Local Government Clean Energy Report

Chapel Hill, North Carolina

Created: April 2021

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?

Solar PV

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)

Energy Efficient Buildings

Types of Certification: ENERGY STAR® and LEED®

Two of the most popular certifications for buildings to demonstrate their energy efficiency are ENERGY STAR and LEED. For commercial buildings, the US Environmental Protection Agency's ENERGY STAR program helps building owners benchmark their energy usage and assigns each building a score according to its efficiency.[1] The median score of these buildings is 50, and those with scores of 75 or more are eligible for ENERGY STAR certification.[2]

Leadership in Energy and Environmental Design (LEED) is a program run by the US Green Building Council that focuses on whole-building sustainability, including water use reduction and improved indoor air quality, in addition to building energy efficiency.[3] There are a variety of certifications that can be achieved depending on the use of the building and its stage of development.[4]

Both ENERGY STAR and LEED maintain datasets of the buildings that currently meet their certification standards.[5,6]

Electric Vehicles (EVs)

As part of NC Department of Transportation's (DOT) ZEV Plan, DOT began releasing North Carolina vehicle registration information online. This information includes the number of electric, plug-in hybrid, and hybrid vehicles by county.[7,8]

EV Charging Stations and Outlets

There are a variety of sources for EV charging stations and outlets, ranging from federal government sources to private networks. Each source varies in how the stations and outlets are verified, so sometimes stations listed in one source may not be in another. For these reports, NCSEA uses the US Department of Energy's Alternative Fuels Data Center database.[9]

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 Q4 2020, North Carolina has the third most installed solar PV capacity in the United States, with over 7,037 MW.[10]

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. In fact, there are many hydroelectric, bioenergy, and wind systems in North Carolina, but this report focuses on solar PV, since those are the only renewable energy systems in Chapel Hill.

The information is this report is current as of 3/9/2021.

Current Renewable Energy Systems in Chapel Hill

All Systems

Most of the solar PV systems (86%) and renewable energy generating capacity (69%) in Chapel Hill are from residential systems, and there are no utility-scale ones.

CATEGORY	# OF SYSTEMS	CAPACITY (MW)
COMMERCIAL	21	0.36
RESIDENTIAL	130	0.79
TOTAL	151	1.15

Table 1. Renewable energy systems and capacity in Chapel Hill by category

Most of the growth of renewable energy systems in Chapel Hill is from residential systems, but since 2014, the total number of systems has increased by over 150%.
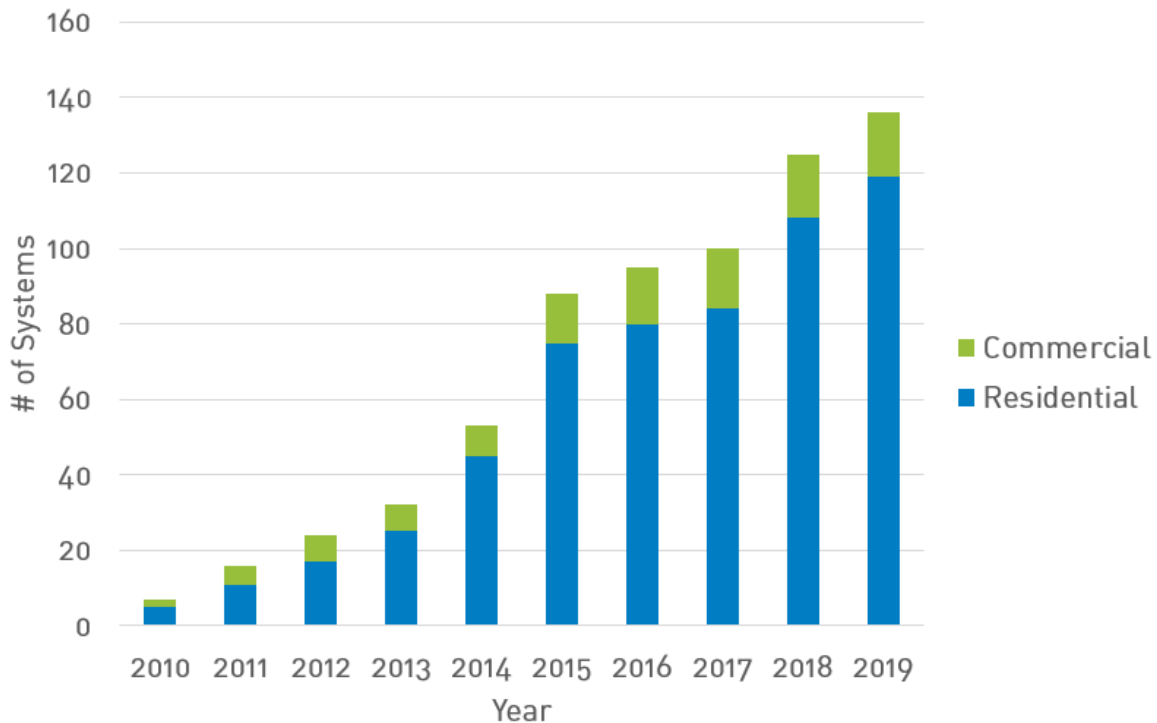

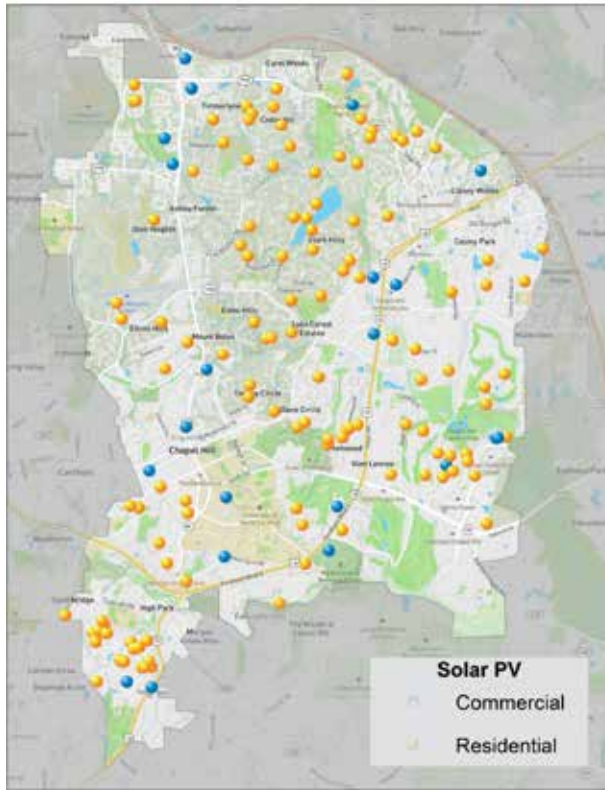Figure 2. New renewable energy systems installed in Chapel Hill, 2010-2019

Figure 3. Locations of installed commercial and residential renewable energy systems in Chapel Hill

Commercial generating capacity has not changed in Chapel Hill since 2016, but over that same period, residential capacity has increased by almost 85%.
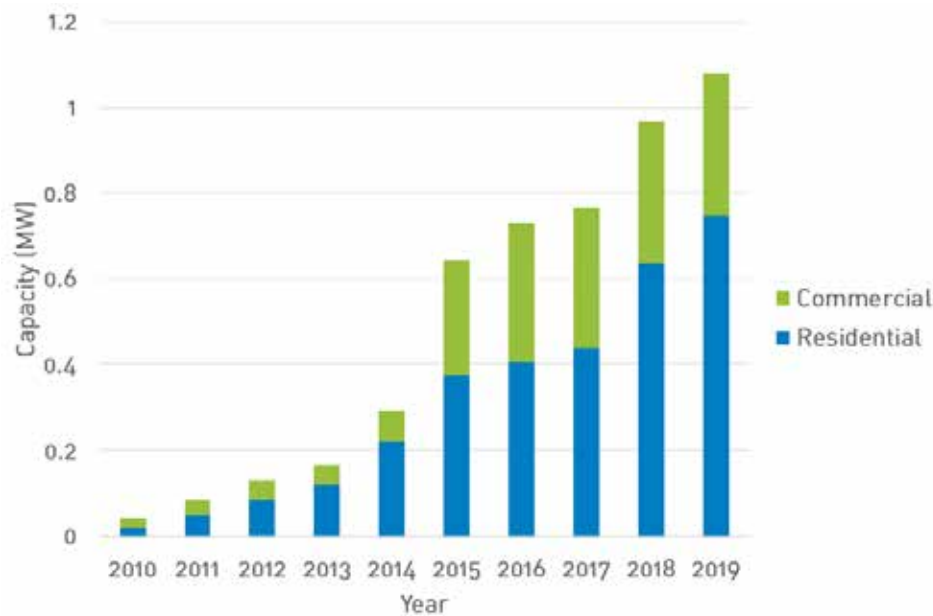

Figure 4. New renewable energy capacity installed in Chapel Hill, 2010-2019

Commercial System Subcategories

Solar PV systems serve a variety of commercial customers in Chapel Hill, ranging from a fire station to a synagogue, as well as offices and retail locations.

SUBCATEGORY	# OF SYSTEMS	CAPACITY (MW)
APARTMENTS	1	4.3
AUTOMOTIVE	1	4.8
EDUCATION	4	26.4
EMERGENCY RESPONSE	1	3.8
HEALTHCARE	1	5
OFFICE	7	90.7
RELIGIOUS FACILITY	4	163.1
RETAIL	2	58.9

Table 2. Commercial renewable energy systems in Chapel Hill by subcategory

Comparing Chapel Hill to Apex

In addition to providing metrics for Chapel Hill's current amount of renewable energy systems and capacity, this report provides a point of comparison from another city in North Carolina of similar population size and/or in a county of similar economic tier.[11,12] For Chapel Hill, this point of comparison is Apex.

Number of Systems

Chapel Hill leads Apex in both the number of residential and commercial solar PV systems and neither have a utility-scale system.

CITY	RESIDENTIAL	COMMERCIAL	TOTAL
CHAPEL HILL	130	21	151
APEX	29	7	36

Table 3. Total number of renewable energy systems in Apex and Chapel Hill

Chapel Hill has more systems than Apex and more of its systems are residential than Apex's too (86% vs. 81%).
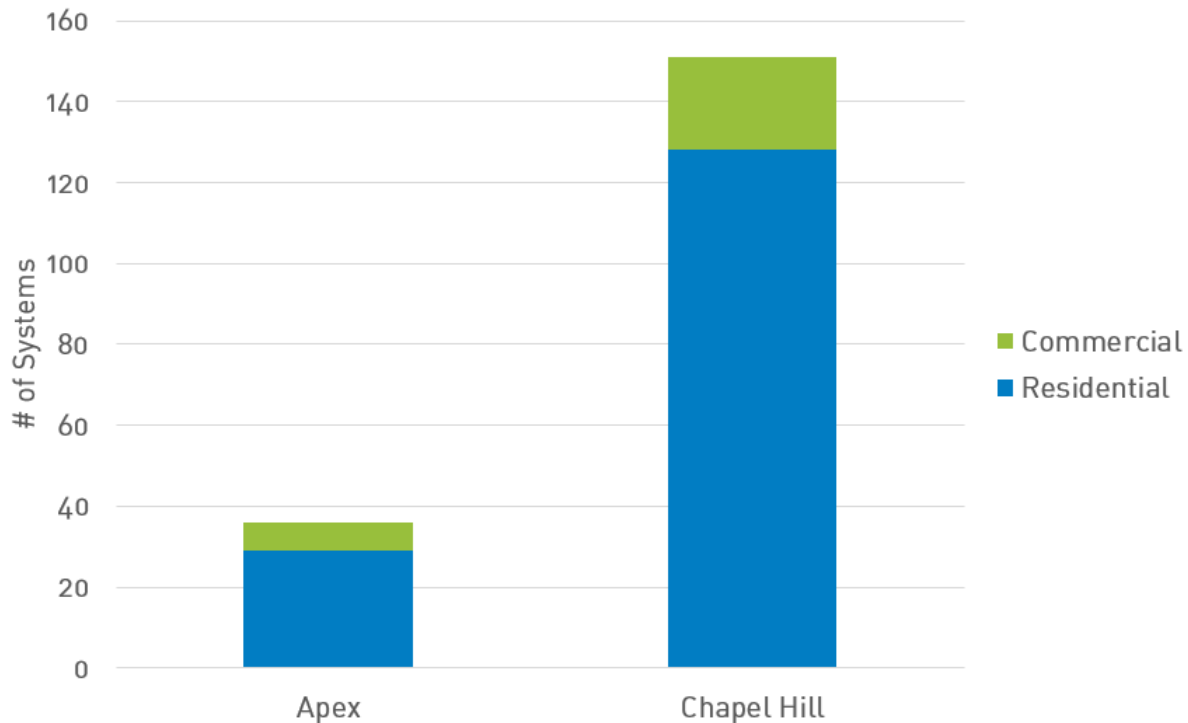

Figure 5. Total number of renewable energy systems in Apex and Chapel Hill

Chapel Hill has lead Apex in the number of renewable energy systems since 2010, but that lead has particularly increased since 2014.
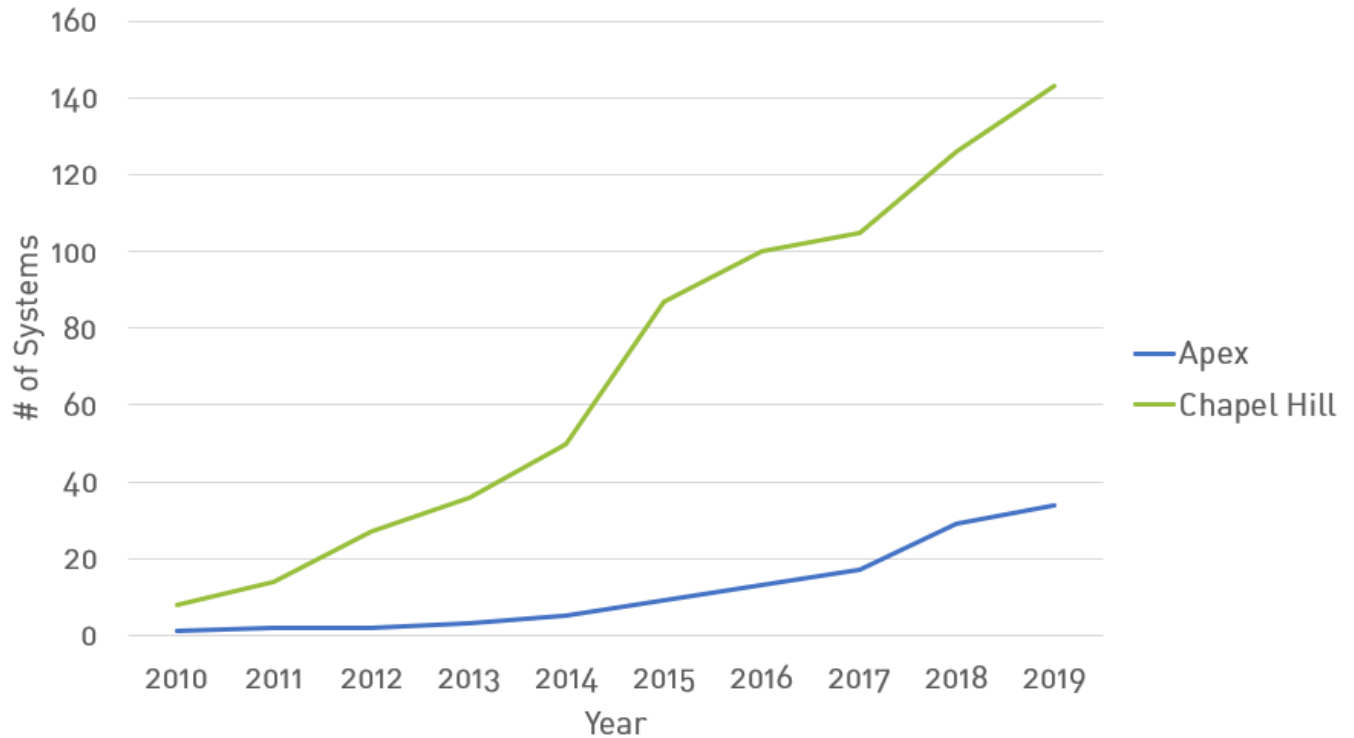

Figure 6. New renewable energy systems installed in Apex and Chapel Hill, 2010-2019

Generating Capacity

While Chapel Hill leads Apex in the generating capacity from residential systems, Apex leads Chapel Hill in the generating capacity from commercial systems. Nevertheless, Chapel Hill does lead Apex in total generating capacity.

CITY	RESIDENTIAL (MW)	COMMERCIAL (MW)	TOTAL (MW)
CHAPEL HILL	0.79	0.36	1.15
APEX	0.21	0.71	0.92

Table 4. Total renewable energy generating capacity in Apex and Chapel Hill

About 69% of Chapel Hill's generating capacity is from residential solar PV systems, while 77% of Apex's generating capacity comes from commercial solar PV systems.
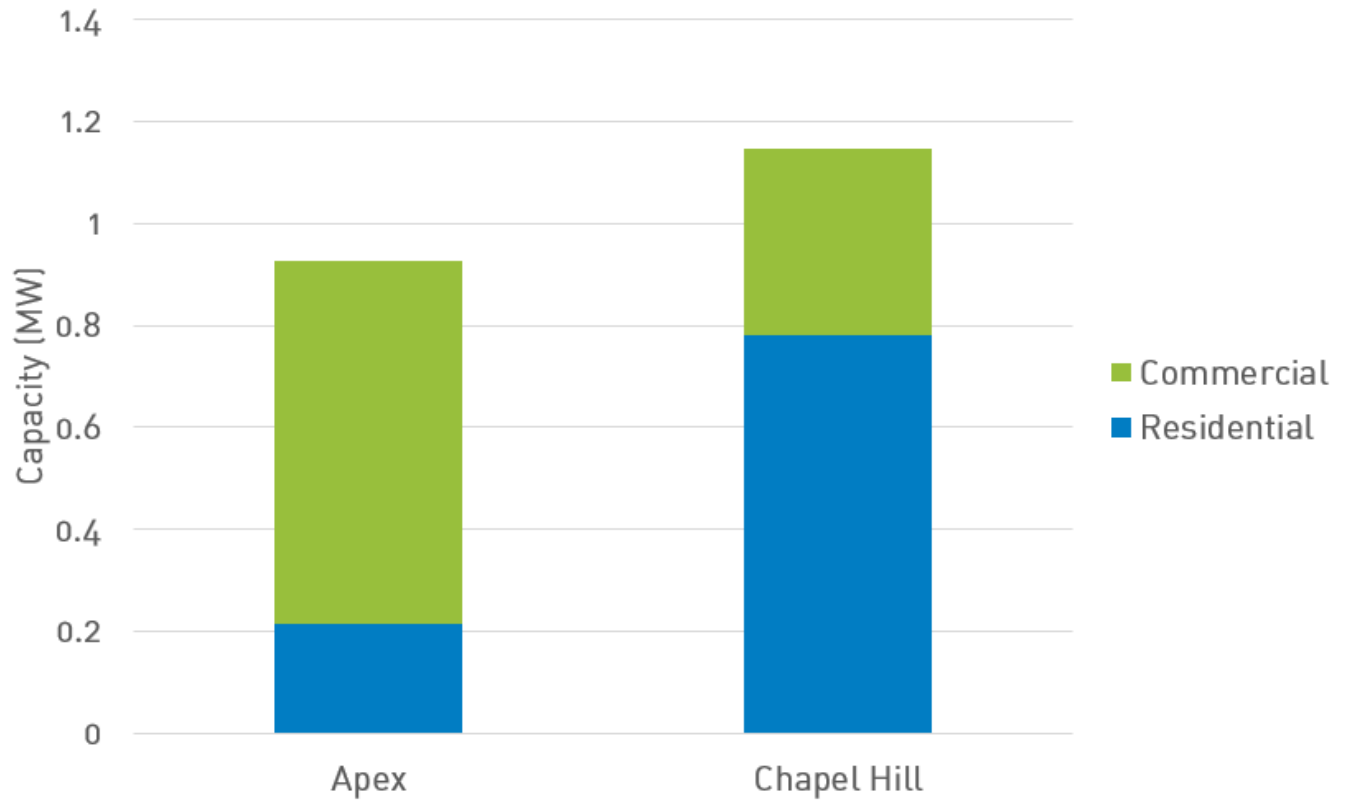

Figure 7. Total renewable energy generating capacity in Apex and Chapel Hill

The only year that Apex led Chapel Hill in the amount of generating capacity is in 2015. Since then, however, Chapel Hill has had almost twice as much new generating capacity than Apex.
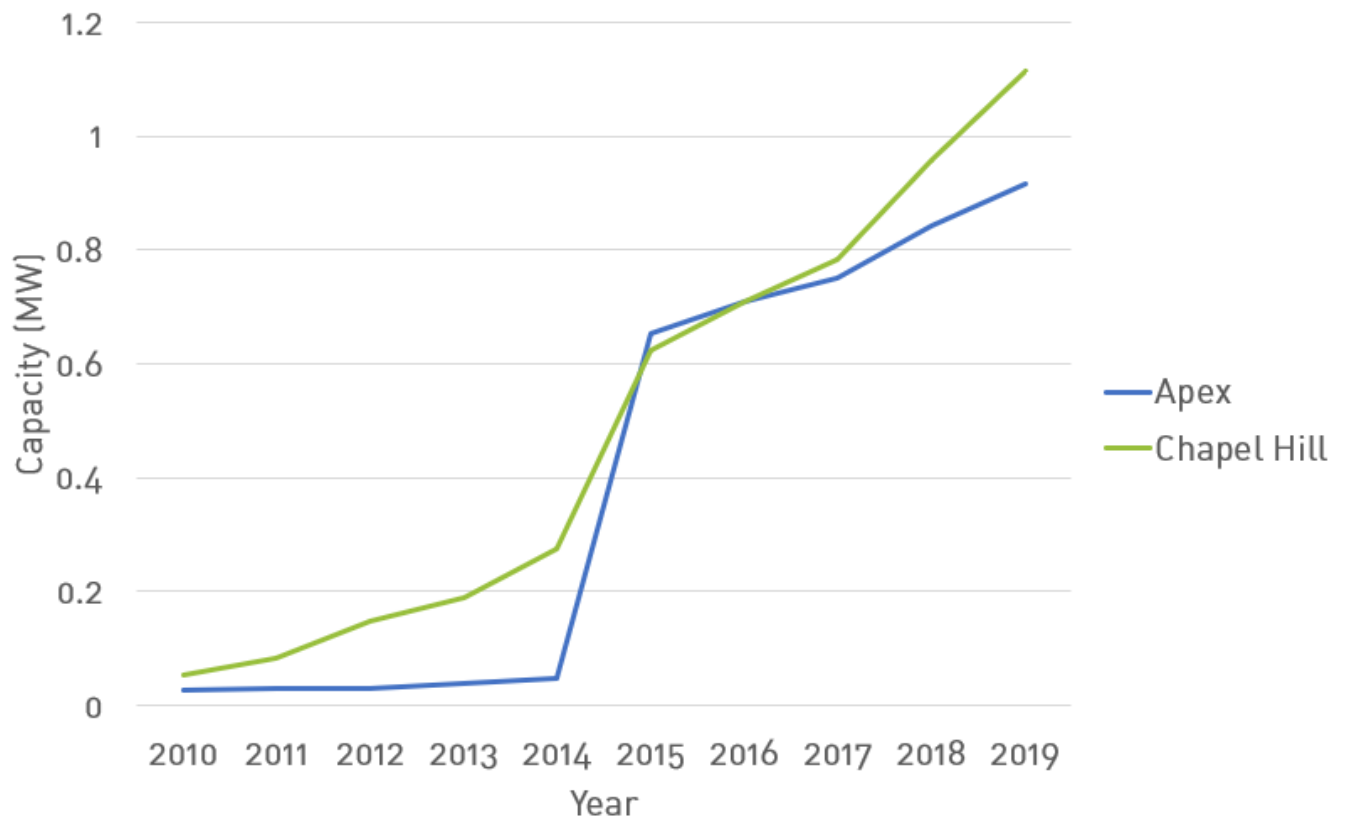
Figure 8. New renewable energy generating capacity installed in Apex and Chapel Hill, 2010-2019

Energy Efficient Buildings

Certified Energy Efficient Buildings

Chapel Hill has more than 7 times as many certified energy efficient buildings as Apex.

CITY	ENERGY STAR	LEED	TOTAL (MW)
APEX	5	1	6
CHAPEL HILL	13	30	43

Figure 8. New renewable energy generating capacity installed in Apex and Chapel Hill, 2010-2019

While most of the certified energy efficient buildings in Apex (83%) are ENERGY STAR certified, most in Chapel Hill (70%) are LEED certified.
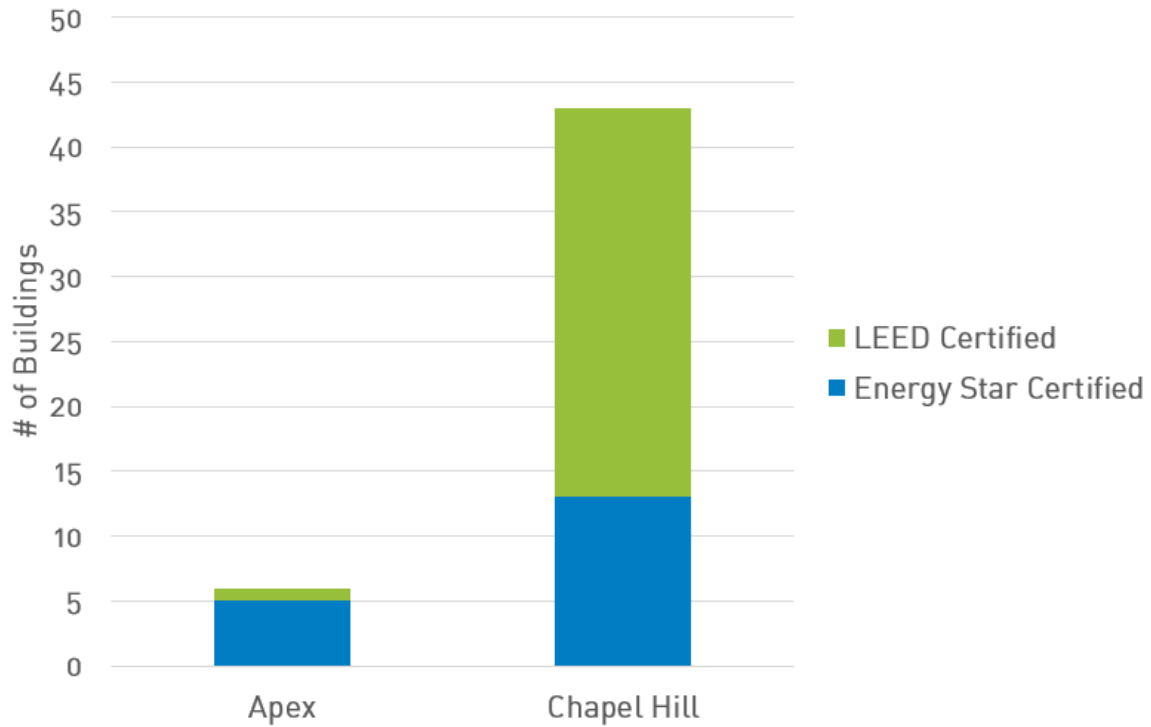

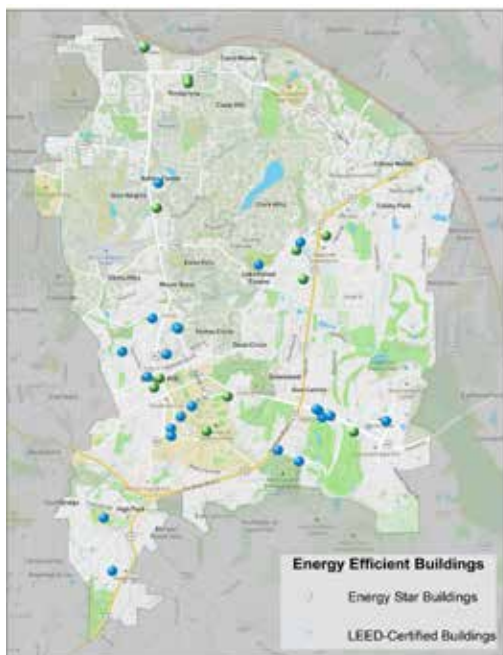Figure 9. Total number of certified energy efficient buildings in Apex and Chapel Hill

Figure 10. Locations of certified energy efficient buildings in Chapel Hill

Building Area in Certified Energy Efficient Buildings
While Chapel Hill has over 7 times as many certified energy efficient buildings than Apex, it has over 8 times as much building area in those buildings.

CITY	ENERGY STAR (FT²)	LEED (FT²)	TOTAL (FT²)
APEX	395,762	4,261	400,023
CHAPEL HILL	1,159,928	2,178,796	3,338,724

Table 6. Building area in certified energy efficient buildings in Apex and Chapel Hill

Electric Vehicles

Wake County leads Orange county in each vehicle category and has almost 4.5 times as many total hybrids, plug-in hybrids, and EVs than Orange county.

COUNTY	HYBRID	PLUG-IN HYBRID	ELECTRIC	TOTAL
ORANGE	5,683	416	816	6,915
WAKE	24,409	1,839	4,337	30,585

Table 7. Electric and hybrid vehicles registered in Orange and Wake Counties

There are more hybrids than EVs and plug-in hybrids in both Orange and Wake Counties.
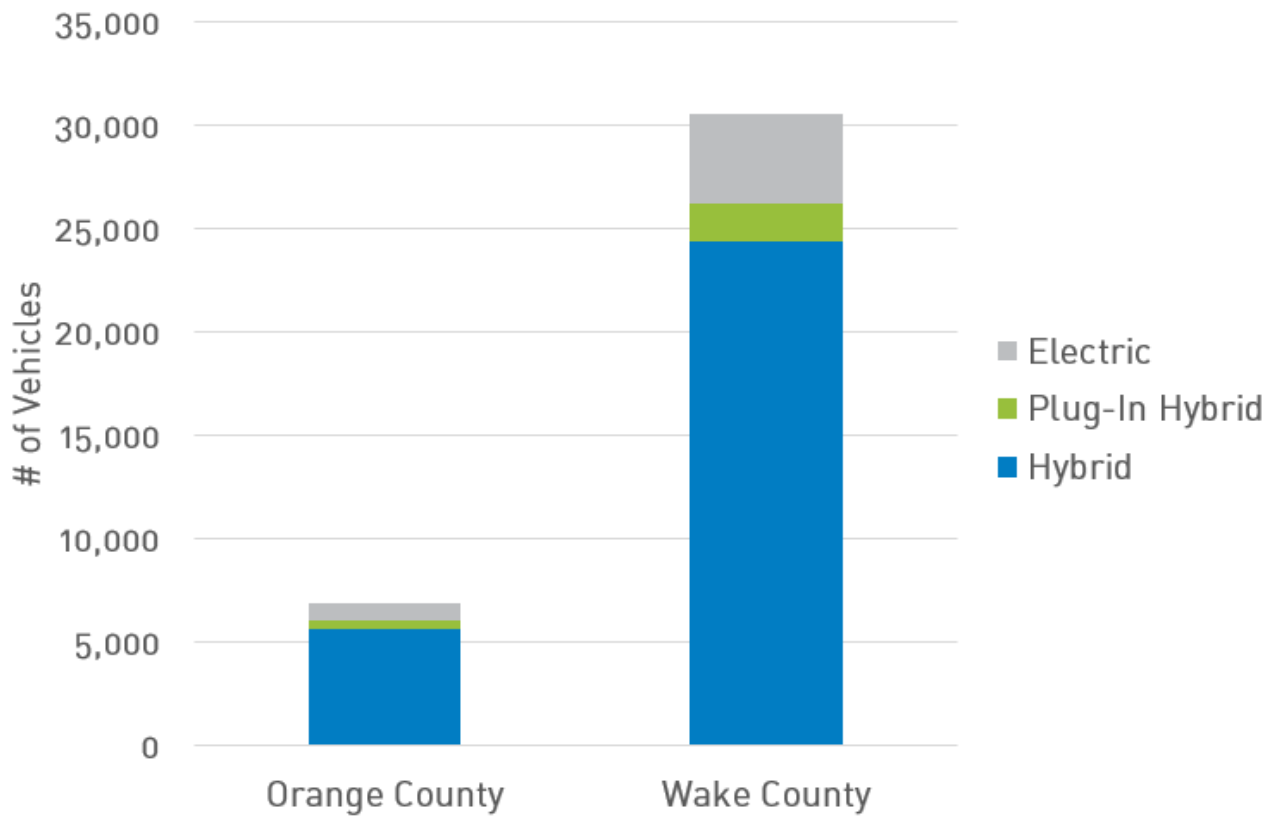
Figure 11. Number of EVs and Hybrids in Orange and Wake Counties

Wake County has over 960,000 more people than Orange County does, so when the total number of hybrids, plug-in hybrids, and EVs are calculated per 1,000 people, Orange County leads Wake County.[13]

COUNTY	TOTAL EVS, HYBRIDS, AND PLUG-IN HYBRIDS	POPULATION	VEHICLES PER 1,000 PEOPLE
ORANGE	6,915	148,476	46.6
WAKE	30,585	1,111,761	27.5

Table 8. EVs, hybrids, and plug-in hybrids per 1,000 people in Orange and Wake Counties.

Electric Vehicle Charging Stations
Chapel Hill has 8 times as many EV charging stations as Apex.

CITY	LOCAL GOVERNMENT	PRIVATE	TOTAL
APEX	1	1	2
CHAPEL HILL	2	14	16

Table 9. Number of electric vehicle charging stations in Apex and Chapel Hill by owner type
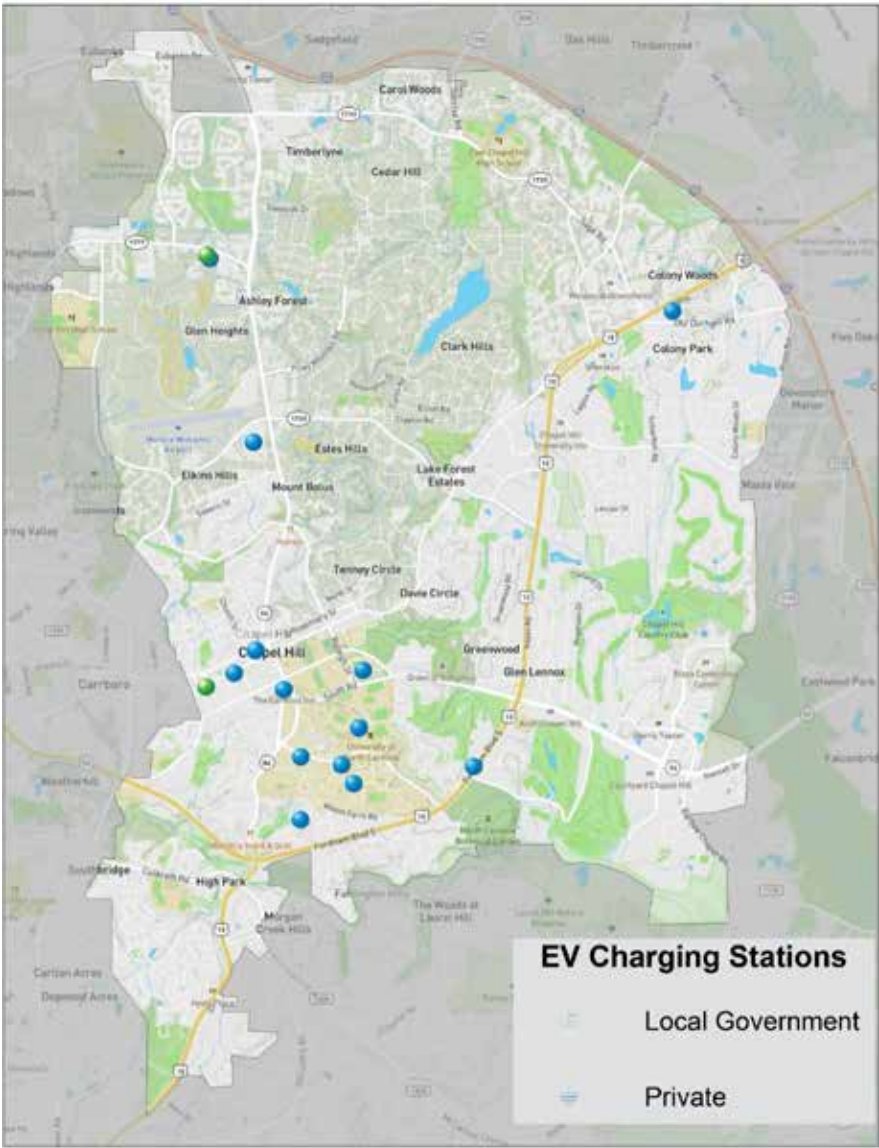

Figure 12. Locations of EV charging stations in Chapel Hill

There are only two EV charging stations in Apex, and one is owned privately while the other owned by the local government. In Chapel Hill, most of the stations (88%) are privately owned.
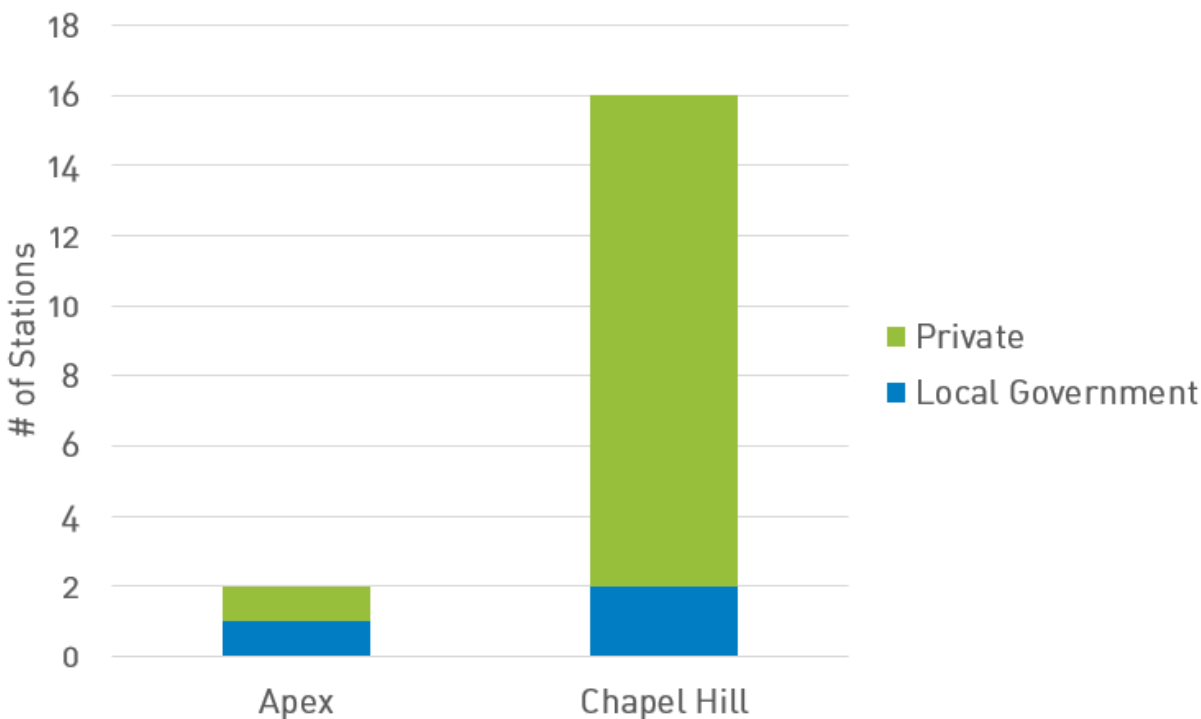

Figure 13. Number of EV charging stations in Apex and Chapel Hill by owner type

EV Charging Station Outlets

At any one EV charging station, there may be more than one outlet that can be used. Chapel Hill also leads Apex in the number of outlets too, with 7 times as many outlets as Apex.

CITY	LEVEL 1	LEVEL 2	DC FAST	TOTAL
APEX	0	5	1	6
CHAPEL HILL	1	41	0	42

Table 10. Number of outlets at EV charging stations in Apex and Chapel Hill by level

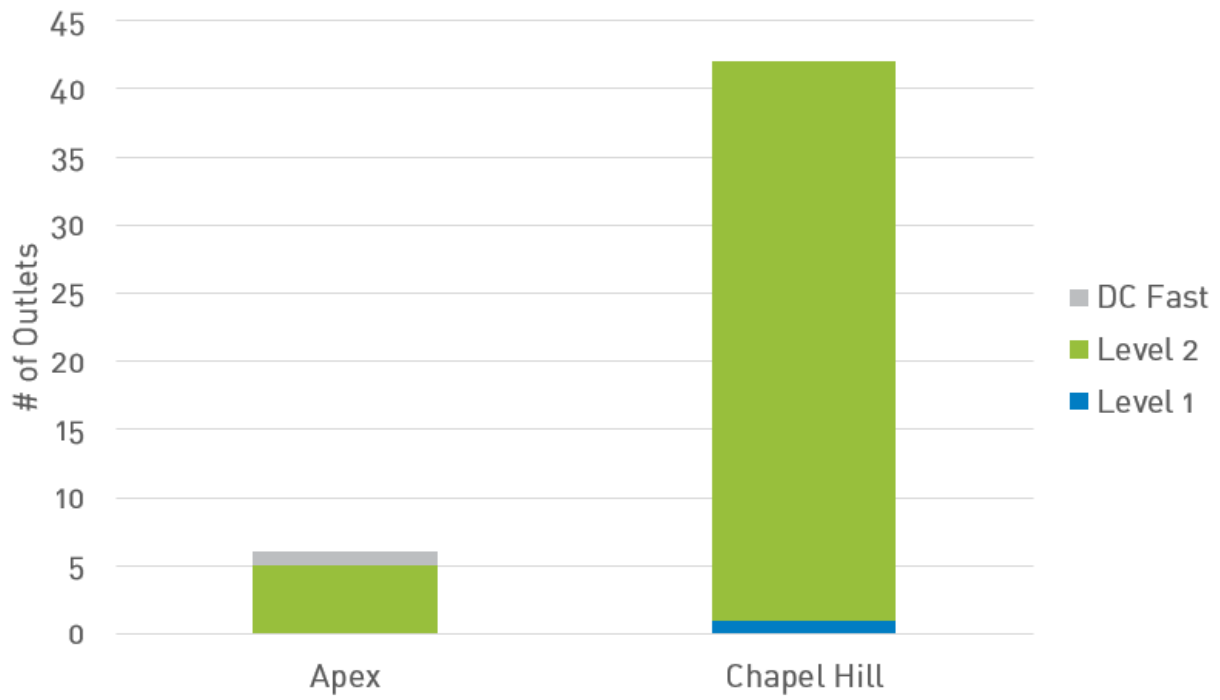Most of the outlets in both Apex (83%) and Chapel Hill (98%) are level 2.

Figure 14. Number of EV charging outlets in Apex and Chapel Hill by level

Endnotes

1. ENERGY STAR. "About ENERGY STAR for Commercial Buildings." https://www.energystar.gov/about/origins_mission/energy_star_overview/about_energy_star_commercial_buildings
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8. North Carolina Department of Transportation. "ZEV Registration Data." https://www.ncdot.gov/initiatives-policies/environmental/climate-change/Pages/zev-registration-data.aspx
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12. North Carolina Department of Commerce. "County Distress Rankings (Tiers)." https://www.nccommerce.com/grants-incentives/county-distress-rankings-tiers
13. United States Census Bureau. "Quickfacts: Orange County, North Carolina; Wake County, North Carolina." https://www.census.gov/quickfacts/fact/table/