

November 2020

Local Government Clean Energy Report

Wilmington, 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.



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Introduction

Where Does This Data Come From?

Before electricity generating systems can be interconnected, they must register with paperwork 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 to the utilities commission 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.

What does the REDB contain?

- Application Information
 - NCUC Docket Number
 - Docket Description
 - Application Date, Quarter, and Year
- Facility Type
 - Residential, Commercial, etc.
- Project Name
- Account Holder Company
- Project Location
 - Address, City, County, NCSEA Region, State, Zip Code, Lat/Long
- General System Type
 - Biomass, Solar, Wind, etc.
- Specific System Type
 - Biogas, PV, Thermal, Waste to Heat, etc.
- System Notes
 - Poultry Waste, Swine Waste, Rooftop, Ground-mount, etc.
- System Capacity
- System Total Cost and Cost per Watt
- To whom the electricity and RECs are sold
- Installer Company
- Whether the system has been installed
- System Operation Date, Year, and Quarter
- How the system information was verified
- Political Districts in which system is located
 - NC House and Senate
 - US Senate

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. In fact, there are many hydroelectric, bioenergy, and wind systems in North Carolina, but this report primarily focuses on solar PV and wind technology.



Current Renewable Energy Systems in Wilmington

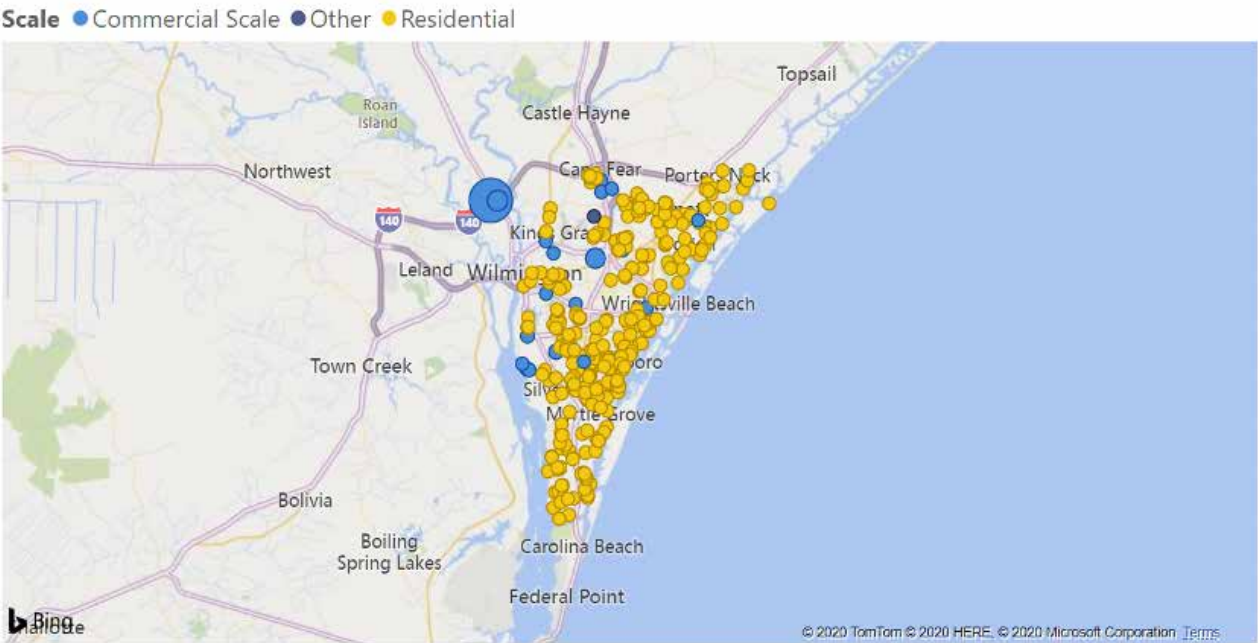


Figure 2. Map of Solar Installations in Wilmington

There are 5.86 MW of renewable energy generating systems installed in Wilmington, all but one of which is solar photovoltaic (PV). While most of the systems in Wilmington are residential (~94%), the majority of generating capacity comes from commercial solar PV (~68%). The largest system in the city is a 1.6 MW system at South Atlantic Services, Inc., a contract packaging company.

TECHNOLOGY	# OF SYSTEMS	CAPACITY (MW)
SOLAR PV	307	5.85
WIND	1	0.01

Table 1. Renewable Energy Systems in Wilmington by Technology Type



SYSTEM TYPE	# OF SYSTEMS	CAPACITY (MW)
COMMERCIAL	20	3.97
RESIDENTIAL	288	1.89

Table 2. Renewable Energy Systems in Wilmington by Ownership Type

CATEGORY	# OF SYSTEMS	CAPACITY (MW)
CORPORATE	9	3.26
RETAIL	1	0.36
CITY-OWNED	4	0.10
COUNTY-OWNED	1	0.01
HEALTHCARE	2	0.11
RECREATION	1	0.10
BEVERAGE	1	0.03
HOUSING	1	0.01

Table 3. Breakdown of Commercial Solar PV Systems in Wilmington by Category

Wilmington's installations have followed the same general trends as renewable energy systems across the state – a large increase before 2015 when the state tax credit expired, followed by another increase in 2018 due to Duke Energy's rebate – which is discussed later. The large amount of capacity added in 2013 is that 1.6 MW system installed at South Atlantic Services.



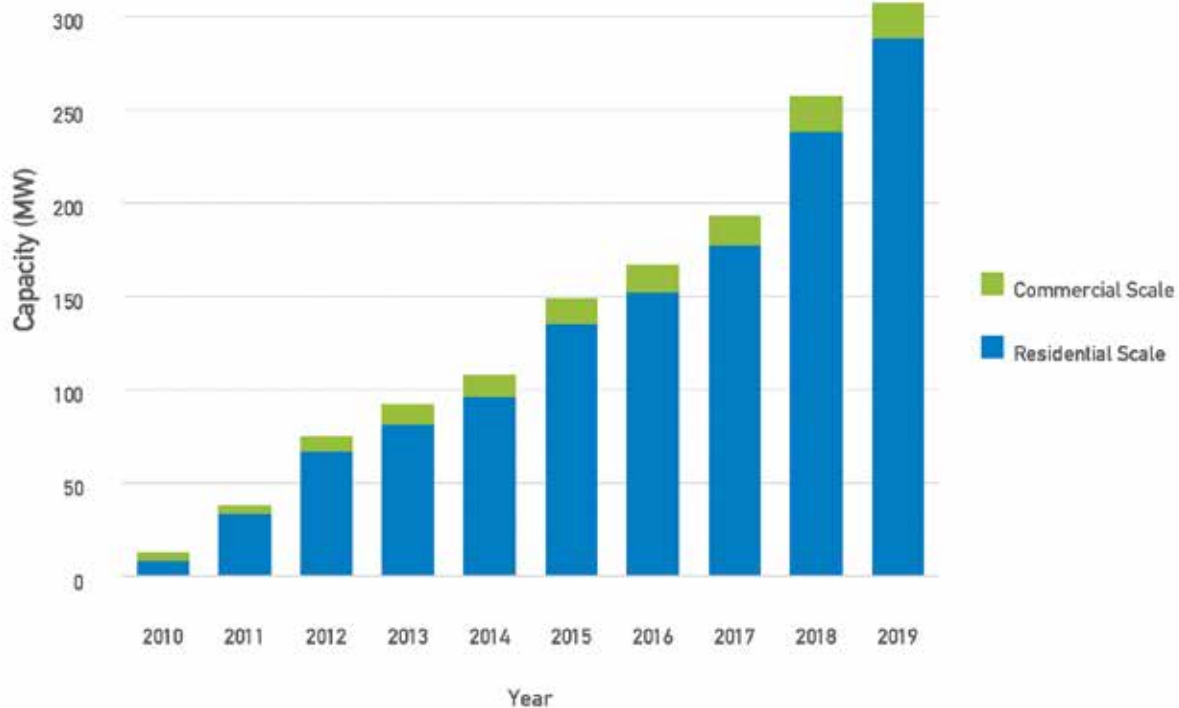


Figure 3. Cumulative Number of Renewable Energy Systems Installed in Wilmington, 2010-2019

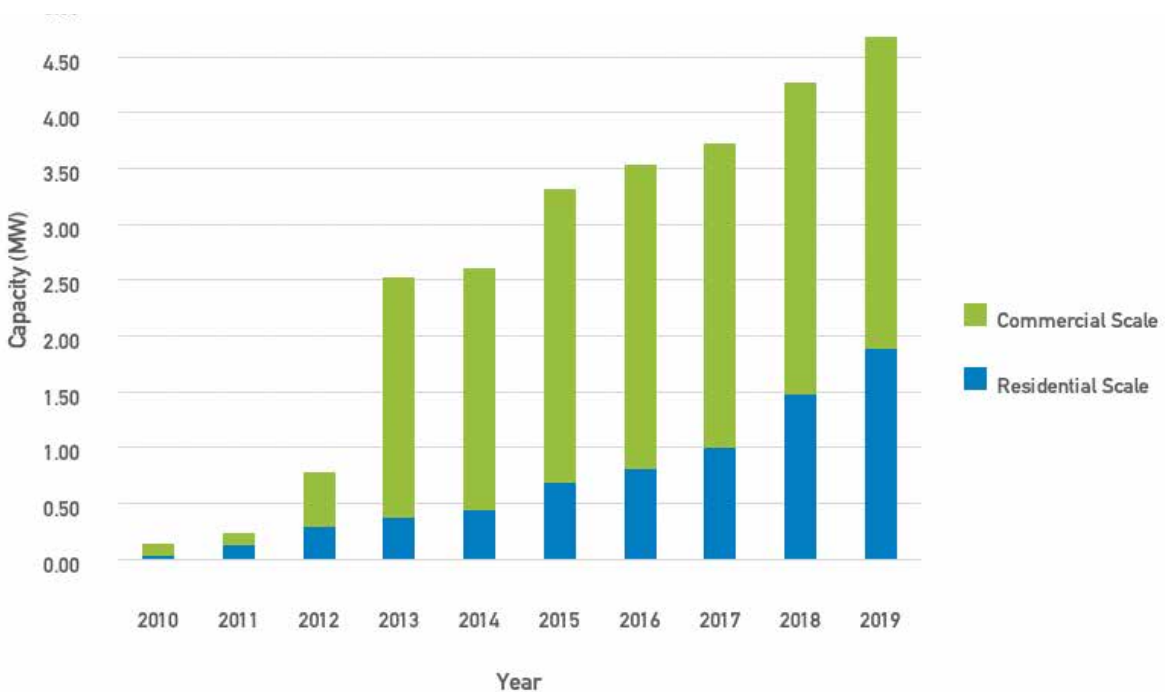


Figure 4. Cumulative Capacity of Renewable Energy Systems Installed in Wilmington, 2010-2019



Incentive Programs

North Carolina State Renewable Energy Tax Credit

Before it expired at the end of 2015, North Carolina had a renewable energy tax credit that applied to 35% of the cost of a renewable energy system that generated electricity through solar wind, hydro, biomass, geothermal, or biofuel. This credit could be taken by individuals or by businesses and contributed to significant growth of the state's solar PV.²

Duke Energy's North Carolina Solar Rebate Program

Since Wilmington is in Duke Energy Progress territory, customers in the city that are served by that utility are eligible for the North Carolina Solar Rebate Program. This includes a one-time rebate of \$0.60/watt for residential customers, up to \$6,000; \$0.50/watt for non-residential customers, up to \$50,000; and \$0.75/watt for non-profit customers, up to \$75,000. This rebate applies to customers that install their system or have its meter installed on or after each October from 2018-2022, with yearly caps on the amount of total rebate amount paid to customers, and a total program participation limit of 10 MW across the service territory.³ Other programs can be found in Table 2 of the Appendix.



Wilmington Compared to Other Cities

Asheville, Cary, and High Point

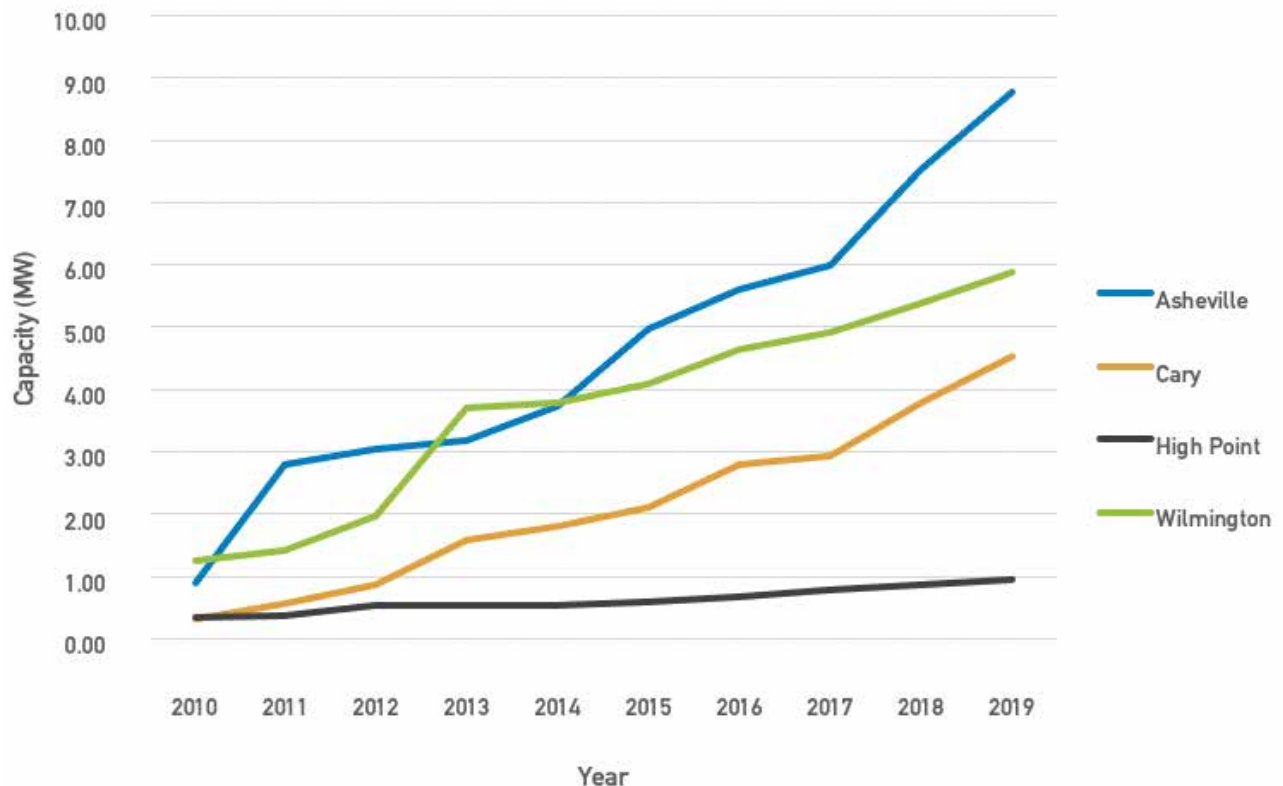


Figure 5. Cumulative Capacity Installed in Cities Similar in Economic Tier and Population to Wilmington, 2010-2019

When choosing cities to compare Wilmington's renewable energy capacity, similar economic conditions and population were given preference. Wilmington, Cary, and Asheville are all located in Tier 3 counties, as designated by North Carolina's Department of Commerce¹, and High Point is located at the center of four Tier 2 counties.⁴ These four cities also have similar populations, ranging from Asheville, with just under 93,000, to Cary, with 170,000.

Although Wilmington received a boost in its renewable energy generating capacity when the South Atlantic Services system was installed in 2013, since then, Asheville has surpassed it, and Cary is closing the gap. Most of the recent growth in Asheville and Cary is due to Duke Energy's Solar Rebate program, which started in 2018. Wilmington has not seen the same amount of residential adoption of solar PV as Cary and Asheville have since then.



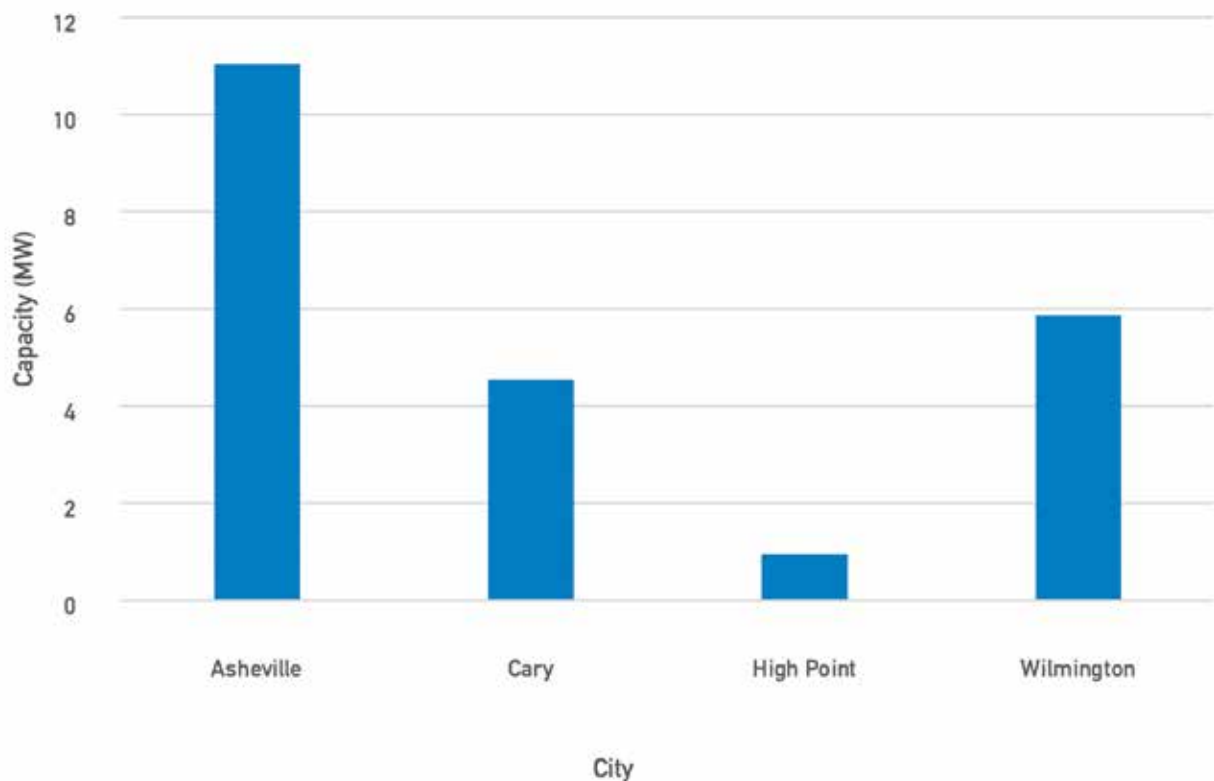


Figure 6. Total Renewable Energy Generating Capacity Installed Since 2010

While the gap between Wilmington and Cary in terms of total renewable energy generating capacity installed since 2009 is small, Asheville has almost double Wilmington's total. Besides the one residential wind system in Wilmington, the only renewable energy systems these cities contain are solar PV.

In terms of generating capacity, Wilmington and High Point share similar ratios of commercial systems to residential ones, 68% to 32% and 61% to 39%, respectively. In Asheville and Cary, however, there is more capacity in residential than commercial, 48% to 52% and 43% to 57%, respectively.



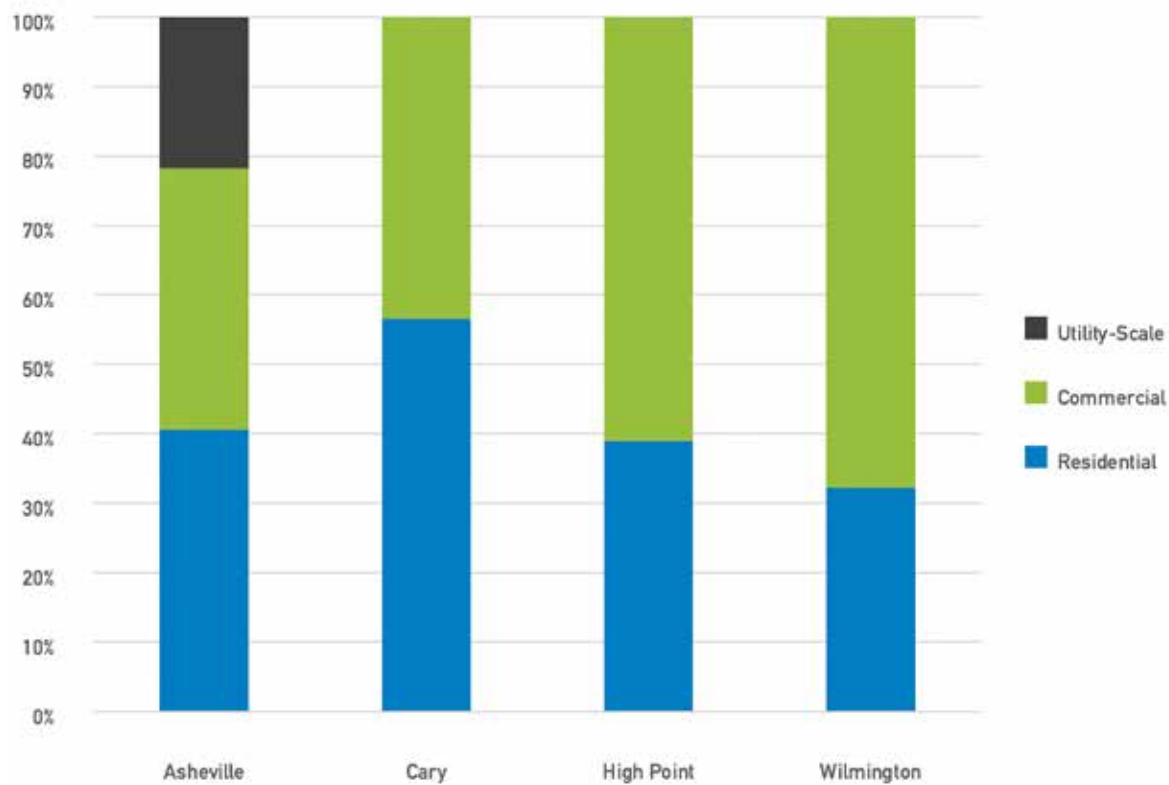


Figure 7. Percent Contribution of Generating Capacity by Ownership Type

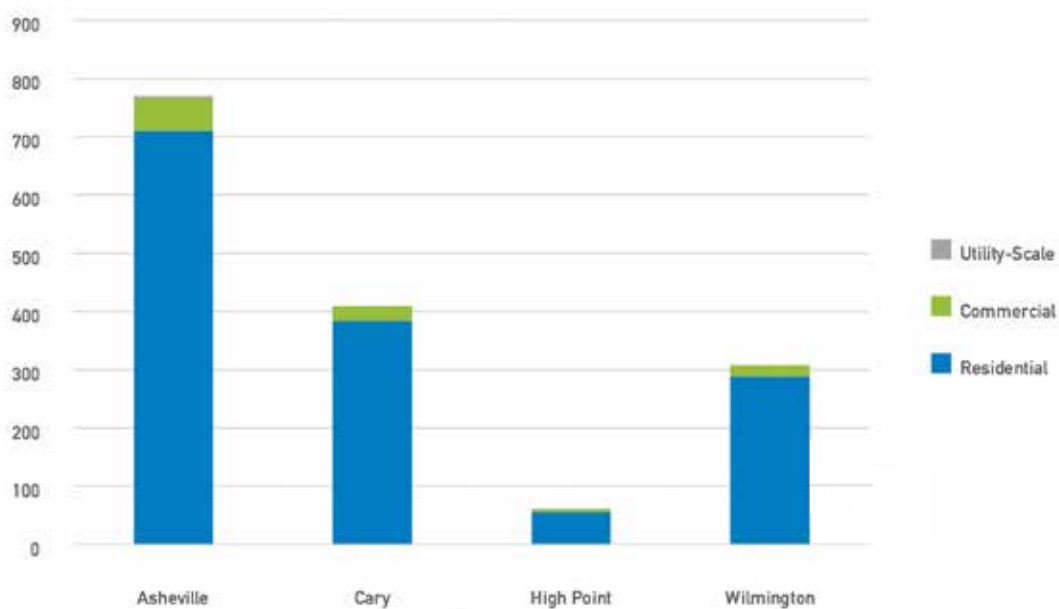


Figure 8. Total Number of Renewable Energy Systems Installed



While Wilmington is second out of these four cities in terms of generating capacity from renewable energy systems, it is third when comparing the number of individual systems. This is mostly due to Wilmington's lower number of residential systems. For example, Wilmington has 288, while Asheville has over 700 and Cary has almost 400.

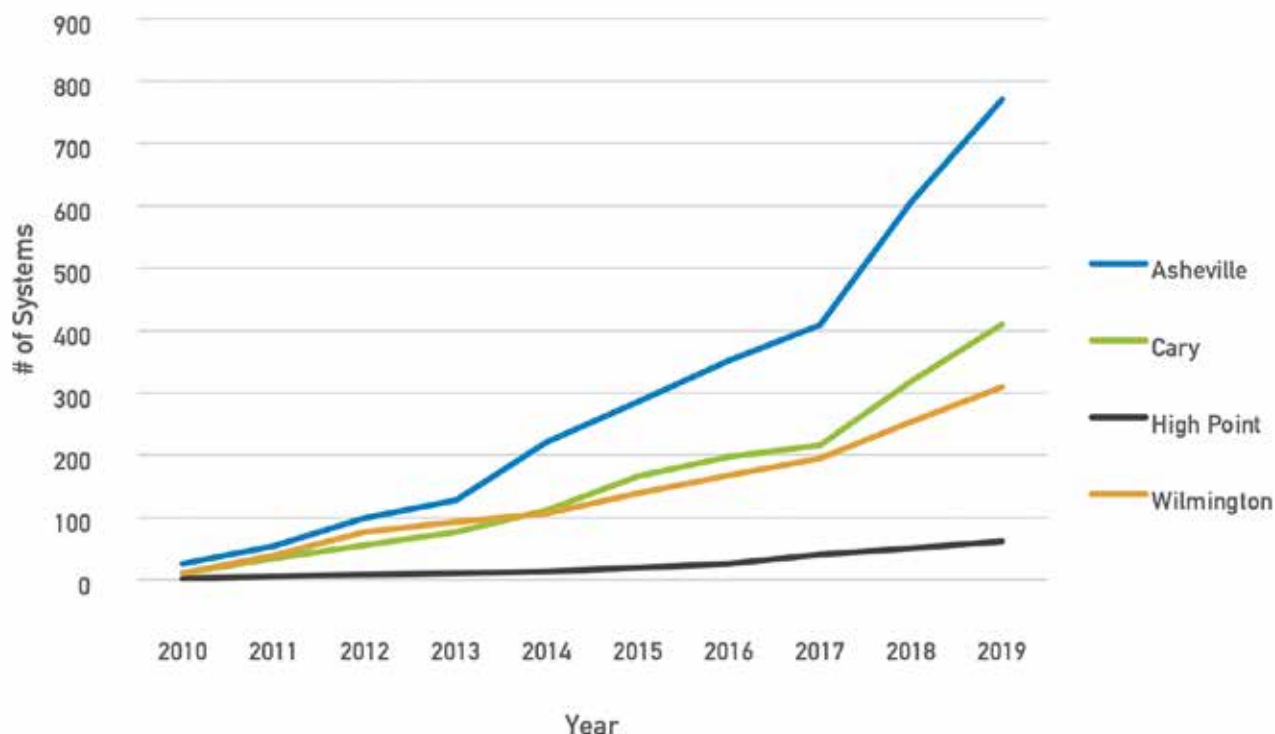


Figure 9. Number of Renewable Energy Systems Installed in Selected Cities from 2010-2019

Jacksonville and Greenville

In addition to cities of similar population and economic tier, Wilmington can be compared to other cities in North Carolina that are geographically-similar: Jacksonville and Greenville. All of the renewable energy systems in Greenville and Jacksonville are solar PV, and they have renewable capacities of 12.4 MW and 0.7 MW, respectively.

Although the total capacities vary significantly between Wilmington and Jacksonville, their ownership types are the same, with no utility-scale systems in either city. Instead, each city relies on commercial scale systems for a majority of their renewable energy capacity, as commercial scale sites in Jacksonville represent 60% of its total capacity and 68% of Wilmington's total.

In contrast, Greenville has three utility-scale systems, which account for 12 MW, or 96% of the city's total capacity.



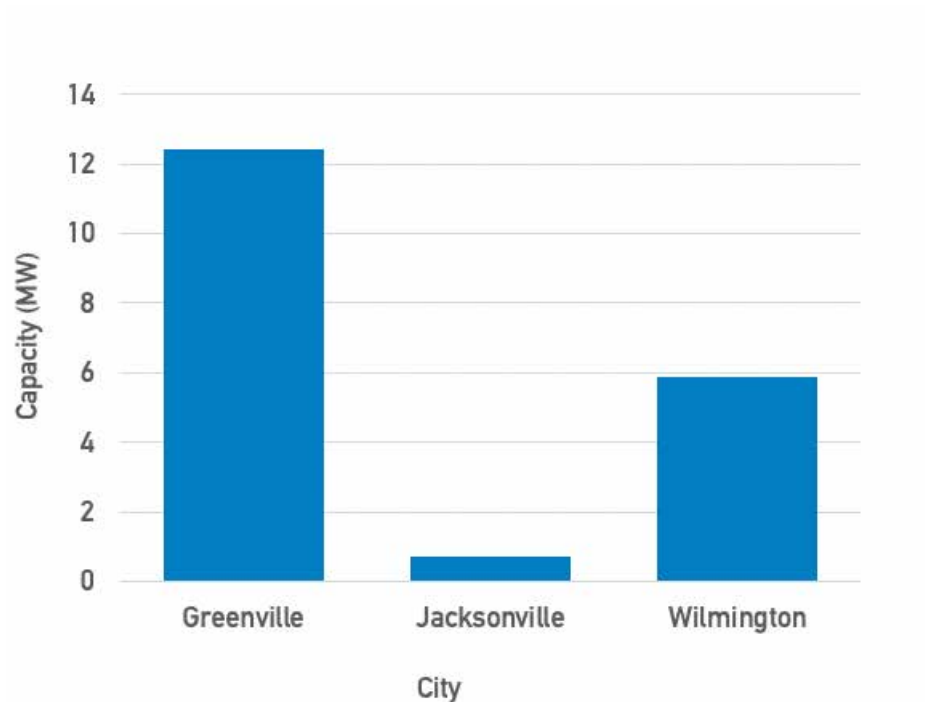


Figure 10. Total Capacity of Renewable Energy Systems in Selected Cities from 2010-2019

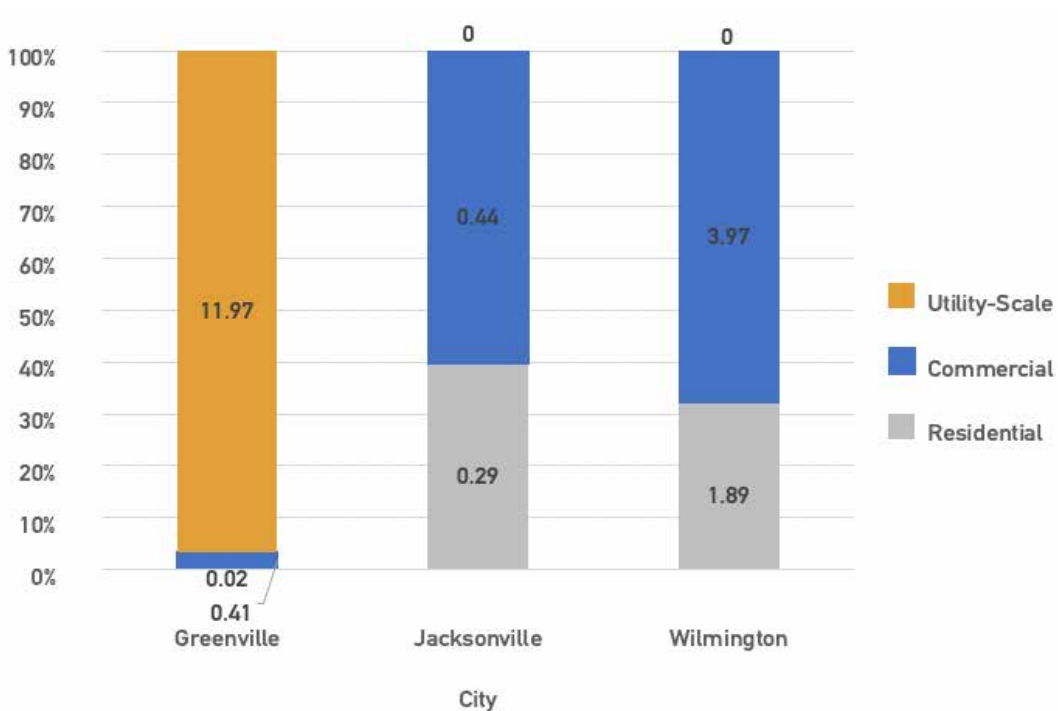


Figure 11. Percent Contribution of Generating Capacity by Ownership Type



Two utility-scale systems were installed in Greenville in 2014, each with a capacity of 5 MW. In 2017, a 2 MW facility was added, and there has not been much additional capacity added since. While Greenville has the most capacity, since most of that capacity comes from utility-scale systems, it has many fewer individual systems than Wilmington.

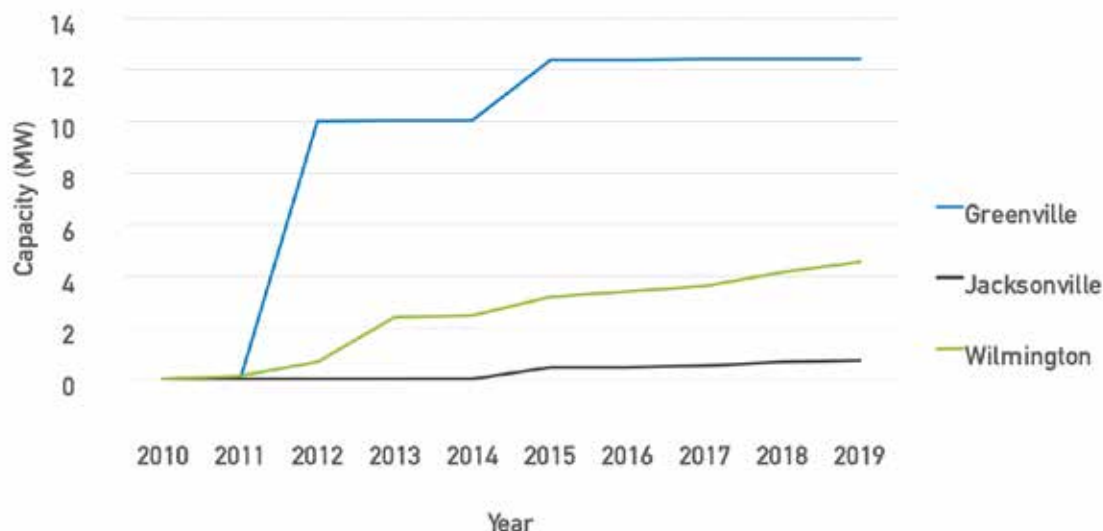


Figure 12. Cumulative Capacity of Renewable Energy Systems Installed in Selected Cities

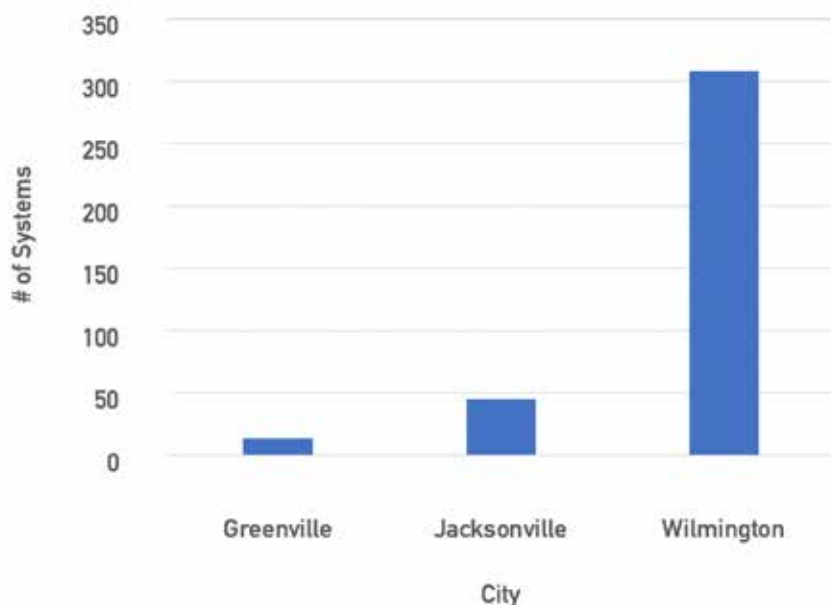


Figure 13. Total Number of Renewable Energy Systems Installed in Selected Cities



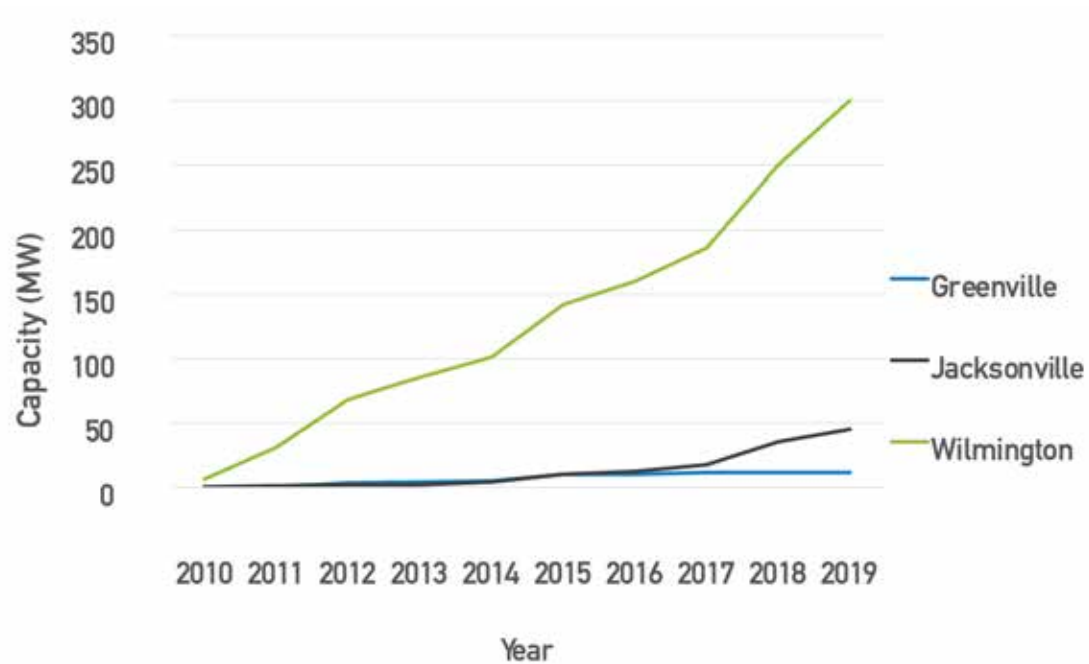


Figure 14. Cumulative Number of Renewable Energy Systems Installed in Selected Cities



New Hanover County Compared to Other Coastal Counties

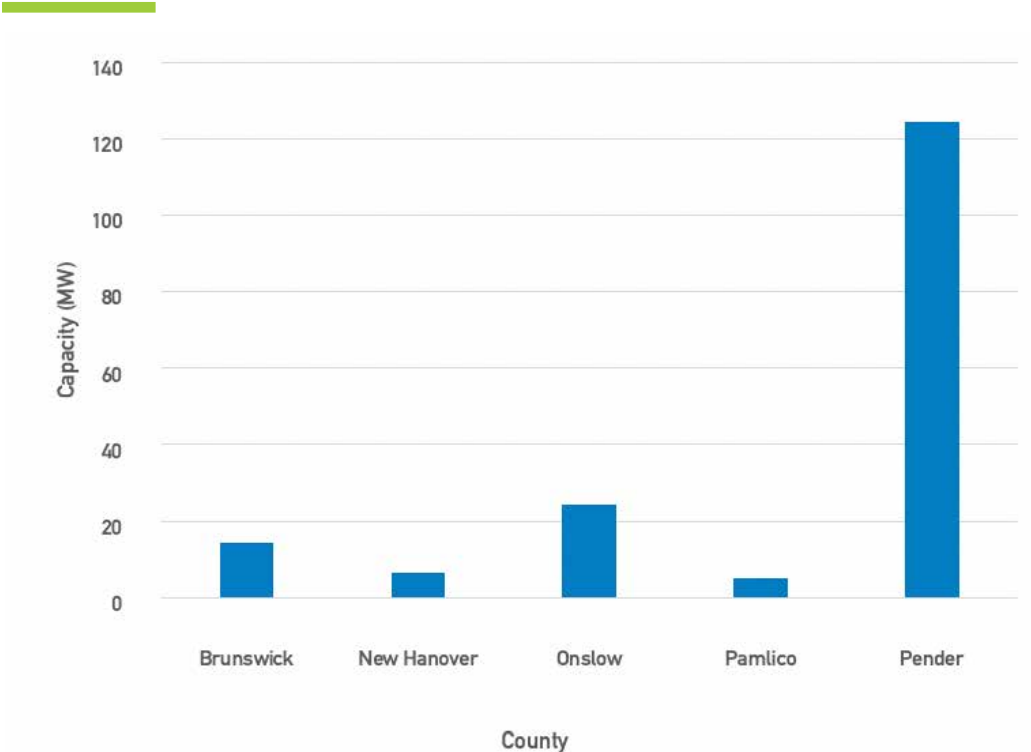


Figure 15. Total Renewable Energy Generating Capacity in Coastal Counties

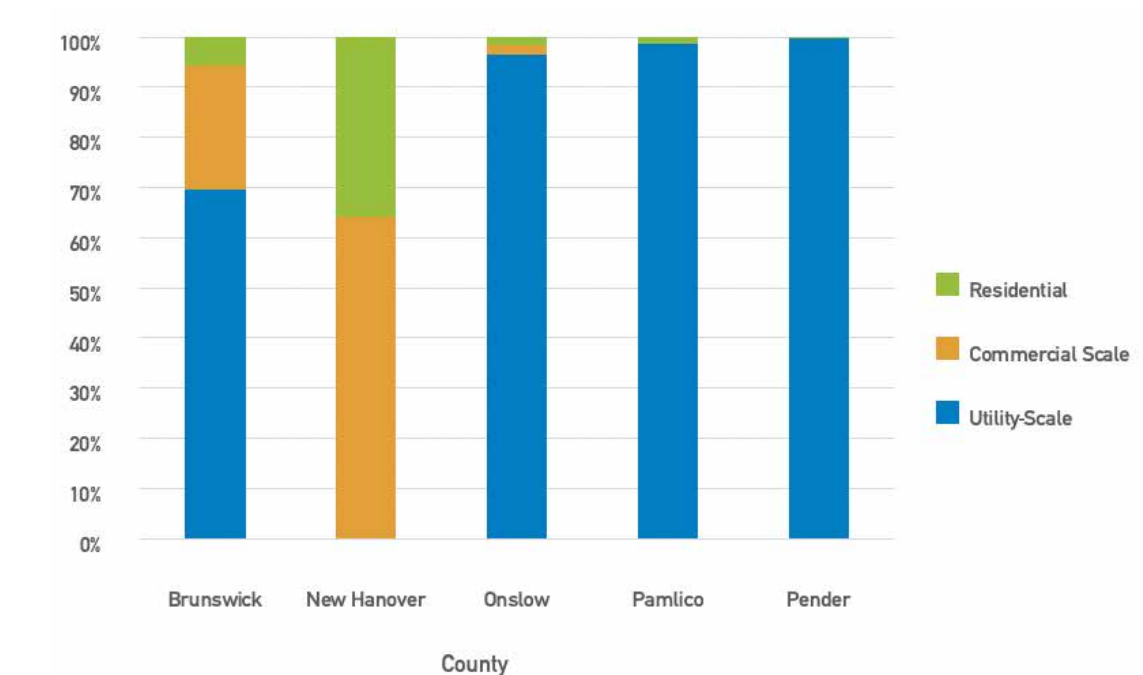


Figure 16. Contribution of Renewable Energy Generating Capacity by Ownership Type for Coastal Counties



The biggest difference in terms of renewable energy generating capacity between New Hanover County and other coastal counties in North Carolina is the presence of utility-scale solar PV. New Hanover is the only county in this group that does not have a utility-scale solar PV system. With its higher population, New Hanover County lacks the inland area necessary to house a utility-scale solar installation.

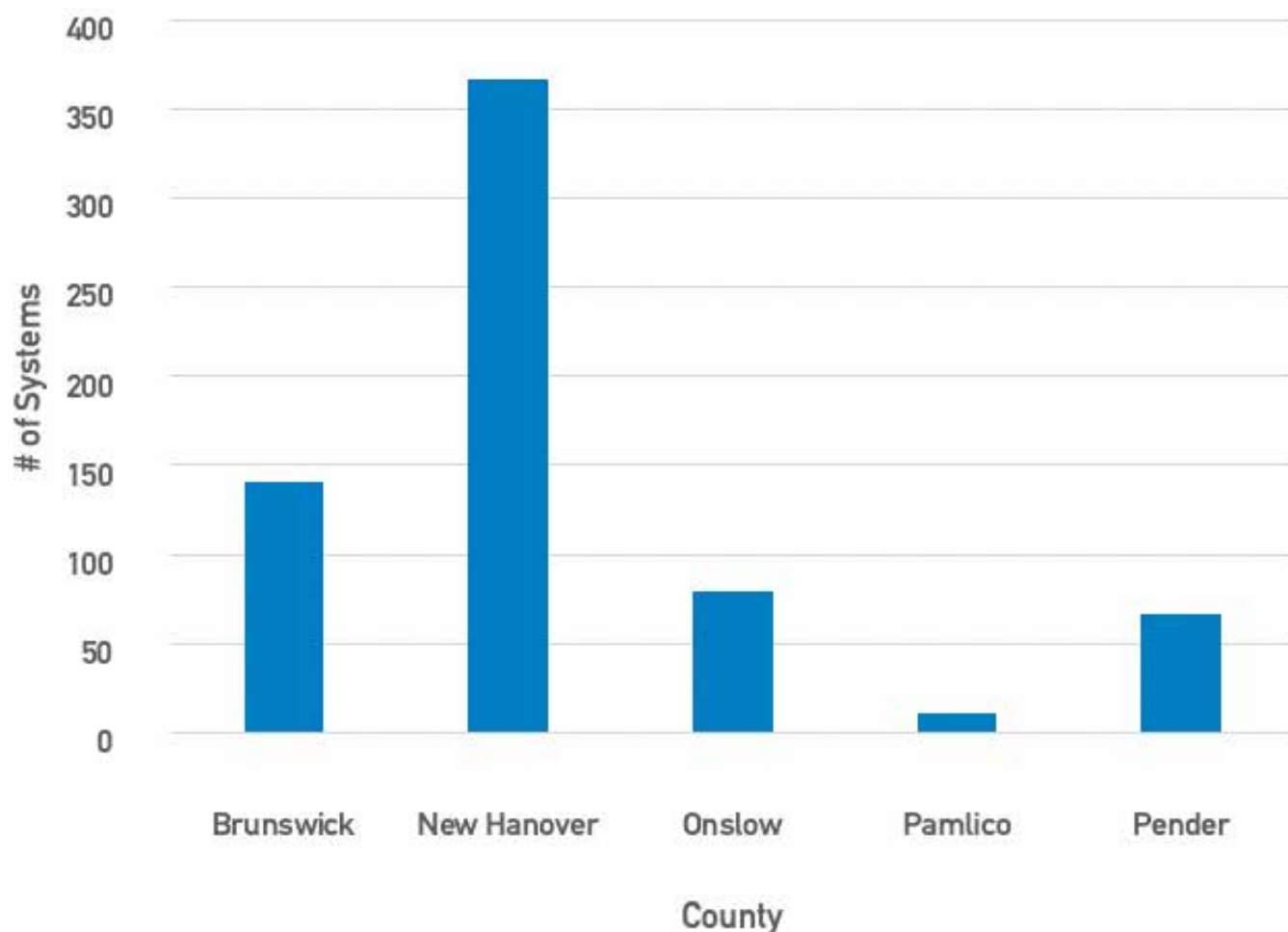


Figure 17. Total Renewable Energy Systems Installed in Coastal Counties

Typically, there is an inverse relationship between the number of renewable energy systems in an area and the total generating capacity of those systems, since more systems generally means more residential ones, which have lower generating capacities. This is true for New Hanover County, as the growth of renewable energy systems in New Hanover County has followed growth in the runup to the expiration of the state tax credit in 2015 followed by a lull until the Duke Solar Rebate Program in 2018 and 2019. In fact, in 2018-2019, 39% of the decade's installations occurred.



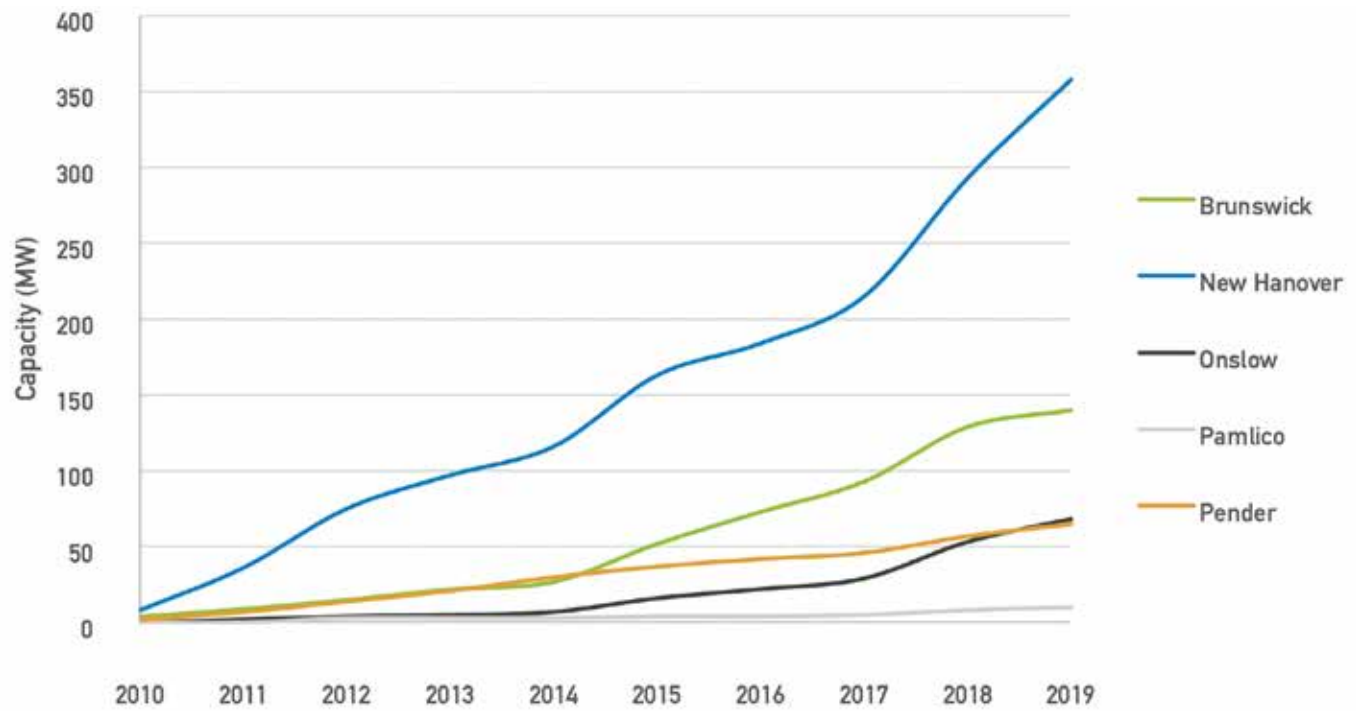


Figure 18. Cumulative Number of Renewable Energy Systems Installed in Coastal Counties



Appendix A – City Profile

Wilmington is the ninth most populous city in North Carolina, with an estimated population of almost 124,000.⁵ That population is primarily White (76%), but there are two other races that make up at least 1%: Black (19%) and Asian (1%). Additionally, about 6% is Hispanic and 2% is two or more races, and slightly over half (53%) of the city's population is female.⁶ In age, almost two-thirds of the city's population is between the ages of 18 and 64 years, with a median age of 36 years.^{7,8} In terms of economics, the median household income is over \$45,000, which is lower than the national average, and the poverty rate is 23%, which is higher than the national average.⁹



Appendix B – Financial Assistance Programs Available in Wilmington

Program Name	Region	Information
Active Solar Heating and Cooling Systems Exemption	NC	Active solar heating and cooling systems may not be assessed at more than the value of a conventional system for property tax purposes; this law applies only to active solar systems.
NC GreenPower Production Incentive	NC	Offers production payments for grid-tied electricity generated by renewable sources such as solar, wind, small hydro (10 MW or less), and biomass. The incentives are made on a per-kWh basis and vary by technology.
Local Option - Green Building Incentives	NC	Allows all counties and cities to provide reductions or partial rebates for building permit fees; the building must meet guidelines established by the Leadership in Energy and Environmental Design (LEED) Program, the Green Globes Program, or another certification program.
Property Tax Abatement for Solar Electric Systems	NC	Exempts 80% of the appraised value of a "solar energy electric system" (PV system) from property tax.
Duke Energy Progress Energy - Residential Energy Efficiency Rebate Program	NC	Rebates are provided for certain heating and cooling products, duct sealing and repairs, air sealing and insulation, and heat pump water heaters. The equipment must meet efficiency requirements for the program and customers must use a Progress Energy-approved contractor.
SystemVision Energy Guarantee Program	NC	The NC Housing Finance Agency, through this program, provides a \$4,000 subsidy to nonprofits and local governments for each home they develop through the Community Partners Loan Pool or the Self-Help Loan Pool following SystemVision efficiency guidelines.
Local Option - Financing Program for Renewable Energy and Energy Efficiency	NC	Authorizes cities and counties to establish revolving loan programs to finance renewable energy and energy efficiency projects that are "permanently affixed" to "real property." These programs can be funded via the Energy Efficiency and Conservation Block Grants from the federal government and the city or county's unrestricted revenue. The loan programs cannot charge more than 8% interest and terms are limited to 20 years.
Business Energy Investment Tax Credit (ITC)	US	Investment tax credits are awarded by the IRS for various technologies. The system must be used and/or constructed by the taxpayer and must meet performance and quality standards. The property must also be operational in the year in which the credit is first taken.



Residential Energy Conservation Subsidy Exclusion (Personal)	US	Energy conservation subsidies provided to customers by public utilities are non-taxable.
Modified Accelerated Cost-Recovery System (MACRS)	US	Businesses may recover property investments via depreciation deductions. Renewable systems under the ITC are classified as five-year property, meaning depreciation occurs over five years.
Residential Energy Conservation Subsidy Exclusion (Corporate)	US	Energy conservation subsidies provided to customers by public utilities are non-taxable. This exclusion does not apply to electricity-generating systems qualifying under the Public Utility Regulatory Policies Act of 1978 (PURPA).
Renewable Electricity Production Tax Credit (PTC)	US	Inflation-adjusted per-kWh tax credit for electricity generated by qualified energy resources and sold by the taxpayer during the taxable year. The credit lasts 10 years.
Energy-Efficient Mortgages	US	Homeowners can use EEM to finance energy efficient improvements or to increase their home buying power with the purchase of a new energy efficient home. These loans are insured through the Federal Housing Authority (FHA) or Veterans Affairs (VA) programs.
USDA - Rural Energy for America Program (REAP) Grants	US	Provides financial assistance to agricultural producers and rural small businesses to purchase, install and construct renewable energy systems, make energy efficiency improvements, use renewable technologies and participate in energy audits and renewable energy development assistance.
Residential Renewable Energy Tax Credit	US	A taxpayer may claim a credit of 30% of qualified expenditures for a system serving a US dwelling that is owned and used as a residence by the taxpayer. Expires 12/31/2021.
Clean Renewable Energy Bonds (CREBs)	US	Bonds for financing renewable energy projects, primarily in the public sector. Qualifying technologies are generally the same as those defined for the PTC. The bondholder receives federal tax credits in lieu of a portion of the traditional bond interest.
US Department of Energy - Loan Guarantee Program	US	DOE is authorized to issue loan guarantees for projects with high technology risks that reduce emissions and pollutants and employ improved technologies.



Qualified Energy Conservation Bonds (QECBs)	US	Qualified tax credit bonds similar to CREBs that may be used by state, local, and tribal governments to finance certain types of energy projects.
USDA - High Energy Cost Grant Program	US	Ongoing grant program for improving energy generation, transmission, and distribution facilities in rural communities.
USDA - Repowering Assistance Biorefinery Program	US	Payments to eligible biorefineries to replace fossil fuels with renewable biomass. Reimbursement payments are provided to offset conversion costs.
FHA PowerSaver Loan Program	US	Federal Housing Administration (FHA) offers three financing options for homeowners to make energy efficiency and renewable energy upgrades. Borrowers must select from PowerSaver lenders.
USDA - Rural Energy for America Program (REAP) Energy Audit and Renewable Energy Development Assistance (EA/REDA) Program	US	Provides assistance to agricultural producers and rural small businesses for energy audits and renewable energy technical assistance including renewable energy site assessments.
Low-Income Home Energy Assistance Program (LIHEAP)	US	Provides resources to assist families with energy costs associated with home energy bills, energy crises, weatherization, and energy-related minor home repairs. The maximum income level to qualify is 150% of the poverty level.
Weatherization Assistance Program (WAP)	US	The USDOE issues grants to states, territories, and some Indian tribes to improve energy efficiency of low-income homes. These entities contract with local governments and nonprofit agencies who provide the weatherization services.
Fannie Mae Green Financing - Loan Program	US	Fannie Mae Green Financing Business provides mortgage financing to apartment buildings and cooperatives for energy and water efficiency property improvements. All loans are securitized as Green Mortgage Backed Securities (Green MBS).

Table 4. Financial Assistance Programs Available in Wilmington¹⁰



Appendix C – Energy Conservation Programs Available in New Hanover County

Program Name	Information
Duke Progress Energy - My Home Energy Report	Duke Energy sends homeowners regular reports via mail comparing their energy use to similar community households. The report also includes tips on how to reduce energy use.
Duke Progress Energy - EnergyWise Home	Voluntary residential program designed to temporarily reduce power consumption during periods of peak energy demand. A contractor installs technology that communicates with a home's central A/C system to power off and on the air conditioner's compressor in cycles.
Duke Progress Energy - Home Energy Improvement Program	Duke Energy provides a variety of products and services through this program to help homeowners reduce energy consumption.
Duke Progress Energy - Residential New Construction Program	Duke Energy helps residents wanting to build a new home to find an approved builder for construction of a new energy-efficient home.
Duke Progress Energy - Energy Conservation Discount Program	Owners of ENERGY STAR qualified homes will receive a 5% discount on utility bills for the lifetime of the home.

Table 5. Energy Conservation Programs Available in New Hanover County¹¹



Endnotes

1. Solar Energy Industry Association (SEIA). "North Carolina Solar." <https://www.seia.org/state-solar-policy/north-carolina-solar>
2. NC Clean Energy Technology Center. "Commercial Solar Incentives." https://nccleantech.ncsu.edu/wp-content/uploads/2018/06/Policy_Commercial-incentives.pdf
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