

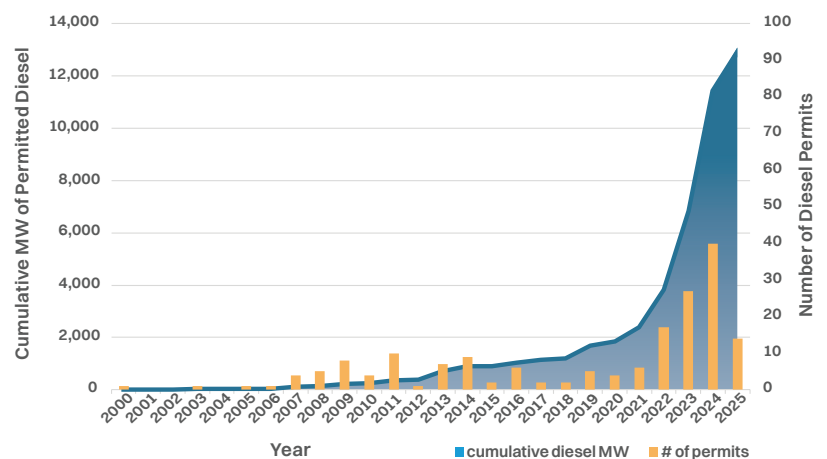
Powering Virginia's Economic Growth: A Closer Look at Diesel Permitting Trends

Northern Virginia houses the world's highest concentration of data centers and continues to see the industry grow through the start of 2025. However, the electricity and backup generation required to power these facilities presents a notable contradiction to the 2022 Virginia Energy Plan (2022 VEP) and Virginia Clean Economy Act of 2020 (VCEA). As highlighted by the VCEA, Virginia's two largest investor-owned utilities (IOUs) mandated to achieve 100% carbon-free electric energy generation by 2050 and retire all coal and natural gas generation within the same timeline.

While Northern Virginia has long been a data center hub, development has increased significantly since 2021, resulting in a commensurate rise in diesel generation permitting.

- 2021 to 2024: 214 diesel generators permitted with a capacity of 24,484 megawatts (MW)
- 2025 (January - March): 52 diesel generators permitted with a capacity of 1,667 MW
- Diesel permits between 2022 to 2025 create 2.6 times the diesel capacity (MW) than permits approved between 2000 to 2021 combined

Data Center Diesel Permits Over Time



519% Increase in cumulative MW of diesel generation in VA between 2020 to 2024

Despite the Commonwealth's ambitious clean energy goals, the 2022 VEP and VCEA failed to discuss diesel as a fuel source or its implementation in backup power. This oversight will be problematic for Virginia's clean energy initiatives due to the carbon-intensive nature of diesel fuel. Based on data provided by Virginia's Department of Energy Quality (VADEQ), between 2000 and March 2025, over 13,000 MW of diesel backup power for data centers were permitted in Virginia, demonstrating the entrenched application of diesel in the Commonwealth. Of those megawatts, 47% were permitted in Loudon County, which has been a U.S. EPA designated ozone nonattainment region since 1992. Increased emissions in this area will lead to increased concentrations of greenhouse gases as well as an exacerbated impact on public health and the local environment.

The widespread use of diesel in Virginia raises significant concerns; however, viable, cleaner alternatives for backup power are available and should be prioritized to support the state's reliability and environmental goals. Renewable energy resources and battery storage are often at the forefront of sustainability policies, but their technological and economic limits (intermittency, land use, and duration limits) disqualify them until these deficiencies are resolved. Natural gas-powered technologies offer a practical co-location solution, providing reliable, on-demand power with significantly lower emissions than diesel generators of comparable capacity.

Emissions Comparison: Diesel Versus Natural Gas Generation*

Pollutants	Diesel Emissions		CARB-DG Certified Natural Gas Reciprocating Engine Generator Emissions		
	Tier 2 Emissions	Tier 4 Emissions	Emission Factors	% Reduction vs Tier 2	% Reduction vs Tier 4
NMHC	14.11	0.42	0.020	99%	95%
NOx		1.48	0.070		95%
CO	7.72	7.72	0.100	99%	99%
PM	0.44	0.07	0.050	89%	29%

Policy Recommendations:

To align with the state's clean energy goals and support system reliability, targeted policies that realize the benefits of natural gas technologies are necessary:

- 1 Virginia's Department of Environmental Quality should incentivize cleaner alternatives by updating air permitting standards to consider alternative fuels to diesel.
- 2 Local and municipal governments should leverage zoning ordinances and economic development programs to incentivize new, clean, onsite generation.
- 3 Utilities should introduce programs that recognize the resource adequacy and transmission relief value of dispatchable onsite generation.
 - Co-location of natural gas-powered technologies can facilitate more efficient grid interconnection for data centers, if economically and environmentally viable, and add benefits to the local grid and community by providing load flexibility.

Communities across the Commonwealth deserve immediate, reliable energy solutions that do not compromise air quality in the name of service. Natural gas should be leveraged as a bridge fuel in the short- and medium-term to mitigate air pollution, while supporting grid flexibility and reliability.

* The California Air Resources Board (CARB) Distributed Generation (DG) Certification Program regulations assure certified technologies meet the current best available control technology for permitted central power station plants.