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May 1, 2025

Via Electronic Mail board.secretary@bpu.nj.gov
Sherri L. Lewis
Secretary of the Board
44 South Clinton Ave., 1st Floor
PO Box 350
Trenton, NJ 08625-0350

Re: In the Matter the 2024 New Jersey Energy Master Plan
BPU Docket No. QO24020126

Dear Secretary Golden:

Please accept for filing these comments being submitted on behalf of the New Jersey Division of Rate Counsel in accordance with the revised Notice issued by the Board of Public Utilities ("Board") in this matter on March 14, 2025. In accordance with the Notice, these comments are being filed electronically with the Board's Secretary at board.secretary@bpu.nj.gov.

Please acknowledge receipt of these comments.

Thank you for your consideration and attention to this matter.

Respectfully submitted,

Brian O. Lipman, Esq.
Director, Division of Rate Counsel

By: /s/ Maura Caroselli
Maura Caroselli, Esq.
Deputy Rate Counsel

Enclosure

cc: Veronique Oomen, BPU
Robert Brabston, BPU

2024 ENERGY MASTER PLAN
BPU Doc. No. QO24020126
COMMENTS OF NEW JERSEY DIVISION OF RATE COUNSEL
May 1, 2024

INTRODUCTION

The "Energy Master Plan" ("EMP") is a living document that on a continuing basis sets forth the State of New Jersey's energy goals and a plan to meet those goals. The objectives of the original EMP statute were energy security, economic growth and environmental protection.[1] The State's last EMP was issued on January 27, 2020 ("2019 EMP").[2] The Board of Public Utilities ("BPU" or "Board") has initiated the process to prepare a new, updated plan. On March 11 and 14, 2024, the BPU gave notice of a series of virtual public meetings to discuss the 2024 update to the State's EMP and invited all interested parties and members of the public to participate. The stated purpose of these four public meetings was to initiate the statutorily mandated EMP update, to examine the progress that New Jersey made toward the seven strategies presented in the 2019 EMP,[3] and to review the State's progress toward achieving Governor Murphy's accelerated targets of 100% clean energy by 2035 and an 80% reduction in greenhouse gas ("GHG") emissions by 2050.[4]

The New Jersey Division of Rate Counsel ("Rate Counsel") submitted written comments on June 12, 2024. On July 23 and 31, 2024, the BPU hosted two stakeholder EMP-related workshops, one for environmental justice and equity stakeholders and one for business and

[1] "The three major goals defined in the 1977 [EMP] Statute are energy security, economic growth, and environmental protection." State of New Jersey, Energy Master Plan, https://www.nj.gov/emp/home/docs/approved/060929.html.
[2] Press Release, Governor Phil Murphy, Governor Murphy Unveils Energy Master Plan and Signs Executive Order Directing Sweeping Regulatory Reform to Reduce Emissions and Adapt to Climate Change, (January 27, 2020), https://www.nj.gov/governor/news/news/562020/approved/20200127a.shtml.
[3] 2019 New Jersey Energy Master Plan Pathway to 2050. Available at https://nj.gov/bpu/pdf/publicnotice/NJBPU_EMP.pdf, hereafter 2019 EMP.
[4] BPU, *In the Matter of the 2024 New Jersey Energy Master Plan*, Docket No. QO24020126, March 11 and 14, 2024.

industry stakeholders. Rate Counsel was invited to attend both workshops and did so. On March 13, 2025, the BPU hosted a public stakeholder meeting that presented the "2024 New Jersey Energy Master Plan Executive Summary DRAFT"[5] ("Draft Executive Summary"), consisting of 62 PowerPoint slides, 41 of which contained substantive information. Due to its brevity, the Draft Executive Summary fails to answer basic questions. Stakeholders were not provided an advance copy of nor notice of the existence of the Draft Executive Summary prior to the actual meeting on March 13, 2025. As a result, Stakeholders were limited in the comments that they could provide. Written comments were invited thereafter to be submitted by May 1, 2025.[6] Rate Counsel continues to participate in this process and provides the following comments. Significantly, these comments are limited to the Draft Executive Summary and PowerPoint slides presented on March 13th. To date, there is no draft full report or underlying data to support any new EMP. Rate Counsel requests that the Board to release a full draft report with ample opportunity for all stakeholders to comment.

Rate Counsel continues to welcome the opportunity to provide written comments in support of an affordable and implementable 2024 EMP that achieves the objectives of energy security, economic growth, and environmental protection. Rate Counsel commends the Governor, the Board, and all EMP committee members for the ambitious goals of the 2024 EMP and encourages all stakeholders to continue working together to achieve its stated goals. While Rate Counsel supports numerous aspects of the 2024 EMP, our comments contain proposals to improve the outcomes and likelihood of the 2024 EMP success.

[5] Available at https://www.nj.gov/bpu/pdf/publicnotice/2024%20New%20Jersey%20EMP%20Findings_13%20March%202025_updated.pdf

[6] *In the Matter of the 2024 New Jersey Energy Master Plan*, Docket No. QO24020126, Public Stakeholder Meeting and Request for Comment, February 28, 2025. Available at https://www.nj.gov/bpu/pdf/publicnotice/2025%20Notice-Stakeholder%20Meeting.pdf.

Rate Counsel represents and protects the interests of all utility consumers — residential customers, small business customers, small and large industrial customers, schools, libraries, and other institutions in our communities. Rate Counsel is a party in cases where New Jersey utilities or businesses seek changes in their rates and/or services. Rate Counsel also gives consumers a voice in setting energy, water, and telecommunications policies that will affect the rendering of utility services well into the future.

The below comments are organized into four sections. The first section provides a summary. The second section identifies criteria that the 2024 EMP Update should satisfy in order to achieve its stated goals and discusses two major EMP initiatives illustrating why the identified criteria for the 2024 EMP Update should be implemented. The second section also lends support to Rate Counsel's comments. The third section is an analysis of the Draft Executive Summary, and the fourth section provides slide-by-slide comments on the slides provided by Board Staff.

I. SUMMARY OF COMMENTS

The State is asking New Jersey residents to make fundamental changes i) to how they heat their homes and businesses, ii) to the vehicles they drive, and iii) to the sources of electricity upon which they are regularly dependent. The litany of proposed changes must be taken seriously as they significantly impact the safety, health, and economic well-being of all New Jersey residents. The 2024 EMP Update plays a vital role in determining how these proposed changes affect New Jersey Ratepayers. The contents of the 2024 EMP Update therefore, including all of its plans, programs and supporting analyses, needs to be well thought out, comprehensive and transparent in order to achieve its stated goals.

The foundation of the 2024 EMP Update and the 2019 EMP lays the groundwork for a massive overhaul of the electricity, natural gas, building and transportation sectors, Additionally, the aim is to shift energy consumption to electricity with heat pumps, electric vehicles (EVs), and appliances powered by offshore wind. Ratepayers are asked to accept these broad, sweeping changes based upon 62 Power Point slides that make up the Draft Executive Summary. It was presented with promises to follow-up with an accompanying report and further explanation. Due to its emphasis on brevity, the Draft Executive Summary does not address the basic questions, such as "What is the cost of upgrading the electric distribution system to accommodate heat pumps and EVs?" and "What would be the associated costs of the EMP proposals to New Jersey residents and small businesses in the state?" Answering these and many other questions is vital to New Jersey's future.

The Draft Executive Summary is also devoid of any acknowledgement regarding i) the recent extraordinary rise in electricity and other utility bills, ii) the long-standing and unresolved issues surrounding interconnecting power plants in PJM, iii) the stalled New Jersey offshore wind industry, and iv) the implementation of current federal trade tariffs that serve to increase the costs of generation, transmission, and distribution equipment. Much has changed since 2019, yet the Draft Executive Summary does not appear to address these shortcomings, and therefore it is unclear how Board Staff can still consider this to be a document that represents progress toward the goal of updating the 2024 EMP.

During the EMP public hearings and stakeholder workshops, the State's EMP representatives acknowledged the importance of transparency and stakeholder feedback as it pertained to improving the 2024 EMP Update. For example, during stakeholder sessions held in July 2024, the EMP Consultants presentation stated "No one knows everything, together we

know a lot. Share what you know and learn from each other's experiences."[7] This request for stakeholder feedback is undercut by the brevity of the 2024 EMP Update.

What will the ultimate cost be to ratepayers as a result of the 2024 EMP Update? This question remains a fundamental focal point of discussion and one that must be answered. During the recent March 13, 2025 public stakeholder meeting, Board Staff appropriately noted the current dramatic electric rate increases in the basic generation supply (BGS) auction and reiterated a commitment to the notion that "any path forward minimizes ratepayer impacts."[8] Also during the March 2025 EMP stakeholder meeting, a BPU representative made a reference to "proposed additional bill credits."[9] However, the Draft Executive Summary does not mention "proposed additional bill credits" nor does it detail a path forward that prevents ratepayers from overpaying for clean energy programs at the outset.

Starting with the 2019 EMP process, Rate Counsel and other stakeholders have been emphasizing the importance of a credible and detailed ratepayer impact analysis and insisting one be conducted. The 2019 EMP failed to include a ratepayer impact analysis, and it was not until August 2022 that the State released its version of a rate impact study.[10] The study was nearly universally dismissed because it omitted the upfront costs of heat pumps and electric vehicles, among many other limitations.[11] Rate Counsel's June 12, 2024 comments reiterated the

[7] Illume and Energy+Environmental Economics (E3), New Jersey 2024 Energy Master Plan, Environmental Justice and Equity Session July 23, 2024, and the New Jersey 2024 Energy Master Plan, Business and Industry Session, July 31, 2024, p. 3. This slide deck is marked "Draft, Deliberative, and Confidential," which is counter to the goals of public transparency and accountability. Participants were not asked to sign non-disclosure agreements. The quoted bullets from the presentation are clearly not confidential as they are widely taught at an early age.
[8] Bob Brabston, 2025 NJBPU EMP Update Presentation, March 13, starting at minute 2:52.
[9] Bob Brabston, 2025 NJBPU EMP Update Presentation, March 13, starting at minute 2:52.
[10] Brattle, New Jersey Energy Master Plan: Rate Impact Study, August 2022. Available at https://nj.gov/bpu/pdf/reports/2022-08-13%20-%20BPU,%20EMP%20Ratepayer%20Impact%20Study%20Report_PUBLIC_Brattle.pdf.
[11] Jonathan A. Lesser, Ph.D., *Independent Peer Review: The Brattle Group Report: "New Jersey Energy Master Plan, Ratepayer Impact Study,"* (August 31, 2022). Available at https://njaffordableenergy.com/wp-content/uploads/2022/08/RatePayer-Impact-Study-independent-analysis-final-v2.pdf; *See also* Tom Johnson, NJ Spotlight News, *Energy may drop, but at what price?* (August 18, 2022). Available at

importance and need to require a ratepayer impact study for the 2024 EMP Update.[12] This ratepayer impact study was to include, among other things, all additional consumer costs, such as the purchase of heat pumps, EVs, and stranded utility investments that consumers are expected to incur as a result of the 2024 EMP Update. Unfortunately, the four ratepayer impact slides provided in the Draft Executive Summary [13] are wholly insufficient as they not only fail to include the impacts on the commercial and industrial sectors, but in some instances the slides exclude EV costs entirely. In addition, the four slides do not specify key assumptions such as the costs of heat pumps, costs of natural gas backup, and appliance and EV rebate levels. Moreover, the necessary assumptions, data, references, supporting calculations, and modeling results are not available even for the partial results in the Draft Executive Summary.

It is a well-established principle that utilities are already required to provide comprehensive filings and documentation as part of a base rate case. During base rate case proceedings in-depth, careful evaluations are conducted by the BPU and they are based on extensive discovery and other evidence provided by the utilities. Expecting a thorough and detailed ratepayer impact analysis to be conducted as part of the EMP, therefore, should not be deemed a transcendental notion incapable of implementation. Moreover, all the necessary assumptions, data, references, supporting calculations, and modeling results required to make the determinations in the impact analyses can easily be made readily available. The Board should, at a minimum, analyze ratepayer impact to ensure that ratepayers do not bear a disproportionate

https://www.njspotlightnews.org/2022/08/brattle-group-new-jersey-board-of-public-utilities-bpu-home-heating-electric-cars-electric-vehicles-green-energy-consumers-savings/.

[12] New Jersey Rate Counsel, 2024 Energy Master Plan Comments of New Jersey Division of Rate Counsel, June 12, 2024, pp. 5-6.

[13] 2024 New Jersey Energy Master Plan Executive Summary DRAFT, slides 27, 28, 61, and 62. For brevity, all future references to slides in the Draft Executive Summary are denoted by only using the word "slide."

burden of the costs necessary to meet the EMP's goal, and stakeholders should insist that all documentation be provided without restriction.

The Draft Executive Summary did not provide access to supporting data, models, calculations, and/or references on which it based its incompletely reported analyses. Much of this supporting information is not confidential or proprietary and is, therefore, readily available, and therefore it should have been made available to stakeholders.[14] Without access to all supporting information, stakeholders are prohibited from properly reviewing and critiquing the Draft Executive Summary.

To fully enable stakeholders to contribute to the 2024 EMP Update, a complete draft report should be released along with all supporting data, assumptions, and supporting analyses. The opportunity for stakeholders to submit written comments on the full report and accompanying information should then also be provided.

Lastly, the key word in this process is "Update." The current Draft Executive Summary, however, provides no update. It does not identify the changes to the 2019 EMP. Instead, it conducts four scenario analyses that omit many major changes since 2019. Theses major changes such as: i) the supply chain issues that started before the current Trump Administration affecting offshore wind (and other energy industries), resulting in delays and cancellations of multiple

[14] Regarding the possible concern that some data and models are proprietary or confidential, two points should be considered. First, the EMP Update Process could have used publicly available models and data, but instead, counter to the trend of using publicly available data sets and models, their wide availability, and substantial pedigrees,,non-publicly available ones were utilized, which prevents a thorough and independent review. Second, there are multiple ways to make confidential data and models available via non-disclosure agreements with independent reviewers and interested stakeholders. As noted above, this is routinely done in utility rate cases. By its refusal to explain its methodology, the Draft Executive Summary does not do the State representatives' and consultants' hard work justice. The research literature is replete with studies emphasizing the importance and feasibility of using open-source models and data for energy planning. See, for example, Gardumi, F., et al. (2018). From the development of an open-source energy modelling tool to its application and the creation of communities of practice: The example of OSeMOSYS. Energy strategy reviews, 20, 209-228.See also, Pfenninger, S., et al. (2017). The importance of open data and software: Is energy research lagging behind? Energy Policy, 101, 211-215. Finally, see Hilpert, S., et al. (2018). The Open Energy Modelling Framework (oemof)-A new approach to facilitate open science in energy system modelling. Energy strategy reviews, 22, 16-25. In addition, the U.S. National Renewable Energy Laboratory (NREL) makes available a suite of open-source models and data for the U.S. at https://www.nrel.gov/analysis/reeds/ and https://www.nrel.gov/analysis/pras.html.

New Jersey offshore wind projects over the last several years;, ii) the Trump Administration halting the permitting of offshore wind projects, and iii) the complete or partial repeal of the Inflation Reduction Act which could eliminate or reduce federal heat pump and EV incentives, should be reflected in the "Update." The Draft Executive Summary, however, does not identify or respond to salient updates considered to be monumental barriers to the 2019 EMP.

In summary, the Draft Executive Summary is only a starting point in this process. As outlined in the extensive discussion below, the remaining process of the 2024 EMP Update can fulfill its mandate by submitting a comprehensive draft update satisfying the list of criteria discussed in the following sections and provided by Rate Counsel in its June 12, 2024 comments, and allow for a review and written comments submitted by stakeholders on the comprehensive draft before a final EMP is released.

II. THE 2024 ENERGY MASTER PLAN UPDATE AND ITS FAILURE TO SATISFY THIRTEEN CRITERIA TO ACHIEVE ITS STATED GOALS

A. Thirteen Essential Requirements for the 2024 EMP Update to Satisfy

Rate Counsel's June 2024 comments provided that the 2024 EMP Update should satisfy a list of thirteen specific requirements, which, in broad terms, would shape the 2024 EMP Update into a transparent, credible, and complete document to ensure that ratepayer interests are best protected, and allow the 2024 EMP Update to succeed. Rate Counsel supplied these requirements in advance of the release of the Draft Executive Summary. Rate Counsel regarded the below thirteen elements as being crucial requirements that the 2024 EMP Update needed to successfully implement prior to adoption. Specifically, the 2024 EMP Update needed to:[15]

1. Be affordable and equitable;

[15] New Jersey Rate Counsel, 2024 Energy Master Plan Comments of New Jersey Division of Rate Counsel, June 12, 2024, pp. 30-31.

2. Contain a cost cap to ensure that ratepayers are protected if costs are underestimated;
3. Be based upon detailed state-of-the-practice reliability and resource adequacy studies;
4. Be transparent and responsive to stakeholder input with the state's responding to each comment made by stakeholders as to why BPU Staff agrees or disagrees with the comment;
5. Be based on comprehensive economic and ratepayer impact studies that include all costs, including stranded costs, that ratepayers will pay as part of their utility rates or otherwise and whose explicit assumptions and methodologies are publicly available and easily verifiable;
6. Conduct a detailed post-mortem of the 2019 EMP to inform the 2024 EMP regarding lessons learned and reasonableness of assumptions;
7. Be realistic and feasible and not assume that massive infrastructure development in electrification of appliances, upgrading the electrical distribution system while shrinking the natural gas system, and expanding the electric transmission system can be done within arbitrary timelines;
8. Incorporate the analysis of alternatives to the 2024 EMP including the consideration of economy-wide pricing of greenhouse gases;
9. Be more precise in the use of the term 'clean energy' and not rely upon aging nuclear power plants to achieve the 2024 EMP's goals;
10. Not transfer costs to ratepayers, such as EV charging stations and workforce development costs, that should instead be borne by those industries that will profit from the energy transition;

11. Leverage recent federal legislation to reduce costs to New Jersey ratepayers, particularly low- and moderate-income residents;
12. Scrutinize utilities' energy efficiency and capital expansion requests, which at their current requested levels will substantially raise costs for ratepayers; and
13. Require ongoing, evidence-based, independent evaluations of each of the 2024 EMP's components.

As discussed in the following two examples and in sections III and IV, the Draft Executive Summary fails to address any of the aforementioned requirements satisfactorily because it neglects to critically examine and analyze the costs, benefits and practical challenges to its proposed programs. Two examples – heat pumps and offshore wind – are discussed in detail to illustrate the need for the release of a comprehensive draft 2024 EMP Update. If Rate Counsel were to conduct similar detailed analyses of other elements in the Draft Executive Summary, such as EVs, nuclear power, demand management, and rate design, the result would also support the need for the release of a comprehensive draft 2024 EMP Update.

B. HEAT PUMPS AND OFFSHORE WIND

1. Example #1: Potential Issues Associated with Heat Pumps

The rapid deployment of heat pumps to replace natural gas heating and hot water is a cornerstone policy of the Draft Executive Summary[16] and the 2019 EMP.[17] The rationale for installing heat pumps is to reduce the greenhouse gas emissions associated with the production, transportation, and combustion of natural gas and propane used in home heating.[18] Given the prominence of heat pumps and related appliances, it is surprising that the Draft Executive Summary omits three key issues. First, there is no mention as to whether greenhouse gas

[16] See, for example, slides 9, 13, 20, and 21.
[17] 2019 EMP, Strategy 4.
[18] Slide 20.

emissions from the production, transportation, and leakage of the refrigerants used in heat pumps were considered. Second, many costs associated with installing heat pumps and related appliances are ignored. Third, the feasibility and practicality of rapidly installing and transitioning to these appliances is not discussed.

Greenhouse Gas Emissions and Environmental Benefits

The heat pumps are not the environmental panacea that they appear to be. Heat pumps in use today utilize refrigerants such as R-410a,[19] and have a very high global warming potential[20] (GWP) of 2,088, hundreds to thousands of times greater than the GWP of carbon dioxide (CO_2).[21] Heat pump refrigerants leak or are vented during operation, maintenance, and disposal.[22] One hundred and forty-seven percent (147%) of a residential heat pump's refrigerant charge is lost during its lifetime.[23] There are also fugitive emissions during the production, transportation, and storage of refrigerants.[24] A household's heat pump refrigerant leakage emissions may be 60% or more on a CO_2-equivalent basis, and depending on leak rates and sizing, compared to CO_2 emissions from using a natural gas fired furnace.[25] Furthermore, heat

[19] Refrigerants are classified using a combination of letters and numbers to designate their chemical properties. See ASHRAE, ASHRAE Refrigerant Designations, available at https://www.ashrae.org/technical-resources/standards-and-guidelines/ashrae-refrigerant-designations.

[20] There are multiple greenhouse gases, and each has a different contribution to warming the climate, referred to as the global warming potential (GWP). CO_2 has a GWP of 1 and the warming contributions of all other gases are measured relative to it. See the U.S. Environmental Protection Agency, Understanding Global Warming Potentials, available at https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.

[21] Hover, B. and Kilgore, B. *Refrigerants, taking the chill out of heat pumps. ACEEE Summer Study on Energy Efficiency in Buildings* (2024). (hereafter Hover and Kilgor, Available at https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722160821125_d5e08544-1392-4f70-83dd-cab5934a66e5.pdf.

[22] *Id. See also* Efficiency Maine, *Refrigerant Leak Assessment,* Table 1 (March 14, 2022). Available at https://www.efficiencymaine.com/docs/EMT_Refrigerants_Report_FINAL_2022-3-14.pdf.

[23] *Id*. The percentage is greater than 100% because of leakage during operations and maintenance and venting at end of life.

[24] Li, Y., Yang, J., et. al., *Thermal Science and Engineering Progress. Leakage, diffusion and distribution characteristics of refrigerant in a limited space: A comprehensive review. , 40*, 101731, (2023).

[25] Hover and Kilgor 2024 and Steven Winter Associates, *Refrigerant Leakage from Heat Pumps: Is It Sabotaging Our Carbon Reduction Goals?*. (March 19, 2025). Available at https://www.swinter.com/carbon-emissions-from-refrigerant-leakage/#:~:text=Burning%20fossil%20fuels%20emits%20CO2,are%20also%20potent%20greenhouse%20gases.

pumps will emit CO_2 from the current generation mix of electricity until the New Jersey electricity sector has zero-GHG emissions. However, due to heat pump efficiency, these emissions will be much less than from a traditional furnace. Although the 2024 Executive Summary includes plans for New Jersey to have an emissions free electricity sector by 2035,[26] this goal may not be possible to achieve on time, as discussed further below.

There are ways to reduce the global warming impact of heat pump refrigerants, but they have safety and cost tradeoffs. Currently, emerging heat pump replacement refrigerants, such as A2L refrigerants, have lower GWPs of less than 700 (compared to 2,088 of existing refrigerants noted above) but are mildly flammable, and some contain toxins.[27] Substitute heat pump refrigerants that have GWPs of less than 10, which are much better for the environment such as natural refrigerants, may not be available until 2030 or later.[28] Additionally, replacing existing refrigerants in installed heat pumps with newer ones is not feasible because newer refrigerants require additional built-in safety equipment, among other features.[29] Older existing heat pumps cannot be retrofitted with the less than 700 GWP refrigerant heat pumps recently made available due to the flammability safety features they require.[30] As a result, to mitigate their high GWP, older heat pumps with R-410a refrigerant must be removed and newer technologies installed. It

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See also, Pistochini, T., Dichter, M., Chakraborty, S., Dichter, N., & Aboud, A, *Greenhouse gas emission forecasts for electrification of space heating in residential homes in the US. Energy Policy*, *163*, 112813 (2022)., reporting that residential heat pumps only reduce carbon dioxide emissions by 38-53% compared to a gas furnace.

[26] Slide 9 referring to the New Jersey Governor Executive Order, EO315, February 2023.

[27] Hover and Kilgor, 2024. See also E^{x}ponent, Preparing for EU PFAS Regulations and Their Global Impact, March 5, 2025. PFAS is per- and polyfluoroalkyl substances and commonly referred to as "forever chemicals" because they persist in the environment and accumulate in the body over time. Europe and some states in the U.S. are banning or considering banning PFAS in selected applications making it challenging to assess the impacts on heat pumps. See Natural Refrigerants, Maine to Ban Sale of PFAS Refrigerants and PFAS-Containing HVAC&R Equipment in 2040, December 20, 2024. Available at https://naturalrefrigerants.com/maine-to-ban-sale-of-pfas-refrigerants-and-pfas-containing-hvacr-equipment-in-2040/.

[28] Hover and Kilgor, 2024.

[29] Hover and Kilgor, 2024.

[30] COAC, Industry Update: New Refrigerant Guidelines and Restrictions, May 30, 2024. Available at https://www.coacair.com/blog/2024/may/industry-update-new-refrigerant-guidelines-and-r/. A2L refrigerants are rated slightly higher on the flammability scale than A1 refrigerants but are safe when handled properly.

is also unlikely the heat pumps being installed can be retrofitted with the less than 10 GWP natural refrigerant in the future (perhaps available in the next five to 10 years) due to issues such as higher gas pressure equipment requirements.[31]

The net greenhouse gas reduction benefits, if any, of heat pumps and similar appliances are complicated and depend on many factors, such as the type of refrigerant, leak rates, and when the New Jersey power system is emissions free, among others. The point here is not to resolve these issues in these comments, but to highlight that the Draft Executive Summary (and the 2019 EMP) does not acknowledge or appear to account for the issues raised to make a reasoned determination as to the impact on the environment and balance it against the cost to ratepayers. The 2024 EMP Update must account for the GHG emissions of refrigerants and demonstrate that its emissions goal is practical when these are included. Aggressively deploying heat pumps and similar appliances, particularly those with high GWP refrigerants in the near term, whose aggregate GHG emission benefits are possibly substantially lower than claimed, does not make sense. Yet, the 2024 EMP Update, with no discussion of these issues, determines to incentivize heat pump installations. Instead of leaping head first without understanding the environmental impact, the 2024 EMP Update should conduct a complete, detailed, and transparent analysis of the net GHG benefits of heat pumps and similar appliances available now and in the near future, and present it to stakeholders for their review and comments.

Costs Associated with Heat Pumps

The second major omission in the Draft Executive Summary related to Heat Pumps is that many costs associated with installing heat pumps and related appliances are not analyzed.

[31] Hover and Kilgor, 2024. See also U.S. Department of Energy, Decarbonizing the U.S. Economy by 2050: A National Blueprint for the Buildings Sector, April 2024 that anticipates building heating, cooling, water heating, and refrigeration equipment with 100-year GWP of less than 10 is widely available by 2035 and by 2050 75% of installed building equipment is using such refrigerants (p. 56). Available at https://www.energy.gov/sites/default/files/2024-12/bto-decarbonizing-us-economy-2050-122724.pdf.

First, the Draft Executive Summary provides upfront costs and federal incentives for moderate-income single-family homes.[32] However, it does not provide data or analysis for any other residential, commercial, or industrial buildings. Second, it does not consider the possible changes to heat pump costs as a result of elimination/reduction to federal incentives for heat pumps, including the Trump Administration's freeze of clean energy incentives currently available from the Inflation Reduction Act,[33] and the likely impact of increased tariffs on the cost of heat pumps and their components.[34] Third, the Draft Executive Summary does not account for additional costs to the electric distribution and transmission system, and the costs of backup heating systems, which the Draft Executive Summary assumes are available in its Hybrid Electrification Scenario,[35] as well as the costs of upgrading the electric distribution system... Lastly, no mention is made regarding any incentives and their associated costs to reduce refrigerant leakage during heat pump disposal.[36] Without addressing these costs, the 2024 EMP Update cannot realistically, meet any of the above requirements and in a worst-case scenario can result in greater costs to ratepayers with little to no net environmental benefit.

[32] Slide 27.

[33] The White House, Unleashing American Energy, Executive Order, January 20, 2025. Available at https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/ and The Oregonian, Hold off on that new heat pump as Trump's freeze on clean energy money sows uncertainty, January 30, 2025. Available at https://www.oregonlive.com/environment/2025/01/hold-off-on-that-new-heat-pump-as-trumps-freeze-on-clean-energy-money-sows-uncertainty.html.

[34] Energy Connects, In the Market for a Heat Pump? Here's What Trump's Tariffs Mean for Your, March 5, 2025. Available at https://www.energyconnects.com/news/renewables/2025/march/in-the-market-for-a-heat-pump-here-s-what-trump-s-tariffs-mean-for-you/#:~:text=Heat%20pump%20manufacturing%20tends%20to,AHRI%20and%20the%20United%20Nation.

[35] Slide 13.

[36] EIA, IGSD, and NRDC, The 90 Billion Ton Opportunity: Lifecycle Refrigerant Management (LRM). Available at https://www.nrdc.org/sites/default/files/lrm-90-billion-ton-opportunity-report-20221020.pdf#:~:text=The%20recently%20passed%20Inflation%20Reduction%20Act%20also,bank%20programs%2C%20heat%20pump%20and%20efficiency%20incentives.&text=A%20smart%20incentive%20could%20also%20be%20implemented,reported%20to%20EPA%20under%20the%20AIM%20Act.

Feasibility and Practicality

The last major omission in the Draft Executive Summary is a failure to account for the real-world issues associated with implementing its proposed rapid and widespread deployment of heat pumps. Challenges related to a shortage of trained technicians, seasonal installation restrictions, and correct sizing of heat pumps will likely inhibit the ability for the program to meet its ambitious adoption goals and therefore its overall benefit to ratepayers. For instance, the installation of heat pumps may be limited to non-winter months to avoid heating systems being disabled during cold temperatures. Additionally, there is a general shortage of trained heat pump installers and heating, ventilation and air conditioning (HVAC) technicians.[37] Training is critical because heat pump installation is not like other HVAC equipment, and installation affects the heat pump's effectiveness to cool or heat, along with its lifetime, operating costs, and amount of refrigerant leakage.[38] Lastly, there are many sizes and types of heat pumps, such as ground source, air source, variable speed, and there are also many installation options. Matching various heat pump systems and sizes to a wide range of residential, commercial, and industrial facilities is time consuming, challenging, but necessary to maximize their useful lives and emission reductions:

> Research shows that most residential HVAC systems aren't installed correctly, and that can cause a lot of problems for both homeowners and contractors. The prevalence of improper installation is a significant concern, as evidenced by various research findings. For instance, research indicates that 70-90% of air conditioner and heat pump systems exhibit at least one performance-compromising fault due to improper installation or inadequate maintenance (DOE

[37] Wired, The One Thing That's Holding Back the Heat Pump, May 6, 2024. Available at https://www.wired.com/story/heat-pump-worker-shortage/ and Extu, What No One Is Saying About the HVAC Technician Shortage, May 8, 2024. Available at https://extu.com/blog/facing-the-hvac-technician-shortage/#:~:text=It's%20been%20looming%20for%20years,leaving%20their%20company%20each%20year.
[38] Wired, The One Thing That's Holding Back the Heat Pump, May 6, 2024. Available at https://www.wired.com/story/heat-pump-worker-shortage/.

> 2018).[39] When factoring in duct leakage, these rates escalate to an alarming 90-100%. Proper commissioning of systems can reduce faults introduced during installation and can result in significant performance improvements.[40]

It may also be necessary to coordinate electric distribution system expansions and upgrades to accommodate heat pumps and EVs. The Draft Executive Summary does not provide any meaningful data, references, or analyses and gives no indication that the above raised issues were identified or considered in its planning.

2. <u>Example #2: Potential Issues with Offshore Wind</u>

Offshore wind is another cornerstone of the 2019 EMP,[41] and the Draft Executive Summary simply assumes attaining the goal of 11,000 megawatts (MW) by 2040 can be accomplished without addressing the steep regulatory and industry challenges that exist.[42] The trials and tribulations of New Jersey offshore wind are well known. As of January 2025, there were three offshore wind projects in development off the coast of New Jersey, but their total is far short of 11,000 MW. Furthermore, they are facing delays, and not one offshore wind turbine has been built.

Governor Murphy has acknowledged the industry's hurdles and urged "patience and prudence" in supporting the BPU's cancellation of its fourth offshore wind solicitation.[43] Offshore wind challenges include supply chain issues, solicitation and project cancellations, cost

[39] U.S. Department of Energy, *Residential HVAC Installation Practices: A Review of Research Findings*, (June 2018). Available at https://www.energy.gov/sites/prod/files/2018/06/f53/bto-ResidentialHVACLitReview-06-2018.pdf.

[40] U.S. Department of Energy, *Heat Pump Quality Installation and Commissioning*, (September 12, 2024). Available at https://basc.pnnl.gov/resource-guides/heat-pump-quality-installation-and-commissioning#edit-group-description. See also Hover and Kilgor, 2024, which reports that contractors have minimal training regarding heat pumps.

[41] 2019 EMP, Strategy 2.2, p. 94.

[42] Slide 9 referring to the New Jersey Governor Executive Order, EO307, September 2022.

[43] New Jersey Monitor, *New Jersey nixes plans for fourth wind farm award*, (February 3, 2025). Available at https://newjerseymonitor.com/briefs/new-jersey-nixes-plans-for-fourth-wind-farm-award/#:~:text="Now%20is%20the%20time%20for,paying%20construction%20and%20manufacturing%20jobs."

increases,[44] federal permitting moratoriums,[45] and public opposition.[46] The Trump Administration is taking major steps to shut down offshore wind, including in New Jersey. Moreover, in February 2025, the New Jersey Economic Development Authority announced that, given the "significant uncertainties in the offshore wind market," it is seeking alternative uses for the New Jersey Wind Port.[47]

The Draft Executive Summary does not provide an updated offshore wind plan with revised costs, timeline, or a transmission plan that considers what is and has been happening with offshore wind. Without these updates, it is not credible to assume the installation of 11,000 megawatts of offshore wind by 2040 and not possible to ensure that any offshore wind program would meet the above requirements listed in Section II.[48] Offshore wind requires extensive new transmission investments and upgrades, both offshore and on land.[49] Given the long lead times of offshore wind, it cannot be installed soon enough to address the near- and medium-term electricity price increases that New Jersey residents are experiencing, nor satisfy the assumptions of the three EMP scenarios of high electrification, demand management, and hybrid electrification.

[44] Canary Media, *NJ has given up on offshore wind for now. Who's to blame?* (February 11, 2025). Available at https://www.canarymedia.com/articles/offshore-wind/nj-has-given-up-on-offshore-wind-for-now-whos-to-blame.
[45] The White House, Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects, Executive Order, January 20, 2025. Available at https://www.whitehouse.gov/presidential-actions/2025/01/temporary-withdrawal-of-all-areas-on-the-outer-continental-shelf-from-offshore-wind-leasing-and-review-of-the-federal-governments-leasing-and-permitting-practices-for-wind-projects/.
[46] Jersey Strong Coastal Coalition, In the Matter of New Jersey's Fourth Solicitation for Offshore Wind Renewable Energy Certificates (ORECs) Attentive Energy And Community Wind Projects Docket No. QO24020109, October 31, 2024. Available at https://www.seagirt-nj.gov/sites/g/files/vyhlif3791/f/news/bpu_letter_attentive_and_community_10-31-24_pdf.pdf.
[47] NJEDA, NJEDA CEO Tim Sullivan Statement on the New Jersey Wind Port, February 3, 2025. Available at https://www.njeda.gov/njeda-ceo-tim-sullivan-statement-on-the-new-jersey-wind-port/.
[48] Slide 9.
[49] ENREast, NJ Awards $1B in Key Offshore Wind-Linked Transmission Upgrades, October 28, 2022. Available at https://www.enr.com/articles/55197-nj-awards-1b-in-key-offshore-wind-linked-transmission-upgrades#:~:text=The%20total%20$1.08%2Dbillion%20cost,to%20the%20grid%2C%20it%20added.

Considering these developments, an analysis of other options that could fully or partially replace New Jersey-funded offshore wind should have been considered, such as out-of-state onshore wind and large-scale geothermal electricity generation. Onshore wind is less expensive, is a more mature industry, and does not face the same regulatory challenges as offshore wind. Large-scale geothermal power plant feasibility is rapidly accelerating, and its costs are declining. Geothermal power plants use steam or hot water from within the earth to generate electricity and advances in enhanced geothermal systems are expanding the geographic availability of geothermal power plants.[50] Geothermal plants may also be able to be located at retired generation facilities, thereby reducing transmission costs while providing firm baseload power and reducing the need for energy storage.[51] This technology is not listed, but should be included, as part of the upcoming Clean Firm Capacity Roadmap referred to in the Draft Executive Summary.[52]

III. OVERALL ANALYSIS OF THE DRAFT EXECUTIVE SUMMARY

The Draft Executive Summary contains five sections: context on the New Jersey Energy Master Plan, New Jersey's Integrated Energy Plan, Societal Impacts of Decarbonization, Conclusions and Recommendations, and Appendices. It does not, however, provide an updated schedule for New Jersey offshore wind (as noted above), account for greenhouse gas emissions (particularly from current heat pump refrigerants), include the cost and implementation challenges of heat pumps (as noted above), consider the actions of the Trump Administration that affect offshore wind and clean energy funding, conduct any sensitivity analyses to assess the

[50] U.S. Department of Energy, Geothermal Technologies Office, Electricity Generation, available at https://www.energy.gov/eere/geothermal/electricity-generation.
[51] Ricks, W., Voller, K., Galban, G., Norbeck, J. H., & Jenkins, J. D. (2024). The role of flexible geothermal power in decarbonized electricity systems. *Nature Energy*, 1-13.
[52] Slide 32.

robustness of its scenarios, consider pricing greenhouse gases as a policy, nor provide the necessary supporting information to enable stakeholders to assess the Draft Executive Summary.

Lessons learned, what went wrong, and what can be improved from 2019 EMP are not presented in the Draft Executive Summary. Prior to its release, the Trump Administration has and continues to take action that undercuts the 2019 EMP. It announced a hold on offshore wind permitting,[53] revoked green energy-related funding, such as the recent EPA termination of $20 billion in green bank grant agreements,[54] and is reviewing over 300 clean energy projects.[55] These projects include wind, solar, battery storage and EV infrastructure and funding to decarbonize buildings.[56] It also raised and promised to further raise import tariffs on clean energy technologies, and committed to reducing incentives for EVs, heat pumps, batteries, and other energy efficiency programs.[57] After the release of the Draft Executive Summary, the Trump Administration imposed additional massive tariff increases that will further raise the cost and slow the delivery of clean energy technologies such as solar panels, heat pumps, and wind turbines.[58] None of these issues were identified, anticipated, or analyzed in the Draft Executive

[53] The White House, *Temporary Withdrawal of All Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects*, Executive Order, January 20, 2025. Available at https://www.whitehouse.gov/presidential-actions/2025/01/temporary-withdrawal-of-all-areas-on-the-outer-continental-shelf-from-offshore-wind-leasing-and-review-of-the-federal-governments-leasing-and-permitting-practices-for-wind-projects/.

[54] U.S. Environmental Protection Agency, *EPA Formally Refers Financial Mismangemnet of $20B "Gold Bars" to Inspector General*, March 3, 2025, available at https://www.epa.gov/newsreleases/epa-formally-refers-financial-mismanagement-20b-gold-bars-inspector-general.

[55] AP, *Trump administration cancels clean energy grants as it prioritizes fossil fuels*, March 28, 2025, available at https://apnews.com/article/trump-energy-department-clean-energy-wind-solar-batteries-hydrogen-fossil-fuels-cf1dff9ee771c566765e9ca3e3599d91.

[56] Heatmap, *Here is the List of 400-Plus Grants EPA is Trying to Can*cel, March 28, 2025. Available at https://heatmap.news/politics/senate-epa-canceled-grants-list.

[57] The White House, U*nleashing American Energy, Executive Order*, January 20, 2205. Available at https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/. The White House, Fact *Sheet: President Donald J. Trump Imposes Tariffs on Imports from Canada, Mexico and China*, February 1, 2025. Available at https://www.whitehouse.gov/fact-sheets/2025/02/fact-sheet-president-donald-j-trump-imposes-tariffs-on-imports-from-canada-mexico-and-china/.

[58] New York Times, *Tariffs Are Likely to Hit U.S. Renewable Energy*, (April 2, 2025). Available at https://www.nytimes.com/2025/04/02/business/trump-renewable-energy-tariffs.html and Canary Media, *What Trump's tariffs mean for the energy transition*, April 4, 2025. Available at

Summary, yet they fundamentally undercut the ability of the 2019 EMP to achieve its goals. This underscores why price caps, a schedule of reporting progress updates, and midcourse corrections must be built into the update.

The Draft Executive Summary does not provide any sensitivity analyses for its scenarios. During the 2024 EMP Update stakeholder workshops, the Board's consultants discussed scenarios (coherent sets of assumptions about a possible future) and sensitivity analysis (varying crucial variables) such as a cost assumption within a scenario.[59] The Draft Executive Summary does not present sensitivity analyses for any of its four scenarios. This prevents an evaluation of the robustness of its findings, such as whether a particular strategy is actually a 'no-regret' strategy.[60] Although the term 'no-regret' is not defined, it is generally used in the energy planning community to refer to policies, technologies, or equipment that both save money and reduce emissions compared to current approaches. The Draft Executive Summary labels several strategies as "no regret" but does not provide adequate data and analysis so stakeholders can assess that claim. For instance, stakeholders cannot assess whether heat pumps are a 'no-regret' appliance without having access to sensitivity analyses on heat pump leakage rates and the GWP of different refrigerants. Sensitivity analyses for different offshore wind deployment schedules should also be conducted among others.

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https://www.canarymedia.com/articles/policy-regulation/what-trumps-tariffs-mean-for-the-energy-transition. The Trump Administration has also eliminated the Low Income Home Energy Assistance Program (LIHEAP). See The Washington Post, DOGE cuts and Trump's plans leave a heating assistance program in limbo, April 26, 2025, available at https://www.washingtonpost.com/politics/2025/04/26/trump-liheap-cuts-heating-assistance/.

[59] Illume and Energy+Enviornmental Economics, New Jersey 2024 Energy Master Plan, Environmental Justice and Equity Session July 23, 2024, and the New Jersey 2024 Energy Master Plan, Business and Industry Session, July 31, 2024. This distinction between scenarios and sensitivity analysis has been made as early as the 1970s in the energy planning community when they were introduced by Shell. See 40 years of Shell Scenarios. Available at https://www.shell.com/news-and-insights/scenarios/what-are-shell-scenarios/_jcr_content/root/main/section_509167378/promo/links/item0.stream/1652289755448/a0e75f042fee5322b72780ee36e5ba17c35a4fc6/shell-scenarios-40yearsbook080213.pdf.

[60] Slide 16.

The Draft Executive Summary does not provide any references, supporting data, or additional materials that normally accompany a long-term, comprehensive energy plan. As noted previously, the Draft Executive Summary contains only 41 substantive slides.[61] Many of the graphics do not provide the numerical values of their components, requiring the viewer to estimate them through intersections with the graphs' axes. These limitations restrict the stakeholders' ability to provide substantive, constructive, and actionable feedback to update the 2019 EMP if it is the only document made available to them for comment. Slides lack references and citations to supporting materials.

IV. DETAILED ANALYSIS OF THE DRAFT EXECUTIVE SUMMARY SLIDES

This section reviews slide-by-slide the Draft Executive Summary. This detailed review highlights how the Draft Executive Summary is incomplete. It identifies the issues that could be cured with a complete draft EMP update and supporting materials made available to stakeholders for their review and comments before being finalized.

EMP Timeline (slides 5-6)

1. The timeline should include the steps that follow the Draft Executive Summary.
2. See the comments above at the end of Section I regarding the required next steps.

Progress and Policy (slides 7-11)

3. Many of the "strides" reported on are vague and do not report actual results but instead report money or resources spent.
4. The Board should detail which key policies issued since the 2019 EMP (slide 9) are modeled in the Current Policy (slide 13).

[61] Non-substantive slides are the following: 1, 2, 3, 5, 6, 7, 12, 15, 24, 30, 33, 34-35 (repeat prior slides), 37, 39, 40, 43, 49, 54, 57, and 59.

5. Slides 10-11 inadequately summarize the hundreds of pages of written and oral stakeholder comments such as Rate Counsel's concern that utilities are not necessarily the appropriate entities for workforce development for many green energy jobs.
6. The NJ EMP responses to stakeholder comments (see also slide 38) are incomplete or nonresponsive.

Methodology (slides 12-14)

7. See the discussion above regarding the need for more clarity on if and how existing policy is modeled in the current policy scenario.
8. See the discussion in Section I above regarding the lack of information on assumptions, models, and results.
9. The descriptions of the four scenarios should include critical details necessary to evaluate the modeling results.
10. The assumed demand management policies in the third scenario should be stated.
11. Homes and building envelope upgrades should be described.

Results (slides 15-23)

12. The key findings (slide 16) are generic and vague. The term "no regret" is not defined and no basis is provided for the finding that building and transportation electrification, utility-scale solar, and battery storage deployment are "no regret" climate action. Also, see above discussion regarding the global warming emissions from heat pumps as part of building electrification.

13. The Executive Summary does not provide the data and results needed to assess the feasibility of any of the four scenarios considered. Nor does it provide a recommended selection of one scenario or a combination of scenarios.

    a. The type of modeling conducted by E3 does not demonstrate real world feasibility but instead only demonstrates that the modeling platform obtains results.

    b. The Executive Summary provides no detailed discussion of the implementation challenges of each of its major initiatives.

    c. As the above discussion in Section IV on heat pumps and offshore wind illustrates, aggressive policies are met with real-world delays, unanticipated circumstances, cancellations, and substituting one negative effect for another potentially worse effect (e.g., the heat pump refrigerant discussion).

    d. Accelerated timelines for electrification of EVs and heating, a 100% clean grid, and offshore wind require unprecedented transmission and distribution expansions and upgrades. These timelines are not supported empirically and are unrealistic.

    e. The Executive Summary's implicit assumption that new nuclear power plants can be constructed on time and on budget (although it does not explicitly provide these assumptions) is unrealistic based on recent and historical U.S. new nuclear power construction (as discussed further below).

    f. It is unclear if New Jersey GHG emissions include those from heat pump refrigerants with their very high global warming potential (slide 17; see slides 29 and 58, which monetize the benefits of GHG reductions). If heat pump

fugitive emissions and leaks are considered, the type of refrigerants and leakage rates are not provided.

g. The fate of the natural gas local distribution companies and the recovery of stranded costs, if any, are not discussed (slide 19).

h. Electricity load growth assumptions are incomplete (slide 20 only reports energy [terrawatthours (TWh)] and not capacity [megawatt (MW)]).

i. The pace of transformation (slide 21) is reported in percentage terms, not in the number of heat pumps, EVs, electric heating, and associated supporting infrastructure, preventing the evaluation of feasibility.

j. The cost assumptions regarding offshore wind and nuclear power (slide 22) should be provided.

k. The timeline for building new nuclear power plants is not provided.

l. The two most recently built and completed nuclear reactors in Georgia were seven years late and more than $16 billion over budget.[62]

m. A determination of whether it is realistic to assume that existing NJ nuclear reactors will be operating in 2050 when they will be between 63 and 73 years old should be provided.

n. See responses below to specific findings,

Societal Impacts of Decarbonization Results (slides 24-32)

14. Unclear as to what proportion of the air quality benefits apply to New Jersey vs. other states or the world generally (slide 25).

[62] U.S. Energy Information Administration, First new U.S. nuclear reactor since 2016 is now in operation, August 1, 2023. Available at https://www.eia.gov/todayinenergy/detail.php?id=57280.

15. Air quality benefits are only reported for the high electrification scenario (slides 25 and 29).

16. Air quality benefits rely upon using the U.S. Environmental Protection Agency COBRA model. Its quantitative results depend on selecting numerous settings and parameters, which are not provided.

17. It is unclear whether net new jobs are job-years, i.e., if 53,900 net new jobs by 2035 are actually 5,390 jobs over the next 10 years (slide 26).

18. Putting these net job years in context, they are a very small percentage of total NJ employment of approximately 4.4 million people[63] (e.g., 5,390/4,500,000 = 0.1%).

19. Job results are not reported to the year 2050, and presumably many of them are one-time construction or installation jobs, so the job benefits likely decrease substantially over time (slide 26).

20. The jobs analysis should make clear whether loss of employment due to high energy prices is included (slide 26). During one of the working group meetings in 2024, the consultants acknowledged that price impacts were not considered.

21. The jobs analysis does not include whether sufficient qualified labor is available (slides 26 and 38 state that analysis is to be conducted).

22. A complete NJ macroeconomic analysis of the four scenarios is needed for an assessment of the complete economic impact on employment, wages, inflation, the NJ government budget, tax revenues, etc.

[63] State of New Jersey Department of Labor and Workforce Development, *New Jersey Exceeded 4.4 Million Jobs in February Setting New Record High*, (March 27, 2025). Available at https://www.nj.gov/labor/lwdhome/press/2025/20250327_February_Jobs.shtml.

23. The assumed rebate dollar amounts per EV, various appliances, and other programs is not provided. The portion funded by the federal government vs. New Jersey ratepayers are not provided (slide 27).

24. It does not account for the possibility that the Trump Administration repeals in part or in whole the Inflation Reduction Act, or the Administration's stated aversion to heat pumps and EVs, which is not accounted for (slide 27).

25. The claim that average energy bills for electric and natural gas households are nearly equal excludes vehicle costs. It is also unclear whether the costs of backup gas heating, building shell and installation, electric distribution system upgrades, or the natural gas rates projected for each scenario are included (slide 28).

26. The claim that electric rate design can offer savings is asserted without describing these changes or providing any analysis (slide 28).

27. The monetized GHG benefits should provide the assumed social cost of carbon (equivalent) (slides 29 and 58).

28. The claim that targeted electrification and strategic demand reduction may be able to lower costs is not described. It does, however, reference a rate design report (slide 29), the Brattle Report, December 9, 2024, which acknowledges that decarbonization may raise rates for all customers (p. 3).[64]

29. The next steps are either unclear or unsubstantiated (slide 32). The term "no regrets" is undefined, the rate design is not specified, as mentioned above, and the programming needed to reduce upfront equipment costs is not described.

[64] See Rate Counsel filing, *In the Matter of Addressing New Jersey Energy Affordability for Low- and Moderate-Income Households*, BPU Docket No. QO24110853, (April 10, 2025), which includes comments on the Brattle 2024 report.

30. The release date of the New Jersey Clean Building Roadmap is not provided (slide 32); slides 5-6 should be updated accordingly.
31. The release date of the Clean Firm Capacity Roadmap is not provided (slide 32); slides 5-6 should be updated accordingly.
32. The Clean Firm Capacity Roadmap does not include geothermal power plants (slide 32).
33. The Executive Summary should have been provided after the release of the building and capacity roadmaps and the rate design report and incorporated their findings into the update (slide 32).
34. The new strategies for the natural gas distribution system are not provided (slide 32 and slide 19).

Appendix: Progress and Policy (slides 33-36)

35. The evolution of the federal context since the 2019 EMP (slide 36) does not include any actions or likely actions taken by the Trump Administration.

Appendix: Stakeholder Feedback (slides 37-38)

36. New Jersey's actions in response to stakeholder feedback are incomplete (slide 38).
37. Dates should be given for the release of the NJ Green Economy and Workforce Analysis, and for the other items listed under "Ongoing Effort" (slide 38).

Appendix: Background and Methodology (slides 39-42)

38. No analysis is provided of real-world feasibility (slide 41).
39. Clean energy standard (CES) is not described (slide 41).
40. The modeling workflow does not provide the input assumptions, models, or complete numerical results (slide 42); see prior discussion regarding confidentiality.

Appendix: Climate PATHWAYS Supporting Findings (slides 43-48)

41. The findings do not provide references for current year data, tabular numerical values that can be analyzed, or the modeling methodology used for the forecasts (slides 44-48).

42. Detailed mixes of different types of heat pumps and their refrigerants, other sources of heating, and vehicles are not provided (slides 44-48).

43. Climate PATHWAYS should provide the implicit annual cost of GHG abatement so that it can be compared to the assumed social cost of carbon used (slides 44-48).[65]

Appendix: Peak Load Supporting Findings (slides 49-53)

44. Findings should provide references for current year data, tabular numerical values that can be analyzed, and the modeling methodology used for the forecasts (slides 50-53).

45. Based upon the provided graph, the claim that the summer peaks for all scenarios except high electrification are similar in magnitude does not appear to be supported, though it is difficult to assess this definitively because the numerical results are not provided (slide 50).

46. Managed and unmanaged light-duty vehicles (LDV) and medium- and heavy-duty vehicles MHDV are not defined (slide 51).

47. Linear heating is not defined (slides 51-52).

[65] See Rate Counsel's April 16, 2025, filing *In the Matter of Successor Solar Incentive Program Pursuant to P.L. 2021 C.169 and In the Matter of Certification of Energy Year 2023 Cost Cap Calcuaiton and Setting ADI Program Megawatt Blocks for Energy Year 2025*, Docket Nos. QO20020184 & QO24020117 regarding the proposed energy year (EY) 2024 value for the social cost of carbon of $245 per ton.

48. NJ Data Center Load Forecast does not provide data centers' electric energy forecasts, their hourly usage profiles, whether some load flexibility is available, or the amount and type of backup or behind-the-meter generation.

Appendix: Electric Sector (slides 54-56)

49. Slides should provide references for current year data, cost and performance assumptions, tabular numerical values that can be analyzed, or the modeling methodology used for their capacity expansion planning and resource adequacy modeling (slides 55-56; slides 22-23 provide graphical results only for 2035 and 2050).
50. The actual yearly numerical values for the generation, transmission, and distribution expansion plans from the modeling are not provided for each scenario (slides 55-56).
51. Loss of load probability (LOLP)/loss of load expectation (LOLE) and other standard resource adequacy assumptions, methodology and results should be provided (slide 55).
52. It is unclear whether only the NJ or PJM electricity sector was modeled (slides 55-56).
53. It is unclear whether the electric distribution system sector was modeled (slides 55-56).
54. It is unclear whether PLEXOS optimized transmission expansion (slides 55-56).
55. Slide 56 is conceptual and should provide numerical values (e.g., loss assumptions, how the clean energy standard was modeled, etc.).

Appendix: Costs and Benefits of Decarbonization Supporting Findings (slides 57-58)

56. Slide 58 is similar to slide 29; see comments above also on slide 17 (GHG emission reductions).

Appendix: Rates and Affordability Supporting Findings (slides 59-62)

57. As discussed above, the jobs impact analysis (slide 26) of the 9% and 75% rate hikes in electricity and natural gas does not include the economic impacts on jobs, inflation, tax revenues, etc. on the NJ macroeconomy.

58. The reference for baseline values, assumptions, and detailed modeling results are not provided (slides 60-61).

59. Slide 62 should provide results by the distribution of low- and moderate-income (LMI) households not just the average LMI household.

CONCLUSION

The Draft Executive Summary is a start to updating the 2019 EMP. However, in order to ensure that the EMP update meets its ambitious goals while ensuring that ratepayers do not bear the risk and the burden of inefficient or useless measures, it is imperative that the Board look at all factors that could increase costs to ratepayers and engage in a ratepayer impact study. Additionally, the Board needs to look at all aspects of recommended new measures, such as heat pumps to determine the full impact on CO2 emissions. To allow stakeholders to provide valuable insight, EMP materials, such as a complete draft EMP update report with all supporting materials, should be issued. It should allow for the submission of public comments, with sufficient time given to review the complete draft prior to a final report being released.

The 2019 EMP update is an opportunity for the State to offer a realistic and evidence-based plan that accounts for the multiple changes since 2019 and is informed by the experience

of the past five years. A thoughtful, deliberative and transparent update that genuinely considers stakeholder comments should be conducted. Such an update would benefit all New Jersey residents by building credibility, expanding public support, and leading to fairer, more efficient and cost-effective outcomes. Rate Counsel looks forward to participating in the next steps in this process.