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BEFORE THE

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AND

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COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

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Chairmen Bridenstine and Weber, and Ranking Members Bonamici and Grayson, and Members of the Subcommittees, I appreciate the opportunity to appear before you today to provide testimony on the Energy Information Administration's (EIA) analysis of the proposed Clean Power Plan rule for existing fossil-fueled electric generating units issued by the Environmental Protection Agency in June 2014. This analysis was undertaken in response to a request by Chairman Smith.

EIA is the statistical and analytical agency within the U.S. Department of Energy. EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding regarding energy and its interaction with the economy and the environment. By law, EIA's data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views expressed in our reports, therefore, should not be construed as representing those of the Department of Energy or other federal agencies.

ANALYSIS OVERVIEW AND FOCUS

The starting point for EIA's analysis of the Clean Power Plan is the 2015 edition of EIA's *Annual Energy Outlook.* EIA's analysis considers the proposed Clean Power Plan in the context of the AEO2015 High Economic Growth and High Oil and Gas Resource cases as well as the Reference case in order to examine indicators of the proposed rule's impacts on energy markets under varying assumptions regarding economic growth, electricity demand, and fuel prices. The report also includes numerous sensitivity cases, many of which address additional questions raised in Chairman Smith's request.

Consistent with EIA's statutory mission and expertise, this analysis focuses on the implications for the energy system and the economy of reducing CO_2 emissions under the proposed Clean Power Plan. It does not consider any potential health or environmental benefits from reducing

CO_2 emissions from existing electric generating units covered by the proposed Clean Power Plan. It is not a cost-benefit analysis.

EIA recognizes that projections over a 25-year horizon are inherently uncertain and subject to changing policy objectives, supply disruptions, the emergence of disruptive technologies, and other future developments. There is considerable uncertainty and many challenges are involved in projecting the impacts of the proposed Clean Power Plan.

- The Clean Power Plan is still a proposed rule; the final rule may differ from the proposed rule in material ways
- The proposed rule applies to individual states; however, the electricity system does not respect state boundaries. EIA's modeling generally uses the 22 Electricity Market Module (EMM) regions in its National Energy Modeling System (NEMS) as Clean Power Plan compliance regions in this analysis. The model assigns each EMM region interim and final emission performance goals that are consistent with EPA's proposed state-level goals
- The regional compliance patterns presented in this analysis are model outputs from NEMS, while actual compliance mechanisms will be defined by state compliance proposals and may have different characteristics
- The construction of new generation to comply with the Clean Power Plan may necessitate upgrades to, and expansion of, electric power transmission systems. NEMS allows increases in interregional transmission transfer capability. However, NEMS does not contain a power-flow model or assess the reliability of bulk power transmission systems in detail
- NEMS does not consider how deliverability of natural gas to power plants using that fuel might be impacted by extreme cold conditions in regions where natural gas is a primary fuel for residential and commercial heating and local natural gas distribution companies typically have the first call on available firm natural gas transmission capacity. Because of the shift away from coal towards intermittent renewables and natural gas generation, natural gas-fired capacity will increase in importance for providing grid reliability.

Additional context and caveats are provided in EIA's report, which has been provided to the Committee and is publicly available on EIA's website. Let me now turn briefly to some of the results of the analysis. For convenience, the Appendix table provides summary descriptions of the 3 baseline and 5 policy cases discussed in this testimony.

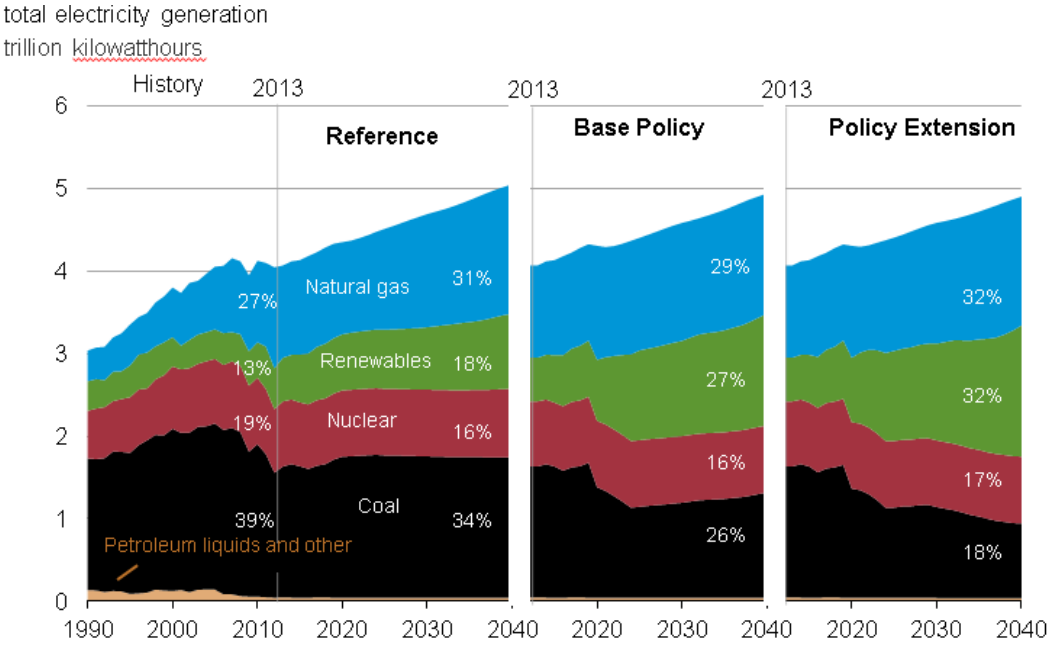
ANALYSIS RESULTS

The proposed Clean Power Plan would reduce projected power sector CO_2 emissions

Reductions in projected emissions in 2030 relative to baseline projections for that year range from 484 to 625 million metric tons. Projected power sector emissions in 2030 ranges from 1,553 to 1,727 million metric tons across the cases, reflecting a reduction of between 29% and 36% relative to the 2005 emissions level of 2,416 million metric tons.

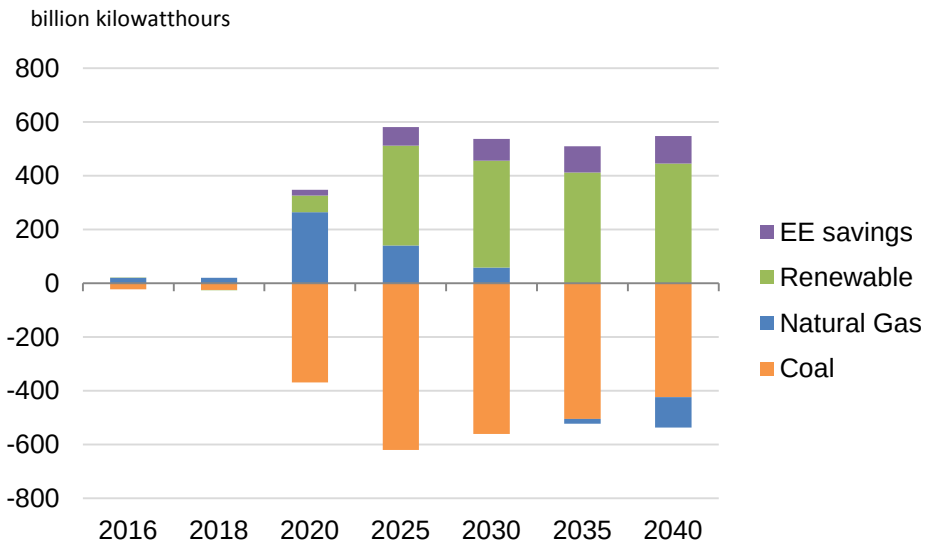
Switching from coal-fired generation to natural gas-fired generation is the predominant compliance strategy as implementation begins, with renewables playing a growing role in the mid-2020s and beyond (Figures 1 and 2)

Figure 1. Electricity generation, AEO2015 Reference case (past and projected); Clean Power Plan Base Policy (CPP) and Policy Extension (CPPEXT) cases (projected only)



Source: EIA, Annual Energy Outlook 2015 and Analysis of Impacts of the Clean Power Plan, May 2015

Figure 2. Change in generation and energy efficiency savings under the Clean Power Plan Base Policy case relative to AEO2015 Reference case

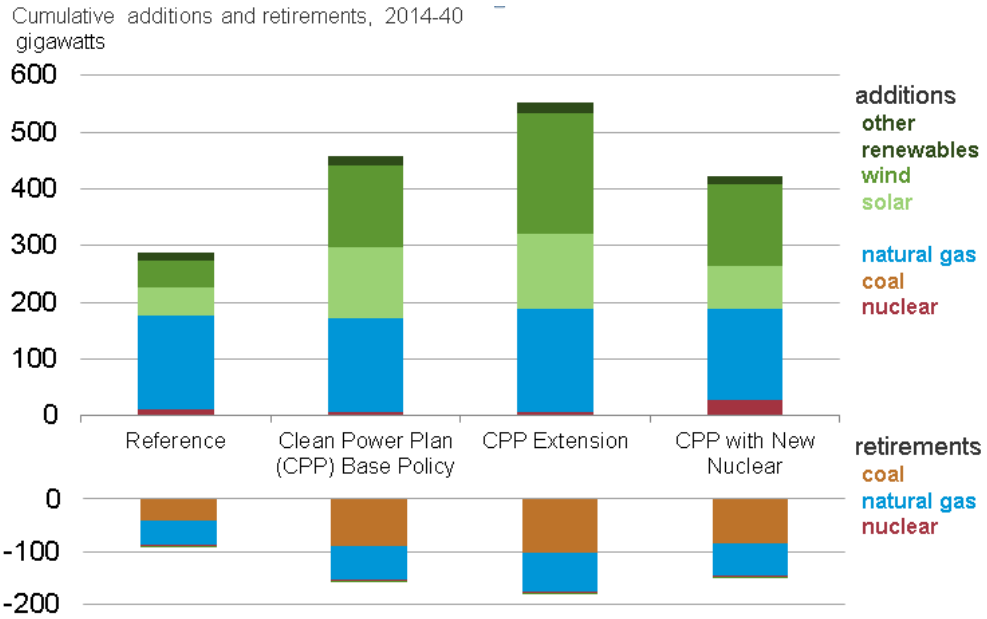


If new nuclear power generation were to be treated in the same manner as new renewable generation in compliance calculations, the Clean Power Plan would also result in increased nuclear generation.

The Clean Power Plan has a significant effect on projected retirements and additions of electric generation capacity (Figures 3 and 4). Projected coal plant retirements over the 2014-40 period, which are 40 GW in the AEO2015 Reference case (most before 2017), increase to 90 GW (nearly all by 2020) in the Base Policy case (CPP). Retirements of inefficient units fueled by natural gas or oil, generally involving primary steam cycles, are also projected to rise.

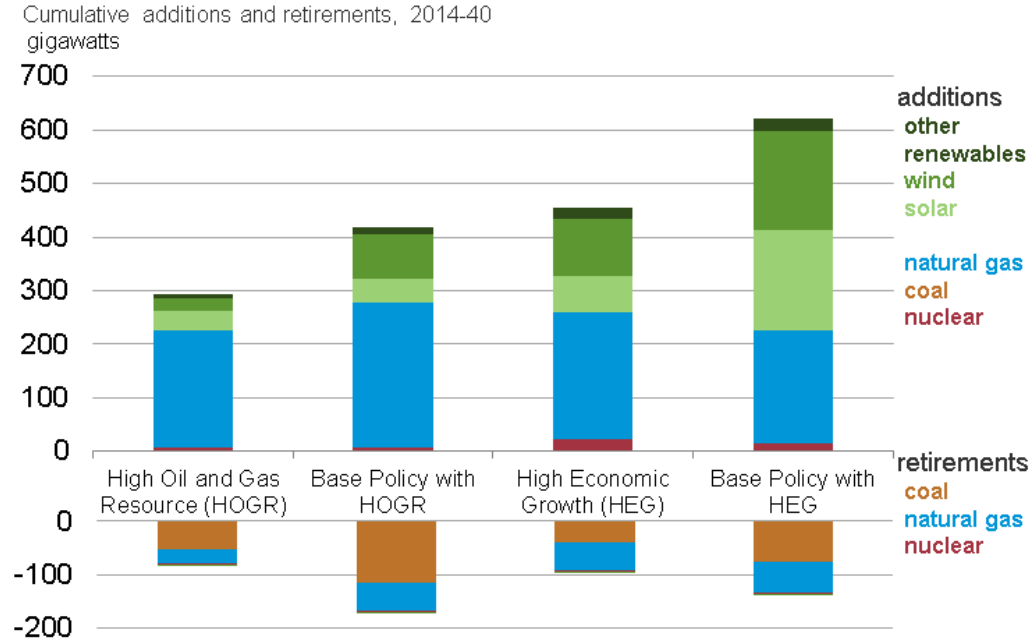
Turning to capacity additions, which are dominated by natural gas and renewables over the 2014-40 period in the AEO2015 Reference case, the Clean Power Plan significantly increases projected renewable capacity additions in all cases. Under favorable natural gas supply conditions, the Clean Power Plan also increases additions of generation capacity fueled by natural gas (CPPHOGR). Nuclear capacity is also added in a sensitivity case in which new nuclear generation receives the same treatment as new renewable generation in compliance calculations (CPPNUC).

Figure 3. Cumulative capacity changes 2014-40 for AEO2015 Reference case and 3 cases implementing the proposed Clean Power Plan rule



Source: EIA, Annual Energy Outlook 2015 and Analysis of Impacts of the Clean Power Plan, May 2015

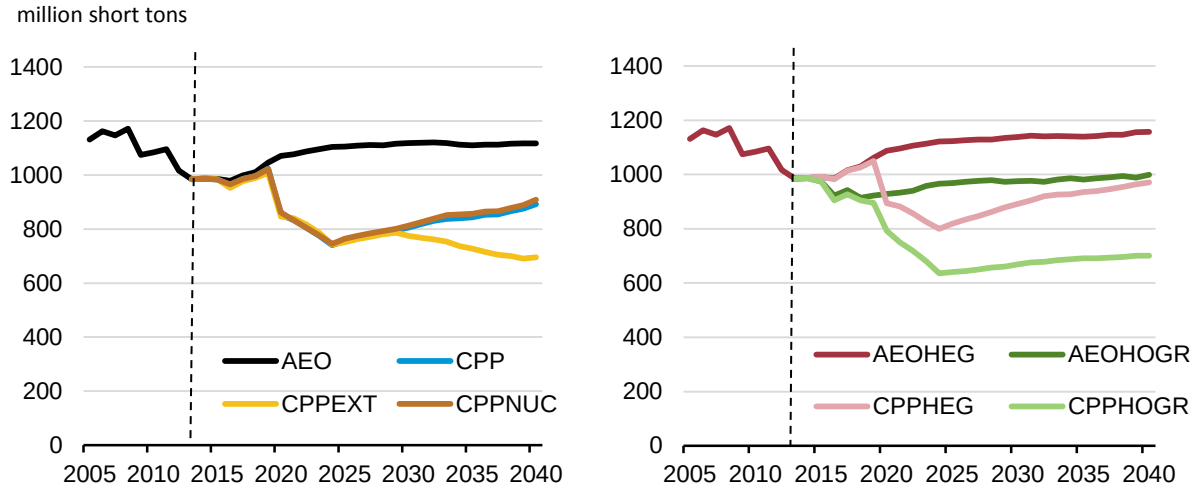
Figure 4. Cumulative capacity changes, 2014-40 for AEO2015 High Oil and Gas Resource and High Economic Growth baselines and cases implementing the proposed rule from each one



Source: EIA, Annual Energy Outlook 2015 and Analysis of Impacts of the Clean Power Plan, May 2015

Coal production and minemouth steam coal prices are lower compared with the AEO2015 Reference case in the early years following Clean Power Plan implementation (Figure 5). In the Base Policy case (CPP) projected U.S. coal production in 2020 and 2025 is 20% and 32% lower relative to the AEO2015 baseline level in those years, respectively. This decline in coal production affects all major coal producing regions (West, Interior, and Appalachia). Expanded generation from renewables, rising natural gas prices, and static emission rate targets in the post-2030 period in the Base Policy case (CPP) allow existing coal-fired plants to operate at higher utilization rates, which rise, on average, from a low of 60% in 2024 to 71% in 2040. As a result, coal production edges higher but still remains 20% below the AEO2015 Reference case level in 2040.

Figure 5. Total U.S. coal production in baseline and Clean Power Plan cases, 2005-40



Source: U.S. Energy Information Administration.

The Clean Power Plan's effect on natural gas production and prices is very sensitive to baseline supply conditions (Figures 6 and 7). The Clean Power Plan increases natural gas use significantly relative to baseline at the start of Clean Power Plan implementation, but this effect fades over time as renewables and efficiency programs increasingly become the dominant compliance strategies. While there are significant differences in projected natural gas prices across baselines, with persistently lower prices in the High Oil and Gas Resource case, the Clean

Power plan itself does not significantly move natural gas prices with the exception of an initial impact expected during the first 2-3 years after the start of implementation.

Figure 6. Natural gas production in baseline and Clean Power Plan cases, 2005-40

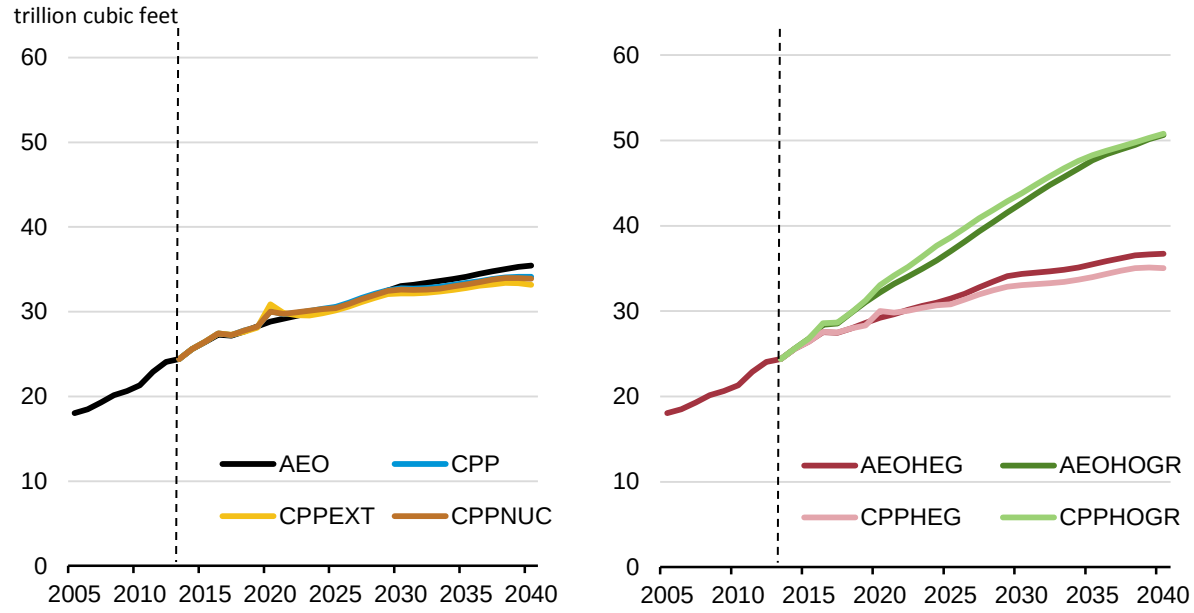
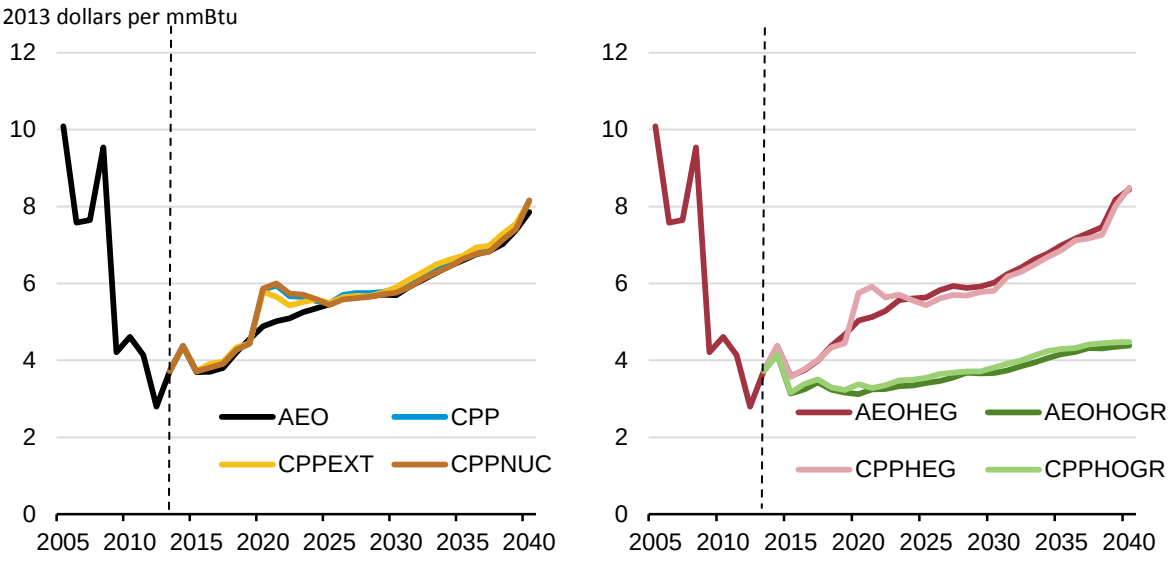


Figure 7 Henry Hub spot price for natural gas in baseline and Clean Power Plan cases, 2005-40



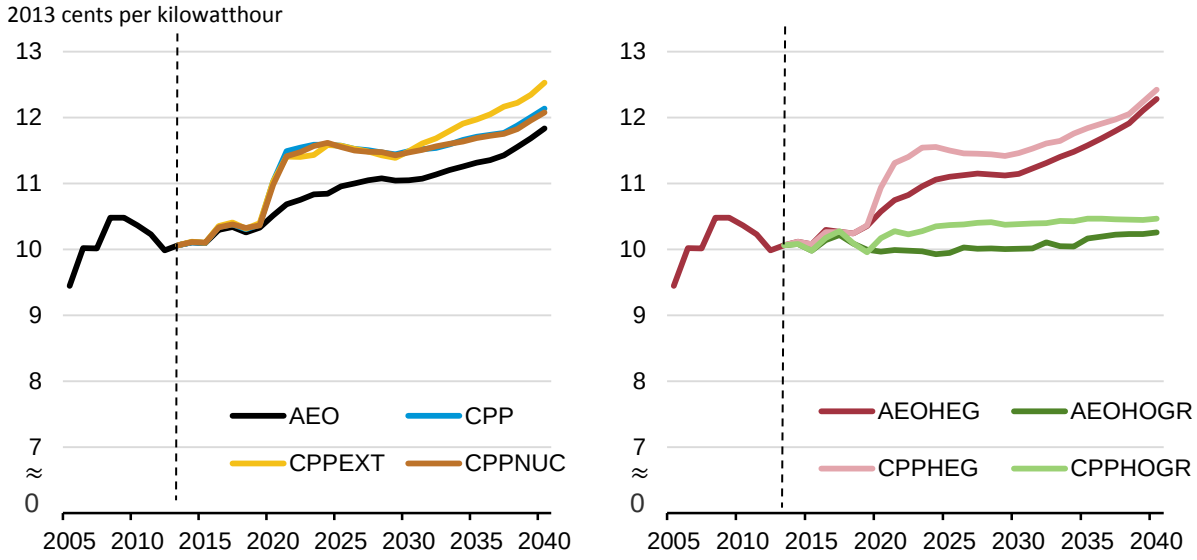
Source: U.S. Energy Information Administration.

Heat rates for coal-fired generators that remain in use, defined as the energy content of coal (in Btu) per kWh of net generation, improve modestly under the Clean Power Plan.

Retail electricity prices and expenditures rise under the Clean Power Plan. Retail electricity prices increase most in the early 2020s, in response to initial compliance measures. Increased investment in new generating capacity as well as increased use of natural gas for generation lead to electricity prices that are 3% to 7% higher on average from 2020-25 in the Clean Power Plan cases, versus the respective baseline cases (Figure 8). While prices return to near-baseline levels by 2030 in many regions, prices remain at elevated levels in some parts of the country. In Florida and the Southeast, the Southern Plains, and the Southwest regions the projected electricity prices in 2030 are roughly 10% above baseline in the Base Policy case (CPP). Some regions experience electricity prices below baseline for particular time periods, but no region has such an outcome for the entire projection period.

Electricity bills, which reflect both the electricity price and the amount of electricity purchased, also generally rise with Clean Power Plan implementation, but expenditure changes are smaller in percentage terms than price changes as the combination of energy-efficiency programs pursued for compliance purposes and higher electricity prices tends to reduce electricity consumption relative to baseline.

Figure 8. All sectors average retail electricity price in baseline and Clean Power Plan cases, 2005-40



Source: U.S. Energy Information Administration.

Economic activity indicators, including real gross domestic product (GDP), industrial shipments, and consumption, are reduced relative to baseline under the Clean Power Plan. Across cases that start from the AEO2015 Reference case, the reduction in cumulative GDP over 2015-40 ranges from 0.17%-0.25%, with the high end reflecting a tighter policy beyond 2030. Implementing the Clean Power Plan under baselines that assume high economic growth or high oil and gas resources result in somewhat smaller cumulative reductions in GDP over 2015-40.

CONCLUSION

As I noted at the outset, while EIA does not take policy positions, its data, analyses, and projections are meant to assist policymakers in their deliberations. Mr. Chairman and members of the committee, this concludes my testimony. I would be happy to answer any questions you may have.

APPENDIX TABLE: **Description of baseline cases and Clean Power Plan cases discussed in this testimony**

Case name	Description
Reference (AEO)	EIA's AEO2015 Reference case. AEO2015 presents annual projections of energy supply, demand, and prices through 2040. The Reference case is generally based on federal, state, and local laws and regulations as of October 2014.
Base Policy (CPP)	The Base Policy case models the proposed Clean Power Plan using the AEO2015 Reference case as the underlying baseline.
Policy Extension (CPPEXT)	The Policy Extension case extends CO_2 reduction targets beyond 2030, in order to reduce CO_2 emissions from the power sector by 45% below 2005 levels in 2040, using the AEO2015 Reference case as the baseline.
Policy with New Nuclear (CPPNUC)	The Policy with New Nuclear case models the Clean Power Plan assuming that generation from currently unplanned new nuclear capacity counts in compliance calculations. The baseline for the CPPNUC case is the AEO2015 Reference case.
Cases using alternative baselines	
High Economic Growth (AEOHEG)	EIA's AEO2015 High Economic Growth case, which reflects higher growth in U.S. gross domestic product (GDP) than the Reference case, resulting in higher electricity demand and fuel prices.
High Oil and Gas Resource (AEOHOGR)	EIA's AEO2015 High Oil and Gas Resource case, which reflects more-optimistic assumptions about domestic oil and natural gas supply prospects than the Reference case, resulting in lower natural gas prices.
Policy with High Economic Growth (CPPHEG)	The CPPHEG case models the proposed Clean Power Plan using the AEO2015 High Economic Growth case as the baseline.
Policy with High Oil and Gas Resource (CPPHOGR)	The CPPHOGR case models the proposed Clean Power Plan using the AEO2015 High Oil and Gas Resource case as the baseline.