

# The Regional Greenhouse Gas Initiative and Its Impact on Natural Gas

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Questions have emerged about whether Virginia's possible participation in the Regional Greenhouse Gas Initiative (RGGI) would incentivize fuel switching from coal to natural gas. The answer, using the best available data and evidence, is that a significant switch to gas (beyond fuel switching already happening for non-RGGI reasons) is unlikely to be triggered by participation in this regional power plant cap-and-trade program. RGGI incentivizes the lowest carbon sources of energy. Since federal rules have made it exceedingly unlikely that new coal plants will be proposed in Virginia or around the country, the RGGI carbon price would favor zero carbon sources over natural gas. This would cause construction of new gas plants to be more expensive than the status quo situation. As for the existing natural gas fleet, these power plants are already operating at near maximum capacity and simply cannot absorb a significant increase in gas use. These two RGGI factors, a deterrent to the construction of new gas plants and a lack of capacity in Virginia of existing gas plants, mean that the state's participation in this mechanism would be highly unlikely to lead to a significant expansion of natural gas.

## New Capacity

By putting a long overdue price on power plant CO<sub>2</sub> emissions, RGGI will hasten a transition towards clean energy sources like wind, solar, and energy efficiency. That transition will be funded in part by investments that might otherwise have gone to new natural gas-fired power plants if not for an emissions pricing system. That is because RGGI places the largest costs on the most carbon intensive sources of power, and moving forward, that means natural gas.

The reason natural gas will be the most carbon-intensive source of new power is that in September 2013, the United States Environmental Protection Agency issued a proposal to regulate CO<sub>2</sub> emissions from new power plants under the authority of the Clean Air Act, noting the need to "combat climate change and improve public health." The proposed pollution limits, which are 51 percent lower than the average emissions rate for U.S. coal-fired power, make it very unlikely that new coal-fired power plants will be built unless significant and costly investments are made in carbon capture technology.

This is a paradigm shift in the energy market. The choice about what to build for power companies and investors is no longer between new coal plants or new natural gas plants. Rather, thanks to an evolving landscape of federal climate regulations and falling technology costs, the choice now for new power is between natural gas and truly clean energy. In this environment, RGGI clearly benefits zero-carbon clean energy and will likely shift new investment away from natural gas. That shift will only intensify as renewable energy prices continue to fall and as the RGGI cap continues to decline, driving an increase in CO<sub>2</sub> allowance prices.

For example, in 2020 the projected RGGI allowance price of \$10+/-ton would add about \$5/MWh to generation from gas-fired power plants. This \$5/MWh would not be added to renewable generation, and would increase the benefits of energy efficiency, thus supporting clean energy over additional gas generation.

### Existing Capacity

In the near-term, RGGI would work in concert with an array of other policy and market forces (i.e. EPA carbon rules, EPA air toxics rules, abundant natural gas supplies) to put additional pressure on Virginia’s existing coal fleet. That is because coal emits more CO<sub>2</sub> than natural gas when burned, and RGGI imposes a carbon price at the point-of-combustion. So while RGGI would add new costs on all fossil fuel plants larger than 25 MW in Virginia, the relative impact on existing coal plants would be greatest.

Roughly 90% of Virginia’s natural gas generation comes from eight combined cycle (CC) natural gas facilities. These facilities are more efficient than simple natural gas combustion turbines or coal plants, and they have been running with much greater frequency in the last five years—more than doubling their energy output from 2009 to 2012 (Table 1).

**Table 1: Virginia Combined Cycle Natural Gas Generation by Facility (2009-2013)**

VA CC Nat'l Gas Plant	Capacity (MW)	Operating Year	2009 Generation (MWh)	2010 Generation (MWh)	2011 Generation (MWh)	2012 Generation (MWh)	2013 Generation (MWh)
Chesterfield	397	1990	2,380,426	2,111,373	2,402,538	2,743,091	3,066,916
Possum Point	559	2003	3,037,637	3,119,899	2,816,924	3,896,191	3,624,513
Hopewell Cogeneration	348	1990	698,102	1,048,844	980,616	1,245,773	814,069
Bellmeade Power Station	267	1997	410,083	699,028	504,895	1,199,107	294,439
Doswell Energy Center	665	1991	1,766,845	2,372,568	2,691,556	3,339,701	3,168,288
Gordonsville Energy LP	218	1994	539,321	647,840	761,846	1,288,917	917,925
Tenaska Virginia	926	2004	2,065,939	3,579,646	4,332,537	5,349,183	4,482,557
Bear Garden	589	2011	0	0	2,215,811	3,998,398	3,732,284
<b>Total VA CC Nat'l Gas Fleet</b>	<b>3,969</b>		<b>10,898,352</b>	<b>13,579,198</b>	<b>16,706,723</b>	<b>23,060,360</b>	<b>20,100,991</b>

Source: U.S. Energy Information Administration. Form EIA-923, 2009-2013 “Monthly Generation and Fuel Consumption Time Series File”

Because these plants have been running more frequently, they have been operating more closely to their technical design capacity. The maximum “capacity factor” for combined cycle natural gas plants is assumed to be 85% according to the U.S. Department of Energy. Capacity factor (CF) is a measure of how much electricity a generator actually produces relative to the maximum it could produce at continuous full power operation during the same period. In recent years, several of Virginia’s natural gas plants have been running at or near an 85% CF. Overall, Virginia’s natural gas fleet is already running at a higher CF than the national average (Table 2).

**Table 2: Capacity Factors of Natural Gas Facilities in Virginia (2009-2013)**

<b>Plant</b>	<b>2009 CF</b>	<b>2010 CF</b>	<b>2011 CF</b>	<b>2012 CF</b>	<b>2013 CF</b>
Chesterfield	68%	61%	69%	79%	88%
Possum Point	62%	64%	58%	80%	74%
Hopewell Cogeneration	23%	34%	32%	41%	27%
<u>Bellmeade Power Station</u>	19%	30%	22%	51%	13%
<u>Doswell Energy Center</u>	30%	41%	46%	57%	54%
Gordonsville Energy LP	28%	34%	40%	67%	48%
Tenaska Virginia	25%	44%	54%	66%	55%
Bear Garden	-	-	43%	77%	72%
<b>Total VA CC Nat'l Gas Fleet</b>	<b>37%</b>	<b>46%</b>	<b>48%</b>	<b>66%</b>	<b>58%</b>
<b>Total U.S. CC Nat'l Gas Fleet</b>	<b>40%</b>	<b>44%</b>	<b>44%</b>	<b>51%</b>	<b>47%</b>

Source: U.S. Energy Information Administration, Form EIA-923, 2009-2013, "Monthly Generation and Fuel Consumption Time Series File"; and Form EIA-860, 2009-2013, "Annual Electric Generator Report"

The data indicates that if RGGI causes part of Virginia's existing natural gas fleet to run more frequently, the impact will be limited because many of Virginia's natural gas plants are already running close to full capacity. Furthermore, while the price differential caused by RGGI will give a near-term advantage to Virginia's existing natural gas fleet relative to coal, other factors such as natural gas pipeline constraints and routine and unscheduled operations and maintenance issues will continue to be a limit on the availability of natural gas.

Moving forward, we know that there will be coal plant retirements. The existing natural gas fleet will be able to fill some of that gap, but new generation will be increasingly necessary. Virginia's RGGI participation would concretely help drive more of that necessary investment towards zero-carbon sources, and thus reduce the amount of new natural gas capacity that would likely otherwise come online.