

North Carolina

Clean Energy Plan

Transitioning to a 21st Century Electricity System



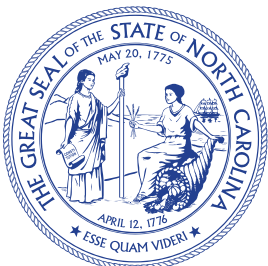
Supporting Document

PART 3

Electricity Rates &
Energy Burden

DRAFT

August 2019



Preface

This is a draft of North Carolina’s Clean Energy Plan (CEP). The public comment period is open from August 16, 2019 through September 9, 2019. Comments may be submitted online at <https://deq.nc.gov/cleanenergyplan>.

The Clean Energy Plan was written by the Department of Environmental Quality as directed by [Executive Order No. 80](#).¹ DEQ was tasked with the creation of a CEP to encourage the use of clean energy resources and technologies and to foster the development of a modern and resilient electricity system. The purpose of the CEP is to outline policy and action recommendations that will accomplish these goals. The CEP is made up of the main document titled *Policy and Action Recommendations* and six supporting documents.



The purpose of this supporting document (Part 3: Electricity Rates and Energy Burden) is to provide a high level background on North Carolina’s electricity rate setting process and factors that influence costs for Commercial, Industrial, and Residential customers. This document also contains a deeper analysis of energy burden on low-income communities and identifies the barriers to energy affordability and access to clean energy and energy efficiency options.

¹ <https://files.nc.gov/ncdeq/climate-change/EO80--NC-s-Commitment-to-Address-Climate-Change---Transition-to-a-Clean-Energy-Economy.pdf>





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List of Abbreviations

CDGB	Community Development Block Grant
DEC	Duke Energy Carolinas
DEP	Duke Energy Progress
DHHS	US Department of Health and Human Services
EMC	Electric Membership Cooperative
FPL	federal poverty level
HHS	US Department of Health and Human Services
IOU	investor owned utility
kWh	kilowatt-hour
KW	kilowatt
NCUC	North Carolina Utilities Commission
REDD	Rural Economic Development Division
WAP	Weatherization Assistance Program



1 Electricity Rates

The consumer cost of electricity generally reflects the cost to build, finance, maintain, and operate power plants and the electricity grid. For-profit utilities are also allowed to include a financial return on investment for owners and shareholders in their electricity prices. Annual revenues of electricity suppliers in North Carolina were approximately \$11.9 billion, with Duke Energy Progress (DEP) and Duke Energy Carolinas (DEC) representing approximately \$7.8 billion of the total.²

1.1 Electric Rate Setting Process

Investor Owned Utilities (IOU) – privately owned utilities such as DEC, DEP, and Dominion are under the jurisdiction of the North Carolina Utilities Commission (NCUC). Electricity rates for these entities are regulated through a formal rate setting process that allows for public input and requires the approval of the NCUC. Any changes to the rates must be justified by the utilities. The NCUC also approves the construction of any new power plants or transmission/distribution systems. North Carolina General Statute §62-2(3a) requires electricity planning and rate setting that results “in the least cost mix of generation and demand-reduction measures which is achievable.”

Electric Membership Cooperatives (EMC) – Member-owned, not-for-profit utilities which often serve rural communities, and municipality owned utilities have a different rate setting process. Rates for EMC providers are established by the board members of those entities based on the cost to deliver electricity to its members or citizens. Local governments, often city or town councils, set rates for municipal utilities. These costs can be high for two reasons; 1) most providers do not own or operate power plants and must purchase the power they distribute to customers (usually from an IOU) and 2) they maintain a large distribution network to deliver electricity to its customers.

For a more complete discussion of both the rate setting process and consumer electricity rates see the “Energy Policy” chapter and the references listed below.

- “Rate Setting In North Carolina Overview and Key Principles”³
- Presentation titled “North Carolina Utilities Commission Public Staff”⁴
- “Residential Electricity Rates and Pricing in North Carolina 2014”⁵

² 2017 Annual Electric Power Industry Report, Form EIA-861 detailed data files, US EIA, October 12, 2018, accessed May 2019. <https://www.eia.gov/electricity/data/eia861/>.

³ Rate Setting In North Carolina Overview and Key Principles, accessed May 2019.

<https://www.advancedenergy.org/wp-content/uploads/2016/12/Final-NC-Rate-Setting.pdf>.

⁴ <https://files.nc.gov/pubstaff/documents/files/Ratemaking%20Presentation%20%283-18%29.pdf>

⁵ “Residential Electricity Rates and Pricing in North Carolina 2014”, David Tucker and Jennifer Weiss, Environmental Finance Center, School of Government, University of North Carolina at Chapel Hill, July 2014, accessed May 2019.

https://efc.sog.unc.edu/sites/default/files/Residential%20Electricity%20Rates%20and%20Pricing%20in%20North%20Carolina%202014_FINAL.pdf.



1.2 Electricity Rates by Economic Sector

Figure 1-1 shows historical average residential, commercial, and industrial electricity rates for North Carolina. Figure 1-2 shows the average national electricity rates.⁶ In general, residential rates are highest, followed by commercial and industrial. Electricity rates across all sectors remains steady through the 1990s, with the average national rate being similar to the average rate in North Carolina. North Carolina then sees a gradual increase from 2000 to 2017 while the national average increases to a higher rate for each economic sector. Currently, North Carolina ranks 34th in the nation for average residential electricity rates, at 11.41 cents/kWh.⁷ Neighboring states South Carolina and Virginia have slightly higher electricity rates at 12.75 cents/kWh and 11.70 cents/kWh, respectively.⁸

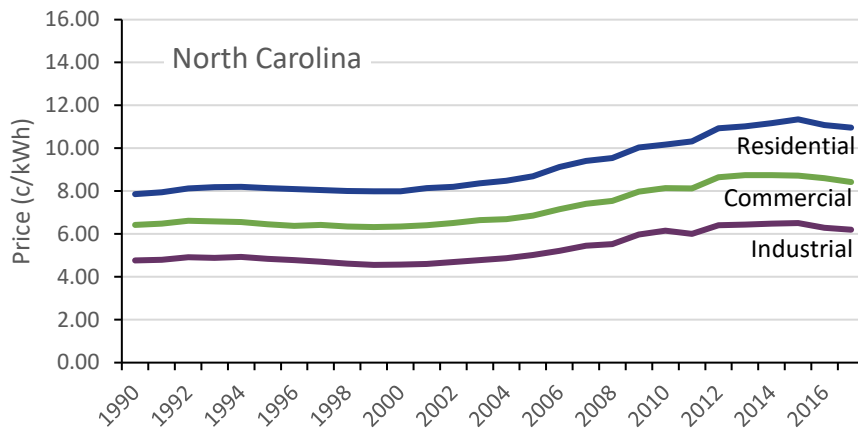


Figure 1-1: Average Electricity Rates by Sector for North Carolina (c/kWh)⁹

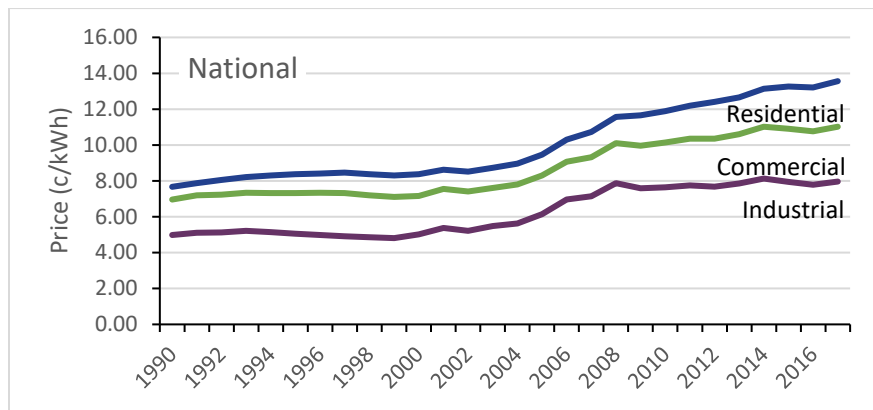


Figure 1-2: Average Electricity Rates by Sector for the United States (c/kWh)¹⁰

⁶ Average Price by State by Provider (EIA-861) 1990-2017, US EIA, data file accessed May 2019. <https://www.eia.gov/electricity/data/state/>.

⁷ Rankings: Average Retail Price of Electricity to Residential Sector, March 2019 (cents/kWh), US EIA, accessed May 2019. <https://www.eia.gov/state/rankings/?sid=NC#series/31>.

⁸ Ibid.

⁹ Average Price by State by Provider (EIA-861) 1990-2017, US EIA, data file accessed May 2019. <https://www.eia.gov/electricity/data/state/>.

¹⁰ Ibid



Table 1-1 quantifies the percent change in the rates for each economic sector.¹¹ North Carolina’s electricity rates are increasing, but at a much lower percentage than nationally. The national electricity rates for each sector increase 20 to 25 percent higher than the rate increases in North Carolina. This indicates that North Carolina’s rates are competitive, even with incentives for renewable resources and energy efficiency in our state. However, while North Carolina’s average monthly rates are the 34th highest in the U.S., the state’s average monthly residential bills of \$113.98 are the 25th highest in the U.S, due to a high level of electricity consumption.¹²

Table 1-1: Increase in Electricity Rates from 2000 to 2017 for North Carolina and the U.S. ¹³

	Residential (c/kWh)	Commercial (c/kWh)	Industrial (c/kWh)
2000	7.99	6.36	4.57
2017	10.96	8.43	6.2
<i>NC Percent Change</i>	<i>137%</i>	<i>133%</i>	<i>136%</i>
2000	8.37	7.16	5.02
2017	13.56	11.02	7.96
<i>US Percent Change</i>	<i>162%</i>	<i>154%</i>	<i>159%</i>

1.3 Peak Rates and Demand Charges

There are certain hours during the day and during the year, such as in the afternoon hours of summer months or during the morning hours of the winter months, in which there is a high consumer demand for electricity. This is referred to as ‘Peak Demand.’ Utilities have several options to meet peak demand: increase electricity generation, purchase electricity from an outside source, lower consumer demand, or curtail customer usage.

Peak demand hours have a large influence on the cost of electricity generation. Not only must utilities purchase or generate electricity from more expensive sources as demand increases, but also concentrated demand in particular locations may also exert additional pressure on the grid and require distribution system upgrades. To reflect these higher costs, utilities may charge commercial and industrial customers a much higher rate for units of electricity consumed at peak times. Traditionally, residential customers were not significantly affected by these price fluctuations. More recently, however, utilities in North Carolina and elsewhere have begun to offer time-of-use pricing to residential households which can include on- and off-peak demand charges.

Peak rates and time of use rates incentivize customers to reduce electricity use during high demand periods (for instance, a family may opt to wait to dry their clothes or charge an electric vehicle). Lowering

¹¹ Average Price by State by Provider (EIA-861) 1990-2017, US EIA, data file accessed May 2019. <https://www.eia.gov/electricity/data/state/>.

¹² U.S. EIA (2017) Average Monthly Bill – Residential, accessed May 2019. https://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf.

¹³ Average Price by State by Provider (EIA-861) 1990-2017, US EIA, data file accessed May 2019. <https://www.eia.gov/electricity/data/state/>.



demand prevents the utility from having to purchase additional power or build new power plants and distribution capacity to supply electricity during peak times.

In addition, utilities may apply demand charges to large customers. A demand charge is a flat fee calculated based on peak usage over the previous month. The fee is assessed even for non-coincident peak demand; that is, when the highest use period for a customer does not coincide with a system peak.

Peak rates are a financial burden to consumers with high electricity use. Industrial, commercial and some residential consumers work to reduce their demand during peak hours. Methods to reduce peak demand include reducing heating and air conditioning use, shifting production hours, operating high demand equipment in off-peak hours, and installing thermal storage. An analysis of peak rates is beyond the scope of this document. Residential peak rates are discussed in “Residential Electricity Rates and Pricing in North Carolina 2014.”

2 Energy Burden

In the United States, 31 % households face challenges when paying energy bills to adequately heat or cool their homes, with one in five U.S. households admitting to forgoing basic necessities like food and medicine in order to pay energy bills.¹⁴ This section seeks to quantify and characterize households in North Carolina that spend a disproportionate amount of annual household income on home energy bills, referred to as energy burden. *Energy burden* is the percentage of a household's annual income that is spent on energy bills. The U.S. Department of Health and Human Services (DHHS) classifies an energy burden of 6 % or higher as “unaffordable”,¹⁵ while other sources define high energy burden as a utility bill of 10 % or more of a household's annual income.¹⁶ Energy burden is primarily driven by a household's poverty status, but factors such as home energy efficiency, housing type, quality of housing stock, and home ownership status contribute to the burden experienced by low income households. Energy-burdened households are more likely to earn less than \$20,000 annually and be of African-American or Latino descent.¹⁷ Many energy-burdened communities are also affected by the environmental and health risks associated with the fossil fuel industry.

¹⁴ U.S. Energy Information Administration (2017). 2015 Residential Energy Consumption Survey. Accessed May 2019.

[https://www.eia.gov/consumption/residential/data/2015/index.php?view=consumption&src=%E2%80%B9%20Consumption%20%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20\(RECS\)-b1#summary](https://www.eia.gov/consumption/residential/data/2015/index.php?view=consumption&src=%E2%80%B9%20Consumption%20%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20(RECS)-b1#summary)

¹⁵ Applied Public Policy Research Institute for Study and Evaluation. (July 2005). LIHEAP Energy Burden Evaluation Study – Final Report. Accessed May 2019. https://www.acf.hhs.gov/sites/default/files/ocs/comm_liheap_energyburdenstudy_appraise.pdf

¹⁶ Fisher, Sheehan, & Colton (2019). Home Energy Affordability Gap. Accessed May 2019. www.homeenergyaffordabilitygap.com/.

¹⁷ Drehobl, A., & Ross, L. (2016). *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*. Accessed April 2019. <https://aceee.org/sites/default/files/publications/researchreports/u1602.pdf>



3 North Carolina Residential Demographics

The federal poverty guidelines in the United States are set by the U.S. DHHS and in 2019 equalled \$25,750 for a family of four which is 51% of the North Carolina median household income of \$49,822.¹⁸ Figure 3-1 shows the growth in North Carolina’s population from 2010 to the present along with the percentage of people living below 100% of the federal poverty level (FPL).²⁰ While the overall state population has grown by 8.45 % since 2010, the percentage of persons living in poverty has remained between 14-16 % of the total population. In 2018, North Carolina had an overall poverty rate of 14.7 %, representing nearly 274,000 households or 1.5 million people living at or below FPL.

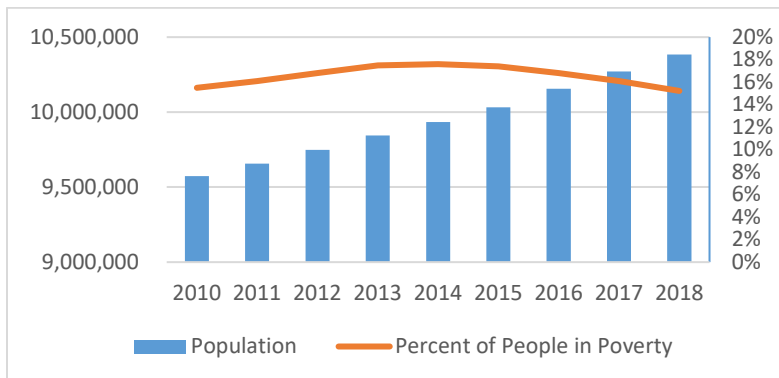


Figure 3-1: Population and Poverty Trends in North Carolina from 2010 to 2018.²¹

According to the U.S. Census Bureau, approximately 30% of the NC residents living in poverty identify as Hispanic or Latino, 26% identify as American Indian and Alaska native, and almost 25% identify as African American as shown in Figure 3-2.²² Much of this population is located in counties that are classified as Tier 1 and Tier 2 in 2019 by the NC Department of Commerce.²³ County tiers are an annual ranking of economic wellbeing based on average unemployment, median household income, population growth, and adjusted property tax base per capita. Residents of low tier counties often face structural unemployment²⁴ and lack access to good quality jobs with benefits and family-sustaining wages. North

¹⁸ North Carolina Department of Commerce (2019). County Average Wages - January 2019. Accessed May 2019. <https://www.nccommerce.com/documents/north-carolina-county-average-wages>

¹⁹ Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. (2019). HHS Poverty Guidelines for 2019. Accessed June 2019. <https://aspe.hhs.gov/poverty-guidelines>

²⁰ United States Census Bureau (2018). American Community Survey (ACS). Poverty Status in the Past 12 Months. Accessed May 2019.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table

²¹ U.S. Census Bureau. (2018). Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2018. Accessed May 2019. <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

²² United States Census Bureau (2018). American Community Survey (ACS). Poverty Status in the Past 12 Months. Accessed May 2019.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table

²³ North Carolina Chamber of Commerce. (2019). 2019 North Carolina Development Tier Designations.

https://files.nc.gov/nccommerce/documents/files/2019-Tiers-memo_asPublished.pdf

²⁴ Unemployment due to industrial reorganization or technological changes rather than fluctuations in supply and demand.



Carolina’s Tier designations for each county are provided in Figure 3-3. By statute, there must be 40 Tier 1 Counties, 40 Tier 2 counties, and 20 Tier 3 counties. The majority of the Tier 1 counties are located in the eastern part of North Carolina.

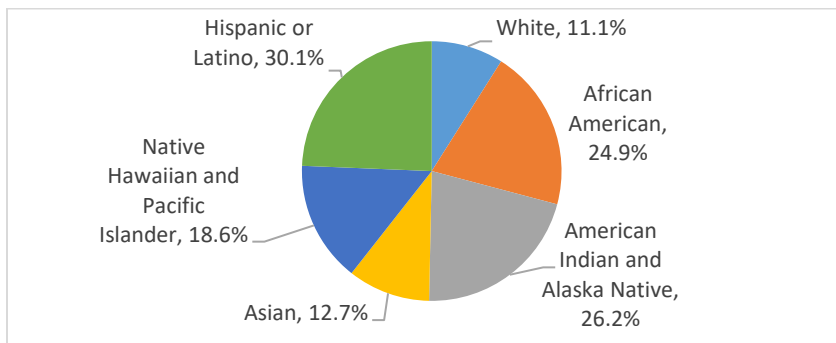


Figure 3-2: Demographic Breakdown of Persons in Poverty, North Carolina

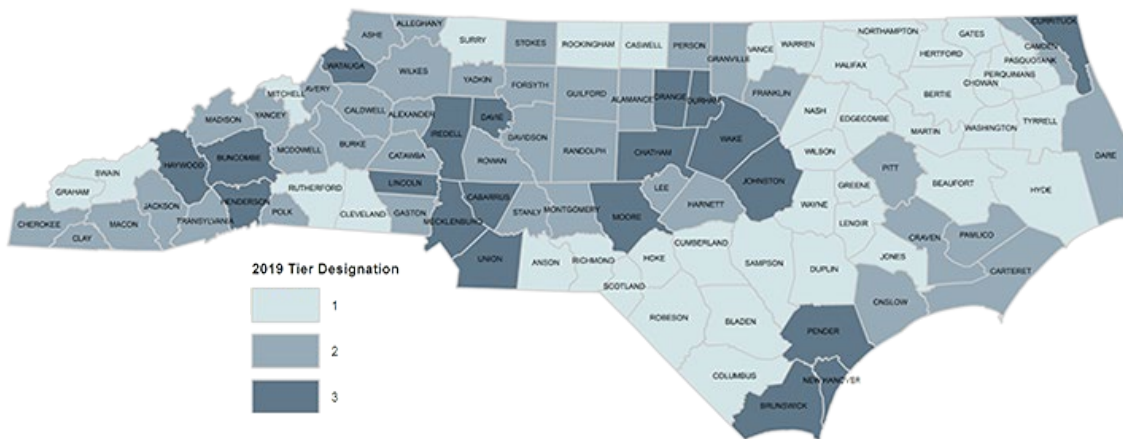


Figure 3-3: 2019 North Carolina County Tier Designations

Figure 13-4 shows the breakdown of occupied housing units by type in North Carolina in 2017.²⁵ The figure indicates that most of the 4.5 million homes in North Carolina, 69%, are single family homes. More than 13% of occupied homes in North Carolina are manufactured homes – including mobile homes – and almost 18% of people live in multifamily homes of two or more units.

Figure 3-5 presents the age of the housing stock in North Carolina.²⁶ Of the housing units in North Carolina, a large percentage – almost 13% of total housing units – were built before the year 1939. North Carolina has a fairly even distribution of housing units constructed between 1970 and 2009, with approximately 14% to 16% of the housing units constructed in each 10-year period. Since 2009, fewer

²⁵ United States Census Bureau (2018). American Community Survey (ACS). Selected Housing Characteristics, 2017. Accessed May 2019.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP04&prodType=table

²⁶ Ibid



homes were built as a result of the real estate bubble, with only 3% of the total housing units built between 2000 and 2014.

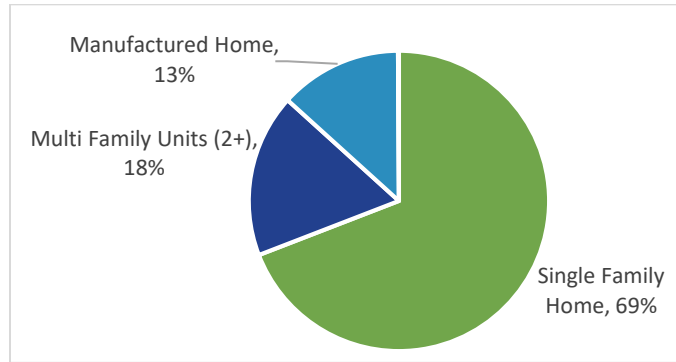


Figure 3-4: North Carolina Housing Units by Type

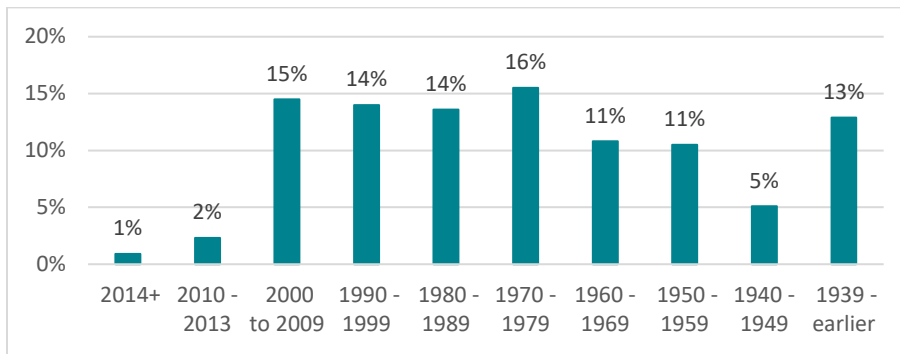


Figure 3-5: North Carolina Housing Structures by Year Built

Renters often experience a high rate of poverty than homeowners, which affects their ability to afford home energy bills. Figure 3-6 shows the number of housing units by tenant type, owner or renter occupied, for the year 2017.²⁷ Approximately 64% of all homes are owner-occupied and 36% of housing units are renter-occupied.

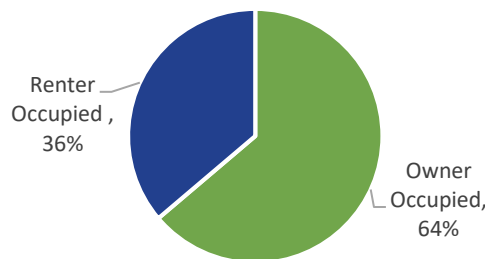


Figure 3-6: North Carolina Housing Occupancy Type

²⁷ United States Census Bureau (2018). American Community Survey (ACS). Selected Housing Characteristics, 2017. Accessed May 2019.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP04&prodType=table



4 Energy Burden in North Carolina

Home energy costs are a crippling financial burden for low-income households in North Carolina. As indicated in Table 4-1 below, low-income households in NC spend a disproportionate percentage of their household income on energy costs relative to their higher income counterparts.²⁸ For those living with incomes below 50% of the Federal Poverty level, 33% of their annual income is spent on energy bills. It is important to note, however, that even households with income between 185% and 200% of the Federal Poverty Level, where 200% of the federal poverty level is \$50,000 for a family of four, still face unaffordable home energy bills worth 7% of household income.

Table 4-1: Average Home Energy Burden for North Carolina Residents, 2018.²⁹

Poverty Level	Home Energy Burden
Below 50%	33%
50 - 100%	18%
100 - 125%	12%
125 - 150%	10%
150 - 185%	8%
185 - 200%	7%

4.1 Distribution of Energy Burden

There are approximately 1.4 million people in North Carolina living with unaffordable energy bills³⁰, most of whom reside in Tier 1 and Tier 2 counties. Figure 4-1 presents the average homeowner’s energy burden for each county in North Carolina at all income levels, not just those living in poverty. Figure 4-2 presents this same data for renters.³¹ North Carolina counties with the highest energy burden are concentrated in the eastern part of the State.

²⁸ Fisher, Sheehan, & Colton (2019). Home Energy Affordability Gap. Accessed May 2019. www.homeenergyaffordabilitygap.com/.

²⁹ Ibid

³⁰ Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openeci.org/doe-opendata/dataset/celica-data>

³¹ Ibid

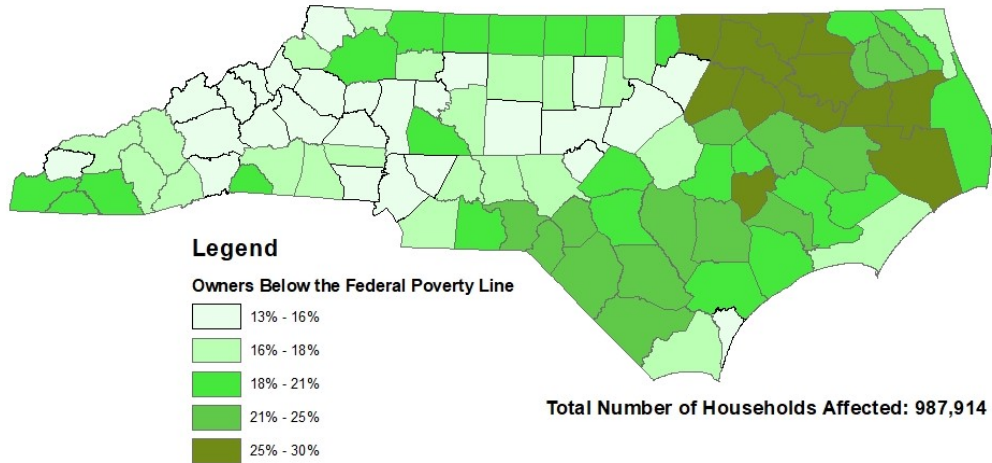


Figure 4-1: Average Energy Burden For Low Income Homeowners, North Carolina Counties, 2018³²

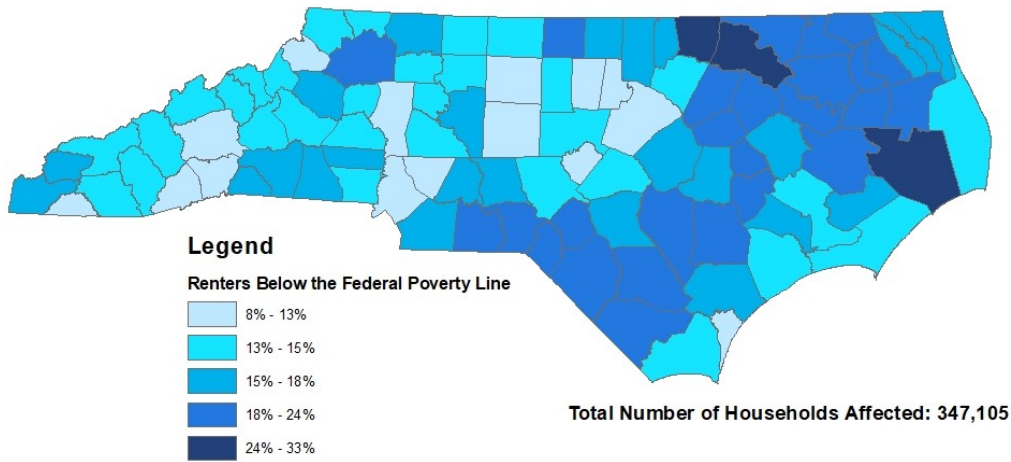


Figure 4-2: Average Energy Burden For Low Income Renters, North Carolina Counties, 2018³³

4.2 Contributing Factors to Energy Burden

Low-income residents often live in older, less efficient housing which requires more energy for heating and cooling than newer homes. Due to lack of savings, little to no disposable income, and little access to credit, low-income households have fewer choices in regard to housing options, with many low-income residents living in homes with structural deficiencies that can make energy efficiency upgrades inaccessible.³⁴

³² N.C. Housing Coalition (2018). 2019 County Profile Data - Energy Burden. Accessed April 2019.

³³ Ibid

³⁴ Drehobl, A., & Ross, L. (2016). *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*. Accessed April 2019.

<https://aceee.org/sites/default/files/publications/researchreports/u1602.pdf>



18% of NC households live in multifamily units like apartments and condominiums. In low-income communities, these units are often underserved in energy efficiency and weatherization programs. Multifamily residents are like those of single-family homes in that they pay their own energy bills and would benefit from energy efficiency programs, but building owners must often approve of and pay for installation, and often see little to no return on investment. This barrier to energy efficiency in multifamily homes is referred to as a split incentive. Split incentives also apply to renter-occupied households, where occupants do not have the freedom to make energy efficiency upgrades to homes.³⁵ Building owners are unmotivated to invest in energy efficiency upgrades to their properties because they typically do not pay for utilities and would not benefit from the reduced energy costs. Likewise, renters who are willing to cover the cost of the upgrades are often unsure if their time in the home will be sufficient to justify the investment³⁶.

Occupants of manufactured homes are typically low-income and living in rural areas. Construction standards for manufactured homes are governed by the U.S. Housing and Urban Development's Manufactured Housing Construction and Safety Standards Act of 1974.³⁷ These codes apply to any home built after 1976 and provides standards for the construction, quality, and durability of the home as well as the electrical efficiency of the homes. Manufactured homes are the most expensive to heat and cool and spend twice as much energy per square foot of living space than site-built homes.³⁸ This is especially true of manufactured homes built before the 1976 building efficiency codes were passed that are still occupied by families below 50% of the federal poverty line across the U.S.³⁹

Figure 4-3 presents the average annual expenditure on energy costs as a function of the percent of household income relative to the area median income.⁴⁰ Low-income households often experience a higher energy burden per square foot than high-income household due to a lack of energy efficiency measures in the housing unit.⁴¹ For this reason, low-income households spend the same amount on home energy costs despite living in smaller homes.

³⁵ Carliner, M. (2013). *Reducing Energy Costs in Rental Housing: JCHS Research Brief 13-2*. Accessed April 2019. https://www.jchs.harvard.edu/sites/default/files/carliner_research_brief_0.pdf

³⁶ Ibid

³⁷ National Manufactured Housing Construction and Safety Standards Act of 1974, 42 U.S.C. 5401-5426.

³⁸ Ross, L., Drehobl, A., & Stickles, B. (2018). *The High Cost of Energy in Rural America: Household Energy Burdens and Opportunities for Energy Efficiency*. Accessed May 2019. <https://aceee.org/sites/default/files/publications/researchreports/u1806.pdf>

³⁹ Ibid

⁴⁰ Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openei.org/doe-opendata/dataset/celica-data>

⁴¹ Drehobl, A., & Ross, L. (2016). *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*. Accessed April 2019. <https://aceee.org/sites/default/files/publications/researchreports/u1602.pdf>

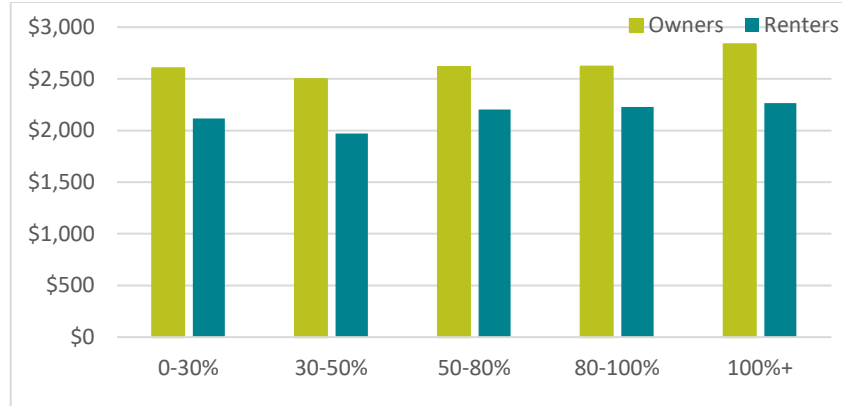


Figure 4-3: Average Annual Expenditure on Energy Bills by Percent of Area Median Income

Figure 4-4 shows the energy burden for homeowners and renters, the percentage of income spent on energy bills as a function of the percent of household income relative to the area median income.⁴² Low-income residents face a higher energy burden than those at higher income levels because, while the annual energy expenditure is roughly the same as shown in Figure 4-3, the average household income is significantly lower than their counterparts that are above the Federal Poverty Line. For example, in households with income between 0 – 30% of the Median Income, customers pay over 20% more than those above 100% of the Median Income.

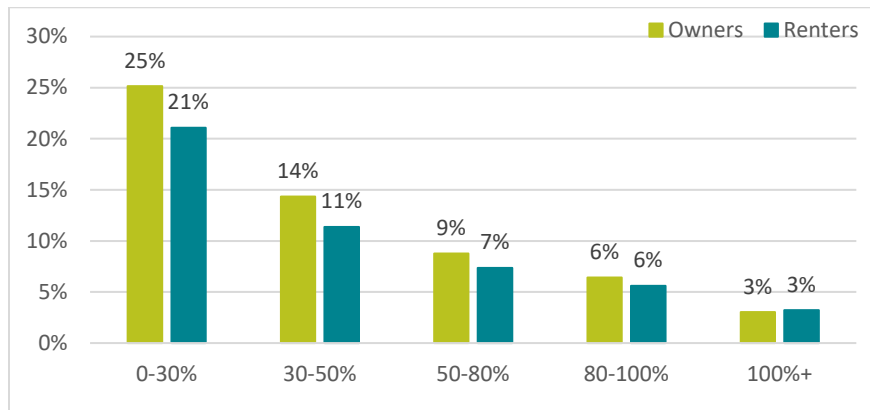


Figure 4-4: Percentage of Income Spent on Energy Bills by Percent of Median Income

⁴² Drehobl, A., & Ross, L. (2016). *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities*. Accessed April 2019. <https://aceee.org/sites/default/files/publications/researchreports/u1602.pdf>



5 Energy Burden by Fuel Type

5.1 Average Usage by Fuel Type

Figure 5-1 presents household energy use by fuel type for all North Carolinians.⁴³ Figure 5-1 indicates that electricity is the most common energy source used by these households (65%), followed by utility natural gas (20%). For heating, approximately 4% of NC households use fuel oil and 7% of households use bottled gas, typically propane. For all households, including those below the FPL, electricity is the most utilized fuel source. Figures 5-2 and 5-3 show the household energy usage by fuel type for homeowners and renters under the FPL. Energy usage is relatively consistent for households under the FPL, with over 50% of all households using electricity.

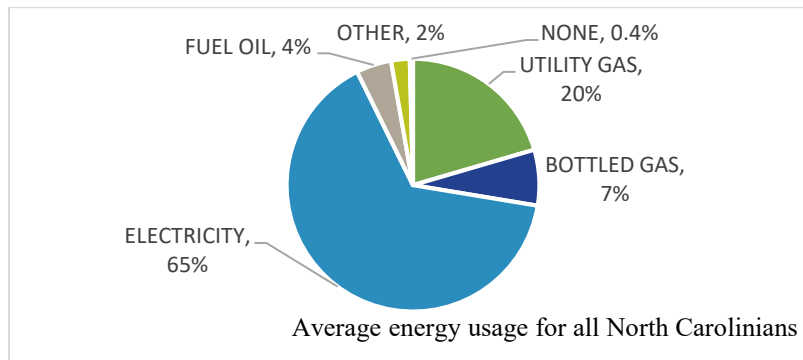


Figure 5-1: Energy Usage by Fuel Type for All North Carolina Households, 2018

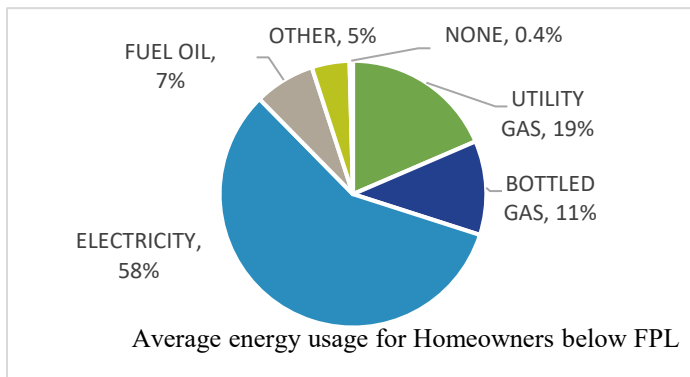


Figure 5-2: Energy Usage by Fuel Type for Low-Income Homeowners

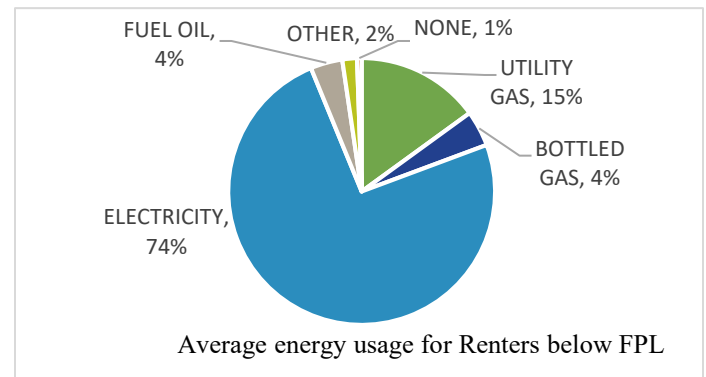


Figure 5-3: Energy Usage by Fuel Type for Low-Income Renters

⁴³ Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openeci.org/doe-opendata/dataset/celica-data>



5.2 Energy Burden by Fuel Type

Figure 5-4 presents the average energy burden for each fuel type for those at or below the FPL, rather than all households, to understand the burden of each fuel type on low-income households.⁴⁴ Figures 5-5 and 5-6 demonstrate the energy burden of each fuel type on owners and renters below the FPL. Low-income residents spent 17% to 21% of their annual income on electricity bills. Households that heat with utility natural gas spend approximately 22% - 26% of annual income. Even though less than 10% of North Carolina households use bottled gas as their primary energy source, households at or below the FPL spend up to 41% of their annual income on propane energy bills. Propane is used for heating and to power appliances, such as stoves, water heaters, and clothes dryers by rural customers in western parts for the state where natural gas lines are inaccessible. Propane is not regulated by the NCUC,⁴⁵ and it does not come from a single provider, which makes its pricing variable and subject to increases during periods of high demand. Households using propane may be in need of energy efficiency upgrades but may not be able to afford them. North Carolina weatherization programs are not available to households that use propane because propane is not provided by a utility.⁴⁶

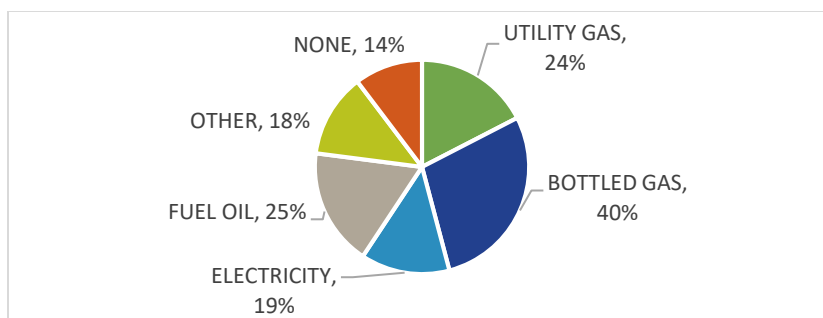


Figure 5-4: Average Energy Burden for All Low-Income Households by Fuel Type, 2018.⁴⁷

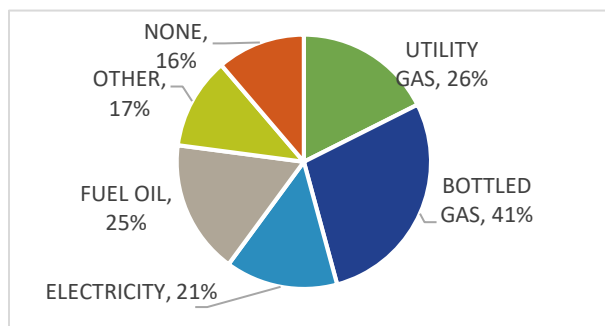


Figure 5-5: Average Energy Burden for Low-Income Homeowners, 2018

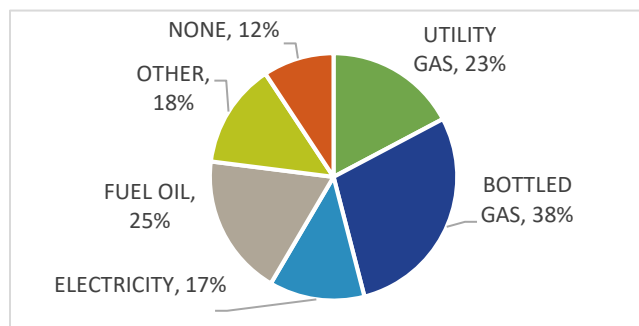


Figure 5-6: Average Energy Burden for Low-Income Renters, 2018

⁴⁴ Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openei.org/doe-opendata/dataset/celica-data>

⁴⁵ North Carolina Utilities Commission (2019). NCUC: What we do. Accessed May 2019. <https://www.ncuc.net/Consumer/whatwedo.html>

⁴⁶ Ibid

⁴⁷ Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openei.org/doe-opendata/dataset/celica-data>



5.3 Electricity-Specific Burden

The average electricity burden in North Carolina for all households at or below the FPL is approximately 19%. To break this down further, the average electricity burden for each of the 100 counties in North Carolina was calculated. Figure 5-7 presents the average electricity - specific burden for households at or below the FPL broken into North Carolina county tier.⁴⁸ While low-income households in Tier 1 experience a slightly higher electricity burden, all households under the FPL have a relatively similar burden from electricity.

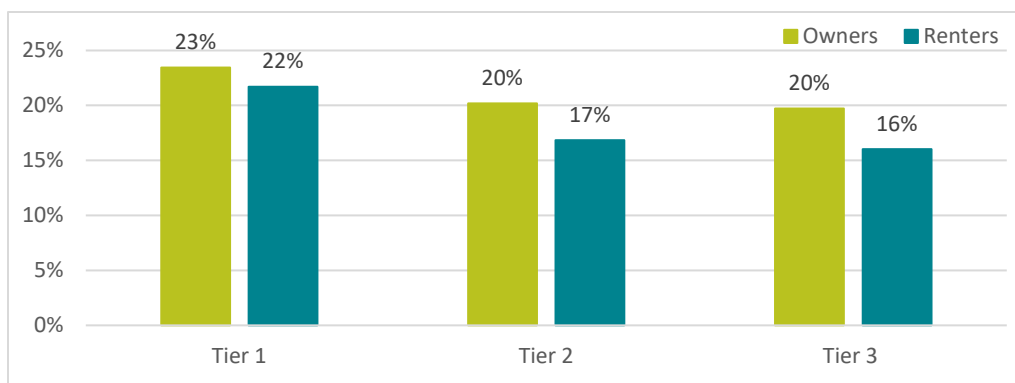


Figure 5-7: Electricity-Specific Burden for Low-Income Households by County Tier

6 Equitable Access to Clean Energy and Energy Efficiency

6.1 Equitable Access to Clean Energy

For many low-income residents, especially renters and multifamily unit residents, clean energy options are inaccessible because they do not have the structural support, space, or freedom needed to install these systems and cannot afford the upfront cost of installation. This is especially the case for accessibility to solar energy.

Many electric cooperatives and some large utility companies offer ‘Community Solar’ programs for low-income and rural customers which allow them to experience the benefits of renewable energy without having to make structural changes to their residence. Depending on the community solar facility organization, multiple community members can obtain financial benefit and/or power from a subscription or own a portion of the system. Member-owners can often receive a monthly credit on their bill for the power generated at the solar facility, which further reduces the monthly cost of electricity.⁴⁹

The North Carolina Weatherization Assistance Program (WAP) is proposing a new initiative to invest in cost of renewable energy for low-income household across North Carolina. WAP plans to implement grid-tied Community Solar PV systems for additional energy savings for its customers. Program services will be divided evenly for up to 80 households within NC Electric Cooperative territories, and then

⁴⁸Office of Energy Efficiency and Renewable Energy. (2017). Low-Income Energy Affordability Data (LEAD) Tool – OpenEi DOE Open Data (K. Layman, Ed.). Accessed May 2019. <https://openeci.org/doe-opendata/dataset/celica-data>

⁴⁹ NC Sustainable Energy Association (2019). *Community Solar*. Accessed Maye 2019. <https://energync.org/community-solar/>



credited monthly to each of those households for the life of the Community Solar system. North Carolina Session Law 2017-192 (House Bill 589), *Competitive Energy Solutions for North Carolina*, calls for the deployment of additional community solar programs to offset the energy usage of utility customers. For more information on Community Solar and House Bill 589, See Clean Energy Plan Supporting Document, Part II: Solar Resources.

6.2 Access to Energy Efficiency

North Carolina offers the following programs which support energy efficiency for low-income and energy-burdened residents:

- *Grant Programs:* The North Carolina Neighborhood Revitalization Program (NC Neighborhood Program) incorporates Community Development Block Grant (CDGB) and Rural Economic Development Division (REDD) grant funds and programs to allow municipalities to design programs to meet the community development needs of low to moderate income residents. The program supports equitable, affordable, energy efficient housing that increases mobility and lowers the costs of living for low-income residents.⁵⁰
- *Weatherization Assistance Program:* The North Carolina State Energy Office receives annual funding from the U.S. Department of Energy to help low-income residents make energy efficiency upgrades to their homes. The program focuses on the elderly, disabled, families with children, high energy users, and the energy burdened. In the Fiscal Year 2018-2019, NC WAP spent more than 16 million dollars in grant funds to weatherize over 2,000 homes and repair hundreds of heating and air conditioning units.⁵¹

⁵⁰ North Carolina Department of Commerce (2019). Community Housing Grants. Accessed June 2019. <https://www.nccommerce.com/grants-incentives/community-housing-grants>.

⁵¹ North Carolina Department of Environmental Quality (2019). Weatherization Assistance Program. Accessed June 2019. <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/weatherization-assistance-program>