Resource Insight, Inc.

Implementing All-Source Procurement in the Carolinas

Duke Energy Carolinas & Duke Energy Progress

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Background and Purpose

All-source procurement is an approach in which a utility issues a Request for Proposals (RFP) in which all types of generation resources are allowed to compete, instead of issuing a RFP for a narrowly defined power plant to fill a specified capacity need. In *Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement* (ASP Report), my co-authors and I suggested that, "All-source procurement means that whenever a utility (and its regulators) believe it is time to acquire new generation resources, it conducts a unified resource acquisition process. In that process, the requirements for capacity or generation resources are neutral with respect to the full range of potential resources or combinations of resources available in the market."[1]

Among the reasons that the Commissions should require Duke Energy to implement all-source procurement are to develop state electric plans that:

Provide an economic basis for scheduling the retirement of power plants, rather than waiting to act only when plants are already uneconomic;

Resolve technical and policy questions that affect bid evaluation in advance, rather than during regulatory approvals;

Obtain price and performance information about generation alternatives directly from the marketplace, rather than from Duke Energy's staff research;

Create opportunities to meet electricity supply challenges more efficiently with a blend of technologies, rather than considering one solution at a time;

Update methods for coordinating of generation investment decisions with development of other resources such as energy efficiency and transmission, rather than making investment decisions in silos;

Regulate the administration of the RFP process to ensure fair, efficient and competitive bidding with robust bid evaluation, rather than allowing for potential bias; and

[1] John D. Wilson, Mike O'Boyle, Ron Lehr, and Mark Detsky, *Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement*, Energy Innovation and Southern Alliance for Clean Energy (April 2020) , p. 6. (Hereafter, "ASP Report")

Expedite Commission certification of winning bids with a narrowed scope of review, reducing the risk of delay in heavily contested proceedings.

All-source procurement helps ensure that a utility arrives at the optimal resource mix, reducing costs and risks to customers. The approach I recommend will enable Duke Energy to:

- Obtain price and performance information about generation alternatives directly from the marketplace, and
- Identify unanticipated opportunities to meet electricity supply challenges more efficiently with a blend of technologies.

The use of market pricing to drive the model-based blending of technologies into a portfolio lifts the constraints of the utility's own cost assumptions and the capacity requirements that are required in conventional single-source RFPs. The additional opportunities made possible in an all-source procurement makes the outcome more robust and benefits customers by driving costs down and reducing the risks of stranded investments.

Experience in other states shows that all-source procurement is a proven approach that delivers clean, low-cost portfolios. The ASP Report reviewed four case studies of recent all-source procurements by vertically integrated utilities, and commented briefly on six other cases (including North Carolina). The ASP Report recommends best practices drawn from each of the case studies, but emphasizes the model used by the Colorado Public Service Commission.

The Colorado model is also recommended by the North Carolina Energy Regulatory Process' ("NERP") Competitive Procurement study group. The study group—co-chaired by representatives from Duke Energy and the solar industry—determined that the Colorado model "offered a good example of a successful generation procurement framework."[2]

Implementing All-Source Procurement in the Carolinas builds on the recommendations from the ASP Report and the NERP process, applying them to the integrated resource plans of Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP).

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[2] North Carolina Energy Regulatory Process, *Competitive Procurement Guidance Document* (December 2020). (Hereafter, "NERP")

Duke Energy's IRPs include both a short-term action plan and a longer term forecast of potential new generation plants and other resource plans.[3] Generation plants identified in the short-term action plan are, for the most part, already approved or otherwise committed for construction or procurement. Thus, this report focuses on the process by which Duke Energy will procure generation resources in the years immediately following the short-term action plan.

The ASP Report shows how regulators have used the integrated resource planning proceedings to make an explicit determination of need in terms of the load forecast that needs to be met, evolving system operating requirements, and existing plants that may need to be retired. Regulators should use this ***total system need*** approach as the starting point for approving an all-source procurement.

Today, vertically-integrated utilities may procure resources through either all-source, comprehensive single-source, and restricted single-source RFPs. As explained in the ASP Report, "In contrast to an all-source procurement, in comprehensive and restricted single-source procurements, the resource mix is determined in a prior phase and the utility conducts resource-specific procurements for each resource to meet the identified need or needs."[4]

Although not discussed explicitly in the IRPs, Duke Energy intends to procure generation resources beyond the short-term action plan using a comprehensive single-source RFP process.[5] In addition to its statutorily mandated competitive renewable energy procurements, Duke Energy "considers the IRPs as the primary vehicle to determine and guide the procurement of generation resources to meet future customer energy needs with RFP solicitations. Competitive

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[3] DEC and DEP file separate IRPs using a consistent methodology, publication format, and underlying assumptions. Both IRPs were submitted in identical form to the North Carolina Utilities Commission and Public Service Commission of South Carolina, along with supplementary materials reflecting each state's unique filing requirements. References citing "DEC and DEP" throughout this report are to their respective 2020 IRPs. Where a single page number is cited, the reference is to the DEC report pagination. References to Duke Energy's responses to any "DR" are responses to data requests filed in NCUC Docket E-100, Sub 165 and SCPSC Dockets 2019-224-E and 2019-225-E by the identified party. No confidential information is included in this report.

[4] ASP Report, pp. 2-3.

[5] Duke Energy's description of its RFP process is provided in the ASP Report, Appendix D.

solicitations are used to identify the most cost effective and reliable resources available in the marketplace consistent with the IRPs."[6]

Duke Energy's IRP lays the foundation for issuing an RFP in late 2021 to obtain about 900 MW of peaking resource capacity for delivery in 2026, likely including performance specifications that will result in restricting the procurement to gas combustion turbine (CT) units. In addition, Duke Energy will continue and potentially expand the competitive procurement of renewable energy mandated under North Carolina law and permitted under South Carolina law over the next several years. Other generation resource needs would be subject to further procurements, potentially after future IRPs update Duke Energy's plans.

Relying on single-source RFPs for resources delivered in 2026 and beyond will not lead to the least-cost solution because the resulting portfolio is created by Duke Energy's assumptions about price, performance, and availability of generation alternatives. Even if each individual RFP results in competitive outcomes, the overall process will not take advantage of competition among technologies, and potential synergies across technologies.

Using an all-source procurement approach would involve considering bids to meet the ***total system*** need, including the 6,000-9,300 MW of winter rated capacity identified from the IRPs over the 2026-2031 timeframe in a single, coordinated process.

Unless the Commissions direct Duke Energy to adopt an all-source procurement process, Duke Energy will continue to utilize a suboptimal process. This report examines Duke Energy's need for an all-source procurement, the ways in which an all-source procurement would benefit customers, and the steps that the Commissions should take to implement an all-source procurement.

Determining the Need for an All-Source Procurement

How should the Commissions define the procurement need?

In conventional procurements, such as Duke Energy's prior RFPs, utilities specify a numeric capacity need (or goal) and technology eligibility, either by name or by restrictive performance standards. A well-designed all-source procurement takes a very different approach: the advance determination of need does not establish the specific capacity or technology to be procured.

[6] Duke Energy, response to SELC DR-8-5.

The ASP Report recommends that regulators use resource planning proceedings to make an explicit determination of need – but ***define total system need in terms of the load forecast that needs to be met, and existing plants that may need to be retired***.[7] Thus, system need should not be defined simply in terms of a specific energy or capacity target, but rather in terms of all system needs—and that should encompass many aspects of what can be called system operating requirements,[8] such as needs for flexible capacity, system inertia, and, simply, lower operating costs. The Commissions should approve the load forecast, including all related methods and assumptions, and the method for evaluating retirements of existing plants. Ideally, the determination of need would ensure that the procurement is open to any technology, and any siting location.

The resulting portfolio should satisfy the need created by the forecast, evolving system operating requirements and retirement options, with the utility procuring any amount of nameplate capacity of a mix of technologies based on cost-effectively meeting the need. The ***total system need*** can give a more optimal result because it is more expansive and less restrictive than a specific, numeric capacity target and technology specification.

When does Duke Energy's IRP anticipate procurements?

Using a conventional definition of need, DEC identifies its first year of need as 2026 and DEP as 2024.[9] Duke Energy's anticipated procurements are defined in various ways in the IRP.

DEP lays the foundation for issuing an RFP in late 2021 to obtain about 900 MW of peaking resource capacity for delivery in 2026, likely including performance specifications that will result in restricting the procurement to gas combustion turbine (CT) units. In addition, both DEC and DEP will continue the competitive procurement of renewable energy mandated under North Carolina law over the next several years.

Thus, even though DEP identifies its "first year of need" as 2024, Table 1 shows that DEP does not forecast resource additions until 2026 in its base

[7] ASP Report, p. 20.

[8] Examples of relevant system operating requirements are discussed in Appendix B, such as renewable interconnection limit, rooftop solar forecast, DSM programs, joint planning/balancing, availability of pipeline capacity, and reserve requirements.

[9] DEC and DEP, Ch. 13, p. 113.

case. DEC identifies its first year of need as 2026, but does not forecast substantial resource additions until 2030.

For purposes of this report, I am identifying 6,000 MW as the conventional definition of need that Duke Energy anticipates procuring, and I am assuming that any procurements would begin delivering resources in 2026. The capacity figures in Table 1 reflect Duke Energy's assessment of resource contribution to winter peak. Duke Energy recognizes solar systems as providing winter peak capacity of 1% of nameplate capacity. For example, in 2025 the 0.75 MW of solar represents 75 MW of nameplate solar capacity.

Table 1: Winter Capacity Resource Additions, 2024-2031 (winter-rated MW)

	2024	2025	2026	2027	2028	2029	2030	2031
Duke Energy Carolinas								
Combined Cycle								
Combustion Turbine							457	457
Solar		1	1	1	1	20	20	20
Battery								
Compliance Renewables	9	(14)	2	30	24	29	14	9
Duke Energy Progress								
Combined Cycle					1,224	1,224		
Combustion Turbine			457	457		913		
Solar							38	38
Battery								457
Compliance Renewables			(9)	19	18	14	(4)	11
Total Resource Additions	**9**	**(13)**	**451**	**507**	**1,267**	**2,200**	**525**	**992**

DEC and DEC Tables 12-E. "Compliance Renewables" calculated as the net change in cumulative renewables capacity (removing undesignated solar and battery).

How soon does Duke Energy believe plant retirements could be advanced?

While it is reasonable to assume that Duke Energy's nuclear, gas and hydroelectric resources will continue to operate for their expected license terms or until fully depreciated, the high fixed costs associated with maintaining coal plants can result in accelerated retirement dates. The potential to cost-effectively replace coal plants is an additional source of resource need in addition to power contract expirations and load growth.

In this IRP, Duke Energy conducted a coal plant retirement analysis to determine the most economic retirement dates.[10] Although these retirement dates are used in Duke Energy's base cases, Duke Energy states that these dates are not a commitment to retire in those exact years. Duke Energy also considered how early retirement could be advanced based on the timeline to bring replacement natural gas generation into service at the same location.[11]

If Duke Energy advanced coal unit retirements to those "earliest practicable retirement dates," then the net increase in conventionally defined capacity need would be about 3,300 MW, as summarized in Table 2. Any procurements to advance these retirements would begin delivering generation in 2026.

Table 2: Advancement from Economic to Earliest Practicable Retirement, 2024-2031 (winter-rated MW)

	2024	2025	2026	2027	2028	2029	2030	2031
Duke Energy Carolinas								
Marshall 1 – 4					2,078			
Belews Creek 1 & 2						1,220		
Duke Energy Progress								
Mayo 1			746			(746)		
Roxboro 1 & 2					1,053	(1,053)		
Total Retirement Advancement			**746**		**3,131**	**(579)**		

DEC and DEC Tables 11-A and.A-11.

Considering both Duke Energy's evaluation of anticipated procurements and the earliest practicable retirement dates, Duke Energy's total procurements

[10] DEC and DEP, Ch. 11.

[11] DEC and DEP, Appendix A, pp. 173-176.

could be as large as about 9,300 MW (winter-rated capacity) between 2026-3031.

How does resource cost uncertainty affect the need determination?

Duke Energy's evaluation of the anticipated procurements and the economic retirement dates are outputs of its IRP modeling, which depends on its forecasted cost of new generation. If the forecasted cost of new generation declines, then the economic retirement dates for some plants should advance to an earlier date. Similarly, if new generation costs decline, then it will be cost-effective to advance or increase procurements and reduce the dispatch of existing generation resources. Thus, cost forecasts for new generation resources are a critical input into the need determination.

Relying on Duke Energy's IRP cost forecasts is likely to lead to the "wrong" procurement, potentially resulting in stranded costs that could have been avoided with a better cost forecast, or s a more competitive procurement process.

As discussed in Appendix C, forecasts of clean energy technologies have often wildly overestimated costs – and even though Duke Energy is forecasting substantially lower clean energy costs in the future, it may still be far too gradual.

Duke Energy even acknowledges that market pricing can differ so much from IRP cost forecasts that a comparison "yields little value in planning space."[12] Whether due to an erroneous forecast of market prices or to the cumulative effect of advantageous pricing due to "unique circumstances," when Duke Energy's "planning space" fails to represent the marketplace, its IRP forecast of capacity needs will inefficiently blend technologies.

The solution is demonstrated in all-source procurement case studies, which show the benefits to a utility that:

- Obtains price and performance information about generation alternatives directly from the marketplace. The PNM all-source procurement received 735 bids – developers are clearly willing to participate in highly competitive procurement.
- Identifies unanticipated opportunities to meet electricity supply challenges more efficiently with a blend of technologies. Xcel Colorado needed to replace 660 MW of coal plants, but was offered

[12] Duke Energy, response to SELC DR-8-1(d).

> over 58,000 MW (nameplate) of generation resources and procured 2,458 MW, representing 1,100 MW of firm capacity.[13]

In a single-source procurement, generation cost forecasts are key assumptions in the model used to determine the capacity objective, or "need," of the RFP. If battery prices decline by 80%, rather than 50%, Duke Energy's plans for resource procurement will be outdated and misaligned in terms of cost, schedule and price – likely resulting in procuring the "wrong" resources. These problems can be mitigated by obtaining market-based pricing at the exact time that it is needed for evaluation and contract negotiation by Duke Energy, or any other vertically integrated utility. To minimize the impact of generation cost forecasts on the RFP, the ASP Report recommends what this report is referring to as a ***total system need*** approach to need determination.

What is the total system need approach to need determination?

The ***total system need*** approach to need determination will require the Commissions to oversee a process that ensures close scrutiny of the utility's assumptions about future electric load (including energy efficiency programs); operation of the existing generation fleet and transmission system; and relevant government policies. These activities are already part of the IRP process, but in addition to applying closer scrutiny, it is likely that regulators will need to require the utilities to make some adjustments.

Future electric load

Future electric load in the context of designing a procurement process is probably best considered as net load: customer electric usage (reflecting the reductions from energy efficiency programs and regulations) minus the power supplied by customer-funded distributed energy resources (DERs).

The ASP Report did not identify cases in which utility-funded energy efficiency programs or customer-sited DERs were procured through an all-source RFP.[14] Those customer-side resources require different evaluation approaches than utility-side resources and are thus not well suited for procurement in the same RFP. Estimating the scale of the customer-side resources requires in-depth scrutiny of program marketing and delivery plans, as well as market potential. A wide range of participant costs and

[13] ASP Report, p. 33.

[14] Demand response programs are an exception as discussed below.

benefits should also be taken into account in estimating program uptake and in evaluating the economics of the measures. In comparison, an all-source procurement for generation resources can expect a number of similarly-qualified developers to offer competitive pricing, enabling the final evaluation to rely on quantifiable differences.

Even though the challenges to including most energy efficiency and DERs in an all-source procurement may not be easily overcome, the Commissions should enhance the connection between Duke Energy's generation procurement process and customer-based resources. An essential connection is ensuring that up-to-date procurement pricing information informs relevant policies and program management decisions.

Among those decisions are Commission reviews of energy efficiency programs, which should be authorized *at least* to the level indicated by the cost of generation resources. Energy efficiency programs can be modeled in system planning models with load shapes and cost information in comparison to generation bids to determine whether certain energy efficiency programs affect the optimal selection of bids. Such an integrated evaluation can then inform the Commission's review of utility-funded energy efficiency programs.

The Commissions should also require similar comparisons for tariffs and policies affecting customer-funded distributed energy resources.

Operation of existing generation fleet and transmission system

Duke Energy's approach to estimating the earliest practicable retirement date improves on its historical methods, and illustrates how changing economics can redefine the existing generation fleet and transmission system. Below, I will show how this approach can be leveraged to determine the retirement portion of the ***total system need*** approach to need determination. The Commissions should not neglect review of the "remaining" generation fleet and transmission system.

On one hand, the IRP models may need to be enhanced to better characterize evolving system operating requirements. For example, relatively crude assumptions regarding system inertia requirements, but greater reliance on resources that utilize "synthetic" inertia may require different modeling techniques. Other areas for enhanced modeling might include flexible capacity requirements, characterization of extreme weather events, and locational benefits of generation.

On the other hand, existing IRP models may contain unreasonable assumptions about the existing system in the form of operating constraints. For example, the PNM case study in the ASP Report discusses an all-source procurement involving replacement resources for a retiring coal plant. PNM's proposed portfolio was challenged, in part, based on how PNM constrained the model's consideration of imported power. The import limit is one of several model constraints that effectively favored the selection of gas resources over solar resources.[15] New Mexico regulators accepted the critique of intervenors, and approved an alternative portfolio with more solar power than PNM had recommended.[16] Similar model constraints are included in Duke Energy's IRP model and should be reviewed for reasonableness, such as its 500 MW/year solar interconnection limit.[17] The ASP Report recommends that the IRP proceeding be used to affirmatively resolve disputes over model constraints in order to expedite the evaluation of bids and approval of portfolios during the procurement process.[18]

Relevant government policies

Duke Energy's IRP includes two base cases, one with and one without a carbon policy. Although the two base cases differ, it is arguable that the carbon policies examined in the two base cases are not different enough, with the carbon policy case only reducing emissions by 10% more than the without carbon policy case by 2035.[19] For example, Nova Scotia Power's 2020 IRP considered a "comparator" case (based on existing policy), a net-zero 2050 case, and an accelerated net-zero 2045 case.[20] The three cases show similar greenhouse gas emissions reductions in 2030, but diverge sharply beginning in the early 2030s.

[15] ASP Report, p. 26; New Mexico Public Regulation Commission, *Recommended Decision on Replacement Resources – Part II*, Case No. 19-00195-UT, June 24, 2020, p. 122.

[16] New Mexico Public Regulation Commission, *Order on Recommended Decision on Replacement Resources – Part II*, Case No. 19-00195-UT, July 29, 2020.

[17] Duke Energy, response to ORS DR-2-26(a).

[18] ASP Report, p. 24.

[19] DEC and DEP, p. 8.

[20] Nova Scotia Power, *2020 Integrated Resource Plan*, NSUARB Matter No. M08929 (November 27, 2020), p. 50.

To its credit, Duke Energy evaluated several alternative resource portfolios, including earliest practicable coal retirements, high wind, high SMR, and no new gas generation, as well as several sensitivity analyses.[21]

Just as fuel cost forecasts presume that market prices will evolve based on known resource or technology characteristics, the government policy forecast used to inform the ***total system need*** determination should not presume the status quo. Locking in today's conditions for the future electric grid is a recipe for the creation of stranded costs.

Instead, the forecast should anticipate how government policy and other external requirements will shape the electric system.[22] Arguably, it is an extreme assumption to assume that the regulatory landscape will remain unchanged for the next decade or two. During the IRP process, the Commissions should give Duke Energy clear direction as to what government policies and related model assumptions be used in the IRP model for both planning and bid evaluation purposes.

Conducting an All-Source Procurement

What is an all-source procurement, and how is it authorized?

"All-source procurement means that whenever a utility (and its regulators) believe it is time to acquire new generation resources, it conducts a unified resource acquisition process. In that process, the requirements for capacity or generation resources are neutral with respect to the full range of potential resources or combinations of resources available in the market."[23]

The previous section discusses how the Commissions should implement the ASP Report recommendation that regulators use resource planning proceedings to make an explicit determination of need in terms of the load forecast that needs to be met, and existing plants that may need to be retired. Once the ***total system need*** is approved by the Commissions, Duke Energy would use that need determination as the starting point for approving an all-source procurement.

[21] DEC and DEP, Ch. 12, p. 89.

[22] Carbon policy is not the only relevant consideration. The Commissions' view on state policies, such as North Carolina's "Ridge Law," will have a significant impact on eligibility and bid evaluation.

[23] ASP Report, p. 6.

The ***total system need*** determination is one of several characteristics that differentiate all-source procurements from other procurement practices. Other important characteristics are a procurement that:

- Provides an economic basis for scheduling the retirement of power plants, rather than waiting to act only when plants are already uneconomic;
- Resolves technical and policy questions that affect bid evaluation in advance, rather than during approval hearings;
- Obtains price and performance information about generation alternatives directly from the marketplace, rather than from utility staff research;
- Creates opportunities to meet electricity supply challenges more efficiently with a blend of technologies, rather than considering one solution at a time;
- Updates methods for coordinating of generation investment decisions with development of other resources such as energy efficiency and transmission, rather than making investment decisions in silos;
- Regulates the administration of the RFP process to ensure fair, efficient and competitive bidding with robust bid evaluation, rather than allowing for potential bias; and
- Expedites Commission certification of winning bids with a narrowed scope of review, reducing the risk of delay in heavily contested proceedings.

The resulting procurement should differ from a conventional single-source procurement—the amount of resources procured may differ in both the mix and the capacities of each technology required from what was projected in the initial modeling.

North Carolina laws and regulations

North Carolina has three requirements related to procurement. First, NCUC Rule R8-60 requires investor-owned utilities to discuss the results of RFPs in their IRPs, but without any specific performance requirements.

Second, NC GS 62-110.1 requires the utility to obtain a certificate that demonstrates that power plant construction is consistent with the NCUC's plan for generation capacity. Although the NCUC could adopt a process to guide utility RFPs as its plan for capacity expansion, its current plan is a compilation of orders and information from relevant proceedings.[24]

Third, and most significant, is the Competitive Procurement of Renewable Energy (CPRE) program, authorized by North Carolina HB 589 in 2017 (NC GS 62-110.8). Two solicitations have been completed for DEC and DEP.[25] The CPRE legislation is extensive, and resulted in detailed rules (NCUC Rule R8-71) governing the RFP process and bid evaluation.

All-source procurement could proceed under an expanded scope of the NCUC's annual plan for capacity expansion, relying significantly on the CPRE process for model rules.

South Carolina laws and regulations

South Carolina's laws and regulations governing competitive procurement are in transition due to the South Carolina Energy Freedom Act (Act 62, May 2019). In 2019, the SCPSC initiated a proceeding to explore rules for a competitive renewable energy procurement process under the authority of SCC 58-41-20(E)(2). Although the proceeding has been underway for over a year, it has been delayed over the question of whether establishing such a competitive procurement program is in the public interest.[26]

Act 62 also amended South Carolina law to permit the SCPSC to establish rules for conducting an RFP and evaluating the bids prior to applying for the certificate required to construct a power plant (SCC 58-33-10). However, the existing SCPSC Rule 103-304 has not been updated and provides little additional guidance beyond reference to the statute.

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[24] The NCUC files an "Annual Report Regarding Long Range Needs for Expansion of Electric Generation Facilities for Service in North Carolina," pursuant to NC GS 62-110.1(c). The report summarizes information from utility IRPs and information from other Commission records and files. This report may also be considered the Commission's "plan," and NC GS 62-110.1(e) conditions a certificate for constructing a generation facility on "a finding that construction will be consistent with the Commission's plan for expansion of electric generating capacity."

[25] DEC and DEP, Ch. 14, pp. 117, 123; Appendix E, and Attachments I and II. DEC's "First Year of Need" is stated as 2026. See discussion on page 3.

[26] SCPSC, Commission Directive, Order No. 2020-779 (November 18, 2020), SCPSC Docket No. 2019-365-E.

Duke Energy also identified a SCPSC order related to the Distributed Energy Resource Program as providing guidance for a 40 MW RFP.[27]

All-source procurement could proceed in South Carolina in a process that combines both Act 62 procurement processes into a single process.

Duke Energy's recent procurements

Duke Energy has conducted 13 RFPs since 2012, as summarized in Appendix A. Most of these have focused on renewable energy, particularly solar power. Two were focused on gas generation. None could be considered all-source procurements.

Some of the key features of the procurements include:

- Most were combined DEC/DEP procurements, with different goals for each utility.
- Most allowed for either power purchase agreements (PPAs) or turnkey ownership, but specific terms and preferences varied among the RFPs.
- Legislative requirements constrained the location and other qualifications.

Duke Energy's current RFP process is documented in Appendix D. Overall, the Competitive Procurement of Renewable Energy (CPRE) procurements demonstrate the most proactive review and oversight practices. In contrast, the other procurements were initiated by Duke Energy without obtaining pre-approval of the process, bid evaluation methods, or other essential terms.

Duke Energy's history of procurements demonstrates a preference for using comprehensive single-source RFPs to procure generation resources, a practice it intends to continue (see page 5). Duke Energy does not obtain pre-approval by either Commission for issuance of an RFP, "Unless required by statute or the respective Commission."[28]

Nonetheless, both Commissions appear to have authority to establish all-source procurement rules. North Carolina's CPRE procurement rules provide an excellent starting point that both Commissions could use to

[27] SCPSC, *Order Addressing Distributed Energy Resource Program and Approving Settlement Agreement*, Order No.2015-514, SCPSC Docket No. 2015-53-E, p. 14; and Order No.2015-515, SCPSC Docket No. 2015-55-E, p. 14. See, Duke Energy, response to SELC DR-8-2(a).

[28] Duke Energy, response to SELC DR-8-2(c).

develop all-source procurement rules. The Commissions could begin by ordering a pilot procurement process in the current IRP proceedings under statutory authority, following up with a rulemaking that incorporates any lessons learned from the pilot.

How should near-term procurements be conducted?

Prior to 2026, Duke Energy's short-term action plan envisions further renewable energy procurements. State policy driving these procurements includes the North Carolina Competitive Procurement of Renewable Energy (CPRE) program and South Carolina Act 62. These state policies will accelerate the pace of adopting renewable energy resources, which help lower fuel costs in the near term.

The CPRE program has procured two tranches, all solar (some projects including storage). A third tranche is envisioned, but its minimum size will depend on how much "transition" renewable capacity (projects with legally enforceable obligations to deliver power to Duke Energy prior to enactment of the CPRE program).[29]

The NCUC may expand the size and number of CPRE procurements, as HB 589 provided for:

> … the offering of a new renewable energy resources competitive procurement in an amount to be procured as determined by the Commission, based on a showing of need evidenced by the utility's most recent IRP approved by the Commission … N.C. Gen. Stat. § 62-110.8

South Carolina Act 236 also provides a vehicle for near-term expansion of renewable energy procurements. The SCPSC is authorized to"

> … open a generic docket for the purposes of creating programs for the competitive procurement of energy and capacity from renewable energy facilities by an electrical utility within the utility's balancing authority area if the commission determines such action to be in the public interest. SCC 58-41-20(E)(2)

The SCPSC has opened such a generic docket (Docket No. 2019-365-E).

Thus, both the CPRE and SC Act 62 provide a strong basis for further renewable energy procurements to provide fuel-free, zero-carbon resources that provide near-term ratepayer savings. Duke Energy has the capability and legal authority to conduct such procurements for resource delivery prior

[29] DEC and DEP, Attachment II, p. 8.

to 2026—as 2026 is the first practicable year for resource delivery under an all-source procurement.

Even in the absence of a specific statutory mandate or other policy directive, there may be reasons to proceed with a renewable resource procurement. A competitive solicitation for renewable energy resources could result in procurement of fuel-free, zero-carbon resources, reducing fuel costs and displacing fossil generation for the benefit of ratepayers. The SC PSC recognized this in its recent order on the Dominion South Carolina IRP, finding that:

> Even in the absence of a need for additional capacity, procurement of energy from solar and/or storage resources in the near term may result in savings for ratepayers, if those resources can provide energy to the system more economically than existing generation resources or alternatives contemplated in the IRP. Competitive procurement of such generation resources creates an opportunity for ratepayer savings.[30]

Further, consideration should be given to whether earlier procurement of resources not immediately needed for capacity or energy is economically beneficial (e.g., to take advantage of an expiring tax credit).

Under the circumstances discussed above, either commission may find cause to authorize Duke Energy to issue a renewable RFP, subject to parameters established by the commission. It would be impractical to include deliveries earlier than 2026 in an all-source procurement pilot due to the timeline for delivering many resources. A solar procurement for delivery in the 2022-2025 timeframe could proceed in parallel with the more complex all-source procurement envisioned in this report, which is intended to result in procurement in the 2026-2031 period.

How should all-source RFPs be scheduled?

Even though DEP's "First Year of Need" is stated as 2024 in the IRP,[31] my review of Duke Energy's base case indicates that about 6,000 MW of procurements, plus the potential for an additional 3,300 MW of

[30] Public Service Commission of South Carolina Order No. 2020-832 at 21, Docket No. 2019-226-E (Dec. 23, 2020), https://dms.psc.sc.gov/Attachments/Order/a4b59f43-e545-43bd-9f35-a846b7602c39.

[31] DEP, Ch. 13, p. 114.

procurements to advance the retirement of coal units, are anticipated in the 2026-2031 timeframe.[32] (See pages 5-8)

As discussed above, Duke Energy currently has a clear preference for the comprehensive single-source RFP process (see page 5). For a new construction CT project to fill a winter 2026 need, Duke Energy states that the RFP should be conducted in winter 2021.[33] Without direction from the Commissions, it is likely that DEP will rely on its IRP submission as the basis to initiate a gas-only procurement—likely missing out on cleaner, cheaper resources that could meet system needs.

Because of DEP's imminent procurement plans, the Commissions should take immediate action to schedule an all-source procurement process. Taking a holistic, all-source procurement viewpoint will require the Commissions to consider the varying development schedules for potential resources. Some existing, uncontracted resources may be available nearly immediately. Solar or storage projects that are in varying stages of permitting and interconnection may also take a bit longer. And still further out, the development schedule for otherwise proven technologies, such as offshore wind, may lack a proven track record.

These scheduling considerations mean that the Commissions would need to resolve whether the all-source procurement should be conducted as a single RFP covering the entire ***total system need*** for generation resources in the 2026-2031 timeframe, or as multiple RFPs. The single RFP approach is described in the ASP Report's Model Process for Bid Evaluation.[34] However, since Duke Energy's procurement needs are so substantial, it could be impracticable to evaluate such a large RFP in a single pass through its IRP model.

On the other hand, breaking the procurement up into multiple rounds could compromise the goal of optimizing the entire resource procurement. Since the bids would only provide pricing for the immediate resource needs of

[32] It may be advisable to allow for delivery of a restricted class of technologies in advance of 2026. According to Duke Energy, "The portfolios in DEP utilizing the earliest practicable coal retirement schedule vary from those that use the most economic retirement schedule, having a significant buildout of batteries from 2022 through 2025 to facilitate the earliest practicable retirement of Mayo station." Duke Energy, response to NC Public Staff DR-7-4.

[33] Duke Energy, response to NC Public Staff DR-3-27.

[34] ASP Report, p. 31.

each round, those resource choices would be optimized against Duke Energy's existing generic resource cost forecasts. As discussed above, I recommend giving generic resource cost forecasts as little consideration as possible.

In evaluating these two alternatives, the Commissions should consider recognition of technologies that require a longer lead time. Duke Energy's IRPs discuss offshore wind and zero emissions load following resources (ZELFRs) such as green hydrogen.[35] An approach that gives long lead time resources a market opportunity, with sufficient lead time, would be preferable to one that only permits projects that can be developed on the timescale of a gas-fueled power plant.

A staged process for bid evaluation

Taking the best of both options, I recommend that the Commissions direct Duke Energy to design and propose an approach that solicits bids to meet the ***total system need*** for the entire 2026-2031 time period, but evaluates, models and contracts in stages. The process could follow this approach:

- Open an RFP soliciting bids for delivery of generation resources in the 2026-2031 time period.
- After conducting an initial screening analysis, update the IRP model's generic resources to representing typical cost and performance data of the most competitive bids. Subdivision of technology categories may be appropriate to ensure consideration of varying performance opportunities.
- Model bids on a year-by-year basis, competing against generic resources in future years. For the 2026 bid year, the actual bids would compete against generic resources for 2027+.
- After evaluating all bids through 2031, construct portfolios for more advanced evaluation, as suggested in the ASP Report and discussed in more detail below (see page 31).[36]

The Commissions may need to allow Duke Energy to fine-tune the bid vs generic resource evaluation method during the bid evaluation process. If so, the fine-tuning should follow guidelines that prescribe a balance between:

- Optimizing among technologies;

[35] DEC and DEP, Ch. 16.

[36] See discussion of Colorado and New Mexico case studies. ASP Report, pp. 20, 26, 31.

- Optimizing across time;
- Committing to sufficient contracts for deliveries later in the period to attract bids for those years; and
- Maintaining future opportunity by reserving a portion of the economic portfolio to future generic resources, with re-solicitation in future RFPs.

Any fine-tuning should be reviewed by the independent evaluator and fully explained in the bid evaluation report (both topics are explored below, beginning at page 31).

To implement this staged approach, the Commissions should direct Duke Energy to propose a more detailed process and, after its approval, proceed to swiftly issue an all-source RFP for the delivery of generation resources in the 2026-2031 time frame. The alternative approach would be to focus on a more limited delivery period (e.g., 2026-2027) and rely on resource cost forecasts for longer-term procurements. As discussed above, relying on cost forecasts will compromise the goal of optimizing the entire resource procurement on market data.

In either case, Duke should anticipate following up with additional RFPs after each IRP.

What resources should be eligible to participate?

Although resource eligibility for an all-source procurement is simple in concept, there are several complications that require advance resolution. As discussed in the ASP Report, "the requirements for capacity or generation resources are neutral with respect to the full range of potential resources or combinations of resources available in the market."[37] On its face, this definition of eligibility encompasses considering solar (including dispatchable and hybrid configurations), wind (including offshore sites), biomass, combined heat and power, battery storage, imported power, natural gas, and any other market-ready technology that can be financed, developed and delivered on a reliable schedule.

Ensuring the neutrality of the requirements for proposed generation plants is essential because rules or practices adapted from single-source RFPs can disadvantage or exclude cost-effective bids. The ASP Report discusses the dominance of natural gas and sources of bias in utility resource

[37] ASP Report, p. 6.

procurement.[38] Generally speaking, vertically integrated utilities have a financial bias towards over-procurement of capacity, a financial bias towards self-built generation, and an organizational culture that currently favors gas-fueled generation. The best practice to remove bias and ensure a neutral RFP process is for Commissions to conduct advance review of procurement assumptions and terms, as discussed below (page 30).

Another practice the Commissions should consider is to proactively support the development of data and analytic methods necessary to support evaluations of near-term emerging technologies. For example, Duke Energy could begin commissioning meteorological towers to independently verify wind speed history in order to evaluate wind projects.[39]

In defining resource eligibility, the Commissions should also determine how to incorporate demand-side management resources and emerging generation resource technologies. These resource options can play a role in an all-source procurement, but with some limitations.

Demand-side management resources

Utilities are also gaining experience with considering third-party demand-side management (DSM) resources in comparison to generation resources. As discussed elsewhere in this report, there are practical reasons to procure utility-funded energy efficiency programs in a separate, but coordinated process. Third-party DSM developers can aggregate the actions of many customers into a virtual power plant, and some third-party programs can meet bid qualification standards on much the same basis as generation resources.

Third-party DSM programs are recommended in Duke Energy's studies of winter peak reduction programs. The studies place the greatest emphasis on dynamic rates, such as time-of-use (TOU) and peak time rebate (PTR), which must be implemented by the utility through tariffs and are therefore unsuitable for an all-source procurement.[40] The studies also give a positive recommendation to a residential and small business bring-you-own-

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[38] ASP Report, pp. 13-18. These topics are further explored in John D. Wilson, Mike O'Boyle and Ron Lehr, "Monopsony Behavior in the Power Generation Market," *The Electricity Journal* 33 (2020).

[39] Duke Energy, response to Vote Solar DR-2-17.

[40] Dunsky Energy Consulting, *Duke Energy Winter Peak Demand Reduction Potential Assessment* (December 2020), p. 23.

thermostat (BYOT) program and a non-residential automated demand response (ADR) program.

A BYOT program pays customers an annual incentive to "allow direct response signals to adjust their smart thermostat temperature settings…"[41] Although BYOT programs are often offered through third-party DSM aggregators,[42] Duke Energy intends to implement its BYOT program using its own EnergyHub aggregation platform that is already being deployed for summer peak demand response.[43]

Even if Duke Energy was open to a third-party DSM aggregator, BYOT programs may be more suitable for a single-resource procurement process. Like some other types of third-party DSM programs, a BYOT program's operational characteristics may evolve as development occurs between the contract award and the delivery date. Also like some other third-party DSM programs, BYOT programs are also likely to require negotiation of proposal-specific measurement and verification methods. Programs with these characteristics are difficult to directly compare with generation resources during bid evaluation.

Non-residential ADR programs offer more potential for participation in all-source procurement. As explained in one of Duke Energy's studies,

> ADR programs involve a combination of innovative rates, programs and technology solutions where customers may choose from among different options designed to fit their needs. This solution may also apply to medium sized customers. ADR technology solutions typically require that participants have, or install, equipment that can be controlled remotely, such as a building energy management system that automatically adjust equipment operating parameters in response to pricing signals from advanced rates, such as critical peak pricing or peak time rebate offers.[44]

Presuming that Duke Energy offers effective dynamic rate designs, third-party DSM developers could offer bids to all-source procurement RFPs

[41] Tierra Resource Consultants, *Duke Energy Winter Peak Targeted DSM Plan* (December 2020), p. 41. (Hereafter, "Winter Plan") Provided by Duke Energy in response to Public Staff DR-5-6.

[42] Tierra Resource Consultants, *Duke Energy Winter Peak Analysis and Solution Set* (December 2020), p. 57. (Hereafter, "Winter Solution Set") Provided by Duke Energy in response to Public Staff DR-5-6.

[43] Winter Plan, p. 39.

[44] Winter Solution Set, p. 24.

related to the installation and control of ADR equipment.[45] One advantage of using third-party DSM developers is that they can specialize in particular market segments (e.g., refrigerated warehouses). Third-party DSM developers can also offer customized combinations of incentives and participation requirements, in comparison to the utility's obligation to make the same offer to each customer.[46] This customized approach may yield different results on a per customer basis, but attract more widespread participation.

As with some other DSM programs, ADR programs may be sufficiently well-understood to be evaluated in comparison with generation resources. Where this report refers to "generation resources," that term is also intended to encompass easily-qualified DSM programs.

Nearer-term emerging technologies

Emerging technologies also require special consideration, when the finance, development, or delivery schedule cannot be reliably guaranteed in the response to the RFP. Offshore wind and SMRs are examples of emerging technology that Duke Energy evaluates in alternative portfolios. While offshore wind is a proven technology, the lack of development experience in North America means that the delivery schedule cannot yet be reliably guaranteed.[47] The development of SMR nuclear plants has not been demonstrated, and cannot be reliably guaranteed at any date.[48] In this IRP, Duke Energy added "SMRs, offshore wind, and pump storage … [to its alternative portfolios] manually after optimization of other resources such as solar, onshore wind, and CCs and CTs."[49]

As Duke Energy develops the capability to evaluate emerging technologies in its planning models, one approach it could take would be to maintain their consideration as generic resources until a developer is able to make a fully qualified RFP response. Even if a technology is not considered for deployment until several years after the all-source procurement period (e.g.,

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[45] A complication is existing policies that allow large commercial and industrial customers to opt-out of Duke Energy's DSM programs, which would complicate third-party enrollment of opt-out customers.

[46] Winter Plan, pp. 90-91.

[47] DEC and DEP, Appendix A, p. 178.

[48] DEC and DEP, Appendix A, p. 180.

[49] Duke Energy, response to NCSEA DR-7-3.

2026-2031), retaining such resources in the model influences the timing and selection of other bids. For example, the model may favor offshore wind delivery in 2035 over potential delivery of wind from the Great Plains in 2031, exhibiting a need for the Commission to endorse supportive policies if it wishes Duke Energy to pursue offshore wind resources.

This suggests that when evaluating emerging technologies as generic resources, it may make sense to limit them to alternative portfolios. When submitting candidate portfolios to the Commissions for review, Duke Energy can include one or more portfolios that include generic emerging technologies. If the Commissions are sufficiently convinced of the value and viability of an emerging technology, they may approve bids included in that portfolio. A decision to approve an alternative portfolio would not make a commitment to develop any specific project, but it would place Duke Energy on a procurement path that is optimized around the emerging technology.

How should procurement with other resource development activities be coordinated?

Even though it is termed "all-source procurement," Duke Energy will continue to rely on other resource development activities. Among these activities are evaluation of longer-term emerging technologies, grid investments, and energy efficiency (and related) programs, as well as consideration of existing zero-carbon facilities. In adopting all-source procurement, the Commissions should renew existing coordination mechanisms and may need to develop new practices.

Longer-term emerging technologies

Although nearer-term emerging technologies can be incorporated into an all-source procurement process, longer-term emerging technologies require even greater speculation on performance and cost. Relying on such assumptions in a procurement process can significantly affect near-term procurement decisions, and thus represents a major policy decision.

Duke Energy's discussion of ZELFR and other investments "needed to accelerate CO_2 reductions and sustain a trajectory to the Company's net-zero carbon goal" emphasizes that action is required now in order to complete such a dramatic and essential transformation.[50] The IRP process is an

[50] DEC and DEP, Ch. 16, p. 131. Duke Energy further states, "achieving an aggressive 70% reduction from the 2005 baseline requires emerging technologies such as battery storage, offshore wind, and SMRs. Other ZELFR technologies such as hydrogen turbines or advanced CCS were not considered in this IRP,

appropriate venue for considering actions to reduce uncertainties around these technologies.

Duke Energy identifies uncertainties related to ZELFRs (and related storage technologies), that can be considered in three categories:

- Nearer-term generation resources, whose reliability is likely to be demonstrated in the market within the next decade, as discussed in the previous subsection;
- Grid investment technologies, discussed below; and
- Longer-term generation resources, whose availability depends on innovation.

Where the viability of an emerging technology depends on innovation, that innovation may be driven by production experience. As discussed above, learning rates relate declining costs to production experience. Technologies with high learning rates, such as battery storage, are likely to be nearer-term generation resources if there is already high interest and significant production.

The viability of longer-term emerging technologies with lower learning rates,[51] such as SMRs or hydrogen electrolysers, can be accelerated in several ways. The best understood acceleration method is to drive fundamental changes in key input prices.

For example, a substantial "green hydrogen" fuel supply could meet a number of needs, such as decarbonizing heavy industry and meeting long-term storage needs in a zero-carbon grid.[52] Electrolysers would become more competitive if electricity costs drop significantly,[53] and tax incentives can have much the same effect.[54] As discussed in Appendix C, RethinkX's future scenarios suggest this is a possibility. However, producing just today's hydrogen supply from electricity and water would require "more than the total annual electricity generation of the European Union."[55]

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but may emerge in the future and, as such, could be considered in future resource plans." Duke Energy, response to NCSEA DR-2-11.

[51] Hydrogen Council, *Path to Hydrogen Competitiveness* (January 2020), p. 13.

[52] Hydrogen Council, p. 9.

[53] Hydrogen Council, p. 23.

[54] Duke Energy, response to NCSEA DR-2-7.

[55] International Energy Agency, *The Future of Hydrogen* (June 2019), p. 43.

Basic science can also transform fundamental technology, repositioning it as a high learning rate technology. Supportive policy, such as government research and development programs, can increase the prospects for breakthroughs.[56] Nevertheless, such transformations cannot be expected on any timetable, as demonstrated by the decades of research into fusion power.

Because of these substantial obstacles, emerging technologies without demonstrated high learning rates or other fundamental challenges should not be considered in IRP models except as alternative, speculative scenarios. In particular, they should not be included in Duke Energy's bid evaluation modeling as potential resources.

Grid investments

Duke Energy's Integrated System & Operations Planning (ISOP) is intended to optimize investments in resources such as transmission, distribution, and voltage optimization programs. The capability to expand renewable resources, energy storage, and imported power is closely linked to investment decisions resulting from the ISOP process.[57] Duke Energy's ISOP is still developing enhanced modeling capabilities that may enable more direct coordination in the evaluation of tradeoffs and synergies between grid, generation, and other resource investments.

Investments in some resources, such as energy storage and DSM programs, can help avoid the need for grid investments. Conversely, grid investments can open up grid access to cost-effective generation resources. This is particularly true for transmission-constrained resources such as imported power and offshore wind. One method for reducing Duke Energy's cost risk associated with transmission-constrained resources could be joining a regional organized power market.[58]

Duke Energy currently plans to integrate transmission and pipeline capacity analysis into its review for replacement of coal units.[59] The analysis Duke Energy describes appears to assume that gas plants will be required for

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[56] Duke Energy, response to NCSEA DR-2-7.

[57] DEC and DEP, Ch. 15.

[58] Duke Energy, response to Vote Solar DR-2-24(c).

[59] Duke Energy, response to Public Staff DR-3-34.

replacement, as there is no discussion of how alternative technologies would be assessed.

Cost forecasts for the necessary grid investments are thus a necessary consideration in all-source procurement bid evaluations. This is an area where market-based pricing cannot replace Duke Energy's internal cost forecasts, since it is generally impractical to pursue an RFP for grid projects that might be needed to support certain potential generation bids. The Commissions should carefully review the basis for proposed grid investments, and ensure that Duke Energy is evaluating alternative investment levels and strategies concurrent with its evaluation of generation resource bids.

Energy efficiency, load management, and demand-side management programs

Energy efficiency (EE), load management, and demand-side management programs are cost-effective resources that help reduce the size of generation resource procurements. It is technically challenging to identify the optimal cost threshold, above which those demand-side resources become too expensive. This presents an economic coordination challenge for utility analysts.

Currently, the primary tool for coordinating generation resources with energy efficiency (EE) resources is the application of avoided costs in cost-effectiveness tests. These methods may also be applied to load management and demand-side management (DSM) programs. As discussed above (see page 21), dynamic rates and residential BYOT programs are recommended as winter peaking resources, but are best delivered through utility tariffs and single-source procurements. The discussion below applies to investment decision-making affecting all of these resources.

Cost-effectiveness evaluation of these programs is supplemented by limited modeling in the IRP, where Duke Energy modeled low, base and high EE portfolios. Although the high EE portfolio was determined to be cost effective, Duke Energy is concerned about "executability risk" and did not include the high EE portfolio in the base case.[60] As of yet, Duke Energy's IRP process has not proven to be an effective driver of EE resource investment decisions.

[60] DEC and DEP, Appendix A, p. 171.

The use of avoided costs as a tool for coordinating EE program investments with generation resource costs may be challenged by the emergence of clean energy technologies and the adoption of a biennial all-source procurement process. Avoided costs are defined as the utility costs that are avoided due to adoption of EE programs, and include energy (fuel and other variable costs) and capacity (fixed costs, including power plant development).[61] Clean energy technologies, with very low variable costs, are likely to gradually drive down the avoided cost of energy on Duke Energy's system.

As clean energy drives the substitution of "steel-for-fuel," it might be assumed that the avoided cost of capacity would increase. However, the adoption of a biennial all-source procurement process, with contract deliveries extending out as far as 8 or 9 years into the future, could counteract that effect. Since generation resources that have been selected are no longer "avoidable," the forecast cost of committed resources is not normally considered in the evaluation of avoided costs.

Thus, if Duke Energy's IRP base case does not include a resource commitment to all cost-effective energy efficiency, the resulting increase in contracting for clean energy resources could drive down both the avoided cost of energy and the avoided cost of capacity. In turn, this would make EE resources appear less cost-effective in comparison to generation resources than is actually the case.

This problem could be compounded by other mismatches between the evaluation of generation resources and the evaluation of EE resources in the treatment of carbon policy (see page 30). Even though Duke Energy emphasizes its "base case with carbon policy," it is continuing to use the "base case without carbon policy" when determining avoided costs.[62] Together, these issues represent emerging risks to coordinated decision-making between supply and demand side investments.

One way to ensure that the all-source procurement process does not prematurely drive down avoided costs and the cost-effectiveness of energy-efficiency and other existing zero-carbon resources could be to provide for delivery flexibility in contracts resulting from the all-source procurement. This delivery delay could be requested (perhaps for a fee) by Duke Energy

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61 Avoided costs are also determined for other important regulatory purposes, notably compensating "qualified facilities" that sell renewable energy to Duke Energy under federal and state rate regulation.

62 DEC and DEP, Tables 12-E and 12-F, pp. 100-101; response to ORS DR-3-1(d).

in the event that its ***total system need*** declines significantly. In addition to providing flexibility in the event of changes to the load forecast, allowing for delay, and thus avoidance, of costs would result in a more realistic avoided cost of capacity. Consideration of this issue in Commission policy, review of RFP documents, and updates to avoided cost methods could help maintain a reasonable coordination between generation and EE procurement activities.

Renewals and upgrades to existing zero-carbon facilities

Renewals and upgrades at existing zero-carbon facilities are a special challenge to an all-source procurement process.[63] In the case of renewals for existing power purchase agreements (PPAs), there is a question of timing. If an existing solar facility wishes to renew at mutually-favorable terms, its renewal may not be well-aligned with the RFP schedule, particularly over the next several years. This may be a particular concern for solar "qualified facility" projects.

A related issue is that some existing suppliers, such as those same solar "qualified facility" projects, may identify a mutually cost-effective opportunity to upgrade their facility to improve performance. For example, a solar project owner might upgrade inverter technology to offer ancillary services, or it might add solar panels or install a battery behind the inverter to improve on-peak production.

Not only suppliers, but also Duke Energy's own generation facilities will require similar evaluations. Duke's existing methods to evaluate the cost-effectiveness of major maintenance to sustain high levels of performance or output may require reconsideration.

To evaluate these opportunities, Duke Energy may need to continue to utilize an avoided cost method. This evaluation method will face the same challenges, with similar resolutions, as the EE programs discussed above.

63 Duke Energy's IRPs assume "existing solar contracts expire over the planning horizon they would be replaced with in-kind generation. This could include renewal of existing contracts or replacement of existing contracts with new solar generation." Duke Energy response to Public Staff DR-3-19.

What should be reviewed in advance?

One of the five best practices identified in the ASP Report is, "Regulators should conduct advance review and approval of procurement assumptions and terms."[64] Resolving technical and policy questions that affect bid evaluation in advance, rather than during approval hearings, can expedite the certification of winning bids. In Colorado, after the utility bid report is submitted to regulators, full evidentiary hearings are not generally required to obtain approval for contracts or even utility-owned projects.[65] By narrowing the scope of review, the Commissions can avoid a contested, time-consuming post-evaluation process.

State regulators have met this challenge. As discussed above, New Mexico resolved model bias issues through an exhaustive review in a special proceeding (see page 11). Colorado regulators conducted a thorough IRP process that includes advance review of "RFP documents, model contracts, modeling assumptions that will be used to conduct the all-source RFP bid evaluation, the process by which transmission costs are factored in to bids, the surplus capacity credit (how to handle bids that aren't perfectly matched to need), backfilling (how to compare bids of various length) and other procurement policy matters."[66]

The Commissions' responsibility for oversight of modeling methods and assumptions will encompass a significant number of issues that have often been left to Duke Energy's discretion in its IRPs – as long as they were deemed reasonable for planning purposes. For bid evaluation purposes, a higher standard of review should be required. Appendix B summarizes several IRP modeling methods and assumptions and provides examples of how each issue might be resolved during the IRP process. While most are likely to be technical, some will require policy judgement or attention to the process for subjective consideration. The Commissions should develop a list of modeling methods and assumptions that will be resolved in the IRP process and direct Duke Energy to file an initial proposal.

One issue requiring the Commissions' policy judgement is carbon policy. Duke Energy states that its capability to achieve net-zero emissions by 2050 depends in part on its ability obtain policy support from state regulators.[67]

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[64] ASP Report, pp. 24-27.

[65] ASP Report, p. 37.

[66] ASP Report, p. 35.

[67] Duke Energy, response to Vote Solar DR-2-11.

Even though Duke Energy emphasizes its "base case with carbon policy," the "base case without carbon policy" will be used to determine RFPs and evaluate bids until the Commissions approves a carbon policy.[68] The Commissions should make an affirmative decision regarding the forecast for carbon policy (see page 11).

Another area requiring attention in the Commissions' final IRP approvals is the use of any "non-price" factors and attributes that require subjective consideration, either in determining whether a bid is qualified or potentially as a post-model evaluation ranking adjustment. For example, the Commissions might direct Duke Energy to consider mitigation of regulatory risks by including the social costs of air pollution with the direct costs of emissions allowances and operating costs of emission control equipment.[69] In the New Mexico proceeding discussed above, legislative direction to consider employment impacts from a coal retirement was a significant factor in selecting a portfolio (see page 11).

In order to build on proven success in conducting all-source procurements, the Commissions should consider directing Duke Energy to incorporate model documents from Colorado in its own all-source RFP materials. Of course, when considering the Colorado model, Duke Energy should also look to its own practices. As discussed above (see page 15), Duke Energy has conducted single-resource procurements, including gas peaking/intermediate contracts and the CPRE process for renewable energy – and I understand that Duke Energy relied on the Colorado model to design the CPRE process.[70]

Using the criteria discussed in the ASP Report and elaborated on throughout this report, the Commissions should encourage Duke Energy to blend familiar, proven practices with further adaptation of the Colorado model to meet the needs of the Carolinas.

How should bids be evaluated?

When the ***total system need*** determination is paired with a robust bid evaluation, the all-source procurement is clearly differentiated from the conventional single resource competitive procurement. As discussed above (see page 8), these two steps enable utilities to

[68] DEC and DEP, Tables 12-E and 12-F, pp. 100-101; response to SELC DR-8-5.

[69] Duke Energy, response to Vote Solar DR-2-1.

[70] NERP Report.

- Obtain price and performance information about generation alternatives directly from the marketplace, and
- Identify unanticipated opportunities to meet electricity supply challenges more efficiently with a blend of technologies.

The use of market pricing to drive the model-based blending of technologies into a portfolio lifts the constraints of the utility's own cost assumptions and the capacity requirements that are required in conventional single-source RFPs. The additional opportunities made possible in an all-source procurement makes the outcome more robust and benefits customers by driving costs down and reducing the risks of stranded investments.

The ASP Report details how a robust procurement process can deliver these benefits in its a model bid evaluation process.[71] The Commissions should direct Duke Energy (or its independent administrator) to follow that process, as summarized briefly below.

- Screen bids for minimum compliance, and potentially remove less competitive bids from consideration.
- Evaluate the bids using the IRP system planning model, including both capacity optimization and subsequent production cost modeling.[72]
    - If authorized by the Commissions, make off-model adjustments to reflect resource-specific costs and benefits prior to input.
    - Apply the staged process for bid evaluation to facilitate consideration of bids over the 2026-2031 timeframe (see page 19).
    - Use the capacity expansion model to optimize among bids of all technologies.
    - Using model results, create and compare multiple resource portfolios, each composed of multiple bids. The Commissions may identify specific objectives that should be met by alternative portfolios, and Duke Energy may wish to build alternative portfolios reflecting future development of emerging technologies (see page 23).

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[71] ASP Report, pp. 31-32.

[72] As shown in Appendix D, Duke Energy's current IRP process uses only production cost modeling. Appendix D, p. 3.

- Further study portfolio costs using a production cost model. If there are concerns about reliability, further portfolio review in resource adequacy or power flow models may be conducted.
- Summarize evaluation results in a report, with all model data made available for review by regulatory staff and qualified intervenors.

This final bid evaluation report is the culmination of the process. As discussed above (see page 30), technical and policy questions that affect bid evaluation should have been resolved in advance. The bid evaluation report presents evidence that the utility has adhered to the agreed-upon methods and assumptions, and should streamline the approval process, as discussed below (see page 36).

The Commissions should identify any specific objectives that they wish to be included in alternative portfolios in the bid evaluation report. The importance of including alternative portfolios in the bid evaluation report is a practice modeled in Colorado and New Mexico, as discussed in the ASP Report.[73] Examples of alternative portfolios include:

- Utility recommendation
- High jobs / local resource preference[74]
- Compliance with non-binding state carbon reduction goals
- Include specific emerging technologies
- Higher levels of efficiency

Duke Energy's alternative IRP portfolios in its 2020 IRPs is an excellent illustration of this concept. All-source procurement would enhance Duke Energy's portfolios by building them with market data from bid proposals, not generic resources. In their approval of the bid evaluation report, the Commissions' decisions would select among the alternative portfolios, or direct further adjustments.

As discussed above (see page 14), the Commissions may wish to pilot this process in an initial all-source procurement, and then adopt a rule similar to the CPRE rule in North Carolina, also consistent with South Carolina's Act 62. Many of the specific parts of the CPRE rule (NCUC Rule R8-71) already reflect best practices discussed in the ASP Report. Relying on the CPRE

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[73] ASP Report, pp. 20, 26.

[74] For example, in the New Mexico case study, the state legislature established a preference for generation resources located in the vicinity of a retiring coal plant. ASP Report, p. 41.

experience should help build confidence in a new all-source procurement process.

How should fairness and objectivity be ensured, especially with respect to a utility's self-build proposals?

The ASP Report recognizes that regulators often allow utilities (and their unregulated affiliates) to participate in their own RFPs, and that regulators have a responsibility to proactively address structural bias and prevent improper self-dealing by utilities.[75] In some cases, regulators (or legislatures) have cited an interest in giving utilities the opportunity to acquire new assets through market procurements in order to avoid "hollowing out rate base."

Among the reasons that it might be in the best interests of a vertically-integrated utility for the utility to self-build generation are the existing control of an optimal site, advantages due to tax or other similar financial circumstances, and special requirements involving a high degree of coordination with a utility-managed grid improvement project. Often an unregulated affiliate is a highly competitive participant in markets across the country, so excluding it could result in a less competitive procurement. The NC Energy Regulation Process found that, "… there is value in diversity of generation ownership. A mixture of third-party ownership and utility rate-based ownership diversifies risk for customers and provides a variety of benefits."[76]

A good example of a situation in which Duke Energy may be the only feasible developer of a project is the ongoing 260 MW upgrade of the Bad Creek Pumped Storage Generating Station. Once the upgrade is completed, Bad Creek will have a capacity of 1,680 MW, continue to shift power from low to high net load hours, and the capability to adjust output to match load variations and help maintain voltage stability.[77] Where Duke Energy already controls an existing site, it is implausible that a third party would be in a position to offer further resource development. Nonetheless, such projects should be proposed in an all-source procurement process and only proceed if selected in a fair bid.

[75] ASP Report, pp. 27-28. It may be either the utility itself, or an unregulated affiliate of the utility. Each requires proactive oversight by regulators.

[76] NCERP, p. 6.

[77] DEC and DEP, Ch. 16, p. 147; response to Public Staff DR-17-5(a).

Citing a well-regarded 2008 NARUC report, the ASP Report summarizes five methods that Commissions should use to proactively address structural bias and prevent improper self-dealing by utilities, including:

- Involvement of an independent monitor or evaluator;[78]
- Transparent assumptions and analysis in a procurement process (see page 30);
- Detailed information provided to potential bidders;
- Utility codes of conduct to prohibit improper information sharing with utility affiliates;[79]
- Careful disclosure and review of "non-price" factors and attributes, particularly if they may advantage self-build or affiliate bids (see page 31).

As these practices appear to be incorporated into the CPRE process, the Commissions can build on experience by evaluating how effective they have been. In the process of adapting them to an all-source procurement context, any identified shortcomings can be addressed with a renewed commitment to ensuring fairness.

The ASP Report identified several other practices related to maintaining an objective and efficient process, some of which are discussed elsewhere in this report. One practice is that the all-source procurement process needs to have clearly established methods to address unforeseen circumstances. These may include utilization of the independent monitor's judgement, or may require rapid review of a proposed process deviation by the Commissions.

Another way to promote objectivity is to address issues of participation and information access. Providing detailed information to bidders helps drive down the ultimate cost of winning bids. In order to finance projects cost-effectively, project developers need to minimize sources of uncertainty that are viewed as risks by financial institutions. Utility concerns about revealing its maximum willingness-to-pay price should be very limited in a highly competitive procurement process where the competition's pricing isn't known. For this reason, the Commission should not just defer to the utility's

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[78] The importance of independent oversight is emphasized in the NC *Competitive Procurement Guidance Document*. NCERP, p. 6.

[79] The importance of communications and separation protocols (modeled on CPRE) is emphasized in the NC *Competitive Procurement Guidance Document*. NCERP, p. 6.

claims of confidentiality when establishing reasonable protections for confidential information.

Furthermore, non-bidding stakeholders can have a constructive influence on the objectivity of the process. The Commissions should allow third parties to participate in decision-making related to finalizing the RFP process and conducting the bid evaluation modeling process to help correct any bias that may exist within the utility's procurement staff. Of course, third parties should not have direct access to bidders' confidential proposals. An example of an area where third party input might be helpful is in determining whether a significant transmission upgrade required to support several competitive proposals should be included in the recommended portfolio, or only offered as an alternative portfolio.

How should portfolios be submitted and approved?

The final step in the model bid evaluation process is for regulators to approve or modify a resource portfolio.[80] Following the best practice based on Colorado's approval process, the Commissions should establish a procedure for approving or modifying a resource portfolio. The procedure should include a request for comments on the bid evaluation report from parties. The procedure should preserve the Commissions' option to conduct a full evidentiary hearing if significant concerns are raised, but should otherwise proceed based on the written record.

The viability of this specific approval process will depend on the Commissions' rules and preferences. If the Commissions conduct a full evidentiary hearing under conventional project certification statutes and rules, some of the benefit of advance review would be lost.

Multi-state approval

A major challenge to implementing a best practice all-source procurement process is the fact that both DEC and DEP operate in two states, and are thus regulated by both the NCUC and the SCPSC. Inconsistent decisions by the

[80] ASP Report, p. 32. The best practice also notes that, "If the Commission authorized multiple need scenarios, the decision should also explicitly identify the need scenario that it is relying upon." The use of multiple need scenarios to be considered in an RFP is an additional wrinkle discussed in the Colorado case study. ASP Report, p. 35. Multiple need scenarios will complicate the bid evaluation process, but could be useful if there is uncertainty about the feasibility of a retirement schedule due to reliability concerns.

Commissions could lead to significant problems. Duke Energy discussed this issue as follows:

> Should the [South Carolina] Commission order a change to the base case in the IRPs that is not consistent with the North Carolina IRPs, it could result in systemic differences in valuations in other dockets.
>
> … NC and SC regulatory bodies have long treated resource planning in a consistent manner, implicitly recognizing the inherent benefits of the large geography and resource diversity enabled by generation in one state serves customers in another, even when faced with policy variations between the states regarding renewable energy (e.g., NC Senate Bill 3 (2007), SC Act 236 (2014), NC House Bill 589 (2017), and SC Act 62 (2019).
>
> To the extent that the utility commissions require different resource plans with different requirements to satisfy such plans, such requirements raise concerns about shared costs and benefits and may ultimately lead to cost shifting from one state to another, or even – if taken to a logical conclusion—a less optimal mix of resources that could ultimately cost customers more.[81]

One path to resolve this challenge could be for the Commissions to hold joint hearings to oversee the all-source procurement process. South Carolina law authorizes such a process.

> SECTION 58-33-420. Joint hearings with agencies from other states; agreements and compacts; joint investigations.
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> The commission, in the discharge of its duties under this chapter or any other statute, is authorized to hold joint hearings within or without the State and issue joint or concurrent orders in conjunction or concurrence with any official or agency of any other state of the United States, ... The commission may request the Office of Regulatory Staff to make joint investigations with any official board or commission of any state or of the United States.

Joint hearings could be a very effective means of avoiding different requirements. Both Commissions would review the same evidence, and act on the same procedural schedule. Such an approach could minimize the chance that the Commissions would reach substantially different decisions, except where differing state laws directed such outcomes.

However, it is not clear that the NCUC has authority to hold joint hearings with the SCPSC. Under NC General Statute 110.1(c), the Commission may "confer and consult with … comparable agencies of neighboring states … and may participate as it deems useful in any joint boards investigating

[81] Duke Energy, response to ORS DR-3-01.

generating plant sites or the probable need for future generating facilities." Whether this authority would permit the NCUC to join the SCPSC in an joint evidentiary hearing is a matter for legal determination. Nonetheless, collaboration between the two Commissions and their staffs to the extent feasible should reduce the risk of creating different requirements that could be adverse to customer interests.

The Commissions should consider what potential joint hearing options are available under existing law, and the NCUC may wish to inform the North Carolina General Assembly if it believes additional authority is required.