Clean Energy Plan
Utility System Planning and Investment Memo

Question

How do we achieve a certain and continuous utility planning and investment process while meeting the criteria that it is flexible, economically efficient, and adaptable, all while maintaining reliable, affordable, safe, equitable, and clean energy?

Summary

Using other states as an example, NC can create a stakeholder engaged electric resource, grid, and system planning process, which is transparent and consistent. Holding a regularly scheduled and regulated process generates trust and certainty for the utility, stakeholders, and State's goals.

Across the country, states are reforming the utility planning process. A larger number of players are joining traditional utilities as collaborative participants in the resource planning and grid investment process. As states pass legislation with the goal of achieving clean energy targets, keeping costs low, and addressing the challenges of a more decentralized and complex grid, resource planning processes must adapt to incorporate input from a diverse group of stakeholders including traditional utilities, ratepayers and their advocates, clean energy advocates, and energy developers.

North Carolina's current path of gradual improvements to a traditional planning process, is not adequate to meet the challenges of integrating deep renewable and distributed energy penetration, which are, in turn, necessary for the state to achieve Executive Order 80's (EO80) economy-wide GHG reduction targets. Reaching the goals set out by EO80 means considering the interaction of the electric sector with other sectors such as the transportation and vehicle electrification shifts which could impact utility planning extensively. Therefore, it is necessary that North Carolina move to a more holistic, iterative, and transparent planning process that incorporates economically non-traditional market solutions, which could lower energy generation costs, all while maintaining a clean, reliable, affordable, equitable, resilient, and secure electricity system.

In North Carolina, two trends run parallel to those developing nationally. First, the current IRP process does not include explicit clean energy goals, with notable legislative exceptions including HB 589 and Clean Smokestacks, which could inhibit the ability of the energy sector to achieve current or future clean energy and environmental goals. Additionally, the current IRP process has little accountability or transparency in its goal-setting and lacks rules governing stakeholder involvement prior to IRP submission, which would provide a forum for constructive discussions on modeling approaches, price forecasts, and scenario development. Therefore, North Carolina's primary long-term energy planning mechanism is currently primarily dictated by the regulated utility. The second tension surrounds the utility's proposed grid modernization proposal, which was rejected by the North Carolina Utilities Commission (NCUC) in 2018, reflecting the need for a collaborative planning process that is inclusive of stakeholder interests.

The central tension driving differing visions of grid modernization is whether to rely, as the regulated utilities' submitted in their long-term plans, on natural gas to replace retiring coal capacity or to shift more quickly toward clean energy as some environmental and ratepayer advocates suggest. Nationally, the electricity generation sector appears to be reaching the "coal crossover" point at which renewables are cheaper than existing coal units in North Carolina[1], raising conflicts between utility concerns of stranded assets and ratepayer concerns over least cost generation. Finally, the regulated utilities' proposed legislative changes to the ratemaking process without a prior stakeholder process once again raises concerns over lack of consensus or public input on potential performance-based ratemaking tools as per national best practice as part of any multi-year ratemaking law.[2]

[1] **The Coal Crossover: Economic Viability of Coal Compared to New Local Solar and Wind Resources**, Vibrant Clean Energy, March 2019.

[2] **State Performance-Based Regulation Using Multiyear Rate Plans for U.S. Electric Utilities,** Grid Modernization Laboratory Consortium, U.S. Department of Energy, July 2017

Addressing the tensions present between multiple parties can be achieved through a better defined and stakeholder-centered utility planning process. An improved planning and investment process could be enabled by the North Carolina General Assembly and overseen by the Utilities Commission. This includes legislation which defines the goals of the planning and investment process, as well as the necessary steps, tools, and costs to develop the process, and what roles the NCUC will play giving explicit authorization where it is currently vague or lacking under existing law. To align North Carolina's process with proven successes in other states, the process should initially include an Integrated Resource Plan (IRP)[3] and Integrated Distribution Plan (IDP)[4], ultimately moving towards an Integrated System Operations Plan (ISOP) approach, which combines the often-separate processes of generation, transmission, distribution, and distributed energy resource planning.

Definitions

IRP - An integrated resource plan is a utility plan for meeting forecasted annual peak and energy demand, plus some established reserve margin, through a combination of supply-side and demand-side resources over a specified future period.

IDP - A more comprehensive approach to distribution planning using new tools and techniques to accommodate the increasingly complex and diverse grid that incorporates new components such as DER and two-way electrical flows

ISOP - A comprehensive planning process using new tools to integrate generation, load, transmission, and distribution together to more effectively, efficiently, and economically deal with an increasingly diverse set of energy factors.

These regulated planning processes should be transparent, consistent, data-driven, and involve stakeholders' input and feedback throughout the development and goal-setting phases, and where possible in the decision-making phase of the process. The IRP, as it presently exists in NC, does not possess adequate tools or stakeholder input to address the changing landscape around generation, grid modernization, and system planning. In order to address these shortcomings updated and novel IRP, IDP, and ISOP requirements should be developed and defined collaboratively by the utility, stakeholders, and the NCUC to meet North Carolina's goals. This means including stakeholder input in a systematic fashion as the utility thinks about what the process looks like, what tools and data are included, how stakeholders play a role, what the timeline is, and how it will be enforced and enacted.

It is recommended that the processes include regularly scheduled plan submissions (filings) with the NCUC to allow for stakeholder intervention early and throughout the process. These submissions should utilize existing analytical tools as well as newly developed tools which incorporate higher quality data. This includes offering improved data and modeling access for industry and stakeholders, which could come in the form of hosting capacity analysis for example, helping to create market opportunities and investment confidence throughout the process. To achieve the state's clean energy goals, utilities must update planning models and assumptions to allow full quantification of the operational benefits of renewable resources, electric vehicle infrastructure build out, and energy storage. Current modeling techniques fail to account for the suite of operational benefits these resources can bring to bear, undervaluing potential benefits and encouraging utilities to rely on past operational practices instead of exploring innovation in electrical systems operations.

Fortunately, North Carolina can look to states already developing and implementing holistic planning processes, which balance the goals of the state, utilities, and stakeholders. Some prime examples include Minnesota, Nevada, Hawaii, Colorado, Washington, and California.

In 2015 the Minnesota Public Utilities Commission opened an inquiry into distribution planning (docket 15-556), aiming to incorporate distributed energy resources (DER) with the appropriate optimization tools and create a transparent grid leading to an enhanced grid, reduce costs, and a more flexible and DER capable system. Ultimately the multi-year process now requires the regulated utilities (Xcel Energy) to develop DER

[3] **Best Practices in Electric Utility Integrated Resource Planning,** Regulatory Assistance Project & Synapse Energy Economics, June 2013

[4] **Integrated Distribution Planning**, ICF International, August 2016

growth scenarios for 10 years, evaluate non-wire alternatives, detail DER queue status, and file annual updates on their 5 and 10-year distribution investment plans.

Nevada's legislature passed a bill in 2017 (SB 146) to address distributed resources along with their cost, benefits, financial compensation mechanisms, integration, and barriers to adoption. The Public Utilities Commission began the rulemaking process in 2017 (Docket 17-08022) leading to a Distributed Resource Plan proposal. The proposal includes a system load/DER forecast, locational net benefit analysis, hosting capacity analysis, and grid needs assessment, filed every 3 years with the IRP.

Hawaii and its utility have adopted (HB 623) and started the planning/development process for its Integrated Grid Planning (IGP) process in 2019 (Docket 2018-0165), a program which incorporates both distribution and generation planning, similar to an ISOP. The IGP (Figure 1), which will continue to change and grow with feedback from stakeholders, includes a capacity expansion model, a substation load and capacity analysis, hosting capacity analysis, and improved stakeholder input to the 3-year process, which produces a 5 year action plan and a long term pathway to achieve the legislative goals of 100% renewables. (*See Figure 1*)

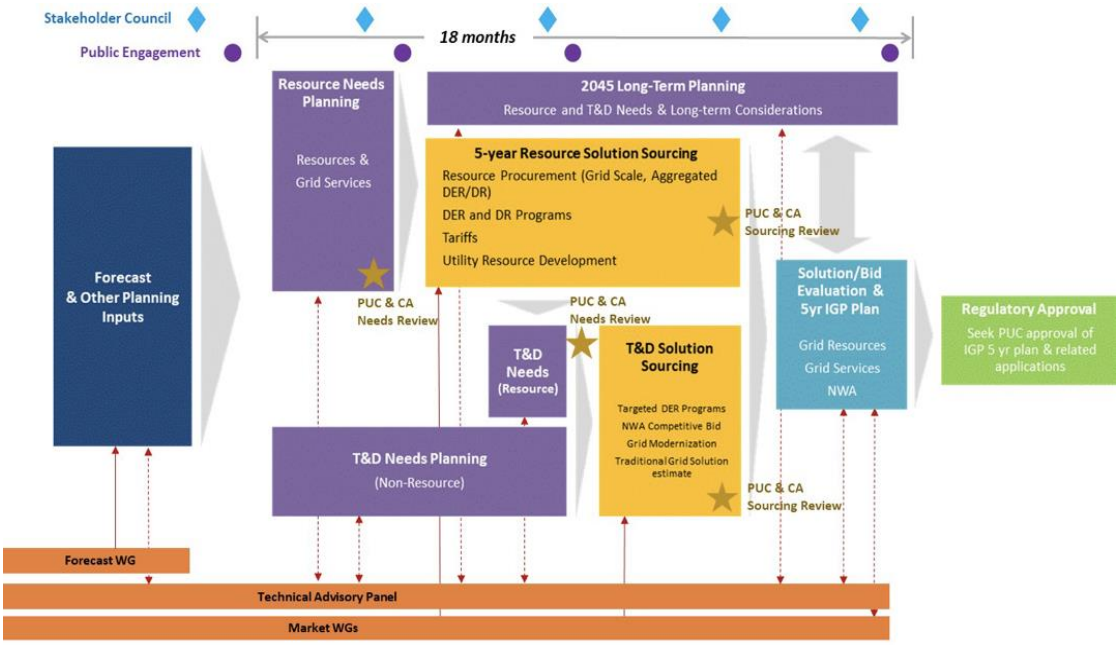

*Figure 1 - Hawaii's Integrated Grid Plan (analogous to ISOP) as an example of the complexity, transparency, and stakeholder engagement (**Integrated Grid Planning Report**, Hawaiian Electric, Maui Electric & Hawai'i Electric Light, March 1, 2018)*

It would be beneficial to invite input from representatives of the cited states on how, moving forward North Carolina can transition to an electric sector system planning process which includes the same level of stakeholder engagement and transparency achieved elsewhere. Duke Energy, the largest regulated electric utility in the NC, having recognized the need for an update has already begun the development of an ISOP, which will include consideration of non-traditional solutions such as DERs and energy storage in Distribution and Transmission. Duke Energy noted in their May 20, 2019 NCUC filing responding to 2018 IRP reply comments that they support a pre-rulemaking stakeholder process to facilitate a common understanding of IDP and ISOP issues. Duke has been actively working on extending modeling capabilities to better address renewables and energy storage, and plans to share more information on these efforts and the overall ISOP vision during the stakeholder process. (*More background on Duke Energy's approach to an ISOP is provided in the addendum*)

A better defined and inclusive resource planning process can ensure that the needs of diverse grid stakeholder group are accounted for and that the electric sector is able to do its part in achieving EO80's economy-wide targets, while putting North Carolina on the path to a low-carbon future in the long-term. This will require stakeholder engagement in the development of the process, and tools and continual involvement throughout the

actual process. North Carolina, its utilities, and stakeholders should look to other states further along in this process to identify best practices and tools to utilize in order to deploy a more advanced planning process effectively and smoothly.

Resources for Further Reading

Integrated System Operation Plan (ISOP)

- "Planning Hawai'i's Grid for Future Generations: Integrated Grid Planning Report", Hawaiian Electric, Maui Electric, Hawai'i' Electric Light, March 1, 2018

Integrated Distribution Plan (IDP)

- "Integrated Distribution Planning", ICF International, Prepared for the Minnesota Public Utilities Commission, August 2016
- "Integrated Distribution Planning Concept Paper: A Proactive Approach for Accommodating High Penetrations of Distributed Generation Resources", Interstate Renewable Energy Council & Sandia National Laboratories, May 2013
- "Integrated Distribution Planning: A Path Forward", GridLab, nd.

Integrated Resource Plan (IRP)

- "Best Practices in Electric Utility Integrated Resource Planning: Examples of State Regulations and Recent Utility Plans", Regulatory Assistance Project & Synapse Energy Economics, June 2013

Addendum
Duke Energy's Ongoing Integrated System Operations Planning (ISOP) Efforts

The following addendum was drafted solely by Duke Energy,
and while approved to be included, is not representative of the group efforts

Duke Energy agrees that the landscape of utility planning is evolving due to declining costs for renewables and storage, customer preferences and policy goals. Duke Energy has connected 2,900 MW of solar in North Carolina, and with House Bill 589, will achieve 7,000 MW by 2025. Duke Energy's utilities in the Carolinas have received over 20,000 solar interconnection requests and connected nearly 17,000 projects since 2006. North Carolina has more distribution connected utility scale solar than any other state. Between 2005 and 2018, Duke Energy reduced CO2 emissions in the Carolinas by 37 percent, and currently projects a 53 percent reduction by 2025. More than half of Duke Energy's generation in the Carolinas now comes from zero-emission sources, including solar, hydro and nuclear.

A more robust approach to distribution planning is necessary, as well as extensive coordination with (generation) resource planning and transmission planning. For this reason, Duke Energy is actively working toward more extensive integration of distribution, generation and transmission planning (ISOP) with a goal of implementation in 2022 IRPs. Duke's ISOP development team has gathered input from other utilities, national labs, EPRI, consultants, and academic groups to inform our vision and work-scope and has been working on extending modeling capabilities to better address renewables and energy storage for the last few years. Duke also agrees that it is important to get input from customers and other stakeholders as we seek to enhance and further integrate planning processes. We are working toward a stakeholder process for ISOP, as announced at the Grid Modernization stakeholder webinar in April. As we prepare for stakeholder engagement on ISOP, Duke has been reaching out to other utilities with stakeholder engagement processes (HECO, TVA, etc.) to learn from their experience.

The ISOP engagement contemplated so far is focused on gathering input and sharing information about the new ISOP processes, which target integration of MW resource specific aspects of G/T/D planning. Duke has not yet evaluated the implications of transitioning the ongoing planning processes to a full or partial collaborative stakeholder process, and thus is not prepared to take a position in favor or against this recommendation. However, several factors should be considered in any stakeholder process for system planning:

- DEC and DEP Balancing Areas include both NC and SC resources and load obligations, and both states have benefitted from the economies of scale in a combined planning process. Any ISOP-related stakeholder engagement process should include both NC and SC stakeholder representatives to ensure balanced outcomes for customers in both states.
- Utilities hold a unique role as the only stakeholders with a regulatory obligation to serve under NC, SC, and FERC/NERC oversight. These oversight processes ensure a focus on safe, reliable and affordable service and motivate utilities to maintain a balanced perspective to meet changing customer expectations, including environmental considerations. Other stakeholders may focus on a single objective (e.g. environmental or economic). Utilities are inherently technology agnostic, but the "obligation to serve" does drive a high priority on reliability and flexibility of resources. Many other stakeholders do not have this responsibility, and therefore may not place similar value on reliability and flexibility of resources.