



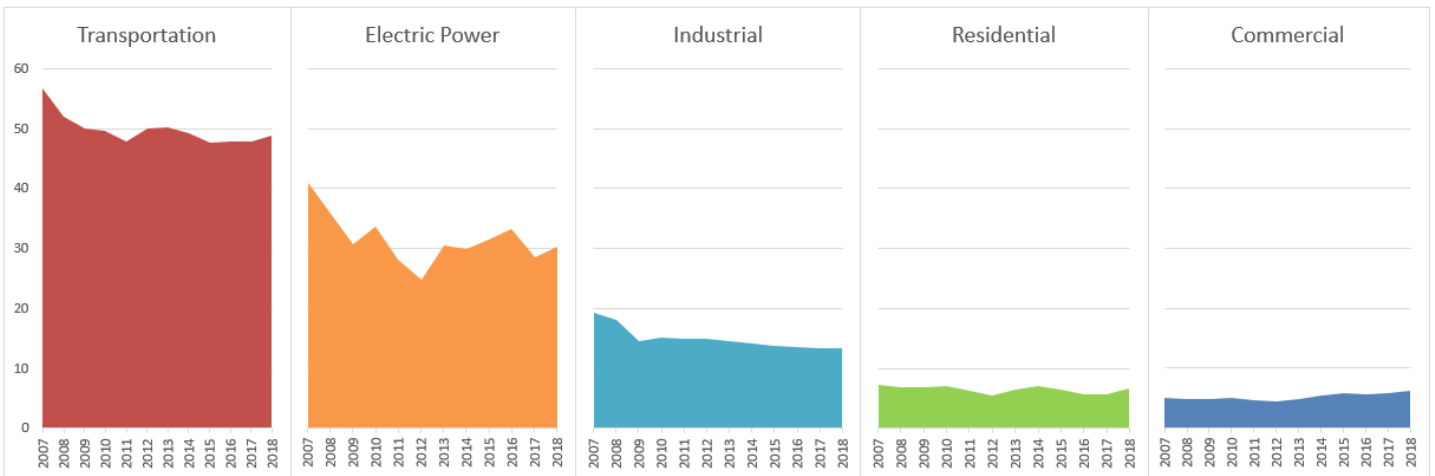
# Virginia Alternative Transportation Fuels Report 2021

Prepared by Virginia Clean Cities (VCC) for Virginia Energy on January 12, 2022

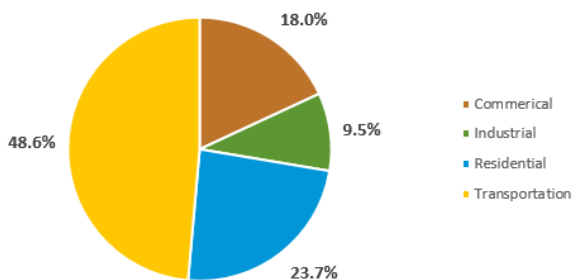
Transportation forms an integral part of Virginia's economy and environment and the transportation sector is the largest end-use energy-consuming sector in the Commonwealth according to the 2018 Virginia Energy Plan. In 2018, Virginia's drivers spent \$37.4 million on 14.5 million gallons of imported gasoline and diesel per day to fuel their vehicles. Each gallon of gasoline produces 19 pounds of carbon dioxide (CO<sub>2</sub>), making transportation the largest energy user, the largest source of carbon dioxide, and a large expense for a product produced out of state or out of the country.

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, 2021 to December 31, 2021.

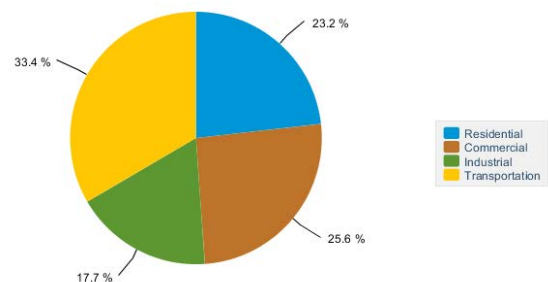
## Virginia's Carbon Dioxide Emissions by Fossil Fuel Combustion Sector 2007-2018



Virginia Energy Expenditure by End-Use Sector, 2019



Virginia Energy Consumption by End-Use Sector, 2019



Front page graphics are most recent available info from Energy Information Administration eia.gov

## SECTION I: ALTERNATIVE FUEL FLEET VEHICLES SUMMARY

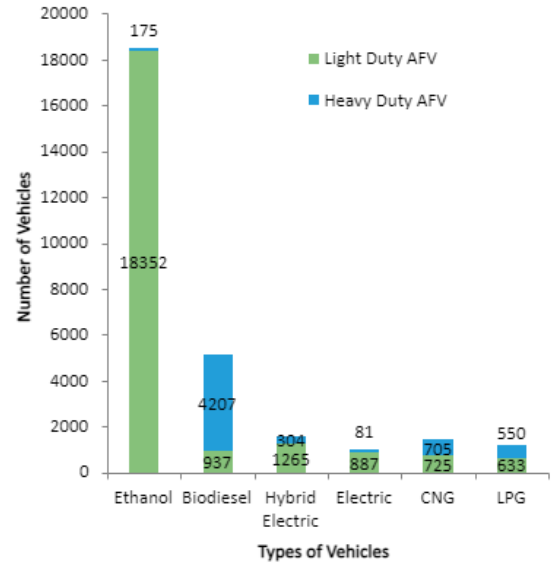
For the year ending December 31, 2021, there were 28,889 vehicles in 101 green fleets, the current percentage of alternative fuel vehicles used in tracked clean fuel Virginia fleets is 44.3 percent of their vehicles. Ethanol, biodiesel, electric, hybrid-electric and propane vehicles made minor net gains in the past year, while a decrease was seen in compressed natural gas. 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.

**Table 1-1 and Figure 1-1. Alternative Fuel Fleet Vehicles: 2021**

Fuel Type	CNG	E85	HEV	ELEC	BD	LPG	AFV Total
2020 Totals	1501	17800	1461	863	4980	993	27598
2021 Totals	1430	18527	1569	968	5144	1183	28889
1-Year Difference	-71	727	108	105	164	190	1282
% Growth	-4.7%	4.1%	7.4%	12.2%	3.3%	19.1%	4.6%

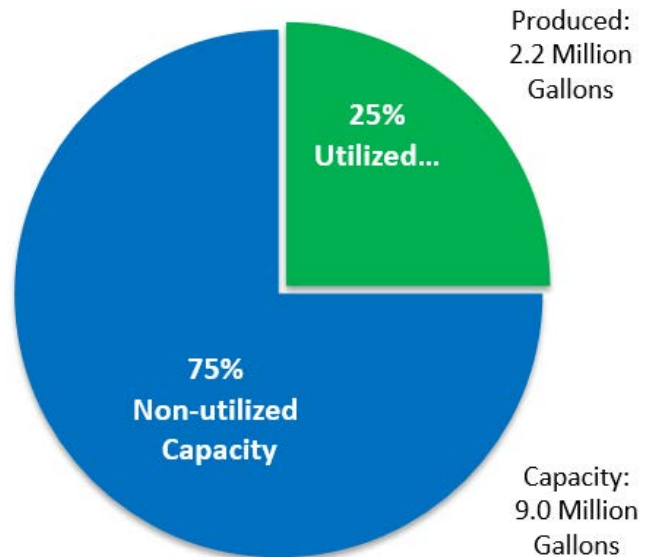
The graph to the right shows the total alternative fuel fleet vehicles broken into light and heavy-duty classifications. A light duty vehicle is considered to be a class 1 through class 3 vehicles while a heavy-duty vehicle is class 4 through class 8.

**Alternative Fuel Fleet Vehicles in Virginia - January 2021**



## SECTION II: RENEWABLE BIOFUEL PRODUCTION SUMMARY

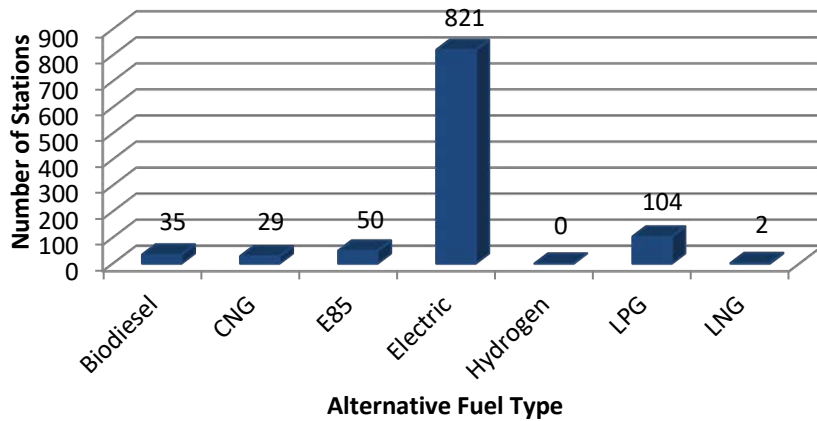
Virginia is host to a rich agricultural economy and numerous corporations and entrepreneurs developing biofuels from plant or recycled materials as a replacement for or mixture with traditional transportation fuels of gasoline or diesel. Virginia research universities have developed advanced biofuels technologies. Currently there are three biodiesel facilities in operation in Virginia, which produced 2.2 million gallons, a 25% utilization of capacity. The U.S. Energy Information Administration (EIA) estimates Virginia produced 0.8 trillion Btu of biofuel energy in 2021, EIA reports no Virginia oil energy production.



**Figure 2-1. Biofuel Production Capacity Achieved in Virginia: 2021**

## SECTION III: ALTERNATIVE FUEL STATION SUMMARY

The total number of alternative fuel station locations reported for the Commonwealth of Virginia in 2021 is 1,035. Of those stations, 860 are public and 180 are private access stations such as individual fleet facilities. Virginia had a growth of 79 electric vehicles charging stations, marking a 10.7% growth for the year. Overall, this was the net of 79 new stations.



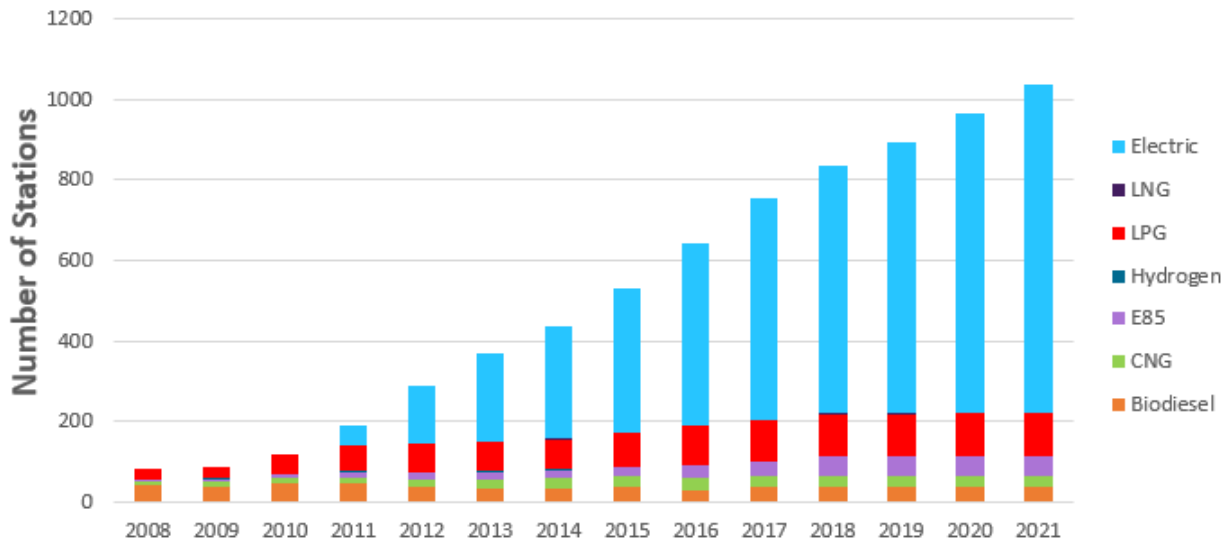
**Figure 3-1. Alternative Fuel Stations in Virginia: 2021**

Year	B5-B20	CNG	E85	EV	H2	LPG	LNG	Total
2020	35	30	50	742	0	104	2	963
2021	35	30	50	821	0	104	2	1035
Growth	0%	0%	0%	10.70%	0%	0%	0%	8.06%

**Table 3-1. Alternative Fuel Station Growth in Virginia: 2021**

Although some fuel types showed no growth, the net total number of alternative fuel stations in Virginia increased by 8.06% Over the last years, electric vehicle charging stations have exhibited the largest growth and have become the most prevalent alternative fuel station in Virginia, attributed to the low cost of infrastructure, and the need for per-vehicle infrastructure at workplaces and destinations. Liquefied natural gas (LNG) and hydrogen stations have continually made up the smallest proportion of stations and this held true for 2021. 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: 2021**



## 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 does not show all of the stations tracked by Virginia Clean Cities due to the fact that the map visualizes 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/#/](https://afdc.energy.gov/stations/#/) with data submitted throughout the year by Virginia Clean Cities.

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

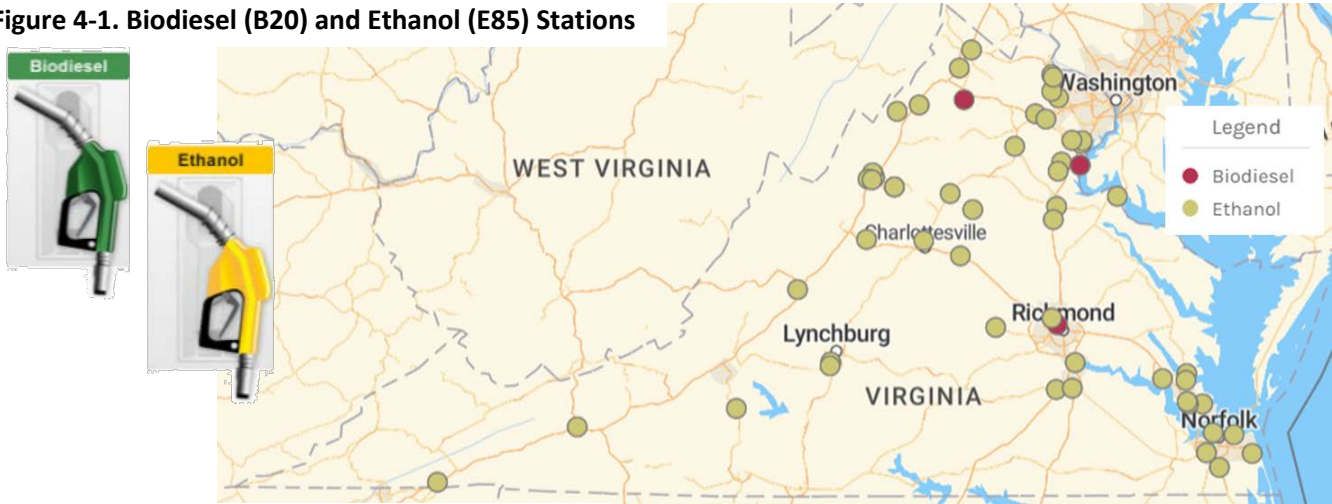


Figure 4-2. Electric and Hydrogen Fueling Stations

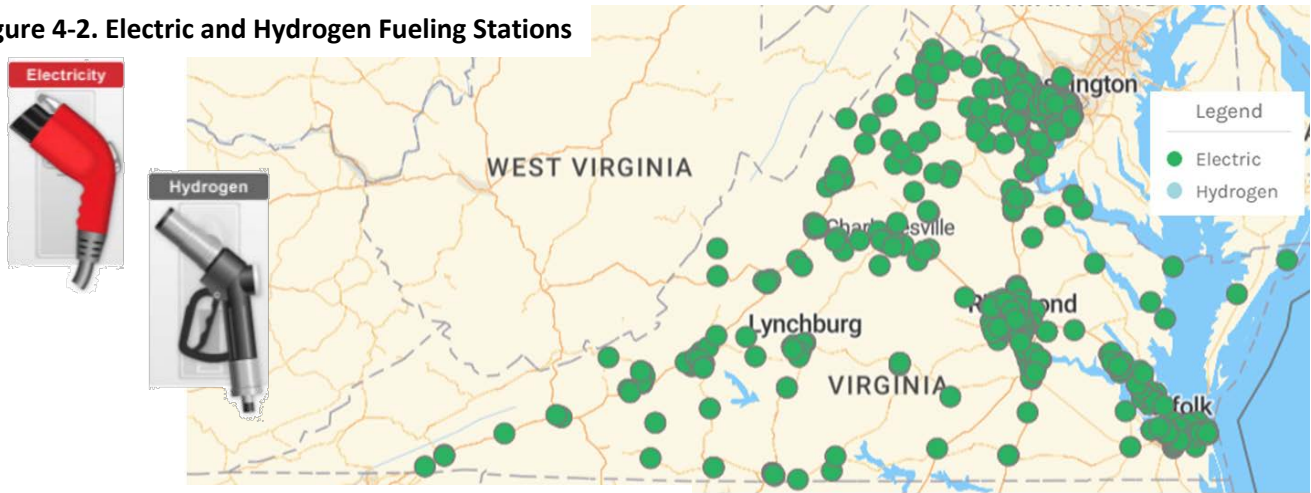
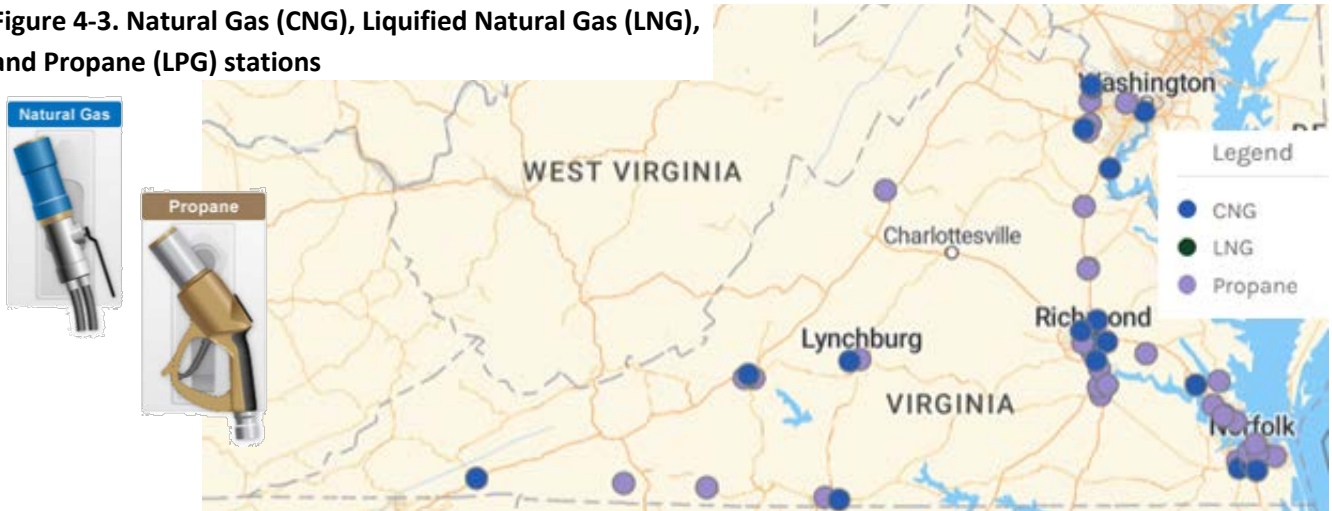


Figure 4-3. Natural Gas (CNG), Liquefied Natural Gas (LNG), and Propane (LPG) stations



## 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. [https://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/](https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/)

Figure 5-1. Electric Vehicle Charging Station READY Corridors



Figure 5-2. Propane Fueling Station READY Corridors.

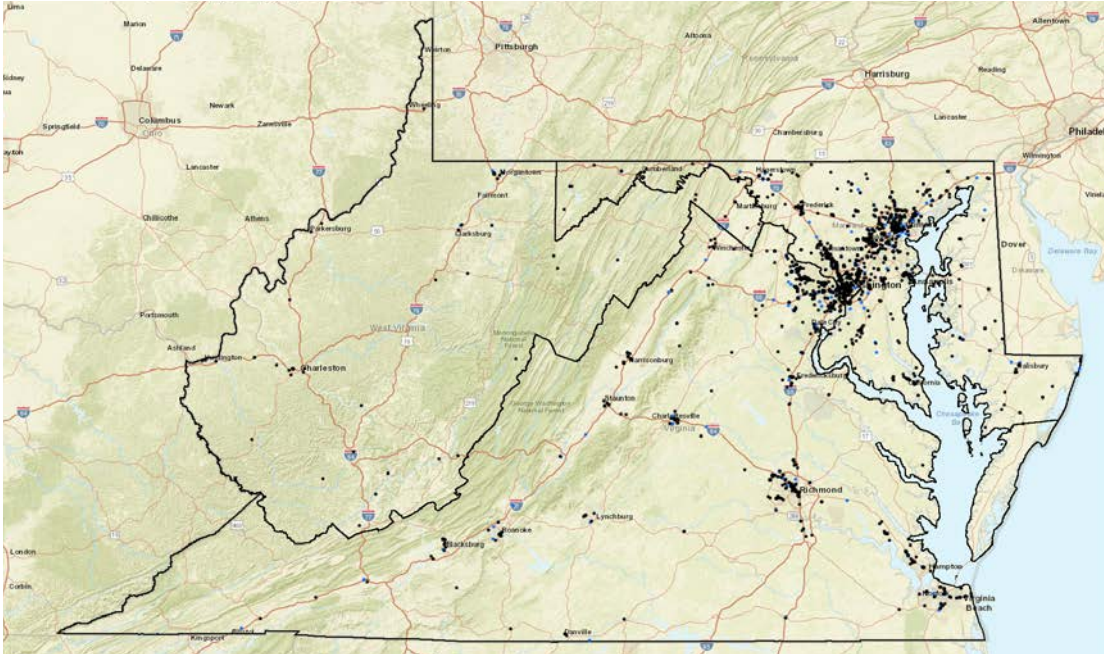


Figure 5-3. Natural Gas Fueling Station READY Corridors



## SECTION VI: VIRGINIA ENERGY MID-ATLANTIC ELECTRIFICATION PROJECT

The Mid Atlantic Electrification Project led by Virginia Energy supports a regional electric vehicle (EV) ecosystem in Virginia, the District of Columbia, Maryland, and West Virginia. This program will deploy 375 charging stations and 175 electric vehicles and has facilitated improvements from Argonne National Laboratory to the *Energy Zone Mapping Tool* adding dozens of layers to the tool for transportation energy planners now with 360+ layers. <https://ezmt.anl.gov/>  
**Figure 6-1. Energy Zone Mapping Tool Example Overlay: Vehicle Charging Locations.**



## SECTION VII: SUGGESTED EV CHARGING COMMUNITY LOCATIONS

Virginia Clean Cities staff at James Madison University reviewed travel corridors and underserved areas in the Commonwealth and identified general locations to expand access for this electric vehicle technology. VCC staff developed an initial spreadsheet and map of locations. Many additional community charging locations in Virginia are needed for DC Fast and also longer stop lower cost Level 2 charging.

**Figure 7-1. Intersectional Communities Map in All-of-Virginia infrastructure expansion, December 2021**

