Coordinated Grid Planning Process Mid-Cycle Assessment

Introduction

Department of Public Service staff (Staff) submits this filing as the mid-cycle assessment of the Coordinated Grid Planning Process (CGPP) required by the Commission's August 17, 2023, Order in this proceeding.[1] The filing reports on activities completed in the CGPP thus far, previews the next steps, and provides suggestions for process modifications that Staff believes should be considered for the next and future CGPP cycles.

Background

As explained in the Order, the Accelerated Renewable Energy and Community Growth Act requires utilities and the Commission to develop new planning processes focused on identifying the distribution, local transmission, and bulk electric system upgrades that will be needed to meet the State's climate targets.[2] The CGPP was designed by the Utilities in response to the Commission's directives, with input and collaboration from the New York Independent System Operator, Inc. (NYISO), New York State Energy Research and Development Authority (NYSERDA), and other interested parties.[3] With the modifications approved in the Order, the CGPP consists of six Stages that are described below.

Stage 1: Data Collection, Scenario Definition, Capacity Expansion Modeling

As a long-term planning process, the CGPP depends on forecasts and assumptions concerning the evolution of the power system. Stage 1 involves developing the data inputs and assumptions to be used in the least-cost capacity expansion modeling, which optimizes locational generation buildout based on cost and availability of transmission resources. To manage the uncertainties inherent in the modeling, the process studies three distinct scenarios that bound the

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1 Case 20-E-0197, Order Approving a Coordinated Grid Planning Process (issued August 17, 2023) (the Order).

2 Chapter 58 (Part JJJ) of the Laws of 2020.

3 The Utilities include Consolidated Edison Company of New York, Inc., Orange and Rockland Utilities, Inc., New York State Electric & Gas Corporation, Rochester Gas and Electric Corporation, Central Hudson Gas & Electric Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, and the Long Island Power Authority.

analysis and examine the range of possible generation and transmission buildout futures for the State. The initial Scenario was designed to follow the assumptions developed for the Climate Action Council (CAC) Scoping Plan, specifically Scenario 2 of the Integration Analysis. The others include a "Low Impact" Scenario aggregating assumptions that tend to reduce the need for transmission buildout, and a "High Impact" Scenario aggregating assumptions that tend to increase the need for transmission buildout.

For this first cycle of the CGPP, the Utilities are relying on the NYISO to perform the capacity expansion modeling, utilizing the PLEXOS modeling framework developed under the NYISO's tariff for the System and Resource Outlook Process (Outlook).[4] Results for Scenario 1 and Scenario 2 are complete with results of the third scenario expected by August 2024.

In the coming weeks the Utilities will also select a number of sensitivities to run on the three scenarios, changing individual parameters to test the impact of different inputs on the model's results. This will provide additional detail on how sensitive the results of the scenarios are to individual assumptions.

Stage 2: Network Model Development

Stage 2 requires the Utilities to develop detailed short circuit and power flow models for the three Stage 1 scenarios. These models are more granular than the model used for the capacity expansion, and thus the disaggregation of the Stage 1 zonal results for use in Stage 2 will be a key step. The Utilities and the EPPAC are currently developing the siting methodology that will transfer the zonal capacity expansion results from Stage 1 into the nodal system models that are developed in Stage 2. The Utilities will use the selected methodology to identify the specific geographic areas of their networks where the resources selected by the capacity expansion model at the zonal level can make use of existing headroom at the local system level. They will also utilize detailed information from the NYISO interconnection queue related to benchmark siting decisions to real-world projects under development in those areas. The Utilities are proposing to maintain consistency with the approach used for the NYISO Outlook, with minor modifications such as including a prohibition on locating new combustion sources in disadvantaged communities.

[4] https://www.nyiso.com/documents/20142/25620932/05_Capacity_Expansion_Primer_REVISED.pdf

Stage 2 is expected to proceed through the second half of 2024.

Stage 3: Local Transmission and Distribution Assessment

Stage 3 requires the Utilities to complete the granular system modeling to determine where local transmission and distribution upgrades may be necessary to enable the least-cost overall solution to meeting the State's clean energy targets. This process will be completed for each of the three scenarios noted and the results will be integrated into Stage 4. The Utilities currently project completing this step by the middle of 2025.

Stage 4: Review of Preferred Solutions

Stage 4 involves a system-wide analysis, utilizing the models developed in Stage 2 and the potential solutions identified in Stage 3, to determine the statewide impact of implementing the identified upgrades for each of the three scenarios. The size and cost of the potential solutions then become inputs to Stage 5. This Stage is expected to begin in early 2025 and run through the third quarter of that year.

Stage 5: Least Cost Planning Assessment

Stage 5 involves the Utilities providing the NYISO with the system limitations identified in Stage 3 and the portfolio of potential local transmission and distribution upgrades developed in Stage 4, and the NYISO then incorporating these outputs into the capacity expansion model. The NYISO would complete modeling to determine how the initial results from Stage 1 may change when the model can see additional information related to local constraints and the cost of mitigating the constraints. The model will then select the least-cost combination of generation and transmission for each of the three scenarios. The Utilities will use this information to identify the final set of preferred solutions required in the least-cost system buildout during the second half of 2025.

Stage 6: CGPP Cycle 1 Final Report

The results of each Stage and the Utilities' recommendations for proposed grid upgrades will be written up in a final report in Stage 6. The CGPP schedule contemplates reaching this point by the fourth quarter of 2025. The report will be submitted to the Commission as directed by the Order, and noticed for comment, so the Commission can make determinations on whether

and how to fund the various proposed solutions, accounting for variability between the modeled scenarios, as well as address related issues such as the potential need for a bulk transmission solution or a NYPA Priority Project.

Progress Update

Since the Commission issued the Order in August 2023, the Joint Utilities and the NYISO have implemented the activities required for Stage 1 and begun preparing for Stage 2. The primary work in the first stage is the capacity expansion modeling, including the development of the required modeling assumptions for the three scenarios noted earlier in this report. The EPPAC is responsible for providing expert stakeholder feedback into the in development of the modeling assumptions and scenarios. Staff took the lead role in convening the EPPAC for these purposes. A number of meetings were held to solicit EPPAC members' input.[5] However, because the NYISO's Outlook process was already underway at the time of the creation of the EPPAC, the timeline for the EPPAC sessions and defining the assumption set for each of the three scenarios was aggressive.

The data and assumptions underlying Scenarios 2 and 3 have been designed to bound Scenario 1. This was accomplished by aggregating assumptions that would tend to reduce potential transmission investments into Scenario 2 and aggregating assumptions that would tend to increase transmission investments into Scenario 3. For example, Scenario 2 includes a higher penetration of DERs, such as distributed solar, that reduce the electricity demand seen within the capacity expansion model. This assumption was paired with a more aggressive storage cost decline to make a scenario that would tend to result in lower peak and total energy demands and therefore fewer transmission-sited resources that drive the need from new grid upgrades. Scenario 3 on the other hand includes a higher electricity demand forecast and a higher capital cost for dispatchable emission-free resources (DEFRs), which lead the model to prefer transmission-sited renewables for energy generation, driving the need for additional headroom and transmission investment.

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[5] A list of EPPAC meeting dates can be found on the EPPAC website: https://dps.ny.gov/energy-policy-planning-advisory-council.

At the time of this report, the NYISO has completed the capacity expansion modeling for the first two scenarios and has provided results to the Utilities. The zonal results from the Stage 1 capacity expansion modeling will be translated into a more granular nodal model at the scale of the Utilities' networks for Stage 2. The Utilities took steps early in the second quarter of 2024 to prepare for this step by bringing a consultant on board to assist in Stage 2 model setup.

EPPAC

Given the aggressive timeline for scenario development and the desire for meaningful stakeholder feedback, a notice inviting applications to the EPPAC was posted the day after the CGPP Order was adopted, on August 18, 2023. Initial EPPAC membership was announced on September 8, 2023, and the first EPPAC meeting was held on September 19th and every other week following the initial meeting throughout the remainder of 2023[6].

EPPAC meetings have continued at a regular cadence, with stakeholders providing detailed feedback on scenario assumptions, data inputs, and modeling methodologies. The feedback has come in the form of live reactions during meetings, as well as in feedback provided through a dedicated EPPAC email address. Due to the time constraints that were necessary to achieve alignment between Scenario 1 of the CGPP and the NYISO Outlook process, EPPAC members had less time to provide feedback on the first scenario than was available for development of substantive input and guidance on Scenarios 2 and 3.

Staff intends to continue holding meetings with the EPPAC into the early phases of Stage 2, likely through the third quarter of 2024, as members may have valuable input on the design of the siting methodology which translates zonal information into the Utilities' nodal model. After that point, EPPAC meetings are expected to occur less frequently, as the Utilities will be completing the modeling and running studies included in Stages 2, 3, and 4. However, Staff intends to ensure the EPPAC is involved in reviewing outputs of that work so that participants are prepared to assess the output of the Stage 5 capacity expansion modeling and final solution recommendations.

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[6] EPPAC meetings are recorded and links to recordings are posted on the EPPAC webpage, along with supporting documents and material presented at each meeting. https://dps.ny.gov/energy-policy-planning-advisory-council.

Suggestions for Process Improvements

Throughout the course of the CGPP work, Staff has noted a number of opportunities for improvement. The suggestions are listed below, along with a description of the issues and possible options for process updates.

EPPAC Engagement

Due to the aggressive timelines associated with launching the initial cycle of the CGPP and facilitating coordination between the CGPP and NYISO Outlook process, many of the materials shared with EPPAC members were not available before the time of the EPPAC meetings. This prevented EPPAC members from having sufficient time to review data and proposed assumptions and to develop feedback prior to the meetings. Ideally, details would be shared with EPPAC members a number of days prior to meetings to facilitate review and improve feedback. In future cycles, Staff recommends following a practice similar to the NYISO working groups, where meeting materials are made available at least 3 days prior to meetings. Additional education for EPPAC members on the modeling tools used in the CGPP would also be beneficial for stakeholders and support he development of appropriate assumptions and data in future cycles.

Similar to the suggestion above, Staff also recommends developing a granular work plan and schedule for the next CGPP cycle, including the areas of expected EPPAC engagement, so that stakeholders have more visibility into the process. In cycle 1, a timeline with key tasks and overall Stage sequence was developed, and Staff recommend this resource should be expanded and made available at the outset of cycle 2.

Additional Time for Scenario Development

The initial Stage of each CGPP involves significant discussion, evaluation, and review of potential data sources and assumptions that should be utilized in models of the future of New York's energy system. This process is very complex, and the interdependence of various assumptions makes coming to final decisions challenging. The complexity and importance of this Stage, which sets the path for all future stages of work, necessitates sufficient time to ensure appropriate levels of stakeholder engagement and consensus. In future cycles, Staff recommends thought be given to the sequencing of Scenario development, to ensure stakeholders have the

ability to fully comprehend the modeling framework and tradeoffs involved with the different potential assumptions.

Sub-zonal Conceptual Costs of Headroom

The CGPP Order required the Utilities to work with DPS Staff to incorporate conceptual local upgrade costs into the capacity expansion model. This process seeds the model with information allowing it to decide whether to pay the conceptual cost in a given zone in order to increase headroom, enabling additional generation resources to be built within the zone. Following this process brings the Stage 1 results more closely in line with the expected final least-cost solution, minimizing the iteration required between Stages 1 and 5.

The process of developing conceptual costs for local headroom improvements is time consuming and requires each utility to study their local systems to determine the cost of potential projects at various locations in their service territory that could be used to increase headroom. The initial cycle of the CGPP did not include enough time for the Utilities to develop granular conceptual costs; as an accommodation, the Utilities worked with DPS Staff to determine a simpler solution for CGPP cycle 1 that could serve the same purpose as the originally proposed conceptual upgrade costs.

During Stage 1, the Utilities and DPS agreed to utilize the average local transmission upgrade costs developed as a part of the Scoping Plan.[7] This data point was developed based on actual project costs from recent transmission projects in New York. However, the average upgrade cost number was utilized across all zones, which muted the variability expected across projects and utilities. In future cycles, Staff recommends the Utilities develop more granular conceptual local transmission upgrade costs that are territory-specific, and also by quantity, as it is expected that certain upgrades may be available at lower cost, and that the incremental cost of adding new headroom is likely to increase as more headroom is added.

[7] New York's Climate Action Council Scoping Plan, (2022). https://climate.ny.gov/Resources/Scoping-Plan.

Additional DEFR Options

Previous modeling through the NYISO's Outlook and the CAC Integration Analysis have shown a need for additional zero carbon firm resources beyond wind, solar, and energy storage, to produce the least-cost reliable energy system in 2040. There are many candidate technologies that could potentially serve as dispatchable emission-free resources (DEFRs), and the characteristics of these resources are under evaluation as part of the 0x40 Proceeding.[8] For the purposes of the CGPP, the capacity expansion model must be seeded with the cost and operating characteristics of at least one DEFR for the model to have the ability to build a firm energy resource and meet the model's reliability requirements.

Due the uncertainty of what specific technologies will be available to serve as DEFRs in 2040 at the time of this filing, as well as the cost and operating characteristics of each candidate DEFR technology, the CGPP team has thus far decided to include only one DEFR option per Scenario. This is primarily to avoid unintended consequences, increased model solve time associated with seeding the model with multiple uncertain resource types, and to remain consistent with the approach used in the Integration Analysis. In theory, the primary use of DEFRs is to serve as the resource-of-last-resort in the model and the total quantity and dispatch of DEFRs represents the energy and capacity required in the model beyond other traditional clean energy resources. However, with the advent of new long-duration storage technologies and advanced nuclear generators, the cost and operational characteristics of potential DEFRs have diverged to the point where there may be significant differences in locational generation builds under scenarios that recognize these alternate DEFR options. For example, long-duration storage technologies may alter the renewable build quantity due to charging requirements in ways that current DEFR assumptions, which are based on hydrogen generation technologies, would not. Staff therefore recommends evaluating the possibility of incorporating additional DEFR options into the CGPP modeling in cycle 2 to capture these potential differences.

[8] Case 15-E-0302, Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard.

Alternate Arrangements for Modeling Effort

The current cycle of the CGPP relies on the modeling staff, tools, and expertise of the NYISO to carry out the Stage 1 capacity expansion modeling, as well as the Stage 5 capacity expansion and production-cost modeling. This decision was made based on the synergy between the goals of the CGPP and the existing NYISO economic planning process. However, given the complexity of the CGPP modeling process and the visibility and transparency required for the CGPP, this effort has likely placed additional burden on NYISO staff beyond what would typically be expected as a part of their biannual economic planning process. Furthermore, the NYISO staff are bound by their existing tariff to follow certain timelines and process steps during the economic planning process, which do not necessarily align with the precise needs and timelines associated with the CGPP.

NYISO staff time is also limited as a matter of course. These complex modeling processes require iteration, testing, modification, and sensitivities, and the magnitude of effort is not known at the outset. The CGPP modeling is likely to undergo more rigorous vetting than alternate scenarios in the economic planning process and may push against the tariff-based timelines that drive NYISO's planning process. In the current cycle, certain CGPP process needs had to be addressed through the negotiation of a Requested Economic Planning Study (REPS) agreement, which defines the level of effort that NYISO staff will provide upfront. Utilizing additional modeling support or a more traditional consulting arrangement, as was done for the Power Grid Study, Integration Analysis, and Energy Storage Roadmap, may grant more flexibility and control of the modeling process.

The NYISO team has unmatched expertise in New York's electric transmission system and remains a valuable partner in the CGPP framework. At this time, DPS Staff recommends evaluating additional pathways for completing capacity expansion and production-cost modeling in cycle 2 of the CGPP. If a new pathway is chosen requiring outside consultant support, consideration should be given to procuring such support sufficiently ahead of time, so that model selection and setup can be completed before CGPP cycle 2 begins.

Shortening the Process Timeline to Two Years

Staff recommends that the CGPP timeline be shortened to two years. A shorter timeline will allow more flexibility for the recommendations to evolve with the rapidly changing energy system. Load forecasts and resource costs are changing rapidly, and the current three-year cycle has less responsiveness to these changes. The Joint Utilities have also filed recommendations for reducing the cycle time to two years, in accordance with the CGPP Order.[9] This filing and the recommendations filed by the Joint Utilities will be noticed for comment.

[9] Case 20-E-0197, CGPP Calendar Compression Filing, June 3, 2024.