

# Equity Assessment of Electrification Incentives in the District of Columbia

Applied Economics Clinic

Prepared on behalf of  
Office of the People's Counsel  
for the District of Columbia

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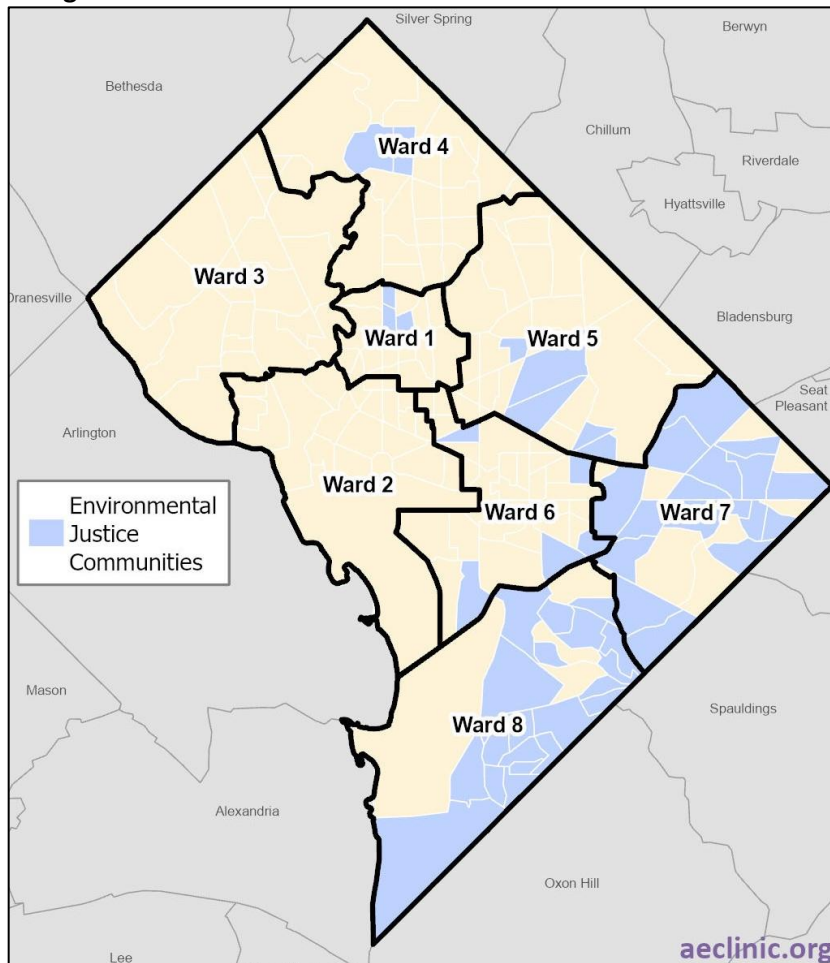
**Applied Economics Clinic**  
Economic and Policy Analysis of Energy, Environment and Equity

## Executive Summary

The District of Columbia has committed to reduce total greenhouse gas emissions to 50 percent of baseline emission levels by 2032 and to reach net-zero emissions by 2050. The Department of Energy and Environment’s proposed Carbon Free DC 2050 plan to achieve carbon neutrality includes a substantial reduction in emissions from buildings and transportation. As part of its proceeding regarding utility plans to support the District’s greenhouse gas reduction goals, the District Public Service Commission (PSC) requested that stakeholders file relevant electrification studies.

On behalf of the Office of the People’s Counsel for the District of Columbia (OPC), this Applied Economics Clinic (AEC) report discusses an important potential pathway for reducing emissions in the District: equitable electrification—a transition away from fossil fuels while taking into consideration equity implications, in both existing and future decarbonization efforts. To help ensure the development of beneficial electrification programs that seek to benefit the District’s most vulnerable residents, AEC worked with OPC to create a proposed DC-specific “Environmental Justice” (EJ) community definition. Using this definition, 27 percent of the District’s total population was identified as an EJ community (see ES-Figure 1).

**ES-Figure 1. Environmental Justice Communities in the District of Columbia**



Equitable electrification requires a fair distribution of implementation efforts and of who pays for those efforts. Fair distribution must consider all District communities, with particular focus on marginalized communities who face greater barriers to decarbonization efforts, already suffer higher energy burdens, and are often on the frontlines of climate change impacts like flooding and heat waves.

A baseline equity analysis of the distribution of energy expenditures, median income and other vulnerability indicators reveals significant disparities across the District. For example, Wards 7 and 8—with by far the lowest median incomes—are more likely to have high rates of poverty, high energy expenditures, high shares of racial/ethnic minorities, higher rates of eligibility for and participation in government assistance programs, higher shares of renters, and lower rates of college degree attainment (see ES-Table 1).

**ES-Table 1. Selected demographics and energy equity dimensions in the District of Columbia by Ward**

		Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District Total
Households	Number of Households	35,796	37,598	37,623	30,675	34,896	46,264	30,877	30,657	284,386
	Median Household Income (2021\$)	\$107,848	\$116,425	\$134,881	\$99,387	\$75,247	\$119,884	\$47,506	\$36,946	\$90,592
	Energy Expenditures (2021\$)	\$1,590	\$1,330	\$1,950	\$2,190	\$1,930	\$1,710	\$2,250	\$2,220	\$1,920
	Limited English Speaking	6%	3%	3%	9%	4%	1%	1%	1%	3%
	Renters	64%	63%	47%	41%	53%	61%	61%	78%	58%
	SNAP Recipients	9%	4%	2%	11%	15%	8%	30%	39%	14%
	Income-Eligible Households	24%		16%	47%	15%		52%		29%
	LIHEAP Participation Rate	9%		1%	8%	35%		33%		21%
Individuals	Total Population	83,811	77,855	82,737	89,992	90,172	99,786	81,946	86,384	692,683
	Racial-Ethnic Minority	54%	35%	29%	75%	77%	44%	97%	95%	63%
	Immigrant	21%	21%	19%	22%	12%	9%	4%	3%	14%
	Below Poverty Line	12%	14%	8%	10%	16%	12%	26%	33%	16%
	Elderly (>65)	7%	10%	18%	15%	14%	10%	13%	9%	12%
	HS Graduate	91%	98%	98%	89%	93%	96%	92%	92%	94%
	College Graduate	74%	88%	89%	58%	56%	79%	32%	28%	64%

To account for the existing disparities of income and access within the District and ensure beneficial electrification efforts are equitable, AEC identified the following priorities:



- **Ensuring that community engagement influences Commission and District decision-making regarding beneficial electrification programs:** Community engagement in decision-making fosters conversations among different groups of residents and provides the opportunity for resident concerns to be heard and to influence program design.
- **Prioritizing beneficial electrification investments in EJ neighborhoods and addressing common decarbonization barriers:** Investing in the District’s most vulnerable communities expedites electrification efforts in these areas, allowing the District to meet its climate targets faster while helping these communities overcome common barriers like the high upfront cost of modern electric heating systems.
- **Ensuring that beneficial electrification programs do not increase the energy burden for EJ and other vulnerable communities:** Reducing the energy burden for the District’s vulnerable communities provides financial relief that has the potential to spur economic growth and improve quality of life in these areas.



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## I. Introduction

The District of Columbia is already facing record-breaking heat waves, stronger snowstorms, and flood events that are directly linked to climate change.<sup>1</sup> The Mid-Atlantic region has warmed by more than 2 degrees Fahrenheit over the last century. Water levels in the Potomac River have been rising<sup>2</sup> and tidal flooding is expected to impact coastal areas near the River—especially the Southwest Waterfront in Ward 6—creating a floodplain that reaches into Ward 2.<sup>3</sup>

The District has committed to reduce total greenhouse gas emissions to 50 percent of baseline emission levels by 2032 and to reach net-zero emissions by 2050.<sup>4</sup> In 2019, the District emitted a total of 7.2 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub>e), a 32 percent reduction in emissions from the 2006 baseline (when emission levels were 10.5 MMTCO<sub>2</sub>e).<sup>5</sup>

The Department of Energy and Environment (DOEE)'s proposed Carbon Free DC 2050<sup>6</sup> plan to achieve carbon neutrality includes a substantial reduction in emissions from buildings and transportation (which were each responsible for about 20 percent of the District's total greenhouse gas emissions), and electric use (about 48 percent of total emissions) in 2019.<sup>7</sup> In 2019:

- Emissions from the building sector amounted to about 1.5 MMTCO<sub>2</sub>e (16 percent lower than the 2006 baseline);<sup>8</sup>
- Transportation related emissions were 1.6 MMTCO<sub>2</sub>e (11 percent less than 2006), and;<sup>9</sup>
- Electric emissions decreased were 3.5 MMTCO<sub>2</sub>e (45 percent less than 2006).<sup>10</sup>

Over the past decade, emissions from the buildings, transportation, and electric sectors have all fallen (see Figure 1), but electric emissions have fallen more rapidly (27 percent, compared to 8.5 and 11 percent for buildings and transport respectively).

On behalf of the Office of the People's Counsel for the District of Columbia (OPC), this Applied Economics Clinic (AEC) report discusses an important pathway for reducing emissions in the District: equitable electrification. Electrification is the term used to describe the switch from traditional fossil fuels like gas and oil to electricity derived from renewable sources.<sup>11</sup>

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<sup>1</sup> DC DOEE. September 2013. *Climate Ready DC*. DOEE ID# 2013-9-OPS. Available at: [https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service\\_content/attachments/CRDC-Report-FINAL-Web.pdf](https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/CRDC-Report-FINAL-Web.pdf). p.1

<sup>2</sup> US EPA. November 2016. *What Climate Change Means for the District of Columbia*. EPA 430-F-16-064. Available at: <https://19january2017snapshot.epa.gov/sites/production/files/2016-11/documents/climate-change-dc.pdf>

<sup>3</sup> The District of Columbia. n.d. "Flood Analysis". Available at: <http://dcfloodrisk.org/main#>

<sup>4</sup> DC DOEE. n.d. "Greenhouse Gas Inventories." Available at: <https://doee.dc.gov/service/greenhouse-gas-inventories>

<sup>5</sup> DC DOEE. 2021. *2006-2019 Greenhouse Gas Inventories* [Excel Spreadsheet]. Available at: <https://doee.dc.gov/service/greenhouse-gas-inventories>

<sup>6</sup> DC DOEE. n.d. *Carbon Free DC by 2050*. Available at: <https://doee.dc.gov/service/climate-change>

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

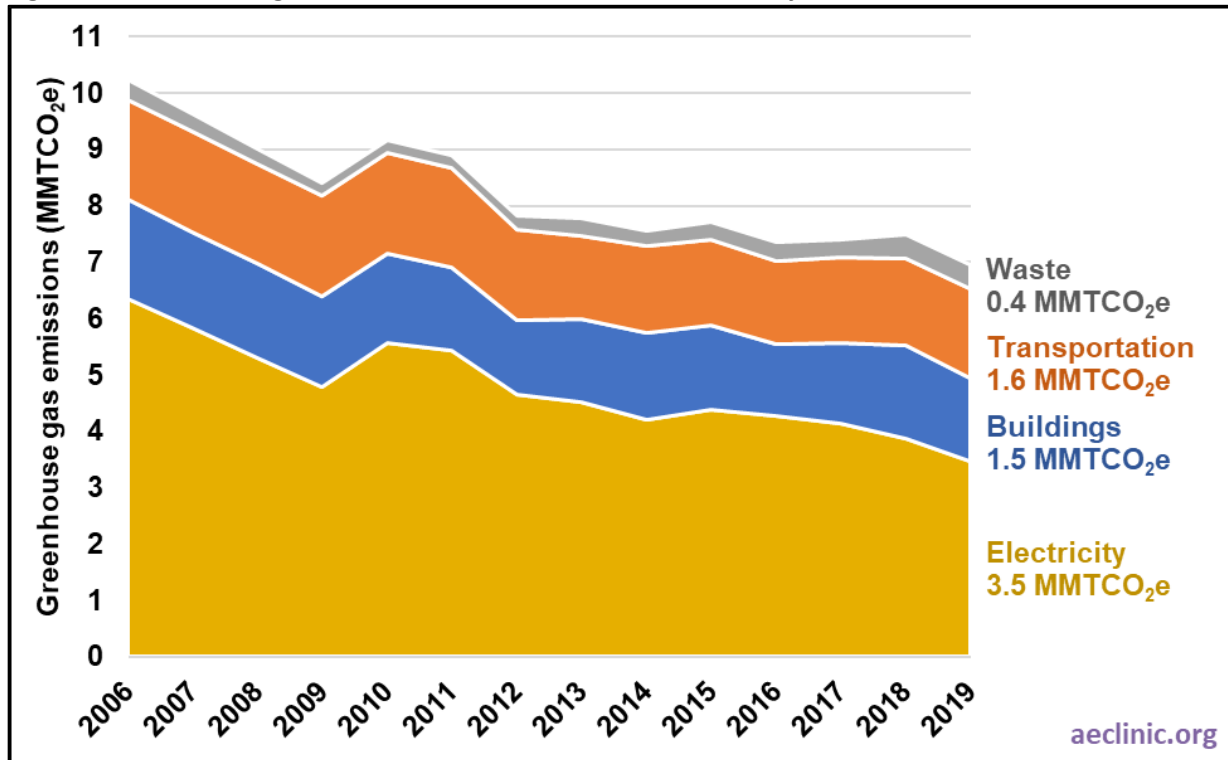
<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Cleary, K. December 5, 2019. "Electrification 101." Available at: <https://www.rff.org/publications/explainers/electrification-101/>



Figure 1. Greenhouse gas emissions in the District of Columbia by sector



Data source: DC DOE. 2021. 2006-2019 Greenhouse Gas Inventories [Excel Spreadsheet]. Available at: <https://doee.dc.gov/service/greenhouse-gas-inventories>; Values for 2007 and 2008 interpolated from 2006 and 2009 values.

The transition away from fossil fuels has important equity implications, in both existing and future decarbonization efforts. Equitable electrification means a fair distribution of implementation efforts and of who pays for those efforts. Fair distribution must consider all District communities, with particular focus on vulnerable communities who face more barriers to decarbonization efforts, already suffer higher energy burdens, and are often on the frontlines of climate change impacts like flooding and heat waves.

Section II of this report presents a baseline equity analysis for the District, taking a close look at existing disparities and the distribution of energy services across Wards. Section 0 proposes a new definition for and identifies Environmental Justice communities in the District. Section IV describes and assesses existing electrification programs in the District. Section 0 discusses the role of active transportation (such as safe walking routes and bike share programs) in decarbonization efforts. Section VI describes electrification programs in progress in other jurisdictions. Lastly, Section VII presents recommended priorities and metrics for the District to ensure that electrification programs are equitable in both costs and benefits.

## II. Existing Disparities

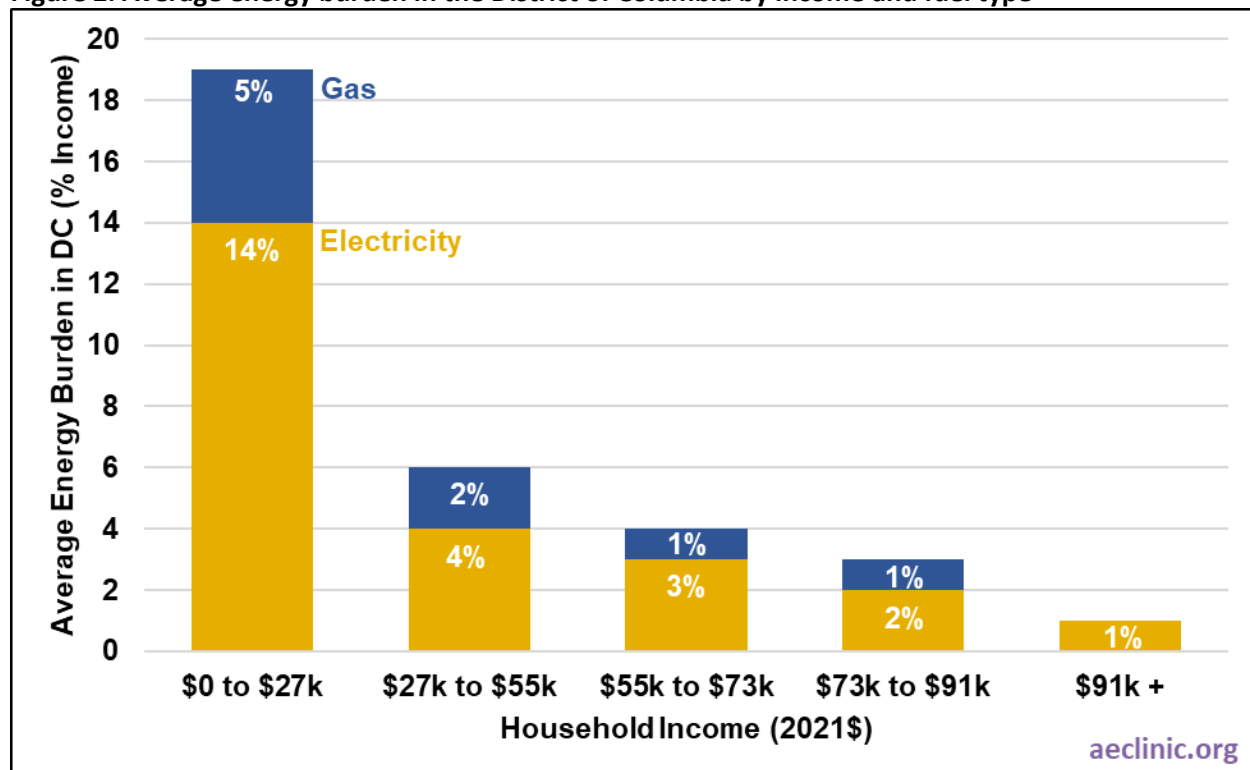
The burden of energy costs is not distributed equitably across the District, or across the nation as a whole. Within a single town or city, households pay the same energy rates (all residential customers pay the same per therm and per kilowatt-hour rate for energy); energy bills are higher for larger and less efficient homes. However, even for the same size of house or amount of energy use, households with lower incomes spend a larger share of that income on energy costs than higher income households do. For

example, two households each pay \$300 in monthly energy bills, but one household earns \$50,000 annually while the other earns \$150,000. The household earning \$50,000 spends a larger share of their income (7.2 percent of annual income) on energy costs than the household earning \$150,000 (2.4 percent of their annual income), leaving less for the lower-income household to spend on other expenses.

Recent research by the American Council for an Energy-Efficient Economy (ACEEE) found that the median energy burden for the District—as a whole—is 2 percent: for every \$1,000 of income, half of all households pay more than \$20 in energy costs and half pay less than \$20.<sup>12</sup> Among low-income District residents, half of households pay more than 7.5 percent of their income in energy costs<sup>13</sup> (a household making \$75,000 annually pays \$470 per month), and one in fourteen of District residents are “severely” energy-burdened—meaning they pay more than 10 percent of their income in energy costs.<sup>14</sup>

In 2018, District households earning 0 to 30 percent of the state median income (\$0 to \$27,000) spent almost one-fifth of their income on energy while those with higher incomes spent only 1 to 6 percent of their incomes on energy (see Figure 2 below). For reference, half of all households in the District make more than \$90,600 per year and half make less.

**Figure 2. Average energy burden in the District of Columbia by income and fuel type**



Data source: (1) U.S. Department of Energy (DOE). Low-Income Energy Affordability Data (LEAD) Tool Chart Export. Available at: <https://www.energy.gov/eere/slsc/maps/lead-tool>; (2) U.S. Census. 2018. ACS 1-Year Estimates Subject Tables [Table ID: S1903].

Beyond income, there are racial/ethnic disparities in energy burden across the United States. ACEEE found

<sup>12</sup> ACEEE. September 2020. “How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burdens across the U.S.” Available at: <https://www.aceee.org/research-report/u2006>.

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.



that non-white households face higher energy burdens compared to their white counterparts.<sup>15</sup> This gap in equity confounded by several other disparities facing racial/ethnic minority<sup>16</sup> populations. For example, because of historical systemic racism, racial/ethnic minorities overall earn less income,<sup>17</sup> are less likely to own a home,<sup>18</sup> and have poorer health outcomes.<sup>19</sup>

In addition, racial/ethnic minorities are disproportionately exposed to air pollution,<sup>20</sup> are more likely to reside near environmental risk areas,<sup>21</sup> and bear the brunt of climate change impacts,<sup>22</sup> a phenomenon termed “environmental racism.” All these factors exacerbate and confound one another, making these communities vulnerable and of particular concern for policymakers to ensure equitable outcomes. For example, racial/ethnic minority populations have been disproportionately impacted by the ongoing COVID-19 pandemic because of preexisting socioeconomic and environmental disadvantages.<sup>23</sup> To take a closer look at these communities in the District, the next section analyzes the demographic breakdown within and across District neighborhoods.

## ***District demographics***

The District is split up into eight wards, which correspond to the Capital’s eight legislative Council districts.<sup>24</sup> These eight wards contain 179 U.S. Census tracts.<sup>25</sup> As of 2019, the District’s eight Wards are fairly evenly distributed in population (see Table 1 below). However, population density varies both within and across wards (see Figure 3). Population density is highest in Wards 1 and 6, the District’s wealthiest

<sup>15</sup> Ibid. [Figure ES-1].

<sup>16</sup> Throughout this report, we use the term racial/ethnic minorities to describe individuals that do not identify as non-latino white.

<sup>17</sup> Wilson, V. 2020. “Racial Disparities in Income and Poverty Remain Largely Unchanged Amid Strong Income Growth in 2019” [Blog]. Economic Policy Institute. Available at: <https://www.epi.org/blog/racial-disparities-in-income-and-poverty-remain-largely-unchanged-amid-strong-income-growth-in-2019/>

<sup>18</sup> Haughwout, A., Donghoon, L., Scally, J., and van der Klaauw, W. 2020. “Inequality in U.S. Homeownership Rates by Race and Ethnicity” [Blog]. Liberty Street Economics. Available at: <https://libertystreeteconomics.newyorkfed.org/2020/07/inequality-in-us-homeownership-rates-by-race-and-ethnicity/>

<sup>19</sup> Ndugga, N., and Artiga, N. 2021. *Disparities in Health and Health Care: 5 Key Questions and Answers*. Kaiser Family Foundation. Available at: <https://www.kff.org/racial-equity-and-health-policy/issue-brief/disparities-in-health-and-health-care-5-key-questions-and-answers/>

<sup>20</sup> (1) Mikati, I., Benson, A.F., Luben, T. J. Sacks, J.D, and Richmond-Bryant, J. 2018. “Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status.” *American Journal of Public Health*, 108, 480-485.

<https://doi.org/10.2105/AJPH.2017.304297>; (2) Miranda, L. M., Edwards, S. E., Keating, M. H., and Paul, C. J. 2011. “Making the Environmental Justice Grade: The Relative Burden of Air Pollution Exposure in the United States.” *International Journal of Environmental Research and Public Health*, 8(6), 1755-1771. <https://doi.org/10.3390/ijerph8061755>

<sup>21</sup> 1) Bullard, R. D., Mohaj, P., Saha, R., and Wright, B. 2008. “Toxic Wastes and Race at Twenty: Why Race Still Matters After All These Years.” *Environmental Law*, 38(2), 371-411. Available at: <https://www.jstor.org/stable/43267204>; (2) Banzhaf, S., Ma, L., and Timmins, C. 2019. “Environmental Justice: The Economics of Race, Place, and Pollution.” *Journal of Economic Perspectives*, 33 (1), 185-208. Available at: <https://www.aeaweb.org/articles?id=10.1257/jep.33.1.185>

<sup>22</sup> Island, S.N. and Winkel, J. October 2017. *Climate Change and Social Inequality*. DESA Working Paper No. 152. Available at: [https://www.un.org/esa/desa/papers/2017/wp152\\_2017.pdf](https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf).

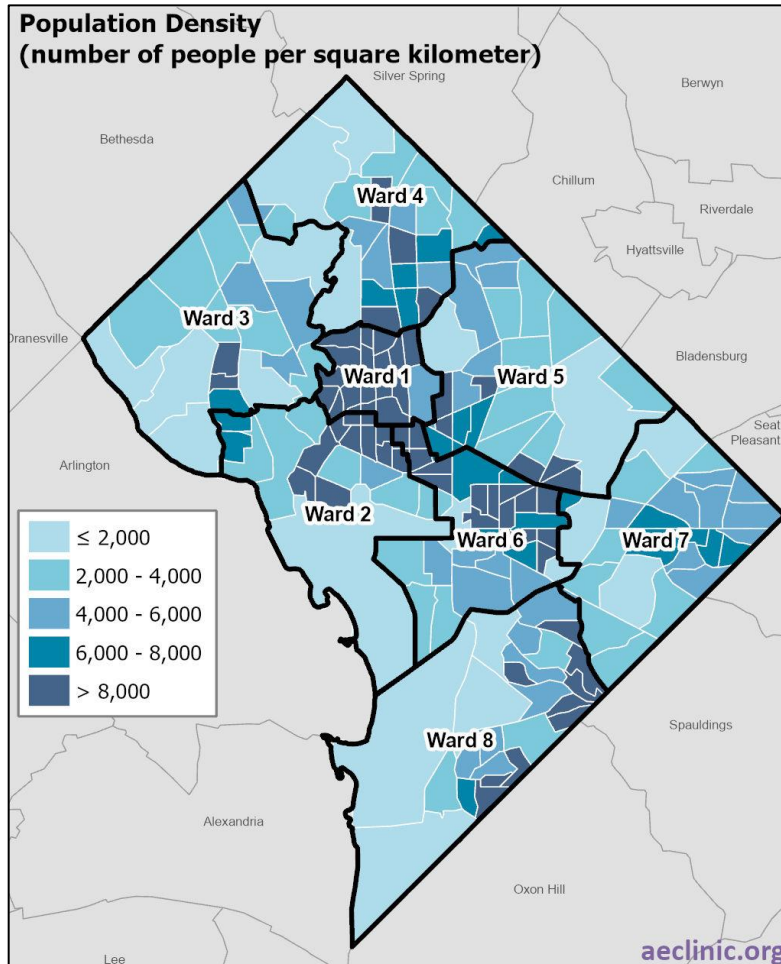
<sup>23</sup> Alisalad, S., Tavares, E., Stasio, T., and Majumder, M. 2021. *What the COVID-19 Pandemic Can Teach Us About Climate Justice*. Applied Economics Clinic. Available at: <https://aeclinic.org/publicationpages/2021/02/03/what-the-covid19-pandemic-can-teach-us-about-climate-justice>

<sup>24</sup> US Census. n.d. “District of Columbia.” Available at: <https://www.census.gov/geographies/reference-files/2010/geo/state-local-geo-guides-2010/districtofcolumbia.html>

<sup>25</sup> Census tracts are defined as small statistical subdivisions that are updated approximately every 10 years. These subdivisions generally have a population size between 1,200 and 8,000 people. See: [https://www.census.gov/programs-surveys/geography/about/glossary.html#par\\_textimage\\_13](https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_13)

neighborhoods. Wards 7 and 8—with by far the lowest median incomes—are more likely to have high rates of poverty, high energy expenditures, high shares of racial/ethnic minorities, higher rates of eligibility for and participation in government assistance programs, higher shares of renters, and lower rates of college degree attainment.

**Figure 3. District of Columbia population**



Data source: U.S. Census. 2019. ACS 5-Year Estimates Subject Tables. [TableID: B03002]

District-wide averages tend to obscure drastic disparities within the District: For example, the median income across the entire District is about \$90,000. The difference in median income between Ward 3 (\$134,881) and Ward 8 (\$36,946), however, is nearly \$100,000. As a consequence, the average person who lives, works, plays, and accesses essential services, like energy, in Ward 8 faces drastically different circumstances—and choices—than the average person who lives less than 8 miles away in Ward 3. Research published in 2017 by the D.C. Policy Center found that the District’s bottom 20 percent of earners are “substantially poorer than the rest of the country”—and likely to be struggling more than the bottom 20 percent of earners elsewhere due to “higher costs of living and disproportionate tax burdens.”<sup>26</sup>

<sup>26</sup> DC Policy Center. 2017. “Income inequality and economic mobility in D.C.” Available at: [https://www.dcpolicycenter.org/publications/income-inequality-and-economic-mobility-in-d-c/#\\_ftn3](https://www.dcpolicycenter.org/publications/income-inequality-and-economic-mobility-in-d-c/#_ftn3).

**Table 1. Selected demographics and energy equity dimensions in the District of Columbia by Ward**

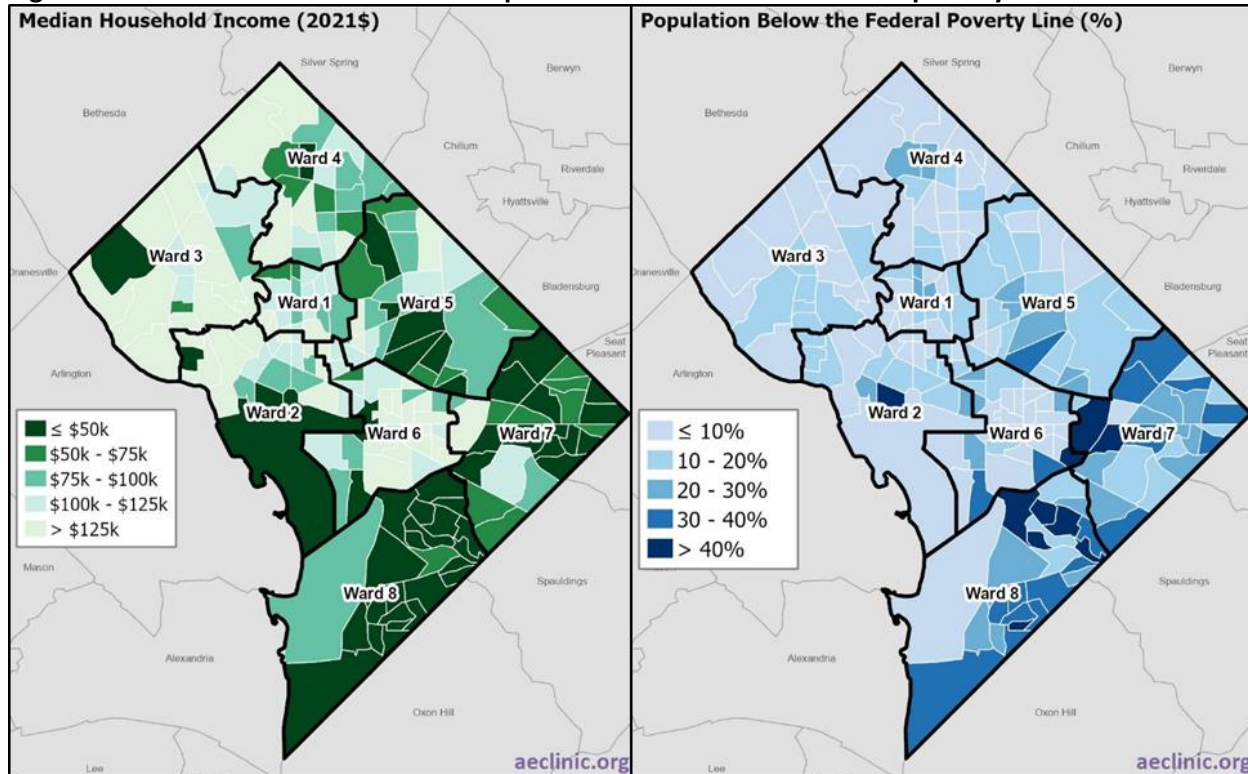
	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District Total
<b>Households</b>	<b>Number of Households</b>	35,796	37,598	37,623	30,675	34,896	46,264	30,877	284,386
	<b>Median Household Income (2021\$)</b>	\$107,848	\$116,425	\$134,881	\$99,387	\$75,247	\$119,884	\$47,506	\$90,592
	<b>Energy Expenditures (2021\$)</b>	\$1,590	\$1,330	\$1,950	\$2,190	\$1,930	\$1,710	\$2,250	\$1,920
	<b>Limited English Speaking</b>	6%	3%	3%	9%	4%	1%	1%	3%
	<b>Renters</b>	64%	63%	47%	41%	53%	61%	61%	58%
	<b>SNAP Recipients</b>	9%	4%	2%	11%	15%	8%	30%	14%
	<b>Income-Eligible Households</b>	24%	16%	47%	15%	52%	29%		
	<b>LIHEAP Participation Rate</b>	9%	1%	8%	35%	33%	21%		
<b>Individuals</b>	<b>Total Population</b>	83,811	77,855	82,737	89,992	90,172	99,786	81,946	692,683
	<b>Racial-Ethnic Minority</b>	54%	35%	29%	75%	77%	44%	97%	63%
	<b>Immigrant</b>	21%	21%	19%	22%	12%	9%	4%	14%
	<b>Below Poverty Line</b>	12%	14%	8%	10%	16%	12%	26%	16%
	<b>Elderly (&gt;65)</b>	7%	10%	18%	15%	14%	10%	13%	12%
	<b>HS Graduate</b>	91%	98%	98%	89%	93%	96%	92%	94%
	<b>College Graduate</b>	74%	88%	89%	58%	56%	79%	32%	64%

*Note: In the color coding in the Table above, the brightest red indicates the greatest vulnerability and brightest green indicates the least vulnerability. The colors between red and green (shades of orange, yellow and green) provide the spectrum between the two extremes.*

*Data sources: (1) U.S. Census. 2019. ACS 5-Year Estimates Subject Tables [TableIDs: S1903, S1602, S2502, DP05, S1701, S2201, B05012, B15003]; (2) DC OPC. 2020. Energy Affordability Study Population Characterization Report [Table 8.7]. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>; (3) Open Energy Data Initiative (OEDI). 2018. Low-Income Energy Affordability Data - LEAD Tool - 2018 Update [DC 2018 LEAD data.zip]. Available at: <https://data.openei.org/submissions/573>.*

Poverty rates in the District are highest in Wards 7 and 8, but Figure 4 demonstrates that—within these Wards—poverty is concentrated in particular neighborhoods. There are also pockets of high poverty incidence in Wards 2 and 6 that Ward-wide averages miss, glossing over important areas of vulnerability (as in Table 1 above).

**Figure 4. Median household income and percent of households below the poverty line**



Data sources: U.S. Census. 2019. ACS 5-Year Estimates Subject Tables. [TableID: S1902, S1701]

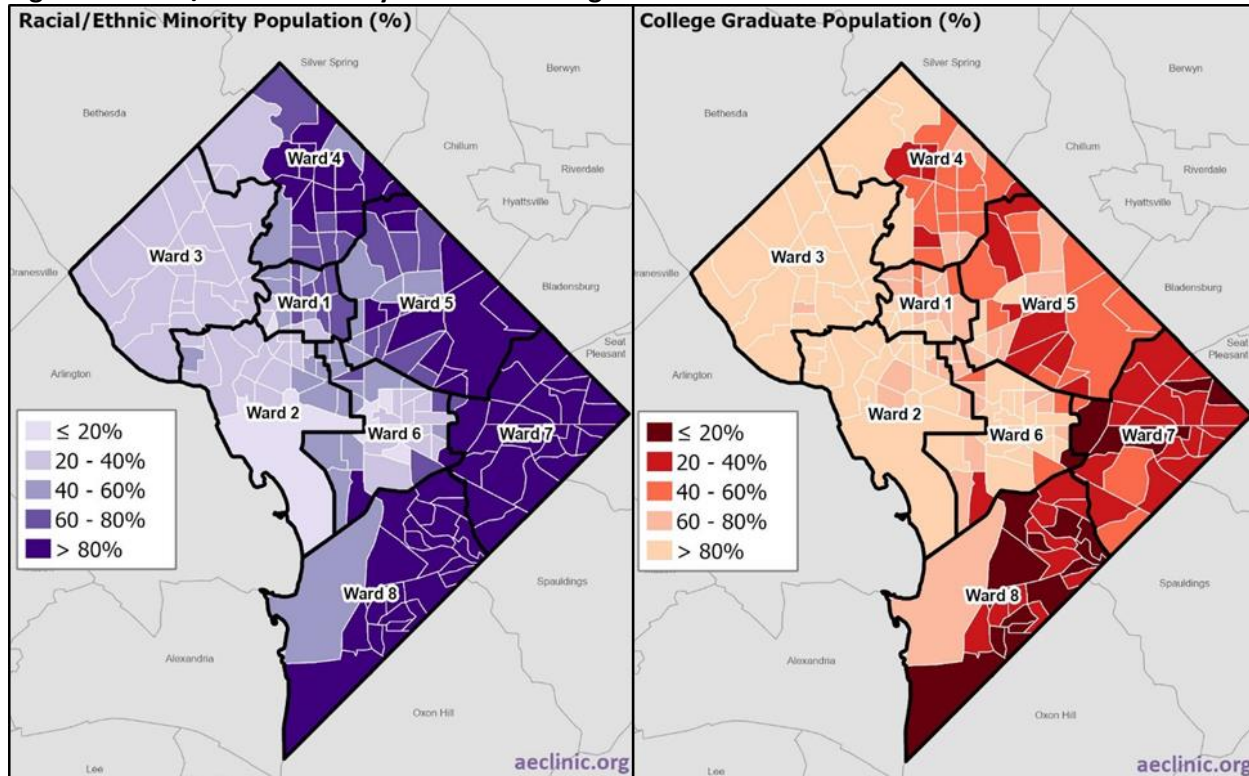
Figure 5 below shows that Wards 7 and 8 have relatively few college-educated residents and overwhelming majorities of racial/ethnic minorities; the opposite is true in Wards 2 and 3. In general, that same trend holds throughout the District (high shares of racial/ethnic minorities in a neighborhood correspond to low shares of college degree attainment, and vice-versa), but there are some exceptions. For example, there are neighborhoods in Wards 1, 4, and 5 that have both high shares of racial minorities and high levels of college degree attainment. These areas also have a median household income closer to the District median (see Table 1 above).

Overall, the Wards that have the lowest median incomes, high rates of poverty, high shares of racial minorities, and low rates of college degree attainment (Wards 4, 5, 7 and 8, most notably) are the same Wards that are more likely to heat their homes with gas (see Table 2 below). An exception is Ward 3 where 59 percent of households heat with gas but there is a relatively high median income, low rates of poverty, low shares of racial/ethnic minorities or high rates of college degree attainment. It is important to note that households currently heating with electricity are not necessarily more efficient (using less energy for more heat) than those heating with gas: Old-fashioned electric resistance heating (which is not the same technology as modern heat pumps) is still common, is very inefficient, and can be expensive for households that use it.





**Figure 5. Racial/ethnic minority status and college education rates across the District of Columbia**



Data sources: U.S. Census. 2019. ACS 5-Year Estimates Subject Tables. [TableID: B03002, B15003]

Note: Racial/ethnic minority is defined as individuals that identify as a race other than white and/or as Hispanic or Latinx.

**Table 2. Household heating fuel by Ward**

Household Heating Fuel	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District Total
Electricity	53%	56%	34%	25%	39%	50%	39%	44%	43%
Gas	44%	40%	59%	72%	58%	47%	58%	54%	53%
Oil	1%	1%	3%	2%	1%	1%	1%	0%	1%
Other	2%	3%	4%	2%	1%	2%	2%	2%	2%

Data source: U.S. Census. 2019. ACS 5-Year Estimates Detailed Tables [Table ID: B25040].

Vulnerabilities are interconnected such that Wards with low-income median incomes have high incidences of poverty, high shares of racial minorities, and low levels of college education. Vulnerabilities can compound and amplify one other. In a 2020 report on energy affordability in the District, the *Energy Affordability Study Population Characterization Report*, OPC found that households that heat with gas are also more likely to be eligible for income-based assistance programs—half of all District households heating with gas qualify for income-eligible energy assistance programs, compared to 46 percent heating



with electricity.<sup>27</sup>

### ***Low-income assistance***

The District has policies and programs in place that target low-income and other vulnerable residents for clean energy, energy efficiency and energy assistance—for example, the LIHEAP program—commonly known as “fuel assistance.”<sup>28</sup> In addition to the energy cost assistance services provided through LIHEAP, the District’s 2008 Clean and Affordable Energy Act authorized the creation of an energy efficiency utility: the District of Columbia Sustainable Energy Utility (DCSEU),<sup>29</sup> which implements energy efficiency and renewable energy programs, including an Income Qualified Efficiency Fund for owners of multifamily buildings that serve low- to moderate-income residents.<sup>30</sup> The program seeks to improve buildings that house low- and moderate-income residents by making those buildings more energy efficient, lowering energy costs for residents while enhancing indoor comfort and air quality.

The District also offers a variety of low-income energy efficiency programs to income-eligible residents through DCSEU. For example, DCSEU offers funding for owners and managers of affordable housing, qualified clinics, and shelters to implement energy efficiency upgrades<sup>31</sup> and has a Low-Income Decarbonization Pilot program to reduce carbon emissions of low-income single-family homes through electrification.<sup>32</sup> In 2020, DCSEU’s income-based efficiency programs (i.e. the Income Qualified Efficiency Fund, the Low-income Multifamily Comprehensive program, and the Low-income Prescriptive Rebate program) saved a combined total of 4,865 megawatt-hours of electric savings.<sup>33</sup>

A program called “Stay DC” provides rent and utility bill assistance to households with financial hardship due to COVID-19, in an effort to keep District residents in their homes.<sup>34</sup> Households can qualify in one of three ways: via income-eligibility thresholds, via financial hardship due to COVID-19 or via housing instability whereby rent and/or utility bills total more than half of household income. Policies and programs like these are important to address energy inequity in the District, but it is of equal importance that the District transparently report on their progress to hold itself accountable to continuing to improve and become a more equitable city for all.

Despite much higher rates of eligibility, only 13 percent of the income-eligible households heating with gas or electric participate in the District’s income-eligible energy assistance programs to receive energy assistance.<sup>35</sup> Households with incomes at or below 60 percent of the District’s median income (less than 60

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<sup>27</sup> DC OPC. 2020. *Energy Affordability Study Population Characterization Report* [Tables 8.6 & 8.7]. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>.

<sup>28</sup> DC DOEE. n.d. “Receive Assistance with Your Utility Bills (LIHEAP).” Available at: <https://doee.dc.gov/liheap>

<sup>29</sup> DC DOEE. n.d. “DC Sustainable Energy Utility (DCSEU).” Available at: <https://doee.dc.gov/service/dc-sustainable-energy-utility-dcseu>.

<sup>30</sup> DCSEU. 2021. “Efficiency Fund.” Available at: <https://www.dcseu.com/commercial-and-multifamily/income-qualified-efficiency-fund>.

<sup>31</sup> DCSEU. 2021. *2020 Annual Report*. Available at: <https://www.dcseu.com/Media/Default/docs/about-us/DCSEU-AnnualReport-2020-final.pdf>

<sup>32</sup> Ibid.

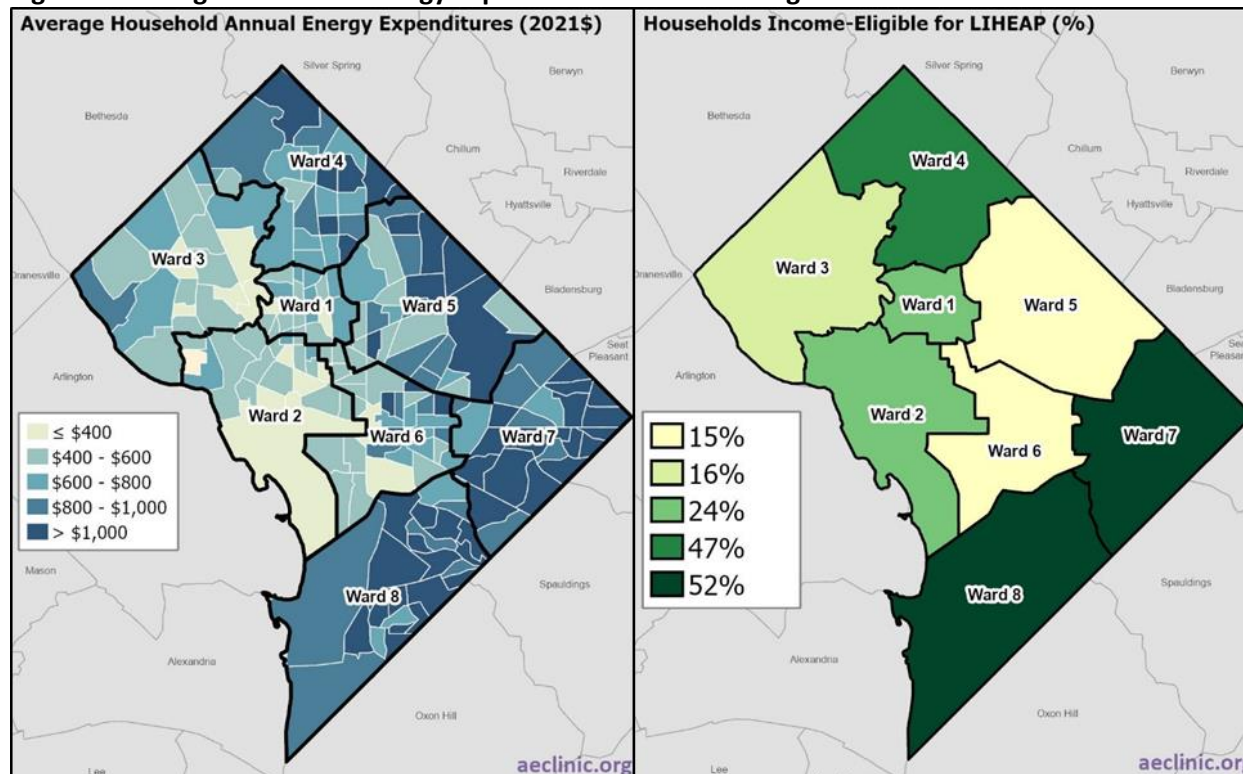
<sup>33</sup> DCSEU. 2020. *Evaluation of DC Sustainable Energy Utility FY2020 Programs* [Tables 170, 173, 176]. Available at: <https://doee.dc.gov/publication/dcseu-evaluation-measurement-verification-reports>.

<sup>34</sup> STAY DC. “Rent and utility assistance when you need it.” Available at: <https://stay.dc.gov/>.

<sup>35</sup> DC OPC. 2020. *Energy Affordability Study Population Characterization Report* [Tables 8.6 & 8.7]. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>.

percent of \$96,720 in 2019<sup>36</sup>, or \$58,000) qualify for LIHEAP. More than half of all households in Wards 7 and 8 are eligible for LIHEAP while fewer than 16 percent are eligible in Wards 3, 5, and 6 (see Figure 6).

**Figure 6. Average household energy expenditure and LIHEAP-eligible across the District of Columbia**



Data sources: (1) Open Energy Data Initiative (OEDI). 2018. Low-Income Energy Affordability Data - LEAD Tool - 2018 Update [DC 2018 LEAD data.zip]. Available at: <https://data.openei.org/submissions/573>; (2) DC OPC. 2020. Energy Affordability Study Population Characterization Report [Table 8.7]. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>

Very often lower-income households that qualify for income-eligible energy assistance also pay more for their energy costs (as a share of income) than their wealthier neighbors (see Figure 6 above). For example, neighborhoods in Wards 7 and 8 have higher energy costs on average than the rest of the District, they also have the highest percentage of income-eligible households. There are some exceptions to this pattern. Ward 2, for example, has a higher median income and a relatively low average energy cost, but about a quarter of households in Ward 2 are eligible for LIHEAP.

Not only income eligibility but also participation rates for LIHEAP (where participation rates measure the fraction of those households eligible for LIHEAP that actually participate in the income-eligible program) differ drastically among Wards (see Table 3). Wards 7 and 8 have the highest share of income-eligible households and also have the second highest share of households participating in LIHEAP. In Wards 7 and 8 more than half of all households qualify for income-eligible programs, and of these eligible households, one in three participate in the LIHEAP program (compared to a 1 in 100 participant rate among eligible households in Ward 3, for example). In Ward 4, in contrast, the share of income eligible residents is almost as large as in Wards 7 and 8, but only 1 out of every 13 eligible households participate in LIHEAP.

<sup>36</sup> Adjusted for inflation and reported in 2021\$. US Census. 2019. ACS 1-Year Estimates Subject Tables [Table ID: S1903].

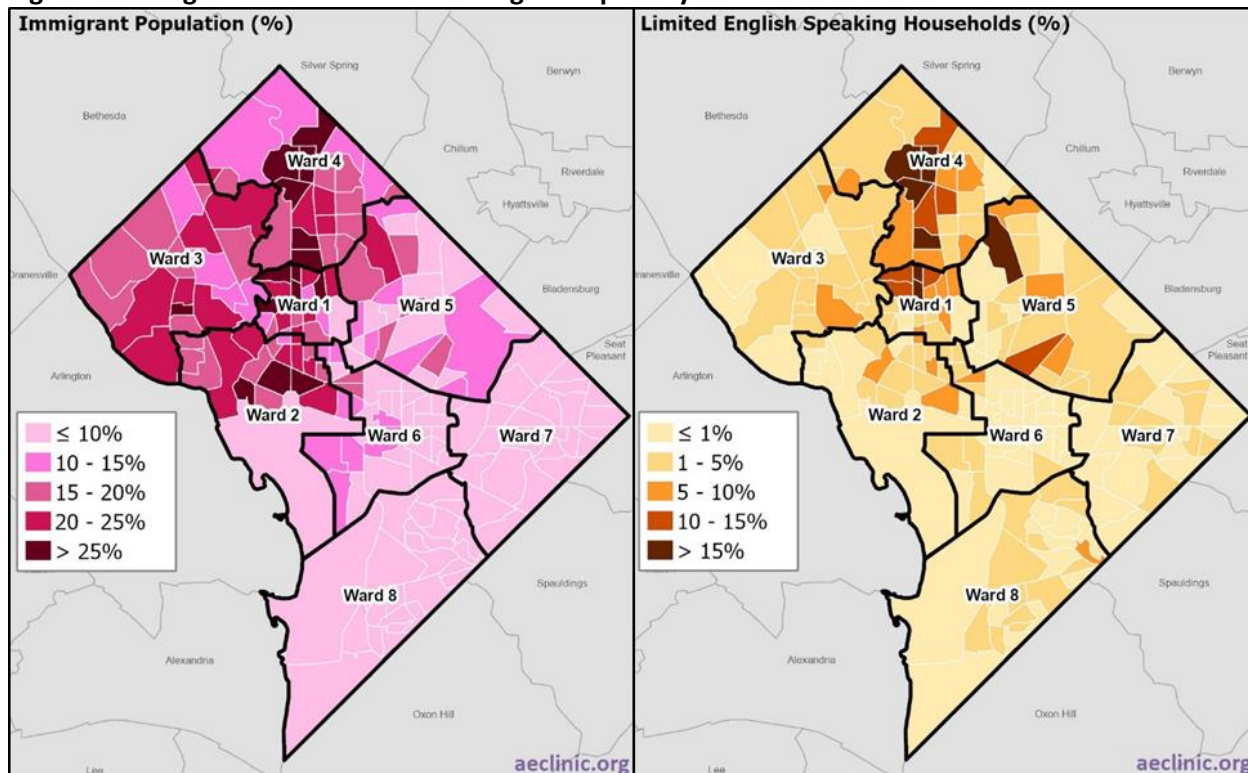
**Table 3. LIHEAP eligibility and participation rate for low-income households by Ward**

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District
<b>Income-Eligible Households for LIHEAP</b>	24%		16%	47%	15%		52%		<b>29%</b>
<b>LIHEAP Participation Rate (Share of Income-Eligible Households)</b>	9%		1%	8%	35%		33%		<b>21%</b>

Data source: DC OPC. 2020. *Energy Affordability Study Population Characterization Report* [Table 8.7]. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>

Ward 4 also has the highest share of immigrants and limited English households of any Ward in the District (see Figure 7)—which underlines the importance of language accessibility in energy assistance programs. When energy assistance programs fail to offer language/translation options appropriate for the languages spoken in English limited communities, the obstacles to these households' participation can be substantial. Immigrant and English isolated communities rarely exceed 15 to 25 percent of a census tract's population across the District, but are concentrated in certain neighborhoods across Wards 1, 2, 4, and 5.

**Figure 7. Immigrant status and limited English capability across the District of Columbia**



Data sources: U.S. Census. 2019. *ACS 5-Year Estimates Subject Tables*. [TableID: B05012, S1602].

Not only are vulnerabilities inequitably distributed across the District, but there is an intersection of multiple kinds of vulnerability concentrated in the same areas. Wards 7 and 8 have higher rates of poverty, higher energy expenditures, higher shares of racial/ethnic minorities, higher rates of eligibility for and participation in government assistance programs, higher shares of renters, and lower rates of college degree attainment. These vulnerabilities are not spread evenly across Wards 7 and 8, however, they tend

to be concentrated in certain neighborhoods: for example, the Congress Heights and Fort Dupont neighborhoods. Ward 4 provides an example of different kinds of compounding vulnerabilities than those faced by Wards 7 and 8: Ward 4 has the highest share of immigrants and limited English households in the District, the second highest share of income-eligible households, and the second lowest share of households participating in income-eligible energy assistance. As with Wards 7 and 8, the vulnerabilities in Ward 4 are concentrated in certain neighborhoods.

### ***Exposure to environmental hazards***

Due to historic inequities, District neighborhoods are also disproportionately exposed to local environmental hazards from soil, air, and water pollution. According to the DC Policy Center, residents of Wards 4, 5, and 6 are disproportionately exposed to environmental hazards, putting these communities at increased risk of asthma, hormone disruption, and cancer.<sup>37</sup> In a recent NASA Earth Observatory study,<sup>38</sup> Wards 7 and 8 were found to suffer disproportionately from particulate matter (PM<sub>2.5</sub>) pollution and related mortality rates compared to the rest of the District (see Figure 8 below).<sup>39</sup> The U.S. Center for Disease Control has found that 23 percent of the District's Black children suffer from asthma, compared to just 6.5 percent of white children.<sup>40</sup>

Soil contamination occurs when hazardous chemicals are spilled or improperly disposed of and can spread to uncontaminated areas. People may later be exposed by breathing in contaminated dust, touching impacted soils, or eating food grown in polluted soil. Brownfields and Superfund sites are other examples of land with soil contamination from industrial activity, which can include retired manufacturing facilities or landfills. For example, the most common source of soil pollution in the District is leaking underground storage tanks—which can hold toxins including septic materials, wastewater, petroleum, and hazardous waste. The District has registered 1,847 leaking underground tanks since 1987, and 130 of those are reported to be actively leaking as of 2020. Ward 5 is home to the most active leaks (28 percent) followed by Ward 4 and Ward 6 (13 percent each) (see Figure 9 below).<sup>41</sup>

Moreover, Ward 3, the District's wealthiest community, is exposed to no water pollution from the sewer system while a good portion Wards 5 and 6 are subject to sewer overflow.<sup>42</sup> Excess sewer overflow ends up in the District's waterbodies, such as the Anacostia River, Rock Creek Park, and Potomac River, potentially exposing the surrounding areas to harmful bacteria.<sup>43</sup>

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<sup>37</sup> Calma, E. October 15, 2020. "The geography of environmental toxins in the District of Columbia." D.C. Policy Center. Available at: <https://www.dcpolicycenter.org/publications/environmental-toxins/>

<sup>38</sup> NASA Earth Observatory. 2021. *An Extra Air Pollution Burden*. Available at:

<https://earthobservatory.nasa.gov/images/149047/an-extra-air-pollution-burden>

<sup>39</sup> Hopkins, P. 2021. "Study: Air pollution plagues D.C. residents of color." Available at: <https://www.axios.com/local/washington-dc/2021/11/16/study-dc-air-pollution-impacts>

<sup>40</sup> CDC. 2018. "2018 Child Asthma Data: Prevalence Tables." Available at:

<https://www.cdc.gov/asthma/brfss/2018/child/tableL4.html>

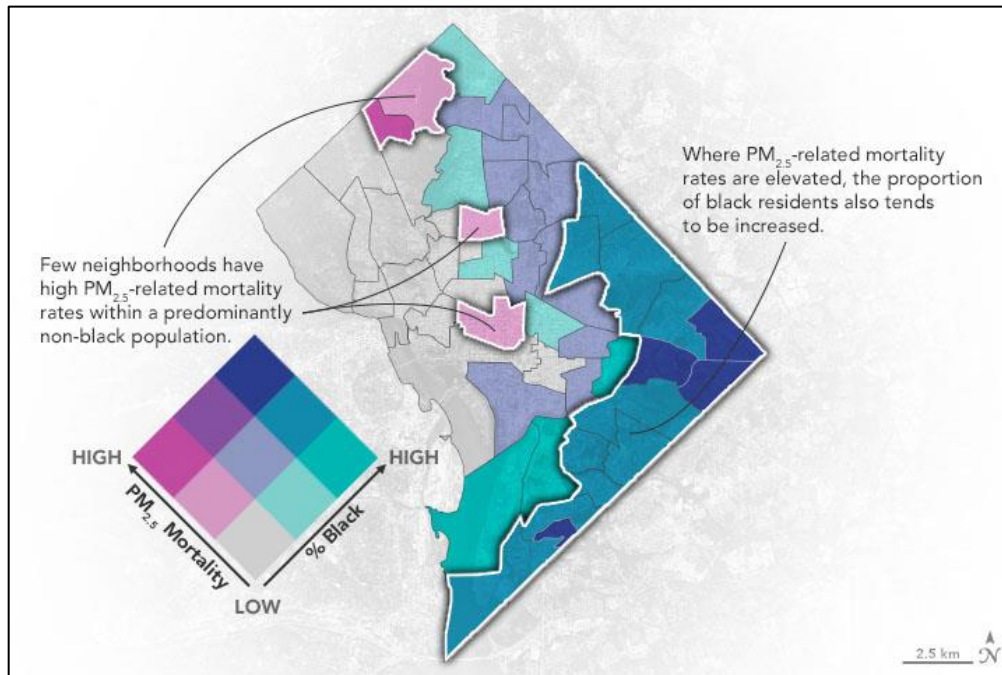
<sup>41</sup> Calma, E. October 15, 2020. "The geography of environmental toxins in the District of Columbia." D.C. Policy Center. Available at: <https://www.dcpolicycenter.org/publications/environmental-toxins/>

<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

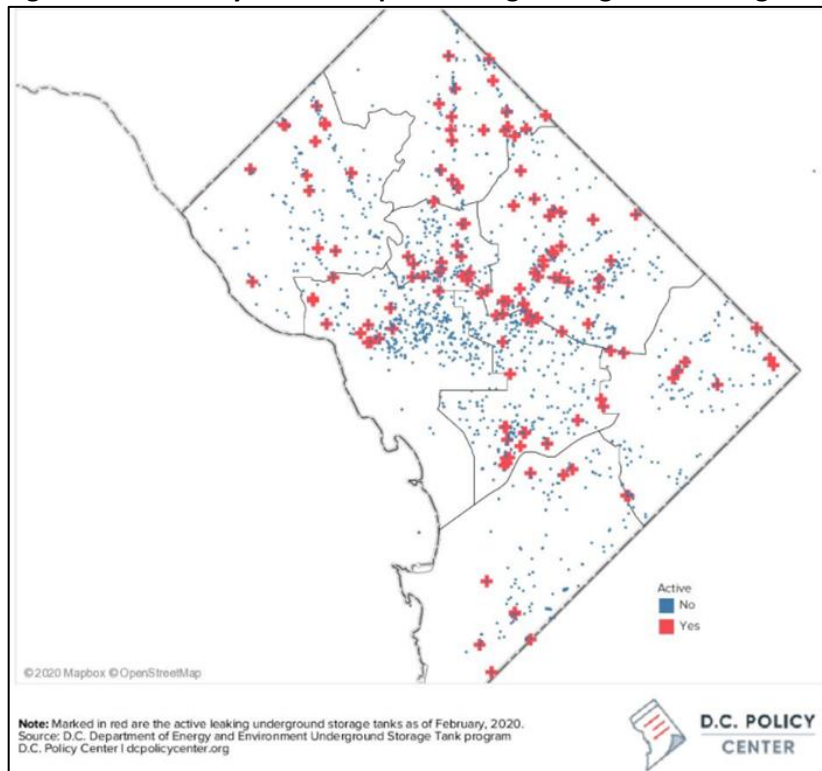


**Figure 8. NASA Earth Observatory map showing relationship between the District's Black residents and PM<sub>2.5</sub>-related mortalities**



Source: Reproduced from NASA Earth Observatory. 2021. *An Extra Air Pollution Burden*. Available at: <https://earthobservatory.nasa.gov/images/149047/an-extra-air-pollution-burden>

**Figure 9. D.C. Policy Center map of leaking underground storage tanks in the District of Columbia**



Source: Reproduced from Calma, E. October 15, 2020. "The geography of environmental toxins in the District of Columbia." D.C. Policy Center. Available at: <https://www.dcpolicycenter.org/publications/environmental-toxins/>



Lastly, in an October 2021 report commissioned by the DOEE, researchers detected over 3,000 gas leaks in the District. Wards 3, 4, 5, and 6 all contained over 500 leaks each; with almost 700 leaks detected in Ward 4.<sup>44</sup> The density of methane emissions was highest in Ward 6.<sup>45</sup>

### III. Environmental Justice Communities

According to the U.S. Environmental Protection Agency (EPA), environmental justice is:

“the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”<sup>46</sup>

The most vulnerable communities suffer the first and worst impacts of climate change; this is true both locally within the District and around the world.<sup>47</sup> These communities also face increased exposure to air pollution<sup>48</sup> and environmental hazards.<sup>49</sup> To ensure that policymakers take into consideration the impact of policy decisions on these communities in particular, AEC worked with OPC to create a proposed DC-specific “Environmental Justice” (EJ) community definition drawing on the EJ community definitions used in New Jersey<sup>50</sup> and Pennsylvania.<sup>51</sup> Moreover, we take in to consideration the District’s large racial/ethnic minority population (see Table 1) and adopt a racial/ethnic criteria similar to that of urban New York.<sup>52</sup> (There is no single standard for EJ communities, and the District does not have its own standard. Neither does the United States.) In this report, and based on OPC’s new definition, an EJ community is defined as any census tract that meets both of the following criteria:

<sup>44</sup> Ackley, B., and Phillips, N. 2021. *2021 Fugitive Methane Emission Survey of the District of Columbia*. Prepared for the DC DOEE. Available at: <https://edocket.dcpsc.org/apis/api/Filing/download?attachId=143587&guidFileName=d93076fd-4fbd-4537-9947-27db2f19f967.pdf>. p. 8

<sup>45</sup> Ibid. [Figure 3].

<sup>46</sup> US EPA. n.d. “Environmental Justice.” Available at: <https://www.epa.gov/environmentaljustice>

<sup>47</sup> Island, S.N. and Winkel, J. October 2017. *Climate Change and Social Inequality*. DESA Working Paper No. 152. Available at: [https://www.un.org/esa/desa/papers/2017/wp152\\_2017.pdf](https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf).

<sup>48</sup> (1) Mikati, I., Benson, A.F., Luben, T. J. Sacks, J.D, and Richmond-Bryant, J. 2018. “Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status.” *American Journal of Public Health*, 108, 480-485.

<https://doi.org/10.2105/AJPH.2017.304297>; (2) Miranda, L. M., Edwards, S. E., Keating, M. H., and Paul, C. J. 2011. “Making the Environmental Justice Grade: The Relative Burden of Air Pollution Exposure in the United States.” *International Journal of Environmental Research and Public Health*, 8(6), 1755-1771. <https://doi.org/10.3390/ijerph8061755>

<sup>49</sup> 1) Bullard, R. D., Mohaj, P., Saha, R., and Wright, B. 2008. “ToxicWastes and Race at Twenty: Why Race Still Matters After All These Years.” *Environmental Law*, 38(2), 371-411. Available at: <https://www.jstor.org/stable/43267204>; (2) Banzhaf, S., Ma, L., and Timmins, C. 2019. “Environmental Justice: The Economics of Race, Place, and Pollution.” *Journal of Economic Perspectives*, 33 (1), 185-208. Available at: <https://www.aeaweb.org/articles?id=10.1257/jep.33.1.185>

<sup>50</sup> The New Jersey Department of Environmental Protection defines an EJ community as any census block group that meets one or more of the following criteria: at least 35 percent of households qualifying as low-income; or at least 40 percent of residents identify as a racial/ethnic minority; or at least 40 percent of households have limited English proficiency. See: <https://www.nj.gov/dep/ej/communities.html>.

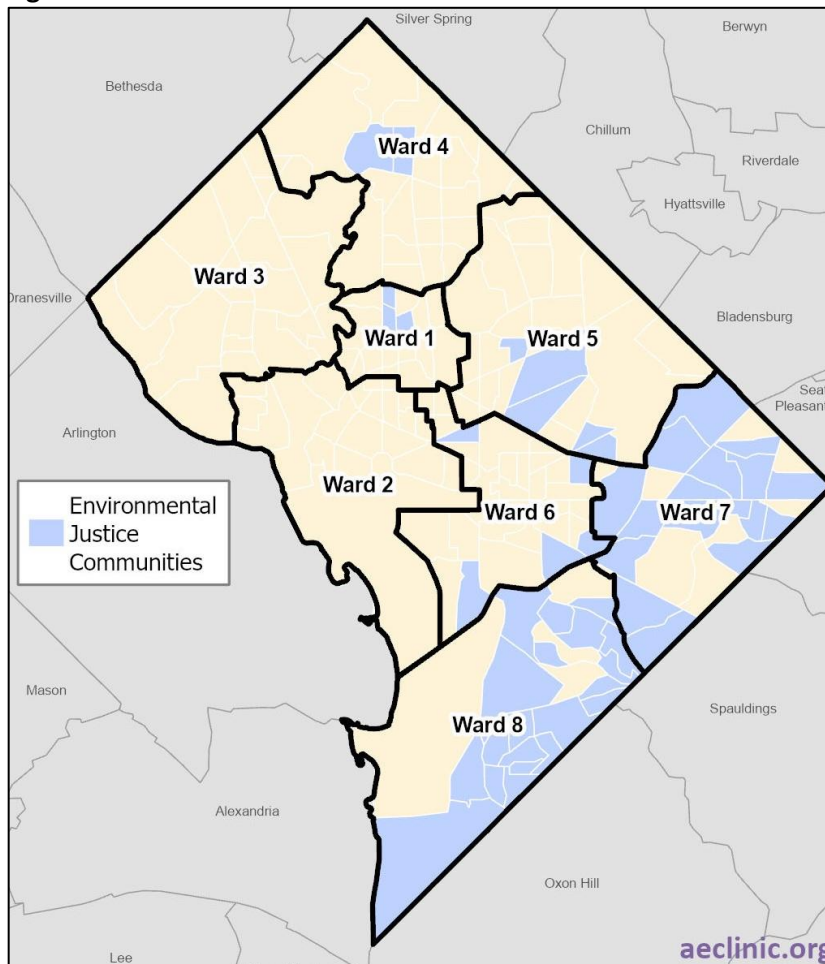
<sup>51</sup> The Pennsylvania Department of Environmental Protection defines an EJ communities as any census tract that meets one or more of these criteria: 20 percent or more of individuals live at or below the poverty line; or 30 percent or more of the population identify as a non-white racial/ethnic minority. See: <https://www.dep.pa.gov/PublicParticipation/OfficeofEnvironmentalJustice/Pages/PA-Environmental-Justice-Areas.aspx>

<sup>52</sup> The New York State Department of Conservation defines an urban EJ area as any census block group that meets one or more of these criteria: 52.42 percent of the population identify as a racial/ethnic minority; or 22.82 percent or more lives at or below the poverty line. See: <https://www.dec.ny.gov/public/911.html>

- 20 percent or more of the population lives at or below the federal poverty line (\$25,926 for a family of four with two children);<sup>53</sup> **AND**
- 60 percent or more of the population identifies as a race other than non-Hispanic/Latinx white.<sup>54</sup>

Based on this new definition, 51 of the District’s 179 census tracts (28 percent), are identified as EJ communities (see Figure 10). More than 70 percent of EJ census tracts are in Wards 7 and 8, zero are in Wards 2 and 3, and less than 10 percent each are located in each of the other wards.

**Figure 10. Environmental Justice communities in the District of Columbia**



Data sources: U.S. Census. 2019. ACS 5-Year Estimates Subject Tables. [TableID: S1701, B03002].

Our analysis finds that census tracts meeting this EJ definition make up 27 percent of the District’s total population. Of the District’s 179 census tracts, 56 have a population with 20 percent or more individuals living below the poverty line, 97 have populations with 60 percent or more individuals identifying as racial/ethnic minorities, and 51 meet both the poverty and racial/ethnic minority criteria and are, therefore, classified as EJ under the OPC definition. Wards 7 and 8 contain the majority of EJ-designated

<sup>53</sup> US Census. 2019. “Poverty Thresholds.” Available at: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>

<sup>54</sup> AEC created the GIS layer for EJ communities using data on poverty and race from the U.S. Census’ 2019 ACS 5-year estimates to identify census tracts that meet the criteria above.

census tracts, due to both high poverty rates and high racial/ethnic minority population (see Table 4).

**Table 4. Environmental Justice census tracts by ward**

EJ Criterion		Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District
20 percent or more of the population live above poverty line	#	3	3	0	2	6	5	17	20	56
	%	18%	15%	0%	9%	24%	18%	68%	83%	31%
60 percent or more of population identifies as a racial-ethnic minority	#	8	0	0	18	19	4	25	23	97
	%	47%	0%	0%	82%	76%	14%	100%	96%	54%
Census tracts that meet both of the criteria above	#	3	0	0	2	5	4	17	20	51
	%	18%	0%	0%	9%	20%	14%	68%	83%	28%

Data sources: U.S. Census. 2019. ACS 5-Year Estimates Subject Tables. [TableID: S1701, S1602, B03002].

As we demonstrated above in Section II, vulnerabilities tend to intersect and compound throughout the District. That is, Wards (and specific neighborhoods within Wards) that exhibit one kind of vulnerability—such as low-income—are more likely to have other vulnerability characteristics, like high poverty rates or high shares of racial/ethnic minorities. This EJ designation is a good indicator of compounded vulnerabilities. The vast majority of the District’s residents are vulnerable to worsening and accelerating climate impacts as well as an inequitable distribution of costs and benefits that may arise from efforts to reduce greenhouse gas emissions.

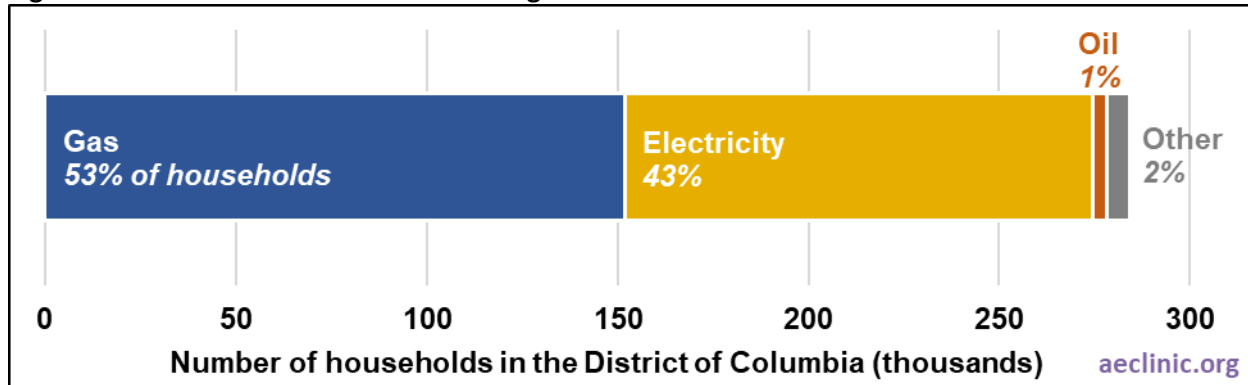
## IV. Existing Electrification Programs

The District used 168 trillion Btus of energy in 2019: 68 percent of which was derived from electricity and 27 percent was derived from gas.<sup>55</sup> Roughly 53 percent of homes in the District use gas as their primary heating fuel, while about 43 percent heat with electricity (mostly old-fashioned electric resistance heating, not modern heat pumps; see Figure 11). The remaining 3 to 4 percent of households use heating oil or other sources (like biomass or solar), or do not use any heating fuels. About 16 percent of electric customers in the District get their electric service from third-party suppliers while the remaining 84 percent purchase energy from Pepco, the District’s public electric utility company.<sup>56</sup>

<sup>55</sup> US EIA. 2019. “District of Columbia State Profile and Energy Estimates.” Available at: <https://www.eia.gov/state/?sid=DC>

<sup>56</sup> Pepco. February 2021. *Potomac Electric Power Company’s Monthly Market Monitoring Report*.

**Figure 11. 2019 District of Columbia heating fuels**



Data source: U.S. Census. 2019. ACS 5-Year Estimates Detailed Tables [Table ID: B25040].

The District is committed to decarbonization, aiming to reduce total greenhouse gas emissions to 50 percent of baseline emission levels by 2032 and to reach net-zero emissions by 2050.<sup>57</sup> The DC Department of Energy and Environment's proposed Carbon Free DC 2050<sup>58</sup> plan to achieve carbon neutrality includes a substantial reduction in emissions from buildings and transportation, which were each responsible for about 20 percent of the District's total greenhouse emissions in 2019.<sup>59</sup>

Beyond increasing the share of electricity generated from renewable sources, electrification of buildings and transportation is one option for decarbonizing these sectors. Programs that aim to decarbonize the buildings and transportation sectors have the potential to provide substantial benefits to the District's most vulnerable communities.

## Buildings

As part of the CleanEnergy DC Omnibus Amendment Act of 2018,<sup>60</sup> the Council of the District of Columbia introduced Building and Energy Performance Standards (BEPS). In January 2021, DOEE launches the BEPS program with an initial set of requirements that implements energy performance standards for privately owned buildings greater than 50,000 sq. ft. and District-owned buildings greater than 10,000 sq. ft. To put this in perspective, the average size of a commercial building in the United States is roughly 16,000 sq. ft..<sup>61</sup> According to U.S. Energy Information Administration (EIA) data, only about 7 percent of commercial buildings in the South Atlantic region were greater than 50,000 sq. ft. in 2018.<sup>62</sup> Based on the BEPS database, the average size of buildings currently required to comply with the standard is approximately 173,000 sq. ft.<sup>63</sup>

<sup>57</sup> DC DOEE. n.d. "Greenhouse Gas Inventories." Available at: <https://doee.dc.gov/service/greenhouse-gas-inventories>

<sup>58</sup> DC DOEE. n.d. *Carbon Free DC by 2050*. Available at: <https://doee.dc.gov/service/climate-change>

<sup>59</sup> Ibid.

<sup>60</sup> DC Law 22-257. *CleanEnergy DC Omnibus Amendment Act of 2018*. Available at: <https://code.dccouncil.us/dc/council/laws/22-257.html>

<sup>61</sup> US EIA. 2018. "Commercial Buildings Energy Consumption Survey (CBECS)" [Table B.1]. Available at: <https://www.eia.gov/consumption/commercial/data/2018/bc/html/b1.php>

<sup>62</sup> US EIA. 2018. "Commercial Buildings Energy Consumption Survey (CBECS)" [Table B.4]. Available at: <https://www.eia.gov/consumption/commercial/data/2018/bc/html/b4.php>

<sup>63</sup> DC Open Data. 2021. "Building Energy Performance." Available at: <https://opendata.dc.gov/datasets/building-energy-performance/explore>

BEPS will apply for all new buildings 25,000 sq. ft. and larger constructed after 2023 and all new buildings 10,000 sq. ft. and larger constructed after 2026.<sup>64</sup> In addition, DOEE has proposed several milestones for decarbonizing the building sector:

- requiring net-zero construction of new homes and buildings by 2026,
- replacing all heat and hot water systems with electric systems by 2035, and
- requiring that 70 percent of existing homes be all-electric by 2040.<sup>65</sup>

To track compliance with the BEPS, DOEE has created a publicly accessible database of all buildings currently covered by the program, their compliance status, and their estimated performance requirements.<sup>66</sup> About 44 percent of all District buildings required to comply with BEPS are already in compliance in advance of the proposed first reporting requirement date of April 1, 2023.<sup>67</sup> Buildings are deemed BEPS compliant based on their ENERGY STAR score or, for buildings without ENERGY STAR scores, their energy use intensity (EUI).<sup>68</sup> The EUI is the total amount of energy used in a year divided by the size of the building.<sup>69</sup> The minimum ENERGY STAR and/or EUI is based on property type.<sup>70</sup>

In Ward 8, the average ENERGY STAR score is lower and the average EUI is higher than the District average (see Table 5 below): More energy is used per square foot to power and heat homes and offices.<sup>71</sup> As a consequence, these wards stand to benefit most from BEPS as buildings are upgraded to meet the standard; this is especially important in Wards 7 and 8 where a disproportionate number of households are below the poverty line and suffer higher energy burdens.

On the residential side, the DOEE has proposed utilizing modern electric heat pumps for heating and cooling systems to achieve reductions in building emissions.<sup>72</sup> To incentivize heat pump adoption, the DCSEU provides rebates to residents and businesses purchasing electric heat pumps and heat pump water heaters.<sup>73</sup> The current rebate for air-source heat pumps ranges from \$375 to \$700 depending on efficiency level while the rebate for water heater electric heat pumps is \$600.<sup>74</sup>

<sup>64</sup> (1) DC DOEE. n.d. "Building Energy Performance Standards (BEPS)." Available at: <https://doee.dc.gov/node/1406676>; (2) DC Law 22-257. *CleanEnergy DC Omnibus Amendment Act of 2018*. Available at: <https://code.dccouncil.us/dc/council/laws/22-257.html>

<sup>65</sup> DC DOEE. n.d. *Carbon Free DC 2050 Buildings Overview* [Presentation]. Available at: [https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service\\_content/attachments/Carbon%20Free%20DC%202050\\_Buildings%20Overview.pdf](https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/Carbon%20Free%20DC%202050_Buildings%20Overview.pdf), p. 22

<sup>66</sup> DC DOEE. n.d. "Does My Building Meet the BEPs?" Available at: <https://doee.dc.gov/node/1550346>

<sup>67</sup> (1) DC Open Data. 2021. "Building Energy Performance." Available at: <https://opendata.dc.gov/datasets/building-energy-performance/explore>; (2) DC DOEE. n.d. "Building Energy Performance Standards (BEPS)." Available at: <https://doee.dc.gov/node/1406676>

<sup>68</sup> DC DOEE. n.d. "Building Energy Performance Standards (BEPS)." Available at: <https://doee.dc.gov/node/1406676>

<sup>69</sup> ENERGY STAR. n.d. "What is Energy Use Intensity (EUI)?" Available at: [https://www.energystar.gov/buildings/benchmark/understand\\_metrics/what\\_eui](https://www.energystar.gov/buildings/benchmark/understand_metrics/what_eui)

<sup>70</sup> DC DOEE. January 2021. *Establishment of the 2021 Building Energy Performance Standards – Emergency and Proposed Rulemaking*. Available at: <https://doee.dc.gov/node/1537071>

<sup>71</sup> DC Open Data. 2021. "Building Energy Performance." Available at: <https://opendata.dc.gov/datasets/building-energy-performance/explore>

<sup>72</sup> DC DOEE. August 2018. *Clean Energy DC*. p. 62. Available at: [https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page\\_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report\\_0.pdf](https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report_0.pdf)

<sup>73</sup> DCSEU. n.d. "Appliance and HVAC Rebates." Available at: <https://www.dcseu.com/homes/appliance-rebates?target>

<sup>74</sup> DCSEU. 2021. "Home Heating and Cooling." Available at: <https://www.dcseu.com/homes/home-heating-cooling>



**Table 5. Average building energy performance indicators by ward**

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District
<b>Median Building Age</b>	1939	1963	1950	1942	1949	1962	1955	1964	<b>1953</b>
<b>Average ENERGY STAR Score</b>	63	66	63	54	52	64	51	55	<b>63</b>
<b>Average Energy Use Intensity (kBtu/ft)</b>	175	202	204	169	173	203	184	203	<b>191</b>
<b>In Compliance with BEPS (%)</b>	49%	46%	42%	44%	40%	45%	38%	36%	<b>44%</b>

Data source: (1) DC Open Data. 2021. "Building Energy Performance." Available at: <https://opendata.dc.gov/datasets/building-energy-performance/explore>; (2) US Census. 2019. ACS 5-Year Estimates Subject Tables [TableID: B25035].

DCSEU has supported thousands of heat pump installations in the District through their rebate programs.<sup>75</sup> Funding for DCSEU programs comes from the Sustainable Energy Trust Fund and the Renewable Energy Development Fund; the former is financed through surcharges on gas and electric ratepayers and the latter is financed by payments from energy suppliers.<sup>76</sup> While the location of over a thousand heat pumps is not recorded in DCSEU data, more than a third of heat pumps installed between FY 2017 and FY 2021 were located in Wards 7 and 8 (see Table 6); for comparison, these two wards together house 22 percent of the District's population.

**Table 6. Residential heat pumps installed through DCSEU rebate programs**

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	Unknown	District
<b>Residential Heat Pumps</b>	107	193	12	115	335	240	431	759	1,065	<b>3,257</b>
<b>Share of Heat Pumps (%)</b>	3%	6%	0%	4%	10%	7%	13%	23%	33%	<b>100%</b>
<b>Share of Households (%)</b>	13%	13%	13%	11%	12%	16%	11%	11%	-	<b>100%</b>

Data source: Retrieved via email from Ted Trabue (DCSEU) on November 3, 2021.

Zero-carbon distributed generation (usually rooftop solar panels) is another important component in the District's decarbonization progress. The District's Renewable Energy Portfolio Standard (RPS)<sup>77</sup>—administered by the Public Service Commission (PSC)—requires that electric distributors purchase Renewable Energy Credits (RECs) equal to an increasing share of their electric sales. Pepco and third-party electric distributors can comply with the District's RPS by purchasing RECs from renewable generation facilities both inside and outside of the District (but interconnected to the DC grid),<sup>78</sup> or through

<sup>75</sup> DCSEU. n.d. "Appliance and HVAC Rebates." Available at: <https://www.dcseu.com/homes/appliance-rebates?target>

<sup>76</sup> DCSEU. n.d. "About the DCSEU." Available at: <https://www.dcseu.com/about>

<sup>77</sup> DC Law 34-1432. Renewable energy portfolio standard. Available at: <https://code.dccouncil.us/us/dc/council/code/sections/34-1432.html>

<sup>78</sup> RECs may be purchased from solar energy systems outside of the District that are interconnected to the distribution grid serving the District. See: DC Law 34-1432. Renewable energy portfolio standard. Available at: <https://code.dccouncil.us/us/dc/council/code/sections/34-1432.html>

compliance payments.<sup>79</sup> In accordance with the CleanEnergy DC Omnibus Amendment Act of 2018,<sup>80</sup> the RPS requires 100 percent of retail electricity sales in the District to be sourced from renewable energy sources by 2032, with at least 5.5 percent derived from solar energy. From 2032 onwards, the percentage of retail electricity sales required to be sourced from solar sources increases annually, up to 10 percent by 2041.<sup>81</sup>

Compliance fees collected through the RPS program are directed to the Renewable Energy Development Fund, which contributes to several programs including DCSEU programs and the Solar for All program,<sup>82</sup> established in the Renewable Portfolio Standard Expansion Act of 2016.<sup>83</sup> This program aims to bring solar generation to 100,000 low-to-moderate income families reducing their energy bills by 50 percent by 2032.<sup>84</sup> In FY 2019, the Solar for All program installed about 7 MW of new solar (benefitting about 8,600 households),<sup>85</sup> up from just 1 MW of new solar installed in FY 2018.<sup>86</sup> (The 1 MW of installed solar reported for FY 2018 includes a 651 kW solar system located on the Winn Companies' Atlantic Terrace property in Ward 8 that was installed in 2017.<sup>87</sup>) More recently, a 2.6 MW community solar system in Ward 8 was brought online in December 2020.<sup>88</sup> In addition, DCSEU will be launching a new Low-Income Decarbonization Pilot<sup>89</sup> program, funded through the Solar For All program, which will install solar PV systems, replace existing gas or oil systems with electric systems, and provide other retrofits in about 15 single-family homes owned or rented by low-income residents.

As of April 2021 (the most recent data available from the PSC), there were over 8,000 solar energy systems eligible to meet the District's solar RPS requirement for a total of 131 MW of solar capacity within the District (see Figure 12).<sup>90</sup> Only about 1.3 percent of solar energy systems in the District are solar thermal, with the majority composed of solar photovoltaic (PV) systems.<sup>91</sup> Included in those systems are 164 community renewable energy facilities (CREFs)<sup>92</sup> with a combined capacity of 19.4 MW.<sup>93</sup> CREFs generate electricity from renewable sources, like solar, that is fed into the electric grid as part of Pepco's energy

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<sup>79</sup> DC PSC. May 2021. *2021 Renewable Energy Portfolio Standard Report*. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

<sup>80</sup> DC Law 22-257. *CleanEnergy DC Omnibus Amendment Act of 2018*. Available at: <https://code.dccouncil.us/dc/council/laws/22-257.html>

<sup>81</sup> Ibid.

<sup>82</sup> DC PSC. May 2021. *2021 Renewable Energy Portfolio Standard Report*. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

<sup>83</sup> DC Law 21-154. *Renewable Portfolio Standard Expansion Amendment Act of 2016*. Available at: <https://code.dccouncil.us/us/dc/council/laws/21-154#%C2%A74>

<sup>84</sup> DC DOEE. n.d. "Solar for All." Available at: <https://doee.dc.gov/node/1226501>

<sup>85</sup> DC DOEE. February 2020. *FY 2019 Solar for All Annual Report*. Available at: <https://doee.dc.gov/node/1226501>

<sup>86</sup> DC DOEE. January 2019. *FY 2018 Solar for All Annual Report*. Available at: <https://doee.dc.gov/node/1226501>

<sup>87</sup> Ibid.

<sup>88</sup> DC DOEE. n.d. "Community Solar at Oxon Run." Available at: <https://doee.dc.gov/service/oxonrunsolar>

<sup>89</sup> DC Sustainable Energy Utility. "Low-Income Decarbonization Pilot." Available at: <https://www.dcseu.com/low-income-decarbonization-pilot>

<sup>90</sup> DC PSC. May 2021. *2021 Renewable Energy Portfolio Standard Report*. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

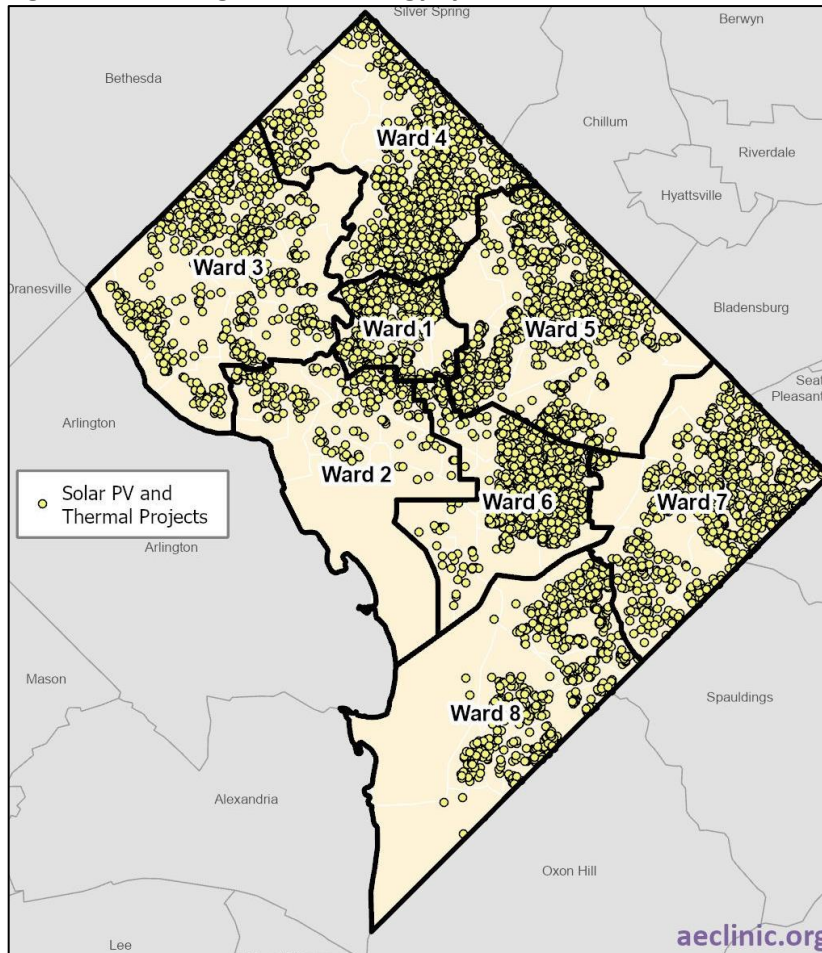
<sup>91</sup> Ibid.

<sup>92</sup> Community renewable energy facilities have at least 2 subscribers and produce less than 5 MW of electricity. See: DC Law 34-1518.01. *Community renewable energy facilities*. Available at: <https://code.dccouncil.us/us/dc/council/code/sections/34-1518.01.html>

<sup>93</sup> DC PSC. n.d. *2021 Renewable Energy Portfolio Standard Report*. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

supply. Pepco customers can then purchase a subscription for a portion of electricity generated from the CREF in exchange for a credit on their bills.<sup>94</sup>

**Figure 12. RPS-eligible solar energy systems in the District of Columbia**



Data source: Retrieved via email from Roger Fujihara (DC PSC) on October 26, 2021. Solar energy systems as of December 2020: includes about 7,700 solar energy systems.

<sup>94</sup> Pepco. n.d. "Community Energy." Available at: <https://www.pepco.com/MyAccount/MyService/Pages/DC/CommunityEnergy.aspx>

Solar generators in the District are not distributed evenly across wards; there is significantly more solar in Wards 4, 5, 6, and 7 (see Table 7 below).

**Table 7. RPS-eligible solar energy systems by ward<sup>95</sup>**

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District
<b>Number of RPS-eligible generators</b>	817	287	838	1,725	1,488	1,462	1,254	790	<b>8,661</b>
<b>Capacity (MW)</b>	8	6	12	18	25	18	18	26	<b>131</b>
<b>Average capacity per generator (kW / unit)</b>	9.67	21.25	14.20	10.43	16.47	12.38	14.67	32.41	<b>15.07</b>

Data source: DC PSC. May 2021. 2021 Renewable Energy Portfolio Standard Report. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

However, in terms of total capacity, both Wards 5 and 8 have the most solar megawatts (MW), suggesting that solar energy systems are, on average, larger in these wards and are able to produce more electricity than any other Ward's solar sources (see Figure 13 below).<sup>96</sup> The combined capacity of the District's solar generators is about 131 MW,<sup>97</sup> or about 6 percent of Pepco's 2021 peak demand (2,110 MW).<sup>98</sup> We estimate annual solar generation from RPS-eligible solar energy systems to be about 180,000 MWh based on an assumed 15.7 percent capacity factor,<sup>99</sup> which is about 90 percent of the District's net electricity generation (about 200,000 MWh as reported by EIA) and 2 percent of the District's retail electricity sales in 2020.<sup>100</sup>

<sup>95</sup> Data on RPS-eligible systems as of December 2020 was retrieved via email from Roger Fujihara (DC PSC) on October 26, 2021. Data reported in Table 3 reflect the most recent data on RPS-eligible solar systems by ward as reported in DC PSC's May 2021 RPS report.

<sup>96</sup> Capacity (MW) was converted to electricity generation (MWh) using a capacity factor of 15.7 percent. See: Camp, E., Havunmaki, B. Vitolo, T., and Whited, M. May 2020. Future of Solar PV in the District of Columbia. Prepared for the District of Columbia Office of the People's Counsel. Available at: [https://opc-dc.gov/images/pdf/solar/OPCs\\_Study\\_on\\_Future\\_of\\_Solar\\_PV\\_in\\_the\\_District\\_of\\_Columbia.pdf](https://opc-dc.gov/images/pdf/solar/OPCs_Study_on_Future_of_Solar_PV_in_the_District_of_Columbia.pdf)

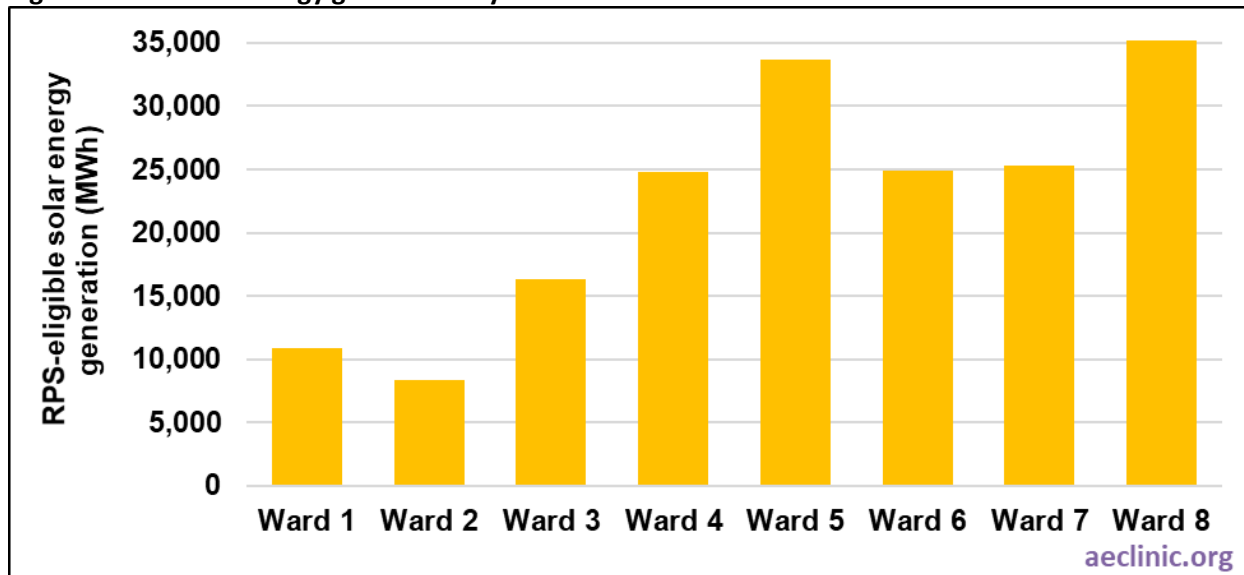
<sup>97</sup> DC PSC. May 2021. 2021 Renewable Energy Portfolio Standard Report. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>

<sup>98</sup> Hledik, P., Sergici, S., Hagerty, M., and Olszewski, J.. August 2021. An Assessment of Electrification Impacts on the Pepco DC System. Brattle. Prepared for Pepco. Available at: <https://www.pepco.com/Documents/1167%20Pepco's%20Electrification%20Study%20%20082721.pdf>

<sup>99</sup> (1) Capacity: DC PSC. May 2021. 2021 Renewable Energy Portfolio Standard Report. Available at: <https://dcpsec.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>. (2) Capacity factor: Camp, E., Havunmaki, B. Vitolo, T., and Whited, M. May 2020. Future of Solar PV in the District of Columbia. Prepared for the District of Columbia Office of the People's Counsel. Available at: [https://opc-dc.gov/images/pdf/solar/OPCs\\_Study\\_on\\_Future\\_of\\_Solar\\_PV\\_in\\_the\\_District\\_of\\_Columbia.pdf](https://opc-dc.gov/images/pdf/solar/OPCs_Study_on_Future_of_Solar_PV_in_the_District_of_Columbia.pdf)

<sup>100</sup> US EIA. 2020. "State Electricity Profiles." Available at: <https://www.eia.gov/electricity/state/>

**Figure 13. DC solar energy generation by ward**



Data sources: (1) Capacity: DC PSC. May 2021. 2021 Renewable Energy Portfolio Standard Report. Available at: <https://dcpsc.org/Orders-and-Regulations/PSC-Reports-to-the-DC-Council/Renewable-Energy-Portfolio-Standard.aspx>. (2) Capacity factor: Camp, E., Havunmaki, B. Vitolo, T., and Whited, M. May 2020. Future of Solar PV in the District of Columbia. Prepared for the District of Columbia Office of the People's Counsel. Available at: [https://opc-dc.gov/images/pdf/solar/OPCs\\_Study\\_on\\_Future\\_of\\_Solar\\_PV\\_in\\_the\\_District\\_of\\_Columbia.pdf](https://opc-dc.gov/images/pdf/solar/OPCs_Study_on_Future_of_Solar_PV_in_the_District_of_Columbia.pdf)

## Transportation

In 2019, the transportation sector was responsible for 24 percent of the District's total greenhouse gas emissions.<sup>101</sup> In an effort to achieve carbon neutrality by 2050, the CleanEnergy DC Omnibus Amendment Act of 2018<sup>102</sup> calls for, among other things, 25 percent zero-emission vehicle registrations by 2035 and 50 percent of public buses to be low or zero emission vehicles by 2030.<sup>103</sup> To achieve these targets, DOEE is leading the development of a transportation electrification roadmap, which was scheduled to be released in summer of 2021 but was delayed and will likely be released in Winter 2022.<sup>104</sup> In addition, DOEE aims to reduce emissions in the transportation sector by:

- ensuring 75 percent of commute trips are made without a car by 2032, and
- requiring all new cars registered in 2045 and later to be electric vehicles (EV).<sup>105</sup>

The District's subway system, Metrorail, is composed of over 1,200 electric subway cars, making it the

<sup>101</sup> DC DOEE. 2021. 2006-2019 Greenhouse Gas Inventories [Workbook]. Available at: <https://doee.dc.gov/service/greenhouse-gas-inventories>

<sup>102</sup> D.C. Law 22-257. CleanEnergy DC Omnibus Amendment Act of 2018. Available at: <https://code.dccouncil.us/dc/council/laws/22-257.html>

<sup>103</sup> Ibid.

<sup>104</sup> DC DOEE. n.d. "Clean Transportation Initiatives". Available at: <https://doee.dc.gov/service/clean-transportation-initiatives>

<sup>105</sup> DC DOEE. n.d. Carbon Free DC 2050 Transportation Overview [Presentation]. Available at: [https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service\\_content/attachments/Carbon%20Free%20DC%202050\\_Transportation%20Overview.pdf](https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/Carbon%20Free%20DC%202050_Transportation%20Overview.pdf). p. 22



region's largest EV fleet.<sup>106</sup> In accordance with the CleanEnergy DC Omnibus Amendment Act of 2018,<sup>107</sup> all public buses in the District will be zero-emission vehicles by 2045. The Metro bus system—diesel and hybrid vehicles that provide bus transportation all over the District (see Figure 14 below)—will begin to incorporate lower-emission and electric buses starting in 2023; by 2038, about two-thirds of the Metrobus fleet will be zero-emissions.<sup>108</sup> As of September 2021, the Washington Metropolitan Area Transit Authority (WMATA) has initiated the Electric Bus Test and Evaluation project, receiving \$4.2 million from the Federal Transit Administration (FTA) Low or No Emission Program<sup>109</sup> grant.<sup>110</sup> In 2022, WMATA will conduct a bus “test and evaluation” to assess the capabilities of different vehicle and charging manufacturers. The upcoming bus test and evaluation will roll out 12 electric buses at the Metro’s Shepherd Parkway Bus Division in Ward 8. This location was chosen because the Division is located in an Opportunity Zone,<sup>111</sup> a low-income and economically distressed community, and because the Division serves a variety of routes across DC, Maryland, and Virginia.<sup>112</sup> In September 2021, following a neighborhood campaign, WMATA announced that Metro’s Northern Bus Garage will be the first all-electric bus garage in the DC area.<sup>113</sup>

In addition, the DC Circulator, which provides bus transportation to the District’s main attractions, currently has a mix of electric, hybrid, and diesel buses.<sup>114</sup> As of April 2018, the DC Circulator bus system had 14 electric buses carrying 4.8 million riders annually and displacing 244,000 pounds of CO<sub>2</sub> emissions each year.<sup>115</sup> These 14 buses alone are expected to generate \$6 million in maintenance cost savings over their 12-year lifetime.<sup>116</sup>

Pepco offers EV incentives through their EVsmart program.<sup>117</sup> Pepco’s EVsmart Public Charging Make-Ready Program provides “make-ready” charging infrastructure for non-residential customers that can host, own, or operate a new vehicle charging station for public use.<sup>118</sup> The Public Charging Make-Ready Program supports installations at commercial sites that are available to the public as well as government-owned sites.<sup>119</sup> This program is funded through the Innovation Fund and Technology Demonstration program

<sup>106</sup> WMATA. n.d. “Zero-Emission Buses.” Available at: <https://www.wmata.com/initiatives/plans/zero-emission-buses.cfm>

<sup>107</sup> D.C. Law 22-257. CleanEnergy DC Omnibus Amendment Act of 2018. Available at: <https://code.dccouncil.us/dc/council/laws/22-257.html>

<sup>108</sup> WMATA. n.d. “Zero-Emission Buses.” Available at: <https://www.wmata.com/initiatives/plans/zero-emission-buses.cfm>

<sup>109</sup> FTA. 2021. “Low or No Emission Vehicle Program.” Available at: <https://www.transit.dot.gov/lowno>

<sup>110</sup> WMATA. 2021. *2021 Zero-Emission Bus Update*. Available at: <https://www.wmata.com/initiatives/plans/zero-emission-buses.cfm>

<sup>111</sup> US Department of Transportation. n.d. “Opportunity Zones.” Available at:

<https://datahub.transportation.gov/stories/s/Opportunity-Zones/s6m7-dg9c/>

<sup>112</sup> WMATA. n.d. “Zero-Emission Buses.” Available at: <https://www.wmata.com/initiatives/plans/zero-emission-buses.cfm>

<sup>113</sup> Pascale, J. September 21, 2021. “WMATA Will Put Electric Buses At Northern Bus Garage After Neighborhood Campaign.” Available at: <https://www.npr.org/local/305/2021/09/21/1039353504/w-m-a-t-a-will-put-electric-buses-at-northern-bus-garage-after-neighborhood-campaign>

<sup>114</sup> DC Circulator. n.d. “Meet the Fleet.” Available at: <https://www.dccirculator.com/meet-the-fleet/#>

<sup>115</sup> Owens, T. April 20, 2018. “Washington D.C. Circulator Deploys Proterra Battery-electric Buses Across Nation’s Capital”. Proterra. Available at: <https://www.proterra.com/press-release/washington-d-c-circulator-deploys-proterra-battery-electric-buses-across-nations-capital/>

<sup>116</sup> Ibid.

<sup>117</sup> Pepco. n.d. “EVsmart.” Available at:

<https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/ElectricVehicleProgramDC.aspx>

<sup>118</sup> Pepco. n.d. “Frequently Asked Questions.” Available at:

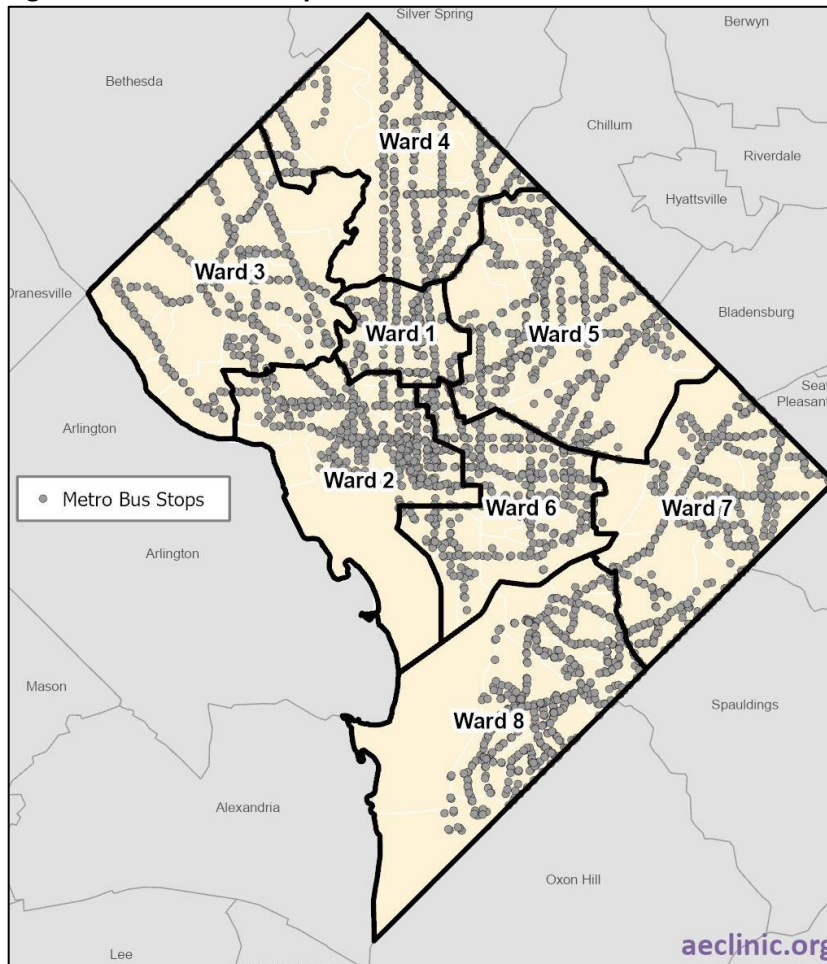
[https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs\\_DC.aspx](https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs_DC.aspx)

<sup>119</sup> Pepco. n.d. *Pepco Public Charging Make-Ready Program*. Available at:

<https://www.pepco.com/Documents/public%20charging%20make%20ready%20program.pdf>

which are funded by the District’s Modernizing the Energy Delivery System for Increase Sustainability (MEDSIS) budget.<sup>120</sup> Pepco is also states that it is working towards providing charging infrastructure for electric buses, taxis, and ride-share vehicles.<sup>121</sup>

**Figure 14. Metro bus stops in the District of Columbia**



Data source: DC Open Data. 2021. “Metro Bus Stops.” Available at: <https://opendata.dc.gov/datasets/metro-bus-stops/explore?location=38.892512%2C-77.020630%2C12.65>

On the residential side, the EVsmart Residential Plug-In Vehicle Rate (R-PIV) offers lower rates for residential customers with plug-in vehicles that shift most of their energy use to off-peak<sup>122</sup> hours.<sup>123</sup> More specifically, the R-PIV is higher during on-peak hours than the standard rate but lower than the standard rate during off-peak hours. R-PIV customers can also opt for the Plug-In Vehicle Green Rider (PIV-Green) to

<sup>120</sup> Pepco. 2019. *The Investigation into Modernizing the Energy Delivery System for Increased Sustainability And The Application of the Potomac Electric Power Company for Approval of its Transportation Electrification Program*. Formal Case No’s 1130 and 1155. p.3. Available at: <https://edocket.dcpso.org/apis/api/filing/download?attachId=84766&guidFileName=db9570ae-6b46-43be-854a-a0b2c6670216.pdf>

<sup>121</sup> Pepco. n.d. “EVsmart.” Available at: <https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/ElectricVehicleProgramDC.aspx>

<sup>122</sup> On-peak hours are Monday through Friday from 12:00pm to 8:00pm (excluding holidays).

<sup>123</sup> Pepco. n.d. “Frequently Asked Questions.” Available at: [https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs\\_DC.aspx](https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs_DC.aspx)

receive 100 percent renewable energy supply for an additional \$0.03249 per kilowatt-hour on top of the R-PIV rate.<sup>124</sup> Customers with net metering are eligible R-PIV and PIV-Green but those who reside in a master-metered apartment are not.<sup>125</sup> Pepco intends to recover the cost of these programs through electricity rates.<sup>126</sup>

In addition to Pepco's offerings, the Office of Tax and Revenue and Department of Motor Vehicles provide:

- Alternative fuel vehicle (AFV) conversion tax credits,
- Reduced registration fees for alternative fuel and fuel-efficient vehicles,
- Plug-In electric vehicle (PEV) title excise tax exemptions, and
- Alternative fuel vehicle exemptions from driving restrictions.<sup>127</sup>

Ten public EV charging stations have been installed under Pepco's EVsmart Public Charging Make-Ready Program, with two each located in Wards 1, 3, and 8, and 4 EV charging stations in Ward 6. There are another four stations in the design phase and five stations under construction. In addition, nine residential customers are enrolled in the Residential Plug-In Vehicle Rate (R-PIV) program.<sup>128</sup>

In addition to Pepco's efforts, there are almost 300 EV charging stations in the District, more than four-fifths of which are public. More than half of these charging stations are located in Ward 2 and only 4 percent are located in Wards 7 and 8 combined (see Figure 15, below, which includes all current public and private EV charging stations).<sup>129</sup>

There are almost 3,000 EVs registered in the District, more than half of which are registered in Wards 1, 2, and 3 (see Table 8 below). Only 5 percent of the District's EVs are registered in Wards 7 and 8.<sup>130</sup>

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<sup>124</sup> Pepco. 2021. "Current Tariffs." Available at: <https://www.pepco.com/MyAccount/MyBillUsage/Pages/DC/CurrentTariffsDC.aspx>

<sup>125</sup> Pepco. n.d. "Frequently Asked Questions." Available at: [https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs\\_DC.aspx](https://www.pepco.com/SmartEnergy/InnovationTechnology/Pages/EVsmartFAQs_DC.aspx)

<sup>126</sup> Ibid.

<sup>127</sup> U.S. Department of Energy Alternative Fuels Data Center. n.d. "District of Columbia Laws and Incentives." Available at: <https://afdc.energy.gov/laws/all?state=DC>

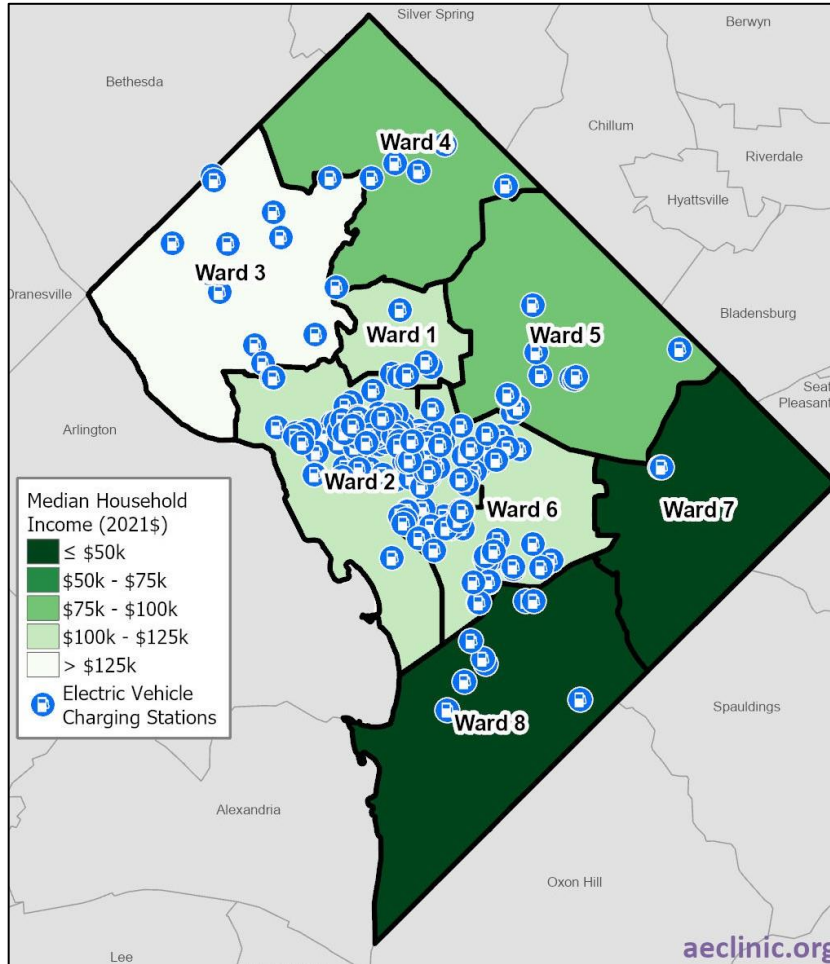
<sup>128</sup> Pepco. October 14, 2021. *Quarterly Report on the Implementation of the Transportation Electrification Program*. Available at: <https://edocket.dcpso.org/apis/api/Filing/download?attachId=142081&guidFileName=7745e5b8-f53e-45ac-8b9c-260fb9df753d.pdf>

<sup>129</sup> Retrieved via email from Eric Cambell (DC DOEE) on October 20, 2021.

<sup>130</sup> Pepco. October 14, 2021. *Quarterly Report on the Implementation of the Transportation Electrification Program*. Available at: <https://edocket.dcpso.org/apis/api/Filing/download?attachId=142081&guidFileName=7745e5b8-f53e-45ac-8b9c-260fb9df753d.pdf>



**Figure 15. Electric vehicle charging stations in the District of Columbia**



Data sources: (1) Electric vehicle charging stations retrieved via email from Eric Cambell (DC DOEE) on October 20, 2021; (2) Median Household Income: US Census. 2019. ACS 5-Year Estimates Subject Tables [TableID: S1903].

**Table 8. Electric vehicle registrations and charging stations in the District of Columbia**

Electric Vehicles		Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	District
Registrations	#	334	371	787	524	418	229	59	83	2,805
	%	12%	13%	28%	19%	15%	8%	2%	3%	100%
Charging Stations	#	5	157	13	5	20	75	2	9	286
	%	2%	55%	5%	2%	7%	26%	1%	3%	100%

Sources: (1) Registrations: Pepco. October 14, 2021. Quarterly Report on the Implementation of the Transportation Electrification Program. Available at: <https://edocket.dcpssc.org/apis/api/Filing/download?attachId=142081&quidFileName=7745e5b8-f53e-45ac-8b9c-260fb9df753d.pdf>; (2) Charging stations: Retrieved via email from Eric Campbell (DC DOEE) on October 20, 2021

## V. Active Transportation

Active transportation is an essential complement to decarbonization efforts: decarbonization is facilitated by widely available non-motorized transport options like safe walking corridors and bike-sharing programs because they encourage alternative transportation to gas-fueled vehicles.

Approved in 2018 and currently being updated for finalization in 2022,<sup>131</sup> “Visualize 2045”<sup>132</sup> is the long-range transportation plan for the National Capital Region, including the District of Columbia and areas of Virginia and Maryland. Developed by the National Capital Region Transportation Board (TPB), the plan’s initiatives include active transportation goals like improving walking and biking options, addressing safety concerns, and completing the National Capital Trail, which would circle the inner District with a path separated from road traffic.<sup>133</sup> The TPB plan aims to increase bike and walking trips by about 50 percent by 2045.<sup>134</sup>

The District also participates in the Safe Routes Partnership, a national nonprofit organization that works to ensure safe travel by foot, bus, or bike in everyday life,<sup>135</sup> and—in 2019—the District Department of Transportation published its “Vision Zero” policy to design safer streets and communities to reduce injuries and fatalities.<sup>136</sup> The policy focused on communities in Wards 7 and 8 that have a high number of traffic related injuries and fatalities.<sup>137</sup> The Safe Routes Partnership aims to improve connectivity between bike trails; implement traffic calming interventions; increase funding for school traffic garden projects and bike education; collaborate with community members during implementation; engage local arts partners in safety events; and fund grants and safety projects run by Ward 7 and 8 residents.<sup>138</sup>

The District also contracts with a private company called Motivate to run its bike share program, “Capital Bikeshare,” that includes 4,500 bikes at more than 500 stations across the city.<sup>139</sup> Twenty-four-hour passes are available for \$8, and memberships start at \$7 per month. Members receive unlimited 30-minute bike rides—after the first 30 minutes, each additional 30 minutes incurs a fee.<sup>140</sup> A May 2020 report on the program’s performance found that “overall ridership between 2016 and 2019 has averaged a 2 percent annual growth rate”<sup>141</sup> and that bikeshare members were most likely to be young, male, higher income and white. To ensure the bikeshare program is affordable and accessible, reduced membership rates are available through the Capital Bikeshare for All program for low-income residents. Capital Bikeshare for All is also planning on increasing “marketing and outreach efforts to promote low-income assistance

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<sup>131</sup> TPB. n.d. *Visualize 2045*. Available at: <https://visualize2045.org/>.

<sup>132</sup> TPB. 2018. *Visualize 2045: A Long-Range Transportation Plan for the National Capital Region*. Metropolitan Washington Council of Governments. Available at: [https://www.mwcog.org/assets/1/28/Visualize\\_2045\\_Plan\\_2018\\_10\\_23\\_No\\_Crops\\_Single.pdf](https://www.mwcog.org/assets/1/28/Visualize_2045_Plan_2018_10_23_No_Crops_Single.pdf).

<sup>133</sup> Ibid. p. 43

<sup>134</sup> Ibid. p. 46

<sup>135</sup> Safe Routes Partnership. N.d. “Who We Are.” Available at: <https://www.saferoutespartnership.org/who-we-are>.

<sup>136</sup> Safe Routes Partnership. 2019. *Moving DC to Zero: Championing Community and change East of the River*. Available at: [https://www.saferoutespartnership.org/sites/default/files/resource\\_files/srp-dc\\_vision\\_zero-toolkit-082819.pdf](https://www.saferoutespartnership.org/sites/default/files/resource_files/srp-dc_vision_zero-toolkit-082819.pdf)

<sup>137</sup> Ibid. p. 2

<sup>138</sup> Ibid. p.15

<sup>139</sup> Capital Bikeshare. N.d. “Capital Bikeshare.” Available at: <https://www.capitalbikeshare.com/>

<sup>140</sup> District Department of Transportation. N.d. “Capital Bikeshare.” Available at: <https://ddot.dc.gov/page/capital-bikeshare>

<sup>141</sup> Capital Bikeshare. 2020. *Development Plan Update*. Available at : [https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page\\_content/attachments/23397\\_Capital\\_Bikeshare\\_Plan\\_Update\\_v4\\_051220\\_WEB.pdf](https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/23397_Capital_Bikeshare_Plan_Update_v4_051220_WEB.pdf). p. 20



programs”.<sup>142</sup>

## VI. Electrification Programs in Other Jurisdictions

Throughout the nation, states and cities are adopting policies and programs to incentivize the electrification of buildings and transport with an aim of reducing reliance on fossil fuels and reap important environmental, health, and economic benefits. Many of these policies and programs include specific provisions for equity—such as higher incentives for low-income customers, dedicated funding for vulnerable groups, or equity-focused pilot programs.

### ***Buildings***

A growing number of heat pump incentive programs are being established throughout the United States. AEC’s review of heat pump programs was not comprehensive but found heat pump rebates ranging from around \$250 up to almost \$2,000 in Colorado, Massachusetts, New York, North Carolina, Rhode Island, Tennessee, Vermont, Washington, and in several cities (Burlington, Vermont; Eugene, Oregon; and Palo Alto, California).<sup>143</sup> In Oregon, the Energize Rogue program installed almost 200 heat pumps between 2015 and 2018 while creating 11 jobs and provided \$700,000 in investment for Southern Oregon. A similar program, Energize South Coast, aims to do the same for Coos County, Oregon.<sup>144</sup> Boulder, Colorado saw a 200 percent increase in heat pump installations in the first year of its Comfort 365 heat pump rebate program; this program offers up to \$1,750 for heat pump installation when replacing a gas furnace.<sup>145</sup> The Efficiency Maine Trust runs one of the largest heat pump programs in the United States and installed about 50,000 heat pump units from 2011 to 2020.<sup>146</sup>

On September 20, 2021, Massachusetts Governor Baker signed an Executive Order establishing a “Commission on Clean Heat” that will be chaired by the Secretary of Energy and Environmental Affairs and will make policy recommendations to the Administration on ways to reduce emissions from building heating fuels by November 30, 2022.<sup>147</sup> The Commission is tasked with establishing a long-term framework for action that ensures costs and benefits are equitably distributed and outcomes are consistent with the Commonwealth’s goal of reducing statewide emissions by 50 percent by 2030, 75 percent by 2040, and full decarbonization by 2050. The Commission will include representatives from “affordable housing, energy efficient building design and construction, healthcare, heating system design and technology, real estate,

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<sup>142</sup> Ibid. p. 98.

<sup>143</sup> Nadel, S. 2020. *Programs to Electrify Space Heating in Homes and Buildings*. American Council for an Energy-Efficient Economy (ACEEE). Available at: [https://www.aceee.org/sites/default/files/pdfs/programs\\_to\\_electrify\\_space\\_heating\\_brief\\_final\\_6-23-20.pdf](https://www.aceee.org/sites/default/files/pdfs/programs_to_electrify_space_heating_brief_final_6-23-20.pdf)

<sup>144</sup> Rogue Climate. n.d. “Energize South Coast.” Available at: <https://rogueclimate.org/energize-south-coast/>

<sup>145</sup> Nadel, S. 2020. *Programs to Electrify Space Heating in Homes and Buildings*. American Council for an Energy-Efficient Economy (ACEEE). Available at: [https://www.aceee.org/sites/default/files/pdfs/programs\\_to\\_electrify\\_space\\_heating\\_brief\\_final\\_6-23-20.pdf](https://www.aceee.org/sites/default/files/pdfs/programs_to_electrify_space_heating_brief_final_6-23-20.pdf)

<sup>146</sup> Ibid.

<sup>147</sup> Massachusetts Executive Office of Energy and Environmental Affairs. September 20, 2021. “Governor Baker Signs Executive Order Establishing First-in-the-Nation Commission on Clean Heat.” Governor’s Press Office. Available at: <https://www.mass.gov/news/governor-baker-signs-executive-order-establishing-first-in-the-nation-commission-on-clean-heat>.

and heating fuel distribution.”<sup>148</sup>

Some electrification programs include provisions to promote equitable outcomes. California’s Building Initiative for Low Emissions Development (BUILD), which provides incentives for heat pumps along with other decarbonization efforts, requires the program’s administrator—the California Energy Commission—to set aside a minimum of 75 percent of funds for low-income projects.<sup>149</sup> Denver, Colorado’s forthcoming Existing Building Strategic Electrification Implementation Plan, aims to tailor electrification incentives to low-income and affordable housing using funds from the State’s Climate Protection Fund.<sup>150</sup> Colorado’s Climate Protection Fund is supported by a dedicated sales tax increase, with half of the funds directed to communities vulnerable to climate change: “low-income households, communities of color and Indigenous people, babies, children, pregnant women, the elderly, people with disabilities, and people with chronic health conditions.”<sup>151</sup> A two-year Pilot Building Electrification Incentive Program under development in Berkeley, California aims to assist property owners and renters by providing funds to retrofit and decarbonize their homes. The program will also work to maximize equitable emissions reductions by providing the most benefits to low-income households.<sup>152</sup>

## **Transportation**

Most U.S. states have programs of one kind or another to incentivize EV ownership. One key barrier to electrifying the transportation sector is the upfront cost of EVs. Many programs aim to reduce this cost by providing incentives for EV and EV charging infrastructure purchases. Almost all U.S. states provide incentives for EVs or plug-in hybrid vehicles, which typically take the form of financial incentives such as rate reductions, tax credits, and rebates.<sup>153</sup> For example, in the State of Washington, the Electrification of Transportation Systems (ETS) program provided \$9.8 million for EV supply equipment, covering 14 projects across the State in 2020;<sup>154</sup> five of these projects were identified as equity enhancing including programs in areas that would directly or indirectly benefit communities with disproportionate environmental burdens like air pollution exposure and high transportation costs.<sup>155</sup> Massachusetts’ Electric Vehicle Incentive Program (MassEVIP) provides funding for EV charging station hardware and installation costs.<sup>156</sup> In addition, many U.S. cities have their own EV incentives. For example, a 2015 report from the International

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<sup>148</sup> Ibid.

<sup>149</sup> Nadel, S. 2020. *Programs to Electrify Space Heating in Homes and Buildings*. American Council for an Energy-Efficient Economy (ACEEE). Available at: [https://www.aceee.org/sites/default/files/pdfs/programs\\_to\\_electrify\\_space\\_heating\\_brief\\_final\\_6-23-20.pdf](https://www.aceee.org/sites/default/files/pdfs/programs_to_electrify_space_heating_brief_final_6-23-20.pdf)

<sup>150</sup> Building Electrification Institute (BEI). n.d. “Denver, Colorado.” Available at: <https://www.beicities.org/denver>

<sup>151</sup> City of Denver. 2020. “Climate Protection Fund.” Available at: <https://www.denvergov.org/Government/Agencies-Departments-Offices/Climate-Action-Sustainability-Resiliency/Climate-Protection-Fund>

<sup>152</sup> City of Berkeley. 2021. “Budget Referral and Resolution Establishing a Pilot Existing Building Electrification Incentive Program to Assist New Homeowners, Renters and Existing Homeowners with Transition to Zero-Carbon Buildings.” Available at: <https://www.cityofberkeley.info/uploadedFiles/Clerk/2021-06-02%20Item%206.pdf>

<sup>153</sup> Hartman, K., and Shields, L. 2021. “State Policies Promoting Hybrid and Electric Vehicles.” National Conference of State Legislatures. Available at: <https://theicct.org/publications/assessment-leading-electric-vehicle-promotion-activities-united-states-cities-2015>

<sup>154</sup> Washington State Department of Commerce. n.d. “Electrification of Transportation Systems Program.” Available at: <https://www.commerce.wa.gov/growing-the-economy/energy/clean-energy-fund/electrification-of-transportation/>

<sup>155</sup> Watkins, F. 2021. *Electrification of Transportation Systems* [Presentation]. Available at: <http://energy.wsu.edu/documents/Electrification%20of%20Transportation%20Systems%20update%207-16-21.pdf>

<sup>156</sup> Montachusett Regional Planning Commission (MRPC). 2021. *Massachusetts Electric Vehicle Incentive Program*. Available at: [https://www.mrpc.org/sites/g/files/vyhli3491/f/news/massdep\\_electric\\_vehicle\\_program\\_announcement\\_jan\\_2021.pdf](https://www.mrpc.org/sites/g/files/vyhli3491/f/news/massdep_electric_vehicle_program_announcement_jan_2021.pdf)

Council on Clean Transportation, examined EV promotion activities in 25 major U.S. cities including Atlanta, Georgia; Chicago, Illinois; and Baltimore, Maryland.<sup>157</sup>

Bus electrification programs, like California's Rural School Bus Pilot Project<sup>158</sup> and Massachusetts' Electric School Bus Pilot<sup>159</sup> provide funding for electric school buses and charging infrastructure. Key findings from the Massachusetts program include substantial emissions savings but also some unexpected challenges such as mechanical issues and high energy costs due to a failure to manage the timing of bus charging.<sup>160</sup>

Some states and cities have also developed comprehensive plans to target transportation electrification. Developed by City Light, with the Rocky Mountain Institute, Seattle, Washington's Transportation Electrification Strategic Investment Plan aims to electrify 30 percent of transportation in the city by 2030 and 80 percent by 2040.<sup>161</sup> The plan aims to reduce barriers to transportation electrification with targeted financial incentives for public transit, vehicle fleets, and personal mobility (cars, bikes, scooters). Importantly, the plan will include Race and Social Justice Initiatives (RSJI) and a Racial Equity Toolkit to ensure equitable outcomes.<sup>162</sup> Since the first release of the June 2019 plan, City Light and the Seattle Office of Sustainability and Environment published a March 2020 blueprint that, among other things, aims for 100 percent of shared mobility (ride shares) and 90 percent of all personal trips to be zero emissions by 2030. The program framework is centered on equity and based on community-identified priorities; the blueprint outlines challenges, existing gaps in incentives, and plans for addressing each challenge.<sup>163</sup>

In January 2021, the Colorado Public Utilities Commission approved<sup>164</sup> Xcel Energy's Transportation Electrification Plan,<sup>165</sup> which includes a goal to deploy about 20,000 EV charging stations across the state. The plan was developed as a result of Senate Bill 77, passed in 2019,<sup>166</sup> which directed utilities to support EV adoption, and includes equity provisions such as: directing that a minimum of 15 percent of all funding must be dedicated to low-income customers and underserved communities; \$5 million in funding for enhanced rebates for low-income customers such as \$5,500 for new EVs and \$3,000 for used EVs; and targeted outreach and education in coordination with community-based organizations in low-income

<sup>157</sup> Lutsey, N., Searle, S., Chambliss, S., and Bandivadekar, A. 2015. *Assessment of Leading Electric Vehicle Promotion Activities in United States Cities*. The International Council on Clean Transportation (ICCT). Available at:

<sup>158</sup> California Air Resources Board. n.d. *Rural School Bus Pilot*. Available at:

<https://ww2.arb.ca.gov/sites/default/files/movingca/pdfs/ruralschoolbus.pdf>

<sup>159</sup> Commonwealth of Massachusetts. "EV Programs & Incentives." Available at: <https://www.mass.gov/info-details/ev-programs-incentives>

<sup>160</sup> Commonwealth of Massachusetts. *MassDOER Electric School Bus Pilot Program Evaluation*. Available at: <https://www.mass.gov/info-details/ev-programs-incentives>

<sup>161</sup> Seattle Climate. n.d. "Transportation Electrification Plan." Available at:

<https://www.seattleclimate.org/policy/governments/seattle-city-light/scl-transportation-electrification-plan>

<sup>162</sup> Seattle City Light. 2020. *Transportation Electrification Strategic Investment Plan*. Available at:

<https://www.seattle.gov/Documents/Departments/CityLight/TESIP.pdf>

<sup>163</sup> Seattle Climate. n.d. "Transportation Electrification Plan." Available at:

<https://www.seattleclimate.org/policy/governments/seattle-city-light/scl-transportation-electrification-plan>

<sup>164</sup> Colorado Public Utilities Commission. 2020. Decision No. C21-0017. *Commission Decision Granting Application With Modifications*. Proceeding No. 20A-0204E. Available at:

[https://www.dora.state.co.us/pls/efi/efi\\_p2\\_v2\\_demo.show\\_document?p\\_dms\\_document\\_id=938521](https://www.dora.state.co.us/pls/efi/efi_p2_v2_demo.show_document?p_dms_document_id=938521).

<sup>165</sup> Xcel Energy. 2020. "Transportation Electrification Plan." *Public Service Company of Colorado*. Available at:

[https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/CO%20Recent%20Filings/03\\_Attachment%20KDS-1.pdf](https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/CO%20Recent%20Filings/03_Attachment%20KDS-1.pdf).

<sup>166</sup> Colorado General Assembly. 2021. Senate Bill 19-077. "Electric Motor Vehicles Public Utility Services." *2019 Regular Session*. Available at: <https://leg.colorado.gov/bills/sb19-077>.

areas.<sup>167</sup>

The City of Boston's 2020 Zero Emission Vehicle Roadmap<sup>168</sup> aims include: to ensure that every household is within a 10-minute walk of a charging station or electric car sharing facility by 2040; installing free public EV chargers in every neighborhood by 2023; and achieving 100 percent EVs among light-duty vehicles by 2035. The plan also addresses equity, including a plan for equitable stakeholder engagement, equitable procurement and equity-focused pilot programs. Equitable stakeholder engagement will involve establishing and strengthening relationships with community groups to ensure public engagement on transportation electrification programs; equitable procurement will involve the creation of a Supplier Diversity Advisory Council, the establishment of training programs, and the execution of a disparity study to examine the participation of racial/ethnic minority- and woman-owned businesses for City contracts and procurements;<sup>169</sup> and equity-focused pilot programs will prioritize EV car share programs in EJ communities, including community-owned or managed programs.<sup>170</sup> Also, in May 2021, the Massachusetts Bay Transportation Authority began procurement for 80 electric buses, which are anticipated to enter service in 2023.<sup>171</sup>

In September 2021, New York City's Mayor's Office of Climate and Sustainability and Department of Transportation released "Electrifying New York: An Electric Vehicle Vision Plan for New York City."<sup>172</sup> The plan aims to help the City reach carbon neutrality by 2050 by: installing over 80 rapid EV chargers by 2025; ensuring that 20 percent of all municipal parking lots and garages have EV chargers by 2030; installing 1,000 curbside chargers across all five boroughs by 2025, and 10,000 by 2030; developing charging systems as part of existing street infrastructure where users supply the charging cord; advocating for supporting funding and policies from the federal government; working with utilities and utility regulators to make installing chargers easier and more affordable; engaging with stakeholders to better understand the EV market and its needs; and increasing public awareness of EVs and charger availability.<sup>173</sup> The plan makes an explicit commitment to ensuring that EV infrastructure is distributed equitably, "rather than concentrated in high-income areas."<sup>174</sup>

## VII. Equitable Electrification in the District of Columbia

Equitable electrification means fair distribution across all District communities of both (1) implementation

<sup>167</sup> Muller, M. and Max B. January 12, 2021. "Colorado Approves \$110M Transportation Electrification Plan." *Natural Resource Defense Council*. Available at: <https://www.nrdc.org/experts/miles-muller/colorado-approves-110m-transportation-electrification-plan>.

<sup>168</sup> Boston Transportation Department. 2020. "City of Boston Zero-Emission Vehicle Roadmap." Available at: [https://www.boston.gov/sites/default/files/file/2020/12/Boston%20ZEV%20Roadmap\\_1.pdf](https://www.boston.gov/sites/default/files/file/2020/12/Boston%20ZEV%20Roadmap_1.pdf).

<sup>169</sup> Ibid. p. 16

<sup>170</sup> Ibid. p. 23

<sup>171</sup> Poftak, S. May 6, 2021. "The MBTA's shift to zero emissions for its bus lines is happening." *The Boston Globe*. Available at: <https://www.bostonglobe.com/2021/05/06/opinion/mbtas-shift-zero-emissions-its-bus-lines-is-happening/#:~:text=The%20MBTA%20will%20begin%20procurement,%2C%202021%2C%2010%3A12%20a.m.&text=The%20MBTA%20is%20embarking%20on,rubber%2Dtired%20vehicles%20in%201922>.

<sup>172</sup> New York City's Department of Transportation and Mayor's Office of Climate and Sustainability. 2021. "Electrifying New York: An Electric Vehicle Vision Plan for New York City." Available at: <https://www1.nyc.gov/html/dot/downloads/pdf/electrifying-new-york-report.pdf>.

<sup>173</sup> Ibid.

<sup>174</sup> Ibid. p. 14.

efforts and (2) who pays for them, with particular focus on vulnerable communities who face more barriers to decarbonization efforts, suffer higher energy burdens, and are often on the frontlines of climate change impacts like flooding and heat waves. To ensure equity goals are met, they must be accompanied by specific plans and actionable metrics that facilitate their evaluation as well as meaningful community engagement. Without any way to measure progress, goals may amount to lip-service, and input from community members is essential in understanding how and if investments in energy and environment-related efforts are reaching their intended beneficiaries.

Our analysis of existing disparities in the District revealed that exposure to environmental hazards and energy cost burdens are inequitably distributed across the District both across and within Wards. In addition, 28 percent of the District's census tracts were identified as vulnerable EJ communities.

In a potential transition away from fossil fuels, it is essential that policymakers consider and address the impact that decarbonization programs will have on the District's most vulnerable, including proactive planning efforts to circumvent pitfalls in equity. If decarbonization takes the form of electrification, there will be declining demand for natural gas heating as customers switch to electric heat pumps or other forms of electric heating (e.g., solar water heating system). Without a well-planned transition, gas utilities could pass their already committed and approved investments in distribution system upgrade and related fixed costs onto a flat (or declining) number of customers, the result could be increasing monthly bills for remaining customers. If gas costs rise further, more customers could be encouraged to leave the gas system entirely, and the customers that remain will be left holding the bag (that is, having to pay for the entire system's fixed costs). Without appropriate policy intervention, the gas system's stranded assets could be passed on to a shrinking customer base. This is an important equity concern that could cause significant financial harm to consumers.

It is critical that any electrification plan for the District establish safeguards to ensure that heating is affordable for all District households, particularly those that are already facing high energy burdens. These safeguards should include specific provisions for the equitable distribution of any stranded assets of the gas system as well as measures to assure that last customers on the gas systems are not also the most vulnerable customers.

Similarly, paying for improvement and expansion of electric-powered public transit by increasing fares for buses and rapid transit may deter ridership and place a disproportionate burden on low-income individuals who are more likely to use public transportation than other populations.<sup>175</sup> In the District, 48 percent of Metrobus riders and 18 percent of Metrorail riders are low-income, compared to 30 percent of the total population who are low-income.<sup>176,177</sup> That means that the ridership of Metrobus is disproportionately composed of low-income individuals; in contrast, Metrorail, has fewer low-income riders than their share of population (likely due to higher fares<sup>178</sup> and more affluent neighborhoods at closer proximity to the Metrorail). At the same time, encouraging the adoption of private EVs commonly entails customer

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<sup>175</sup> Baxandall, P. March 24, 2021. *Does it Make Sense to Collect Bus Fares?* Massachusetts Budget and Policy Center. Available at: <https://massbudget.org/2021/03/24/does-it-make-sense-to-collect-bus-fares/>

<sup>176</sup> The Lab. n.d. "Can discounted transit improve mobility and well-being for low-income residents?" Available at: <https://thelabprojects.dc.gov/fare-subsidy>

<sup>177</sup> DC OPC. 2020. *Energy Affordability Study Population Characterization Report*. Available at: <https://opc-dc.gov/news-events/news/alerts/opc-releases-findings-of-energy-affordability-study>

<sup>178</sup> The Lab. n.d. "Can discounted transit improve mobility and well-being for low-income residents?" Available at: <https://thelabprojects.dc.gov/fare-subsidy>



incentives that disproportionately benefit higher-income households, for example:

- Certain federal EV tax credits apply only to the purchase of a new EV and not to used vehicles.<sup>179</sup>
- Federal EV tax credits are only available up to the amount of taxes that an individual pays.<sup>180</sup> Under the Earned Income Tax Credit (EITC), low-to-moderate income families pay little to no income taxes,<sup>181</sup> making them ineligible for these tax credits.
- EV ownership tends to be more accessible to homeowners, because charging in a driveway or garage is more feasible than finding a public charging station within walking distance of a rental property.<sup>182</sup> This problem is compounded by the fact that 58 percent of DC households are not home-owners but renters.<sup>183</sup> Barrier to EV ownership may be reduced by seeking support from the federal government.<sup>184</sup>

Overcoming barriers to participation for lower-income residents must be an essential component of any decarbonization plan.

To account for the existing disparities of income and access within the District and ensure beneficial electrification efforts are equitable, AEC identifies the following priorities:

- **Ensuring that community engagement influences Commission and District decision-making regarding beneficial electrification programs:** Community engagement in decision-making fosters conversations among different groups of residents and provides the opportunity for resident concerns to be heard and to influence program design.
- **Prioritizing beneficial electrification investments in EJ neighborhoods and addressing common decarbonization barriers:** Investing in the District's most vulnerable communities expedites electrification efforts in these areas, allowing the District to meet its climate targets faster while helping these communities overcome common barriers like the high upfront cost of modern electric heating systems.
- **Ensuring that beneficial electrification programs do not increase the energy burden for EJ and other vulnerable communities:** Reducing the energy burden for the District's vulnerable

<sup>179</sup> It is not mandatory for the credit to flow through into lease rates and the credit cannot apply to used electric vehicle purchases (unless the credit was unclaimed when the car was purchased new). See: Edmunds. September 28, 2021. "Electric Vehicle Tax Credits: What You Need to Know." Available at: <https://www.edmunds.com/fuel-economy/the-ins-and-outs-of-electric-vehicle-tax-credits.html>.

<sup>180</sup> Ibid.

<sup>181</sup> (1) US IRS. n.d. "Earned Income Tax Credit (EITC). Available at: <https://www.irs.gov/credits-deductions/individuals/earned-income-tax-credit-eitc>; (2) Tax Outreach. n.d. "What is the Earned Income Tax Credit (EITC)?" Available at: <https://www.taxoutreach.org/tax-credits/earned-income-tax-credit/>

<sup>182</sup> Voelcker, J. February 5, 2021. "JD Power Study: Electric Vehicle Owners Prefer Dedicated Home Charging Stations." Available at: <https://www.forbes.com/wheels/news/jd-power-study-electric-vehicle-owners-prefer-dedicated-home-charging-stations/>.

<sup>183</sup> US Census. 2019. ACS 5-Year Estimates Subject Tables [TableID: S2502]. Available at: <https://data.census.gov/cedsci/table?q=Owner%2FRenter%20%28Tenure%29&g=0400000US11,11%246100000&tid=ACST5Y2019.S2502&hidePreview=true>

<sup>184</sup> See for example: (1) The White House. 2021. "FACT SHEET: Biden Administration Advances Electric Vehicle Charging Infrastructure." Available at: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-biden-administration-advances-electric-vehicle-charging-infrastructure/>; (2) Yen, H. 2021. "AP Fact Check: Biden Hypes \$1T Bill Impact on Electric Cars." AP News. Available at: <https://apnews.com/article/joe-biden-technology-business-environment-and-nature-ap-fact-check-071ac73689a0191f31355a0d63bb931b>

communities provides financial relief that has the potential to spur economic growth and improve quality of life in these areas.

The following sections describe each of these priorities and recommend equity metrics that are directed towards the Public Service Commission and more broadly, District agencies.

### ***1. Ensuring that community engagement influences Commission and District decision-making regarding beneficial electrification programs***

To ensure that community engagement influences Commission and District decision-making regarding beneficial electrification programs, it is imperative to have a structured community participation. The Commission should solicit feedback on its community participation processes from public stakeholders that represent diversified segments of the community, including Advisory Neighborhood Commissions, City Council members, OPC, faith-based organizations, and environmental groups, in a process that involves facilitated group discussion.<sup>185</sup> Based on this feedback, and information regarding best practices for inclusive governmental decision making, the Commission should adjust its public participation processes for decisions around beneficial electrification. As evidenced in other jurisdictions (i.e., California), it may be necessary to compensate intervenors for their participation to ensure that stakeholders with fewer resources can actively participate in all aspects of community engagement.<sup>186</sup> To evaluate the success of these measures, the Commission should consider setting and tracking metrics for public participation processes for beneficial electrification decisions that examine the inclusivity of those processes.

### ***2. Prioritizing beneficial electrification investments in EJ neighborhoods and addressing common decarbonization barriers***

The Commission and District agencies should set, track, and report on numerical goals for transportation and building electrification development dollars directed to EJ communities. For instance, the Commission could adopt list of benchmarks with respect to the share of spending by (i) electrification issues identified, (ii) racial groups, (iii) income group, and (iv) neighborhoods. This list would be developed with assistance from public stakeholders that represents diverse segments of the community—Advisory Neighborhood Commissions, City Council members, OPC, faith-based organizations, and environmental groups etc.—and a facilitator knowledgeable in social and economic concerns pertaining to communities in the District and with a demonstrated ability to facilitate entities with a diverse group of interests.

### ***3. Ensuring that beneficial electrification programs do not increase the energy burden for EJ and other vulnerable communities***

The Commission and District agencies should determine baseline (status quo) energy burdens and/or environmental justice designations to establish a context in which to understand the impacts of beneficial

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<sup>185</sup> Participation of regulatory (DC PSC), funding agencies (DOEE and others) and utility companies should be scrutinized because they may influence the interest of vulnerable communities.

<sup>186</sup> Billimoria, S., and Henchen, M. 2020. *Regulatory Solutions for Building Decarbonization: Tools for Commissions and Other Government Agencies*. Rocky Mountain Institute. Available at: <https://rmi.org/insight/regulatory-solutions-for-building-decarbonization/>



electrification. For each potential beneficial electrification program, the Commission should evaluate whether the program's funding mechanism and program structures are likely to increase the energy burden for EJ and vulnerable communities. Programs should prioritize the most equitable funding sources possible including federal funding, grant funding, regional funding, and taxpayer funding. Commission decisions regarding beneficial electrification program applications should discuss, and report on, the equities involved in the program's funding.