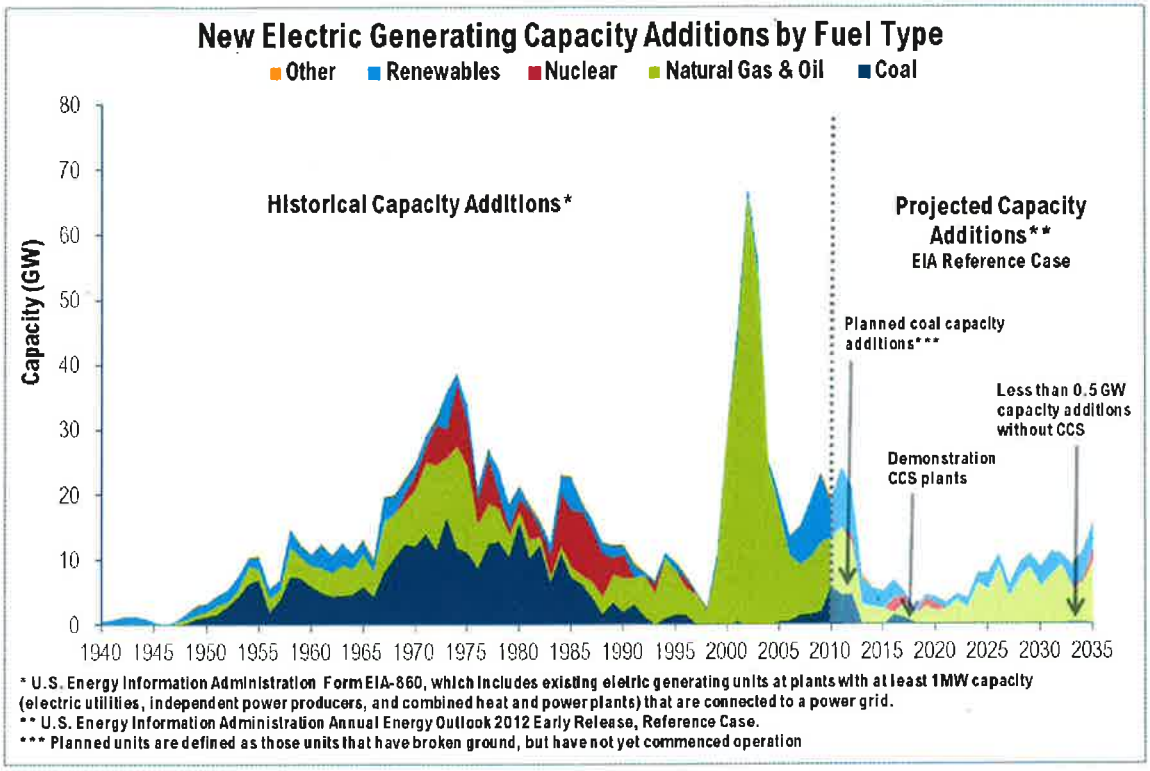
EPA states that they are not suggesting specific accounting methods due to the independent Science Advisory Board's Biogenic Carbon Emissions Panel's ongoing peer review of EPA's draft biogenic emissions accounting framework, which was submitted in September of 2011.

What impacts does EPA project the regulations will have?

- In the Preamble EPA writes, "Our Integrated Planning Model (IPM) model projects that for economic reasons, natural gas-fired EGUs will be the facilities of choice until at least 2020." They later go on to say that "because the IPM modeling shows that natural gas-fired plants are the facilities of choice, the proposed standard of performance in today's rulemaking –which is based on the emission rate of a new NGCC unit – does not add costs"

- Below is a chart that depicts historical trends in the construction of new electric generating units and the latest projections from the Energy Information Administration, as found in the Annual Energy Outlook 2012 Early Release. The AEO 2012 Early Release does <u>not</u> include EPA's proposed GHG performance standards for power plants.

[14] If a unit is capable of burning both biomass and fossil fuel, the unit may need to take a permit restriction on the amount of fossil fuel burned to avoid applicability of the rule.



How does this rule compare to new source standards set in various states?

- Several states have already adopted CO_2 emission standards for EGUs, as shown in the figure below.

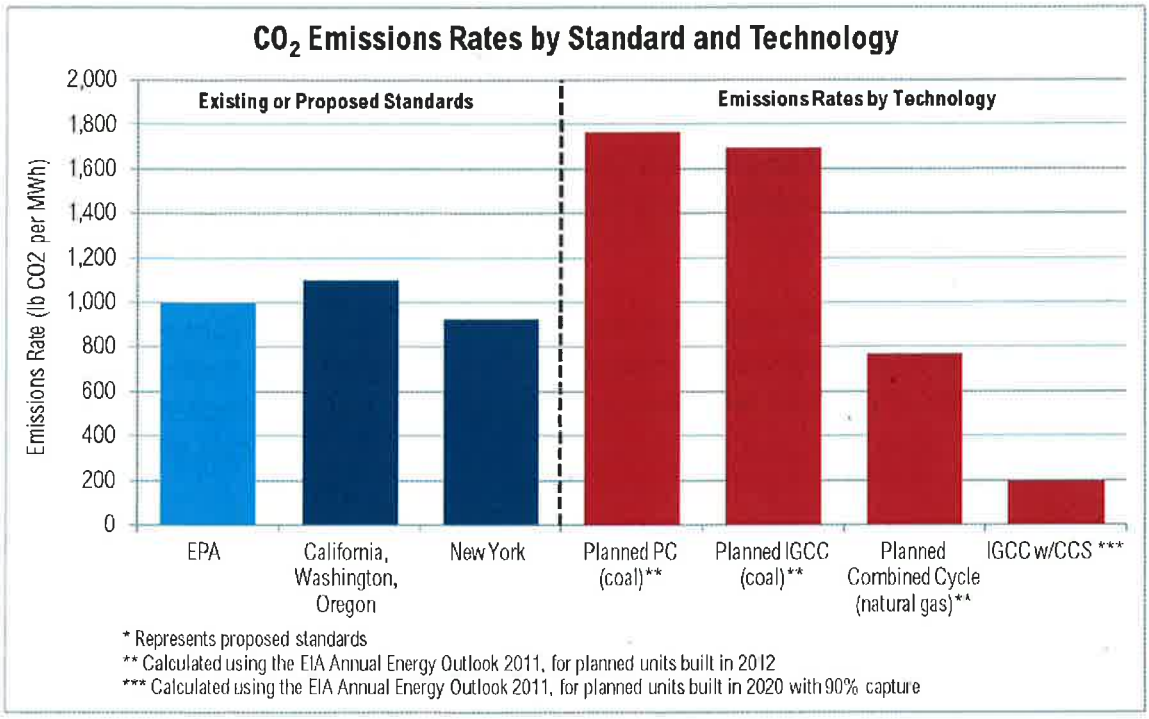
- California, Washington, and Oregon restrict utilities from entering into long-term financial commitments with base load power plants that emit more than 1,100 pounds CO_2 per MWh.[15]

- New York has proposed the following technology-specific standards for new major electric generating facilities and for facilities that undergo large expansions (25 MW).[16,17] Any emission source that fires with less than 70 percent fossil fuel is required to propose a case-specific emission limit for CO_2.

    - 925 pounds CO_2 per MWh: boilers that are permitted to fire greater than 70 percent fossil fuel; combined cycle combustion turbines; stationary internal combustion engines that fire only gaseous fuel.
    - 1,450 pounds CO_2 per MWh: simple cycle combustion turbines and stationary internal combustion engines that fire either liquid fuel or liquid and gaseous fuel simultaneously.

[15] http://www.edf.org/sites/default/files/State_GHG_standards_3-13-2012.pdf
[16] http://www.dec.ny.gov/regulations/79556.html
[17] Emission sources directly attached to a gasifier are exempt from the standards.

- While Montana[18] and Illinois[19] do not have CO_2 emissions standards, these states require new coal plants to capture a portion of their emissions through carbon capture and storage (CCS) technologies.



Will EPA need to update this standard in the future?

- Section 111(b)(1)(B) of the Clean Air Act requires EPA to "review and, if appropriate, revise" standards for new sources at least every 8 years.

[18] http://data.opi.mt.gov/bills/2007/billpdf/HB0025.pdf
[19] http://ilga.gov/legislation/publicacts/95/PDF/095-1027.pdf