

January 2021

Local Government Clean Energy Report

Raleigh, North Carolina



NC SUSTAINABLE
ENERGY ASSOCIATION

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About North Carolina Sustainable Energy Association

North Carolina Sustainable Energy Association (NCSEA) is the leading 501(c)(3) non-profit organization that drives public policy and market development for clean energy. Our mission is to drive policy and market development to create clean energy jobs, economic opportunities, and affordable energy that benefits all of North Carolina. NCSEA's work enables clean energy jobs, economic opportunities, and affordable energy options for North Carolinians. Learn more at www.energync.org.



Introduction

Where Does This Data Come From?

Before electricity-generating systems can be interconnected, they must register with paperwork that is filed to the North Carolina Utilities Commission (NCUC). This paperwork includes Reports of Proposed Construction (ROPCs) and Certificates of Public Convenience and Necessity (CPCNs), depending on their generating capacity. NCSEA tracks these ROPC and CPCN filings and compiles them into the Renewable Energy Database (REDB), which is the source of information for this report. The REDB is the most comprehensive source of data on clean energy systems in the state, and includes information on system technology type, size, and location.

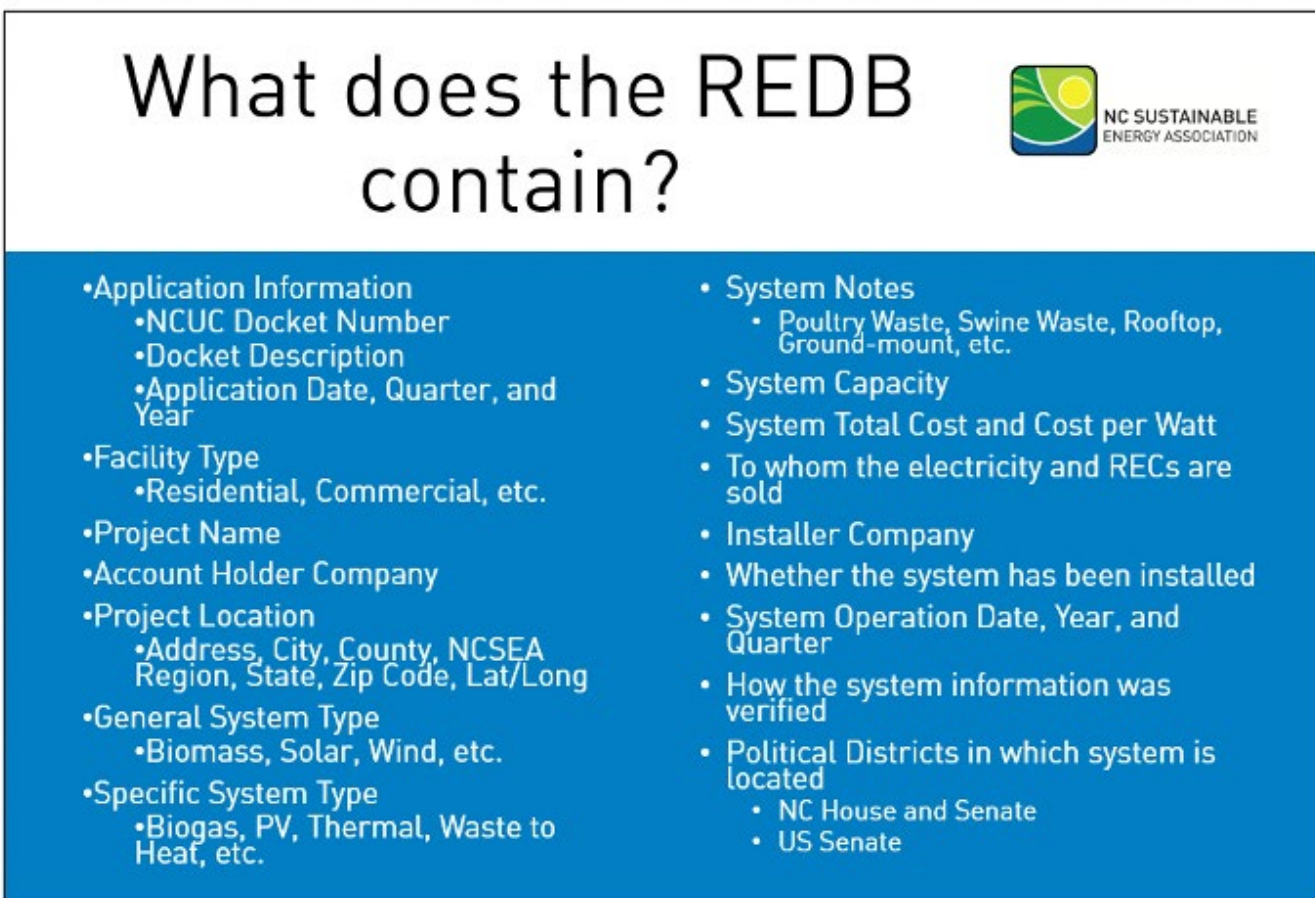


Figure 1. Information Contained in NCSEA's Renewable Energy Database (REDB)



How Does NCSEA Define Renewable Energy Categories?

While there is no industry standard for defining renewable energy system categories, based on research and internal discussion, NCSEA groups them into three general categories which depend on their location, size, and/or use:

1. **Residential** - a renewable energy system of any generating capacity that is installed on or near a home/residence and produces electricity for use in that home/residence.
2. **Commercial/Industrial** - a renewable energy system with a generating capacity under 2 MW (AC) that is installed on or near a non-residential building that produces electricity for use in that non-residential building.
3. **Utility-Scale** - a renewable energy system with a generating capacity of 2 MW (AC) or greater that generates electricity for sale to an electricity utility.

Background Information

North Carolina is a leader in renewable energy, and specifically in solar photovoltaic (PV) systems. As of Q2 2020, North Carolina has the second-most installed solar PV capacity in the United States, with over 6,451 MW.¹

While most of that capacity comes from utility-scale solar PV systems, there are many residential and commercial/industrial systems across the state too. Solar PV, however, is not the only type of renewable energy technology that contributes electricity to our grid. While there are many hydroelectric, bioenergy, and wind systems in North Carolina, this report focuses on solar PV, since those are the only renewable energy systems in Raleigh.

This data is from 12/18/2020.



Current Renewable Energy Systems in Raleigh

All Systems

Raleigh has over 12 megawatts (MW) of renewable energy generation capacity. Almost all (93%) of these solar PV systems are residential, but most of the capacity (52%) comes from commercial systems.

CATEGORY	# OF SYSTEMS	CAPACITY (MW)
COMMERCIAL SCALE	52	6.4
RESIDENTIAL	724	4.5
UTILITY-SCALE	1	1.3
TOTAL	777	12.2

Table 1. Number and generating capacity of renewable energy systems in Raleigh by category

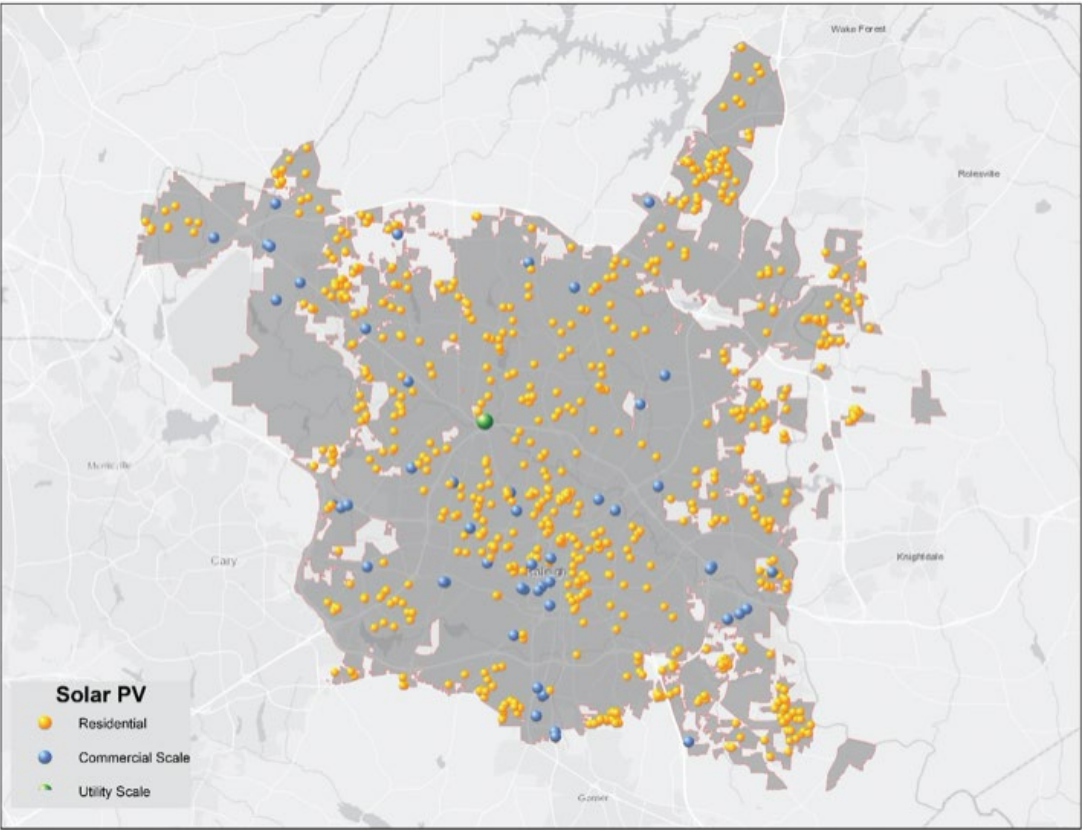


Figure 2. Solar PV systems in Raleigh



Commercial System Subcategories

Commercial solar PV systems in Raleigh serve a variety of businesses and other uses, including the convention center, schools, and restaurants.

CATEGORY	# OF SYSTEMS	CAPACITY (MW)
AUTOMOTIVE	2	0.1
BANK	2	1.7
CONVENTION CENTER	1	0.4
CORPORATE	1	0.2
EDUCATION	5	0.4
GOVERNMENT	6	0.4
HEALTHCARE	1	0
HOUSING	1	0
OFFICE	14	0.6
PARKING GARAGE	1	0.3
RECREATION	1	0
RELIGIOUS FACILITY	6	0.3
RESTAURANT	2	0
RETAIL	4	1
STORAGE FACILITY	1	0.4
WAREHOUSE	4	0.5
TOTAL	52	6.4

Table 2. Commercial systems in Raleigh by sub-type



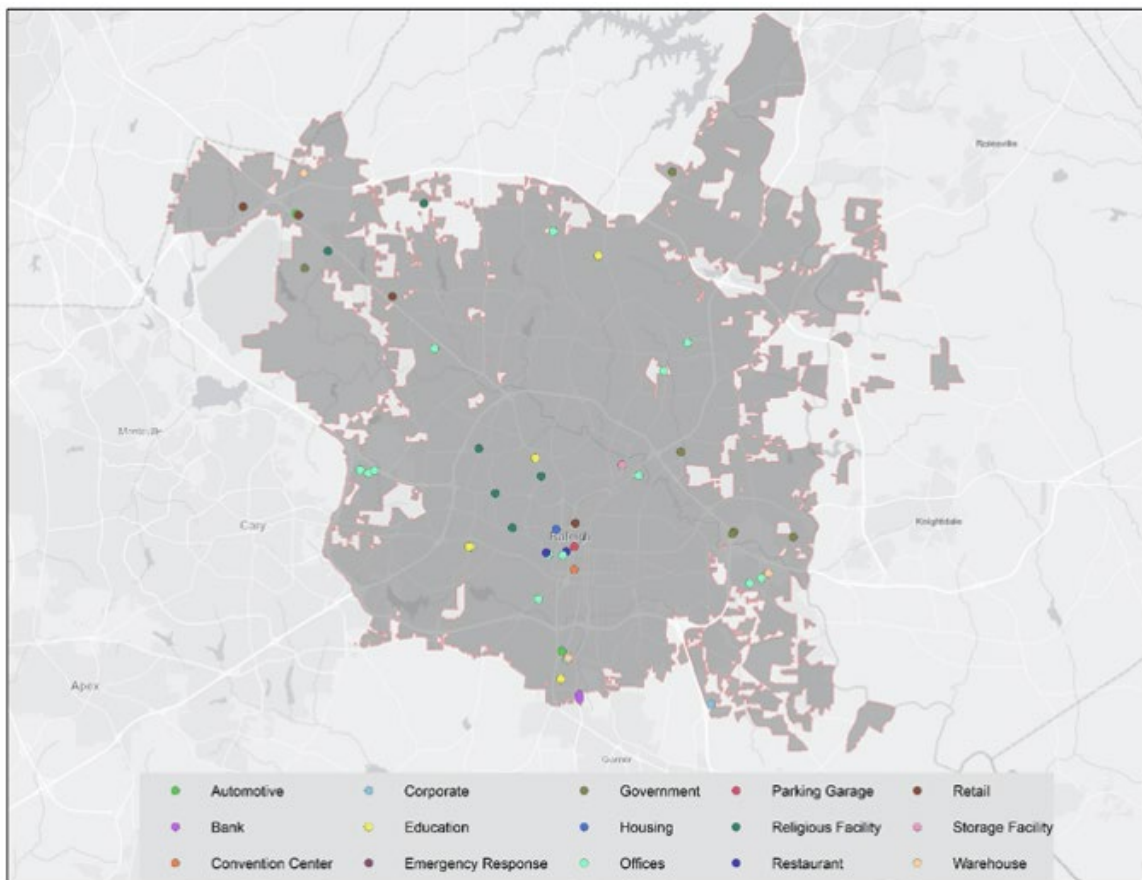


Figure 3. Commercial solar PV systems in Raleigh

Renewable energy growth in Raleigh has been steadily increasing since 2010, with large increases in 2018 and 2019. This growth is dominated by residential solar PV systems, which have increased in number by over 250% since 2015 and over 10,000% since 2010.



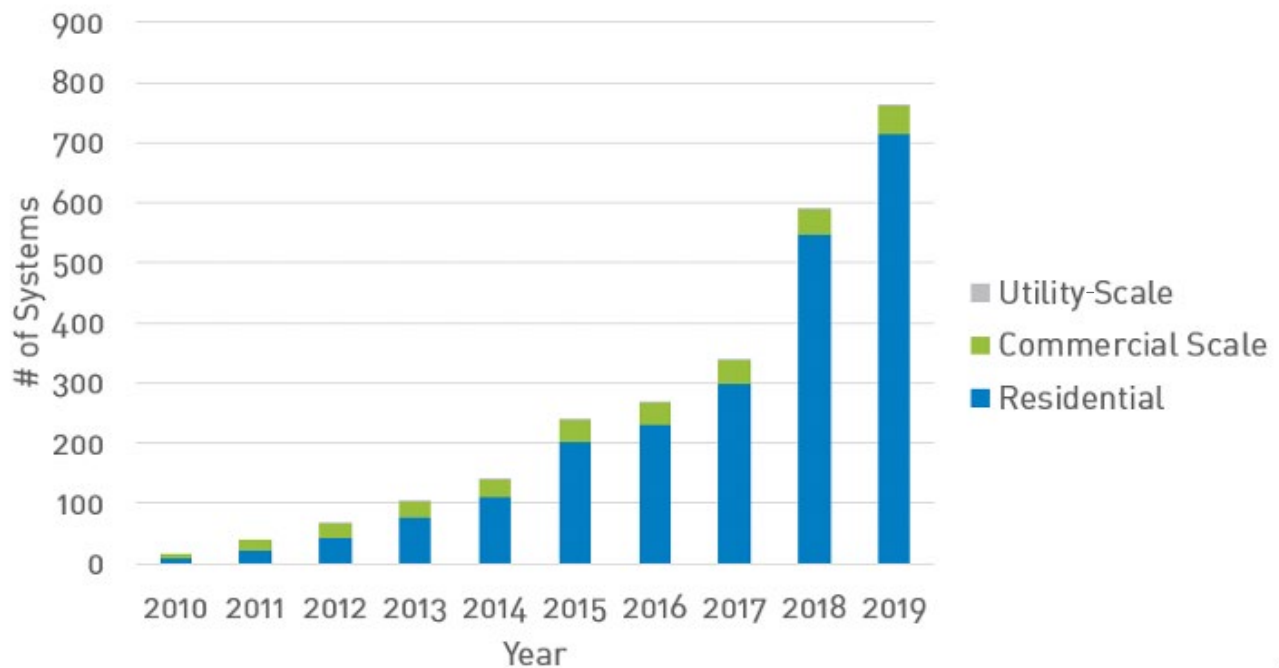


Figure 4. Renewable energy systems in Raleigh from 2010-2019

Since 2011, the main source of growth in terms of capacity has been residential systems. This makes sense because the city only has one utility-scale system and growth in capacity from commercial systems has become stagnant. Over that time, residential capacity has grown over 2,200%, while commercial capacity has grown just under 50%.

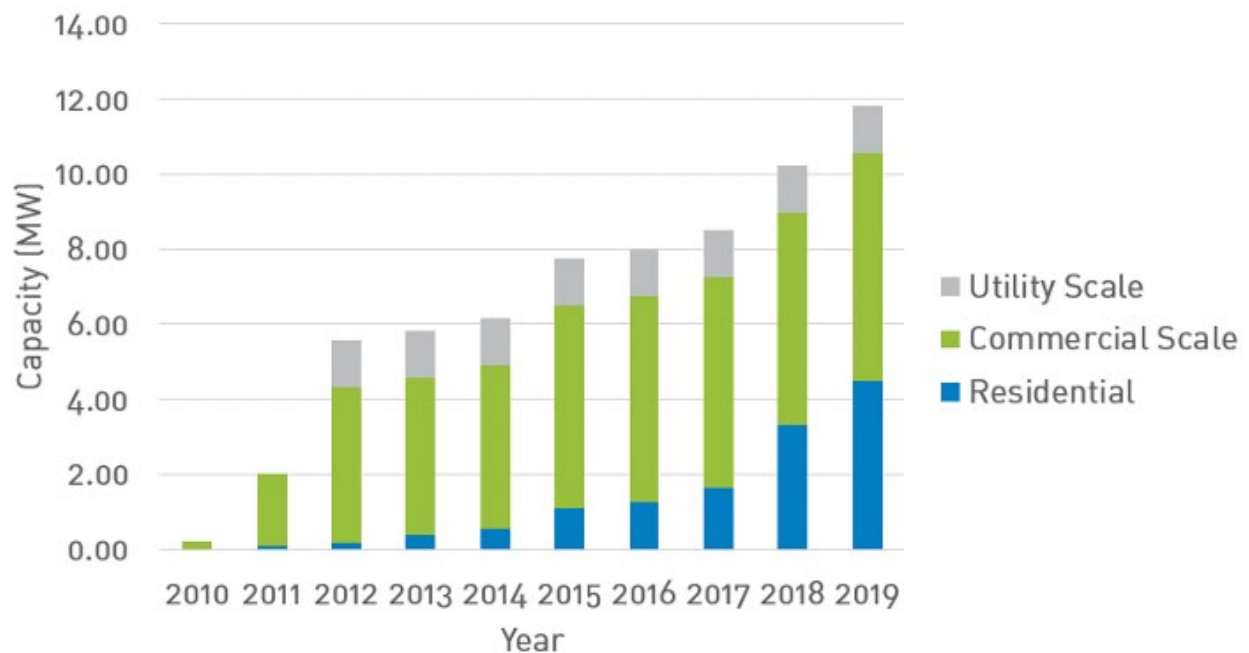


Figure 5. Renewable energy generating capacity in Raleigh from 2010-2019



Comparing Raleigh to Charlotte

In addition to providing metrics for Raleigh’s current amount of renewable energy systems and capacity, this report provides a point of comparison from another city in North Carolina of a similar population size and/or in a county of similar economic tier.^{2,3} For Raleigh, this point of comparison is Charlotte.

Number of Systems

Raleigh falls behind Charlotte in terms of both number of systems and capacity. While Charlotte has almost twice the population of Raleigh, however, it only has 65% more renewable energy systems.⁴

CATEGORY	CHARLOTTE (MW)	RALEIGH (MW)
RESIDENTIAL	1,204	724
COMMERCIAL	75	52
UTILITY-SCALE	0	1
TOTAL	1,279	777

Table 3. Number of renewable energy systems in Charlotte and Raleigh by type

The main difference between Raleigh and Charlotte is the number of residential solar PV systems, as the number of commercial systems is much closer between the two cities.

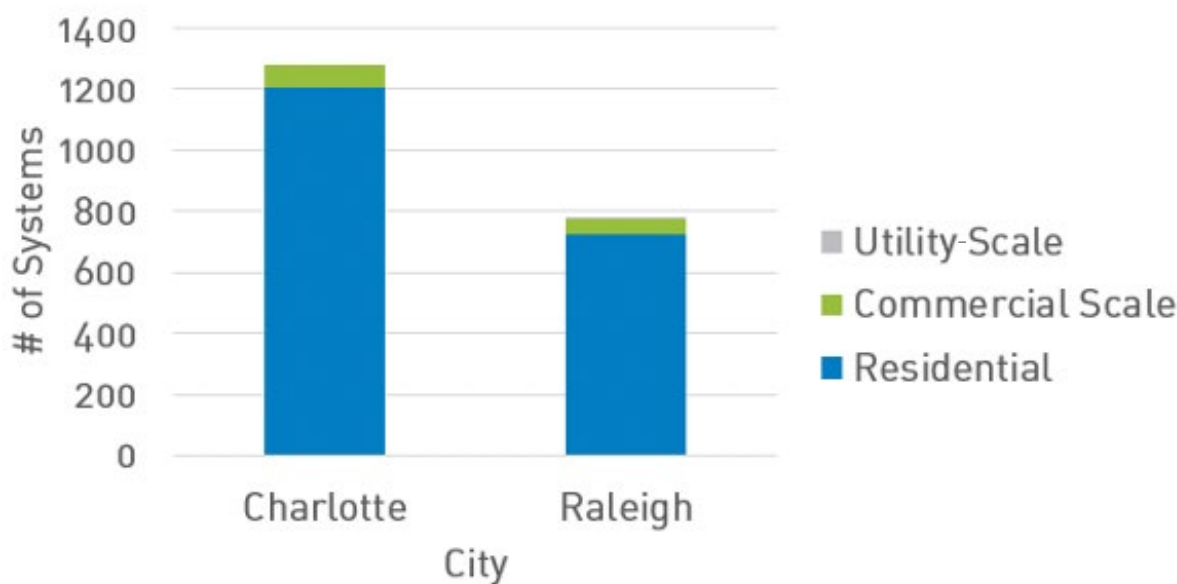


Figure 6. Renewable energy systems in Charlotte and Raleigh by category



Until 2014, Raleigh led Charlotte in the number of systems and until 2017, both cities had very similar numbers. After 2017, however, Charlotte began to outpace Raleigh.

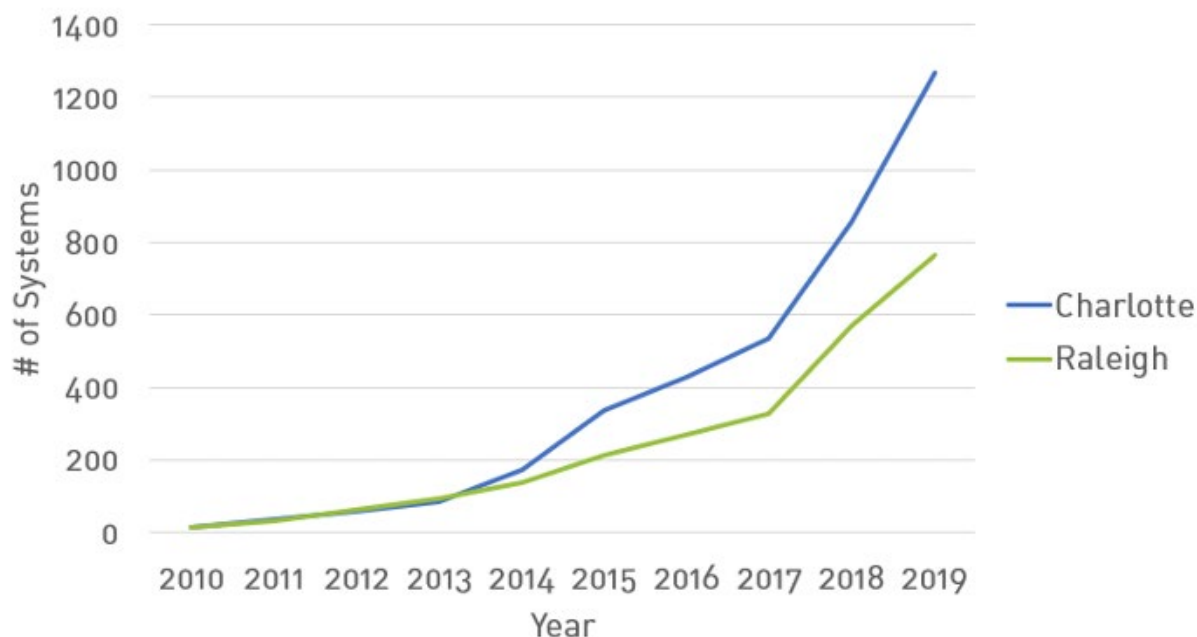


Figure 7. Total renewable energy systems in Charlotte and Raleigh from 2010-2019

Generating Capacity

Raleigh is also behind Charlotte in terms of generating capacity, by 4 MW. The main difference, once again, is in the residential category, as well as the one utility-scale system that is in Raleigh.

CATEGORY	CHARLOTTE (MW)	RALEIGH (MW)
RESIDENTIAL	7.3	4.5
COMMERCIAL	8.9	6.4
UTILITY-SCALE	0	1.3
TOTAL	16.2	12.2

Table 4. Generating capacity of renewable energy systems in Charlotte and Raleigh by type



Charlotte leads Raleigh in both residential and commercial capacity by at least 2.5 MW in each category.

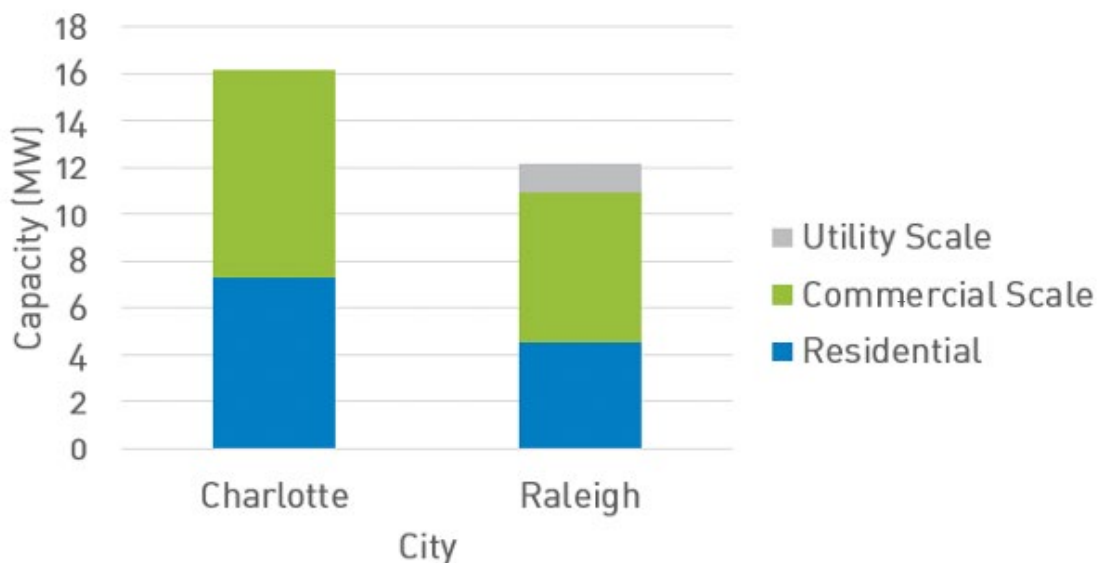


Figure 8. Renewable energy generating capacity in Charlotte and Raleigh by category

Between 2011 and 2015, Raleigh led Charlotte in generating capacity. Since then, Charlotte has led consistently, but the margin is not as wide between the two cities as it is in the number of systems.

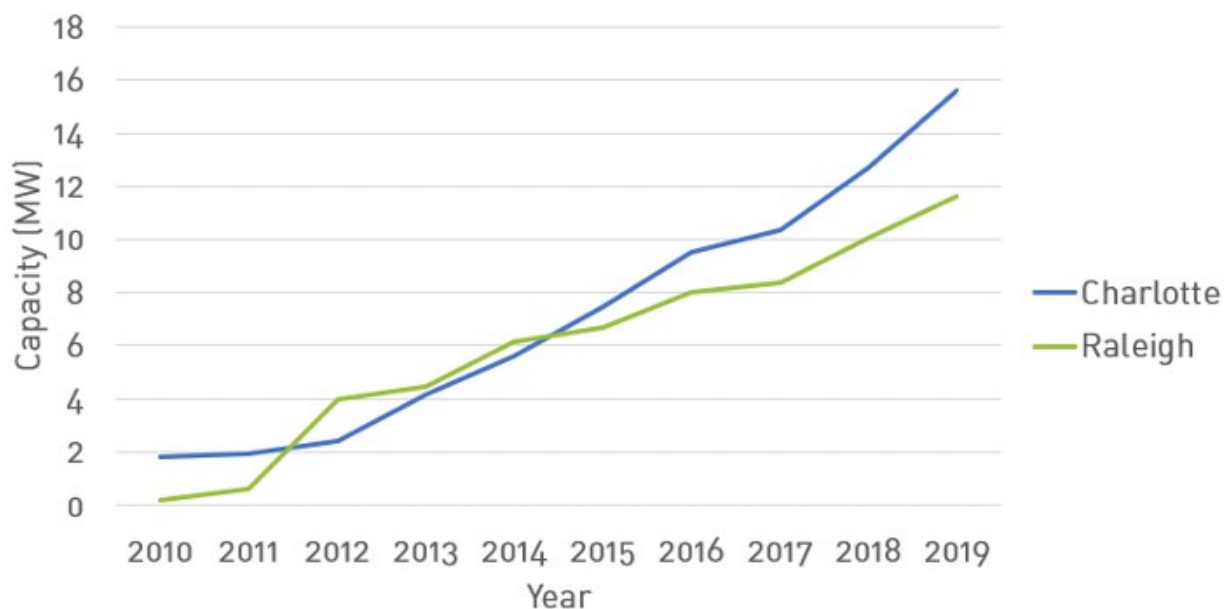


Figure 9. Total renewable energy generating capacity in Charlotte and Raleigh from 2010-2019



Energy Efficient Buildings

Charlotte also leads Raleigh in the number of energy efficient buildings, with over three times as many total energy efficient buildings.

CATEGORY	CHARLOTTE	RALEIGH
ENERGY STAR CERTIFIED	307	109
LEED CERTIFIED	679	280
TOTAL	986	389

Table 5. Energy efficient buildings in Charlotte and Raleigh by type

In both cities, most of the certified energy efficient buildings are LEED certified rather than Energy Star certified.

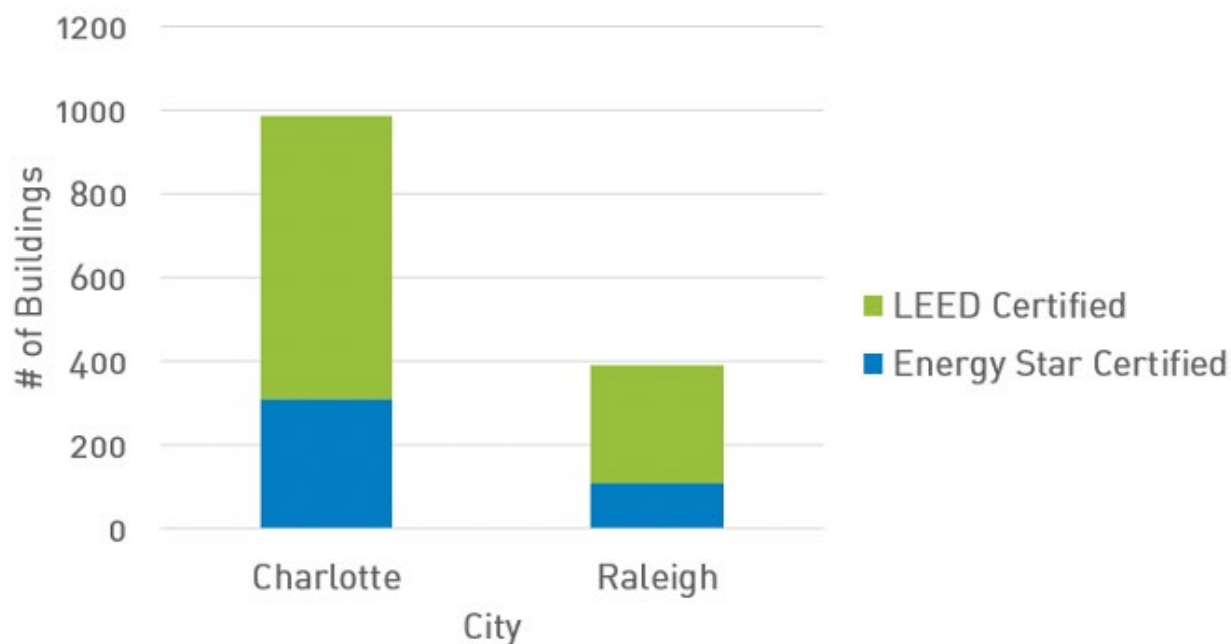


Figure 10. Energy efficient buildings in Charlotte and Raleigh by type



Both cities also have more building are in LEED certified buildings than Energy Star ones.

CATEGORY	CHARLOTTE (FT ²)	RALEIGH (FT ²)
ENERGY STAR CERTIFIED	47,074,520	13,142,191
LEED CERTIFIED	58,094,814	15,157,847
TOTAL	105,169,334	28,300,038

Table 6. Square footage of energy efficient certified buildings in Charlotte and Raleigh

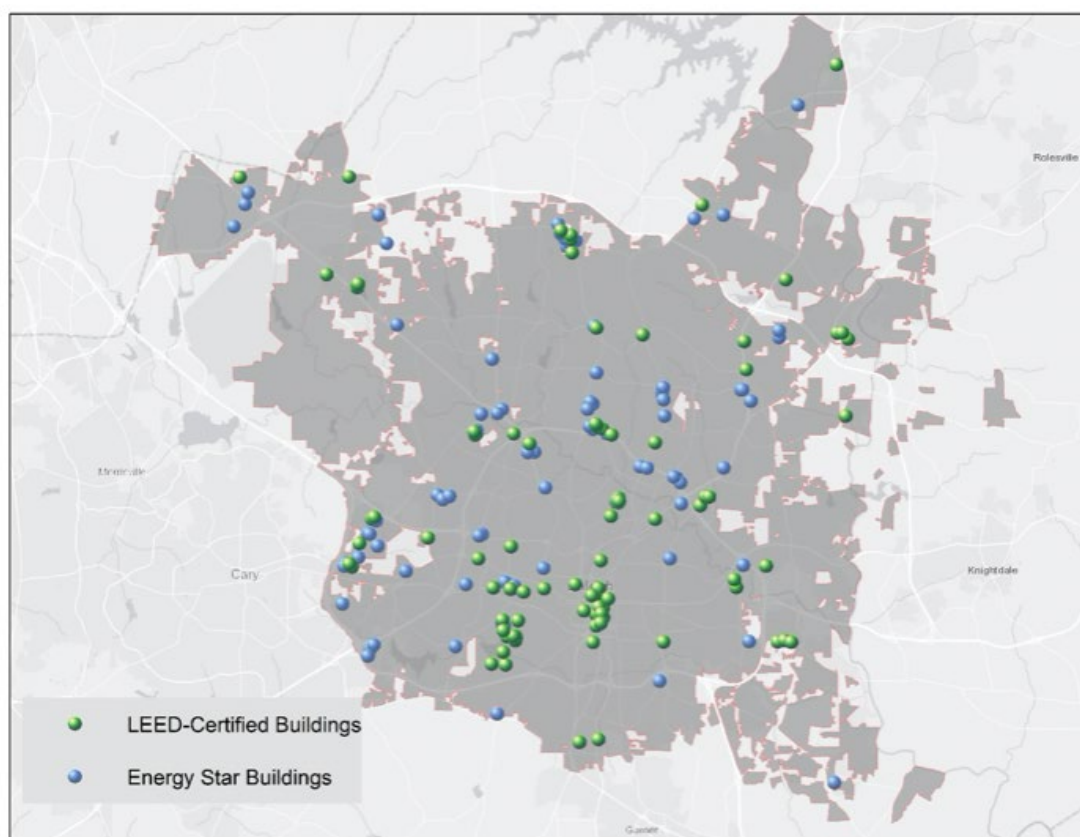


Figure 11. Energy efficient certified buildings in Raleigh



Electric Vehicles

In terms of electric vehicles (EV) and hybrid vehicles, Wake County leads Mecklenburg County, with over 60 percent as many total EV and hybrid vehicles.

TYPE	MECKLENBURG	WAKE
ELECTRIC	2,164	3,882
PLUG-IN HYBRID	1,143	1,776
HYBRID	13,833	21,834
TOTAL	17,140	27,492

Table 7. Electric and hybrid vehicles in Wake and Mecklenburg Counties by type

The majority (79%) of these vehicles in Wake County are hybrids, and this category is the one in which Wake has the largest lead. Nevertheless, Wake County also leads Mecklenburg County in both of the other vehicle categories.

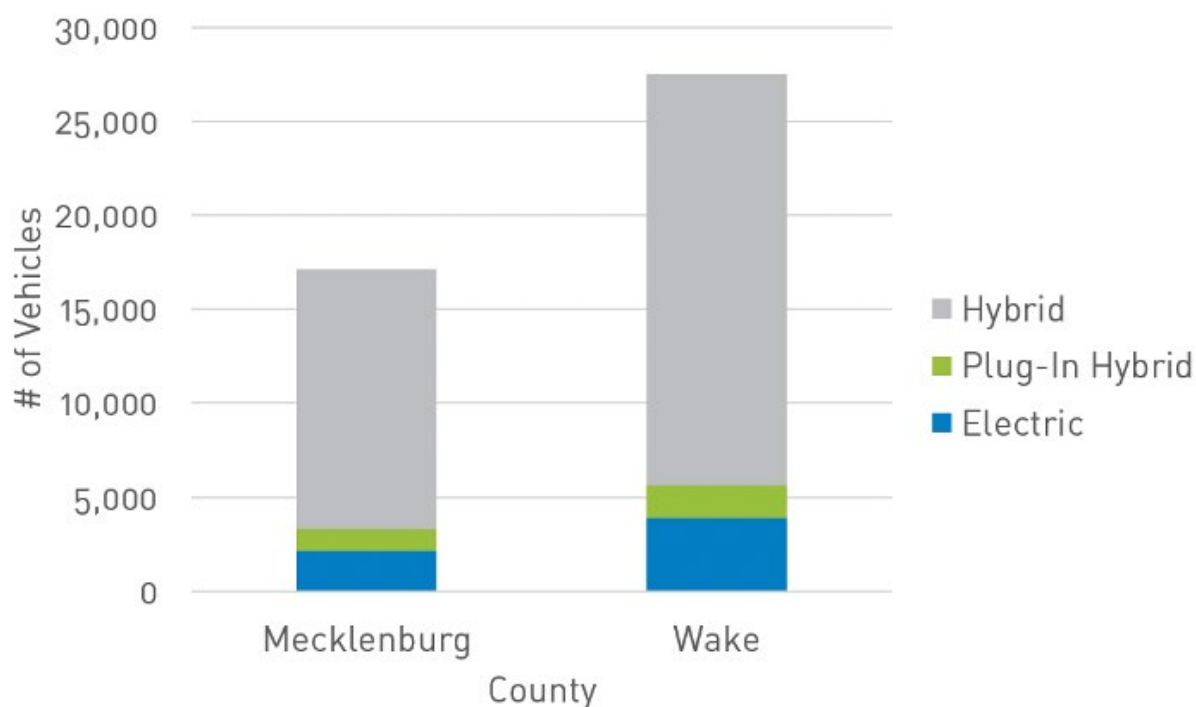


Figure 12. EVs and hybrid vehicles in Mecklenburg and Wake Counties by type



EV Charging Stations

While Charlotte leads Raleigh in the number of EV charging stations, Raleigh has more variety of station owners.

CATEGORY	CHARLOTTE	RALEIGH
LEVEL 1	2	6
LEVEL 2	339	196
DC FAST CHARGE	39	26
TOTAL	380	228

Table 8. EV charging stations in Charlotte and Raleigh by type

In Raleigh, most (69%) of the EV charging stations are privately owned, but 19% are owned by either local, municipal, or state government.

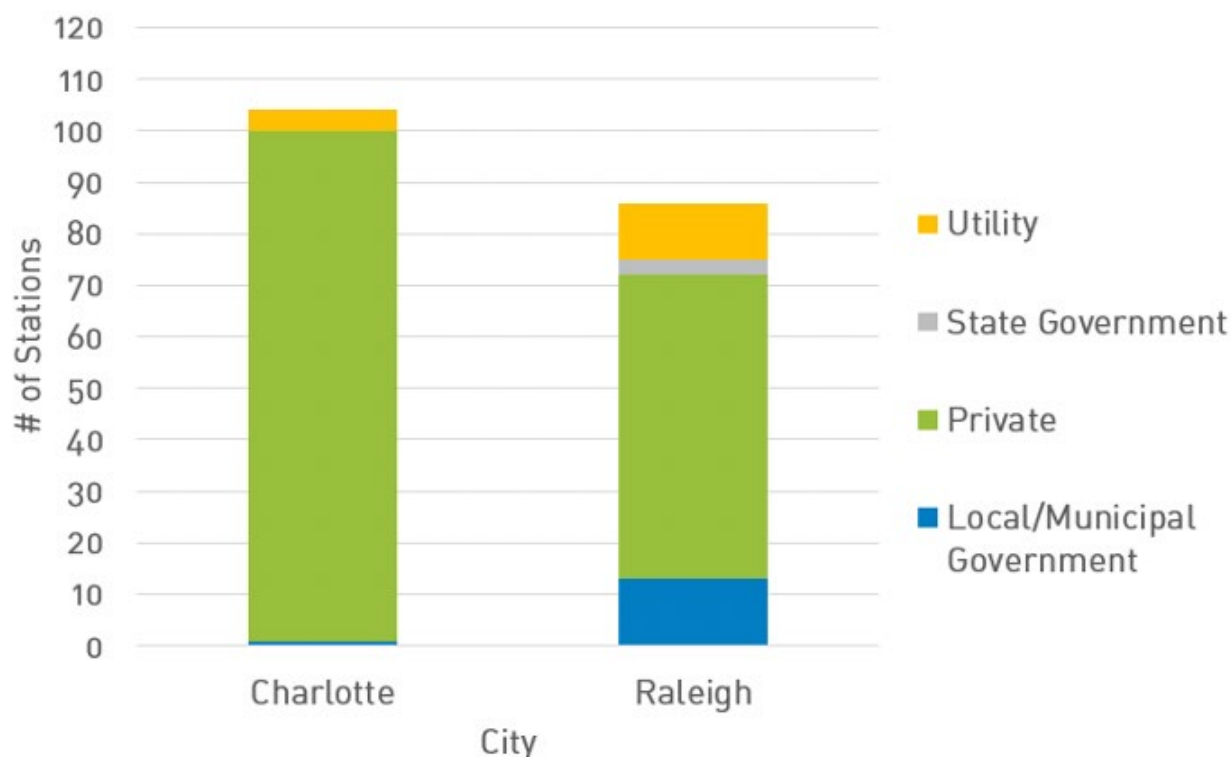


Figure 13. EV charging stations in Charlotte and Raleigh by owner type



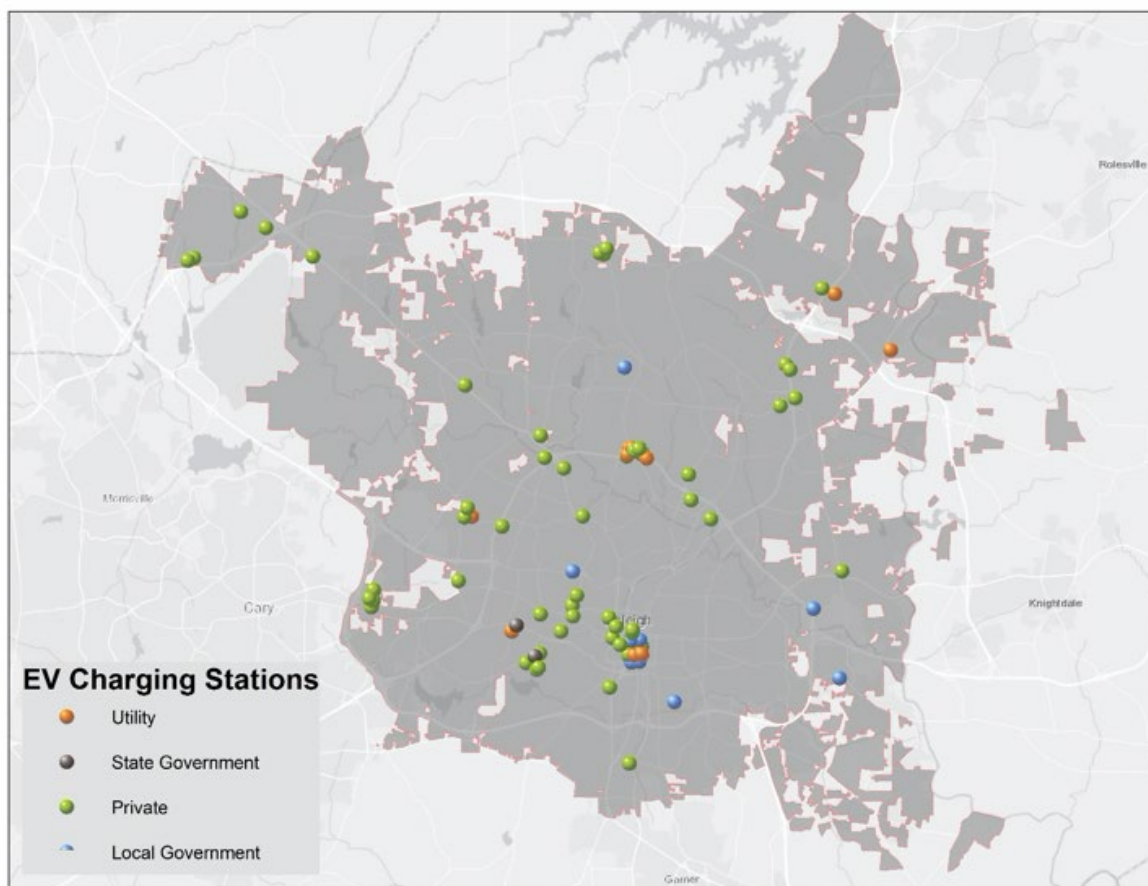


Figure 14. EV charging stations in Raleigh

EV Charging Station Outlets

At any one EV charging station, there may be multiple outlets that can be used. In terms of the actual number of outlets at charging stations, Charlotte also leads Raleigh.

CATEGORY	CHARLOTTE	RALEIGH
LEVEL 1	2	6
LEVEL 2	339	196
DC FAST CHARGE	39	26
TOTAL	380	228

Table 9. EV charging outlets in Charlotte and Raleigh by type



Most of the outlets in Charlotte (89%) and Raleigh (86%) are Level 2, and most of the rest are DC fast charging outlets in both cities too.



Figure 15. EV charging outlets in Charlotte and Raleigh by type



Endnotes

1. Solar Energy Industry Association (SEIA). "North Carolina Solar." <https://www.seia.org/state-solar-policy/north-carolina-solar>
2. United States Census Bureau. "QuickFacts: Charlotte city, North Carolina; Raleigh city, North Carolina. <https://www.census.gov/quickfacts/fact/table/charlottecitynorthcarolina,raleighcitynorthcarolina/PST045219>
3. North Carolina Department of Commerce. "County Distress Rankings (Tiers)." <https://www.nccommerce.com/grants-incentives/county-distress-rankings-tiers>
4. United States Census Bureau. "QuickFacts: Charlotte city, North Carolina; Raleigh city, North Carolina. <https://www.census.gov/quickfacts/fact/table/charlottecitynorthcarolina,raleighcitynorthcarolina/PST045219>

