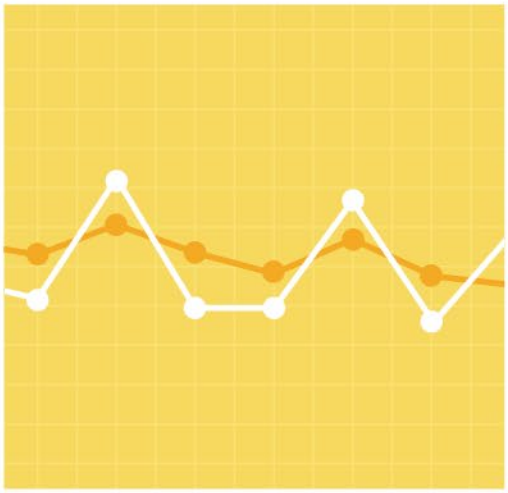
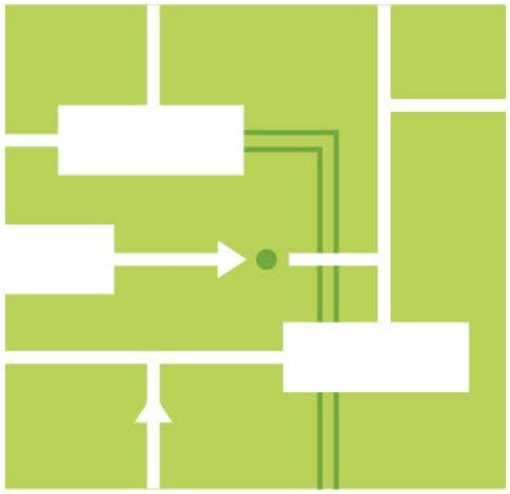
Consumer Liaison Group
Coordinating Committee

2021 Report of the Consumer Liaison Group

Joint Report of the Consumer Liaison Group Coordinating Committee and ISO New England

MARCH 9, 2022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Statement from the Consumer Liaison Group Coordinating Committee

Dear Reader,

Welcome to the *2021 Report of the Consumer Liaison Group* (CLG) prepared jointly by the Consumer Liaison Group Coordinating Committee (CLGCC) and ISO New England (ISO). This is the twelfth annual CLG report, the first published in 2010 summarizing 2009 activities, the year the CLG was established.

The CLG was formed to meet the need, as cited in the Federal Energy Regulatory Commission's (FERC) Order No. 719, for heightened communication between Regional Transmission Organizations (RTOs) and their stakeholders, with a particular focus on electricity consumers, consumer advocates, and state government regulators. Like other RTOs across the country, ISO New England is responsible for the reliable operation of the region's bulk power system, administration of the region's wholesale electricity markets, and regional power system planning.

The CLG bylaws, formulated by stakeholders and ISO New England, require the organization to be governed by a Coordinating Committee of 12 members. These members represent various stakeholder groups, with no more than four members coming from any one New England state. Rebecca Tepper, chief of the Energy and Environmental Bureau of the Massachusetts Attorney General's Office, continues to serve as chair of the CLGCC.

ISO New England's information flow to the CLG is instrumental to fulfilling CLG's mandate to provide for greater understanding of the ISO's activities and decision-making processes and the potential cost impacts of its decisions and initiatives on consumers. The CLG and the ISO have worked collaboratively to identify issues of importance to end-use consumers and have provided information at the quarterly CLG meetings.

Because New England's wholesale electricity markets are continually evolving, the CLG also serves as a forum for consumers to provide input and information to the ISO and to each other regarding what is working well and what may need to be changed. Looking to the future, members of the CLGCC recognize that the CLG's full mandate cannot be fulfilled without greater participation from consumers on the issues that concern them, including potential changes to the power system and the wholesale markets.

The CLGCC's goals for 2022 are as follows:

1. Increase dialogue and improve communication between ISO New England and the CLG, as well as between the CLGCC and CLG members at large.
    - Heighten efforts to provide the ISO, particularly board members and staff, with a greater understanding of consumer issues, needs, and concerns regarding reliability, costs, and environmental impacts of the electric power system.
    - Increase communication concerning the CLG and consumer issues, needs and concerns through current channels and enhanced use of new media.
2. Continue to provide a platform for CLG members to learn about proposed and newly enacted wholesale market and state and regional policy actions and the impact these actions may have on issues of concern to consumers.
    - Monitor current proposals for market and ISO governance reform, and provide a forum for input by CLG participants, particularly regarding the effectiveness of consumer representation in ISO New England policy and governance.

3. Ensure that CLG meeting topics and presentations balance consideration of environmental and consumer cost impacts and, where possible, provide information on potential mechanisms to mitigate increased costs in an understandable and useful manner.
    - Consider exploring the challenges of electricity supply options available to residential consumers.
4. Support ISO New England efforts to reduce carbon emissions.
5. Continue to increase the number and diversity of CLG participants.
    - Develop and implement best practices for increasing racial and gender diversity of panelists and attendees at quarterly meetings.
    - Ensure that quarterly meeting topics incorporate the interests of environmental justice communities and other marginalized groups of consumers.
    - Capitalize on remote participation opportunities utilized during COVID-19 restrictions.
6. Complete revision of CLG governance documents.

Sincerely,

Rebecca Tepper (MA)
Chair
Consumer Liaison Group Coordinating Committee
Chief, Energy and Environment Bureau
Massachusetts Attorney General's Office
Rebecca.tepper@state.ma.us

Eric Annes (CT)
Research Analyst Supervisor
Connecticut Department of Energy and Environmental Protection

Deena Frankel (VT)
Deena Media

August Fromuth (NH)
Managing Director
Freedom Energy Logistics

Doulas Gablinske (RI)
Executive Director
The Energy Council of Rhode Island

Donald M. Kreis (NH)
Consumer Advocate
New Hampshire Office of Consumer Advocate

Andrew Landry (ME)
Deputy Public Advocate
State of Maine

James Porter (VT)
Director of Public Advocacy
Vermont Department of Public Service

Robert Rio (MA)
Senior Vice President, Government Affairs
Associated Industries of Massachusetts

Mary Smith (MA)
The Energy Consortium (TEC)

Dave Thompson (CT)
Utilities Examiner
Connecticut Office of Consumer Counsel

Hank Webster (RI)
Rhode Island Director and Staff Attorney
Acadia Center

Note: Coordinating Committee members' affiliations are listed for identification purposes only.

Section 2
Purpose and Structure of the Consumer Liaison Group

The Consumer Liaison Group (CLG) is an open forum for sharing information between ISO New England and those who ultimately use and pay for electricity in New England. Through this forum, the ISO improves its understanding of consumer issues, needs, and concerns relative to the electric power system and its costs. Similarly, consumers and their representatives gain a better understanding of regional electricity issues.

The CLG is governed by a Coordinating Committee (CLGCC), which sets the agenda for four meetings each year, including featured topics and speakers. ISO New England facilitates the meetings and communications among CLG participants. CLG meetings provide a forum to share information on regional electricity issues among end-users, consumer advocates, and other interested stakeholders. The subject matter in CLG meetings is designed to be less technical than the information presented in regional discussions through the Planning Advisory Committee (PAC) and the New England Power Pool's (NEPOOL) technical committees.[1]

2.1 Objectives

The objectives of the CLG are as follows:

- Be generally informed of the operation of the power system and industry issues, which includes having access to ISO subject matter experts
- Be made aware of market changes in advance of final consideration by the ISO when feasible, that can have an impact on consumers
- Work with the ISO to ensure that it provides timely quantitative and qualitative information on the cost impacts of important initiatives
- Have the ISO assist consumers in identifying the issues that can affect them economically
- Be informed of and participate in the stakeholder process that determines wholesale power market rules and power system needs
- Be informed of the results of any economic analysis conducted and presented to stakeholders in the regional stakeholder process
- Provide the ISO with a greater understanding of the specific issues of interest to consumers

2.2 Participation and Meeting Format

The CLG is open to the public and there is no registration fee. Participants generally include consumers and consumer representatives (including state consumer and ratepayer advocates), state business and industry associations, chambers of commerce, individual businesses, trade groups, nonprofit organizations, and other end users. State regulators, including those who are NEPOOL members, are regular, active participants in CLG discussions.

[1] The Planning Advisory Committee (PAC) is an open stakeholder forum that provides input and feedback to ISO New England on the regional system planning process. More information on the PAC is available at http://www.iso-ne.com/committees/planning/planning-advisory. The New England Power Pool (NEPOOL) is a group formed in 1971 by the region's private and municipal utilities to foster cooperation and coordination among the utilities in the six-state region for ensuring a dependable supply of electricity. Today, NEPOOL members are ISO stakeholders and market participants. More information on NEPOOL is available at www.nepool.com.

CLG meetings attract a diverse group of approximately 75–100 attendees, both in person and via teleconference. CLG meetings follow the same general format:

- Opening remarks from a keynote speaker—typically, an industry or business executive, policymaker, or regulator—who provides a unique perspective on a particular topic or issue
- An update, by a representative from the ISO, on regional energy issues and initiatives that may have an impact on electricity prices, which have or will be taking place at NEPOOL and ISO stakeholder meetings
- A panel discussion that provides different perspectives on a particular issue, facilitated by a moderator (panelists have included representatives from industry, the ISO, regulators, and consumer groups)

Time is reserved during each meeting for audience questions and answers.

Since the beginning of the COVID-19 pandemic and throughout 2021, the ISO's employees have hosted and attended stakeholder meetings via teleconference or webinar rather than in-person.

The shift to an online platform has not significantly reduced attendance at the CLG meetings, however. In 2021, attendance at the quarterly meetings ranged from 87 to about 127 persons. In 2020, attendance ranged from 120 to about 175 attendees.

2.3 Governance

The CLGCC is the governing body that works closely with the ISO to identify issues of importance to the CLG membership, sets the agenda for CLG meetings, and generally guides the work of the CLG.[2]

The CLGCC consists of up to 12 members (six members and six alternates) with no more than four members from any one of the New England states. Specific membership requirements ensure that consumers (residential, commercial, and industrial) are represented from a majority of the New England states and that a range of consumer interests is considered when determining CLG priorities. The committee has at least one representative of residential ratepayers and one representative of commercial and industrial ratepayers, and members must be either a ratepayer (or directly represent ratepayers), a member of a consumer organization, or a government consumer or ratepayer advocate.

CLGCC members are selected by vote of the CLG at one of its quarterly meetings in an even-numbered calendar year and serve for a term of two years or until successors are selected. The Coordinating Committee annually designates a chairperson from its membership. The chairperson fills any vacancies on the committee with the approval of a majority of the remaining members. Current CLGCC members are listed on page 2. The ISO designates a point of contact within its External Affairs Department to support the CLGCC.

[2] The "CLG Purpose and Structure" document (December 29, 2009) fully explains CLG governance; see https://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/othr/clg/consum_lias_grp_gov/clg_structure_document_revised_12_29_09.pdf.

2.4 Information and Communications

ISO New England secures meeting space and funds CLG activities. A dedicated section of the ISO's website has been established for all CLG materials, communications, annual reports, and other valuable information.[3] This practice ensures that the body of information developed through the CLG is transparent, easily accessible, and available to all interested consumers and industry participants.

A glossary defining electricity market and power system terms is available on the ISO's website to assist CLG members in understanding frequently used electricity market or power system terms and acronyms.[4]

CLG participants are also encouraged to follow the ISO's online newsletter—the *ISO Newswire*—and subscribe to the mailing list to receive a monthly email highlighting some of the most recent articles.[5] Stakeholders also can follow the ISO on Twitter and LinkedIn.

Since 2012, ISO New England has provided a mobile app, *ISO to Go*, offering smartphone access to frequently viewed real-time data available on the ISO website and data portal, *ISO Express*.[6]

In October 2020, the ISO launched a new homepage, a new online document library, and a refreshed *ISO Newswire*. The ISO made these changes based on reviewing market participant feedback, monitoring frequently visited pages to gain a better understanding of how stakeholders use these pages, and studying the best practices of other data-driven websites. These updates built on changes made in 2018 when the ISO launched the latest version of the app, *ISO to Go 2.0,* with the following features:

- A map of pricing data, including day-ahead and real-time prices for each of the region's eight load zones
- Demand curves providing a simple visual of New England's actual consumer demand for electricity and how it tracks with the forecast
- An enhanced fuel-mix section detailing the energy sources powering New England at any given moment
- Customizable push notifications for users who want to be alerted when the power system is operating under abnormal or emergency conditions or when prices cross certain thresholds

In June 2021, the ISO added a new option to ISO Express that allows individuals to view actual, real-time grid demand coupled with estimated production from behind-the-meter resources. This new setting provides an estimate of the region's total electricity usage from both grid resources and more than 200,000 solar installations capable of producing over 4,000 megawatts for New England.[7]

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[3] ISO New England's Consumer Liaison Group webpage is available at http://www.iso-ne.com/committees/industry-collaborations/consumer-liaison.

[4] ISO New England's glossary of terms is available at http://www.iso-ne.com/participate/support/glossary-acronyms.

[5] The *ISO Newswire* is available at http://isonewswire.com/. To subscribe, send a blank email to isolist-isonewswire-subscribe@mail.iso-ne.com.

[6] *ISO to Go 2.0* is available at http://www.iso-ne.com/about/news-media/iso-to-go. The app is available free for the iPhone or iPad at the Apple App Store or for Android devices at Google Play. ISO Express is available at http://www.iso-ne.com/isoexpress/.

[7] ISO New England Inc. *Let the sunshine in: View regional energy usage—including behind-the-meter solar—through ISO Express* (June 22, 2021) https://isonewswire.com/2021/06/22/let-the-sunshine-in-view-regional-energy-usage-including-behind-the-meter-solar-through-iso-express/

In addition, ISO New England's annual *Regional Energy Outlook* is a valuable source of information on current trends and issues affecting the regional electric power grid.[8] Each month, ISO New England's External Affairs Department issues a memo that provides timely updates on regional energy issues, stakeholder meetings, and other information that may be of interest to consumers.[9] These memos are available on the External Affairs and CLG pages of the ISO website, along with presentations and speeches delivered by ISO technical experts and senior management.

Section 3
Consumer Liaison Group Meeting Summaries for 2021

In 2021, the Consumer Liaison Group (CLG) held quarterly meetings on issues of importance to electricity consumers in New England. The members of the CLG Coordinating Committee (CLGCC) selected the topics, special guest speakers, moderators, and panelists featured at these meetings.

The topics discussed in 2021 were wide-ranging, diverse, and featured issues relating to the effects of the Biden Administration's energy policy, privatization of the energy sector, consumer involvement in the regional energy grid, and the future of fossil fuel infrastructure, as follows:

- **March 12**: The Impact of the Biden Administration's Energy Policy on Energy Consumers

  Meeting location: Held via WebEx

- **June 17**: Does our Energy System Serve Consumers, or Energy Companies? Have We Privatized a Public Good?

  Meeting location: Held via WebEx

- **September 9**: How to be Heard: Consumers' Voice in the Regional Grid

  Meeting location: Held via WebEx

- **December 1**: No New Fossil Fuel Infrastructure? Decarbonizing While Maintaining Affordable, Reliable Energy

  Meeting location: Held via WebEx

The following summaries capture the general discussions that took place at CLG meetings in 2021. These summaries are posted to the CLG webpage shortly after each quarterly meeting. They are not intended to capture every discussion and do not necessarily reflect the views of the ISO or the CLGCC. Individual meeting summaries capture information that was current at the time of each meeting and may not reflect developments that have since transpired. Section 5 contains further information about the ISO New England updates presented at each meeting.

[8] ISO New England, *2020 Regional Electricity Outlook* (February 2020), https://www.iso-ne.com/static-assets/documents/2020/02/2020_reo.pdf.

[9] The ISO's "Government and Industry Affairs" webpage is available at https://www.iso-ne.com/about/government-industry-affairs.

3.1 March 11: The Impact of the Biden Administration's Energy Policy on Energy Consumers

Meeting Summary: Discuss the implications of the Biden Administration's Energy Policy on Energy Consumers in New England.

3.1.1 *Opening Remarks*
Rebecca Tepper, Chair, Consumer Liaison Group Coordinating Committee (CLGCC) and Chief, Energy and Environmental Bureau, Massachusetts Attorney General's Office, offered welcoming remarks and provided background on the Consumer Liaison Group (CLG) and the CLGCC. In addition, Tepper welcomed suggestions for topics that the CLG should cover in future meetings and welcomed feedback from participants on the event.

3.1.2 *ISO New England Update*
Anne George, ISO New England (ISO) Vice President of External Affairs and Corporate Communications, provided an update on recent and upcoming ISO publications as well as ongoing initiatives and compliance efforts underway at the ISO. Her presentation is posted on the CLG page of the ISO website.

George first discussed the recent release of the *2020 Report of the Consumer Liaison Group,* which includes a statement from the CLGCC, a summary of the CLG's 2020 activities, updates of the ISO's activities and initiatives, and information on 2020 wholesale and retail electricity costs across New England. In addition, she said that 2021 CLG meeting dates have been finalized and that future CLG meetings will be held via WebEx on June 17, September 9, and December 1.

Recently released reports, including an update to the New England Power Grid and New England State Profiles, were discussed. George noted that the upcoming 2021 Regional Energy Outlook (REO) is likely to be released in the coming weeks and that additional resources and materials are available on the ISO's CLG webpage and External Affairs webpage.

Initial details on Forward Capacity Auction 15 (FCA #15), which was held in February to procure capacity resources to meet demand and reserve requirements for June 1, 2024 to May 31, 2025, were presented. The auction concluded with sufficient resources to meet the installed capacity target of 33,270 MW. Clearing prices ranged from $2.47 to $3.98 per kilowatt-month (kW-mo.), up from $2/kW-mo. in FCA #14.

Overall FCA #15 procured 34,621 MW of capacity including:

- 29,243 MW of generation, including:
  - 50 MW of new generating resources and
  - Approximately 600 MW of battery resources.
- 3,891 MW of energy-efficiency and demand reduction measures, including 170 MW of new demand resources; and
- 1,487 MW of total imports from New York, Quebec, and New Brunswick.

Clearing prices in FCA #15, the first auction held without the Mystic Generation Station Units 8 & 9, ranged from $3.98/kW-mo. in the Southeast New England Zone to $2.61/kW-mo. in the Rest-of-Pool Zone, and $2.48/kW-mo. in the Northern New England and Maine "Nested" zones. While clearing prices increased from FCA #14 to FCA #15, George highlighted that overall estimated capacity market value ($1.4 billion) remains low compared to previous FCAs and indicates the region has sufficient resources in place to meet the region's needs.

George discussed the ISO's Interconnection Queue, which has shifted significantly over the past decade and is now dominated by clean energy resources including wind, solar, and battery storage resources which make up 62%, 18%, and 15% of the queue, respectively. A significant number of resources in the queue are driven by state policies.

Ongoing regional trends of increasing development of energy efficiency, solar, and wind were discussed. George highlighted the ISO's solar and energy efficiency forecasting efforts and stated that 2021 forecasts will be released later in the spring. In addition, she noted that the annual ISO forecast now includes forecasts for electric vehicle adoption and heating electrification.

George briefly discussed numerous large-scale transmission projects, proposed under the elective transmission upgrade (ETU) provisions of the ISO's tariff, to deliver clean energy to load center across the region. Similar to other clean energy resources, these projects are largely driven by state policy goals.

An update of the ISO's ongoing efforts to support the New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid, which was released in October 2020, was presented. George explained that the ISO has participated in three technical conferences held during the first few months of 2021 to discuss the Wholesale Electricity Markets, Transmission Planning, and the ISO's Governance and Engagement with the States.

George also highlighted the ISO's recently updated Vision Statement, which commits the ISO to working with the region to achieve a clean, reliable grid. George provided an update on the ISO's New England Future Grid Initiative, including the Future Grid Reliability Study (FGRS) and Pathways to the Future Grid (Pathways) discussions. She stated that Phase I of the FGRS will be submitted to the ISO as a 2021 Economic Study request, while two market design concepts evaluated in the Pathways discussion, the Forward Clean Energy Market and Net Carbon Pricing, will be further evaluated. George also discussed a number of ongoing planning studies that will provide information about how to achieve the regions goals.

George also discussed the future of the Minimum Offer Price Rule (MOPR) in the region's capacity market. She acknowledged that FERC, at the direction of new Chairman Richard Glick, has indicated a desire to revisit the MOPR. Further, she indicated that the ISO would participate in the upcoming FERC technical conference on Resource Adequacy, currently scheduled for March 23. Moreover, she indicated that if the FGRS or FERC did not resolve the MOPR issue moving forward, additional analysis and stakeholder discussion would be required to address the issue.

Lastly, George briefly touched on the ISO's ongoing FERC Order 2222 compliance efforts. (*On March 22, the ISO informed stakeholders of its intention to seek an extension of the compliance filing deadline until February 2022.)*

During and directly following George's presentation, George fielded several questions related to the participation of energy efficiency and solar in the FCA, recent extreme weather events and power outages in Texas, the ISO's Energy Security Initiative (ESI), the ISO's solar forecast, and the MOPR.

3.1.3 *Panel Discussion*
Eric Annes, CLG Coordinating Committee Member, moderated a panel of energy leaders to discuss the implications of the Biden Administration's Energy Policy for Consumers.

Panelists included: **David Cash**, Dean and Associate Professor, John W. McCormack School of Policy and Global Studies; **David Springe**, Executive Director, National Association of State Utility Consumer Advocates (NASUCA); and, **Christina Simeone**, Senior Fellow, Kleinman Center for Energy Policy, University of Pennsylvania.

A recording of the meeting is available on the CLG page on the ISO website.

David Cash provided a high-level overview of the New England energy situation, including putting a spotlight on the region's reliance on natural gas for electricity generation.

Cash then highlighted what he said will be the consequences of the status quo on energy consumers, including: continued volatility associated with fossil fuel use; payment of subsidies to the fossil fuel industry; lack of action on addressing environmental externalities; lack of involvement/input from Environmental

Justice (EJ) communities; lack of investment in innovation; and costs due to climate related and extreme weather events.

Cash provided an overview of the Biden-Harris administration's energy agenda. He said that the administration was taking an all-of-government approach to climate change. In addition, he highlighted the administration's stated commitment to a 100% carbon-free electricity sector, a net-zero emissions target, increased EV adoption, increased utilization of union labor and American-made goods, and engagement with EJ communities and others to ensure that the transition to the future energy system is just.

Cash closed by discussing the rapid and continuing decrease in the price of renewables and pointed to continued wind and solar development in "red" and "blue" states. He also discussed the numerous benefits the Biden administration's energy policy could have across the economy and advocated for continued engagement with EJ communities in regional energy decisions.

David Springe opened his statements by providing an overview of NASCUA and acknowledging the association's members from the six New England states. Springe then discussed some of the cost considerations associated with elements of the Biden Administration's policy priorities, such as EV adoption and its associated costs for the distribution and transmission systems.

Springe discussed a lack of consideration of social and environmental justice issues in energy policy to date and welcomed the opportunity to engage on these issues. Further, he questioned how the Biden administration plans to simultaneously eliminate fossil plants while maintaining reliability on the grid. He highlighted increasing costs to consumers associated with needed investment in cyber security and increased visibility of the distribution system by bulk system operators.

Springe mentioned the administration's desire to increase investment in and the development of transmission to move renewables to load centers and increase the reliability of the nation's electricity system. He discussed the current challenges associated with developing transmission projects. Further, he discussed the potential positives and negatives associated with increased federalization of transmission development across the country. Specifically, Springe said he believed that federalization could resolve some permitting challenges; however, federal processes can be hard for consumers to participate in and may reduce overall stakeholder engagement.

Springe closed by discussing ongoing work at NASUCA to develop guidelines to ensure RTO and ISO are independent, transparent, fair, and cost-effective to/for consumers. He also expressed interest in FERC's Office of Public Participation, which was authorized in 1978 but is just now being created.

Christina Simeone began her presentation by discussing what ISO/RTO governance provisions are and highlighting why ISO/RTO governance is an issue consumers should care about. Further, Simeone stated her belief that ISO/RTO governance is ripe for reform across the nation.

Simeone discussed the voting process and participant composition in various ISO/RTO decision-making processes. Simeone also discussed several landmark FERC Orders, including Order 888, Order 719, and Order 2222. She also stated that despite rapid, transformative changes in the electricity industry many rules/regulations have remained the same.

Simeone highlighted some of her concerns regarding the stakeholder process, including low member participation, structural bias, lack of transparency, administrative bias, and issue prioritization at various ISOs and RTOs.

Simeone closed by stating that she believes there is a need to expand the principles of fairness and representation to all stakeholders, not just market participants. In addition, she stated the FERC process must become more responsive to consumers and other "new" stakeholders.

A brief question and answer period followed the panelist's remarks. Panelists discussed questions on the ISO's governance, addressing project-development challenges such as siting, and potential stress on the distribution system associated with increased EV adoption.

Closing remarks
Rebecca Tepper offered closing remarks. She thanked the panelists for their participation, encouraged attendees to fill out the online survey that they would receive via email, and encouraged attendees to take part in the next CLG meeting, scheduled for June 17.

3.2 June 17: Does Our Energy System Serve Consumers, or Energy Companies? Have We Privatized a Public Good?

Meeting objective: Discuss the privatization of the New England energy system and how it has affected consumers.

3.2.1 *Opening Remarks*

Rebecca Tepper, Chair, Consumer Liaison Group Coordinating Committee (CLGCC) and Chief, Energy and Environmental Bureau, Massachusetts Attorney General's Office, offered welcoming remarks and provided background on the Consumer Liaison Group (CLG) and Consumer Liaison Group Coordinating Committee (CLGCC). In addition, Tepper welcomed suggestion for topics that the CLG should cover in future meetings and welcomed feedback from participants on the event.

In closing, Tepper encouraged attendees to follow the CLG on Twitter, to submit possible topics for future meetings, and to provide feedback to the CLGCC by filling out the post-meeting surveys.

3.2.2 *ISO New England Update*

Anne George, ISO New England (ISO) Vice President of External Affairs and Corporate Communications, provided an update on recent publications and ongoing initiatives and compliance efforts underway at the ISO. Her presentation is posted on the CLG page of the ISO website.

George began her update by highlighting the dates of the remaining 2021 CLG meetings; September 9 and December 1. She also discussed the 2021 Regional System Plan Public Meeting that is scheduled to be held virtually on October 6.

The ISO New England Internal Market Monitor's (IMM) 2020 Annual Markets Report (AMR), released on June 9, was then discussed. The AMR assesses the state of competition in the whole electricity markets administered by the ISO. George noted several highlights of the 2020 AMR including a 17% decrease (or $1.7 billion) in the total cost of wholesale electricity compared to 2019. She stated that this decrease was driven by a 27% decrease in energy market costs and 22% decrease in capacity market costs. She also noted that transmission costs were the only component of wholesale costs that increased ($0.2 billion) in 2020.

Key takeaways from ISO New England's summer outlook were also presented. George noted that the ISO has sufficient capacity (more than 31,000 MW) to meet a peak demand of 24,810 MW expected under typical summer weather and 26,711 MW expected under above-average weather. In addition, she noted that energy efficiency (EE) measures and behind-the-meter solar are forecasted to reduce the 2021 summer peaks by 2,600 MW and 800 MW, respectively.

Recent Federal Energy Regulatory Commission (FERC) technical conferences on electrification, grid modernization, reliability challenges posed climate change and extreme weather, and resource adequacy

were also discussed. George discussed the ISO's participation and testimony in these conferences. She also highlighted the ISO's commitment to filing tariff changes to eliminate the Minimum Offer Price Rule (MOPR) and run Forward Capacity Auction #17 without the MOPR.

George then discussed the 2021 Capacity, Energy, Loads, and Transmission (CELT) Report that was released on May 1. The CELT is the primary source for assumptions used in ISO system planning studies. George highlighted that overall electricity use is expected to increase 1.1% annually through 2030. Further, she noted that summer peak demand is forecasted to remain flat while winter peak is expected to increase 0.8% annually. George also noted the Heating and Transportation Electrification, and Solar PV Forecasts that are included in the 2021 CELT.

Several of the future planning studies and interconnection processes that are currently underway were also discussed. George discussed the First Cape Cod Resource Integration Study (CCRIS). The First CCRIS is intended to help facilitate the interconnection of an additional 1200 MW of offshore wind over and above the 1600 MW of generation with completed System Impact Studies (SIS). She also noted that the ISO has initiated a Second CCRIS in order to identify transmission upgrades needed to facilitate the interconnection of the remaining offshore wind generation in the ISO's interconnection queue.

George discussed: the ISO's progress in the Future Grid Reliability Study Phase 1, which was accepted as the 2021 Economic Study; the Pathways Evaluations; 2050 Transmission Study; and FERC Order 2222 compliance efforts. Lastly, she discussed work the ISO has recently initiated to remove the MOPR from the FCA going forward and future efforts to determine resource contributions to resource adequacy.

3.2.3 *Panel Discussion*
Mary Smith, CLG Coordinating Committee Member, moderated a panel of energy leaders to discuss "Does Our Energy System Serve Consumers, or Energy Companies? Have We Privatized a Public Good?"

Panelists included: **Dan Dolan**, President, New England Power Generators Association (NEPGA); **Pete Fuller**, Principal, Autumn Lane Energy Consulting, LLC; and **Erin Camp**, PhD, Senior Associate, Synapse Energy Economics, Inc.

A recording of the meeting can be found on the CLG page on the ISO website.

Dan Dolan provided an overview of NEPGA and expressed the organization's support for fair, open wholesale markets. Dolan also discussed recent trends in energy, capacity, and transmission costs. He highlighted that transmission rates have increased significantly since 2004. Dolan also provided a comparison of ratepayer bills across New England.

Dolan also highlighted emissions reductions in the electricity sector over the last two decades and the significant shift in resources providing electricity. Finally, Dolan highlighted the increasing quantity of contracted energy procured through state solicitations and expressed a need to understand the implications of these contracts.

Pete Fuller discussed the beginning of the electric utility industry and establishment of the "regulatory compact." Fuller also discussed the introduction of competition into the generation and retail sectors of the electricity industry in the mid-1990s. He also discussed the benefits he believed markets have provided to consumers. Finally, Fuller discussed a need to draw on the lessons of deregulation and create opportunities for private capital to utilize different business models to facilitate decarbonization, decentralization, and electrification.

Erin Camp began her discussion by comparing and contrasting the desires/objectives of consumers versus electricity companies. Camp also discussed the proportion of votes allocated to consumers and producers of energy and the implications of this allocation. Further, she discussed the barriers to entry for nonprofessionals who want to participate in the regulatory process. Finally, Camp highlighted the growing cost of transmission in the region and highlighted trends in energy, capacity, and transmission costs.

Closing remarks
Mary Smith offered closing remarks. She thanked the panelists for their participation, encouraged attendees to fill out the online survey that they would receive via email, and encouraged attendees to take part in the next CLG meeting, scheduled for September 9.

3.3 September 17: How to Be Heard: Consumers' Voice in the Regional Grid

Meeting objective: Discuss how consumers can make their voices heard in the regional grid.

3.3.1 *Opening Remarks*
Margaret Sullivan, Assistant Attorney General, Energy and Telecommunications Division, Massachusetts Attorney General's Office, offered welcoming remarks and provided background on the Consumer Liaison Group (CLG) and Consumer Liaison Group Coordinating Committee (CLGCC). In addition, Sullivan welcomed suggestion for topics that the CLG should cover in future meetings and welcomed feedback from participants on the event.

3.3.2 *ISO New England Update*
Anne George, ISO New England (ISO) Vice President of External Affairs and Corporate Communications, provided an update on recent publications and ongoing initiatives and compliance efforts underway at the ISO. Her presentation is posted on the CLG page of the ISO website.

George shared a variety of resources with the CLG, including a reminder of upcoming events such as the 2021 Regional System Plan public meeting (via WebEx) on October 6 and the final CLG quarterly meeting on December 1. She also described a new feature on the ISO's mobile app, ISO Express, which allows for the estimation of real-time, behind-the-meter solar production.

The ISO update highlighted the performance of the electric grid so far this summer, explaining that the ISO initiated three precautionary alerts: one from July 8 to July 9 because of anticipated severe weather; one from August 20 to August 23 ahead of Tropical Storm Henri; and one on August 25 because hot, humid weather during peak demand periods. However, the update noted that there have been no emergency actions taken this summer.

The ISO update also highlighted that the ISO's Mission is to plan the transmission system, administer the region's wholesale markets, and operate the power system to ensure reliable and competitively priced wholesale electricity. Further, the ISO's Vision is to harness the power of competition and advanced technologies to reliably plan and operate the grid as the region transitions to clean energy.

The Mission and Vision are important elements that the ISO considers in building its annual budget, which was also detailed in the update. The ISO's proposed capital budget for 2022 is projected to be $32 million, up by $4 million, or 14.3%, from the 2021 capital budget. The proposed operating budget for 2022 is projected to be $189 million, which is $10.6 million, or 5.9% higher, than the 2021 operating budget. The update highlighted that the Revenue Requirement for 2022 is projected to be $215.1 million. In addition, the update noted that if the ISO's projected Revenue Requirement for 2022 was fully passed through to end-use customers, their cost would average $1.12 per month (based on average consumption).

The update also discussed the next steps for the budget approval process including: an opportunity for the New England states to submit questions and comments; the ISO's Board of Directors' review of the proposed budget and stakeholder feedback in September; the ISO's Board of Directors' October vote on the proposed budget; and the ISO's planned mid-October filing with FERC in which the ISO will request approval by January 1, 2022.

The ISO also provided a number of updates on the studies undertaken as part of the Transition to the Future Grid project, including the Future Grid Reliability Study Phase I (FRGS) and the Pathways Evaluations. The ISO noted that initial results of the FGRS were presented during recent Planning Advisory Group meetings.

Further, the update provided information on ongoing efforts to comply with FERC Order 2222 (*Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators)*. The update noted that the ISO is working with stakeholders to identify an implementation timetable and that the ISO presented its revised compliance proposal in May. Moreover, the update highlighted that the compliance filing deadline for the order is February 2, 2022, and that stakeholders can track all Order 2222 developments on the ISO webpage devoted to the project.

The update also featured details of the ISO's efforts to remove the Minimum Offer Price Rule, or MOPR, from the region's capacity market. The update noted that ISO's External Market Monitor has begun analyses regarding the potential effects of removing the MOPR. In addition, the ISO and stakeholders began discussions about post-MOPR competitive capacity markets. The project began after FERC indicated that addressing MOPR is one of its top priorities. Together with the New England states and NEPOOL stakeholders, the ISO has begun work to make a filing to eliminate the MOPR in time for the Forward Capacity Auction (FCA) #17 in February 2023.

Lastly, the ISO updated the group on preparations for FCA #16, which is scheduled to take place in February 2022 to procure the capacity resources needed during the 2024–2025 capacity commitment period.

Retirement de-list bids for FCA #16 were due in mid-March 2021, and the ISO received an aggregate of 996 MW of resources that may leave the capacity market or all of the ISO's markets. The resources are located throughout the region, and upon review it was determined that none of their retirements would trigger a reliability need.

ISO New England has a process for determining the number and boundaries of capacity zones over time as conditions change in the region, and has identified four capacity zones for FCA #16: the Northern New England Capacity Zone, which is export-constrained; Maine's "Nested" Capacity Zone, which is also export-constrained; the Southeast New England Capacity Zone, which is import-constrained; and the Rest-of-Pool Capacity Zone.

Regarding next steps, the NEPOOL Reliability Committee will vote in September on the ISO's zonal determinations and projected capacity need for the region, as well as other auction-related values. Then, in October, the NEPOOL Participants Committee will vote on the ISO's determinations and calculations, and in November, the ISO will submit a pre-FCA information filing with FERC.

A short question and answer period followed the ISO's presentation. Anne George answered questions regarding proposed facility retirements, system costs, and the ISO/NEPOOL relationship.

3.3.3 *Panel Discussion*

Hank Webster, a CLGCC Member representing Rhode Island, moderated a panel discussion titled, "How to Be Heard: Consumers' Voice in the Regional Grid."

Panelists were: **Tyson Slocum,** Director, Energy Program, Public Citizen; **Jolette Westbrook**, Director and Senior Attorney, Energy Markets & Regulation, Environmental Defense Fund; and **Rebecca Tepper**, Chair, Consumer Liaison Group Coordinating Committee, Chief, Energy and Environment Bureau, Massachusetts Attorney General's Office.

The panelists discussed a number of topics including the NEPOOL voting process, the role of consumer/ratepayer advocates, and public interest entities in other ISO/RTO.

Further, the group discussed their perspectives on the need for transparency, governance reforms, and accountability at the ISO. The panelists also discussed ways to engage with and educate the public, how to ensure affected stakeholders are involved in the decision-making processes, and how to ensure public interest groups have sufficient financial resources to participate in the process. Lastly, the panelists discussed

the need for urgency in addressing climate change and regional and federal initiatives related to energy and climate.

The panel fielded questions from the audience on a range of issues, including interveners and consumer advocates in other ISO/RTOs, the NEPOOL voting process, integrated system planning, cost transparency, and transportation emissions.

The panel did not include slide presentations; however, a recording of the panelist discussion can be found on the CLG page on the ISO website.

Closing remarks
Margaret Sullivan offered closing remarks. She thanked the panelists, attendees, and ISO staff for their participation in the event. In addition, Sullivan encouraged attendees to fill out the online survey they would receive via email and encouraged attendees to take part in the next CLG meeting, scheduled for December 1.

3.4 December 1: No New Fossil Fuel Infrastructure? Decarbonizing While Maintaining Affordable, Reliable Energy

Meeting objective: Discuss the future of fossil fuel infrastructure in the region and how decarbonization can be achieved while maintaining affordability and reliability.

3.4.1 *Opening Remarks*

Margaret Sullivan, Assistant Attorney General, Energy and Telecommunications Division, Massachusetts Attorney General's Office, offered welcoming remarks and provided background on the Consumer Liaison Group (CLG) and Consumer Liaison Group Coordinating Committee (CLGCC). In addition, Sullivan welcomed suggestions for topics that the CLG should cover in future meetings and welcomed feedback from participants on the event.

3.4.2 *ISO New England Update*

Anne George, ISO New England (ISO) Vice President of External Affairs and Corporate Communications, provided an update on recent publications, ongoing initiatives, and compliance efforts underway at the ISO. Her presentation is posted on the CLG page of the ISO website.

George shared a variety of resources with the CLG, including updates on the ISO's budget filed with FERC on October 15, the 2021 Regional System Plan finalized in November, and a recent presentation highlighting the ISO's response to the New England States' Vision Statement and Advancing the Vision report. She also noted the ongoing op-ed series by ISO New England CEO Gordon van Welie that is being published in *CommonWealth* Magazine.

George offered some key takeaways ahead of the upcoming winter: heightened concerns due to sharp increases in global energy demand and supply chain contraction; large, fuel-secure resources continue to retire while new resources are delayed; weather continues to be a key factor in winter reliability; and, liquefied natural gas (LNG) imports remain critical to New England during cold weather.

In addition, George provided an overview of historic and anticipated winter peak demand in New England and a summary of the ISO's high-level assessment of what the region can expect if this winter is similar to previous winters. George detailed a number of efforts the ISO has undertaken to plan for winter peak demand. She explained some of the operating procedures the ISO can rely on to prepare for, and respond to, potential issues on the grid.

The ISO update also highlighted the preparations for — and filings made related to — the upcoming Forward Capacity Auction #16 (FCA #16). FCA #16 is scheduled to take place in February 2022 and will procure

resources needed to meet reliability requirements during the June 1, 2025 to May 31, 2026 capacity commitment period.

Key elements of the ISO's pre-FCA informational filing were also discussed. George noted that four capacity zones will be modeled in FCA#16 and that the installed capacity requirement will be 31,645 MW. She explained that the ISO has qualified 33,356 MW of existing capacity and 5,246 MW of new capacity to participate in the auction. She also said that the ISO qualified 15 demand bids, totaling 994 MW, and 193 supply offers, totaling 779 MW, to participate in the substitution auction under the Competitive Auctions with Sponsored Policy Resources (CASPR) framework.

The update also provided a brief overview of historic market costs and projected wholesale market costs for 2021.

The 2022 CLG meetings are scheduled for March 10, June 9, September 16, and November 30, with locations still to be determined.

A short question and answer period followed the ISO's presentation. George answered questions regarding project wholesale electricity costs and Winter 2021-2022 peak demand.

3.4.3 *Keynote Address*
Rebecca Tepper, Chair of the Consumer Liaison Group Coordinating Committee (CLGCC), introduced the keynote speaker, **Allison Clements**, a Commissioner of the Federal Energy Regulatory Commission.

Commissioner Clements opened her remarks by discussing a number of the challenges that FERC considers on a daily basis, including reliability and resiliency; cybersecurity; the effects of climate change and extreme weather on the grid; the evolving resource mix; winter reliability; integrating state policy and state policy resources into the wholesale markets; transmission planning and development; and state and federal coordination.

Commissioner Clements discussed the need to reform the Minimum Offer Price Rule (MOPR) to allow state resources to participate in wholesale electricity markets and contribute to reliability and resiliency. She also commented on the ongoing evolution of markets across ISO/RTOs.

The Commissioner spoke about FERC's role in transmission planning, cost allocation, and ensuring cost-effectiveness for ratepayers. She highlighted stakeholder discussions related to the interconnection of resources, the development of effective oversight of transmission spending, and the maximization of consumer benefits from energy investments. The Commissioner complimented New England on its efforts to address these issues in a proactive manner.

Lastly, Commissioner Clements spoke about the newly created Office of Public Participation (OPP) at FERC and the need for greater consideration of equity in our energy system. Clements was encouraged by the efforts of the OPP to date and the role it will play in advancing public participation moving forward.

A short question and answer period followed. The Commissioner answered questions regarding low-income consumers, FERC's role in transmission development, energy efficiency, and stakeholder engagement and education.

3.4.4 *Panel Discussion*
Robert Rio, a CLGCC Member representing Massachusetts, moderated a panel discussion titled, "No New Fossil Fuel Infrastructure? Decarbonizing While Maintaining Affordable, Reliable Energy."

Panelists were: **Robert Ethier**, Vice President, System Planning, ISO New England;
Liz Delaney, Senior Director, Wholesale Market Development, Borrego; **Michael Giaimo**, Regional Director,

Northeast Region, American Petroleum Institute; **Dale Bryk**, Director of State & Regional Policies, Harvard Environmental & Energy Law Program.

The panelists' presentations are available on the CLG page of the ISO's website.

Robert Ethier said that ISO New England is planning for a future grid with increased loads due to the electrification of heating and transportation, and increased dependence on renewable and battery storage resources. He explained that the ISO has a range of studies underway to evaluate the anticipated effects of this transition, looking as far as 30 years into the future. Ethier said the results could influence market design, transmission needs assessments, transmission build decisions, and resiliency efforts. He provided an overview of several studies, including those exploring the impacts of extreme weather events; the transmission needed to support renewable/high load future; the operational effects of a renewable-heavy grid; and the different market options to support a renewable grid.

Liz Delaney explained that the cost of building renewable energy projects has dropped so much that it is cost-competitive with existing generation. She said, while renewables alone will not meet all of our future reliability needs, they will be the primary workhorses for the energy transition. Also, while New England has seen significant investment in solar, the region lags other areas of the other country in terms of renewable generation. She praised the ability of batteries to ramp up and down to meet the fluctuations of demand and to contribute to resource adequacy. She said an electric grid with high levels of renewables will be reliable as long as it is understood and prepared for. She said New England is at the beginning of a very long push to build renewable resources in a region where siting resources has historically been challenging. She said we likely do not need additional fossil fuel infrastructure.

Michael Giaimo said there are three expectations that people have for the regional electric system: affordability, reliability, and clean, renewable resources. He encouraged people not to lose sight of how well the region's electricity system has evolved, in that the generation fleet is much cleaner, wholesale electricity costs have been relatively low, and the grid has performed reliably through a variety of challenging conditions, including the Northeast Blackout of 2003. He discussed the increasing role natural gas plays in the region's electricity mix and energy costs. He said that the region needs to be careful not to allow older generating units to retire until new ones are built to replace them, and that siting and permitting new electricity infrastructure is very difficult in New England.

Dale Bryk discussed the risk-management aspects of continuing to provide safe, affordable, reliable electricity while transitioning to a renewable energy grid. She discussed the need to make a plan for a just and orderly transition, explaining that there is a risk that there may be stranded costs associated with fossil-fuel infrastructure and that stakeholders need to plan for that eventuality. Further, Bryk stated that low-income customers should not be left to pay for those costs. She highlighted the need to increase investments in energy efficiency so that increased electrification in the building and transportation sectors does not needlessly increase demand for electricity. She also said that policymakers should spend pending federal infrastructure money in transformative ways.

Closing remarks

Rebecca Tepper offered closing remarks thanking the panelists, attendees, and ISO staff for their participation in the event. She also encouraged attendees to fill out the online survey they would receive via email.

Section 4
Consumer Liaison Group Future Initiatives

ISO New England, working with Consumer Liaison Group (CLG) members and the CLG Coordinating Committee (CLGCC), will continue to conduct outreach in the states to inform consumers and consumer advocates of the existence, role, and information provided by the CLG.

Additionally, the CLGCC will continue striving to attract more end-user participation, to increase participation from all New England states, and to increase consumers' presence in ISO New England stakeholder discussions and initiatives. The CLGCC will also explore more ways to educate end users about industry institutions, such as New England Power Pool (NEPOOL) and FERC (Federal Energy Regulatory Commission), and about how consumers can advocate before industry institutions, government bodies, and elected officials.

Efforts will pinpoint and explain to end users the basic policy dilemmas and choices currently facing the energy industry, the public, and government.

To identify and select topics of interest to address at future CLG meetings for fully engaging consumers and consumer advocates, the members of the CLGCC meet at least quarterly, around the time of the CLG meetings. In particular, the CLGCC attempts to identify market or policy issues likely to have a direct impact on consumers. The objective is to provide information and perspectives on a topic that consumers and consumer advocates may not otherwise acquire in the course of their other professional responsibilities.

Typically, the locations of the CLG quarterly meetings rotate among the New England states, and Coordinating Committee members from the host state typically recommend people who might deliver the keynote address and others who might contribute to the panel discussion. The remaining CLGCC members provide additional assistance and approvals, when necessary. Before the CLG meeting, confirmed panelists participate in a planning call with the panel moderator (a CLGCC member) and ISO New England to plan for a robust, diverse, and well-organized discussion. While meetings went virtual in 2020, the CLGCC planned the June and September meetings as if Connecticut and Rhode Island hosted. CLGCC members from the host states served as moderators and attempted to focus discussions on the interests of Connecticut and Rhode Island.

When choosing a topic for discussion, the CLGCC relies on conversations with and recommendations from the CLG membership, as well as the participant survey conducted after each quarterly CLG meeting. The CLGCC encourages all interested participants to recommend potential topics, via either the participant survey or direct communication with the CLGCC.

Section 5
ISO New England Activities and Initiatives

This section highlights the major topics presented by the ISO at Consumer Liaison Group (CLG) meetings in 2021. In addition to these presentations, the ISO's External Affairs Department issues a memo each month that provides timely updates on regional energy issues, stakeholder meetings, and other information that may be relevant to consumers.[10]

[10] The monthly memos are posted to the ISO's CLG webpage at http://www.iso-ne.com/committees/industry-collaborations/consumer-liaison.

5.1 Transition to the Future Grid

New England is unquestionably on a path to a clean-energy future. Over the past twenty years, competitive wholesale electricity markets, combined with state emission-reduction regulations and policies, have driven the retirement of approximately 7,000 MW of older, less-efficient power plants and fostered the development of more than 12,000 MW of newer and cleaner resources.[11,12] Going forward, the states are expanding their energy and environmental laws to reduce carbon emissions across the economy, which will set in motion extensive electrification of the transportation and heating sectors.

In recognition of the move toward a clean energy future, ISO New England's Board of Directors adopted a new vision for the company in December of 2020. The ISO's stated vision is: "To harness the power of competition and advanced technologies to reliably plan and operate the grid as the region transitions to clean energy" (ISO Vision). [13] The ISO views the statement as complementary to its mission, which is to plan the transmission system, administer the region's wholesale markets, and operate the power system to ensure reliable and competitively priced wholesale electricity.

The ISO has been engaging with market participants and state entities to assess the future of the regional power system and explore potential pathways for ensuring a reliable, efficient, and sustainable clean-energy grid. These efforts are expected to continue through 2022.[14,15]

5.1.1 *Future Grid Reliability Study*

The Future Grid Reliability Study (FGRS) is a stakeholder-led assessment of the potential future state of New England's power system. The purpose of the study is to better understand the implications of the substantially changed future grid. The study examines whether revenues from the existing markets will be sufficient to attract and retain the new and existing resources needed to continue to operate the system reliably, to determine what operational and reliability challenges will need to be addressed in the future grid, and to identify possible ways to meet those needs.

The work of this study includes the following tasks:

- Defining scenarios
- Studying whether the ISO can operate the grid reliably under current market mechanisms
- Considering what products and attributes are missing (through gap analysis)
- Discussing what market changes could be developed in response to any identified gaps in reliability or resource needs

Throughout 2020 and 2021, stakeholders developed a framework and spreadsheet of specific assumptions to be used in the study scenarios, and at the request of NEPOOL, the Future Grid Reliability Study – Phase 1 was

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[11] ISO New England, *2021 Regional Electricity Outlook* (March 2021), https://www.iso-ne.com/static-assets/documents/2021/03/2021_reo.pdf.

[12] ISO New England, "Markets," webpage (2021) https://www.iso-ne.com/about/key-stats/markets.

[13] ISO New England, "About Us > What We Do." Webpage (2022) https://www.iso-ne.com/about/what-we-do

[14] Information about this key project is posted to the ISO's Future Grid Initiative webpage: https://www.iso-ne.com/committees/key-projects/new-englands-future-grid-initiative-key-project/.

[15] The ISO posted an update on the Future Grid Initiative on February 25, 2021 on the *ISO Newswire*. See ISO New England, "New England Future Grid Initiative: February 2021 Update," *ISO Newswire* article (February 25, 2021), https://isonewswire.com/2021/02/25/new-england-future-grid-initiative-february-2021-update/.

accepted as the ISO's 2021 Economic Study. [16],[17],[18],[19] Further, beginning in June and throughout 2021, the ISO began providing preliminary results of various elements of the study, including production cost modeling, ancillary services analysis, resource adequacy screening, probabilistic resource availability analysis, and high level transmission analysis.[20]

The ISO has presented the key findings and results of the Future Grid Reliability Study – Phase 1 for stakeholder comment and plans to issue the final study in 2022.

5.1.2 *Pathways to the Future Grid*

Stakeholder discussion in the Pathways to the Future Grid study (Pathways Study), which includes regional identification, exploration, and evaluation of potential market frameworks that may help support the evolution of the power grid, continued throughout 2021.

At the NEPOOL PC meeting on January 7, Dr. Frank Felder discussed a report he was commissioned to write that evaluated the various pathways the region could take with a particular focus on the following two questions: 1) whether, and to what extent, a particular pathway would support (or help to advance) the clean energy policies of New England states; and, 2) whether and to what extent pathways garner efficiency of regional markets.[21]

Building on that report, the ISO, with the collaboration of stakeholders and ISO's consultant, Analysis Group, has undertaken a study to simultaneously evaluate three market-based approaches that may support the evolution of the power grid. Several stakeholder working sessions were held throughout 2021 to review the scope of the analysis and the inputs and assumptions that will underpin the evaluation.

The market-based approaches being considered in the Pathways Study include:

- A Forward Clean Energy Market (FCEM)/Integrated Clean Capacity Market (ICCM) that would procure clean energy certificates (CECs) in quantities sufficient to meet state policy goals three years in advance;
- A net carbon pricing regime in which the cost of carbon would be included in wholesale market prices and emissions fees would be rebated to end users to mitigate cost impacts; and
- A hybrid model, where both the FCEM/ICEM and Net Carbon Pricing are implemented for new and existing resources, respectively.

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[16] NEPOOL Future Grid Reliability Study, Study Framework for Phase 1 Economic Study Request (March 12, 2021) https://www.iso-ne.com/static-assets/documents/2021/03/a02_2021_03_31_framework_document_reflecting_consensus_following_meeting.docx

[17] Future Grid Reliability Study Phase 1 Assumptions (March 31, 2021) https://www.iso-ne.com/static-assets/documents/2021/03/assumptions_3_31_21.xlsx

[18] *2021 Economic Study: Future Grid Reliability Study Phase 1 Overview of Assumptions – Part 1*, Presentation, (April 14, 2021) https://www.iso-ne.com/static-assets/documents/2021/04/a8_2021_economic_study_request_assumptions_phase_1_part_1.pdf

[19] NEPOOL Request for 2021 Economic Study (Future Grid Reliability Study- Phase 1) (March 12, 2021) https://www.iso-ne.com/static-assets/documents/2021/03/nepool_memo_for_2021_economic_study_request_3_12_21.DOCX

[20] Economic Studies, webpage, (November 11, 2021), https://www.iso-ne.com/system-planning/system-plans-studies/economic-studies/

[21] Frank A. Felder, *NEPOOL's Pathways to the Future Grid Process Project Report* (January 6, 2021), https://www.iso-ne.com/static-assets/documents/2021/01/npc_20210107_felder_report_on_pathways.pdf.

Beginning in October of 2021, the ISO and its consultant, Analysis Group, began presenting initial sets of results from the Pathways evaluation for stakeholder review.[22] These results included initial findings of base cases and reviews of additional sensitivities that will be run. The ISO and Analysis Group issued a draft report in February 2022 for stakeholder review.[23]

5.1.3 *2050 Transmission Study*

In response to the recommendations outlined in the New England States' Energy Vision,[24] the ISO is conducting a high-level transmission study for the years 2035, 2040, and 2050. The study's goal is to inform the region about the amount, type, and high-level cost estimates of transmission infrastructure that would be necessary to cost-effectively incorporate clean-energy and distributed-energy resources and to meet state energy policy requirements and goals, including economy-wide decarbonization.

The ISO began stakeholder discussions of the objectives, preliminary assumptions, and methodology for the 2050 Transmission Study in November 2021.[25] Further, through the fourth quarter of 2021, the ISO consulted with NESCOE to consider feedback received at the Planning Advisory Committee and finalize the study's scope of work. The ISO will be discussing initial results of the 2050 Transmission Study with stakeholders at the Planning Advisory Committee in early 2022.

5.1.3.1 *Extended-Term Transmission Planning*

The ISO is implementing changes to Attachment K of the Tariff that will create a process to allow the New England states to request, on a recurring basis, that the ISO perform extended-term planning analyses on the system beyond the current 10-year planning horizon. [26] The ISO filed its proposed changes with FERC on December 27, 2021, with a requested effective date of February 25, 2022.[27]

On February 25, 2022, FERC issued an Order accepting the ISO's proposed tariff changes.

Beginning in 2022, the ISO also expects to discuss with stakeholders a second phase of long-term planning Tariff changes. The second phase would address the rules to enable a state or states to elect potential options for addressing the transmission analysis' identified issues and cost allocation for the associated transmission infrastructure.[28]

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[22] NEPOOL Participants Committee Working Session Composite Materials, (November 11, 2021) https://www.iso-ne.com/static-assets/documents/2021/10/npc-fg-20211025-composite3.pdf

[23] Analysis Group Inc., *Pathways Study, Evaluation of Pathways to a Future Grid (Draft)* (March 1, 2022) https://www.iso-ne.com/static-assets/documents/2022/02/pathways-study-report.pdf

[24] New England States Vision Statement, Correspondence, (October 16, 2020) https://nescoe.com/resource-center/vision-stmt-oct2020/

[25] 2050 Transmission Study: Preliminary Assumptions and Methodology for the 2050 Transmission Study Scope of Work, Presentation, (November 17, 2021) https://www.iso-ne.com/static-assets/documents/2021/11/a6_2050_transmission_study_preliminary_assumptions_and_methodology_for_the_2050_transmisssion_study_scope_of_work.pdf

[26] Attachment K Revisions: Extended-Term Planning, Presentation, (September 28, 2020) https://www.iso-ne.com/static-assets/documents/2021/09/a07_tc_2021_09_28_attk_ext_trans_presentation.pdf

[27] ISO New England Inc. and New England Power Pool, Docket No. ER22-733-000; Attachment K Longer-Term Planning Changes (December 27, 2021), https://www.iso-ne.com/static-assets/documents/2021/12/er22-727-000_12-27_21_attachment_k_longer_term_planning.pdf

[28] ISO New England's 2020 Work Plan, Presentation, (October 8, 2021) https://www.iso-ne.com/static-assets/documents/2021/10/2022_awp_final_10_08_21.pdf

Further, ongoing processes at the Federal Energy Regulatory Commission, such as the *Advance Notice of Proposed Rulemaking: Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection,*[29] may further inform these efforts going forward.

5.1.4 *Operational Impacts of Extreme Weather and Contingency Events*
As demonstrated by events in Texas and California, extreme weather can exacerbate reliability risks on the power grid. With this in mind, ISO New England initiated a project in October of 2021 to conduct a probabilistic energy security study for the New England region under extreme weather conditions.

The ISO will work with the Electric Power Research Institute (EPRI) on the project in order to leverage EPRI's ongoing, "Resource Adequacy for a Decarbonized Future" initiative. The initiative includes three major steps: extreme-weather modeling to be conducted by EPRI; risk model development and scenario generation to be conducted by EPRI; and energy security/adequacy assessment to be conducted by ISO New England. Following these assessments, the ISO hopes to discuss with stakeholders if and how the region should protect against these risks in the future. The ISO anticipates the project will take approximately 15 to 18 months and expects to discuss the project with stakeholders throughout 2022 and into early 2023.[30]

5.2 Winter Operations and Energy Security

5.2.1.1 *Winter 2021/2022 Outlook*

For the past two decades, ISO New England has raised concerns about fuel supply issues and their impact on electricity supply during periods of extreme cold weather. Constraints on the natural gas pipeline system limit the availability of fuel for natural gas-fired power plants, as heating customers are served first through firm service contracts. While the region has tried to address the need to ensure regional energy adequacy through actions by the states, the Federal Energy Regulatory Commission (FERC), or the ISO, most of these major steps to solve this risk have been unsuccessful.[31] The ISO recently launched a webpage detailing the history of efforts to address fuel security issues in New England.[32]

Further exacerbating these regional energy risks is the retirement, or announced retirement, of roughly 7,000 MW of resources fueled by liquefied natural gas, coal, oil, or nuclear energy, which have traditionally operated when natural gas is unavailable or is higher priced than alternative fuels.

While the ISO has developed a significant number of tools and procedures to better assess and respond to these energy security issues, a severe, prolonged cold snap could necessitate emergency actions if power-producing resources lack access to the fuel they need to operate. To enhance situational awareness entering this winter, the ISO compared expected consumer demand levels and other system conditions for this winter with three historical weather scenarios:

- Last winter (2020/2021), when the region experienced no extreme temperatures;
- The winter of 2017/2018, when, despite a forecasted mild season, all major cities in New England had average temperatures below normal for at least 13 consecutive days; and

[29] Advance Notice of Proposed Rulemaking: Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection, (July 15, 2021), https://www.ferc.gov/news-events/news/advance-notice-proposed-rulemaking-building-future-through-electric-regional

[30] NEPOOL Participants Committee Composite Materials, (October 7, 2021), https://www.iso-ne.com/static-assets/documents/2021/10/npc-20211007-additional-1.pdf

[31] The ISO's "Timeline: Historical Efforts to Address Fuel Security Issues in New England" webpage is available at https://www.iso-ne.com/about/what-we-do/in-depth/efforts-to-address-fuel-security-in-new-england

[32] ISO New England, "Timeline: Historical Efforts to Address Fuel Security Issues in New England", Webpage (January 17, 2022) https://www.iso-ne.com/about/what-we-do/in-depth/efforts-to-address-fuel-security-in-new-england

- The winter 2013/2014, when the region experienced several cold weather stretches of four or more consecutive days, including a stretch of 10 consecutive days at or below freezing.

The analysis assumed that there were no significant generation or transmission outages, and that fuel replenishment was limited.

Under this analysis, the ISO anticipates reliable system operations without the need for emergency procedures with mild conditions similar to last year. Weather similar to 2017/2018 may require limited emergency procedures, while weather similar to 2013/2014 may require the implementation of all available emergency procedures. The ISO would not expect these actions to be necessary if generators are able to adequately replenish their fuel supplies and if the system does not experience any unexpected generator or transmission outages.

The ISO posts information on the seasonal outlook twice each year (for both summer and winter), including the Winter 2021/2022 Seasonal Outlook.

5.2.1.2 *Maintaining Resource Adequacy: Resource Capacity Accreditation in the Forward Capacity Market*

In addition to other reforms under consideration, the ISO is also reviewing the way resources are qualified in the Forward Capacity Market (FCM) to support a reliable, clean-energy transition. Because using an appropriate methodology for accrediting resources is critical to reliability and market efficiency, the ISO initiated an effort that seeks to identify and implement a methodology that will more appropriately accredit resource contributions to resource adequacy as the resource mix transforms.

At technical information sessions held in August and November, the ISO began assessing and discussing potential accreditation methodologies with stakeholders, including how Effective Load Carrying Capability (ELCC) techniques could be used in quantifying resource contributions.

The ISO anticipates continued assessment of potential methodologies in consultation with stakeholders throughout 2022, with a potential filing at FERC by the end of the year.

5.3 ISO-NE Response to the New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid

In October 2020, the six New England states released the *New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid* (Vision Statement). [33] The Vision Statement outlined the states' vision for a "clean, affordable, and reliable 21st century regional electric grid." Throughout the first half of 2021, NESCOE held a series of public, online technical forums to discuss the major issues presented in the Vision Statement, including wholesale market design, transmission planning, governance reform, and equity and environmental justice.

In June 2021, NESCOE released the *New England Energy Vision Statement, Report to The Governors: Advancing the Vision* (Advancing the Vision Report). [34] The Advancing the Vision Report highlighted and summarized the

[33] Information on the New England States' Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid and the technical forums held in 2021 are available on the "New England Energy Vision" webpage, (2021) https://newenglandenergyvision.com/

[34] *New England Energy Vision Statement, Report to the Governors, Advancing the Vision,* (June 2021), https://newenglandenergyvision.files.wordpress.com/2021/06/advancing-the-vision-report-to-governors-2.pdf

progress made toward achieving the framework outlined in the Vision Statement, the ongoing activities related to each element of the Vision Statement, and the next steps that the states hope to take in these areas.

In September 2021, the ISO New England Board of Directors presented its Response to the New England States' Vision Statement and Advancing the Vision Report (the Response).[35] The Response reaffirmed the ISO Board and Management's commitment to working with the states to achieve a reliable and efficient clean-energy future for New England.

The Response discussed a number of the transmission planning activities that the ISO has underway, including the 2050 Transmission Study; Cluster Studies to Interconnect Offshore Wind on Cape Cod; Transmission Planning for the Clean Energy Transition – Pilot Study; the Future Grid Reliability Study; and, the Investigation of Storage as a Transmission Solution. The Response also reviewed wholesale market design initiatives that are underway, or being considered, including the Pathways to the Future Grid Analysis; elimination of the Minimum Offer Price Rule (MOPR); ancillary services design enhancements; capacity accreditation enhancements, and FERC Order 2222 compliance efforts.

In the Response, the Board shared that it is pursuing targeted governance and communications enhancements, consistent with its independence and oversight role and with the need to focus on transmission and market priorities. More specifically, the Response explained that the Nominating and Governance Committee, as well as the full board, have reviewed their current practices in light of the states' recommendations, have met with the states, and are making changes that are consistent with the ISO's core requirement for independence and its role as an oversight board and can be achieved without impeding the organization's focus on the states' markets and transmission goals.

The Board's Markets Committee and System Planning and Reliability Committee have updated their charters to ensure the committees' work is conducted consistent with the ISO's vision, described above.

The ISO Board also shared that it will begin holding an annual open meeting. In even-numbered years starting in 2022, the event will include a meeting focused on wholesale electricity markets. In odd-numbered years starting in 2023, the annual open meeting will focus on system planning. These meetings would be in addition to current meetings the Board holds with the states and NEPOOL sectors.

The Board noted a number of targeted enhancements to their communications, including more direct communication with the states, improving communication of technical information to non-technical audiences, and serving as a resource to the states on matters related to the regional power system. Lastly, the Board discussed the region's long history of collaboration and welcomed continued work with the states, NEPOOL, and other stakeholders.

5.4 Regional System Planning

Key aspects of the ISO's planning process in 2021 included developing forecasts of energy use, energy efficiency and distribution generation development, and transportation and heating electrification.

5.4.1.1 *Energy Efficiency and Distributed Generation Forecasts*

Since 2012, the ISO has developed an energy-efficiency (EE) forecast to equip system planners with information about the long-term impacts of EE investments on the region's peak and overall demand for

[35] Response to the New England States' Vision Statement and Advancing the Vision Report (Sept. 2021) *https://www.iso-ne.com/static-assets/documents/2021/09/iso-ne-response_to_states-vision_sept_23_2021.pdf*

energy. Energy efficiency is a key topic that experts and policymakers at the CLG have addressed since its inception.

Developing this forecast is a collaborative process led by the ISO with input from the Energy-Efficiency Forecast Working Group (EEFWG).[36] The process incorporates input from state-sponsored EE programs and state regulatory agencies. State policies are the major drivers of EE investments, and thus the forecast model is built using state policy information on EE statutory targets, funding levels, and economic trends, as well as FCM inputs such as clearing prices.

The most recent EE forecast was released on May 1, 2021, with the next one scheduled for release in May 2022.[37] The ISO forecasts that the region will have approximately 4,294 MW of EE resources by 2029, a change from the 5,733 MW projected by 2029 in the 2020 EE forecast. This reduction in forecasted EE resources is the result of changes to the reconstitution methodology for EE resources in the gross load forecast and changes instituted to the qualification process for EE resource in the FCM.[38, 39]

Since 2013, the ISO has also led a regional Distributed Generation Forecast Working Group (DGFWG) to collect data on distributed generation (DG) policies and implementation and to forecast long-term incremental DG growth in New England.[40] For purposes of this forecast, DG resources are 5 MW or less in nameplate capacity and are interconnected to the distribution system. Solar PV resources represent the largest share of DG resources throughout New England.

The final 2021 photovoltaic (PV) forecast shows steady growth in PV through 2030, with approximately 10,033 MW of solar PV (AC nameplate rating) to be installed by 2030 throughout New England.[41] The forecast also reported that about 3,995.9 MW of solar PV had been installed throughout New England through the end of 2020.

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[36] More information about the EEFWG is available at the ISO's "Energy-Efficiency Forecast Working Group," webpage (2021), https://www.iso-ne.com/committees/planning/energy-efficiency-forecast/.

[37] ISO New England, *Final 2020 Energy-Efficiency Forecast for 2020–2029* (May 1, 2020), https://www.iso-ne.com/static-assets/documents/2020/04/eef2020_final_fcst.pdf. More information on the ISO's 2020 draft energy-efficiency forecast is available at the EEFWG webpage: http://www.iso-ne.com/committees/planning/energy-efficiency-forecast.

[38] ISO New England, "Final 2021 Energy Efficiency Forecast" (May 1, 2021) https://www.iso-ne.com/static-assets/documents/2021/04/eef2021_final_fcst.pdf

[39] ISO New England and NEPOOL, "Joint Filing of ISO New England Inc. and New England Power Pool Regarding the Qualification of Energy Efficiency Resources in the Forward Capacity Market and Regarding the Monthly Reconfiguration Auction Qualification Process; Docket No. ER21-640-000," https://www.iso-ne.com/static-assets/documents/2020/12/ee_qualification_changes.pdf

[40] Information about the DGFWG is available at the ISO's "Distributed Generation Forecast Working Group," webpage (2021), https://www.iso-ne.com/committees/planning/distributed-generation/. Information about the latest DG forecast is available at https://www.iso-ne.com/system-planning/system-forecasting/distributed-generation-forecast/.

[41] ISO New England, *Final 2021 Solar PV Forecast* (March 22, 2021), https://www.iso-ne.com/static-assets/documents/2021/03/final_2021_pv_forecast.pdf.

Table 5-1
Final 2021 PV Forecast (MW)

States	Cumulative Total MW (AC nameplate rating)										
	Thru 2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CT	682.3	790.4	922	1069.6	1160.7	1251.8	1342.9	1434	1517.2	1572.6	1626.0
MA	2502.3	2956.6	3387	3793.5	4200	4606.5	4965.2	5197.3	5422.4	5640.4	5851.5
ME	68.8	207.6	406.6	615.8	817.5	915.3	928.1	940.9	953.7	966.5	979.1
NH	125.3	144.4	162.5	179.6	196.7	213.8	230.9	248	265.1	282.2	299.4
RI	223.8	272.9	319.4	361.8	404.2	446.6	489	531.4	573.8	616.2	658.5
VT	393.5	418.2	441.6	463.7	485.8	507.9	530	552.1	574.2	596.3	618.4
Regional—Cumulative (MW)	**3,995.9**	**4790.1**	**5639.1**	**6484.0**	**7264.9**	**7941.9**	**8486.1**	**8903.7**	**9306.4**	**9674.2**	**10,032.9**

The ISO develops the EE and solar PV forecasts with input from stakeholders; the forecasts are published in the ISO's annual *Capacity, Energy, Loads and Transmission Report* (CELT Report).[42]

5.4.1.2 *Transportation and Heating Electrification Forecasts*

Since 2020, the ISO has forecasted the impacts of heating and transportation electrification on state and regional electric energy and demand. The forecasts are included in the annual CELT Report.

The electrification of the heating and transportation sectors is expected to play a pivotal role in meeting the New England states' greenhouse gas reduction mandates and goals over the coming decades. To help ensure the power grid is prepared for the decarbonized future, ISO New England expanded its 10-year planning forecasts to capture growth in air-source heat pumps and light-duty electric vehicles and to quantify resulting increases in grid electricity demand. In February 2021, the ISO published its 2021 heating electrification forecast and 2021 transportation electrification forecast. [43]

The ISO forecasted that by 2030, more than 1.3 million air-source heat pumps would be installed in New England with nearly a 916 MW increase in load during the winter months. Light-duty electric vehicles (LDVs), including cars and light-duty trucks, were estimated to number over 1 million region-wide, adding up to 1,556 MW to winter peak load by the end of 2030. The final forecasts were published in the ISO's 2021 CELT, released in May 2021.

The ISO recognizes that heating and transportation electrification are relatively nascent trends. Therefore, as needed, the ISO will modify its forecasting methodologies as policy-drivers and state initiatives are further developed and additional data becomes available. For example, the ISO is considering the addition of non-LDVs and other heating electrification technologies in future forecasts.

[42] The ISO's CELT Reports and related materials are available at https://www.iso-ne.com/system-planning/system-plans-studies/celt/.
[43] ISO New England, *Final 2021 Heating Electrification Forecast*, presentation (February 19, 2021), https://www.iso-ne.com/static-assets/documents/2021/02/lfc2021_final_heating_elec.pdf , and *Final 2021 Transportation Electrification Forecast*, presentation (February 19, 2021), https://www.iso-ne.com/static-assets/documents/2021/02/evf2021_forecast.pdf

5.4.2 *Transmission Planning*

One of ISO New England's responsibilities as a Regional Transmission Organization is ensuring that the power system continues to operate reliably as conditions on the grid change. Ensuring continued reliability of the transmission system requires thorough and continuous review and planning. Several major transmission planning efforts currently underway and discussed at the CLG are detailed below.

5.4.2.1 *First Cape Cod Resource Integration Study*

In October 2020, in consultation with the Planning Advisory Committee (PAC), the ISO initiated the First Cape Cod Resource Integration Study (First CCRIS). The First CCRIS identified the transmission upgrades necessary on Cape Cod to enable the continued interconnection of proposed new offshore wind resources. The ISO refers to these as Cluster Enabling Transmission Upgrades (CETUs).

The First CCRIS built on the 2019 NESCOE Economic Study, which indicated— absent significant transmission development beyond Cape Cod — the limit for generation interconnection on the Cape would be between 2,400 and 3,200 MW.[44] To that point, the ISO had completed System Impact Studies (SIS) for approximately 1,600 MW of offshore wind generation on Cape Cod. However, beyond the 1,600 MW of generation with completed SIS that may readily interconnect, an additional ~2,948 MW of generation are seeking to interconnect on Cape Cod.

On July 30, the ISO published the Final First CCRIS Report. The report included the results of the CETU Regional Planning Study (CRPS) and identified the addition of new 345 kV transmission infrastructure that will enable the interconnection of an additional 1,227 MW of offshore wind on Cape Cod. The ISO also identified queue positions that are eligible to participate in First CCRIS.

Following the release of the Final First CCRIS Report, the ISO established a 30-day deadline for eligible queue positions to pay a Cluster Participation Deposit (CPD) in order to enter the Cluster Enabling System Impact Study (CSIS). The CSIS will determine the final interconnection plans for the proposed resources and final results are expected in the second quarter of 2022.[45]

5.4.3 *Second Cape Cod Resource Integration*

On May 19, the ISO initiated the Second Cape Cod Resource Integration Study (Second CCRIS). The Second CCRIS was initiated to identify enabling upgrades for additional offshore wind interconnections in the Cape Cod area that do not proceed forward in the First CCRIS. These proposed interconnections include 2,000 MW still seeking to interconnect to Cape Cod and an additional 1,200 MW seeking to interconnect near Plymouth, Massachusetts.

The Second CCRIS will build on the first by addressing the issues identified for offshore wind additions greater than the approximately 2,800 MW as identified in completed System Impact Studies and the First CCRIS. The ISO anticipates presenting the preliminary results of the Second CCRIS in second quarter of 2022[46].

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[44] ISO New England Inc. *2019 Economic Study: Offshore Wind Integration* (June 30, 2020) https://www.iso-ne.com/static-assets/documents/2020/10/2019-anbaric-economic-study-final.docx

[45] ISO New England Inc. *First Cape Cod resource Integration Study Redacted Non-CEII Version* (July 30, 2021) https://www.iso-ne.com/static-assets/documents/2021/07/cape-cod-resource-integration-study-report-non-ceii-final.pdf

[46] ISO New England Inc., *Notice of Initiation of the Second Cape Cod Resource Integration* (May 19, 2021) https://www.iso-ne.com/static-assets/documents/2021/05/a4_initiation_of_second_cape_cod_resource_integration_study_presentation.pdf

5.4.4 *Competitive Transmission Solicitation Enhancements Key Project*
Building on its experience in 2020 conducting its first competitive transmission Request For Proposals (RFP) under FERC Order 1000, the ISO launched a lessons-learned process at the Planning Advisory Committee (PAC) to discuss potential improvements to the Competitive Transmission Solution process.[47]

After robust stakeholder discussions, which included participation from consumer advocates, the ISO proposed several refinements to the ISO's Tariff, including clarifications on cost-containment provisions, the addition of evaluation criteria for assessing proposed solutions, and the addition of a new Selected Qualified Transmission Project Sponsor Agreement. In addition, the ISO proposed several conforming changes to governing documents on items such as transmission cost-allocation and the process for inclusion in the Forward Capacity Market network model.[48]

NEPOOL's Transmission Committee, Reliability Committee, and Participants Committee approved the ISO's proposed changes in the fall of 2021. The ISO filed the proposed changes with FERC in late 2021 and on February 25, 2022, FERC issued an Order accepting the proposed changes.[49]

5.4.5 *2021 Regional System Plan and Public Meeting*
On October 6, the ISO released the 2021 Regional System Plan (RSP 2021) and held a virtual public meeting that featured a keynote address from United States Senator Angus King (I–Maine), a panel discussion on maintaining reliability through extreme events, and an ISO presentation by ISO staff of RSP 2021.

Senator King delivered a keynote address, noting the regional and global effects of climate change. The senator also discussed the challenges of the region's transition to a cleaner electric grid and balancing New England's reliability and renewable energy goals. He also noted the importance of preparing for and responding to cybersecurity challenges, an issue Senator King has made a priority in the U.S. Senate.[50]

Phil Shapiro, who recently retired from the ISO New England Board of Directors, moderated a panel discussion on extreme weather events. The panelists were:

- Jim Robb, CEO, North American Electric Reliability Corporation (NERC)
- Bill Magness, former CEO, Electric Reliability Council of Texas (ERCOT)
- Charlotte Ancel, Vice President, Regulatory Strategy, Avangrid
- Debra Lew, Associate Director, Energy Systems Integration Group (ESIG)

The panelists discussed resilience, risk tolerance, and resource adequacy as key topics in maintaining grid reliability in the face of increasingly extreme weather events. The panelists also stressed that the changing

[47] Competitive Transmission Solicitation Enhancements Key Project page (December 20, 2021) https://www.iso-ne.com/committees/key-projects/competitive-transmission-solicitation-enhancements/

[48] ISO New England Inc. *Proposed Revisions to Attachment K – Order 1000 Lessons Learned Changes* (September 28, 2021) https://www.iso-ne.com/static-assets/documents/2021/09/a03_tc_2021_09_28_order_1000presentation.pdf

[49] FERC, Order Accepting Transmission Planning Improvements (February 25, 2022) https://www.iso-ne.com/static-assets/documents/2022/02/er22-733-000_2_25_22_order_accepting_transmission_planning_improvements.pdf

[50] ISO New England Inc., *Regional System Plan, 'Grid of the Future' panel highlight a grid in transition at 2021 public meeting* (October 15, 2021), https://isonewswire.com/2021/10/15/regional-system-plan-grid-of-the-future-panel-highlight-a-grid-in-transition-at-2021-public-meeting/

resource mix is adding to the complexity of ensuring resilience. Finally, the panel discussed the need for additional coordination on both national and regional levels.[51]

ISO staff presented RSP 2021 to the public during the October 6 meeting. The RSP 2021 is a biennial report that lays the foundation for long-term system planning in New England. The RSP 2021 planning process and development is managed by the ISO, with input from stakeholders through the PAC.

The report, which was approved by the ISO Board of Directors on November 2, 2021,[52] discusses:

- Forecasts of annual electric energy use and peak demand that consider the impact of expanded electrification in the heating and transportation sectors;
- The transformation of the grid and the physical and structural challenges posed by the interconnection of more variable energy resources, including wind, solar, and batteries;
- How careful planning and wholesale market improvements can facilitate the grid's transformation and mitigate challenges with resource adequacy in the longer-term;
- The transmission development needed to safely and reliably interconnect the influx of renewable resources onto the grid.

The Regional System Plan is developed in accordance with the ISO Open Access Transmission Tariff every other year to meet requirements established by FERC, NERC, and NPCC. Each regional system plan is a snapshot of the power system, regional studies, and forecasts at a point in time, and results are updated regularly.[53]

5.5 Wholesale Electricity Markets

In 2021, ISO New England provided updates to the CLG regarding the markets it designs and operates, with key points summarized below.

5.5.1 *Annual Markets Reports from ISO New England's Independent Market Monitors*

The ISO regularly reports on the performance of the region's wholesale electricity markets.[54] In addition to detailed quarterly, monthly, and weekly reports, the ISO's internal and external market monitors (IMM and EMM) prepare comprehensive annual reports on the development, operation, and performance of the markets.[55] Each year, the IMM meets with state officials, including public utility commissioners, consumer advocates, and attorneys general, to discuss the Annual Markets Report and field questions about the performance of the markets.

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[51] ISO New England Inc., *Regional System Plan, 'Grid of the Future' panel highlight a grid in transition at 2021 public meeting* (October 15, 2021) https://isonewswire.com/2021/10/15/regional-system-plan-grid-of-the-future-panel-highlight-a-grid-in-transition-at-2021-public-meeting/

[52] ISO New England Inc., *ISO-NE issues 10-year regional power system plan* (November 3, 2021) https://isonewswire.com/2021/11/03/iso-ne-issues-10-year-regional-power-system-plan/

[53] ISO New England Inc., *2021 Regional System Plan* (November 2, 2021) https://www.iso-ne.com/static-assets/documents/2021/11/rsp21_final.docx

[54] The ISO's various market reports are posted at its "Market Performance Reports," webpage (2021), http://www.iso-ne.com/markets-operations/market-performance/performance-reports.

[55] The internal market monitor's annual reports are posted at http://www.iso-ne.com/markets-operations/market-monitoring-mitigation/internal-monitor. The external market monitor's annual reports are posted at http://www.iso-ne.com/markets-operations/market-monitoring-mitigation/external-monitor.

In June 2021, the IMM published the *2020 Annual Markets Report*.[56] The report assessed the state of competition in the wholesale electricity markets administered by the ISO during the prior operating year, January 1 to December 31, 2020. As stated in the report, the IMM determined that New England's capacity, energy, and ancillary service markets performed well and exhibited competitive outcomes, with the Real-Time Energy Market showing an overall improvement in its structural competitiveness. Anne George summarized the report results during her ISO update at the June CLG meeting (see Section 3.2).

Among other observations, the report noted that the total wholesale cost of electricity in 2020 was $8.1 billion. This was $1.7 billion (or 17%) lower than the 2019 total.) The low energy prices were driven by record-low natural gas prices and wholesale electricity demand. Energy costs in 2020 were $3.0 billion, down 27% or $1.1 billion from 2019.

Capacity costs totaled $2.7 billion, down by 22% or $0.7 billion from 2019, driven by clearing prices in the tenth and eleventh Forward Capacity Auctions (FCA #10 and FCA #11).

5.5.2 *Forward Capacity Auction #16*

On Monday, February 7, ISO New England conducted the 16th Forward Capacity Auction (FCA #16) as scheduled and in accordance with the ISO's tariff. Unresolved legal matters involving a supply resource prevented the ISO from releasing the results in the days immediately following the auction, which is the usual practice. The ISO expects to release the results in March.

The resource at issue, the Killingly Energy Center, is a power plant that NTE Energy has proposed to develop in Connecticut. In November 2021, the ISO sought FERC's approval to terminate the resource's commitment in the Forward Capacity Market because of delays in the project meeting its critical-path-schedule milestones.[57] (NTE Energy initially received a Capacity Supply Obligation during the Forward Capacity Auction held in February 2019, for the Killingly Energy Center to be commercially available June 1, 2022.) FERC approved the termination on January 3, 2022, but on Friday, February 4, the D.C. Circuit Court of Appeals issued an order that stayed (paused) the ruling from FERC. On March 2, the court lifted the stay on FERC's termination of Killingly's CSO, which will enable the ISO to finalize and release the results of the auction.

The annual FCM auction is held three years before each capacity commitment period to provide time for new resources to be developed. Capacity resources can include conventional power plants, renewable generation, imports, and demand resources such as load management and energy-efficiency measures. Resources that clear in the auction receive a monthly capacity payment in that future year in exchange for their commitment to provide power or curtail demand when called on by the ISO.

Resources that fail to meet their capacity commitment during a shortage event must refund part of their capacity payment; this refunded money goes to resources that over-performed during the shortage event. The capacity market is separate from the energy market, where resources with and without a capacity commitment compete on a daily basis to provide power and are paid for the electricity they produce.

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[56] ISO New England Inc., *2020 Annual Markets Report* (June 9, 2021) https://www.iso-ne.com/static-assets/documents/2021/06/2020-annual-markets-report.pdf

[57] ISO New England Inc., Resource Termination Filing; FERC Filing Docket No. ER22- -000 (November 4, 2021) https://www.iso-ne.com/static-assets/documents/2021/11/public_resource_termination_killingly.pdf

5.5.3 *Order No. 2222: Participation of DER Aggregations in Wholesale Markets*

FERC issued Order No. 2222: Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators (RM18-9-000) on September 17, 2020.[58].

Beginning in December 2020, the ISO dedicated significant resources toward developing its Order No. 2222 compliance proposal. Through a comprehensive stakeholder process and substantial coordination among a large number of affected entities across the six New England states, including prospective DER aggregators, electric distribution companies and meter readers, electric retail regulatory authorities, and others, the ISO formulated a comprehensive compliance proposal.

Consistent with FERC's directive that RTOs/ISOs propose Tariff revisions that establish DER aggregators as market participants and address a number of technical compliance directives to facilitate DER aggregator market participation, the ISO's compliance proposal includes several novel market participation models and amends several existing models to facilitate the participation of DER aggregations in its markets.[59]

In addition, the ISO is proposing two effective dates for these proposed compliance revisions. The proposed effective date for the Forward Capacity Market changes will be during the fourth quarter of 2022 so that the ISO could implement needed changes on time for the FCA 18 qualification process, which commences in the spring of 2023. Assuming that the Commission accepts the ISO's proposal by the fourth quarter of 2022, distributed Energy Capacity Resources will be able to participate in FCA 18, which will be conducted in February 2024 for the Capacity Commitment Period beginning June 1, 2027. The proposed effective date for the changes to the energy and ancillary services markets will be during the fourth quarter of 2026.[60]

Beginning in December 2021, the ISO presented its final design, including Tariff revisions, to the relevant NEPOOL technical committees. The final design received sufficient support from each technical committee to be recommended for approval by the NEPOOL Participants Committee (PC) and the PC voted to support the ISO's compliance proposal at their January 6, 2021 meeting. The ISO filed its Compliance Proposal with FERC on February 2, 2022.[61]

In addition, on February 18, FERC granted a motion by Advanced Energy Management Alliance (AEMA) extending the comment period on ISO-NE's Compliance Proposal to April 1.[62]

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[58] FERC. Order No. 2222: Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators (RM18-9-000), https://www.ferc.gov/sites/default/files/2020-09/E-1_0.pdf

[59] ISO New England Inc., Order No. 2222 Key Project Webpage (December 21, 2021) https://www.iso-ne.com/committees/key-projects/order-no-2222-key-project/

[60] ISO New England Inc., *ISO Voting Memo – Order 222 Compliance* (December 1, 2021) https://www.iso-ne.com/static-assets/documents/2021/12/a04_tc_2021_12_13_voting_memo_o2222l.pdf

[61] FERC, In Reply Refer To: Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators Docket No. RM18-9-000 – Letter Order (May 24, 2021) https://www.iso-ne.com/static-assets/documents/2021/05/rm18-9-000.pdf

[62] ISO New England Inc., *Rev. to Allow Participation of DER Aggregations in NE Markets*, FERC Filing, Docket ER22-983 (February 2, 2022) https://elibrary.ferc.gov/eLibrary/docketsheet?docket_number=er22-983&sub_docket=all&dt_from=1960-01-01&dt_to=2022-03-01&chklegadata=false&pagenm=dsearch&date_range=custom&search_type=docket&date_type=filed_date&sub_docket_q=allsub

5.5.4 *Minimum Offer Price Rule Removal*

Throughout 2021, the ISO and NEPOOL stakeholders held numerous meetings to discuss removal of the Minimum Offer Price Rule (MOPR) from the Forward Capacity Market (FCM). Following the Participants Committee meeting on February 3, ISO New England began preparing to file a proposal with the FERC to remove the MOPR from the Forward Capacity Market (FCM). The proposal, which received 69.56% support, eliminates the MOPR for Forward Capacity Auction (FCA) #19, scheduled for 2025, and creates an exemption from the MOPR for 700 MW of capacity from sponsored resources for FCAs #17 and #18. This exemption is in addition to other current opportunities for renewables to enter the capacity market.[63]

The final proposal, which amended the ISO's original proposal, was first put forward by stakeholders and was supported by the New England Power Pool (NEPOOL) Participants Committee at their February 3, 2022 meeting. The ISO voiced its support for the proposed amendment in January at the NEPOOL Markets Committee and gave a more complete explanation of its decision in a memo prior to the Participants Committee.[64]

At the time of publication, the ISO is continuing to prepare the MOPR elimination filing and intends to file with FERC by the end of March.

5.6 The ISO's Budget Review Process

On October 15, 2021, following consultation with New England state regulators, consumer advocates, state attorneys general, and other stakeholders, ISO New England filed its proposed 2022 operating and capital budgets with FERC for review and approval.[65] FERC approved the budget on December 21, 2021.[66] The ISO shared highlights of its proposed budget at the September 9 meeting of the Consumer Liaison Group.

5.6.1 *Proposed Operating Budget*

The proposed operating budget for 2022, before depreciation and true up, is projected to be $189 million, which is $10.6 million or 5.9% higher than the 2021 operating budget. After depreciation and true up, the Revenue Requirement for 2022 is projected to be $215.1 million, which is $10 million or 4.9% higher than the 2021 Revenue Requirement of $205.1 million. If the ISO's projected Revenue Requirement for 2022 was fully passed through to end-use customers, their cost would average $1.12 per month (up from $1.05 per month for the 2021 revenue requirement).

5.6.2 *Proposed Capital Budget*

The 2022 capital budget is projected to be $32 million ($4 million more than the 2021 capital budget). The increase is driven by investments in software, cyber security needs, projects to enable the clean energy transition and improve reliability, and the replacement of IT asset and infrastructure.

5.6.3 *Budget Review Process*

The ISO's budget-development process begins in January of each year with stakeholder discussions on priorities in planning, operations, and capital projects. In the June to August timeframe, the ISO presents

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[63] Vistra, *MOPR Transition Proposal UPDATE (revised)* (January 31, 2022)(Pg. 640 of 1349) https://www.iso-ne.com/static-assets/documents/2022/02/npc-2022-02-03-composite4.pdf

[64] ISO New England Inc., *ISO Support and Preference of Transition to Minimum Offer Price Rule (MOPR) Elimination* (Pg. 196 of 1349) (01/26/22) https://www.iso-ne.com/static-assets/documents/2022/02/npc-2022-02-03-composite4.pdf

[65] ISO New England Inc., *Filing of 2022 Capital Budget and Revised Tariff Sheets for Recovery of 2022 Administrative Costs*, Docket No. ER22-113-000 (October 15, 2021), https://www.iso-ne.com/static-assets/documents/2021/10/iso_2022_operating_and_cap_budget_filing.pdf

[66] FERC, 2022 Capital Budget and Revised Tariff Sheets for Recovery of 2022 Administrative Costs, Docket No. ER22-113-000 letter order (December 21 2021), https://www.iso-ne.com/static-assets/documents/2021/12/er22-113-000_12-21-2021_ltr_order_accept_2022_budget.pdf

preliminary operating and capital budgets to its stakeholders for review. By the end of October, the ISO submits its final operating and capital budgets to FERC for review. The ISO's board of directors plays an active role throughout the budget-review process, taking into account feedback from stakeholders before voting on the proposed budget in October.[67]

The ISO's formal budget-review process also includes a preliminary budget presentation at the annual New England Conference of Public Utilities Commissioners (NECPUC) Symposium and an additional budget presentation with the New England states in August.[68] This year, because of the COVID-19 pandemic and a shift in the scheduling of the NECPUC Symposium, the June and August budget meetings were held via WebEx.

After the budget presentation in August, the New England states had the opportunity to submit questions and comments on the proposed budget, for which the ISO issues formal responses. The comments submitted by the New England states and the ISO's responses are filed with FERC in October alongside the proposed budget and posted to the ISO's website.[69]

More information regarding the ISO's budget, including an overview of the budget-development process, is available on the ISO website.[70]

Section 6
Analysis of Wholesale Costs and Retail Rates

One of the primary goals among Consumer Liaison Group (CLG) participants when the group first formed was to better understand how a typical retail consumer's bill reflects wholesale market costs. The ISO first conducted this analysis in 2009 and has subsequently updated it each year for the annual CLG report.

The analysis concluded that wholesale costs and the rates for residential retail power supply can vary dramatically among the states and from year to year, mainly because wholesale electricity markets and retail electricity markets are used to obtain different products. Wholesale markets reflect the short-term spot market for electric energy, whereas retail rates reflect longer-term, fixed-price contracts. The relationship between wholesale costs and retail rates will also vary with each utility's and state's procurement practices for retail power. Understanding these differences is essential when comparing the two markets.

Table 6-1 shows the range of average wholesale market costs for calendar years 2012 to 2021 among the New England states and the range of residential retail power supply rates in effect immediately thereafter (i.e., on January 1 of each year) for each of the states with unbundled retail electricity markets.

[67] ISO New England, "The ISO's Funding and Budgeting Process" (webpage) (January 2022) https://www.iso-ne.com/about/what-we-do/in-depth/the-iso-funding-and-budgeting-process

[68] ISO New England, *Settlement Agreement, Docket Nos. ER13-185, ER13-192* (May 13, 2013), https://www.iso-ne.com/static-assets/documents/regulatory/ferc/filings/2013/may/er13_185_000_5_9_13_settlement_agreement.pdf.

[69] ISO New England, "Budget", webpage (2022), https://www.iso-ne.com/about/corporate-governance/budget/

[70] ISO New England, "The ISO's Budget," webpage (2022), is https://www.iso-ne.com/about/corporate-governance/budget/.

Table 6-1
Wholesale Market Costs and Residential Retail Power Supply Rates (¢/kWh)[a]

	Wholesale Market Costs (¢/kWh)	Date Residential Retail Power Supply Rates in Effect	Residential Retail Power Supply Rates[b] (¢/kWh)
2012	4.82 – 5.10	**January 1, 2013**	7.19 – 9.08
2013	6.75 – 7.23	**January 1, 2014**	6.81 – 9.56
2014	7.53 – 8.27	**January 1, 2015**	7.56 – 15.56
2015	5.43 – 5.78	**January 1, 2016**	6.56 – 11.85
2016	4.11 – 4.37	**January 1, 2017**	6.64 – 10.36
2017	5.36 – 5.68	**January 1, 2018**	7.83 – 12.61
2018	7.48 – 7.81	**January 1, 2019**	8.92 – 13.51
2019	6.13 – 6.20	**January 1, 2020**	7.24 – 13.11
2020	4.82 – 4.88	**January 1, 2021**	6.41 – 11.97
2021	6.63 – 6.75	**January 1, 2022**	9.82 – 15.18

(a) The analysis is based on a hypothetical residential consumer that uses 750 kWh/month. The values indicate a range of lowest-to-highest costs among the states. Wholesale markets costs for 2021 are preliminary.

(b) The ranges for residential retail power supply rates include the states that have unbundled retail electricity markets. Vermont has not unbundled its retail electricity market; therefore, its rates are not included as part of this analysis.

Additional results of the analysis are as follows:

- From 2020 to 2021, wholesale market costs increased 36.9% to 38.8% across the New England states, largely, due to higher demand and higher natural gas prices because of supply chain disruptions. All the states saw an increase in retail power supply rates in effect on January 1, 2022, compared with retail power supply rates in effect on January 1, 2021.
- All six states saw an increase in total residential retail electricity rates in effect on January 1, 2022, compared with total residential retail electricity rates in effect on January 1, 2021. These rates include costs for power supply, transmission, distribution, and all other delivery service charges.[71]
- The estimated regional transmission rate increased by approximately 13% from 2020 to 2021 (from 1.9193 ¢/kWh in 2020 to 2.1757 ¢/kWh in 2021) and is equivalent to 7% to 11.2% of total

[71] Total residential retail electricity rates in effect on January 1, 2021, ranged from 15.48 to 25.43 ¢/kWh among the New England states. Total residential retail electricity rates in effect on January 1, 2022, ranged from 19.40 to 29.93 ¢/kWh among the New England states.

residential retail electricity rates in effect on January 1, 2022, which ranged from 19.40 ¢/kWh to 29.93 ¢/kWh.[72]

- A review of actual transmission rates for residential retail consumers in Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island in effect on January 1, 2022 shows that transmission represents 13% to 21.8% of total residential retail electricity rates.[73]

Section 7
New England Wholesale Electricity Costs

The annual wholesale costs of meeting consumer demand for electricity in New England can vary significantly. Over the past 10 years, total annual costs have ranged from a low of $7.7 billion in 2016 to a high of $12.5 billion in 2014.

Table 7-1 summarizes New England's wholesale electricity costs for 2011 to 2021.

[72] The regional transmission rate reflects the costs of reliability projects identified through the regional transmission planning process as providing a regional benefit. These costs are considered part of the regional network service (RNS). The regional transmission rate is calculated as the sum of all RNS charges and tariff-based reliability services for the specific period, divided by the total net energy for load for the same period. For 2021, the period is based on the 12 months ending December 31, 2021. The regional transmission rate is established by the region's transmission owners and is collected through ISO New England's *Transmission, Markets, and Services Tariff*. For more information, see http://www.iso-ne.com/participate/rules-procedures/tariff and http://www.iso-ne.com/participate/support/faq/oatt-iso-tariff. Information on net energy for load is available at http://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/net-ener-peak-load.

[73] The difference between actual transmission rates for residential consumers and the regional transmission rate is the inclusion of local transmission costs and projects in the residential transmission rates. Additionally, methodologies to allocate transmission costs to residential customers are likely to vary by state and utility.

Table 7-1
New England Wholesale Electricity Costs, 2011 to 2021 (in Millions and ¢/kWh)[a]

	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021[b]	
	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh
Wholesale market costs																						
Energy (LMPs)[c]	$6,695	4.9	$5,193	3.9	$8,009	6.0	$9,079	6.9	$5,910	4.5	$4,130	3.2	$4,498	3.5	$6,041	4.7	$4,105	3.3	$2,996	2.4	$6,101	4.8
Ancillaries[d]	$39	0.0	$56	0.0	$152	0.1	$331	0.3	$210	0.2	$146	0.1	$132	0.1	$147	0.1	$81	0.1	$61	0.0	$52	0.0
Capacity[e]	$1,345	1.0	$1,182	0.9	$1,039	0.8	$1,056	0.8	$1,110	0.8	$1,160	0.9	$2,245	1.8	$3,606	2.8	$3,401	2.7	$2,662	2.2	$2,243	1.8
Subtotal	*$8,079*	*5.9*	*$6,431*	*4.8*	*$9,200*	*6.9*	*$10,466*	*8.0*	*$7,229*	*5.5*	*$5,437*	*4.2*	*$6,875*	*5.4*	*$9,794*	*7.6*	*$7,586*	*6.0*	*$5,719*	*4.7*	*$8,396*	*6.6*
Transmission charges[f]	$1,368	1.0	$1,493	1.1	$1,822	1.4	$1,828	1.4	$1,964	1.5	$2,081	1.6	$2,199	1.7	$2,250	1.7	$2,146	1.7	$2,331	1.9	$2,687	2.1
RTO costs[g]	$130	0.1	$139	0.1	$167	0.1	$165	0.1	$165	0.1	$180	0.1	$193	0.2	$196	0.2	$184	0.1	$191	0.2	$216	0.2
Total	**$9,577**	**7.0**	**$8,063**	**6.0**	**$11,189**	**8.4**	**$12,459**	**9.5**	**$9,358**	**7.1**	**$7,698**	**5.9**	**$9,267**	**7.3**	**$12,240**	**9.4**	**$9,915**	**7.9**	**$8,242**	**6.7**	**$11,299**	**8.9**

(a) Average annual costs are based on the 12 months beginning January 1 and ending December 31. Costs in millions = the dollar value of the costs to New England wholesale market load servers for ISO-administered services. Cents/kWh = the value derived by dividing the dollar value (indicated above) by the real-time load obligation. These values are presented for illustrative purposes only and do not reflect actual charge methodologies.

(b) **The wholesale values for 2021 are preliminary and subject to reconciliation.**

(c) Energy values are derived from wholesale market pricing and represent the results of the Day-Ahead Energy Market plus deviations from the Day-Ahead Energy Market reflected in the Real-Time Energy Market.

(d) Ancillaries include first- and second-contingency Net Commitment-Period Compensation (NCPC), forward reserves, real-time reserves, regulation service, and a reduction for the Marginal Loss Revenue Fund.

(e) Capacity charges are those associated with the transitional Installed Capacity (ICAP) Market through May 2010 and the Forward Capacity Market from June 2010 forward.

(f) Transmission charges reflect the collection of transmission owners' revenue requirements and tariff-based reliability services, including blackstart capability, voltage support, and FCM reliability. In 2019, the cost of payments made to these generators for reliability services under the ISO's *Open-Access Transmission Tariff* (OATT) was $60.1 million. Transmission charge totals for 2010 forward reflect the refund of OATT, Schedule 1 through-or-out (TOUT) service charges to regional network load.

(g) RTO costs are the costs to run and operate ISO New England and are based on actual collections, as determined under Section IV of the *ISO New England Inc. Transmission, Markets, and Services Tariff*.

Total wholesale costs include the cost of traditional supply resources and demand resources and the annual cost of transmission investment to serve all the region's power needs. These costs also include the cost of all ISO functions to operate the power grid, administer the markets, implement the 10-year power system planning process, and provide market-monitoring oversight of participant behavior and in-depth market analysis and reporting. Between 2011 and 2021, the ISO's annual costs have ranged from $130 million to $216 million.

Market participants that purchase electricity from the wholesale market for their own use or to supply to retail customers pay wholesale electricity costs. In turn, suppliers and utilities provide electricity to retail customers according to the retail market structures and requirements of the six New England states. Utilities charge retail customers for power supply through their monthly bills using the rates approved by the state or local public utilities commissions. Retail customers share in the cost of regional transmission upgrades for reliability and generally pay for it over a 35- to 40-year period through the transmission rates in their retail bill.

In 2021, the total value of all wholesale electricity costs, including the cost of regional transmission upgrades and ISO operations, was approximately $11.3 billion. Allocating this cost across the load served at a wholesale level (real-time load obligation) in 2021 yields a rate of 8.9 ¢/kWh. Wholesale values for 2021 are preliminary and subject to reconciliation.