



# **Proposed Carbon Pollution Standard For New Power Plants**

June 14, 2012  
CT SIPRAC Meeting

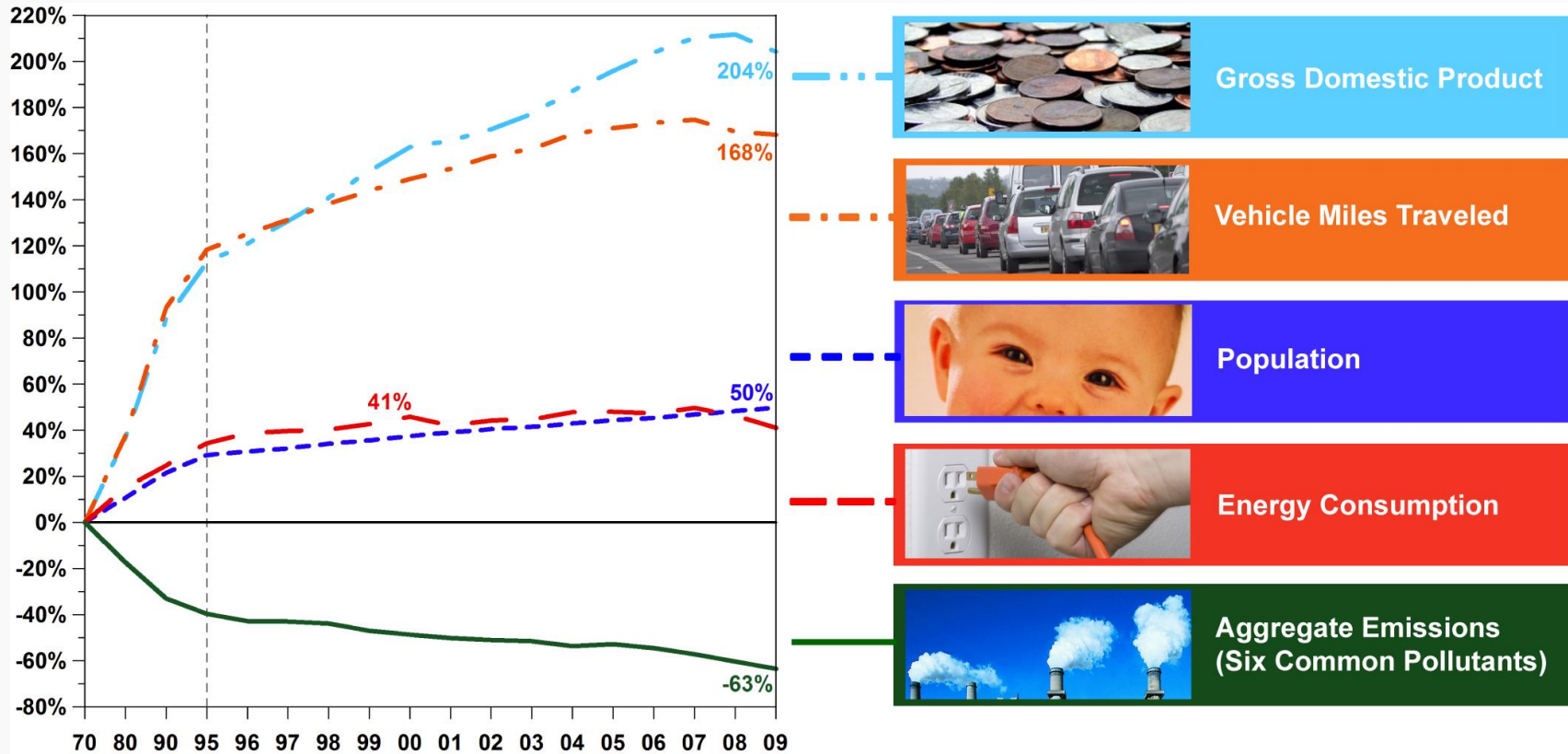


# Overview

- Background
- Why This Standard is Needed
- Sources of Carbon Pollution
- Summary of Action
  - Proposed standard
  - Flexibilities
  - Transitional sources
- Open Process and Public Comment



# Cleaner Air AND A Growing Economy

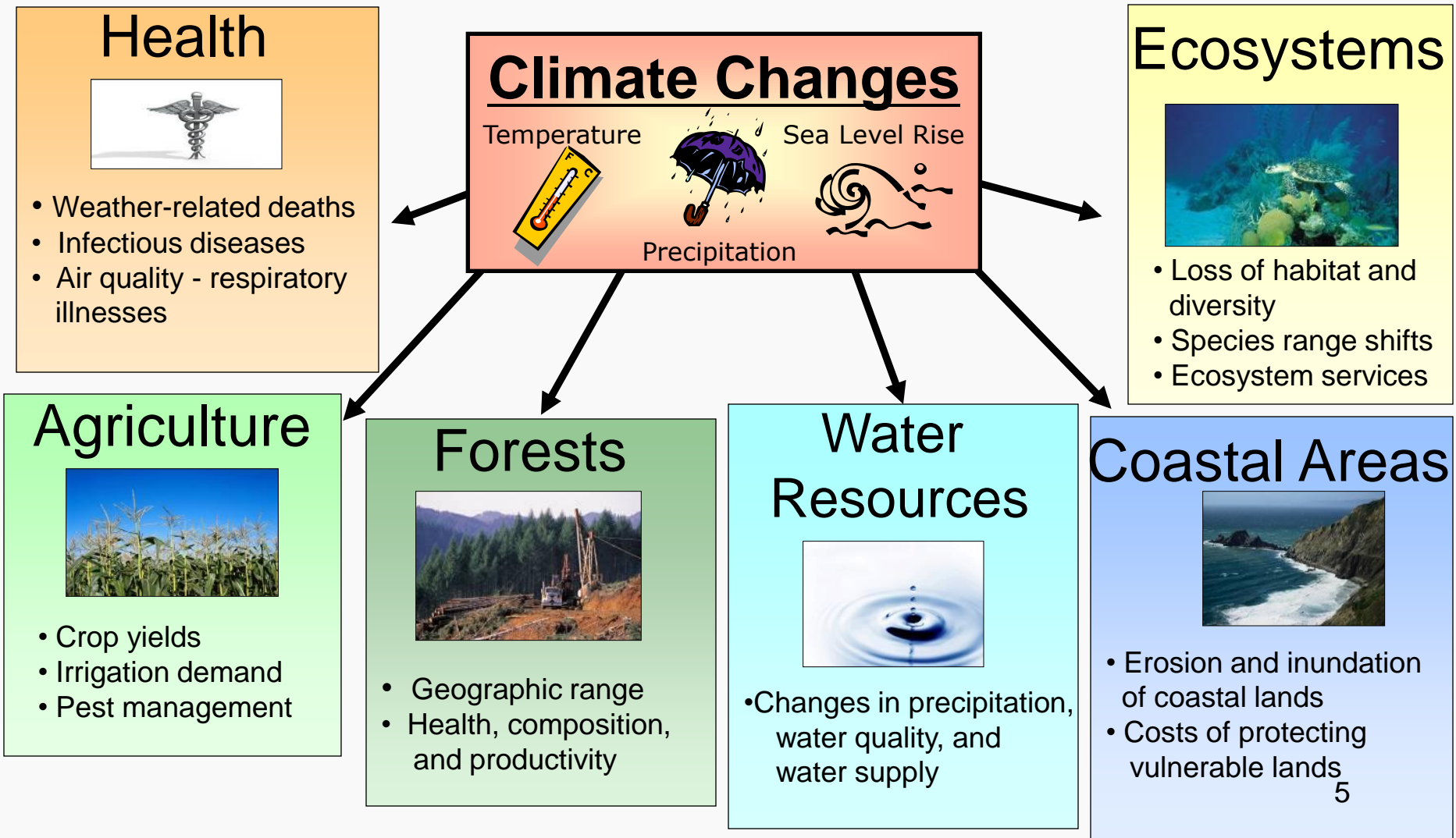




# Carbon pollution impacts public health and the environment

- Carbon pollution contributes to climate change. The scientific evidence of climate change is overwhelming and greenhouse gases **endanger the health and welfare** of the American people.
- The Earth's climate is changing in ways that can have **serious consequences** for public health and the environment.

# Expected Impacts of Climate Change



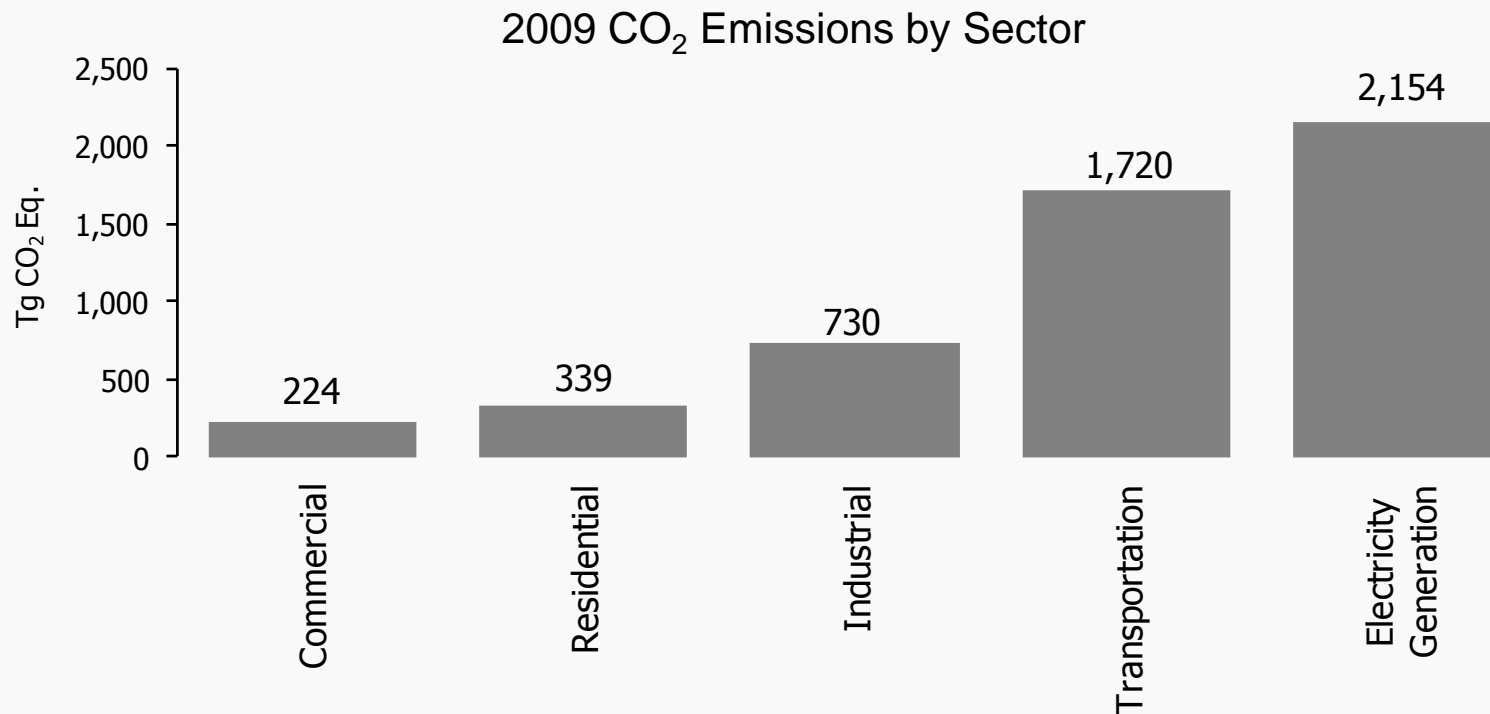


# EPA Greenhouse Gas Regulations

- Greenhouse Gas Mandatory Reporting Rule
- Vehicle GHG Standards
  - Light-Duty Vehicles for Model Year 2012-2016 (Final Rule)
  - Medium- and Heavy-Duty Engines, beginning Model Year 2014 (Final Rule)
  - Light-Duty Vehicles for Model Year 2017-2025 (Proposed Rule)
- Tailoring Rule
  - Prevention of Significant Deterioration Permits
  - Title V Operating Permits
- Carbon Pollution Standard for New Power Plants



# EPA is focusing first on the largest emitters of carbon





# History & Makeup of Electric System

- Aging infrastructure in need of updates
  - Low efficiency
  - Health impacts
- How do we modernize our electric generating system?





# Aging Fleet

**Table 4-4. Coal Steam Electricity Generating Units, by Size, Age, Capacity, and Thermal Efficiency (Heat Rate)**

Unit Size Grouping (MW)			No. Units	% of All Units	Avg. Age	Avg. Net Summer Capacity (MW)	Total Net Summer Capacity (MW)	% Total Capacity	Avg. Heat Rate (Btu/kWh)
0	to	25	193	15%	45	15	2,849	1%	11,154
>25	to	49	108	9%	42	38	4,081	1%	11,722
50	to	99	162	13%	47	75	12,132	4%	11,328
100	to	149	269	21%	49	141	38,051	12%	10,641
150	to	249	81	6%	43	224	18,184	6%	10,303
250	and up		453	36%	34	532	241,184	76%	10,193
<b>Totals</b>			<b>1,266</b>				<b>316,480</b>		

Source: National Electric Energy Data System (NEEDS) v.4.10

Note: The average heat rate reported is the mean of the heat rate of the units in each size category (as opposed to a generation-weighted or capacity-weighted average heat rate.) A lower heat rate indicates a higher level of fuel efficiency. Table is limited to coal-steam units online in 2010 or earlier, and excludes those units with planned retirements.



# Baseload Electricity from Coal

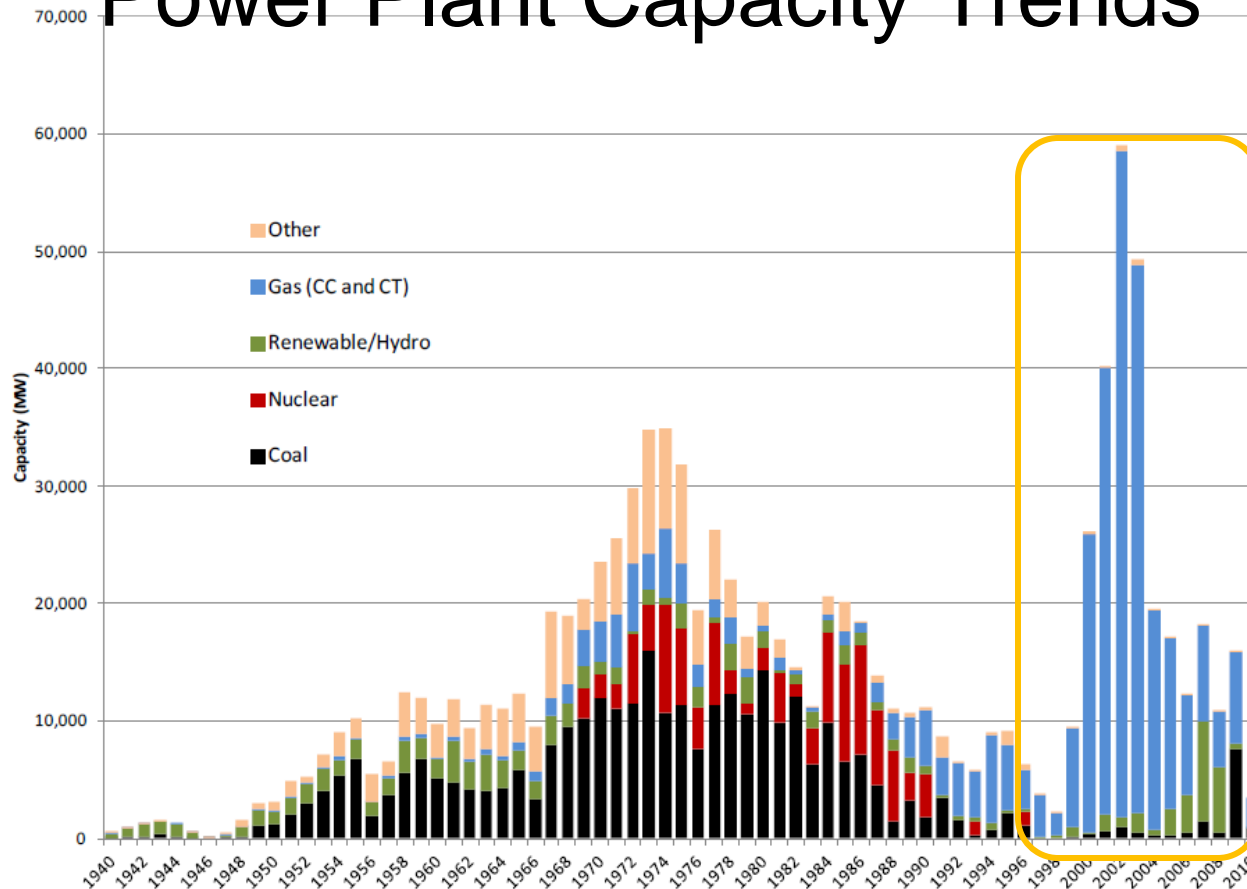
**Table 4-3. Electricity Net Generation in 2010 (Billion kWh)**

	Net Generation (Billion kWh)	Fuel Source Share
Coal	1,847	44.8%
Petroleum	37	0.90%
Natural Gas	988	23.9%
Other Gases	11	0.3%
Nuclear	807	19.6%
Hydroelectric	260	6.3%
Other	175	4.2%
<b>Total</b>	<b>4,125</b>	<b>100%</b>

Source: EIA 2010a

Note: Retail sales are not equal to net generation because net generation includes net exported electricity and loss of electricity that occurs through transmission and distribution.

# Power Plant Capacity Trends



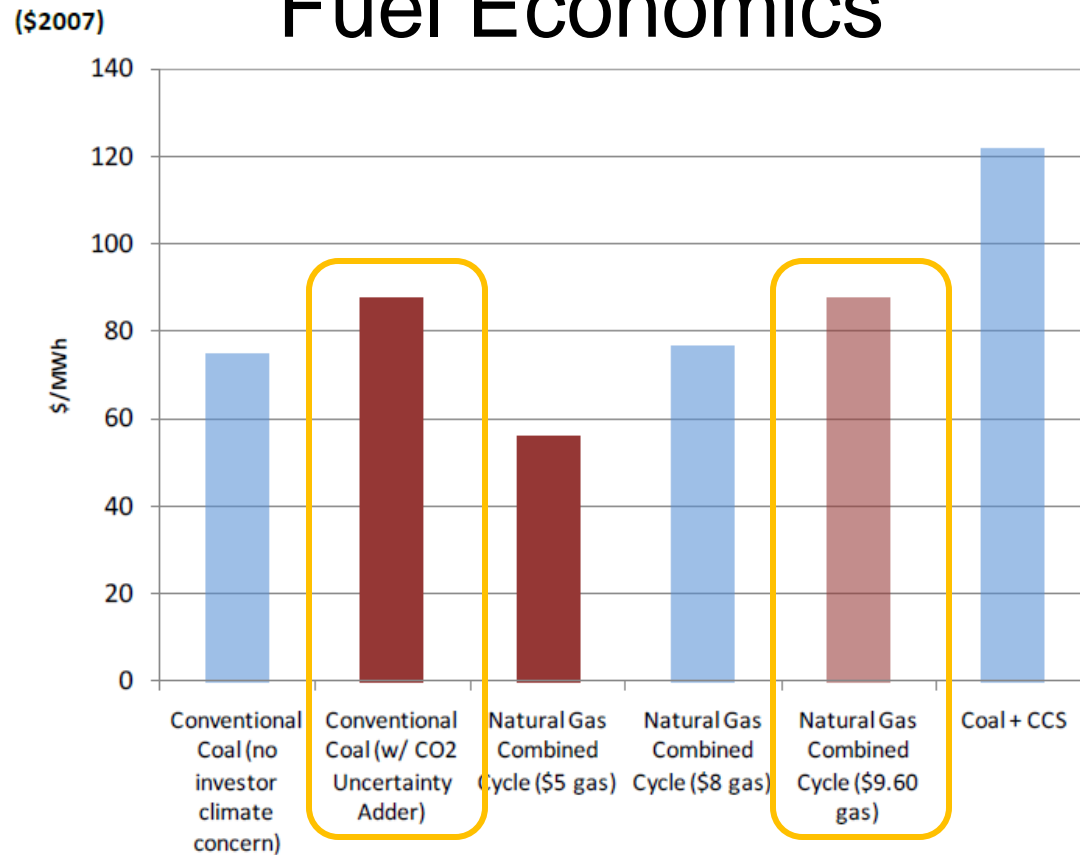
**Figure 5-1. Historical U.S. Power Plant Capacity Additions, by Technology**

Source: National Electric Energy Data System (NEEDS) v4.10\_PTox

Note: Renewables include geothermal, biomass, solar, and wind energy technologies. A considerable amount of renewables were built in 2009 and 2010, and these are reflected in EPA modeling applications but not necessarily in NEEDS.



# Fuel Economics



**Figure 5-4. Illustrative Wholesale Levelized Cost of Electricity of Alternative New Generation Technologies, EPA<sup>23</sup>**

Notes: Assumptions derived from EPA's application of IPM. Technologies include Coal without CCS, Natural Gas Combined Cycle with natural gas costing \$5 per mmBtu, Natural Gas Combined Cycle with \$8 per mmBtu costs of natural gas, and Integrated Gasification Combined Cycle with CCS (with 90 percent capture). In this graph coal is a high sulfur bituminous at \$2 mmBtu. Conventional Coal is at a heat rate of 8,875 Btu/kWh net, capacity factor of 85 percent assumed across all technologies.



# Fuel Economics

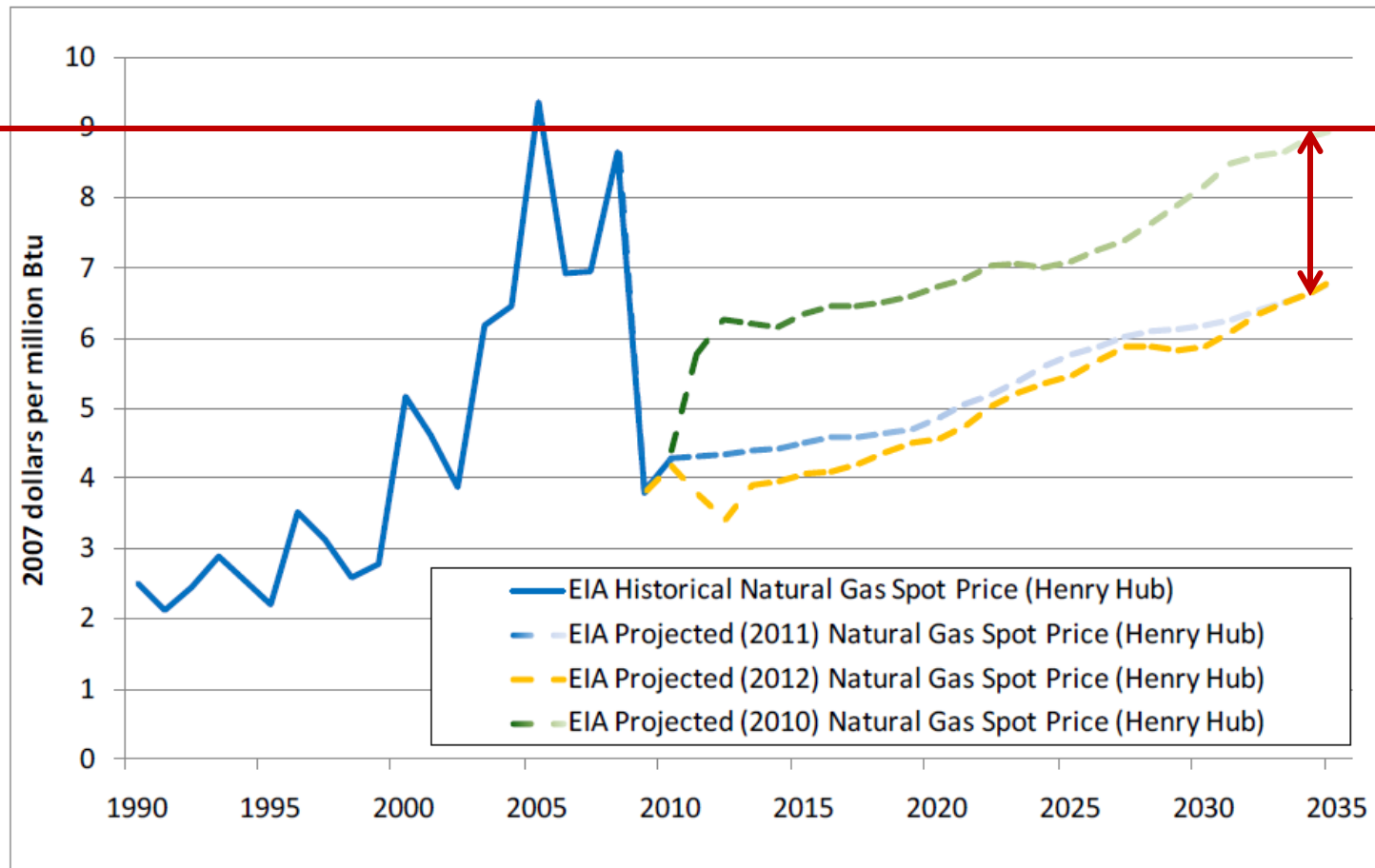


Figure 4-9. Natural Gas Spot Price, Annual Average (Henry Hub)

Source: EIA 2010d, EIA 2011, EIA 2012



## Summary of Actions

- On March 27 EPA proposed a carbon pollution standard for new fossil-fuel fired power plants (published in FR on April 13, 2012)
- Currently there are no national limits on the amount of carbon pollution new power plants can emit.
- The proposed standard would ensure that new power plants use modern technology to limit this harmful pollution.
- EPA's proposed standard is flexible, achievable and can be met by a variety of facilities using different fossil fuels, such as natural gas and coal.
- The proposed carbon pollution standard for new power plants is posted at: <http://www.epa.gov/carbonpollutionstandard>
- The comment period will close on June 25, 2012.



# Legal Background

- In April 2007, the U.S. Supreme Court ruled, in Massachusetts v. EPA, that **GHGs meet the definition of “air pollutant” in the CAA**. This decision clarified that the authorities and requirements of the CAA, including section 111, apply to GHG emissions.
- As a result of this decision, the EPA obtained a **voluntary remand** from the U.S. Court of Appeals for the District of Columbia Circuit (the “Court”) to reconsider the EPA’s actions in a **2006 rulemaking for EGUs** under CAA section 111, in which the EPA had promulgated standards for criteria air pollutants, but had declined to regulate GHG emissions.
- In part in response to **threatened litigation** over the EPA’s failure to act on the remand, the EPA agreed to propose today’s action to regulate GHG emissions from new fossil fuel-fired EGUs.



# Statutory Authority

- Clean Air Act (CAA) section 111(b) requires EPA to regulate new sources.
  - **Section 111(b) – Federal Program for New Sources**
    - The Administrator shall “establish Federal standards of performance” for “new sources within [the] source category.”
  - **“Standard of Performance”**
    - “A standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction, which (taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.”





# Proposed Carbon Pollution Standard for New Sources

- Proposes output-based emission standard of **1,000 pounds of CO<sub>2</sub> per megawatt-hour** (lb CO<sub>2</sub> /MWh gross)
- Applies to new
  - Fossil fuel-fired boilers,
  - Integrated Gasification Combined Cycle (IGCC) units, and
  - Natural Gas Combined Cycle (NGCC) units
- New **combined cycle natural gas** power plants could meet the standard without add-on controls.
- New coal or petroleum coke power plants would need to incorporate **carbon capture and storage technology** (CCS).
  - The proposal includes an **alternative 30-year compliance period** to allow these new plants to incorporate CCS at a later date to reach compliance



# Proposed Carbon Pollution Standard for New Sources

- Some states already limit emissions of greenhouse gases from new power plants.
  - Washington, Oregon, and California
- Some states already have CCS requirements.
  - Montana and Illinois



# Flexibilities for New Coal-fired Power Plants

- New power plants that use Carbon Capture and Storage (CCS) would have the option to use a **30-year average of CO<sub>2</sub> emissions** to meet the proposed standard, rather than meeting the annual standard each year.
- Provides **flexibility** for new power plants to phase in CCS technology
  - Plants that install and operate CCS right away would have the flexibility to emit more CO<sub>2</sub> in the early years as they learn how to best optimize the controls
  - Plants could wait to install or operate CCS for up to 10 years to take advantage of lessons learned from other early installations.
- For example, a new power plant could emit more CO<sub>2</sub> for the first 10 years and then emit less for the next 20 years, as long as the average of those emissions met the standard.
  - Because CO<sub>2</sub> is long-lived in the atmosphere, the 30-year averaging period is not expected to have a different impact on climate compared to a continuous emission rate limit or an annual emissions limit.
- This would also allow for CCS to become even more widely available, which should lead to lower costs and improved performance over time.



# Transitional Sources

- EPA is proposing that sources **with the necessary construction permits** will not have to comply with this standard, even if they have not yet begun construction, provided that they **begin construction within 1 year** of the proposal's publication
- EPA is also proposing that sources looking to **renew permits** and that are **part of a Department of Energy (DOE) demonstration project** would also not be required to comply with this standard, provided that they **begin construction within 1 year** of the proposal's publication



# Modifications and Reconstructions

- EPA is **not proposing a standard** for “modified” power plants.
- The EPA’s current regulations define a “modification” under NSPS as a physical or operational change that increases the source’s maximum achievable hourly rate of emissions.
- **Pollution control projects are specifically exempted** from the NSPS modification definition.
- Most projects that EPA anticipates might increase the hourly rate of CO<sub>2</sub> emissions are pollution control projects.
- We **don’t have enough information** about projects besides pollution control projects that would likely constitute “modifications” under our current regulations, so we do not have adequate information on which to base a proposed standard of performance.
- EPA is not proposing a standard for reconstructions, also **due to lack of information**.



# Public Process for Proposed Rule

- In 2011, EPA held several **listening sessions**
  - EPA obtained important information and feedback from key stakeholders and the public
  - Each listening session included a round table discussion and public comments.
- EPA also solicited **written comments**.
- EPA considered all this information when drafting this proposal.
- EPA also held **public hearings** on this proposal on May 24, 2012 in Chicago and Washington, D.C.



# Public Process – Next Steps

- The EPA will accept **comment** on this proposed rule until **June 25, 2012**.
- Comments on the proposed standard should be identified by Docket ID No. EPA-HQ-OAR-2011-0660.
- All comments may be submitted by one of the following methods:
  - [www.regulations.gov](http://www.regulations.gov): Follow the on-line instructions for submitting comments.
  - E-mail: Comments may be sent by electronic mail (e-mail) to [a-and-r-Docket@epa.gov](mailto:a-and-r-Docket@epa.gov).
  - Fax: Fax your comments to: 202-566-1741.
  - Mail: Send your comments to: Air and Radiation Docket and Information Center, Environmental Protection Agency, Mail Code: 2822T, 1200 Pennsylvania Ave., NW, Washington, DC, 20460.
  - Hand Delivery or Courier: Deliver your comments to: EPA Docket Center, Room 3334, 1301 Constitution Ave., NW, Washington, DC, 20460. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.



## Connecticut Impacts

- Reinforces existing market conditions
- No existing facilities impacted
- Long-term health and environmental benefits





Questions?



Thank You!