# Understanding the Impact of Electric Choices on North Carolina Residential Electricity Rates and Bills





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The NC Sustainable Energy Association (NCSEA) is a 501(c)(3) nonprofit membership organization of individuals, businesses, government, utility providers and nonprofits interested in North Carolina's sustainable energy future. NCSEA drives public policy and market development to create energy jobs, economic opportunities and affordable energy to benefit North Carolina.

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## I. Introduction

### North Carolina's Electric Industry

In North Carolina, there are three types of electric power providers that sell electric power to retail customers: investor-owned utilities (IOUs), electric membership corporations, and municipally-owned utilities. North Carolina has a highly-regulated electricity industry where at least 67% of electric customers are provided service by IOUs.<sup>1</sup> North Carolinas' IOUs include Duke Energy Carolinas (DEC), Duke Energy Progress (DEP), and Dominion North Carolina Power (Dominion). The merger of Duke Energy Carolinas and Duke Energy Progress (formally known as Progress Energy), approved by the NC Utilities Commission in 2012, made Duke Energy the largest electric power holding company in the United States, supplying and delivering power to approximately 7.2 million U.S. customers in six states.



### Figure 1. North Carolina's Electric Investor-Owned Utilities Service Area Map<sup>2</sup>

North Carolina's IOUs generate, transmit, distribute, and sell electric power to consumers across the state. In exchange for an exclusive service territory, IOUs can design rates to recoup operating expenses and capital costs necessary to meet their obligations to provide reliable, available, and affordable energy to their customers.

<sup>&</sup>lt;sup>1</sup> The remainder 33% of customers are served by electric membership corporations and municipally-owned utilities within the state. *North Carolina's Public Utility Infrastructure & Regulatory Climate, Presented by North Carolina Utilities Commission (July 2014),* pp. 16-17, accessed at http://www.ncuc.commerce.state.nc.us/overview/overview.pdf.

<sup>&</sup>lt;sup>2</sup> North Carolina's Public Utility Infrastructure & Regulatory Climate, Presented by North Carolina Utilities Commission (July 2014), p. 18, accessed at http://www.ncuc.commerce.state.nc.us/overview/overview.pdf.

The utilities' generation portfolios include a mix of resources, with different operating and fuel characteristics, to meet customer demand. In 2014, coal, nuclear and natural gas made up 79% and 91% of DEC and DEP's existing electric generation and non-renewable purchased power, respectively. The remainder was supplied by other generation resources such as hydroelectric, long term purchased power agreements from the wholesale market, and renewable energy. **Table 1** below illustrates the current capacity by resource type for DEC and DEP, as reported in their most recent Integrated Resource Plans (IRPs), a long-range planning document that provides insight into the utilities' current and proposed conventional and clean energy infrastructure that could meet electricity demand.

What's Powering Our State									
	Percent (%) of Total Generation								
Resource Type	Duke Energy Carolinas	Duke Energy Progress							
Nuclear	27%	23%							
Coal	33%	22%							
Natural Gas Combined Cycle ("CC")	6%	17%							
Natural Gas Combustion Turbine ("CT")	12%	18%							
Hydroelectric	15%	1%							
Non-Hydroelectric Renewables	0.7%	2.6%							
Demand-Side Management ("DSM")	5%	5%							
Energy Efficiency ("EE") – Permanent Load Reductions	0.2%	0.1%							
Non-Renewable Purchased Power	1%	11%							

#### Table 1. Duke Energy Carolinas and Duke Energy Progress Capacity by Fuel Type in 2014<sup>3</sup>

Reliable and affordable energy is essential to support businesses, jobs, hospitals, and government services – but it comes at a cost. What makes up these costs and, in turn, customers' rates is complex.

#### Behind Your Bill Glossary Term: The NC Utilities Commission

The North Carolina Utilities Commission (Commission) oversees and reviews rates and charges, rate schedules, classifications, and practices of public utilities operating in North Carolina to ensure that they're just and reasonable.

#### You, the Consumer

For more than a decade, retail electric rates in North Carolina have been on the rise. The cost to build, finance, maintain and operate electricity generation is reflected in electricity prices to consumers. There are several factors that influence the cost of electricity prices including, but not limited to: the cost of

<sup>&</sup>lt;sup>3</sup> DEC 2014 IRP and REPS Compliance Plan, p. 37, Commission Docket No. E-100, Sub 141; DEP 2014 IRP (Redacted) and Testimony, p. 37, Commission Docket No. E-100, Sub 141.

maintaining and using the transmission and distribution systems to deliver electricity, the cost of constructing, operating, and maintaining power plants, and fuel costs that go up and down over time.

In reality, the cost to generate and supply electricity changes by the hour, minute and second. However, most residential customers pay flat monthly rates, so they do not see this variability in costs when paying their bill. Customers on the common flat rate who want to see when they use the most electricity during the day cannot, because they do not have modern electricity meters installed and cannot easily access their electric usage information through their utility. Most North Carolinians take some sort of action each year to reduce their electricity use, but improving meters and customers' ability to easily see when they are using the electricity they pay for could make saving energy and money much easier.

To better understand the cause of the rise in rates and residential customer bills, the NC Sustainable Energy Association examined recent orders issued by the NC Utilities Commission where increases and decreases in rates have been approved. NCSEA is providing this service to residential customers so they can see what has caused the average residential customer's monthly bill to rise since 2001.

# II. Clean Energy and Your Electric Bill

It's understood that everything has a cost, and for the average rate payer the cost of electricity generation, moving electricity, and consuming or saving electricity adds up to the amount of your monthly electric bill. Many customers are under the misconception that clean energy resources are simply an added cost. However, without these resources the utilities would need to invest in additional conventional technologies to meet that same demand, some of which costs more and some less. In order to understand the drivers of electric rates, this report breaks down the factors as the following:

- 1. **Conventional Energy and Plant costs:** The cost of purchasing fossil and nuclear fuel (coal, fuel oil for starting up coal plants, gas and uranium) and pollution control materials for coal-fired power plants. Also, the cost of purchasing electricity from third parties, including non-renewable energy from wholesale power plants;
- 2. Renewable Energy Purchased Power costs: When the utility buys electricity generated by systems owned by someone else, the amount the utility pays is called the "avoided cost." This avoided cost rate is previously approved by the Commission, and is a cost that would have been spent anyway in the absence of clean energy it would have instead been spent on fossil fuels and/or nuclear power. This is not an additional cost to ratepayers for clean energy;
- 3. **Renewable Energy and Energy Efficiency Portfolio Standard (REPS) costs:** The incremental costs associated with compliance with the REPS; and
- Demand-Side Management and Energy Efficiency (DSM/EE) costs: The cost of the utility's DSM/EE programs that reduce individual customer energy costs and produce energy savings for all utility customers.

For the purposes of this report, the drivers are evaluated as separate line items to illustrate the nominal cost impact of clean energy resources as compared to conventional energy costs. A discussion of costs must begin and end with this accurate information.

#### **Driver #1 – Conventional Energy and Plant**

As we see in **Table 1**, the utilities have made large, long-term investments in conventional energy resources to provide reliable, available and affordable energy to their customers. Since the costs of these investments are passed on to their customers, it can be easily understood that conventional resources are the primary driver of utility rates. For instance, in DEC's 2013 rate increase application, the Commission summarized the primary drivers for a need to increase rates as:

- "Capital investments for plant modernization, environmental compliance, and other capital additions;
- Fleet modernization efforts of retiring, replacing, and upgrading generation plants and transmission and distribution systems; and
- Other capital investments including: (1) the new Cliffside Unit 6, a state-of-the-art advanced coal technology plant; (2) the Dan River Combined Cycle [natural gas] plant; (3) the uprate project at the McGuire Nuclear Station; and (4) the NRC-mandated Tornado/High-Energy Line Break (HELB) Project at the Oconee nuclear station."<sup>4</sup>

By analyzing key North Carolina Utilities Commission proceedings, it was uncovered that the cumulative changes to monthly residential bills were driven primarily by investments in conventional energy sources (coal, natural gas, and nuclear). **Figure 2** and **Figure 3** below show the overall residential bill increase on an inflation-adjusted basis for each component of DEC and DEP residential rates from 2001 to 2014.<sup>5</sup> The data shows that investments in conventional energy sources (coal, natural gas, and



<sup>&</sup>lt;sup>4</sup>Order Granting General Rate Increase, pp. 16-17, Commission Docket No. E-7, Sub 1026 (24 September 2013).

<sup>&</sup>lt;sup>5</sup> In order to adjust for inflation, the original monetary value (nominal value) was divided by the Consumer Price Index (CPI).

nuclear) make up the vast majority of residential customer charges; accounting for 84% of DEC and 75% of DEP's cumulative increase in average residential bills from 2001 through 2014.

### Driver #2 – Renewable Purchased Power

The second driver of utility rates is the cost of renewable energy investments made by the utilities under Public Utility Regulatory Policies Act (PURPA). PURPA requires North Carolina's electric utilities to purchase energy from developers with renewable energy projects connected to the grid. For such purchases, utilities are required to pay rates which are just and reasonable to their customers and adequately reflect the value of these projects. To finance these agreements, utilities pay "avoided cost" rates that are reflective of the cost they'd otherwise pay to generate or purchase from other resources.

### Behind Your Bill Glossary Term: Avoided Cost

Avoided cost rates shape the entire clean energy industry by serving as the basis for setting the price paid to developers for the electricity their facilities sell to the grid. Avoided cost rates also determine the cost effectiveness of DSM/EE programs; the incremental costs of compliance with the REPS for cost recovery purposes; and are influential in the ratemaking application and approvals process.

While these investments do have a short-term rate impact (see **Figure 2** and **Figure 3**), most of the investments themselves are explicitly designed to curb future utility costs for all customers, because they are for long-lasting infrastructure built in North Carolina. These investments provide North Carolina's utilities with a unique opportunity to meet customer demand with low-cost clean energy resources.

### Driver #3 – The REPS

Similar to renewable energy purchased power, the third and fourth drivers of residential utility rates are designed to avoid future costs for all customers.

Passed in 2007 with bipartisan support, Senate Bill 3 created North Carolina's REPS law, in addition to other clean energy provisions. Under the REPS, electric utilities are required to meet a portion of their electricity sales through renewable energy and energy efficiency resources. Utilities have several options for complying with the REPS, including:

- Using renewable resources to generate power at new or existing power plants<sup>6</sup>;
- Purchasing bundled or unbundled power and renewable energy certificates, known as "RECs", from renewable energy facilities; and
- Implementing energy efficiency measures to reduce demand.

<sup>&</sup>lt;sup>6</sup> Renewable energy resources under the REPS law include: solar electric/thermal; wind; hydropower (less than 10 megawatts); geothermal generation; wave energy or ocean current; biomass resources, including wood waste, animal waste, agricultural waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, landfill methane or energy crops; waste heat derived from a renewable energy resource and used to produce electricity or useful, measurable thermal energy at a retail electric customer's facility; and hydrogen derived from a renewable energy resource. Renewable energy resources do not include fossil fuels (e.g. oil, natural gas, coal, peat) or nuclear energy.

#### Behind Your Bill Glossary Term: The Renewable Energy and Energy Efficiency Portfolio Standard (REPS)

The REPS law requires the following by 2021:

- North Carolina's IOUs to generate 12.5% of their energy needs through renewable resources or energy savings measures.
- Up to 40% of this requirement can be achieved through energy efficiency measures.
- The remaining 60% of the requirement must be met through purchasing renewable energy credits (RECs).
- The utilities must rely upon "in-state" renewable facilities to satisfy at least 75% of this requirement.
  - The Commission currently defines "in-state" as a location inside the IOU's service territory, which spans North Carolina and part of South Carolina.
- Furthermore, Senate Bill 3 specifies three "set-aside" to prioritize the development of these particular resources:
  - o Solar
  - Swine Waste
  - Poultry Waste

Under the oversight of the Commission, the utilities are allowed to recover costs associated with complying with the REPS from their customer classes: residential, commercial, and industrial.<sup>7</sup> As noted in **Section III** and **Section IV** to follow, the average customer experiences a small REPS credit or charge on their bill – less than a dollar per month in 2014. Furthermore, utilities' compliance with the REPS is providing customers with cost savings both now and in the future. (See **Figure 5**)

#### Driver #4 – DSM/EE

Senate Bill 3 also authorized utilities, like DEC and DEP, to create customer-funded DSM/EE programs. DSM refers to activities, programs, or initiatives undertaken by an electric power supplier to shift the timing of its customers' electricity use from periods of high-energy demand to periods of low demand. The total cost of DSM/EE programs can be passed on to customers if and only if the programs actually save customers more money than they cost in the first place. The Commission must review and approve each program and its associated costs to ensure customers' money is used prudently and is actually used to reduce energy consumption. The utilities recover costs associated with DSM/EE programs separately from the REPS. Since 2007, the cost of renewable energy technologies have significantly declined and DSM/EE programs have remained a low cost resource.

As we see in **Figures 2 and 3**, North Carolina utility customers are predominately paying for conventional resources to keep the lights on in their homes and businesses. Unlike with renewable energy, these resources require costly, regular maintenance to keep pace with consumer demand – and many of them rely on finite fuel sources at fluctuating costs to continue running properly. Renewable energy

<sup>&</sup>lt;sup>7</sup> "Incremental costs" are defined as (1) all reasonable and prudent costs incurred by an electric utility to meet the solar and renewable generation requirements of the statute that are in excess of the utility's avoided costs, and (2) costs associated with research that encourages the development of renewable energy, energy efficiency, or improved air quality provided those research costs do not exceed one million dollars (\$1,000,000) per year.

resources, by comparison, are sustainably operated, and rapidly advancing in technological efficiency and performance as their costs decrease.

# **III. The Average North Carolina Monthly Residential Bill**

Since 2001, residential customers of DEC and DEP have experienced increases in their electric bills. As we see from the preceding analysis, this is largely due to the fact that the utilities have made large, long-term investments in increasingly expensive conventional energy technology. (See **Figures 2 and 3**)

According to Commission-reported rate information, the average monthly residential bill is estimated by the Commission to be \$107.04 and \$106.67 for DEC and DEP customers, respectively. Within this total, monthly REPS charges are nominal: \$0.39 and \$0.83 per month, respectively. (See **Figure 4**)





While a portion of our electric bills can be attributed to clean energy resources like renewables and energy efficiency programs, clean energy costs have largely been shown to either reduce residential customer bills, or to help customers avoid an equal amount of future utility cost increases in the future.

<sup>&</sup>lt;sup>8</sup> Source: Order Approving REPS and REPS EMF Riders and 2013 REPS Compliance, p. 4, Commission Docket No. E-2, Sub 1043 (21 November 2014); Order Approving REPS And REPS EMF Riders And 2013 REPS Compliance, p. 5, Commission Docket No. E-7, Sub 1052 (21 August 2014); North Carolina's Public Utility Infrastructure & Regulatory Climate Presented by North Carolinas Utilities Commission (July 2014). These amounts under-estimate the average monthly bill because they are based on a monthly consumption of 1,000 kWh. EIA reports average NC residential monthly consumption is 1,124 kWh. Using this average would result in a higher bill, but the REPS Rider would not change.

## **IV.** Conclusion

be saved by 2029.

Since 2001, North Carolina electric ratepayers have seen their monthly bills steadily rise. In response, public curiosity and dialogue on the topic has also become amplified, with fingers pointing in many directions towards the blame.

This report sheds light on what's behind these increases, and uses nonpartisan, reputable sources to help readers navigate the assumptions heard in today's swirling public discourse about electricity costs. The trends documented in this report – namely, that conventional costs are rising and clean energy costs are nominal – equip all North Carolina customers with accurate information about where their electric bill charges come from.

Even though customers see a line item on their monthly bill for investments in clean energy resources, they are saving a great deal more in current and future utility costs. (See **Figure 5**)



Compliance Portfolio Conventional Portfolio We can conclude that while rates have risen in the last decade, they would be higher without renewables and energy efficiency – **Drivers 2, 3 and 4** – in North Carolina's energy mix. The result of these clean energy line items is of benefit to rate payers statewide: \$162 million in cost savings with clean energy in our state's balanced energy mix since 2007, and an estimated additional \$489 million to

What goes into our electric bill costs is a complex matter. At the same time, this report proves that understanding is possible – for the North Carolina home owner, for the small business owner and for the legislator in Raleigh influencing energy policy. We hope the findings outlined here will increase awareness and empower customers to continue advancing the most beneficial long-term energy decisions for their own property and for North Carolina.

<sup>&</sup>lt;sup>9</sup> Source: <u>The Economic and Rate Impact Analysis of Clean Energy Development in North Carolina</u> – 2015 Update, RTI International/ScottMadden (February 2015)

# APPENDICES

Duke Energy Carolinas NCUC Docket Numbers														
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fuel & Fuel Related Costs (& Renewable Purchased Power)	E-7, Sub 685	E-7, Sub 708	E-7, Sub 725	E-7, Sub 746	E-7, Sub 780	E-7, Sub 805	E-7 Sub 825	E-7, Sub 847	E-7, Sub 875	E-7, Sub 934	E-7, Sub 982	E-7, Sub 1002	E-7, Sub 1026	E-7, Sub 1051
General Rate Cases								E-7, Sub 828	E-7, Sub 828	E-7, Sub 909	E-7, Sub 909	E-7, Sub 989	E-7, Sub 1026	E-7, Sub 1026
DSM/EE Programs									E-7, Sub 831	E-7, Sub 831	E-7, Sub 941	E-7, Sub 979	E-7, Sub 1001	E-7 Sub 1031
Renewable Energy and Energy Efficiency Portfolio Standard Cost Recovery									E-7, Sub 872	E-7, Sub 936	E-7, Sub 984	E-7, Sub 1008	E-7, Sub 1034	E-7, Sub 1052
					Duke Energ	gy Progress NC	UC Docket Nu	mbers						
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fuel & Fuel Related Costs (& Renewable Purchased Power)	E-2, Sub 784	E-2, Sub 806	E-2, Sub 833	E-2, Sub 851	E-2, Sub 868	E-2, Sub 889	E-2, Sub 903	E-2, Sub 929	E-2, Sub 949	E-2, Sub 976	E-2, Sub 1001	E-2, Sub 1018	E-2, Sub 1031	E-2, Sub 1045
General Rate Cases													E-2, Sub 1023	E-2, Sub 1023
DSM/EE Programs								E-2, Sub 931	E-2, Sub 931	E-2, Sub 951	E-2, Sub 1002	E-2, Sub 1018	E-2, Sub 1030	E-2, Sub 1044
Renewable Energy and Energy Efficiency Portfolio Standard Cost Recovery								E-2, Sub 930	E-2, Sub 948	E-2, Sub 974	E-2, Sub 1000	E-2, Sub 1020	E-2, Sub 1032	E-2, Sub 1043

### Appendix A. North Carolina Utility Commission dockets referenced in this analysis

# APPENDIX

### Appendix B. Table of cumulative inflation-adjusted approved utility rate changes

Monthly Bill Impact for Average Duke Energy Carolinas ("DEC") and Duke Energy Progress ("DEP") Residential Customer (Nominal and Real)														
Source: Appendix A; Archived Consumer Price Index Detailed Report Information, US Bureau of Labor Statistics, accessed at http://www.bls.gov/cpi/cpi_dr.htm#2013														
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
DEC - Conventional Energy and Plant Charges		\$4.39	-\$0.25	\$2.85	\$2.46	\$1.56	\$4.80	\$18.03	\$4.56	\$1.17	-\$2.14	-\$1.94	\$10.46	-\$4.64
DEC - Cumulative Conventional Energy and Plant (Nominal)		\$4.39	\$4.14	\$6.99	\$9.45	\$11.01	\$15.81	\$33.84	\$38.40	\$39.57	\$37.43	\$35.49	\$45.95	\$41.31
DEC – Cumulative Conventional Energy and Plant Charges (Real)		\$5.68	\$5.24	\$8.62	\$11.27	\$12.72	\$17.77	\$36.63	\$41.71	\$42.29	\$38.79	\$35.49	\$45.27	\$39.94
DEC - Renewable Purchased Power (Nominal)									\$0.17	\$0.30	\$0.44	\$0.67	\$0.76	\$0.79
DEC - Renewable Purchased Power (Real)									\$0.18	\$0.33	\$0.45	\$0.67	\$0.75	\$0.76
DEC - REPS Rider Charge (Nominal)									\$0.16	\$0.27	\$0.49	\$0.22	-\$0.04	\$0.39
DEC - REPS Rider Charge (Real)									\$0.17	\$0.29	\$0.51	\$0.22	-\$0.04	\$0.38
DEC - DSM/EE Rider Charge (Nominal)									\$0.43	\$1.47	\$1.93	\$2.44	\$1.78	\$6.50
DEC - DSM/EE Rider Charge (Real)									\$0.46	\$1.57	\$2.00	\$2.44	\$1.75	\$6.28
DEP - Conventional Energy and Plant Charges		\$5.58	\$0.58	\$4.23	\$7.06	\$1.13	\$5.47	\$6.61	-\$1.50	\$5.24	-\$4.80	-\$9.18	\$9.75	\$1.92
DEP - Cumulative Monthly Conventional Energy and Plant Charges (Nominal)		\$5.58	\$6.16	\$10.39	\$17.45	\$18.58	\$24.05	\$30.66	\$29.17	\$34.40	\$29.60	\$20.42	\$30.18	\$32.10
DEP - Cumulative Conventional Energy and Plant Charges (Real)		\$7.22	\$7.80	\$12.82	\$20.83	\$21.49	\$27.04	\$33.19	\$31.69	\$36.77	\$30.67	\$20.42	\$29.72	\$31.03
DEP - Renewable Purchased Power (Nominal)									\$0.55	\$0.10	\$1.16	\$3.79	\$5.02	\$4.79
DEP - Renewable Purchased Power (Real)								_	\$0.60	\$0.11	\$1.20	\$3.79	\$4.95	\$4.63
DEP - REPS Rider Charge (Nominal)								\$0.36	\$0.65	\$0.58	\$0.56	\$0.42	\$0.20	\$0.83
DEP - REPS Rider Charge (Real)								\$0.39	\$0.71	\$0.62	\$0.58	\$0.42	\$0.20	\$0.83
DEP - DSM/EE Rider Charge (Nominal)								\$0.85	\$0.63	\$2.50	\$3.62	\$4.14	\$3.51	\$4.86
DEP - DSM/EE Rider Charge (Real)								\$0.92	\$0.68	\$2.67	\$3.75	\$4.14	\$3.46	\$4.70