



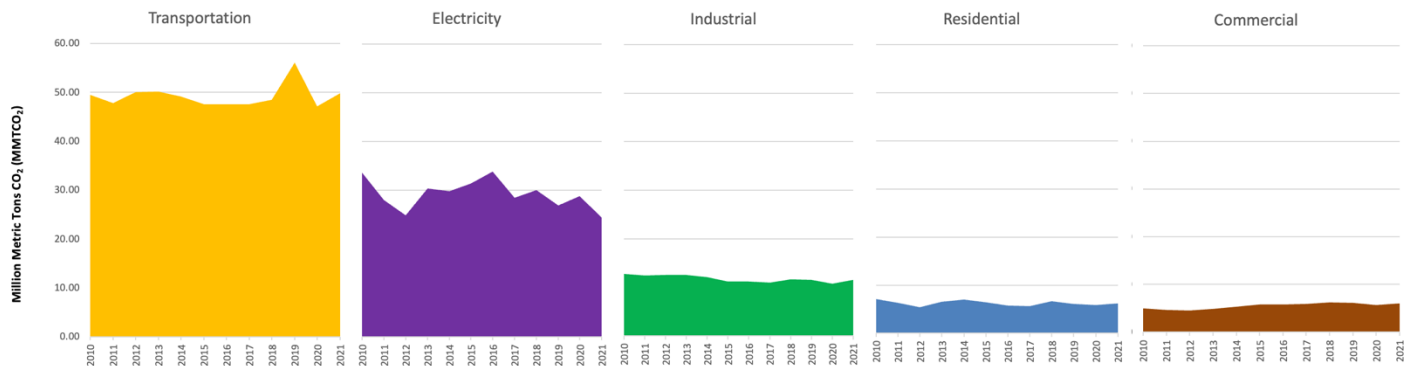
Virginia Alternative Transportation Fuels Report 2023

Prepared by Virginia Clean Cities (VCC) for Virginia Energy on March 22, 2024

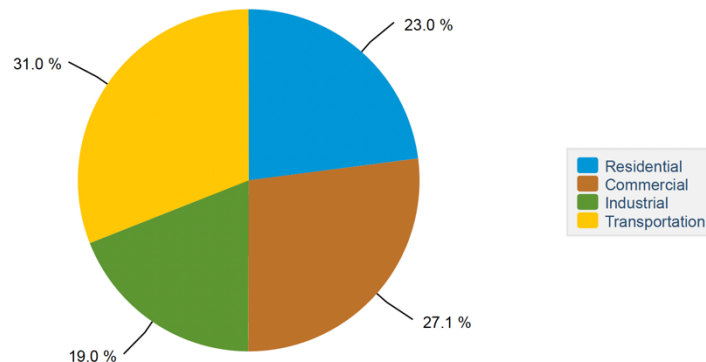
Transportation forms an integral part of Virginia's economy and environment and the transportation sector is the largest end-use energy-consuming sector in the Commonwealth according to the U.S. Department of Energy, Energy Information Administration (EIA) and the U.S. Environmental Protection Agency.

VCC connects with voluntary fleet leaders, biofuel producers, and station operators to present this status of fleets, fuel production, and stations in the transition to cleaner, domestic and/or renewable fuels. Data was collected by VCC staff through infrastructure development, emails and phone from January 1, 2023 to December 31, 2023.

Virginia Carbon Dioxide Emissions by Fossil Fuel Combustion Sector 2010-2021



Virginia Energy Consumption by End-Use Sector, 2021



Front page graphics are most recent available info from Energy Information Administration [eia.gov](https://www.eia.gov)

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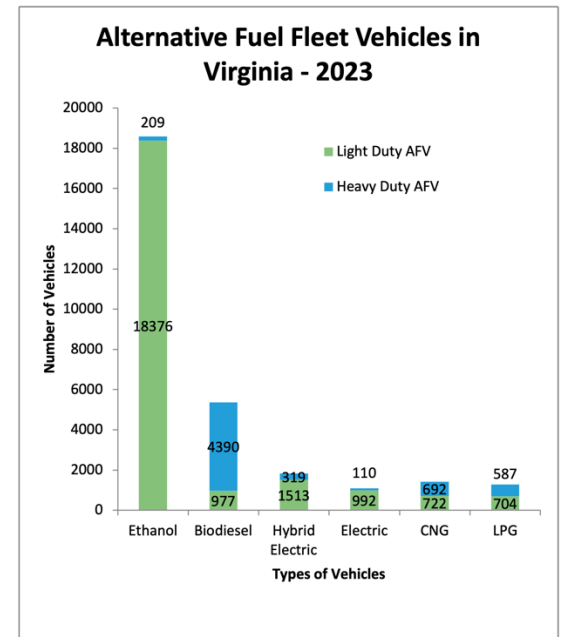
SECTION I: ALTERNATIVE FUEL FLEET VEHICLES SUMMARY

For the year ending December 31, 2023, there were 42,005 vehicles in 219 green fleets, with a significant number of additional fleets in 2023 reflecting tracking of aspirational smaller fleets Hybrid-Electric (HEV) and Electric (ELEC) both had significant growth in use, with +15.5% (HEV) and +10.1% (ELEC) respectively. E85, Bio-diesel, and Liquid Petroleum Gas (LPG) all made minor gains in fleets, whereas Compressed Natural Gas (CNG) vehicles have decreased by 1.1%. The vehicles reported are in service with clean fleets, designated by operating five or more clean fuel vehicles, and include business fleets and local, state, and federal government fleets. Vehicles are voluntarily reported for light and for heavy duty vehicles in voluntary and regulated fleets.

Table 1-1 and Figure 1-1. Alternative Fuel Fleet Vehicles: 2023

Fuel Type	CNG	E85	HEV	ELEC	BD	LPG	AFV Total
2022 Totals	1,430	18,527	1,586	1,001	5,144	1,204	28,892
2023 Totals	1,414	18,585	1,832	1,102	5,367	1,291	29,591
1-Year Difference	-16	+58	+246	+101	+223	+87	+699
% Growth	-1.1%	0.3%	15.5%	10.1%	4.3%	7.2%	2.4%

The graph to the right shows the total alternative fuel fleet vehicles broken into light and heavy-duty classifications. A light duty vehicle is considered to be a class 1 through class 3 vehicles while a heavy-duty vehicle is class 4 through class 8.



SECTION II: RENEWABLE BIOFUEL

Virginia is host to a rich agricultural economy and numerous corporations and entrepreneurs developing biofuels from plant or recycled materials as a replacement for or mixture with traditional transportation fuels of gasoline or diesel. In the year 2023, local biofuel producers reported further shift to brokerage sale of high-value used cooking oil feedstock to emerging renewable diesel producers outside of Virginia. 2023 brought forward renewable natural gas production. In future years, availability and access to renewable natural gas is likely to increase as innovative production from captured methane in Virginia increases. Renewable natural gas is a resource generated from landfill, wastewater, and agricultural sources where methane is captured for reuse. Statistics for 2023 are unreported as this section is revisited in the year ahead.

SECTION III: ALTERNATIVE FUEL STATION SUMMARY

The total number of alternative fuel station locations reported for the Commonwealth of Virginia in 2023 is 1,240. Of those stations, 1,042 are public and 198 are private access stations such as individual fleet facilities.

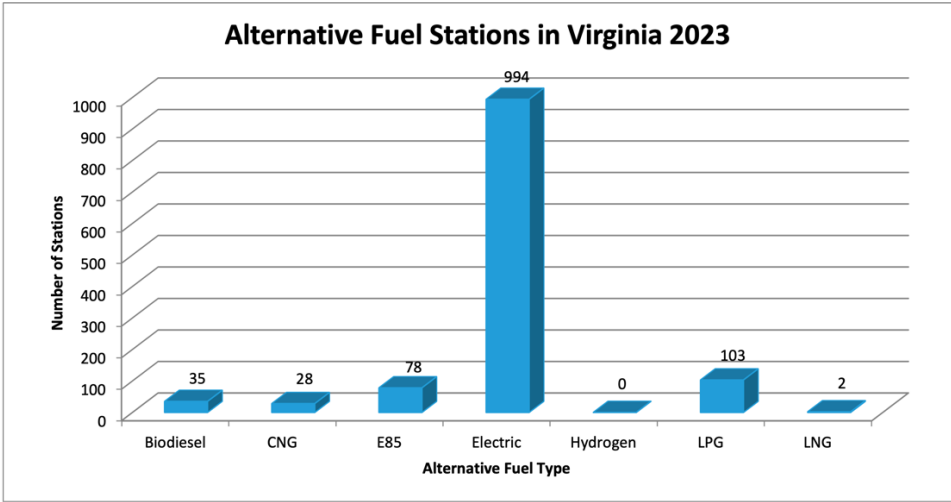


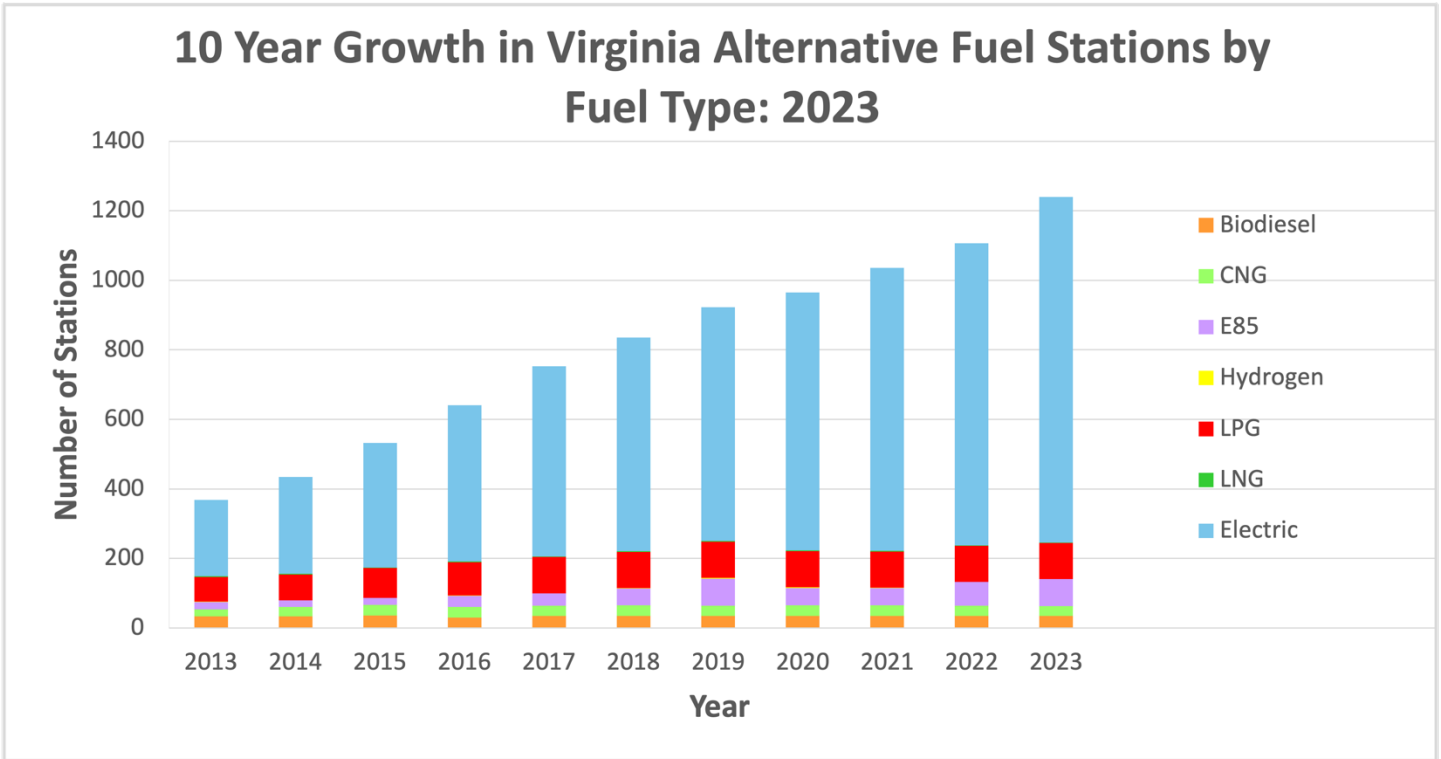
Figure 3-1. Alternative Fuel Stations in Virginia:

Year	B5-B20	CNG	E85	EV	H2	LPG	LNG	Total
2022	35	29	68	869	0	104	2	1,113
2023	35	28	78	994	0	103	2	1,240
Growth	0%	-3.44%	5.41%	14.38%	0%	0.96%	0%	11.41%

Table 3-1. Alternative Fuel Station Growth in Virginia:

Although some fuel types showed no growth, the net total number of alternative fuel stations in Virginia increased by around 11.41% over the last year, electric vehicle charging stations have exhibited the largest growth and have become the most prevalent alternative fuel station in Virginia. Overall, the total number of alternative fuel stations in Virginia has continued to increase as alternative fuel use continues to expand, as seen in Figure 3-2 below.

Figure 3-2. Growth Total of Virginia Alternative Fuel Stations by Fuel Type:



SECTION IV: ALTERNATIVE FUEL STATION LOCATIONS

In order to observe the geographic distribution of these stations, clean fuel infrastructure maps are presented below. This map reflects planned and current stations that are both public and private. This map shows only stations with biodiesel blends with at least 20% biodiesel. The station totals presented in this report include all blends of biodiesel. This interactive mapping tool is hosted by the Department of Energy and can be found at the alternative fuel data center and at afdc.energy.gov/stations#/ with data submitted throughout the year by Virginia Clean Cities.

Figure 4-1. Biodiesel (B20) and Ethanol (E85) Stations

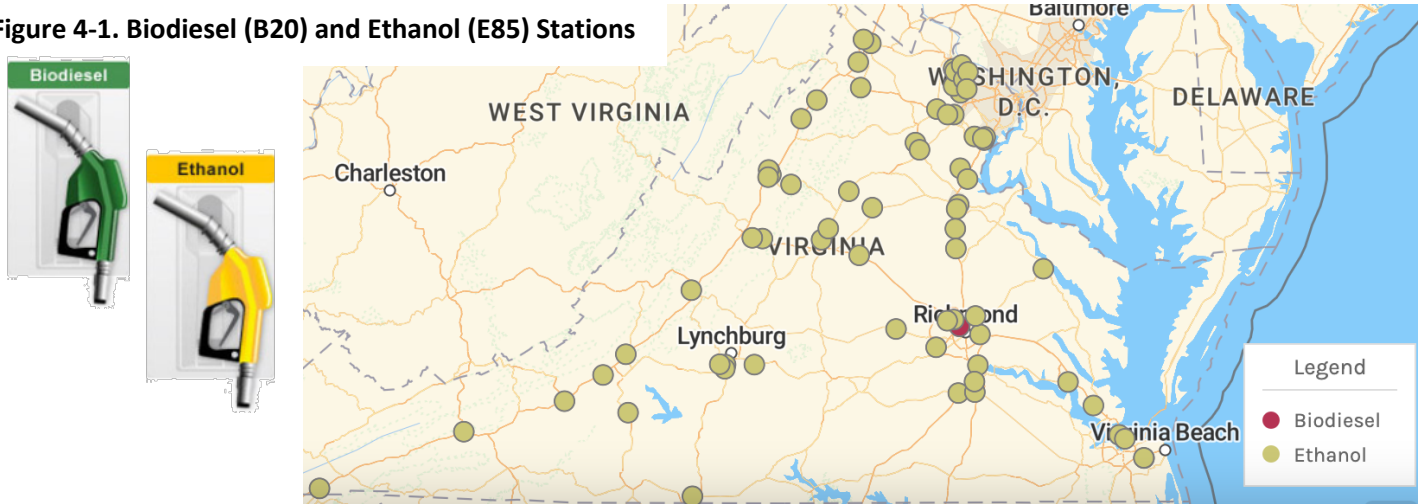


Figure 4-2. Electric and Hydrogen Fueling Stations (electric is mapped)

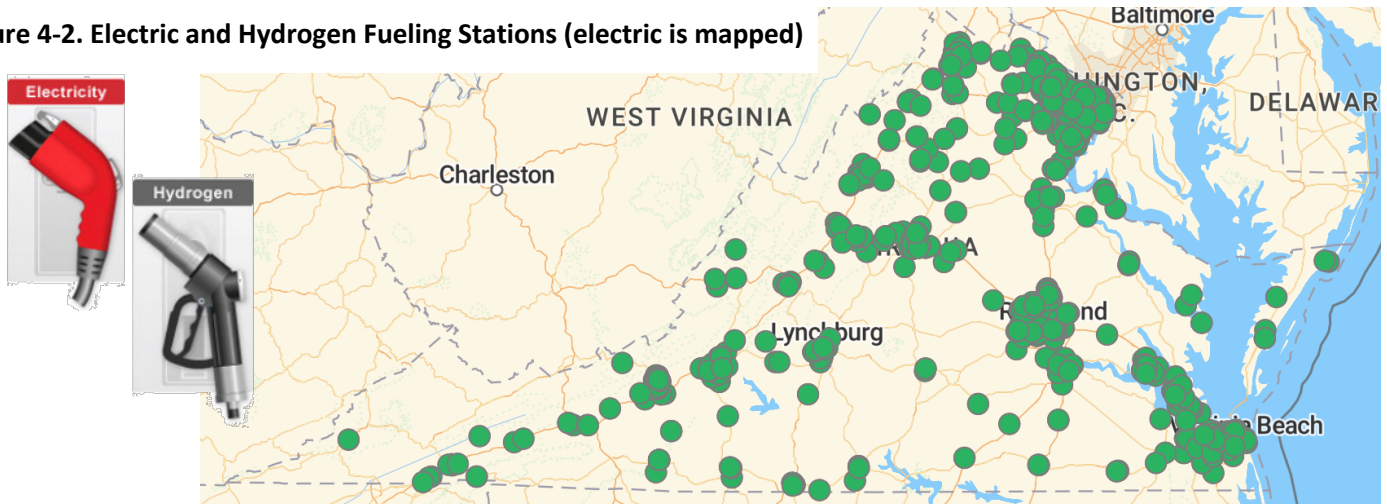
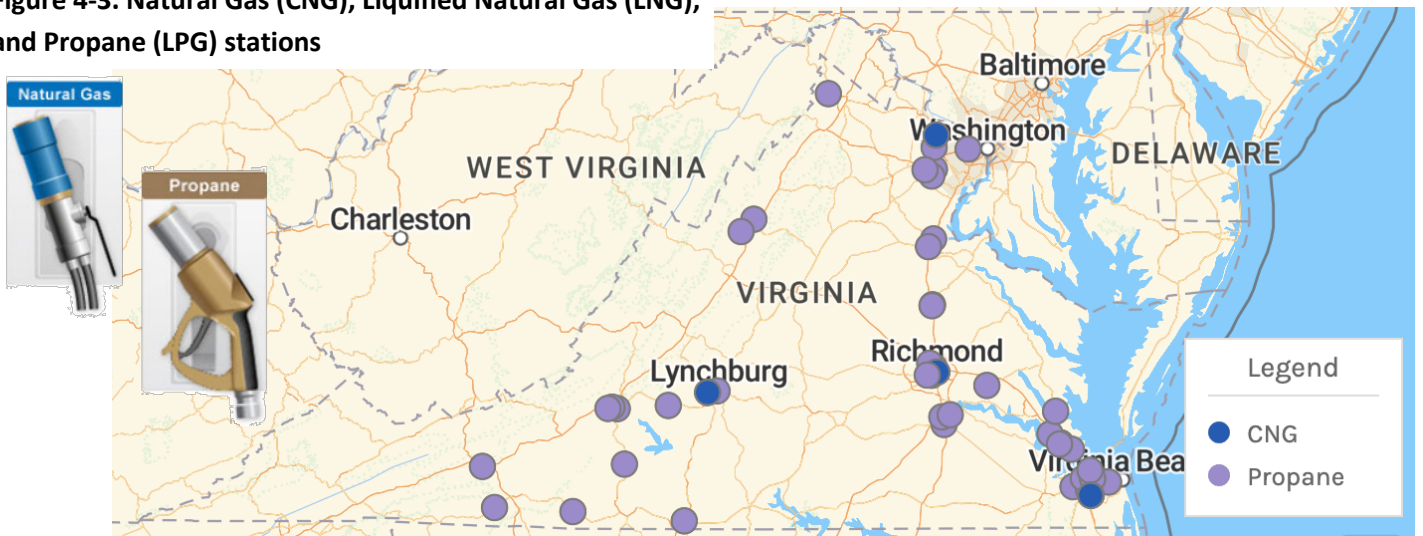


Figure 4-3. Natural Gas (CNG), Liquefied Natural Gas (LNG), and Propane (LPG) stations



SECTION V: ALTERNATIVE FUEL CORRIDORS

In 2016, the Department of Transportation and the Federal Highway Administration (FHWA) announced their designated Alternative Fuel Corridors under the Fixing America's Surface Transportation (FAST) Act. The cumulative designations (Rounds 1-5) for propane, electric and compressed natural gas in Virginia are submitted by Virginia Energy and detailed in the maps below. The green lines indicate signage ready corridors which are corridors that have sufficient alternative fuel facilities to warrant highway signage. Hydrogen, Propane, and CNG corridors will be for fleet and heavy duty use not for consumer sized vehicles. https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

Figure 5-1. Electric Vehicle Charging Station READY Corridors Light Duty

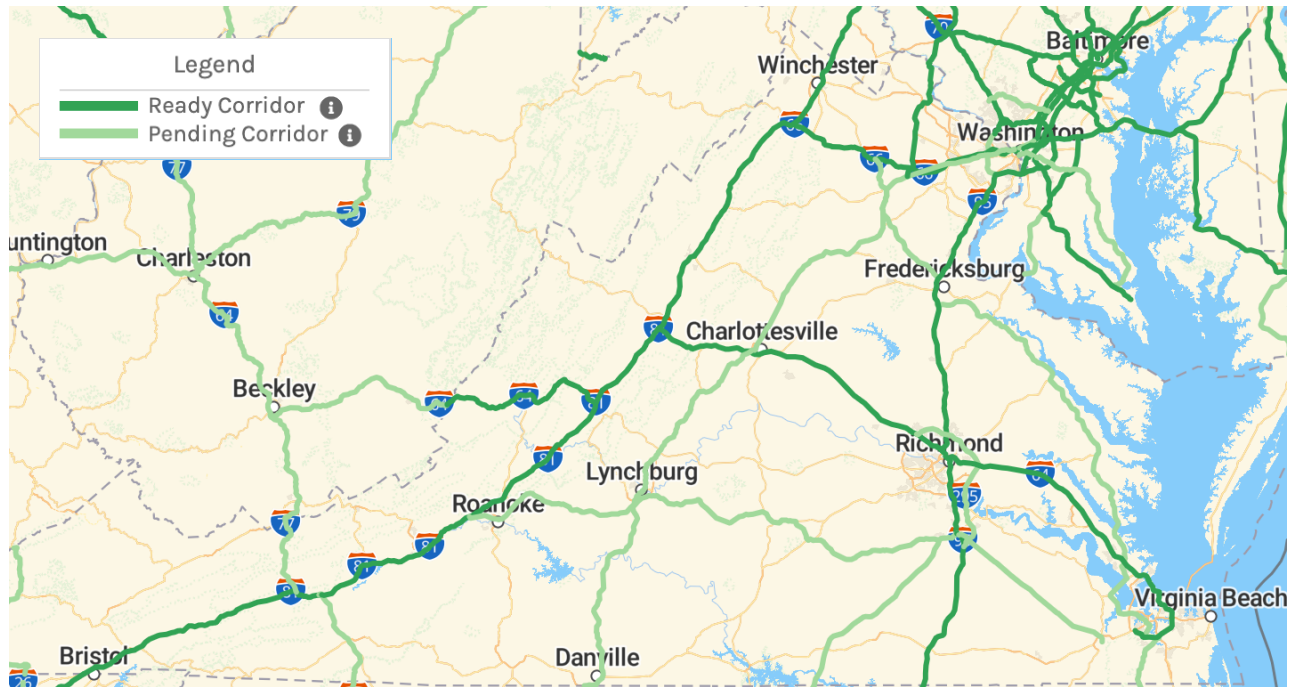


Figure 5-2. 2023 New Hydrogen Pending Corridors and FHWA Urban Areas (Pending is Dashed Line)

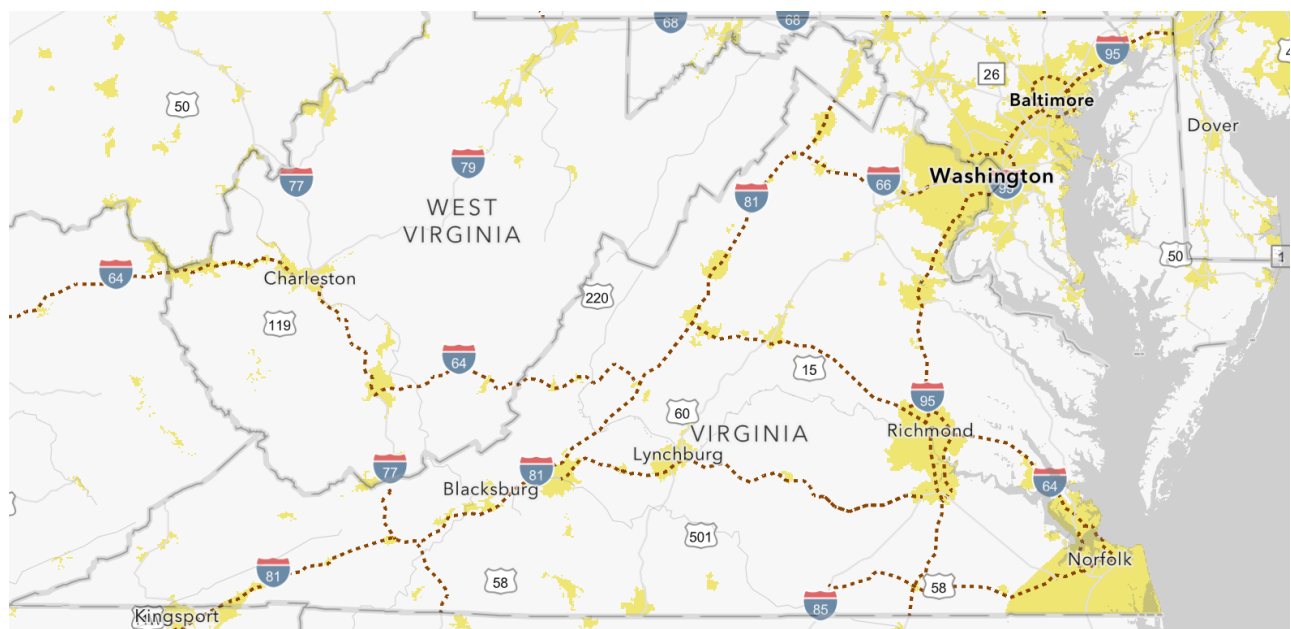
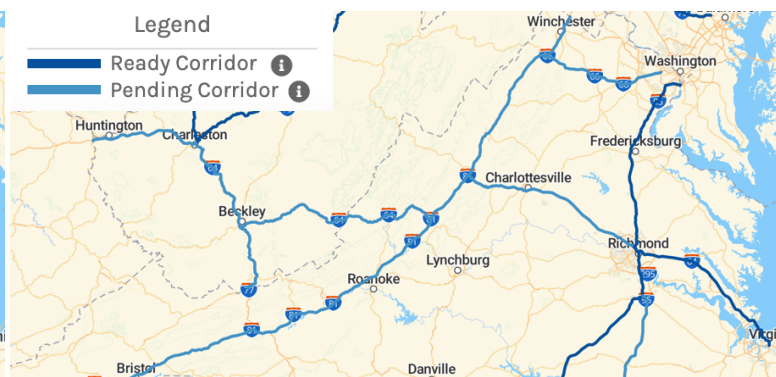


Figure 5-3. Propane Fueling Station READY Corridors.



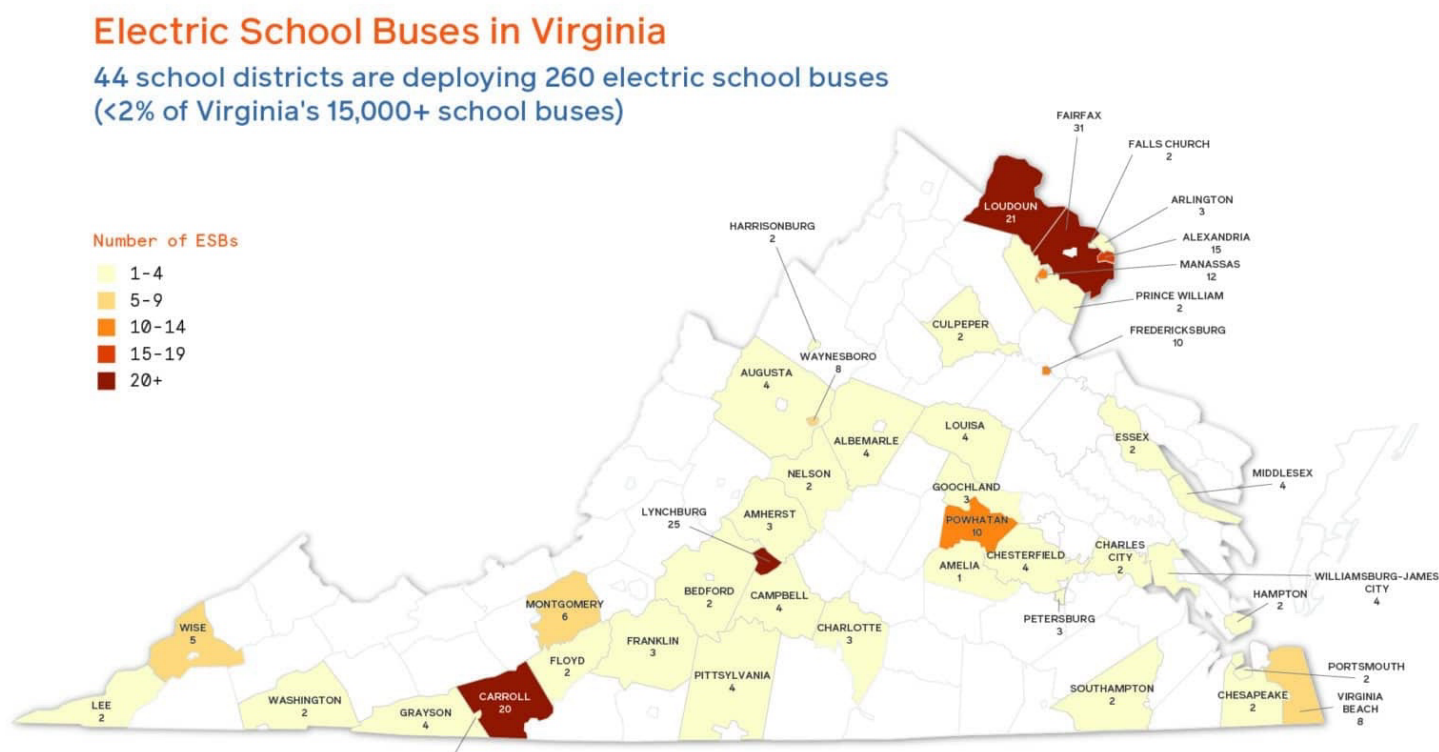
Figure 5-4. Natural Gas Fueling Station READY Corridors



SECTION VI: SCHOOL BUS ELECTRIFICATION

School bus electrification has been a major focus of utility, state, and federal spending in recent periods with Virginia selected repeatedly for federal funding. By the end of 2023, 44 school districts are deploying electric school buses in Virginia. Announced vehicles include some delivered in 2024 and beyond.

Figure 8-1. Electric School Bus Deployment Announcements, as of October 2023



Graphic created by Generation 180

UPDATED OCTOBER 2023 / SOURCE: GENERATION180

SECTION VII: CONSUMER ELECTRIC VEHICLE DATA

Electric vehicles are deployed widely across the Commonwealth. Virginia Clean Cities has worked to secure data and seeks to present information to the public at www.driveelectricva.org and at atlaspolicy.com/evaluateva. Below is a graphic of electric vehicle deployment based on registrations per locality. Virginia will work to secure more frequent vehicle data. At the end of 2023, there were approximately 97,463 EVs on the road in the Commonwealth, representing 1.35% of the light duty vehicles on the road in Virginia (72,886 battery electric vehicles and 24,577 plug-in hybrid vehicles)

Figure 9-1. Electric Vehicle Registration Data End of Year 2023 per 1000 people - EvaluateVA

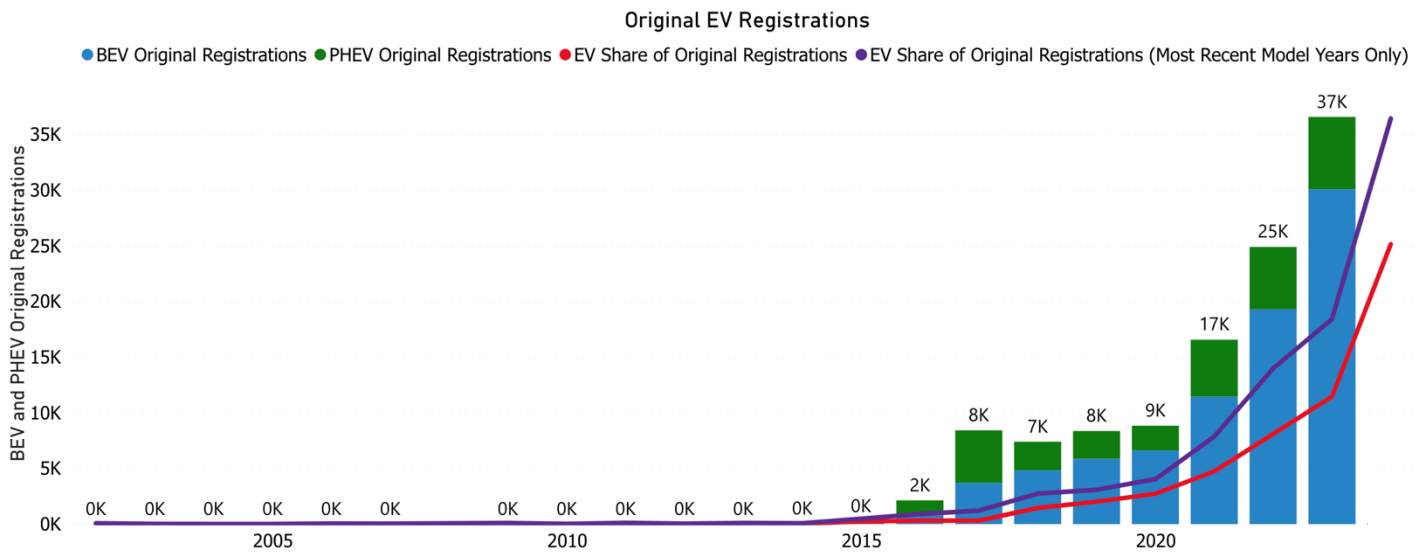
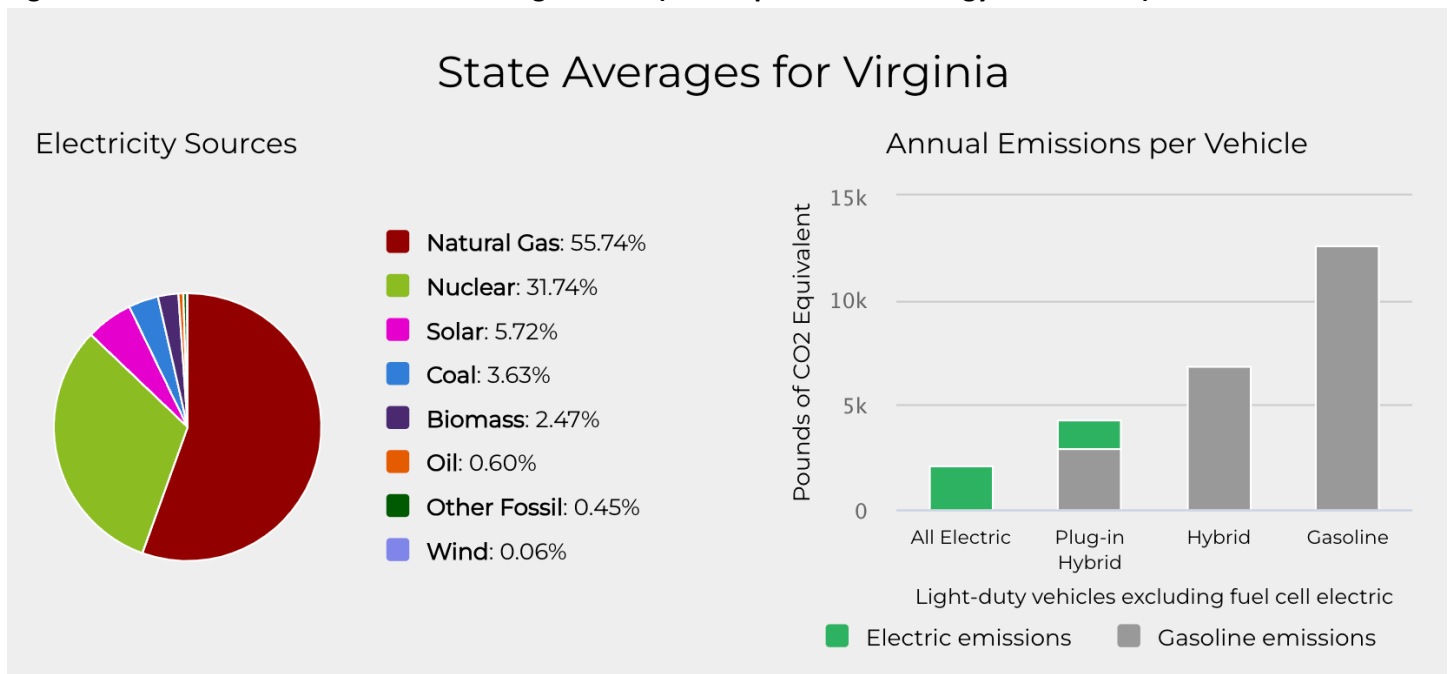


Figure 9-2. Electric Vehicle Emissions on Virginia Grid (U.S. Department of Energy March 2024)



Over the summer 2022, Virginia Clean Cities worked with Cadmus Group on a series of projections leading to 2045 – this adoption curve is detailed below and shows even in high adoption scenarios and purchases that a wide number of internal combustion vehicles will operate on the Commonwealth’s roads through mid-century. In March 2024, the US Environmental Protection Agency set vehicle emission standards plans aligned with the high adoption scenario.

Figure 9-3. Electric Vehicle Adoption Curves and Percentage of Vehicle Stock Through 2045

