IRP metrics

Challenge: Lack of demonstration in electric utility IRPs that selected plan ensures "access to energy supplies at the lowest practical environmental and economic cost."

Background: Electric utility IRPs vary across utility, and some IRPs do not contain any form of cost estimate for the selected plan or for alternative plans that were not selected. Similarly, IRPs do not contain relevant environmental impact projections for the selected plan or alternative plans. Without including, as part of IRP documents, cost and environmental impact metrics for multiple possible resource plans, it is unclear whether environmental quality is being maximized, and whether the cost of energy is being minimized. See, for example, 2015 IRPs at http://www.energy.sc.gov/utilities.

Recommended Approach: Requirements should be established to ensure that IRP documents include economic and environmental outcome metrics. These metrics should be presented for the selected plan and for alternative plans that were not selected.

Timeframe: The recommendations should be applied within 2017 IRP filings. (2018 for SCANA?)

Authorities: SC Code 58-37-10 and 58-37-40 define "integrated resource plan" and require utilities to prepare them. The state energy plan would include recommendations on metrics to include in IRPs, and the SC PSC and Santee Cooper board would adopt those recommendations to require inclusion of these metrics in IRPs. The statutory definition of IRP provides for comparing options, and 58-37-40 lays out what the State Energy Office shall and shall not do with respect to IRPs. No statutory changes would be needed to implement this recommendation.

Funding: Utilities already pay for software licenses and trained FTEs to do the necessary modeling. This would continue as is, with additional model runs being performed at minimal if any additional cost. Documentation of modeling results in IRPs should also add minimal if any additional cost. Including environmental impact metrics that are not already provided by utility software could add costs.

Commented [PJ1]: Santee Cooper
Electric utilities make decisions that include meeting very stringent governmental controls at the federal, state and local level. For example, a generation choice considers air, water and land environmental regulations. These laws include the Clean Water Act, the Clean Air Act, the Endangered Species Act, the SC Pollution Control Act, and the Surface Water Withdrawal Act. There are many more. Environmental protections and their costs are a big part of the IRP process already.

The following three recommendations related to IRPs are not necessary. For example, one recommends an RPS, which is not a good idea for SC.

IRP resource portfolios

Challenge: Lack of demonstration in electric utility IRPs that selected plan ensures "access to energy supplies at the lowest practical environmental and economic cost," or that "demand-side options are pursued wherever economically and environmentally practical."

Background: Electric utility IRPs vary across utility, but generally do not evaluate relevant alternative resource portfolios that are expected to result in lower environmental and economic costs. In particular, IRP documents do not consider alternative resource portfolios that feature aggressive deployment of demand-side energy efficiency, or resource portfolios that feature greater procurement of viable renewable resources compared to the selected plan. Without analyzing and including, as part of IRP documents, alternative resource portfolios featuring more aggressive adoption of efficiency and

renewables, it is unclear whether environmental quality is being maximized, and whether the cost of energy is being minimized. See, for example, 2015 IRPs at http://www.energy.sc.gov/utilities.

Recommended Approach: A set of relevant alternative resource portfolios should be established and updated annually, and utilities should include at a minimum this set of portfolios as part of their IRP analysis and public documentation. For example, a portfolio featuring annual energy savings at 1.5% of retail sales; a portfolio featuring a cumulative goal by 2025 of generating 10% of annual energy production from solar photovoltaics.

Timeframe: The recommendations should be applied within 2017 IRP filings. (2018 for SCANA?)

Authorities: SC Code 58-37-10 and 58-37-40 define "integrated resource plan" and require utilities to prepare them. The state energy plan would include recommendations on alternative resource portfolios to include (at minimum) in IRPs, and the SC PSC and Santee Cooper board would adopt those recommendations to require inclusion of these alternative resource portfolios in IRPs. The statutory definition of IRP provides for comparing options, and 58-37-40 lays out what the State Energy Office shall and shall not do with respect to IRPs. No statutory changes would be needed to implement this recommendation.

Funding: Utilities already pay for software licenses and trained FTEs to do the necessary modeling. This would continue as is, with additional model runs being performed at minimal if any additional cost.

Commented [PJ2]: Duke
The recommendation for an energy efficiency resource standard of 1.5% of retail sales left the EE committee without consensus. Additionally ultimately customers not the utility determine the amount of energy efficiency adopted. A utility can provide incentives and market them, but ultimately it cannot force a customer to adopt energy efficiency. For this reason EE should continue to be considered as it always has in resource planning, as a reduction in the load the needs to be met with generation resources. 1.5% is over double what the utilities are achieving today.

IRP scenario analysis

Challenge: Lack of demonstration in electric utility IRPs that selected plan ensures "access to energy supplies at the lowest practical environmental and economic cost."

Background: Electric utility IRPs vary across utility, and some IRPs do not contain any form of scenario analysis for the selected plan or for alternative plans that were not selected. Scenario analysis is commonly used to test the performance of a resource plan under multiple possible future scenarios. By testing each candidate resource portfolio under several relevant scenarios, planners obtain information on how robust a resource plan is across a range of future conditions. Without including, as part of IRP documents, scenario analysis for the resource plans evaluated, it is unclear whether environmental quality is being maximized, and whether the cost of energy is being minimized. See, for example, 2015 IRPs at http://www.energy.sc.gov/utilities.

Recommended Approach: A set of relevant scenarios should be established and updated annually, and utilities should include at a minimum this set of scenarios as part of their IRP analysis and public documentation. For example, a scenario featuring a mass-based Clean Power Plan approach and elevated natural gas prices; a scenario featuring additional delays in completion of V.C. Summer Units 2 and 3.

Timeframe: The recommendations should be applied within 2017 IRP filings. (2018 for SCANA?)

Authorities: SC Code 58-37-10 and 58-37-40 define "integrated resource plan" and require utilities to prepare them. The state energy plan would include recommendations on scenario analysis to include (at

minimum) in IRPs, and the SC PSC and Santee Cooper board would adopt those recommendations to require inclusion of these scenarios in IRPs. The statutory definition of IRP provides for comparing options, and 58-37-40 lays out what the State Energy Office shall and shall not do with respect to IRPs. No statutory changes would be needed to implement this recommendation.

Funding: Utilities already pay for software licenses and trained FTEs to do the necessary modeling. This would continue as is, with additional model runs being performed at minimal if any additional cost.

Energy efficiency potential studies

Challenge: Lack of demonstration that "demand-side options are pursued wherever economically and environmentally practical."

Background: Electric utilities have commissioned territory-specific demand-side energy efficiency potential studies, and these studies are sometimes used as a basis for long-term efficiency plans within IRPs. However, the potential studies typically do not evaluate multiple levels of market penetration that would represent low, medium, and high customer incentives, program marketing, and other factors influencing program participation. Without analyzing higher market penetration of demand-side options, it is unclear how much cost-effective efficiency is available in South Carolina.

Recommended Approach: A set of market penetration scenarios should be established and updated annually, and utilities should include at a minimum this set of scenarios as part of their energy efficiency potential analyses. Additionally, a requirement should be established for producing and updating efficiency potential studies at reasonable intervals.

Timeframe:

Economic impact modeling

Challenge: Lack of consideration of expected economic development consequences of resource plans.

Background: Economists routinely use modeling tools to evaluate how government policies, new infrastructure, and other economic changes are expected to impact employment, gross state product, state and local government revenues, and other economic indicators. These tools and the information they provide to aid decision-making have not been adopted for resource planning purposes in South Carolina. Additional background can be found in EPA's *Assessing the Multiple Benefits of Clean Energy*, Chapter 5: https://www.epa.gov/sites/production/files/2015-08/documents/epa_assessing_benefits_ch5_0.pdf

Recommended Approach: As part of coordinating "the preparation of an integrated resource plan for the State" (SC Code 58-37-40(D)), the SC Energy Office should perform or commission economic impact modeling to further inform resource decisions and policy.

Timeframe:

Commented [PJ3]: Duke
As a general comment on EE, it is dangerous to consider EE like a firm generation resource with respect to reliability

Commented [PJ4]: Santee Cooper
This belongs in the DSM/EE group.

Commented [PJ5]: Duke
Again a similar recommendation came in the EE sub Committee and it did not move forward with consensus. Duke Energy currently does market potential in the Carolinas about every three years which we believe is more frequently than other utilities. Our market potentials to have base cases and high penetration in them. Market potential studies are expensive to perform and are unique to each utility, requiring more frequent studies or a standardization is not necessary and costly.

Commented [PJ6]: Santee Cooper
There is an economic impact group. This belongs in that group for consideration.

Electric portfolio standard

Challenge: Lack of a planning mechanism that ensures utilities are deploying resources "at the lowest practical environmental and economic cost."

Background: Various types of quantitative analysis – including but not limited to integrated resource planning, energy efficiency potential studies, and economic impact modeling – have the potential to demonstrate that deploying clean energy resources such as energy efficiency and renewable energy would be expected to reduce environmental and economic costs and risks, and also enhance economic development in South Carolina. Yet absent a strong utility motivation to pursue these resources, they may not be deployed. Establishing binding targets for these types of resources, based on quantitative analysis, would ensure that the goals of the state energy plan are being met. Notably, in 2008 the South Carolina Climate, Energy and Commerce Advisory Committee ("CECAC") recommended, by super majority, development of energy portfolio standards.

Recommended Approach: As part of coordinating "the preparation of an integrated resource plan for the State" (SC Code 58-37-40(D)), the SC Energy Office should identify and recommend energy portfolio targets for adoption by the SC Public Service Commission.

Timeframe:

Natural gas and propane efficiency programs

Challenge: Lack of clarity regarding the potential for demand-side efficiency programs to reduce natural gas and propane consumption.

Background: While demand-side incentives for high-efficiency natural gas-consuming equipment are available, South Carolina has not systematically evaluated the cost-effective potential of demand-side efficiency programs to reduce natural gas or propane consumption across the state.

Recommended Approach: A requirement should be established for producing and updating efficiency potential studies for natural gas and propane at reasonable intervals, and all cost-effective efficiency potential should be pursued.

Timeframe:

Solar property tax policy

Challenge: Lack of clarity and uniformity regarding how solar equipment is assessed for property tax purposes is creating uncertainty in solar markets.

Commented [PJ7]: Santee Cooper
This is another name for a Renewable Portfolio Standard and we are not comfortable recommending that SC have an RPS.
Believe the RPS recommendation got down voted in the renewables group.

Commented [PJ8]: Nucor
Broad state-wide electric portfolio targets or standards should not be endorsed or established. Such standards could lead to choices that are not cost-effective and do not lead to the lowest reasonable electric rates or most reliable service. Utilities in SC should have reasonable flexibility within their IRPs to determine and propose the most cost effective resources and customize their resource plans for their specific needs. If others want to question utility choices, this can be done either by raising the issue directly with the utility or in the context of an individual IRP process, as part of other regulatory proceedings related to the issue and/or when the utility proposes to put the costs into rates.

Commented [PJ9]: Duke
There is no need to establish a energy portfolio standard. It would lead to issues related to industrial customer opt-out, the impact of building code and appliance standards advancement. As demonstrated by the fact the SCPSC has created a positive regulatory environment for EE has motivated utilities to aggressively pursue energy efficiency in the most cost effective manner possible. The rate/rider impact of achieving a high energy efficiency requirement would be high in the near term while the system savings are realized over time.

Commented [PJ10]: Duke
The "background" section states, "…property tax burdens on solar equipment are difficult for "developers" to predict, and can be excessively high." Difficult to predict – not necessarily. "excessively high" is pretty subjective……a fix would be to focus more on tax clarity around rooftop.

Also, the second part of the "Solar property tax policy" section seems to be all about PPAs, not tax policy. Seems out of place, perhaps nowhere else to put?

Commented [PJ11]: Santee Cooper
Belongs in the Economic Development group. Also, just a suggestion – this might be treated more favorably if it were residential only.

Background: Rules and regulations for determining property tax liability on solar equipment are complex and have been adapted from existing practices that originally did not contemplate solar technologies. As a result, property tax burdens on solar equipment are difficult for developers to predict, and can be excessively high. Additional background can be found in the 2016 SC Clean Energy Summit powerpoint presentation (http://www.scceba.org/speaker-bios/), slides 55-92.

Recommended Approach: Property tax policy that specifically considers solar technologies should be adopted.

Timeframe: The recommendations should be adopted as soon as possible, to ensure a smooth and cost-effective implementation of Act 236.

Challenge: Corporations seek renewable energy purchases

Background: Sixty percent of Fortune 100 companies and nearly two-thirds of Global 100 companies have set renewable energy and/or greenhouse gas goals and therefore demand access to renewable energy in the places where they do business.1[1] These goals are driven by cost considerations and locking in long-term energy pricing, fuel supply diversification, and environmental stewardship. When large corporations scout locations for new facilities, power is a major consideration—reliability, price, and whether or not it is renewable. Recent examples in South Carolina include Boeing in North Charleston and Volvo in Berkeley County, both of which demanded renewable energy to power their facilities. In North Carolina, major companies such as Apple, Google, Facebook, and Amazon have driven major development of solar and wind energy, while providing substantial economic development and employment impacts. South Carolina should ensure that renewable energy is available to attract and retain large employers.

Commented [PJ12]: Duke
Should this be in "Solar property tax policy" section? seems to be all about PPAs, not tax policy. Seems out of place.

Recommended Approach: The State should encourage the use of utility green power buying programs by corporate customers and the development of renewable energy projects to help provide the renewable energy needed. Power purchase agreement terms between the utility and the renewable energy facility should be structured so as to not be unnecessarily prohibitive to renewable energy developers. The State Energy Plan can include PPA best-practices recommendations for utilities and renewable energy facilities.

Timeframe: Begin immediately.

Statutory Facilitation of Second License Renewal for Nuclear Plants

Challenge: Second License Renewal is being pursued for nuclear plants throughout the industry. For example, Oconee Nuclear Station represents 2,538 MW of capacity and currently provides approximately 22% of the energy consumed by Duke Energy Carolinas (DEC) customers. Obviously, Oconee is a critical component of the DEC generation system.

1[1] Word Wildlife Fund et al. 2014. *Power Forward 2.0*.

Background: U.S. nuclear power plants are licensed to operate for 40 years, as specified in the Atomic Energy Act of 1954. Congress selected a 40-year period for nuclear plant licenses because this period was a typical amortization period for an electric power plant. The 40-year license term is not based on safety, technical or environmental factors. An NRC rule allows licensees to apply for multiple extensions of up to 20 years after the initial 40-year license. The company must demonstrate to the NRC that it will manage aging issues effectively during the renewal term, thus ensuring equipment safety and functionality.
Renewing the licenses for the Nuclear Power Plants serving South Carolina for another 20 years is good for our customers, South Carolina and the environment. For our customers: safe, reliable and low-cost electricity will continue for over 30 more years because our nuclear stations are among the most efficient and most reliable sources of electricity that we operate.

Recommended Approach: The Energy Plan should include a recommendation that lawmakers identify or create the necessary statutory provisions to facilitate the extension of the lives of assets serving South Carolina customers and any associated investment necessary to effectuate requirements of Second License Renewal.

Timeframe: 2016-note possibility of second licenses in the forward looking part of Plan. Second License Renewal is being pursued for nuclear plants throughout the industry. Exelon and Dominion have announced their intension to pursue SLR for Peach Bottom Nuclear Station and Surry Nuclear Station, respectively.

Natural Gas Infrastructure

Challenge: Ensure that natural gas is a viable energy option for residential, commercial, industrial, and power generation customers across South Carolina; and enable South Carolina to continue to attract economic development prospects.

Background: Natural gas is a cost effective[2], reliable[3], clean[4] and domestic[5] source of energy for residential, commercial, industrial and power generation customers in South Carolina. Additionally, natural gas supports a balanced approach to electric generation in the state.

Since natural gas is not produced in South Carolina, all natural gas is transported into South Carolina by three underground interstate pipelines: Dominion Carolina Gas Transmission (DCGT), Transco and Southern Natural Gas. The natural gas is then delivered to local distribution companies, municipalities, power generators and industrial customers.

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[2] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *Short-Term Energy Outlook*. N.p., n.d. Web. 04 Aug. 2016.
[3] "PHMSA - FAQs - General Pipeline FAQs." *PHMSA - FAQs - General Pipeline FAQs*. N.p., n.d. Web. 04 Aug. 2016.
[4] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *How Much Carbon Dioxide Is Produced per Kilowatthour When Generating Electricity with Fossil Fuels?* N.p., n.d. Web. 04 Aug. 2016.
[5] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *U.S. States*. N.p., n.d. Web. 04 Aug. 2016.

Interstate natural gas transmission pipelines are regulated by the Federal Energy Regulatory Commission (FERC), the Pipeline and Hazardous Materials Safety Administration (PhMSA) and other federal and state agencies.

South Carolina has thousands of miles of underground transmission pipelines that bring and move natural gas across the state. These pipelines serve energy needs for industrial, commercial and residential customers. Due to the increased availability of low-cost, domestic natural gas; the implementation of the Clean Power Act (if approved); and manufacturing and population growth in South Carolina, natural gas is in high-demand[6] and consequently, new investment or capacity expansion within the existing pipelines will need to occur.

In order to continue to serve the growing demand for natural gas in South Carolina, additional natural gas transmission pipeline capacity is needed. The process for planning for additional natural gas pipeline capacity begins only when necessary end-user commitments have been finalized. Construction does not begin until the pipeline has been reviewed and approved by all required regulatory bodies. The process to submit and receive approval to expand or construct a pipeline system can take several years.

Recommended Approach:

1) A study committee should be convened in 2017 to consider issues that prevent natural gas from being an option for many South Carolina energy consumers. The goals of the committee should include the following:

    a) Expand education of current natural gas infrastructure and potential new infrastructure to policy advisors, business development professionals, and legislative/community stakeholders.

    b) Determine/further evaluate the potential government efforts/programs that may encourage or assist with the subsidy/recovery of development costs to encourage gas infrastructure growth in rural or underserved areas.[7]

        1. In order to increase statewide access to natural gas and to expand natural gas pipelines to rural or underserved areas and to enhance future economic development, the state of South Carolina will need to encourage and support firm transportation capacity contracts from creditworthy customers to support natural gas fired electric generation; residential and commercial growth served via municipal utilities and distribution companies, as well as additional industrial consumption to existing and prospective companies.

[6] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis." *Short-Term Energy Outlook*. N.p., n.d. Web. 04 Aug. 2016.

[7] For example, during the 2015 North Carolina Legislative Session, legislation was passed to provide recovery of capital-related costs incurred by a natural gas company for constructing natural gas infrastructure for a large manufacturing employer. Cost recovery for natural gas economic development infrastructure (§ 62 -133.15. General Assembly of North Carolina).

2. Recognizing the constraints on the current interstate natural gas pipeline systems and the capital costs required to construct new infrastructure into new and underserved markets, the State/utilities/municipalities/industrial and commercial customers could contract to anchor new pipeline expansion projects to serve those regions of the state. This could position new areas of the state to market and compete for future economic development prospects. As those prospects are landed, the capacity obligation can be shifted from the state to the new entities. Interstate pipeline expansion projects typically take four (4) or more years to implement, so there would be no costs incurred by the state until 2020 or later. Annual costs would then be dependent on the amount of capacity for which the state contracts.[8]

   As future economic development projects have participants which seek and utilize natural gas, the State/utility/municipality/industrial customer/commercial customer would have flexibility to permanently release portions of its firm capacity based on the prospects' timing. As the capacity is permanently released to prospect(s), the state reduces its ongoing obligation. This could be a win/win for all parties to support and realize new infrastructure builds and minimize the long term financial risk to the state.

c) Review existing regulations and policies to determine if there are opportunities to enhance current policy or regulations to further help expedite infrastructure enhancement.

d) Determine the gas infrastructure project(s) that are desired and then determine the necessary coalitions required to make the projects a reality. Note: with new infrastructure projects taking four years or more to implement, each day of delay further impacts the opportunity for future economic development in new and underserved areas.

   1. Interstate natural gas pipeline companies, as a matter of practice, routinely conduct open seasons for expansions. These open seasons provide a mechanism for identifying market interest. Open seasons can be binding or non-binding. Generally, binding open seasons are held when a specific project and anchor customer(s) have already been identified. Nonbinding open seasons are more general solicitations of interest to help identify potential future capacity needs. The ultimate goal of open seasons is to develop and construct infrastructure that serves the greatest need in the most cost-effective way. A prudent approach for new infrastructure development in South Carolina would be to hold an open season; gather potential participants; determine where new

[8] Note: Pipeline capacity is separate from the commodity purchase of natural gas itself. Committing to firm pipeline capacity is a fraction of the cost of the natural gas itself.

Commented [PJ13]: Duke- Edit
Recognizing the constraints on the current interstate natural gas pipeline systems and the capital costs and risks required to construct new infrastructure for new or expanded pipelines to provide potential service to underserved markets, the state/utilities/municipalities/industrial and commercial customers could contract for new or expanded pipeline expansion projects to serve regions of the state for future economic development prospects. This could position new areas of the state to have infrastructure in place to market and compete for future economic development prospects. Interstate pipeline expansion projects typically take four (4) or more years to implement, so these costs would likely not seen in customer rates until until 2020 or later. As these prospects are secured, the capacity obligations if assumed by the state could be shifted to the applicable entities providing service. Annual costs would then be dependent on the amount of capacity for which each respective company contracted for.[1]

As future economic development projects have participants which seek and utilize natural gas, the applicable state/utility/municipality/industrial customer/commercial customer would have flexibility to manage and optimize any unutilized or uncommitted capacity by looking for opportunities to minimize costs by releasing portions of its firm capacity if possible based on the prospects' timing. This would provide opportunities for parties to support expanded infrastructure projects while looking for opportunities to minimize cost over time.

infrastructure is desired and how much incremental capacity is needed, and then design the most cost effective pipeline project(s) to meet those needs.

Ultimately, the key issue will be to determine which entity(s) will be the contracting party(s) and serve as the anchor customer(s). A binding open season could then be held to further enhance the project economics by attracting additional participants. It is recommended that the state work with South Carolina entities in this initial phase of evaluation.

Timeframe: Begin conversations with the natural gas transmission companies immediately. The review process for new pipelines can take many months/years before it is approved.

Convene the study committee to review issues that prevent access to natural gas in the first quarter of 2017.

Residential Energy Storage

Challenge: Consumers have a desire for renewable energy options, but there is a limit on how much the electric grid can handle. Residential energy storage should be developed more as part of Act 236, Phase II.

Background: As demonstrated by several localities, there is a limit on the economic and structural benefits of renewable energy. For example, in Texas the cost of wind-generated electricity has (at times) become negative. Another example is Hawaii, where the electric grid has hit the limit on how much solar energy it can handle.

In addition, consumers as a whole see the benefits of renewable and no longer (necessarily) need substantial tax incentives to spur the development of solar or wind systems. Lastly, from an economic justice standpoint, many consumers cannot afford solar panels, even with economic incentives. However, battery systems are substantially less expensive and, coupled with time of use rates, could provide benefits to consumers in cost savings and to utilities in peak shaving.

Recommended Approach: Commission a study with the goal of finding the best mix of financial incentives to make residential energy storage feasible to consumers and utilities.

Timeframe: Begin immediately, with the goal of having a framework developed in the next 18-24 months.

Electric Grid Modernization

Commented [PJ14]: Duke
Delete all instances of the word "residential" from the energy storage recommendation. Revise the recommended approach to read: "utilities participating in Act 236 should be encouraged to examine the costs and benefits of an incentive to encourage electricity consumers to adopt energy storage." No need to commission a study.

Commented [PJ15]: Santee Cooper
While we agree that energy storage is a technology that should be considered and studied, we think this recommendation is duplicative to the one titled 'Utility Regulations' below. Prefer the one referenced above because think it is more comprehensive.

Energy storage will be key in the future but not sure at this point if it should be included into Act 236. Fine with a study, but before Act 236 is reviewed but are cautious to prevent subsidizing other rate payers.

Commented [PJ16]: Nucor
Rather than focus only on identifying incentives to make energy storage feasible and assume such incentives are necessary and desirable, the study should also assess the costs, benefits and feasibility of such energy storage without incentives and whether any potential incentives identified are necessary and desirable.

Commented [PJ17]: Santee Cooper
Agree with this statement and believe that the upgrades will be a natural process due to the ever improving technology. If our grid does get to the point that it HAS to be upgraded due to distributed energy, do the rate payer bear this cost? Even ratepayers without renewables?

Commented [PJ18]: Nucor
Grid investment upgrades are important, but each upgrade should still should be evaluated to determine if such upgrade is cost-beneficial and/or necessary to maintain reliability. Costs related to replaced equipment should be treated in ratemaking the same as all plant that is retired and no longer used and useful.

Challenge: South Carolina's electric grid is aging and needs to be modernized for the dynamic needs of the future

Background: The nation's electric delivery system design is more than 100 years old, and much of the equipment installed across the country has been in place for decades (e.g., transformers, capacitors, regulators). This delivery system, or electric grid, was designed to transport electricity from large centralized generation plants to customers across the Carolinas, sometimes hundreds of miles away. This fundamental infrastructure is still the basis for an electricity grid in the U.S. that is almost 100 percent reliable. Although it has served South Carolina well, the existing electric grid was not designed to support the diverse and dynamic demands that are increasingly being placed on it, such as increased distributed energy resources, reliability challenges and grid hardening/security requirements.

In particular, the existing grid is limited in its capability to integrate large amounts of renewable energy sources. Keeping the grid running reliably is a balancing act, where the amount of power put into the grid must equal the amount taken out. So the electricity being used right now was created just a few seconds ago, at a generation plant that an operator can ramp up or down continuously to meet electric demand of the customers it serves. With the variability of renewable energy sources, like wind or solar power, this balance becomes increasingly difficult to maintain. In South Carolina this becomes especially important with the passage of Act 236 and the expansion of distributed energy resources already expressed in the policy and statutes.

The continued safe and reliable operation of the grid is critical, and given the adoption of digital consumer and commercial technologies, outages have become increasingly impactful if they occur. While the utilities have been commended for excellent restoration in South Carolina considering the severe weather seen in this State in recent years, challenges to the grid make restoration an increasingly difficult task (e.g., winter storm of February 2014). Homes, hospitals, businesses, and schools all depend on a reliable power supply. Reliability is also important to the economy of South Carolina as large manufacturers could lose entire production runs if they are out of power. Reliability is key for economic development and vital for businesses contemplating South Carolina locations.

There are significant grid enhancements that have taken place in South Carolina. However, utilities foresee the need for growing such investments. Meeting customer expectations for power 24x7, and immediate restoration when an outage does occur, requires enhancements and improvements in the South Carolina infrastructure.. A modernization and hardening of the existing infrastructure will also allow the integration of new forms of technologies such as battery storage and microgrids.

The modernization of the grid includes the application of information technology and digital equipment that provide remote monitoring, remote control, and expanded intelligence capabilities, including smart meters at the homes of consumers. Smart meters, as reported by the Economic and Demographic Subcommittee, lay the foundation for customer programs and data that provide more transparency and control to consumers over their usage and ultimately their bill. Examples include Time-of-Use (TOU) rate programs that provide customers with variable usage charges based on the time of day to encourage optimal usage patterns, and pre-pay programs. All of the needs described above require communications among grid equipment and with centralized systems. Tomorrow's grid will operate with increased efficiency, easily integrate renewable sources of generation, and provide South Carolina consumers and utilities with near real-time data and greater monitoring capabilities.

Furthermore, it has become clear through the development of this Energy Plan that electric utilities are facing expanding customer expectations, increasing environmental regulation, and new technologies that have to be integrated seamlessly into the grid. The grid of the rapidly-approaching future will function in ways never imagined when the original wires were installed. If South Carolina is to participate in the innovation coming to fruition in the electric sector, (e.g., solar panels, wind turbines, electric vehicles, battery storage, microgrids) then the State will require an advanced, integrated grid to manage and optimize the increasingly dynamic flow of electricity.

Recommended Approach:

1) Policies in South Carolina should continue to support the upgrade to leading edge grid and metering technology while supporting the continued recovery of the asset life of the older equipment being replaced.
2) Categories of grid investment should be identified and updated in subsequent Energy Plans since modernization of the grid is more diverse than central station generation investment. Utilities should be encouraged to bring their major grid modernization projects before the Commission for transparency in how the utilities are utilizing new and developing technology to serve South Carolina customers.

Timeframe: Adopt recommendation in 2016 Energy Plan.

Ensuring Standard Nomenclature (Two Parts)

Challenge: Tying the nomenclature of the Energy Plan to SC Code 48-52-210

Background: On the whole the specific requirements of the state plan are laid out in SC Code 48-52-210. The policy of the State is to "encourage the development and use of clean energy resources, including nuclear energy, energy conservation and efficiency, and indigenous, renewable energy resources." The policy does not rank or prioritize any one of these resources over the other.

Recommended Approach: The nomenclature of the Plan should refer to " carbon-free resources" articulated in 48-52-210 as a whole, and not unnecessarily divide these resources in a manner that appears that the Plan prefers one over the other.

Timeframe: Begin immediately.

SC Code 48-52-210

"(A) It is the policy of this State to have a comprehensive state energy plan that maximizes to the extent practical environmental quality and energy conservation and efficiency and minimizes the cost of energy throughout the State. To implement this policy there is adopted the Plan for State Energy Policy."
(B) The purpose of the plan is to:
(1) ensure access to energy supplies at the lowest practical environmental and economic cost;
(2) ensure long-term access to adequate, reliable energy supplies;
(3) ensure that demand-side options are pursued wherever economically and environmentally practical;
(4) encourage the development and use of clean energy resources, including nuclear energy, energy conservation and efficiency, and indigenous, renewable energy resources;
(5) ensure that basic energy needs of all citizens, including low income citizens, are met;
(6) ensure that energy vulnerability to international events is minimized;

Commented [PJ19]: Santee Cooper
Don't think the 'clean energy' language needs to be changed. What about natural gas? The current language could be interpreted to include natural gas but the change would exclude it.

(7) ensure that energy-related decisions promote the economic and environmental well-being of the State and maximize the ability of South Carolina to attract retirees, tourists, and industrial and service-related jobs;
(8) ensure that short-term energy decisions do not conflict with long-range energy needs;
(9) ensure that internal governmental energy use patterns are consistent with the state's long-range interests;
(10) ensure that state government is organized appropriately to handle energy matters in the best public interest;
(11) ensure that governmental energy-related tax, expenditure, and regulatory policies are appropriate, and, wherever possible, maximize the long-range benefits of competition; and
(12) ensure that any future energy strategy that promotes carbon-free, nongreenhouse gas emitting sources includes nuclear energy, renewable resources, and energy conservation and efficiency."

Challenge: Tying the nomenclature of the Plan to SC Code 58-39-110

Background: As laid out in SC Code 58-39-110, the policy of the State with respect to Distributed Energy Resources is to "promote the establishment of a reliable, efficient, and diversified portfolio of distributed energy resources."

Recommended Approach: The nomenclature of the Plan should refer to "distributed energy and renewable energy resources" together to tie the SC Code 48-52-210 (B)(4) with 58-39-110 to reflect the policy of SC. Distributed energy resources are often discussed as solar, but can be different than solar. Discussions should focus on "distributed energy resources" to make sure that additional DR technologies such as battery storage are considered and discussed on par with solar technologies.

Timeframe: Begin immediately.

As reference: See SC Code 48-52-210 listed in previous recommendation.

Federal and Regulatory Mandates

Challenge: Lack of holistic scope around the breadth of legal requirements outside of the control of the State of South Carolina.

Background: There are ever increasing federal and regulatory mandates outside of the State of South Carolina that affect the price, quality and sources of electric generation in the State of South Carolina.

Recommended Approach: A running list/catalog should be established to document the material statues and regulations promulgated outside the State of South Carolina to inform future policy, resource planning and ratemaking considerations.

Timeframe: Begin immediately.

Fuel Diversity

Challenge: Ensuring energy diversity

Background: South Carolina's energy production includes a diverse mix of fuel sources for its electric generation plants. Energy diversity is defined as having a varied set of energy options to include, but not limited to, coal, natural gas, nuclear, hydro, pumped storage, solar, biomass and wind. This diversity provides benefits to the citizens of South Carolina by enabling the economical dispatch of generating facilities based on the lowest fuel prices at the time of consumer demand needs, the reliable and continuous baseload power customers count on each day and night, as well as the lessening of environmental impacts through the reduction of emissions. In maintaining a balanced and diverse energy mix in South Carolina, a reliable, versatile resilient, clean, and cost effective energy system will continue to be available to all residents and businesses as the South Carolina economy continues to grow.

Recommended Approach: To that end, nuclear power, used as baseload electric generation, is critically important to meet 24x7 customer demand with zero greenhouse gas emissions. In fact, almost 33% of the energy consumed in South Carolina comes directly from nuclear power, and is estimated to be 45% in 2025. Nuclear plants have been providing power safely and reliably for over four decades, and will well into the future. Nuclear generation is able to avoid volatile market price fluctuations in coal and natural gas which often occur during periods of high customer demand. Recently, the decision to build new nuclear power as a zero greenhouse gas emitting source was affirmed by the new nuclear baseload plants qualifying as credit against SC's goal for CO2 reductions. Therefore, South Carolina's continued reliance on nuclear generation is an important factor to provide energy supplies, today and tomorrow, at the lowest practical environmental and economic cost.

South Carolina lawmakers in 2007 established the Base Load Review Act (BLRA), a law which adds structure and consistency to the process regulated utilities follow in licensing and building new base load generation plants. This law helps protect customers from responsibility for imprudently incurred costs associated with building such plants, while at the same time providing for the recovery of prudently incurred costs. Before the BLRA was established, prudency decisions about new base load plants were not determined until after construction was completed and the units began operation, which caused uncertainty.

Two provisions of the BLRA that are pertinent to South Carolina's new nuclear projects are:

- **Base Load Review Order —** protects the interests of SCE&G customers by requiring the Public Service Commission of South Carolina and the South Carolina Office of Regulatory Staff to determine whether the anticipated costs and construction schedule for a nuclear plant are prudent before construction begins and to oversee construction along the way to ensure it is proceeding prudently. The ORS issues quarterly reports updating the status of the capital cost and construction schedules for the new nuclear project; those reports are available to the public.
- **Revised Rates Order —** has the effect of lowering the total cost of a new nuclear plant to customers. By allowing the utility to adjust rates each year during the construction phase to reflect only *financing* costs (the cost of capital), the amount of interest associated with construction is significantly reduced. Then, as each plant begins commercial operation, a final adjustment to rates under the BLRA allows for recovery of *construction* costs for that plan. By assuring more effective recovery of prudently incurred costs, the BLRA assists the utility in attracting investment capital at reasonable rates, which also helps control costs to customers.

Independent analysis has affirmed that paying financing costs while the two new nuclear units are being built, as opposed to waiting until they are complete, significantly lowers the project cost, which, in turn,

reduces the amount customers will pay through rates. It is estimated that the BLRA will save customers approximately $4 billion in electric rates over the life of the new units.

Utility Regulations

Challenge: The electric utility industry is in a state of transformation. Keeping the grid running reliably is a balancing act, where the amount put into the grid must equal the amount taken out. Utilities are seeing the effect of energy efficiency and slower growth in demand for electricity at the same time there is increased demand for renewable energy and natural gas resources, and utilities are striving to incorporate those new sources of generation onto the grid.

Background: While utilities have been modernizing their generating plants and building new, cleaner sources of generation including non-greenhouse gas emitting nuclear, utilities are also increasingly modernizing the electric grids with advanced metering infrastructure and investing in enhancements to maintain and improve reliability for customers and the broader manufacturing economies within South Carolina.

New technologies like energy storage are becoming more of a reality every day. Customer expectations are also shifting as customers are expecting their utilities to interact with real-time information, through smart phones and non-traditional communication channels, and to provide increasing options for payment and service. And, in South Carolina, customers have a variety of options for their energy supply, including community solar farms and customer-sited solar systems, whether owned or leased.

This industry transformation is ongoing in the midst of ever-increasing environmental and system security regulations that put pressure on utilities to recover their investments in a timely manner. Given the changes happening in the industry, it merits asking whether the regulatory construct we have in place today in SC is sufficient to keep pace with evolution of the industry and the technological advancements driving that evolution.

Recommended Approach: Accordingly, we recommend that a new subcommittee convene in 2017 to evaluate the regulatory construct, comprised of resource planning, revenue recovery and rate design policies, to determine if:

- there are opportunities to enhance current policy or regulations to further help expedite infrastructure modernization and expansion;
- does the changing state of the industry merit a more flexible revenue recovery model for utilities; and
- what are the ratemaking or rate-related policy changes that may allow maximum flexibility to better allow for adaptation, send informative price signals to customers, and properly account for costs in an obligation to serve territory.

Environmental Impact

Challenge: Federal rules and regulations regarding environmental impacts

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There does not seem to be a compelling need to evaluate, much less make significant changes in, the current regulatory construct for electric utilities. However, if a subcommittee is to be convened on this topic, the mission should be more general and leave the specifics to the subcommittee. For example, the recommendation could be shortened to: "Accordingly, we recommend that a new subcommittee convene in 2017 to evaluate the regulatory construct, comprised of resource planning, revenue recovery and rate design policies, and to determine if any changes should be recommended."

Background: As discussed in the Baseline section titled Environmental Outlook, South Carolina is already meeting or doing better than required under the ever-tightening federal [and state environmental] standards. This is true because recently enacted environmental rules have had a collateral effect on other emissions. For instance, the Cross State Air Pollution Rule (CSAPR) which governs emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2), led to many coal fired generation units retrofitting "scrubbers" to remove SO_2 and selective catalytic converters (SCRs) to remove NOx. Once the retrofits were completed, many utilities had emissions well below their compliance target. Later when the Mercury and Air Toxics Standard (MATS) was issued, the units which employed scrubbers, SCRs, and baghouses typically met the mercury standard. The older units without the retrofits either shutdown or did a fuel switch from coal to natural gas ahead of the MATS compliance deadline.
The same is also true for greenhouse gases (GHGs). As of January 2013, South Carolina's annual CO_2 emissions had already dropped 32% from 2005 and this trend is expected to continue because of the following:

- Increased use of natural gas for generation due to the lower cost of natural gas,
- A downturn in the economy which reduced customer demand,
- Fuel switching at some units from coal to natural gas,
- Startup of two new nuclear units that will displace dispatch from fossil units,
- Retirement of older coal-fired units (SC had 26 in 2005 and only 12 are expected to remain in 2020),
- Addition of more renewables including new solar generation as encouraged by S.C Act 236, and
- Increased use of energy efficiency measures by SC customers.

Even though there is some uncertainty regarding the regulation of GHGs, South Carolina is on-track to meet or exceed anticipated State targets due to the anticipated displacement of fossil generation by new nuclear and renewables. Additionally, state departments and stakeholder organizations such as the SC Energy Coalition have relationships and processes in place to continually monitor, evaluate, develop and respond to the changing environmental regulatory landscape.

Recommended Approach: Therefore, no new policies or subcommittees are necessary at this time.