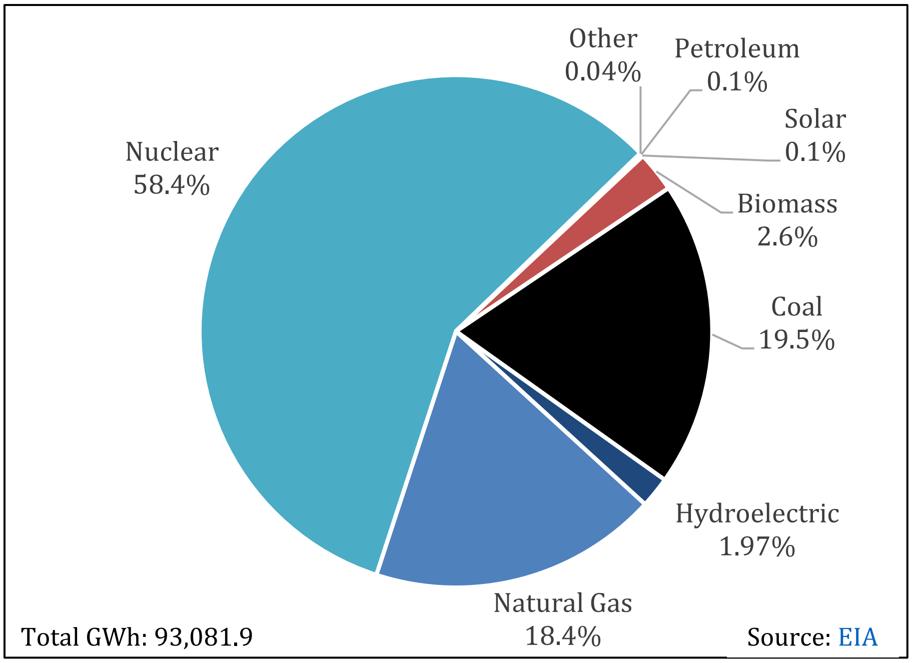
State Brief: South Carolina

BACKGROUND

South Carolina's Net Electric Generation, 2017



The majority of South Carolina's energy mix is supplied by nuclear power, comprising almost three-fifths of the state's electricity generation in 2017. South Carolina consistently ranks as one of the most nuclear-dependent states, ranking third in the nation in total nuclear generation capacity. Coal and natural gas are the second and third largest contributors to the energy mix, respectively, together supplying almost 40% of the state's electricity. While dependent upon these resources, South Carolina has no in-state coal or gas production and relies on imports from out-of-state. The proportion of electricity generated from coal has declined significantly over the past decade, dropping from 40.2% in 2007 to 19.5% in 2017. Conversely, natural gas-fired generation more than doubled in the same period, with the U.S. Energy Information Administration (EIA) projecting additional increases in 2018.

The Palmetto State boasts substantial solar and biomass energy potential. Driven by the state's robust forest resources and timber industry, biomass provides a sizeable amount of the state's renewable electricity and surpassed hydroelectric generation in 2017. According to the most recent verified EIA data available, installed solar capacity boomed in 2017, increasing from roughly 100 megawatts (MW) in nameplate capacity in 2016 to approximately 400 MW in 2017. Preliminary EIA data suggests solar generation experienced increased even more dramatically in 2018. The majority of new solar capacity is a result of several utility-scale projects coming online. Signed by Henry McMaster in May 2019, House Bill 3659, or the Energy Freedom Act, seeks to expand the state's solar industry by restoring the state's net metering policy and by improving grid access for smaller solar-based power producers (see below: Mainstreaming Renewables).

The South Carolina Public Service Commission (PSC) regulates two natural gas companies, four investor-owned utilities (IOUs), and exercises limited jurisdiction over 24 electric cooperatives in the state. The PSC has seven non-term-limited members appointed via an election held by the General Assembly. Currently, there are six commissioners who are either unaffiliated with a political party or have non-public party identification, and one Republican commissioner. Comer Randall serves as Chair. Republican majorities control both chambers of the state legislature, and Governor Henry McMaster is a Republican.

POLICY STRENGTHS AND OPPORTUNITIES[1]

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[2] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency

[1] For more information on policy opportunities, please visit the SPOT for Clean Energy. For more information on specific policy actions related to these opportunities, please review the *Clean Energy Policy Guide for State Legislatures*.

[2] V.A. Krasko and E. Doris, *National Renewable Energy Laboratory*, 2012. Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions. http://www.nrel.gov/docs/fy13osti/56428.pdf.

and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs in order to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

GRID MODERNIZATION

The transition to a digital economy requires affordable, sustainable, and reliable electricity and presents challenges and opportunities to the grid. Emerging physical and cyber security threats, along with increased demand for faster outage response times, require, at minimum, real-time incident tracking and response capabilities. Increased grid penetration of renewable energy coupled with the adoption of advanced metering, energy storage, microgrids, electric vehicles, and other technologies to modernize our electric system will provide economic benefits, increase security, and ensure more reliable, resilient, and clean electricity. These innovations will require substantial planning and investment in grid technologies.

Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation. Grid modernization strategies, while recognizing regional and inter-state diversity and avoiding one-size-fits-all plans, should take a holistic view of the electric system.

Although the GridWise Alliance's latest Grid Modernization Index ranks South Carolina 34th for grid modernization efforts, policymakers have begun to emphasize the importance of updating electricity infrastructure in recent years. North Carolina State's 50 States of Grid Modernization Report shows the state was among the most active in the U.S. in pursuing grid modernization actions in 2018. Among the grid modernization activity that occurred, Duke Energy held a Grid Improvement Initiative workshop with assistance from the Rocky Mountain Institute (RMI). Pending PSC approval, Duke Energy has proposed a $454 million South Carolina Grid Improvement Plan, which includes programs to develop self-optimizing grids, voltage optimization, energy storage, distributed energy resource (DER) dispatch, and transmission upgrades.[3]

There are policies that South Carolina's policymakers could adopt to support in-state modernization efforts.

1. Develop a grid modernization strategy through a stakeholder process. Alternatively, states might decide to require that utilities develop and propose a ten-year grid modernization plan to the PSC within a specified timeframe. Utilities would then be required to implement that plan within another specified timeframe. Strategies and/or plans should outline a clear set of grid modernization goals and describe methods to measure, report, verify, and enforce progress towards those goals. Further action following Duke's grid modernization stakeholder workshop last year has yet to take place. Advancement of the utility plan may depend upon the ongoing rate case currently before the commission.

2. States might also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals. Policymakers could consider directing the PSC to evaluate alternative ratemaking mechanisms, performance-based regulation, and/or new utility business models that support grid modernization. In its current form, the grid improvement plan proposed by Duke Energy will be financed through conventional cost-of-service regulation.

[3] See PSC Docket 2018-218-E. For a detailed analysis on The SC Grid Improvement Plan, see GridLab's whitepaper: "Modernizing the Grid in the Public Interest: Getting a Smarter Grid for the Least Cost for South Carolina Customers" (2019).

3. Require that utilities' integrated resource plans (IRPs) include plans to enhance cybersecurity, integrate DERs (including electric vehicles and energy storage), increase smart meter deployment and demand response and/or demand-side management (DSM) programs, and measure and report on the results of grid modernization efforts.

4. South Carolina does not have clear state policies governing customer data access and privacy protections. To address this, policymakers should develop legislation or rules that, at minimum, do the following: clarify who owns the energy data associated with consumer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible. The state could establish customer data access to energy data through a program like Green Button.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while maximizing the value of grid resources. By deploying storage in strategic locations, utilities can more effectively manage their energy portfolios. First, storage provides management of intermittent demand – helping to flatten peak demand requirements for the utility. Second, the responsiveness of energy storage can allow the utility to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, storage can dispatch power to better integrate intermittent resources like renewable energy.

The flexibility of battery storage, combined with advanced metering infrastructure, allows customers to control, for instance, how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can lead to a number of economic and environmental gains.

Two major trends have enabled increased deployment of energy storage: declining costs and technological advances. State policy can help maximize these benefits through a combination of establishing a framework for easy integration of energy storage into the grid and establishing a marketplace that monetizes the benefits of energy storage for cost-effective investment. South Carolina is primed to substantially increase adoption of storage technologies. Not only does Duke Energy's Grid Improvement initiative set aside $24.5 million for energy storage projects,[4] but the landmark legislation - the Energy Freedom Act – will support energy storage by removing regulatory barriers to grid access and by recognizing the values storage provides to the grid (discussed further below).

In addition to evaluating energy storage's benefits to the grid, there are additional opportunities for developing supportive state policies:

1. Amend existing interconnection policies to ensure that storage can connect to the grid through a transparent and simple process. The Interstate Renewable Energy Council (IREC) has produced a series of interconnection protocols that states can easily adopt. The state could establish best practices for interconnecting storage in statute, or legislation could provide an instruction to the PSC to update existing policy.

2. Instruct utilities to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it will be cost effective, or identify the price point at which it will become cost effective. The Energy Freedom Act directs the PSC to open a docket to establish new avoided cost methodologies in making resource approval determinations, and geographic location is one factor to be considered in calculating the avoided cost for siting storage projects.

3. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives (NWAs) to large transmission and generation investments. Alternatively, states might want to require that utilities develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value. Because the Energy Freedom Act requires utilities to factor avoided costs into resource planning decisions, the legislation should have a positive impact on energy storage deployment. Greater storage penetration levels would reduce the

[4] Gridlab. Modernizing the Grid in the Public Interest: Getting a Smarter Grid for the Least Cost for South Carolina Customers, p. 19

potential impact of electric service outages, and reduce overall costs to ratepayers, which would factor into avoided-cost methodologies.

4. Consider creating a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can limit the amount of utility owned storage; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for storage at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

5. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment for storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This should signal to customers the value of leveraging storage while better aligning customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Policy might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

6. Clear data access policies that allow third parties to provide energy management services based on signals from the utility can greatly increase the value of efforts to monetize the value stream offered by energy storage. (See discussion above, under Grid Modernization.)

MAINSTREAMING RENEWABLES

As the renewable energy industry has matured, technology has improved, and global production of generating equipment has increased, renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). A 2019 Bloomberg New Energy Finance report predicts that renewable resources will generate at least 60% of total global electricity and 43% of U.S. electricity by 2050. With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices. For these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean energy resources.

To reduce barriers to customer and utility participation in the renewable energy market, policymakers in South Carolina might consider several options.

Customer-Oriented Policies

1. Interconnection, net metering, and streamlined permitting – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. To ensure this, South Carolina's policymakers could consider adopting IREC's model interconnection procedures, removing net metering system size limitations and crediting net excess generation at the customer's retail rate. Allowing aggregated net metering would be especially beneficial to the state's agricultural operations. Other applications for aggregated net metering include commercial properties and public entities like state and local governments, universities, and schools. The state might also consider establishing either statewide standards for streamlined permitting processes, or resources to support local governments that voluntarily implement a streamlined program, as Charleston has done. State incentives, such as tax credits, financial incentives, or loans can be tied to systems that are established within a designated streamlined permitting jurisdiction.

2. Shared Renewables – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the project or the generation provided by the system. South Carolina might consider adopting a virtual net metering policy. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays

the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment - which can adversely affect the economics of the system (and may come as a surprise to the participant).

Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate-income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be ensured either through a percentage mandate for the overall annual contracted capacity, or by offering a higher rate of payment for the portion of shared solar capacity attributed to LMI customers. States that have a shared renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program or the Low Income Home Energy Assistance Program to provide recipients of assistance with participation in a shared renewable system.

While the Energy Freedom Act does not establish a statewide community solar program, it does encourage utilities to implement their own shared renewables programs. The Act also directs the PSC to open an investigative docket to study existing utility programs in the state and establish best practices for increasing solar access for low- and moderate-income customers. Currently, Duke Energy, Progressive Energy, South Carolina Gas and Electric, and a number of electric cooperatives maintain community solar programs.[5]

There are several additional policy options that South Carolina might consider to promote renewable energy uptake by low- and moderate-income consumers. Generally, successful state policies should be tailored to these customers, be cost-effective and financially sustainable, have measurable performance indicators, and be flexible enough to allow later changes in design.

3. Corporate Procurement – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Over the last five years, over 16 gigawatts (GW) of renewable contracts have been announced by corporate entities. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. South Carolina's policy allows companies to purchase renewable energy credits (RECs), buy renewable energy through green tariffs, and develop or lease onsite renewable energy projects. With the recent passage of the Energy Freedom Act, companies can now enter into onsite PPAs. The Energy Freedom Act also provides that electric utilities can develop a voluntary renewable energy tariff, in which customers can bundle demand under a single procurement contract to be approved by the PSC. Policies to increase corporate access to renewable energy can be designed to meet the six Corporate Renewable Energy Buyers' Principles. In addition, it is prudent to incorporate corporate renewable purchase commitments into the IRPs that utilities submit to regulators to plan for resource needs over multiple decades. By integrating these renewable purchase commitments into the IRP process, regulators can avoid over-building resources and stranding generation assets.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase utility investments in clean energy resources. South Carolina's voluntary Distributed Energy Resource Program has an aggregate target of 2% renewable energy by 2021. Cities and utilities are taking the lead. Columbia has set a goal to meet the city's energy needs with 100% renewable energy by 2036. Charleston has set a target to achieve an 80% reduction in GHG emissions, relative to a 2002 baseline, by 2050. Duke Energy has a goal to own or contract 8,000 MW of renewable energy by 2020. Dominion energy plans to reduce its GHG emissions 80% by 2050.

To increase utility adoption of clean energy technologies, South Carolina's policymakers might consider the following:

1. Emission standards are designed to drive emission reductions through either 1) a carbon portfolio standard or 2) a market-based approach. Both types of approaches can take a technology neutral stance that drives emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. These policies can also address other concerns such as pollution, asthma risk, environmental justice, and water use.

[5] National Renewable Energy Lab. Midmarket Solar Policies in the United States, South Carolina.

A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the utility planning process or by establishing a maximum allowable rate of emissions per unit.

Market-based approaches can take the form of an emissions trading regime or a tax. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 40% below 1990 levels by 2030. This reduction is achieved by the distribution of annual emission allowances that decrease over time until the goal is met. Allowances can be bought and sold on a market that allows utilities and other emitting firms flexibility in reaching total emissions goals. Revenue generated by these markets can be used to support the development of renewable energy, energy storage, and energy efficiency programs. There are emissions trading markets in operation today that states can join. The other pathway to reaching emissions targets is through a tax on fossil fuel use that can be used to generate revenue to fund emissions reductions policies and technologies and to incentivize the reduction of emissions over time. One of the advantages of a market-based program is that these are designed to reduce emissions in the most economically efficient manner possible.

2. Clean Peak Standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options including: planning and procurement requirements that focus on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives for clean energy resources delivered during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that 57% of all new passenger vehicle sales will be electric by 2040 and that price parity with conventional vehicles will be met for most segments in the mid-2020s. Designing infrastructure that will facilitate easy connection of EVs to the grid is a key part of building a modernized grid. The relationship between the increased adoption of EVs and the availability of EV charging stations is complicated. On the one hand, consumer range anxiety creates a barrier to increased adoption. On the other hand, while greater availability of charging stations would ease this anxiety, the relatively low numbers of vehicles on the road provides little incentive to install and make these stations available to the public. The good news is that both supportive policies for developing charging infrastructure and advancements in technology have eased range anxiety.

A few incentives for alternatively fueled vehicles are currently available in South Carolina. State facilities and educational institutions are eligible to use a revolving loan fund to finance alternative vehicle acquisitions in South Carolina. Duke Energy is in the process of conducting a pilot program to develop infrastructure for residential charging, electric school buses, electric public transit charging, and DC fast charger deployment. There are several policy opportunities to further encourage and prepare for increased market penetration of EVs in the state, including:

1. EV and EV Supply Equipment (EVSE) Financing and Financial Incentives – Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing high up-front costs of EVs and EVSE. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers as the credit is not applied at the time of purchase.[6] States have adopted other financial incentives including low-interest loans, grants, vouchers and rebates. A handful of states qualify EVSE under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

2. Charging Infrastructure Plan – Locating charging infrastructure is different from locating conventional fueling stations. For the most part, EVs are cars used for commuting and local trips. Furthermore, while a driver of a

[6] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

conventional vehicle stops only briefly at a gas station for the specific purpose of filling up, a driver of an EV is generally looking to refuel when they are parked for a longer period of time, for example when going shopping, going to a restaurant, or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process.

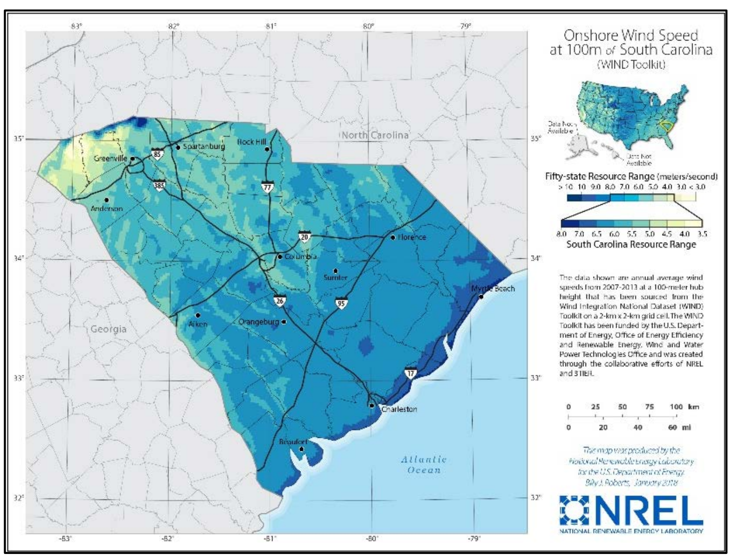
3. Parking Infrastructure Requirements – In tandem with the development of a statewide plan, legislation could set requirements for EV parking infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third party developer might install an EV charging station. South Carolina's building energy code could also be updated to include requirements for EV charging infrastructure.

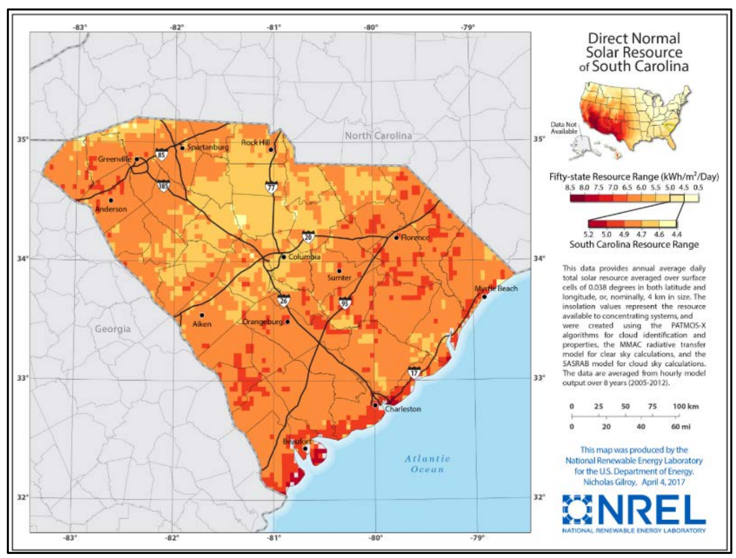
NEWS

- August 12, 2019: Charleston 'Green Gas' Company Investing in Renewable Energy
- August 7, 2019: SC Utility Regulators Drop Consultant with Deep Ties to State's Largest Power Companies
- August 2, 2019: Carbon Emissions Drop in Southeast, S.C. Eyes Further Action
- July 25, 2019: Commentary: With Energy Freedom Act, South Carolina Takes Steps Toward Resilience
- July 24, 2019: Future is Bright for Solar Energy in South Carolina after Energy Freedom Act
- July 23, 2019: Duke Energy Invests More than $150,000 in South Carolina Programs That Will Build Diverse, Talented Workforce

SOUTH CAROLINA'S WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/sc
SOLAR https://www.nrel.gov/gis/solar.html





OTHER RESOURCES

- South Carolina, State Energy Office: http://www.energy.sc.gov/
- The American Council for an Energy-Efficient Economy State and Local Policy Database, South Carolina: https://database.aceee.org/state/south-carolina
- The Database of State Incentives for Renewables and Efficiency, South Carolina: https://programs.dsireusa.org/system/program?fromSir=0&state=SC
- U.S. Energy Information Administration, South Carolina: https://www.eia.gov/state/?sid=SC
- American Wind Energy Association (AWEA): https://www.awea.org/resources/fact-sheets/state-facts-sheets
- National Renewable Energy Laboratory Biomass Maps: https://www.nrel.gov/gis/biomass.html
- U.S. Department of Energy's Alternative Fuels Data Center, South Carolina: https://afdc.energy.gov/laws/state_summary?state=SC
- SPOT for Clean Energy, South Carolina: https://spotforcleanenergy.org/state/south-carolina/

- The Rocky Mountain Institute: From Gas to Grid – Building Charging Infrastructure to Power Electric Vehicle Demand
- The GridWise Alliance: EVs - Driving Adoption, Capturing Benefits
- The Regulatory Assistance Project: Performance-Based Regulation

Our Resources

CNEE Homepage: http://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

Clean Energy Policy Guide for State Legislatures: http://cnee.colostate.edu/cleanenergypolicyguide/

The Energy Policy Podcast: http://energypodcast.colostate.edu/

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