Final Meeting Minutes – Approved by GMAC

Joint meeting of the

Clean Energy Transmission Working Group (CETWG)

and

Grid Modernization Advisory Council (GMAC)

MEETING MINUTES

Friday, October 13, 2023, 9–11 a.m.

Via Zoom

Clean Energy Transmission Working Group present:

- Jason Marshall, Deputy Secretary and Special Counsel for Federal and Regional Energy Affairs, Executive Office of Energy and Environmental Affairs, designee for Commissioner Elizabeth Mahony, Massachusetts Department of Energy Resources, CETWG Co-Chairperson
- Jamie Van Nostrand, Chair of the Massachusetts Department of Public Utilities, CETWG Co-Chairperson
- Ashley Gagnon, Massachusetts Office of the Attorney General, designee for Attorney General Andrea Campbell
- Michael J. Barrett, Co-Chair of the Joint Committee on Telecommunications, Utilities and Energy
- Jeffrey N. Roy, Co-Chair of the Joint Committee on Telecommunications, Utilities and Energy
- Doug Howgate, Massachusetts Taxpayers Foundation, Inc, submitted by the Massachusetts Taxpayers Foundation, Inc.
- Joseph LaRusso, submitted by the Acadia Center
- Hilary Pearson, LineVision, submitted by the Northeast Clean Energy Council
- Johannes Pfeifenberger, Brattle Group, representing or consulting to the offshore wind industry
- Liz Delaney, New Leaf Energy, representing or consulting to the solar energy industry
- Sheila Keane, New England States Committee on Electricity, economist with knowledge of electricity transmission, distribution, generation and power supply
- Ronald DeCurzio, Massachusetts Municipal Wholesale Electric Company (MMWEC), representing municipal interests or a regional public entity
- Barry Ahern, National Grid, representing investor-owned utilities in the Commonwealth
- Dave Burnham, Eversource, representing investor-owned utilities in the Commonwealth

CETWG members absent:

- Brooke M Thomson, Associated Industries of Massachusetts, Inc, submitted by the Associated Industries of Massachusetts, Inc.

Grid Modernization Advisory Councilors present:

- Commissioner Elizabeth Mahony, Massachusetts Department of Energy Resources, GMAC Chairperson
- Kelly Caiazzo, Massachusetts Office of the Attorney General, representing the Attorney General
- Sarah Cullinan, Massachusetts Clean Energy Center, representing the Massachusetts Clean Energy Center
- Larry Chretien, Green Energy Consumers Alliance, representing low- and middle-income residential consumers
- Kyle Murray, Acadia Center, Representing the environmental advocacy community
- Kathryn Wright, Barr Foundation, representing the environmental justice community
- Alex Worsley, Enel North America, representing the transmission-scale renewable energy industry
- Kate Tohme, New Leaf Energy, representing the distributed generation renewable energy industry, designee for Kathryn Cox-Arslan
- Sarah Bresolin Silver, ENGIE North America, representing the energy storage industry
- Amy McGuire, Highland Electric Fleets, representing the electric vehicle industry
- JS Rancourt, Direct Expansion Solutions (DXS), representing the building electrification industry
- Andy Sun, Massachusetts Institute of Technology, representing engineering expertise in interconnecting clean energy
- Jeremy Koo, Metropolitan Area Planning Council, representing municipal or regional interests, designee Julie Curti
- Jonathan Stout, Dana-Farber Cancer Institute, representing large commercial and industrial end-use customers

Non-voting GMAC councilors present:

- Carol Sedewitz, representing National Grid
- Digaunto Chatterjee, representing Eversource

Non-voting GMAC councilors absent:

- Kevin Sprague, representing Unitil

GMAC councilors absent:

- Marybeth Campbell, Worcester Community Action Council, representing a local agency administering the low-income weatherization program

Presenters:

- Lavelle Freeman and Jacob Lucas, Eversource
- Elton Prifti, National Grid
- Kate Tohme, New Leaf Energy
- Sarah Bresolin Silver, ENGIE North America
- Amy McGuire, Highland Electric Fleets

DOER staff present: Shirley Barosy, Colin Carroll, Austin Dawson, Aurora Edington, Julia Fox, Paul Holloway, Sarah McDaniel

Consultants present: Paul Alvarez, Jennifer Haugh, Chelsea Mattioda, Dennis Stephens, Tim Woolf

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1. Call to order

Paul Holloway called the meeting to order at 9:04 a.m. Holloway conducted roll call and confirmed a quorum. Commissioner Elizabeth Mahony, as GMAC Chair, conducted roll call and confirmed a quorum.

2. Review and vote on meeting minutes

Burnham moved to approve the CETWG meeting minutes of Friday, September 22, 2023. Rep. Roy seconded. DeCurzio abstained. The motion carried.

3. Background

Commissioner Mahony offered background on the Grid Modernization Advisory Council. The GMAC was created in the Clean Energy and Climate Plan of 2022, which set up the Council to work together with the three investor-owned electric utilities develop electric-sector modernization plans (ESMPs). These are required to be filed in January and then every five years thereafter. The GMAC is 18 people with diverse representational membership. The GMAC convened in March and has met monthly since then until September, when it began meeting biweekly after the ESMPs were shared September 1.

The GMAC is focused on ensuring that the grid is prepared to meet the statues to accommodate the growth in building and vehicle electrification. Over the summer, the GMAC worked with the utilities to gain a baseline understanding of the work that we're all doing. We also adopted an outline for the ESMPs. This is our first time, and we were able to develop a common outline for the three utilities to follow. On September 1, the plans were filed with the GMAC, and we are now systematically going through each section of the plans. There is a lot of engineering and forecasting thought work that goes with it. Slide 5 shows a lot of the areas the ESMPs must focus on. We are meeting twice monthly until the middle of November, when the GMAC will put together a set of recommendations to the utilities on what we'd like to see changed or added to those plans. The EDCs then have until January to decide whether to make those changes and indicate to the DPU whether they accepted or rejected them. This has been a very fast process, and we will grow from this and do better over time.

The GMAC is hosting two listening sessions that are coming up on October 30 and November 1. The utilities will be hosting technical sessions on November 15 and 28. Slide 6 shows a broad brushstroke of what the GMAC has been tasked with. Everything is available on the GMAC website. Consultants have been helping with the process, and their recommendations and analysis have been posted as well.

> ***Sen. Mike Barrett***: The Commissioner mentioned that the process has been good and could be better. Could you recap briefly in what ways it's been less than optimal?
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> ***Commissioner Elizabeth Mahony***: The biggest concern is the timing—we are covering hundreds of pages of proposals in a very short amount of time, and we are lucky to have a terrific set of GMAC members, but they have day jobs as well. We think that in the future, having additional time to work through the plans and understand them a little more will be beneficial to everyone. Overall, we've been really successful in having an open dialogue and good planning sessions.
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> ***Sen. Mike Barrett***: Are these deadlines mandated by the legislation?

Commissioner Elizabeth Mahony: Yes.

4. Public comment

Co-Chairs Jason Marshall and Jamie Van Nostrand managed the public comment period.

Van Nostrand acknowledged the work of the GMAC and appreciated the time folks have been dedicated to assist in this process.

Marshall echoed the thanks to Commissioner Mahony and the GMAC. We don't operate in silos—we talk about the high-voltage transmission system—but it's important to talk about the distribution side and its relationship to the transmission system. One additional housekeeping item is to welcome to Ron DeCurzio, who is new and confirmed that he was sworn in.

No comments from the public were offered.

5. Presentations

a. Lavelle Freeman and Jacob Lucas, Eversource, on distribution and transmission planning

Freeman presented on slides 4 through 12 on distribution system planning:

- Slide 4: Climate law requirements and ESMP contents. Lefthand bullets encapsulate what the EDCs have been doing for a while. The law doesn't influence behavior to do things they're not normally doing; the objectives are the same regardless and in alignment with the CECP.
- Slide 5: The final filing of the ESMPs to the DPU is January 30, 2024. Implementation is expected to begin January 2025.
- Slide 6: Key themes of the ESMP (see ESMP content outline). This includes building an electric system to enable a just transition that is equitably distributed and in alignment with clean energy goals. Drivers are reliability, resiliency, capacity needs, voltage, and quality, but the impact on disparate communities is a central tenant to help understand the impacts of infrastructure build-out and other factors on EJCs. There are several projects that Eversource is building that would have been constructed anyway to meet existing demand.
- Slide 7: The distribution planning process, starting with planning drivers, system planning studies, solution development, then regulatory process. Getting into the details, things reveal themselves: planning drivers now include more comprehensive and integrated tracking and predicting of step loads, working with communities to understand when those loads are increasing and not relying on when customers call and share that information. We use econometric regression models to understand drivers down to the zip code and street level using demographic information, traffic patterns, using mobility data to understand where EVs are garaged, etc. These inform charging needs and demand requirements of substations. These advanced models will help us to construct hourly electrical demand at every substation in our system. Forecasted demand data is incorporated in system planning analysis to help identify grid constraints. This includes load flows analysis not just at a snapshot, but to be done over the load cycle (not just summer peak); a lot of impacts that would historically manifest at peak are now manifesting at different times. We are using dynamic software to identify down to the second to understand impacts on the distribution system, which has become far more complex. Reliability and resilience are also becoming much more complex; we need to understand service interruptions more granularly. Then we need to understand solutions, including non-wires alternatives (NWA) investments—the

most viable solution to accommodate customers experiencing interruptions. The regulatory process is what is covered in the GMAC and CETWG processes.

- Slide 8: The base load is 6 GW; Eversource is predicting 7.3 GW by 2033. By 2050, we're looking at 15 GW peak load.
- Slide 9: What this means is we need to close the gap, so in the next 10 years we need to build 14 new substations and upgrade 12 substations just for capacity needs.
- Slide 10: Even doing that, there is still a capacity gap that could be filled by technology and other solutions.
- Slide 12: Eversource will need to build 17 new substations and 26 substation upgrades for 10-year distributed energy resource (DER) and capital investment project (CIP) solutions.

Lucas presented slides 14 through 16 on transmission system planning:

- Slide 14: Overview of transmission system planning and sources for performance modeling, including the North American Electric Reliability Corporation. New England is part of the NPCC. Most planning is performed by ISO-NE; costs of upgrades identified are usually shared across New England. ISO-NE has prescribed tariff mechanisms for needs assessment.
- Slide 15: New clean energy resources continue to be identified, including offshore wind and DERs. More than 13 GW of power has been identified from offshore wind from the south coast.
- Slide 16: transmission planning initiatives related to clean energy. FERC mandates long-term scenarios with a 20-year planning horizon to include all laws that affect demand, demand response, decarbonization, and electrification. Eversource is looking to understand at a granular level where demand will occur.

  Sen. Mike Barrett: There is a difference in tone from ISO-NE 2050 study than what he is hearing from Eversource here. He has heard ISO present on this point and has been at some variance with regard to a sense of urgency. Potential loads 27 years from now could be addressed through rebuilding existing facilities; that's not quite a call for the urgent build-out that we're hearing from the ESMPs.

  Jacob Lucas: That's a difference in modeling. The bottom line is is ISO is looking for zonal transfers—their modeling put in existing stations, whereas ESMPs show where loads are needed and are addressing through distribution systems.

  Sen. Mike Barrett: This warrants more thoughtful discussion.

  Johannes Pfeifenberger: 13 GW of offshore wind is available, and he sees most lines go to southern New England; these will require significant and expensive upgrades. Will these upgrades minimize necessary costs?

  Jacob Lucas: You have to look at this holistically and optimize the solution set for both problem statements at the same time.

  Johannes Pfeifenberger: If these could be connected, we could make it work, but if we connect them all in southern New England…

  Jacob Lucas: There is actually a lot of existing available capacity on the network, and we need to utilize that fully. When adding DERs to the equation, new transmission is needed. Boston imports is a perfect example of what we need to look at.

Digaunto Chatterjee: What Lucas is describing is different from ISO-NE studies; they only know the 100 stations that we have in the Commonwealth today. Lucas is modeling brand new stations in and out of Boston and Plymouth and running a transmission study with offshore wind. We're going to hit limits in transmitting to Boston and we need to redesign that before the distribution stations can be constructed.

Sen. Mike Barrett: He appreciates the hard work everyone is doing. Looking at plans from an outside perspective, minimizing rate payer impacts is a priority. He senses a difference between ISO-NE's view and Eversource's look at the transmission (not distribution) components of the grid. ISO is saying much of the job can be done by focusing on expanding and modernizing infrastructure and working with existing rights of way; you're saying there's a different view. Both think about DERs, EVs, and heat pumps; you're thinking of exactly the same needs and coming up with different conclusions. Both working groups need to embrace both models. We need to somehow reconcile those two views of what 2050 may need.

Digaunto Chatterjee: Chatterjee agreed, and said he is not suggesting we can't upgrade our existing transmission system to meet needs; just highlighting that there are some constraints in the Boston area, but most can be relieved by upgrading existing transmission paths.

Sen. Mike Barrett: It seems you're working with the same sources of additional supply and demand or need, but there is a different set of conclusions being reached.

Digaunto Chatterjee: These decision paths will converge eventually. For example, the CIP will require some substation upgrades in Plymouth. Today, that substation can transfer only 50 MW of DERs. With an upgrade, that station can transfer 150 MW. ISO doesn't have that level of clarity on distribution.

Joseph LaRusso: This is a wonderful opportunity to talk about this. His question is about distribution responsibility for what happens at the bulk power system level and the distribution level with respect to offshore wind. We've seen in this presentation a representation of having power delivered to load centers by the distribution system. Are we really asking the distribution system to do double duty? If there's an alternative and presumably one that's less expensive to deliver offshore power to deliver power directly to the load centers (Boston, e.g.), are we relieving the distribution system of having to manage what is primarily a distribution system problem, and in doing so, wouldn't we just leave the distribution system to be designed to accept distributed resources?

Digaunto Chatterjee: This is a really good point. Our industry is so fragmented: DER is trying to unlock their electrons, and offshore wind is as well; ultimately the POs have to enable their electrification. With the CIPs, we've enabled one new GW of power in that area. We're seeing DER developing in areas where there isn't load, and frankly if we're going to help decarbonize, we need to unlock wherever DER wants to go. In Southeastern Massachusetts, if the DERs are there and they climb onto the same distribution system, they will overload those same paths that offshore is jumping onto. We need to come up with very minimal cost upgrades to enable massive amounts of offshore wind instead of having to route directly into Boston. There are transmission overloads throughout Southeastern Massachusetts. Our role is to prevent that fragmented planning which is going on quite a bit in our industry right now.

Johannes Pfeifenberger: With respect to injecting offshore wind directly into Boston, there is a bullet point on slide 18 stating that the import would need to be increased. There are quite a few studies showing that with electricity loads considered; you'd be much better off getting offshore

wind into the Boston area rather than via southern New England. He is wondering whether the Eversource analysis shows the opposite.

Jacob Lucas: You have to factor in all clean energy resources, including DERs. All of New England has a net load of a few hundred megawatts because it's being served by solar.

Digaunto Chatterjee: When you increase load in this area, we're going to be building 10 new substations in Boston. Section 6 of ESMP offers more detail. When you build substations, all transmission paths will be overloaded—it doesn't matter if you bring 5 GW of new offshore wind. Transmission will pull power from the totality of power sources.

Johannes Pfeifenberger: Pfeifenberger indicated that he had seen New York studies pointing to different conclusions.

Jacob Lucas: New York is a good example because the power needs to get upstate; they still need to increase the interface limit.

Johannes Pfeifenberger: New York is still trying to get 6 GW into New York City and into the harbor to connect directly to those centers. He has seen several studies that show that there might be a need to serve the city outside of Long Island.

Jacob Lucas continued presenting slides 18 through 25:

- Slide 18: types of transmission upgrades are both to physically interconnect new stations and transmit new power.
- Slide 19: transmission study combines new clean energy resources with ESMP. "No regrets" themes emerging from various scenarios.
- Slide 21: DER's impact on transmission upgrades. There are many things happening to impact transmission.
- Slide 22: Mid-day minimum net loads could hit 0 by the mid-2030s.
- Slide 24: highlighting need for interregional transfer capability. Massive benefits associated with capacity intertie—need for new transmission lines.
- Slide 25: There are challenges to overcome. With the entire lifecycle of executing projects, it's taken an average of 27 months to obtain EFSB decisions; filings taking an average of 38 months to approve.

Sen. Mike Barrett: Thanks to Jacob Lucas and Lavell Freeman. We'd love to see from Eversource a series of timelines indicating which state and local processes trigger which months of delay. The mention of the EFSB timing is very helpful; we need a delineation of a number of state processes and whether they're additive or if they can be done contemporaneously. We need to know what's triggering what delay. Regarding the Boston study and net zero load from slide 22, he's not sure he understands that; maybe you can convey the reason for the emphasis offline.

b. Barry Ahern and Elton Prifti, National Grid, on the Electric Sector Modernization Plan

Elton Prifti presented slides 2 through 10 on distribution:

- Slide 3: The ESMP charter calls for a smarter, cleaner, stronger grid.
- Slide 4: National Grid's service territory is six areas with more than 18,000 distribution lines.

- Slide 5: Massachusetts is the leading state in New England when it comes to interconnections of distributed energy resources. Nationally, we're No. 3 behind Rhode Island and New Jersey when it comes to solar per square mile. We have more than 2 GW of applications in our queue that we're currently studying in our service territory. The majority are stand-alone battery storage. These are both a load and distribution system with constraints in charging those batteries. We've been providing developers options and will be able to control and manage the inputs and outputs of those energy storage units.
- Slide 6: The current peak load demand is 4.9 GW as of 2022; that is all DER that's connected. If you extrapolate all of that, the true system load is just over 6 GW in Massachusetts service territory. By 2050, that load will be more than doubled, and what the forecast has considered is all state goals prorated by National Grid's share of the service territory.
- Slide 7: The shift to winter peaking is predicted to happen sometime in 2037. We will be potentially bending the curve to a lower curve by using new technologies to optimize use of systems and loads. Forecast itself is base forecast. By 2035, without ESMP, forecasted demand exceeds system capacity. With no capacity expansion, the system will be overloaded.
- Slide 8: In the next ten years, National Grid will see a 21% load growth from 2022. To accommodate this, they plan to upgrade 17 existing substations, build 28 new, and add 17 feeders. NWAs are being looked into; the framework is in place to screen those projects and "avoided infrastructure" and as a "bridge to wires." For 2035–2050 growth, there are 86 projects identified, including upgrading 44+ existing substations and building 26 new substations.
- Slide 9: By 2035, National Grid hopes to increase 4 GW of capacity to enable electrification.
- Slide 10: overview of DER process

Barry Ahern presented slides 12 through 14 on distribution:

- Slide 12: impact of transmission. ISO-NE did a terrific job with their 2050 study, which allows us to better consider real estate needs.
- Slide 13: We are seeing an unprecedented ramp-up of capacity growth. We need to look at new technologies and build bigger conductors.
- Slide 14: What can be done with ISO-NE to best manage impacts is we need to dig into what the best design approaches are to build the system if we're going into rights of way to accommodate offshore wind and other new stations that our ongoing work is not going to absorb naturally.

  Sen. Mike Barrett: The ISO-NE's repeated use of the word incremental needs to be reconciled with the more aggressive build-out recommended here. He does not think they are convergent; there is a difference of opinion and would like to explore that, whether he's right or wrong. He would like this group to discuss that at the appropriate moment.

c. Kate Tohme, New Leaf Energy, on alignment necessitated by proactive distribution planning

Kate Tohme presented slides 1 through 6:

- New Leaf Energy is a solar and storage developer specializing in distributed generation that has been operating in Massachusetts since 2007. Distributed generation means any small generator connecting to the distribution system. In Massachusetts, this means solar and storage. The most recent CECP requires ~9 GW of solar by 2035 and 37 by 2050. Massachusetts has had unprecedented growth and now has aggressive goals, but we've hit a roadblock. We've seen a stagnation due to significant upgrades required to host interconnection. We're seeing a nearly five-fold length of time in growth to get projects online. DPU developed a provisional program

and the process is ongoing. We still have a long way to meet state clean energy needs. The next step is the ESMPs.

- Slide 2: Distributed generation interconnection process
- Slide 3: Affected system operator studies. In 2019, solar saw a large influx of applicants and high saturation. At that point, almost every project greater than 1 GW in size required a system operator study, which is essentially a transmission-level impact study. These studies can take 12-18 months and are likely to continue as all or most substations have reached distributed generation saturation.
- Slide 4: Proactive vs. reactive interconnection. Massachusetts is a reactive state, which means it will review interconnection requests as they come in, rather than anticipate the need for them and accommodate accordingly. There is a lack of regulatory certainty for interconnecting customers in terms of timing and costs.
- Slide 5: There is a need to align distribution and transmission systems upgrades. This is essential to meet the Commonwealth's 2050 GWSA goals. Delays could be a minimum four to nine years unless the transmission and distribution system upgrades are aligned.
- Slide 6: recommendations

d. Sarah Bresolin Silver, ENGIE North America, on distributed battery energy storage systems and transmission planning

Sarah Bresolin Silver introduced herself and the work of ENGIE, then presented slides 1 through 3:

- Slide 1: DER impacts on transmission system. ENGIE looked at high-level results of ISO-NE 2050 study and saw that battery energy storage system impacts were not factored in, likely for two reasons: one, they were flagged as being outside the scope, and two, the study relies on the 2050 decarbonization roadmap put out in 2020 in Massachusetts. There was not significant evidence about BESS in that data set. But we have heard that exponential growth in BESS on the transmission system and ask that BESS be included in DER.
- Slide 2: Benefits of distributed batteries
- Slide 3: Recommendations

e. Amy McGuire, Highland Electric Fleets, on considering fleet EVs on distribution and transmission planning

McGuire introduced herself and the work of Highland Electric Fleets. She believes fleet EVs have a role in distribution and transmission planning. The focus has been on school buses in the majority of fleets to date, but they have other types of vehicles in their growing portfolio. School buses, to her, are equivalent to many more rolling batteries on the road in the next few years.

- Slide 9: Vehicle-to-grid using electric school buses is mobile storage. There is a high dwell time, predictable routes, and schedules with flexible benefits. The numbers here may seem small in the broader context of the transmission system, but this technology and industry is nascent and expanding, and the benefits to these smaller-scale BESS projects are that they can be very targeted, prioritizing very specific circuits. In aggregate, they can have a very large impact. We have done vehicle-to-grid bidirectional activity in Massachusetts and National Grid territory and have been compensated for that work.
- Slide 10: shows how that can be done.
- Slide 12: transportation is a distributed energy resource. Vehicles broadly can have a big impact and are anticipated to have an impact on our peak load. They're also mobile storage assets. Where

we need to significantly reduce the peak and figure out right-sizing of load generation, they should be part of the solution as we move forward.

6. Discussion of CETWG report outline

Holloway shared the outline for the CETWG report.

Van Norstrand discussed slide 9; the focus is how they'll produce the report. Note a couple of new meetings added: one not reflected on the slide is on November 3 with a presentation on cost allocation. December 6 and 21 are additional meetings to review and finalize the report.

> ***Barry Ahern***: If we're assigned to a new area, will we be contacted? And for the comments and recommendations, if we're writing a section now, should we not spend too much time in our section and wait toward the end?
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> ***Jamie Van Norstrand***: He was thinking the comments and recommendations section would flow, so he proposed that it be subject for review, comment, and deliberation by the whole group. Regarding as-yet unassigned sections, Holloway and Marshall will be taking the lead working with the authors on preparing the report.
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> ***Jason Marshall***: We may propose our own recommendations as well.
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> ***Ashley Gagnon***: In looking at slide downloaded from this meeting, she's not seeing new meeting dates.
>
> ***Paul Holloway***: The new slides will be uploaded to the website. He will poll members for availability.

7. Close and next steps

Van Norstrand shared slide 10 covering future meeting topics and presentations.

The meeting was adjourned at 11:05 a.m.

Respectfully submitted,
Jennifer Haugh
GreenerU

Meeting attachments:

- CETWG meeting minutes of September 22, 2023
- Updated CETWG report outline
- Meeting agenda and slides
- Slide presentations:
    - Eversource
    - National Grid
    - ENGIE North America
    - New Leaf Energy
    - Highland Electric Fleets