

FINAL

Pursuant to notice duly given, a meeting of the NEPOOL Participants Committee was held beginning at 9:30 a.m. on Monday, October 25, 2021. A quorum determined in accordance with the Second Restated NEPOOL Agreement was present and acting throughout the meeting. Attachment 1 identifies the members, alternates and temporary alternates who participated in the meeting.

Mr. David Cavanaugh, Chair, presided and Mr. Sebastian Lombardi, Acting Secretary, recorded.

APPROVAL OF SEPTEMBER 23, 2021 PATHWAYS STUDY MEETING MINUTES

Mr. Cavanaugh referred the Committee to the preliminary minutes of the September 23, 2021 Pathways Study meeting, as circulated and posted in advance of the meeting. Following motion duly made and seconded, the Committee unanimously approved those minutes, with an abstention noted on behalf of Michael Kuser by his alternate.

ANALYSIS GROUP (AGI) PRESENTATION

Mr. Cavanaugh then introduced Mr. Todd Schatzki of AGI who reviewed materials circulated and posted in advance of the meeting. Mr. Schatzki informed the Committee that the purpose of the day's presentation was to provide preliminary results and findings of the quantitative analyses of the four alternative Pathways to decarbonizing the New England grid (i.e., Status Quo, Forward Clean Energy Market (FCEM), Net Carbon Pricing (NCP), and Hybrid approaches). He indicated that the preliminary set of results for the core central cases would be presented during the meeting.

Mr. Schatzki then provided an overview of the key preliminary modeling results. He noted that market prices and resulting incentives varied widely across the alternative approaches and thus had important consequences for expected market outcomes. He provided the following examples:

(i) storage resource build out and utilization varies depending on energy market incentives created for non-carbon-emitting generation; (ii) the extent of available renewable energy that does not clear energy market (“economic curtailments”) varies given market incentives for storage; and (iii) efficiency (and resulting carbon-intensity) of fossil (gas-fired) resources reflects incentives for clean energy versus carbon reduction. He then indicated that the NCP approach produced the lowest production costs, with similar but somewhat higher costs for the FCEM and Hybrid approaches. He further stated that the Status Quo approach led to notably higher costs, reflecting multiple factors including the absence of market incentives for clean energy/decarbonization and higher curtailment of renewable resources. AGI’s modeling assumed clean energy resource mixes reflecting state decarbonization “roadmaps” and plans.

Mr. Schatzki then provided a summary overview of AGI’s pathways modeling effort, and a recap of the central case assumptions. He reminded the Committee that the focus was on the comparison of the implications of the following four alternative regulatory approaches/pathways on economic outcomes, including the incentives for decarbonization: (i) Status Quo – continued reliance on state-authorized procurements of multi-year contracts for renewable energy from new resources; (ii) FCEM – a market for clean energy, where “clean energy” is assumed to include electricity generated from nuclear, renewables, hydropower and biomass (but not storage); NCP – carbon pricing with generator payments for carbon emitted credited to load; and (iv) Hybrid approach – combination of carbon pricing to cover existing clean energy “missing money” plus a forward clean energy market for not-yet-in-service resources. Recapping key central case assumptions, Mr. Schatzki indicated that such assumptions were held constant across all four policy approaches studied, over a 2020 to 2040 time period, and included an ISO New England system-only geographic scope (with assumed imports) and a decarbonization target of 80% reduction in

carbon emissions by 2040 compared to 1990 levels. He also clarified that no Minimum Offer Price Rule (MOPR) was assumed for the central case modeling. Regarding assumed loads for the central case, Mr. Schatzki noted that a high load would be assumed to reflect the electrification of transportation and heating sectors (consistent with Scenario 3 of NEPOOL's Future Grid Reliability Study (FGRS)). He indicated that, over the course of the study, the System would shift from a summer peaking system to a winter peaking system to address how resources are affected. He explained that the system resource mix would include existing and new resources, would follow baseline state clean energy policies, and include incremental resources. In response to a question about state policies as they relate to the role of storage under the Status Quo approach, Mr. Schatzki agreed that state policies would evolve and change and would be accounted for in the model accordingly.

Turning to the preliminary quantitative modelling results, Mr. Schatzki began by reviewing a graph which outlined the resource mix required over the course of the model. He then reviewed carbon emissions throughout the model, noting that, as of 2033, additional clean energy resources would be required to achieve the emissions target(s). In response to a question about carbon emissions constraints and potential resource adequacy implications, he noted that resource adequacy was not fully met with renewables causing a need for some existing dispatched resources. He further explained the resource mix within the central case, and indicated that the model was intended to be a forecast and that factors may change over time.

Mr. Schatzki then proceeded to review resource additions within the central case, with the first decade largely reflecting baseline-assumed state policies, and the second decade reflecting resources needed to meet both resource adequacy and clean energy requirements, including incremental additions of new renewable and dispatchable resources. He further explained that the

energy mix that emerged from the central case reflected an evolving resource mix, which included increased supply of renewables, reduced utilization of fossil resources, increased use of batteries, and continued utilization of nuclear resources and imports.

Turning to the differences in resource mix and utilization within the central case results, Mr. Schatzki indicated that policy and economic outcomes reflected the mix of resources arising under each approach and the use of resources given market incentives. He noted that the policy approaches differed in terms of the resources that emerge and their use, reflecting a combination of factors and interactions. He then explained the incentives across the different approaches and how they would likely affect energy market prices and create differences in incentives. He also discussed in greater detail the widely varying distribution of prices (levels, variation and range) across the four alternative approaches. When asked about where renewable energy credits (RECs) were represented in the Status Quo approach, Mr. Schatzki indicated that the current resources backed by state-sponsored power purchase agreements (PPAs) include RECs belonging to states and that, to his knowledge, were generally structured to avoid negative pricing. He also noted that negative pricing would incent storage to charge and then discharge in smaller quantities due to energy losses.

Next, Mr. Schatzki shared preliminary analysis of costs and payments through a comparison of outcomes under the four alternative pathways, but noted that AGI's analysis of payments remained on-going and further results would be presented at the December 6 Pathways Study meeting. He noted that important differences in prices, costs and payments emerge because of a combination of factors affecting quantity, type and utilization of resources under each policy approach.

Mr. Schatzki then provided a brief overview/update on AGI's on-going analyses of the proposed set of scenarios, remarking that the assumptions for these alternative scenarios are different from those in the central case. He shared with the Committee the list of scenarios, noting that the list reflected AGI's current thinking, as supplemented by stakeholder discussion and feedback submitted to date.

Addressing next steps, Mr. Schatzki indicated that updates to central cases, if any, based on stakeholder feedback and on-going research/analysis, would be presented at the December 6 meeting along with the initial set of scenario results.

There being no further business, the meeting adjourned at 12:48 p.m.

Respectfully submitted,

Sebastian Lombardi, Acting Secretary

**PARTICIPANTS COMMITTEE MEMBERS AND ALTERNATES
PARTICIPATING IN THE OCTOBER 25, 2021 MEETING**

PARTICIPANT NAME	SECTOR/ GROUP	MEMBER NAME	ALTERNATE NAME	PROXY
Acadia Center	End User	Melissa Birchard		
American Petroleum Institute	Fuels Industry Participant	Paul Powers		
AR Large Renewable Generation (RG) Group Member	AR-RG	Alex Worsley		
AR Small RG Group Member	AR-RG	Erik Abend		
AR Small Load Response (LR) Group Member	AR-LR	Brad Swalwell		
Ashburnham Municipal Light Plant	Publicly Owned Entity		Brian Thomson	
Associated Industries of Massachusetts	End User			Doug Hurley
AVANGRID: CMP/UI	Transmission		Jason Rauch	
Belmont Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
Block Island Utility District	Publicly Owned Entity	Dave Cavanaugh		
Boylston Municipal Light Department	Publicly Owned Entity		Brian Thomson	
BP Energy Company	Supplier			José Rotger
Braintree Electric Light Department	Publicly Owned Entity			Dave Cavanaugh
Brookfield Renewable Trading and Marketing LP	Supplier	Aleks Mitreski		
Calpine Energy Services, LP	Supplier	Brett Kruse		
Castleton Commodities Merchant Trading	Supplier			Bob Stein
Chester Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
Chicopee Municipal Lighting Plant	Publicly Owned Entity		Brian Thomson	
CLEARresult Consulting, Inc.	AR-DG	Tamera Oldfield		
Clearway Power Marketing LLC	Supplier			Pete Fuller
Concord Municipal Light Plant	Publicly Owned Entity		Dave Cavanaugh	
Connecticut Municipal Electric Energy Coop.	Publicly Owned Entity	Brian Forshaw		
Connecticut Office of Consumer Counsel	End User		Dave Thompson	
Consolidated Edison Energy, Inc.	Supplier	Norman Mah		
Cross-Sound Cable Company (CSC)	Supplier		José Rotger	
Danvers Electric Division	Publicly Owned Entity		Dave Cavanaugh	
Dominion Energy Generation Marketing	Generation		Weezie Nuara	
DTE Energy Trading, Inc.	Supplier			José Rotger
Dynergy Marketing and Trade, LLC	Supplier	Andy Weinstein		
Environmental Defense Fund	End User	Jolette Westbrook		
Eversource Energy	Transmission			Parker Littlehale
FirstLight Power Management, LLC	Generation	Tom Kaslow		
Galt Power, Inc.	Supplier	José Rotger	Jeff Iafrati	
Generation Group Member	Generation		Abby Krich	Alex Worsley
Georgetown Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
Groton Electric Light Department	Publicly Owned Entity		Brian Thomson	
Groveland Electric Light Department	Publicly Owned Entity		Dave Cavanaugh	
Harvard Dedicated Energy Limited	End User			Doug Hurley
H.Q. Energy Services (U.S.) Inc. (HQUS)	Supplier	Louis Guibault	Bob Stein	
Hingham Municipal Lighting Plant	Publicly Owned Entity		Dave Cavanaugh	
Holden Municipal Light Department	Publicly Owned Entity		Brian Thomson	
Holyoke Gas & Electric Department	Publicly Owned Entity		Brian Thomson	
Hull Municipal Lighting Plant	Publicly Owned Entity		Brian Thomson	
Ipswich Municipal Light Department	Publicly Owned Entity		Brian Thomson	
Jericho Power LLC	AR-RG		Nancy Chafetz	
Littleton (MA) Electric Light and Water Department	Publicly Owned Entity		Dave Cavanaugh	
Maine Power LLC	Supplier	Jeff Jones		
Maine Public Advocate Officer	End User	Drew Landry		
Mansfield Municipal Electric Department	Publicly Owned Entity		Brian Thomson	
Maple Energy LLC	AR-LR			Doug Hurley

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PARTICIPANT NAME	SECTOR/ GROUP	MEMBER NAME	ALTERNATE NAME	PROXY
Marblehead Municipal Light Department	Publicly Owned Entity		Brian Thomson	
Mass. Attorney General's Office (MA AG)	End User	Tina Belew	Ben Griffiths	
Mass. Bay Transportation Authority	Publicly Owned Entity		Dave Cavanaugh	
Mass. Municipal Wholesale Electric Company	Publicly Owned Entity	Brian Thomson		
Mercuria Energy America, LLC	Supplier			José Rotger
Merrimac Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
Michael Kuser	End User		Jason York	
Middleborough Gas & Electric Department	Publicly Owned Entity		Dave Cavanaugh	
Middleton Municipal Electric Department	Publicly Owned Entity		Dave Cavanaugh	
National Grid	Transmission		Tim Martin	
New England Power Generators Association (NEPGA)	Fuels Industry Participant	Bruce Anderson		
New Hampshire Electric Cooperative	Publicly Owned Entity	Steve Kaminski		Brian Forshaw; Dave Cavanaugh
North Attleborough Electric Department	Publicly Owned Entity		Dave Cavanaugh	
Norwood Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
NRG Power Marketing LLC	Generation		Pete Fuller	
Pascoag Utility District	Publicly Owned Entity		Dave Cavanaugh	
Paxton Municipal Light Department	Publicly Owned Entity		Brian Thomson	
Peabody Municipal Light Plant	Publicly Owned Entity		Brian Thomson	
Princeton Municipal Light Department	Publicly Owned Entity		Brian Thomson	
Reading Municipal Light Department	Publicly Owned Entity		Dave Cavanaugh	
Rowley Municipal Lighting Plant	Publicly Owned Entity		Dave Cavanaugh	
Russell Municipal Light Dept	Publicly Owned Entity		Brian Thomson	
Shrewsbury Electric & Cable Operations	Publicly Owned Entity		Brian Thomson	
South Hadley Electric Light Department	Publicly Owned Entity		Brian Thomson	
Sterling Municipal Electric Light Department	Publicly Owned Entity		Brian Thomson	
Stowe Electric Department	Publicly Owned Entity		Dave Cavanaugh	
Sunrun Inc.	AR-DG			Pete Fuller
Taunton Municipal Lighting Plant	Publicly Owned Entity		Dave Cavanaugh	
Templeton Municipal Lighting Plant	Publicly Owned Entity		Brian Thomson	
The Energy Consortium	End User			Doug Hurley
Union of Concerned Scientists	End User		Francis Pullaro	
Vermont Energy Investment Corporation	AR-LR		Doug Hurley	
Vermont Electric Power Company (VELCO)	Transmission	Frank Ettori		
Vermont Public Power Supply Authority	Publicly Owned Entity			Brian Forshaw
Village of Hyde Park (VT) Electric Department	Publicly Owned Entity		Dave Cavanaugh	
Wakefield Municipal Gas and Light Department	Publicly Owned Entity		Brian Thomson	
Wallingford DPU Electric Division	Publicly Owned Entity		Dave Cavanaugh	
Wellesley Municipal Light Plant	Publicly Owned Entity		Dave Cavanaugh	
West Boylston Municipal Lighting Plant	Publicly Owned Entity		Brian Thomson	
Westfield Gas & Electric Department	Publicly Owned Entity		Dave Cavanaugh	