

The Natural Gas Solution: API's Modeling of EPA CPP

Market forces, public policy and environmental policy are driving the ongoing shift in our nation's power generation mix. The challenge of ensuring environmental compliance, reliable generation and affordable electricity rests on states and regional transmission organizations that must consider the interests of electricity consumers as well as the overall well-being of the state economy. U.S. Environmental Protection Agency's (EPA) Clean Power Plan (CPP) is a sweeping and complex rule affecting most power generation in the country, with the singular focus of environmental impact. Should the rule be upheld by the courts, states must carefully consider CPP implementation choices as they balance their need to meet emission requirements, maintain reliability and minimize costs. Natural gas generation meets all three objectives, providing a generation solution that is **clean, reliable and affordable**.

Key Findings

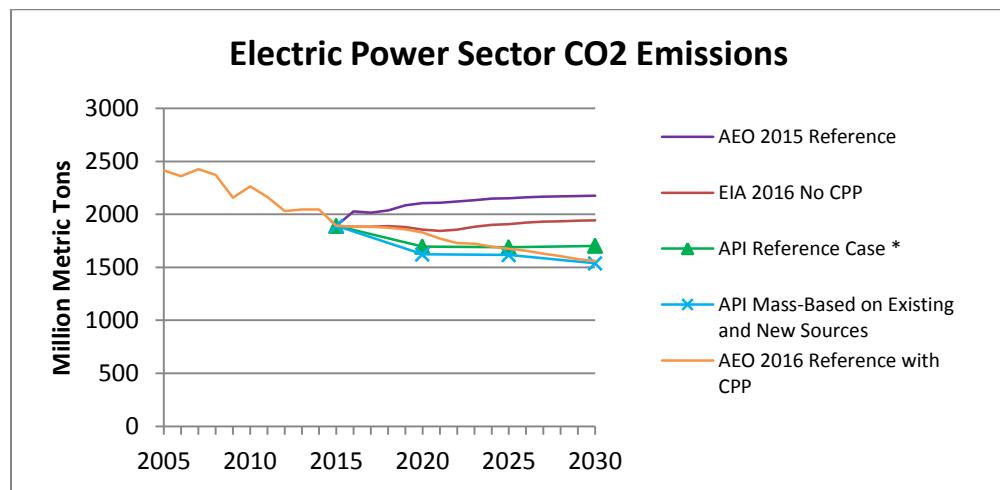
- Natural gas in the power sector will drive emission reductions even without the CPP. In fact, modeled CO₂ emissions under API's reference case¹ are 30% lower than 2005 CO₂ emission levels;
- Total production costs² are lowest when market forces drive the future resource mix to achieve compliance rather than relying on government mandates for energy efficiency or renewables;
- Within each of the EPA-defined compliance pathways, the lowest cost solution to meeting compliance also has the most natural gas generation.

¹ API reference case assumes: No CPP, Business As Usual load, API natural gas resource assumptions based on AEO 2015 high natural gas resource case.

² The Integrated Planning Model (IPM) includes costs associated with the production of electricity including capital, fixed operating and maintenance, fuel, and variable operating and maintenance.

Emissions Reductions

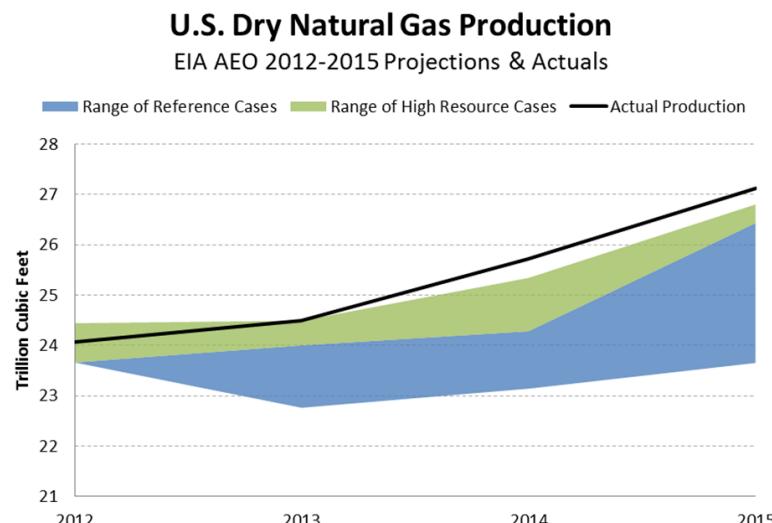
Even without the Clean Power Plan, natural gas is projected to continue driving **emissions reductions** in the power sector. Using more realistic natural gas resource assumptions provides over 350 million short tons of CO₂ emission reductions compared to EPA's Business-As-Usual case. U.S. Energy Information Administration (EIA) shows similar CO₂ reduction in their 2016 cases when they use more realistic natural gas resource assumptions, clearly demonstrating the ability of natural gas generation to deliver significant emissions reductions.



*API Reference Case assumes: no CPP, business as usual load, and is based on AEO 2015 high natural gas resource assumptions

High Resource Reality

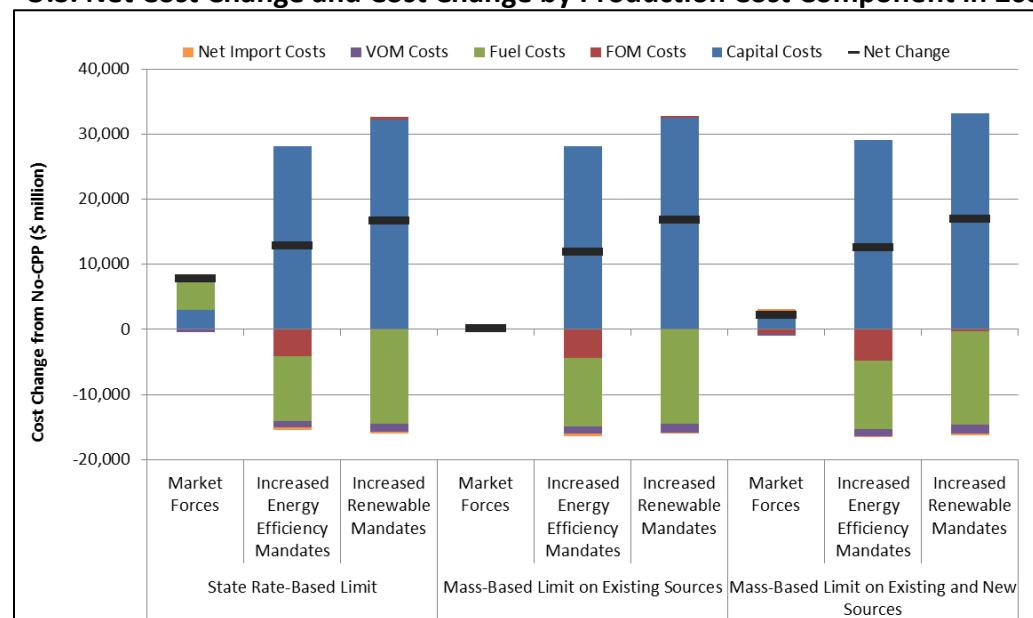
Natural gas is clean-burning, reliable, cost-effective, and abundant. Over the past three years, actual U.S. natural gas production exceeded EIA AEO high gas resource case projections. Continued increases in reserve estimates, industry technological improvements since 2010, and the demonstrated robust production response to real market signals, make clear that *reality aligns with a high natural gas resource*. Most published assessments of the CPP do not reflect a resource consistent with this high resource reality. To understand the potential for natural gas utilization in the United States, states and regions contemplating CPP implementation or generation planning must rely on assessments that reflect realistic natural gas resource assumptions.



Natural Gas = The Lowest Cost Solution

When the market drives the generation mix, rather than regulation mandating renewables or energy efficiency, natural gas is the **lowest cost solution** for meeting emission reduction requirements.

U.S. Net Cost Change and Cost Change by Production Cost Component in 2030



Because natural gas is so affordable:

- Reductions in fuel costs in the mandated EE and RE cases are more than offset by increased EE & RE capital costs.
- Capacity investments and generation shifts in the API reference scenario result in greater emission reductions than required by the CPP Mass-Based Limit on Existing Sources, therefore the market forces implementation case shows no cost change.

The API CPP Model

- ✓ Provides data driven analysis and an understanding of the role natural gas can play in a future generation mix, with or without CO₂ emission limits;
- ✓ Demonstrates the significance of underlying assumptions about the natural gas resource base and energy efficiency;
- ✓ Uses the same model as EPA with the following exceptions:
 - Considers realistic assumptions about the size of our nation's natural gas resource base;
 - Includes model version updates that reflect changes between the proposed and final CPP rules.