




**VA Governor's EO 57
Climate Work Group**
February 28, 2017

**Pam Faggert, Chief Environmental Officer
and SVP Sustainability**



Dominion®



- **Dominion Corporate Environmental Policy**

Dominion is fully committed to meeting its customers' energy needs in a manner consistent with a clean environment. We believe it is both good business practice and our duty to protect the natural and cultural resources of the communities we serve.

In keeping with this belief, it is our policy to conduct our business in an environmentally responsible manner that protects the public, our employees and the earth that we all share.

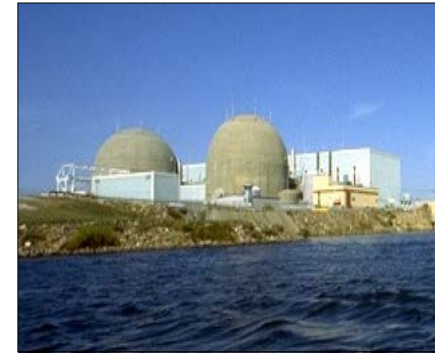
<https://www.dom.com/corporate/our-commitments/environment/reports-and-data/corporate-environmental-policy>

- **Our industry is in the midst of a profound transformation, and Dominion remains committed to delivering safe, reliable, affordable and increasingly clean energy.**
- **Dominion has and will continue to transition to a lower-emitting generation portfolio to prepare for and ensure compliance with future carbon requirements.**

Fleet Transition



Electric Generation Fuel Mix for Dominion Units Serving Virginia



Natural Gas

Coal

Oil

Nuclear

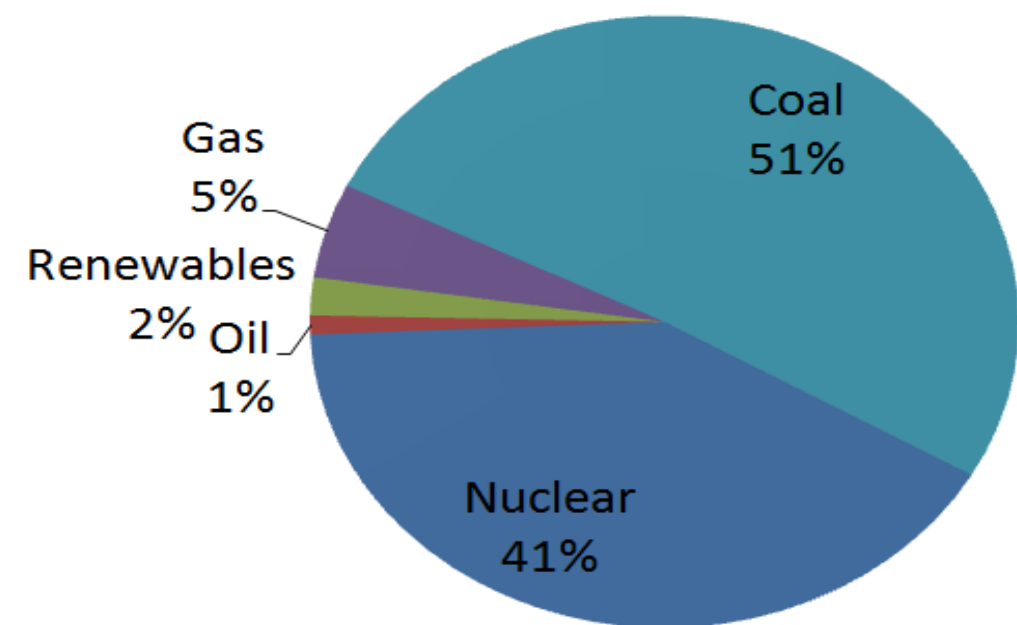
Hydro

Solar

Electric Generation* by Fuel Type: 2015 vs. 2007 - More Gas and Renewable Energy, Less Coal

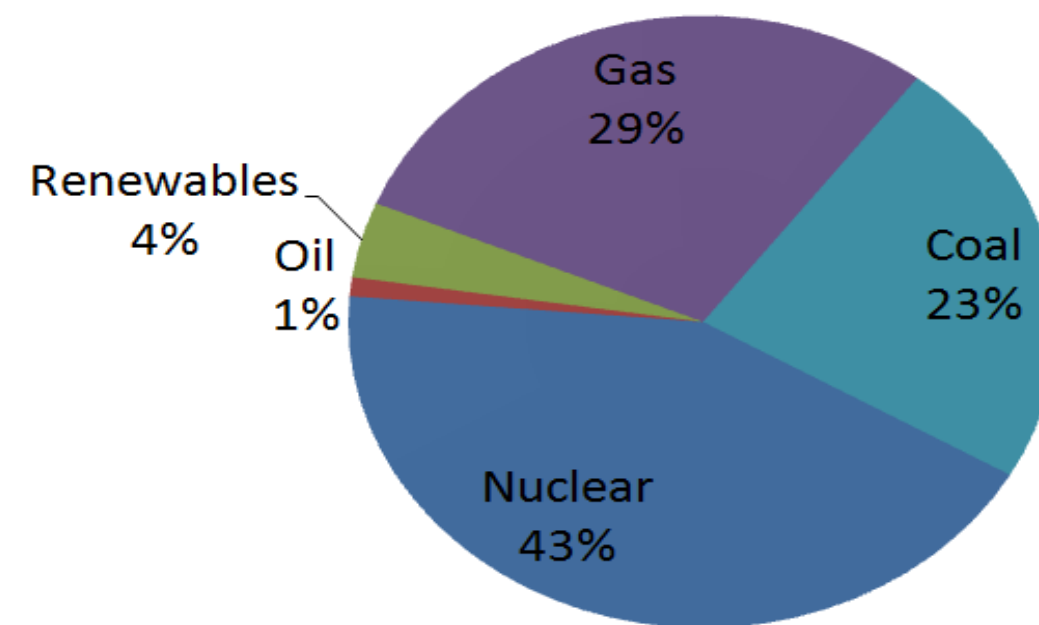
*Electric Production by Fuel proportions exclude Non-utility Generation (NUG) under contract.

2007



■ Nuclear ■ Oil ■ Renewables ■ Gas ■ Coal

2015



■ Nuclear ■ Oil ■ Renewables ■ Gas ■ Coal

Fleet Transition



Generation fuel mix – coal unit retirement, conversions and new assets

– Coal Retirements

- Chesapeake Energy Center - coal units retired 2014
- Yorktown - limited operation, scheduled for retirement 2017

– Converted coal-fired units to natural gas

- Possum Point - 2003
- Bremo - 2014

– Converted coal-fired units to biomass

- Hopewell - 2013
- Altavista - 2013
- Southampton - 2013

– Hybrid coal and biomass, new technology

- Virginia City Hybrid Energy Center - 2012

– New combined cycle natural gas power stations

- Bear Garden - 2013
- Warren County - 2014
- Brunswick County - 2016
- Greenville County - 2018 projected startup

– Renewable generation

- Plans to develop multiple utility-scale solar projects totaling 500 MW in VA and NC through 2020
- Will have nearly 400 MW of solar operational in VA by end of 2017
- 500 MW of contracted solar capacity in NC; additional capacity under negotiation

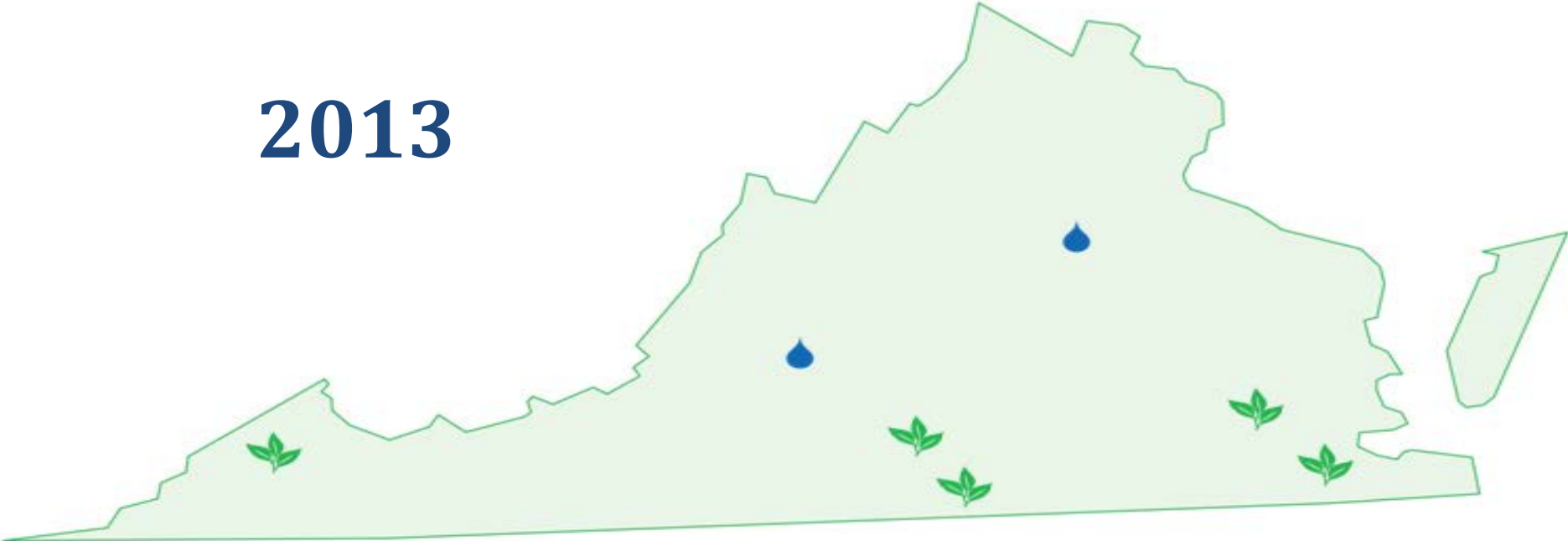


Renewables in Virginia




Momentum is Growing

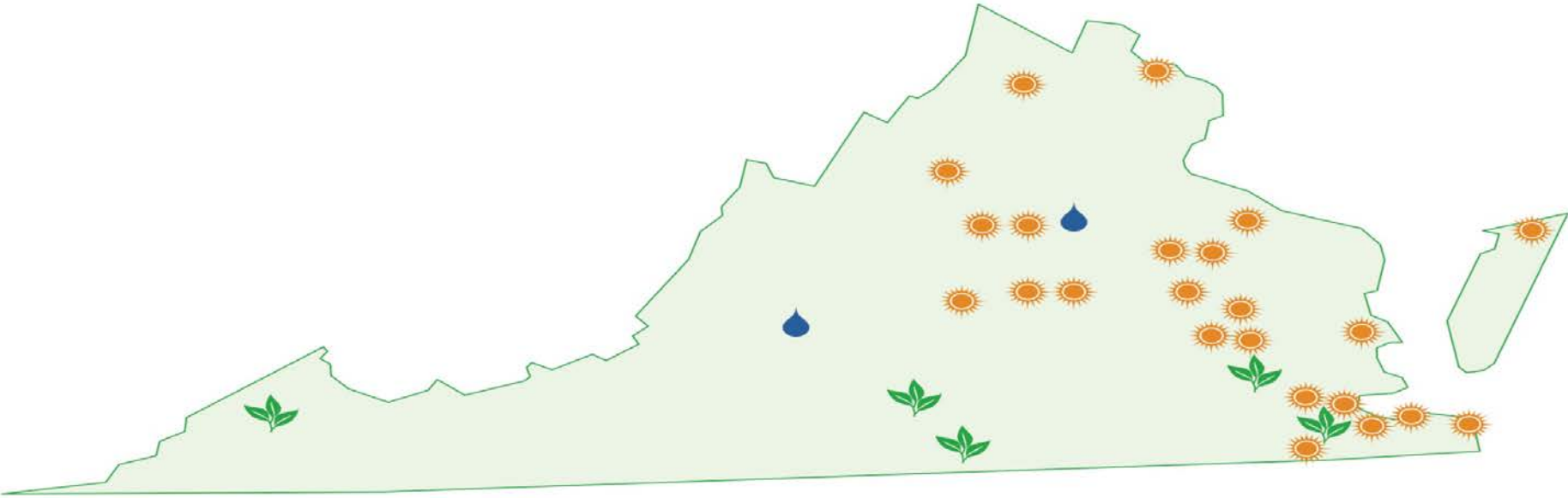


2013



Today

| | |
|-------------------------------------------------------------------------------------|---------------|
|  | Hydroelectric |
|  | Biomass |
|  | Solar |

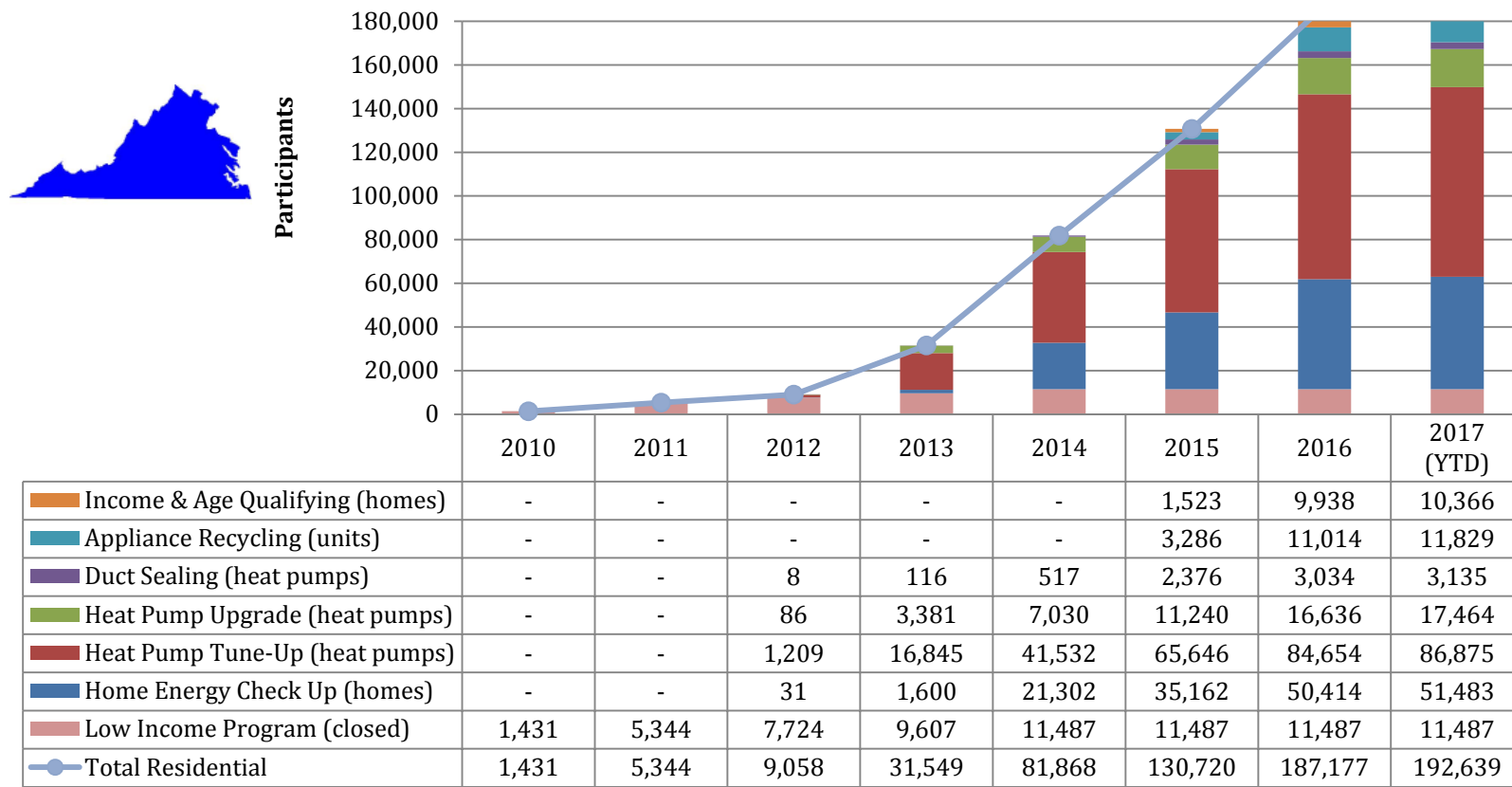


Operational, Under Construction, In Development

Energy Conservation Programs

Through January 31, 2017 unless otherwise noted.

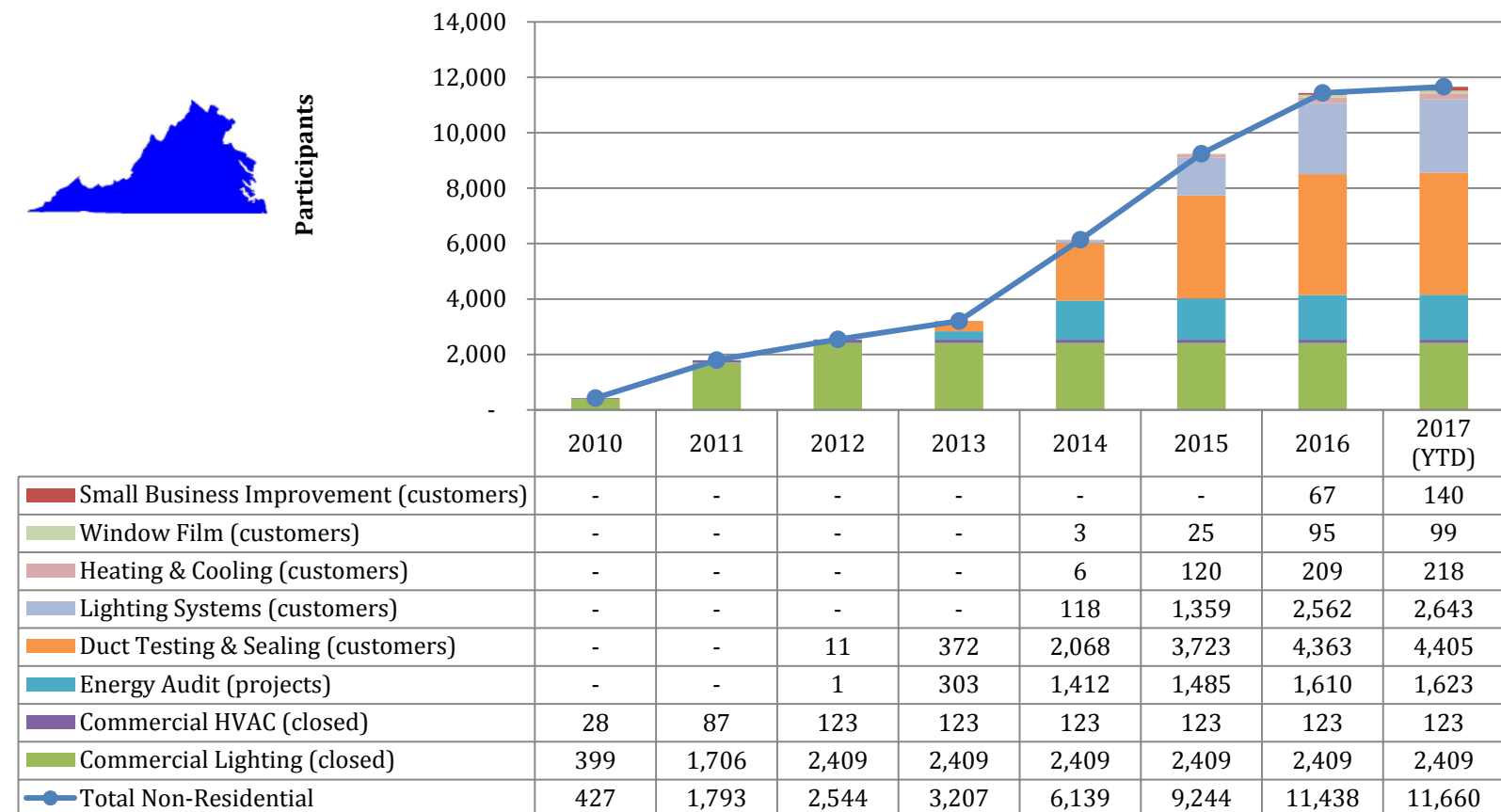
Virginia Residential Energy Efficiency Programs



Peak Shaving Programs

| | Residential AC Cycling | Non-Residential DG: |
|------------------|------------------------|---------------------|
| Active Customers | 104,480 | 21 |
| 2017 Events | 0 | 1 |
| Estimated MW | 72 | 7 |

Virginia Non-Residential Energy Efficiency Programs



North Carolina Energy Efficiency Programs

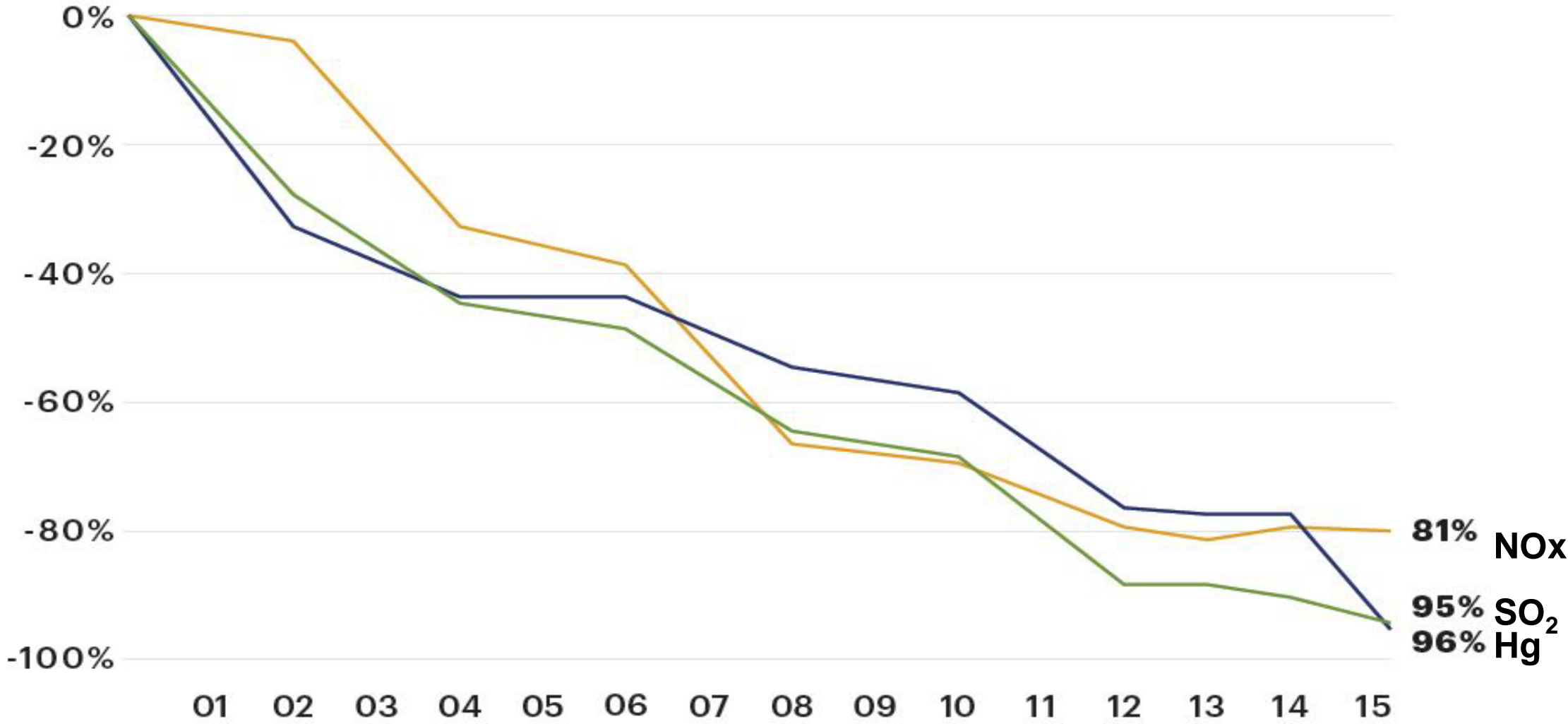
Total residential participants **9,640**
 Total non-residential participants **471**

Improving Air Emissions Reductions

Air Emission Reductions from Generating Units Serving VA



Emissions Intensity Reductions (lbs/MWh)

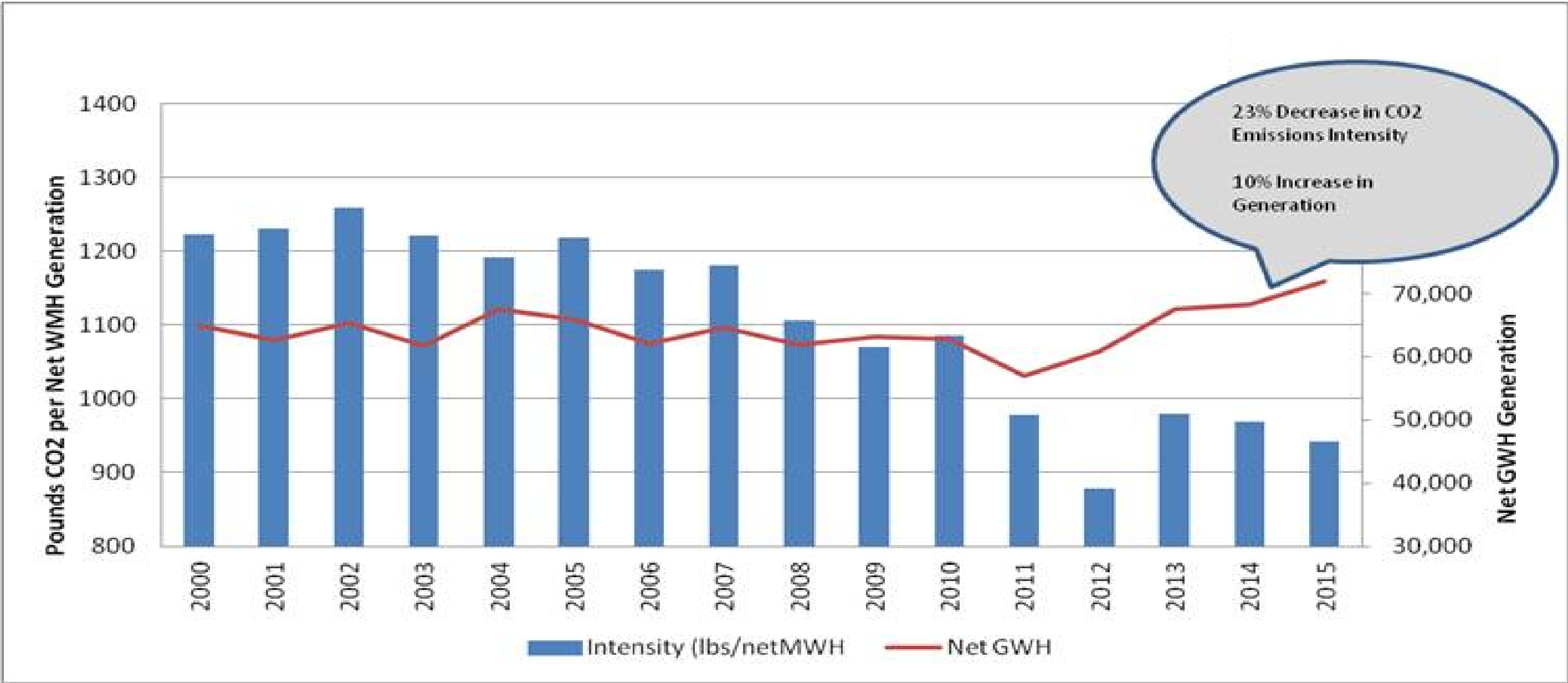


Dominion Carbon Reductions



Carbon Intensity for Dominion Generating Units Serving Virginia

CO₂ emissions intensity has decreased as generation increased

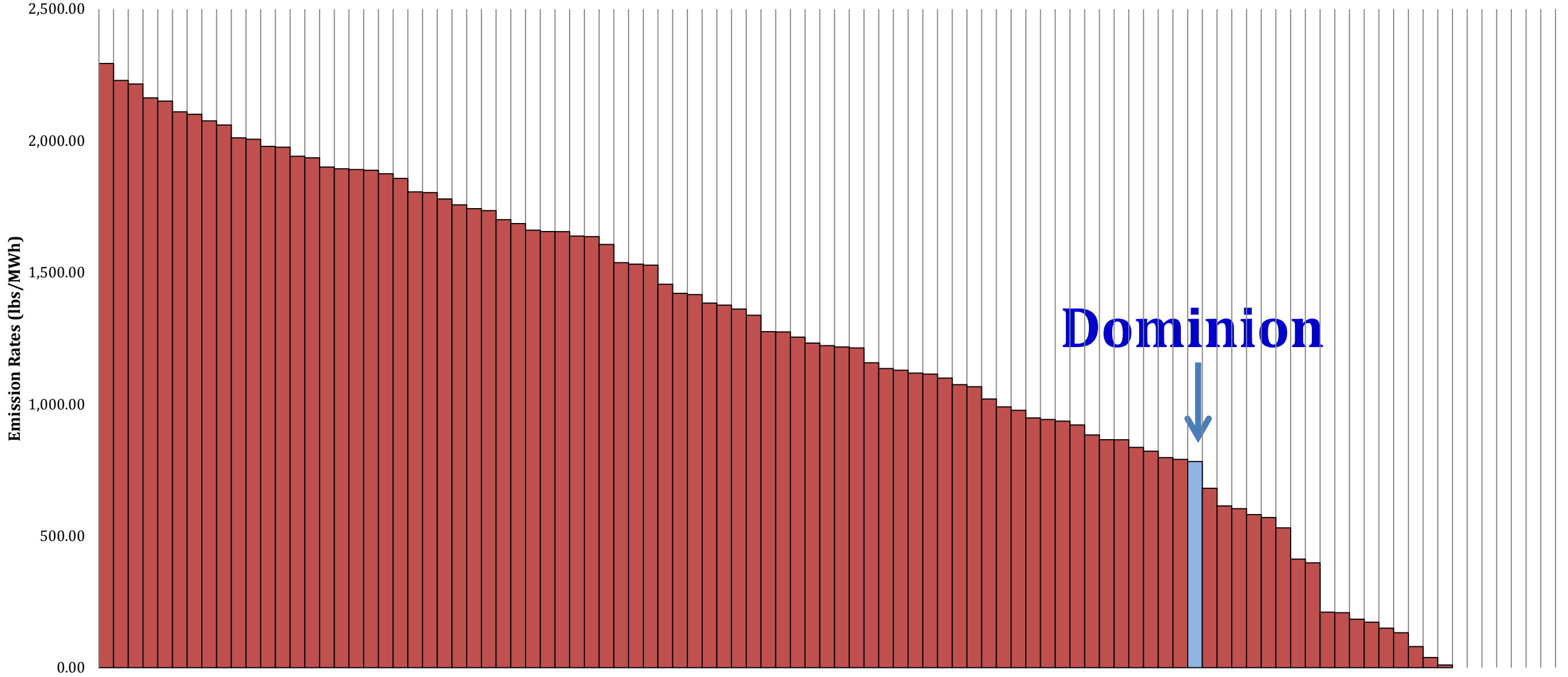


Dominion Performance - Benchmarking



Dominion ranks in best quartile for lower carbon emitters per energy produced

Generation - Pounds CO2 per MWh Output



Source: Benchmarking Air Emissions: May 2016 (2014 Data). Study produced by M.J. Bradley and Associates.

Going Forward



Trend toward less carbon-intensive and diversified fleet will continue

— More renewable energy, both system and merchant

- Initiative in VA/NC for 500 MW new solar by 2020 is just the start
- Exploring use of pumped storage utilizing on-site or off-site solar as power source

— Percentage of clean-burning natural gas fuel mix will increase

- Adding 1600 MW of highly efficient NGCC capacity (Greenville County – 2018)
- NGCC/CT will be used to complement renewables and help replace more coal-intensive power imported from PJM
- ACP interstate NG transmission project will help multiple public utilities meet VA and NC energy needs and diversify our energy portfolio

— Maintaining nuclear options

- Seeking to extend licenses for existing nuclear fleet
- Option open for large zero-emitting baseload nuclear generation

— Energy Efficiency

- Case with new programs currently under review at the SCC
- Best in class energy efficiency and energy assistance program now part of EnergyShare (combines one-time energy assistance with ongoing benefits from weatherization)

Planning will become more complex

Offers dispatchable lower carbon generation critical to meet energy needs

- Dominion operates some of the most efficient NGCC facilities with the most stringent GHG limits in the country:
 - Warren (1329 MW): Not subject to GHG BACT or EPA NSPS limits, but operating below EPA NSPS
 - Brunswick (1358 MW): 920 lbs/MWh CO₂(e) permit limit*
 - Greenville (1600 MW – under construction): Tiered permit limits*
 - 812 lbs/MWh CO₂(e) first 6 years
 - Increases in 6 year increments
 - Final Limit (years 31 & later) – 890 lbs/MWh
- Increased utilization of existing NGCC generation is a cost-effective way to continue reducing carbon emissions from the existing fleet in VA
- New, highly efficient NGCC is the lowest cost, cleanest, and most reliable form of dispatchable generation to consistently meet increasing energy demand
- Ability of NGCC to ramp up-and-down quickly complements the non-dispatchable, intermittent nature of renewables

* 12 operating month annual average calculated monthly

Critical to maintaining carbon reductions

- Recognition of Virginia's existing nuclear fleet is critical to maintaining progress toward reducing carbon
 - Existing nuclear represents about 40% of Virginia's baseload generation. The operating licenses for these generating units will, if not renewed, expire in the 2032-2038 timeframe.
 - The potential loss of existing zero-emitting nuclear would significantly complicate compliance with any carbon reduction program in the post-2030 timeframe.
 - The state would need to make up shortfall of this critical baseload generation with a combination of solar and gas, which would increase CO₂ emissions.
- Dominion is seeking to extend licenses for Surry and North Anna
 - Will require significant investments to shift technology from analog to digital and for turbine replacements
- Expect Certificate of License (COL) to keep option open for large zero-emitting baseload nuclear generation

Key Considerations and Conclusion



- Dominion has significantly reduced carbon from its generating fleet serving Virginia.
- The trend and transition to lower and zero carbon-emitting sources will continue to best position the Company to meet future carbon requirements.
- Whether it is through federal or alternative state-specific regulation, a carbon reduction program must be designed to provide flexible compliance options to maintain fuel diversity, ensure electricity reliability and minimize cost to ratepayers.
- Key considerations include:
 - Critical role of natural gas as the lowest cost, cleanest, and most reliable form of dispatchable generation to complement the integration of renewables to the electric grid;
 - Natural gas pipeline and electric grid infrastructure improvements necessary to meet energy needs and for the continued transition to cleaner generation;
 - Critical role of extending the operation of Virginia's existing nuclear fleet. Account for and maintain options in the event existing nuclear must be replaced in the 2032-2038 timeframe; and
 - Evaluation of what surrounding states are doing in absence of federal requirements and impacts that may have on power markets, trading opportunities, leakage and economic growth.
- Dominion is committed to working with all state regulatory agencies and stakeholders to achieve workable, cost-effective carbon reductions in Virginia.

