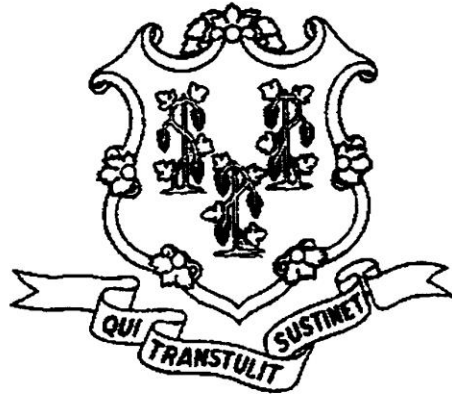


# STATE OF CONNECTICUT



## THE NUCLEAR ENERGY ADVISORY COUNCIL REPORT

# 2018

**Established Pursuant to Public Act 96-245**

**Rep. Kevin Ryan, Chairperson**

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## **CHARGE TO THE COUNCIL**

Section 17 of Public Act 96-245(now CGS16-11a as amended) created the Nuclear Energy Advisory Council (NEAC) and requires it to:

1. Hold regular public meetings to discuss issues relating to the safety and operations of nuclear power plants and to advise the governor, legislature, and municipalities within a five-mile radius of the plants on these issues;
2. Work with federal, state, and local agencies and the companies operating such plants to ensure public health and safety;
3. Discuss proposed changes in, or problems arising from, the operation of the plants;
4. Communicate, through reports and presentations, with the plants' operators about safety or operational concerns at the plants, and
5. Review the current status of the plants with the Nuclear Regulatory Commission.

## **COUNCIL MEMBERS**

The Council consisted of fourteen (14) members appointed by the Governor, legislative leadership, and the executive bodies in the towns in or near which the state's nuclear power plants are located. There were seven active members at the end of 2018. Two members resigned their positions due to personal reasons. (Appendix 1).

## *Executive Summary*

This is the twenty-first annual report presented by the Nuclear Energy Advisory Council (NEAC). During calendar year (CY) 2018, the NEAC met four times and received reports from representatives of the Nuclear Regulatory Commission (NRC), Connecticut Department of Energy and Environmental Protection (DEEP), and Dominion Energy Nuclear Connecticut as well as a written status report from Connecticut Yankee Independent Spent Fuel Storage Installation (ISFSI). Routine and Special NRC Millstone Power Station (MPS) inspection and performance assessment reports were also received and reviewed.

The NEAC continues to examine issues relating to the safety and operations of nuclear power plants and advise the governor, legislature, municipalities, and residents within a five-mile radius of the plants on these issues.

During 2018, Dominion continued to safely operate the nuclear plants at Millstone Power Station. Spent nuclear fuel continues to be safely stored and monitored in wet storage and ISFSI at Millstone Power Station and in ISFSI at Connecticut Yankee. NRC and DEEP oversight provides effective oversight of activities.

### *NEAC Recommended Actions*

#### **State:**

- Facilitate and encourage the Division of Emergency Management and Homeland Security (DEMHS)/DEEP nuclear emergency preparedness collaboration and continue executing current responsibilities and duties in kind.
- The Governor/General Assembly/DEEP should endorse a nuclear waste strategy that includes consent based consolidated interim storage.

#### **NEAC:**

- The NEAC will continue to discharge its duties as specified by Section 17 of Public Act 96-245 (now CGS16-11a as amended). The Council acknowledges Dominion Energy's improvements in performance and safety culture.
- State energy policy should recognize the importance of Millstone for regional grid fuel security as indicated by the Independent System Operator (ISO) New England.
- The Council requests the Legislature clarify NEAC's responsibilities for nuclear power plant decommissioning in the state.

## *Highlighted Findings*

**Millstone Operations:** The NRC has not identified any immediate safety concerns; deviations from standards were minor, rectified, and appropriately assessed. Both Millstone Units 2 and 3 remain in the Licensee Response column of the NRC's Regulatory Oversight Process (ROP). This represents baseline regulatory oversight by the NRC and reflects good safety performance. In 2018, NEAC has concluded that there was evidence of:

- Improved regulatory performance at Millstone as indicated by positive trends in NRC performance indicators and a reduced regulatory actions by the NRC.
- Positive safety and work culture improvements made by Dominion. NEAC note that continued vigilance should be maintained to ensure sustainability of actions.



NEAC noted positive performance of NRC oversight and Dominion corrective actions. In 2017, the NRC identified several potential security enforcement issues related to performance of a contract armorer and maintenance of weapons. The NRC offered the licensee (Dominion) Alternate Dispute Resolution (ADR). This allows the NRC to achieve broader actions not available through traditional enforcement action. The NRC and Dominion did engage in ADR related to the security issues. On September 20, 2017 the NRC and Dominion signed a confirmatory order documenting the agreed upon actions. The order provided additional transparency by documenting more details of the events including falsification of weapons maintenance records. NEAC reviewed the confirmatory order. The NRC conducted follow-up inspection of compliance with the confirmatory order actions. In addition, DEEP Radiation Division personnel and members of Connecticut State Police, including a qualified armorer, conducted on-site review of the armory, weapon readiness and other corrective actions. NEAC reviewed the status of Dominion's corrective actions and found them to appropriate.

No emergency events in were declared at either Millstone or Connecticut Yankee in 2018.

There was one environmental impact events at Millstone in 2018.

- On August 2, 2018 Dominion made a voluntary groundwater report to the state and local authorities of a leak in an underground auxiliary condensate pipe containing tritium because Dominion could not verify that less than 100 gallons leaked. Failure occurred from a combination of high temperature and high chlorides in the line. Millstone removed the piping section from service and installed a new double-walled pipe with built in leak detection.

NEAC determined that the event was appropriately identified by Dominion's robust groundwater monitoring program, properly reported to authorities, and properly monitored to ensure no offsite impact. Testing of on-site wells and offsite indicated that all of the leakage was contained within the site boundary and did not adversely affect offsite public or private water supplies.

## **Decommissioning:**

*Millstone* - No significant decommissioning activities were conducted at the unit during 2018.

*Connecticut Yankee* – Normal operations, no significant regulatory findings were identified.

## **High Level Nuclear Waste:**

On May 10, 2018, the US House of Representatives advanced the Nuclear Waste Policy Amendments Act (NWPAA, H.R. 3053) by a vote of 340 - 72. CT Representatives Courtney, Himes, Esty and Larsen all voted in favor; Representative DeLauro did not vote on the bill. The NWPAA 2018 attempted to overcome the barriers to removing spent nuclear fuel (SNF) from permanently shut down sites such as Connecticut Yankee. Such measures include authorizing consolidated interim storage facilities



(currently being considered in TX and NM) to store the SNF until Yucca Mountain is complete. Both CT's Nuclear Energy Advisory Committee (NEAC) and the Northeast Council of Government's (COG) Northeast High-Level Waste Transportation Task Force have supported the key principles addressed by this legislation. With respect to the US Senate legislative action, the NWPAA 2018 that passed the House was referred to the Senate Environment and Public Works Committee which did not take any action on it. The Senate Energy Committee and the Energy & Water Development Appropriations Committee leaders have taken no action to introduce a bi-partisan comprehensive nuclear waste reform bill along the lines of what they introduced in the past two sessions. There has not been a senate floor vote related to nuclear waste since 2002 and only 22 of the sitting Senators have ever cast a vote on nuclear waste legislation.

## ***Council Activities in 2018***

As required by CGS16-11a (PA 96-245) as amended, the NEAC held four public meetings. The purpose of these meetings was to provide a venue for discussion of issues relating to the safe operation of the state's nuclear power plants. Meeting minutes are included in Appendix 2.

- April 4, 2018 (Waterford Public Library): This was a joint meeting with the NRC Region I staff and focused on the Annual Assessment Report of Millstone Power Station Units 2 and 3 for the four quarters of CY2017. It was reported that overall these two units were operated in a manner that preserved public health and safety and Unit 2 fully met NRC cornerstone objectives.
- June 20, 2018 (Legislative Office Building in Hartford, CT): After conclusion of the public meeting, NEAC travelled to the Independent System [electrical grid] Operator – New England (ISO – NE) for a tour and briefing on electrical grid operations, market dynamics, regulatory impacts, cybersecurity, and fuel security. Due to market sensitivity and security access requirements at ISO – NE, this briefing and tour were closed to the public. A public version of the briefing is included with the minutes.
- September 25, 2018 (Waterford Town Hall): Dominion Nuclear Connecticut representatives provided an update of activities at Millstone Power Station.
- December 13, 2018 (Millstone Simulator Training Building in Waterford, CT): The CY2018 Annual Report was discussed, reviewed, and approved for promulgation. NRC Correspondence and Inspection Results received since the last meeting were discussed. The meeting schedule for CY2019 was approved and possible topics for the meetings were discussed

Millstone 1 Decommissioning Advisory Committee (M1DAC): Since Millstone 1 remains in Safe Storage (SAFSTORE) and no significant activities were conducted at the Unit during the past calendar year, M1DAC did not meet in CY2018.

## ***Recommendations***

### **STATE**

1. DEMHS and DEEP should continue to address any emergency preparedness issues at Connecticut's nuclear sites.
2. DEEP, in conjunction with Connecticut State Police should continue to address any security issues at Connecticut's nuclear sites.
3. DEEP should continue radiological and environmental monitoring of Connecticut's nuclear sites.
4. The Governor, General Assembly, DEEP, and NEAC should continue to insist that the NRC continue vigilant oversight of Connecticut Yankee and Millstone Power Station sites for as long as high-level nuclear waste remains on site.
5. The Governor, General Assembly, and DEEP should encourage the federal government to develop a solution to the spent fuel storage. Specifically, The Governor, General Assembly and DEEP should endorse a nuclear waste strategy that includes consent based consolidated interim storage that gives priority to removal of waste from permanently shutdown reactor.
6. Elected officials should work with NEAC to make appointments necessary to fill vacant Council positions.

### **NEAC**

1. Continue to monitor the stability of the Employee Concern Program and Safety Conscious Work Environment and Corrective Action Program at Millstone Power Station.
2. Continue to monitor operations and activities at Millstone Power Station and Connecticut Yankee Site, including the dry cask storage programs.
3. Continue to encourage the development of a solution to the problem of Spent Nuclear Fuel, High Level Waste and Greater Than Class C Low-Level Radioactive Waste and the safe transfer of this nuclear waste from Connecticut. Including the establishment of a consent based consolidated interim storage that gives priority to removal of SNF and GTCC waste from permanently shutdown reactor sites and transfers title of SNF to DOE upon receipt.
4. Determine status of the Low Level Waste Compact and its impact on Connecticut.

## ***Conclusions***

Dominion continues to safely operate the nuclear plants at Millstone Power Station. Spent nuclear fuel is safely stored and monitored in wet storage and ISFSI at Millstone Power Station and in ISFSI at Connecticut Yankee. NRC and DEEP oversight provides effective oversight of activities. All oversight entities and stakeholders must continue vigilant oversight of Connecticut Yankee and Millstone Power Station sites for as long as high-level nuclear waste remains on site. Each must encourage the federal government to develop a consolidated interim storage solution to the spent fuel storage problem that prioritizes removal of Spent Nuclear Fuel (SNF) and Greater Than Class C (GTCC) waste from permanently shut down reactor sites and includes transfer of the SNF title to DOE upon receipt.



**Appendix 1**  
**NUCLEAR ENERGY ADVISORY COUNCIL MEMBERSHIP**

**Rep. Kevin Ryan** Oakdale: OD, Pennsylvania College of Optometry. Legislator, Adjunct Faculty, University of New Haven.

**John W. (Bill) Sheehan** Waterford: BS, Naval Science, US Naval Academy; MBA, Rensselaer Polytechnic Institute; former Commanding Officer, Nuclear powered submarine.; retired Navy Captain

**Thomas A. Nebel** Niantic: BS Industrial Engineering New York Polytechnic University; Retired Monsanto/Solutia - former First Responder & NE HAZMAT Coordinator for company; C.E.R.T. Member Missouri & Connecticut.

**Raymond D. Woolrich** Waterford: BS, Nuclear Science, US Naval Academy; MS Computer Systems and Financial Management, US Naval Postgraduate School; former Commanding Officer, Nuclear Powered Submarine; retired Navy Captain; Naval Analyst, Sonalysts, Inc.

**Craig Salonia** Haddam: BS in Medical Technology from Northeastern University. Account manager and trainer for GE Health care Life Sciences division.

**James Sherrard** Mystic: PhD Nuc. & Mech Eng. MIT/UCONN. Chairman, Nuclear Engineering Technology Department, TRCTC.

**Mr. Jeffrey Semancik** Groton: BS Physics, US Naval Academy. MS, Electrical Engineering. Former qualified engineer, nuclear powered aircraft carrier. Former Senior Reactor Operator at Millstone Unit 3. Director, Radiation Division, Department of Energy and Environmental Protection.

**Royce W. James**, New London, PhD, Physics, Stevens Institute of Technology; MS, Applied Physics, Columbia University; BS, Physics, New Mexico State University. Physics Professor, U. S. Coast Guard Academy

**Members resigning in 2018:**

**Gregg W. Dixon** Niantic: PhD Mechanical Engineering (Nuclear) Stanford University. Retired Professor, Mechanical Engineering, US Coast Guard Academy.

**Robert J. Klancko** Woodbridge: BSE Chemical Engineering, UCONN. PE, CSP, Engineering Consultant, member State Emergency Response Commission.

**Appendix 2**  
**NUCLEAR ENERGY ADVISORY COUNCIL**  
**MEETING MINUTES**

## **NUCLEAR ENERGY ADVISORY COUNCIL**

**April 4, 2018 6:00 PM**

**Waterford Public Library**

**49 Rope Ferry Road**

**Waterford, CT 06385**

### **MINUTES**

#### **Members Present**

Rep Kevin Ryan, Chair

Mr. Jeffrey Semancik representing DEEP Commissioner Klee

Mr. Bill Sheehan                      Mr. Edward Munster

Mr. Tom Nebel                         Mr. James Sherrard

Mr. Ray Woolrich                     Mr. Arnold Jordan

CDR Royce James

Members not present

Mr. Gregg Dixon

Mr. Robert Klancko

#### **1. Call to Order of Meeting**

NEAC Chairperson Rep. Ryan called the meeting to order at 6:00 PM at Waterford Public Library, Waterford, CT.

#### **2. Approval of Minutes of the December 11, 2017 NEAC Meeting**

Mr. Jordan noted his name was missing from list of members present. A motion was made to approve the as so amended by Mr. Sherrard and seconded by Mr. Nebel. Mr. Munster abstained. Minutes were approved without objection.

#### **3. Approval of 2017 NEAC Annual Report**

Mr. Sheehan identified some administrative corrections, A motion was made to approve the 2017 Annual NEAC Report to the legislature as so amended by Mr. Sheehan and seconded by Mr. Sherrard. The report was approved without objection.

#### **4. Program – Briefing on Millstone Power Station Annual Assessment by M. Gray, Acting Deputy Director, Division of Reactor Projects (DRP); D. Schroeder, Branch Chief, Projects Branch 2, DRP; T. Setzer, Senior Project Engineer, J. Fuller, Senior Resident Inspector; C. Highley, Resident Inspector; R. Guzman, Senior Project Manager, Office of Nuclear Reactor Regulation; and, Mr. J. Grieves, Regional State Liaison Officer, Region 1.**

- a. Mr. Gray provided an overview of the NRC's regulatory role and principles of regulation highlighting the agency's commitment to openness and transparency.

- b. NRC presenters provided introductions including each member's experience in operation and oversight.
- c. Mr. Schroeder briefed NEAC on performance of Dominion's operation of Millstone. Mr. Schroeder stated that Millstone continues to operate safely, protect public health and safety, and protect the environment. Millstone Units 2 and 3 are both in the Licensee Response column of the Regulatory Response Matrix (the highest level of performance) and will therefore remain under baseline inspection. There were no scrams (automatic shutdowns) of either Millstone unit in 2017. The NRC identified ten inspection findings, five in security, of very low safety significance (green). Six findings had cross cutting issues in human performance and one in problem identification and resolution (PI&R) but no cross cutting issue areas exceeded NRC thresholds for significance. Of note, there were no cross cutting issues identified in safety conscious work environment (SCWE). The NRC All performance indicators are green at both units. The emergency AC power indicator did have reduced margin towards white associated with a service flaw in a weld such that structural integrity may have been challenged. The licensee has corrected the issue and no other issues were identified.
- d. Mr. Schroeder noted the NRC is tracking one unresolved issue (URI) associated with Anchor Darling double disk gate valves. The NRC is using a Temporary Instruction (TI) to ensure industry commitments are completed.
  - i. Mr. Sheehan asked is the issue was associated with the main coolant loop stop valves. Mr. Schroeder responded that the valves associated with this URI are installed in Millstone Unit 2 as containment spray header isolation valves and refueling water storage tank (RWST) outlet header stop valves.
- e. Mr. Schroeder briefed NEAC on the NRC's assessment of safety culture at Millstone.
  - i. The NRC has three resident inspectors (RI's) on site who evaluate tone and tenor of the safety culture at the station as they attend meetings, observe control room activities, and interact with staff. The NRC also monitors the SCWE when inspecting PI&R through staff interviews that identified that staff was willing to use the corrective action process (CAP), willing to raise safety issues, not aware of any retaliation, and has adequate knowledge of CAP and SCWE program requirements. Moreover, they evaluate every NRC finding and identified no SCWE cross cutting issues. The NRC determined that there were no challenges to the free flow of information in the Millstone Organization.
  - ii. When allegations to the NRC from the site are received (through RI's, hotline, email, mal, etc.) each issue is evaluated by a panel that includes the Office of General Counsel (OGC) and senior NRC management. RI's maintain files and confidentiality. The NRC received eight allegations in

2017 from Millstone. This represents an improving trend from 2014 when they received ten allegations.

- f. Mr. Schroeder discussed cyber security of nuclear power plants.
  - i. The NRC has been inspecting cyber security for years and is aware that attempts to hack business systems (internet) have been made at some sites. Nuclear and safety related systems are not connected to the internet and were not challenged by these attempts.
  - ii. Safety systems are mostly analog while some support systems (turbine and feedwater controls) have been digitized. Software changes for these systems are controlled to maintain an air gap. For example, a thumb drive would be scanned at a kiosk, verified clean and then uploaded to the system. Plant computer displays are for trending and indication only using data diodes to the business intranet to allow data out but not in.
  - iii. Cyber security regulations have been fully implemented as of January 2018 and a cyber inspection team will verify compliance at Millstone in July 2018. Prior inspections identified four violations in 2013 and one in 2016.
    - 1. CDR James asked if the violations were against the regulations. Mr. Grieves stated that the regulations required licensees to have a cyber security plan. Inspectors verify that the plan meets the regulations and that the licensee implementation meets their plan. The violations identified shortcomings in the plan to meet the regulation. All were of very low safety significance and have been corrected.
    - 2. Mr. Nebel asked how many allegations were internally and how many externally initiated. Mr. Fuller noted that the NRC website provides these statistics and that all eight allegations were internal. None came from external sources.
  - iv. Mr. Sherrard asked who looks at non-nuclear entity (specifically the grid operator) for cyber issues that could affect the plant. Mr. Schroeder stated that the Federal Energy Regulatory Commission (FERC) is the federal grid oversight partner. Mr. Semancik noted that the NRC and FERC have a memorandum of understanding (MOU) that defines the brightline guidance (clear demarcation of what portions of the grid each agency will regulate) for oversight of cyber security at nuclear power stations.
- g. Mr. Schroeder discussed the recent Alternate Dispute Resolution (ADR) related to security issues and the resulting confirmatory order.
  - i. The NRC identified a potential level 3 traditional enforcement issue and offered the licensee ADR. This allows the NRC to achieve broader actions not available through traditional enforcement action. On September 20, 2017 the NRC and Dominion signed a confirmatory order documenting the agreed upon actions. The order provided additional transparency by

documenting more details of the events including falsification of weapons maintenance records. The NRC will conduct a follow-up inspection of compliance with the confirmatory order actions within their security baseline inspection.

1. Mr. Munster noted that when he reviewed the issue, this appeared to have a safety culture concern – that a person was not able to express a concern with ability to conduct maintenance. Mr. Gray acknowledged that this was a valid point and that this issue, combined with allegation traffic has led the NRC to provide more focus on security. Mr. Schroeder noted that the NRC expects individuals and organizations to be truthful and records to be complete. He reinforced the benefit to the ADR process in that it allowed NRC to get broad organizational corrective actions to improve armory and organization oversight and culture. For example Dominion has already reinforced expectations for truthfulness, has committed to have an independent SCWE assessment in security, will benchmark other plants where security culture is strong and is sharing lessons learned with the industry.
2. Mr. Jordan asked if the five findings in security previously discussed included those in the ADR or were separate. Mr. Setzer noted the ADR is separate from the five findings. Mr. Jordan asked if they ADR findings would be looked at historically. Mr. Setzer noted that the ADR and its follow-up inspection are not figured into the annual plant performance assessment. Mr. Gray noted that they assessed the five findings for deliberate wrong doing and concluded there was none.
3. Mr. Semancik asked what the consequences of not completing actions committed to in the confirmatory order were. Mr. Gray stated it was a rare occurrence and not expected. Mr. Grieves stated that they have not had that occur before and would verify the answer.
4. Mr. Nebel asked if the confirmatory order was issued to Dominion or the security contractor. Mr. Gray state the NRC holds the licensee responsible for the performance of their contractors. Mr. Grives noted, however, that many of the confirmatory actions are directed at the contractor through Dominion. Mr. Nebel stated that is seemed like a workload issue by the security company as opposed to directly by Dominion and asked if the contractor was free to reduce staffing to improve margins. Mr. Schroeder answered that the licensee is responsible for oversight, organizational effectiveness of security operations.

- h. Mr. Fuller provided a brief on inspections conducted by the NRC including those conducted by resident inspectors as well as focused inspections performed by teams of NRC experts in areas such as fire protection, design modifications, emergency planning, and security.
  - i. During a 2017 Design Basis Assurance team inspection, the NRC identified a failure to maintain the environmental qualification (EQ) of auxiliary feedwater system solenoid valves at Unit 2. The licensee corrected the issue by extending the qualified life with a more accurate assessment of temperatures.
    - 1. Mr. Semancik asked if there were any failures of the solenoids. Mr. Gray stated there were no failures of the valves and the licensee was able to identify additional margin.
  - ii. Mr. Fuller discussed NRC assessment of a Unit 3 pressure transient that occurred on October 13, 2017 as noted in the fourth quarter inspection report. He noted that he was in the control room and observed the operators' response to the overpressure. The reactor coolant system (RCS) in a water solid condition and Dominion was preparing to do work on another system. The boundary used to isolate the other component for work caused the charging makeup valve to go full open and increase RCS pressure until a residual heat removal relief valve opened at 350 psia and limited the pressure transient to a peak pressure of 472 psia. The maximum pressure allowed by procedure is 435 psia. This resulted in a violation of the plant's technical specifications and required Dominion to perform an engineering analysis to ensure the structural integrity of the RCS pressure boundary. Mr. Fuller stated that the operations staff immediately recognized the off normal conditions and that licensed operators had timely and proper response.
    - 1. CDR James asked that, as these analog systems become so complicated, at what point does it not become sustainable to operate them. Mr. Fuller acknowledged the plants are complicated but that licensees are managing the complexity and the NRC is verifying that they can. CDR James asked if the tempo of incidents is increasing. Mr. Gray noted that there were zero scrams at Millstone in 2017 and that the trend in events is improving. Mr. Schroeder noted that in the past 15 years, licensees, in general, have improved performance through computer systems and use of CAP to make the complex simple by avoiding putting the plants in vulnerable situations.
  - iii. Mr. Sheehan noted that Millstone 2 has entered the period of its license extension and asked how that changes the way the NRC inspects. Mr. Gray stated that prior to entering the period of extended operations (PEO), licensees must identify structures, systems and components (SSCs) that are susceptible to aging effects and create aging management plans

(AMPs). When a plant is five to seven years into its PEO, the NRC sends special teams to look at AMP compliance and effectiveness. In addition, every three years, a design basis assurance inspection team verifies the aging management engineering process.

- i. Mr. Highley noted that Dominion made two Unusual Event emergency declarations in 2017:
  - i. Millstone Unit No. 2 on August 15, 2017 due to a fire alarm in containment. The control room staff responded quickly, entered the containment building, and determined there was no fire. Response and notifications were appropriate. Dominion determined that two smoke alarms had malfunctioned and plan to repair at the next available opportunity. The NRC monitored Dominion's classification and response to the event and identified no findings of significance.
  - ii. Millstone Unit No. 3 on October 10, 2017 due to a hydrogen leak from the main electrical generator. The licensee was investigating a hydrogen gauge equipment deficiency tag. Maintenance personnel proactively sampled the upper vent of the panel where the gauge was located and detected hydrogen gas concentration above the lower explosive limit of 4%. The control room made a proper declaration of emergency and took prompt action to isolate the gauge and ventilate the area. The NRC monitored Dominion's classification and response to the event and identified no findings of significance.
    1. Mr. Semancik noted that Dominion declared another unusual event at Unit 3 due to a hydrogen leak in 2016 and asked if there were any concerns with maintenance practices on hydrogen boundary of system. Mr. Highley stated there was not a commonality in the two issues. Mr. Fuller added that the NRC does cognitively trend issues including root cause evaluation corrective actions and determined the issues associated with the two events were unrelated.
- j. Mr. Highley discussed NRC follow-up of corrective actions related to a 2016 notice of violation on the Unit 3 turbine driven auxiliary feedwater pump. He stated that Dominion's corrective actions were on the docket and completed. The NRC will be conducting a closeout inspection in the third quarter of 2018. Mr. Fuller added that the licensee has demonstrated successful completion of the corrective actions to the pump and that he has personally observed its performance.

**5. NRC Correspondence Received since past meeting.**

The list of NRC Correspondence was reviewed. There were no additional questions from NEAC members other than those addressed during the NRC presentation.

- a. Millstone Power Station – Integrated Inspection Report 05000336/2017004 and 05000423/2017004 dated February 1, 2018.



- b. Millstone Power Station, Unit Nos. 1, 2, and 3 - Issuance of Amendment Nos. 118, 334, and 271 to Revise Licensee's Name (CAC Nos. MF9844, MF9845, and MF9848; EPID L-2017-LLA-0245 and EPID L-2017-LLA-0346) dated February 26, 2018.
- c. Annual Assessment Letter for Millstone Power Station, Units 2 and 3 (Report 05000336/2017006 AND 05000423/2017006, Report 05000336/2017402 and 05000423/2017402, REPORT 05000336/2017501 and 05000423/2017501) dated February 28, 2018.

**6. Other material reviewed since past meeting.**

NEAC reviewed the following information related to nuclear industry and trends.

- a. Resource Assessment of Millstone Pursuant to Executive Order No. 59 and Public Act 17-3; Determination Pursuant to Public Act 17-3 issued February 1, 2018.

**7. Public Comment**

- a. Seven members of the public were in attendance. There were no questions from the public.

**8. Council Business**

- a. Mr. Semancik reported to the Council that the Governor's Office decided not to proceed with the proposed legislative change to the NEAC statute discussed at the December 2017 meeting. The Governor's Office was concerned that any discussion of decommissioning might influence other legislation actions with respect to Executive Order No. 50 and Public Act 17-3.
- b. The Council agreed to the:
  - i. June 20, 2018 (Wednesday, 3 PM to 5 PM) at ISO – New England: presentation to the Council on Millstone impact on regional fuel security and a tour of the regional electrical grid operations center.
- c. Up-coming regularly scheduled meetings:
  - i. September 13, 2018 – Dominion Annual Presentation
    - 1. Mr. Semancik said that he would poll members by email for topics that they would like Dominion to present.
    - 2. Mr. Jordan noted that Dominion should address Security performance given the recent ADR and the other findings in that area. Other members concurred.
  - ii. December 13, 2018 – Annual Report Meeting

**9. Adjournment**

Motion was made by Mr. Sheehan and seconded by Mr. Jordan to adjourn; no objections; unanimous vote in favor; meeting adjourned at 7:35 PM.

*Sec. 16-11a. Nuclear Energy Advisory Council; composition; duties. (a) There is established a Nuclear Energy Advisory Council which shall (1) hold regular public meetings for the purpose of discussing issues relating to the safety and operation of the nuclear power generating facilities located in this state and to advise the Governor, the General Assembly and municipalities within a five-mile radius of any nuclear power generating facility in this state of such issues, (2) work in conjunction with agencies of the federal, state and local governments and with any electric company operating a nuclear power generating facility to ensure the public health and safety, (3) discuss proposed changes in or problems arising from the operation of a nuclear power generating facility, (4) communicate with any electric company operating a nuclear power generating facility about safety or operational concerns at the facility, which communications may include, but not be limited to, receipt of written reports and presentations to the council, and (5) review the current status of facilities with the Nuclear Regulatory Commission.*

NEAC requests that the NRC's presentation focus on the safety, security, and operation of the facility referenced in the statute by discussing the following items over the period since the last NEAC presentation:

- Issues relating to the safety and operation of the nuclear power generating facilities
  - ROP Performance
  - Summary of significant NRC Findings
    - Millstone Unit 3 Pressure Transient
  - Other regulatory actions
    - ADR on Security (esp organizational aspects)
    - Status of closeout of U3 TDAFW pump issues (GTG finding)
  - NRC performance indicators (PIs)
  - Assessment of Safety Culture including
    - Number of allegations submitted in the past year
    - Are allegations increasing or decreasing (trend)
    - Comparison of the number of allegations at Millstone with numbers at other nuclear power plants
- Discuss proposed changes in or problems arising from the operation of a nuclear power generating facility
  - Significant license changes
  - Offsite Emergency Plan
    - Significant changes
    - NRC Assessment of Licensee response to declared emergency events
      - U2 Containment Fire Alarm
      - U3 Hydrogen Leak
- Other
  - Resident Inspector Staff experience/background
  - Cyber Security of NPPs (non-safeguards level)

# NUCLEAR ENERGY ADVISORY COUNCIL

**Public Meeting**  
**June 20, 2018 2:00 PM**  
**Legislative Office Building**  
**Room 1C**  
**300 Capital Avenue**  
**Hartford, CT 06106**

**Closed Briefing**  
**Independent System Operator – New England (ISO-NE)**  
**One Sullivan Ave**  
**Holyoke, MA 01040**

## MINUTES

### Members Present

Rep Kevin Ryan, Chair

Alternate Chair Mr. Jeffrey Semancik representing DEEP Commissioner Klee

Mr. James Sherrard

Mr. Bill Sheehan

Mr. Tom Nebel

Mr. A. Jordan

Mr. R. Woolrich

Mr. Denny Galloway (alternate)

Mr. Michael Firsick (alternate)

### Members Not Present

CDR Royce W. James, Ph.D.

Mr. Robert Klancko

Mr. Edward Munster

Mr. Gregg Dixon

#### 1. **Call to Order of Meeting**

NEAC Chair Ryan called the meeting to order at 2:07 PM at the Legislative Office Building in Hartford, Waterford, CT.

#### 2. **Approval of Minutes of the April 4, 2018 NEAC meeting**

Mr. Sherrard noted minor administrative corrections. A motion was made to approve the minutes by Mr. Sheehan and seconded by Mr. Jordan. The minutes were approved as amended or objections.

#### 3. **NRC Correspondence Reviewed since past meeting**

NEAC reviewed the following NRC Correspondence was reviewed. The council did not have any questions or comments.

- a. Millstone Power Station – Integrated Inspection Report 05000336/2018001 and 05000423/2018001019 dated May 3, 2018

- b. March 7, 2018, NRC Generic Fundamentals Examination Results for Millstone Power Station, Unit 3 (Cover Letter Publicly Available, Enclosures Withheld From Public) dated April 12, 2018 (Public Version)
- c. Millstone Power Station – Evaluated Emergency Preparedness Exercise Inspection Report 05000336/2018501 and 05000423/2018501 dated April 17, 2018.
- d. Millstone Power Station – Integrated Inspection Report 05000336/2018001 AND 05000423/2018001 dated May 3, 2018.
- e. NRC Letter to Mr. Paul Gunter, Director Reactor Oversight Project for Beyond Nuclear - Proposed Director's Decision under 10 CFR 2.206 dated June 6, 2018.
- f. Millstone Power Station – Integrated Inspection Report 05000336/2017002 and 05000423/2017002 dated August 9, 2017.

**4. Other material reviewed**

NEAC reviewed the following information related to nuclear industry and trends. The council did not have any questions or comments.

- a. Department of Energy and Environmental Protection (DEEP) and Public Utilities Regulatory Authority (PURA), Governor's Executive Order Number 59: DEEP and PURA Joint Proceeding Docket No. 17-07-32 - DEEP and PURA Joint Proceeding to Implement the Governor's Executive Order Number 59 Notice of Close of Proceeding dated April 30, 2018.
- b. First Energy Solutions letter L-18-109 Certification of Permanent Cessation of Power Operations for Beaver Valley Power Station. Unit Nos. 1 and 2. Davis-Besse Nuclear Power Station. Unit No. 1 and Perry Nuclear Power Plant. Unit No. 1 to NRC dated April 25, 2018.
- c. H.R. 3053, the Nuclear Waste Policy Amendments Act of 2018 overview and summary from the House Energy & Commerce committee.

**5. Public Comment**

- a. Three members of the public were in attendance. There were no questions from the public.

**6. Adjournment**

Motion was made by Mr. Sheehan and seconded by Mr. Jordan to adjourn; no objections; unanimous vote in favor; meeting adjourned at 2:15 PM.

**7. Closed Briefing**

- a. After conclusion of the public meeting, NEAC travelled to the Independent System [electrical grid] Operator – New England (ISO – NE) for a tour and briefing on electrical grid operations, market dynamics, regulatory impacts, cybersecurity, and fuel security. Due to market sensitivity and security access requirements at ISO – NE, this briefing and tour were closed to the public. A public version of the briefing is attached.



# ISO New England Overview and Regional Update

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*CT Nuclear Energy Advisory Council*

Kerry Schlichting

EXTERNAL AFFAIRS REPRESENTATIVE



# ISO New England (ISO) Has Two Decades of Experience Overseeing the Region's Restructured Electric Power System

- **Regulated** by the Federal Energy Regulatory Commission
- **Reliability Coordinator** for New England under the North American Electric Reliability Corporation
- **Independent** of companies in the marketplace and **neutral** on technology



# ISO New England Performs Three Critical Roles to Ensure Reliable Electricity at Competitive Prices

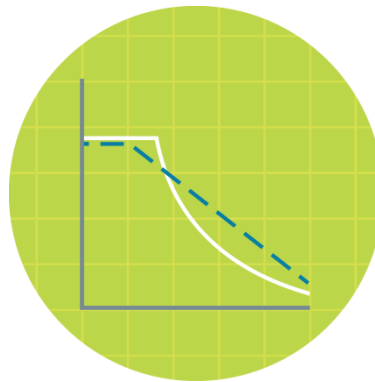
## Grid Operation

Coordinate and direct the flow of electricity over the region's high-voltage transmission system



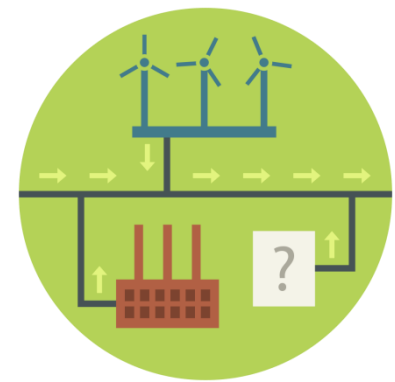
## Market Administration

Design, run, and oversee the markets where wholesale electricity is bought and sold



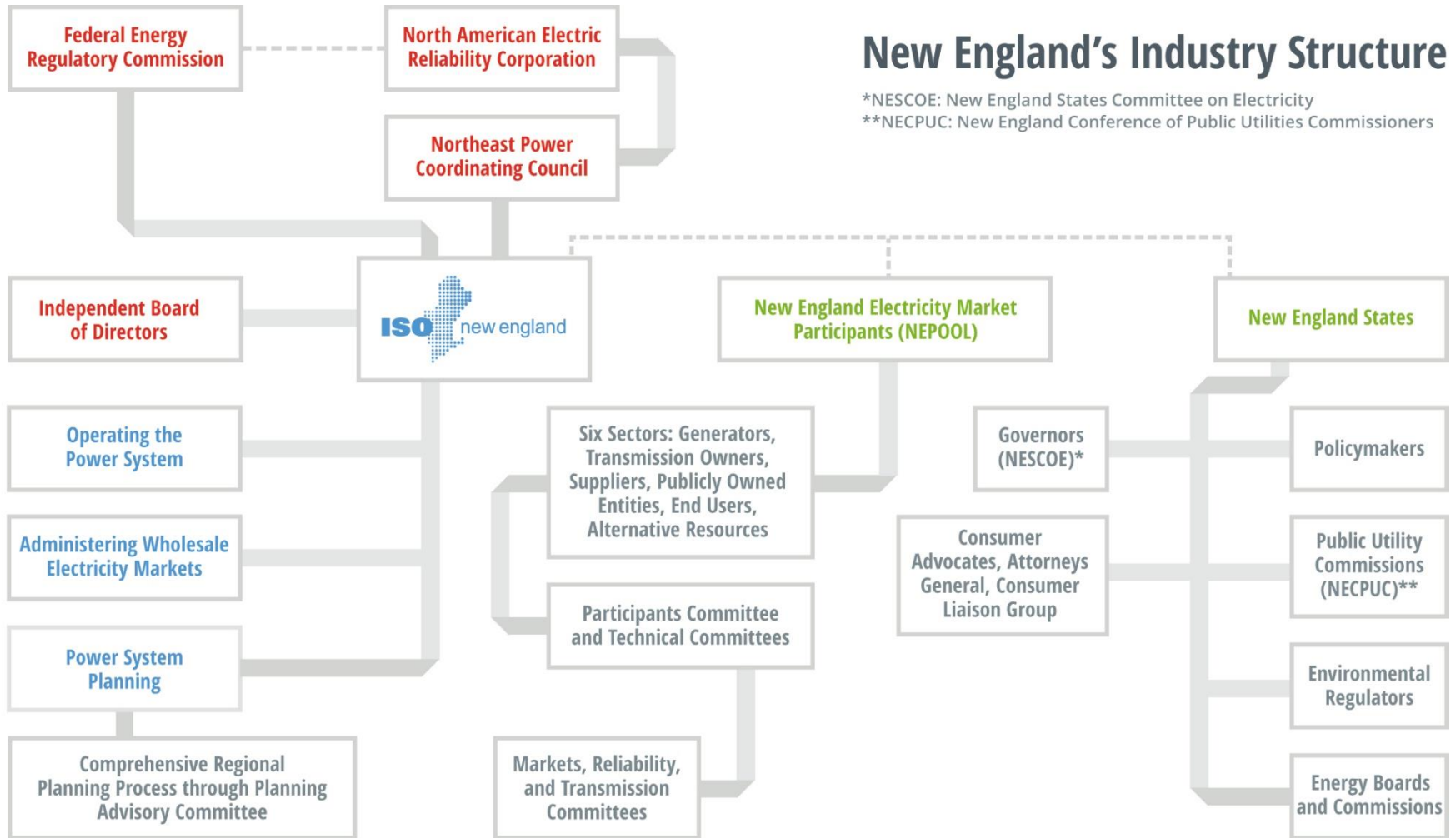
## Power System Planning

Study, analyze, and plan to make sure New England's electricity needs will be met over the next 10 years



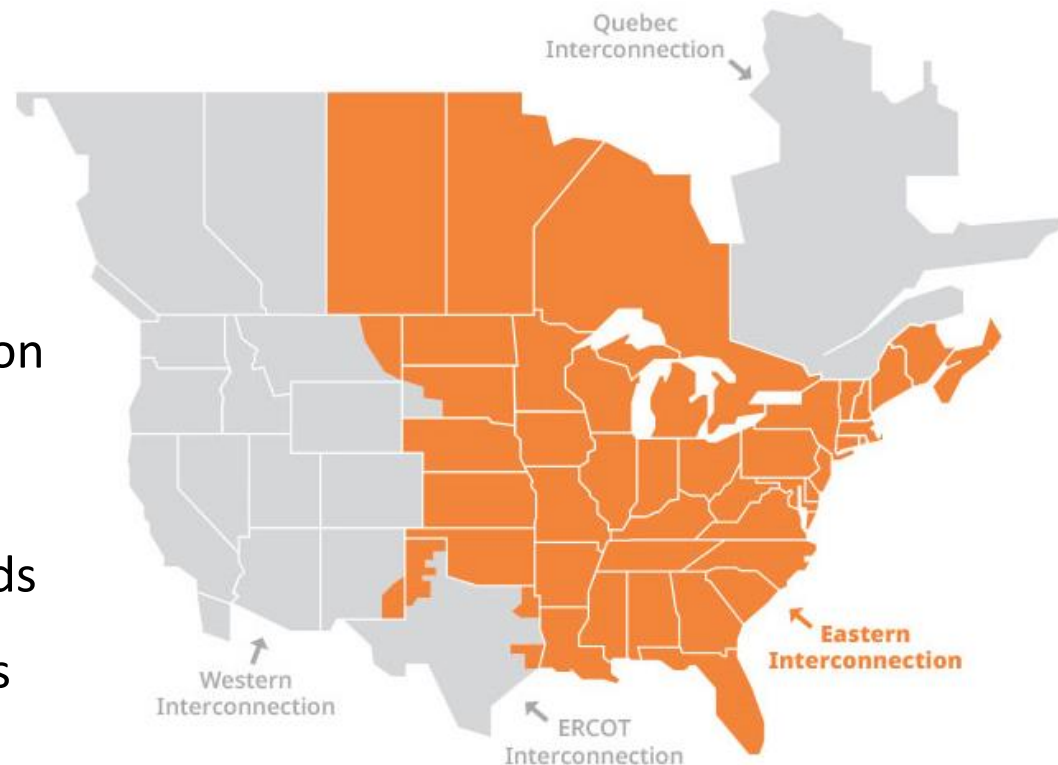


# Numerous Entities Including an Independent Board Provide Oversight of and Input on ISO's Responsibilities



# New England's Power Grid Is Part of a Larger Electric Power System

- Part of the **Eastern Interconnection**, one of four large power grids in North America
  - Interconnected through primarily alternating current (AC) transmission
- Tied to **Québec** only through direct current (DC) transmission
- 2003 blackout ushered in wide-area monitoring and **mandatory** reliability standards
- Subject to reliability standards set by **NERC** and **NPCC**\*

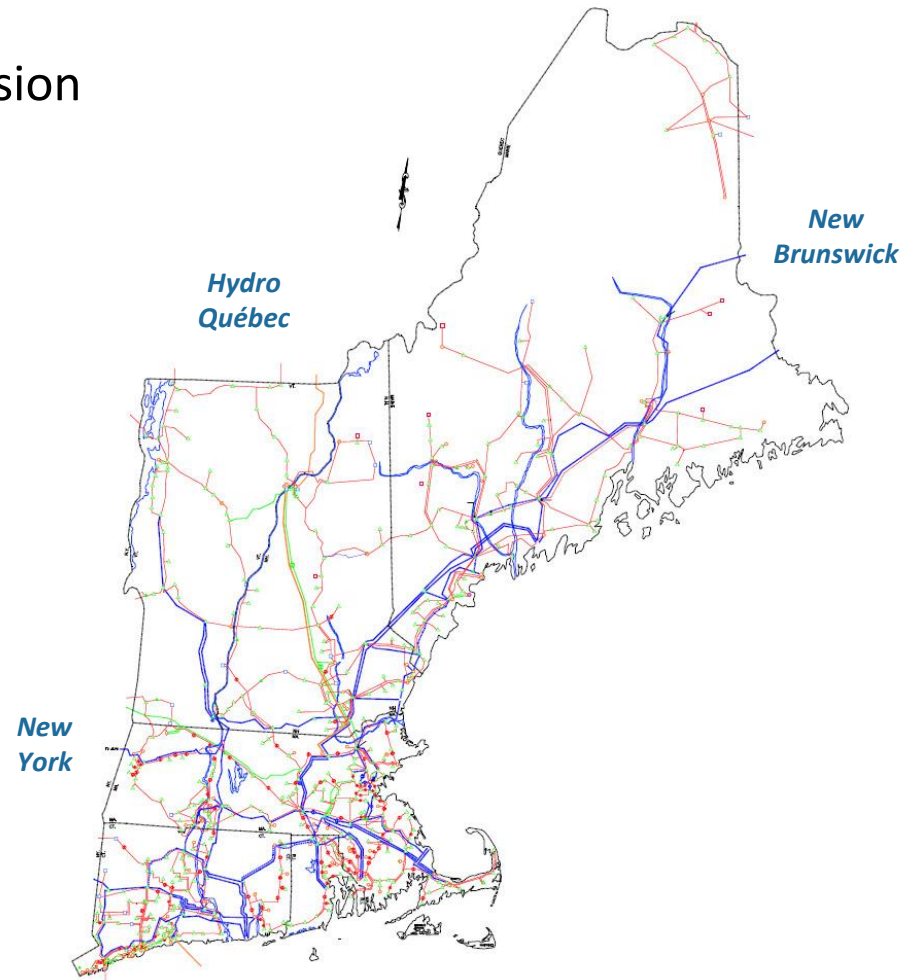


\* North American Electric Reliability Corporation (NERC) and Northeast Power Coordinating Council (NPCC)



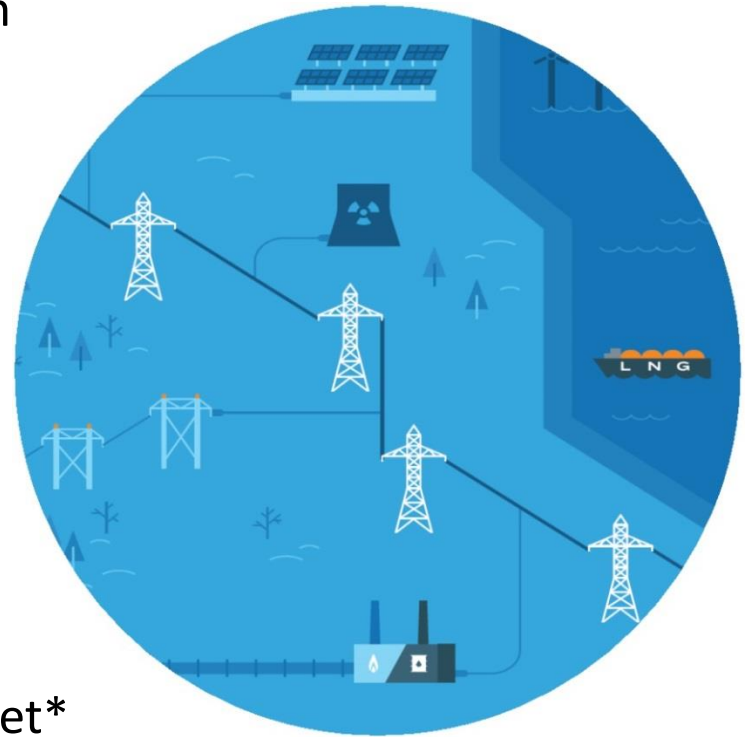
# New England's Transmission Grid Is the Interstate Highway System for Electricity

- **9,000 miles** of high-voltage transmission lines (115 kV and above)
- **13 transmission interconnections** to power systems in New York and Eastern Canada
- **17%** of region's energy needs met by imports in 2017
- **\$10.4 billion** invested to strengthen transmission system reliability since 2002; **\$1.9 billion** planned
- Developers have proposed multiple transmission projects to access **non-carbon-emitting resources** inside and outside the region



# Generation and Demand Resources Are Used to Meet New England's Energy Needs

- **350** dispatchable generators in the region
- **31,000 MW** of generating capacity
- **15,000 MW** of proposed generation in the ISO Queue
  - Mostly wind and natural gas
- **4,600 MW** of generation have retired or will retire in the next few years
- **400 MW** of active demand response and **2,500 MW** of energy efficiency with obligations in the Forward Capacity Market\*
  - Beginning June 1, 2018, demand resources will have further opportunities in the wholesale markets



\* In the Forward Capacity Market, demand-reduction resources are treated as capacity resources.



# Demand Patterns Are Changing

- **7.2 million** retail electricity customers drive the demand for electricity in New England (14.8 million population)
  - Region's all-time summer peak demand: **28,130 MW** on August 2, 2006
  - Region's all-time winter peak demand: **22,818 MW** on January 15, 2004
- Energy efficiency (EE) and behind-the-meter (BTM) solar are **reducing** peak demand growth and overall electricity use over the next ten years
  - **-0.2%** annual growth rate for summer peak demand (with EE and BTM solar)
  - **-0.9%** annual growth rate for overall electricity use (with EE and BTM solar)
- BTM solar is **shifting** peak demand later in the day in the summertime

Note: Without energy efficiency and solar, the region's peak demand is forecasted to grow 0.8% annually and the region's overall electricity demand is forecasted to grow 0.9% annually. Summer peak demand is based on the "90/10" forecast for extreme summer weather.

# ISO New England Is Focused on Developing Solutions to Today's Grid Challenges

## Balancing Multiple Policy Objectives

Accommodating the states' clean energy goals while maintaining competitively based capacity pricing for other resources



## Addressing Fuel Security

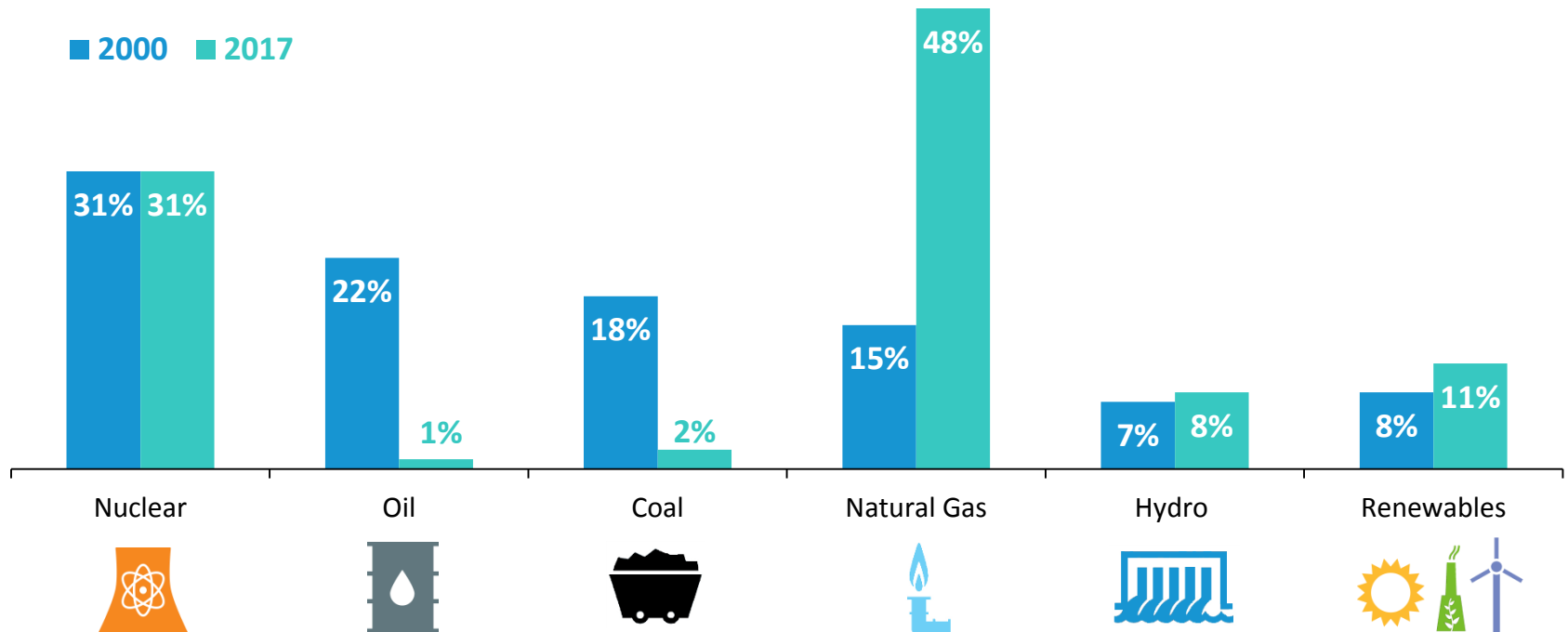
Ensuring the region's generators have adequate fuel to produce electricity, particularly in the wintertime



# Dramatic Changes in the Energy Mix

*The fuels used to produce the region's electric energy have shifted as a result of economic and environmental factors*

Percent of Total **Electric Energy** Production by Fuel Type  
(2000 vs. 2017)



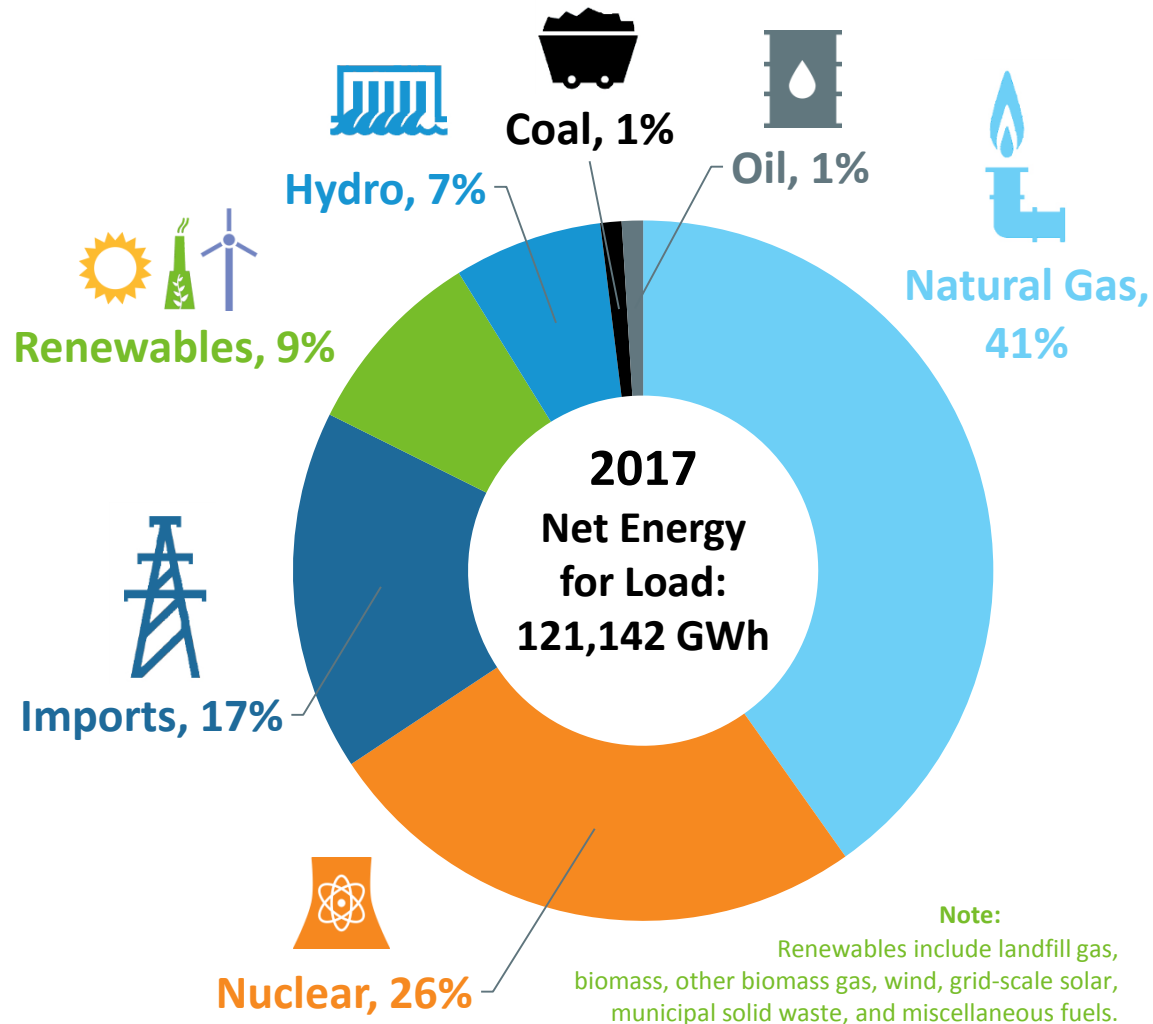
Source: ISO New England [Net Energy and Peak Load by Source](#)

Renewables include landfill gas, biomass, other biomass gas, wind, grid-scale solar, municipal solid waste, and miscellaneous fuels.

This data represents electric generation within New England; it does not include imports or behind-the-meter (BTM) resources, such as BTM solar.

# Lower-Emitting Sources of Energy Supply Most of New England's Electricity

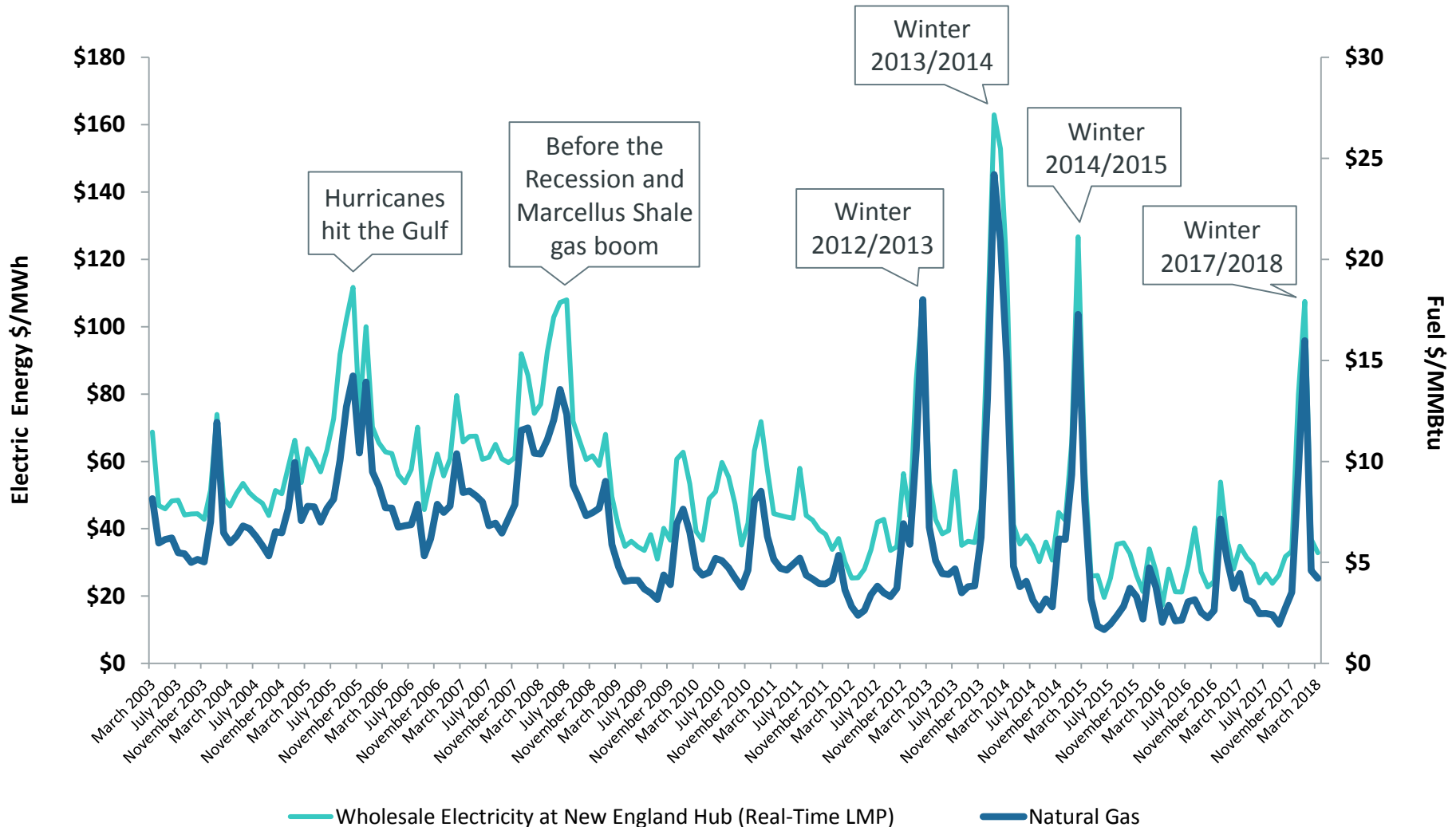
- In 2017, most of the region's energy needs were met by natural gas, nuclear, imported electricity (mostly hydropower from Eastern Canada), renewables, and other low- or non-carbon-emitting resources
- Region is transitioning away from older coal and oil resources





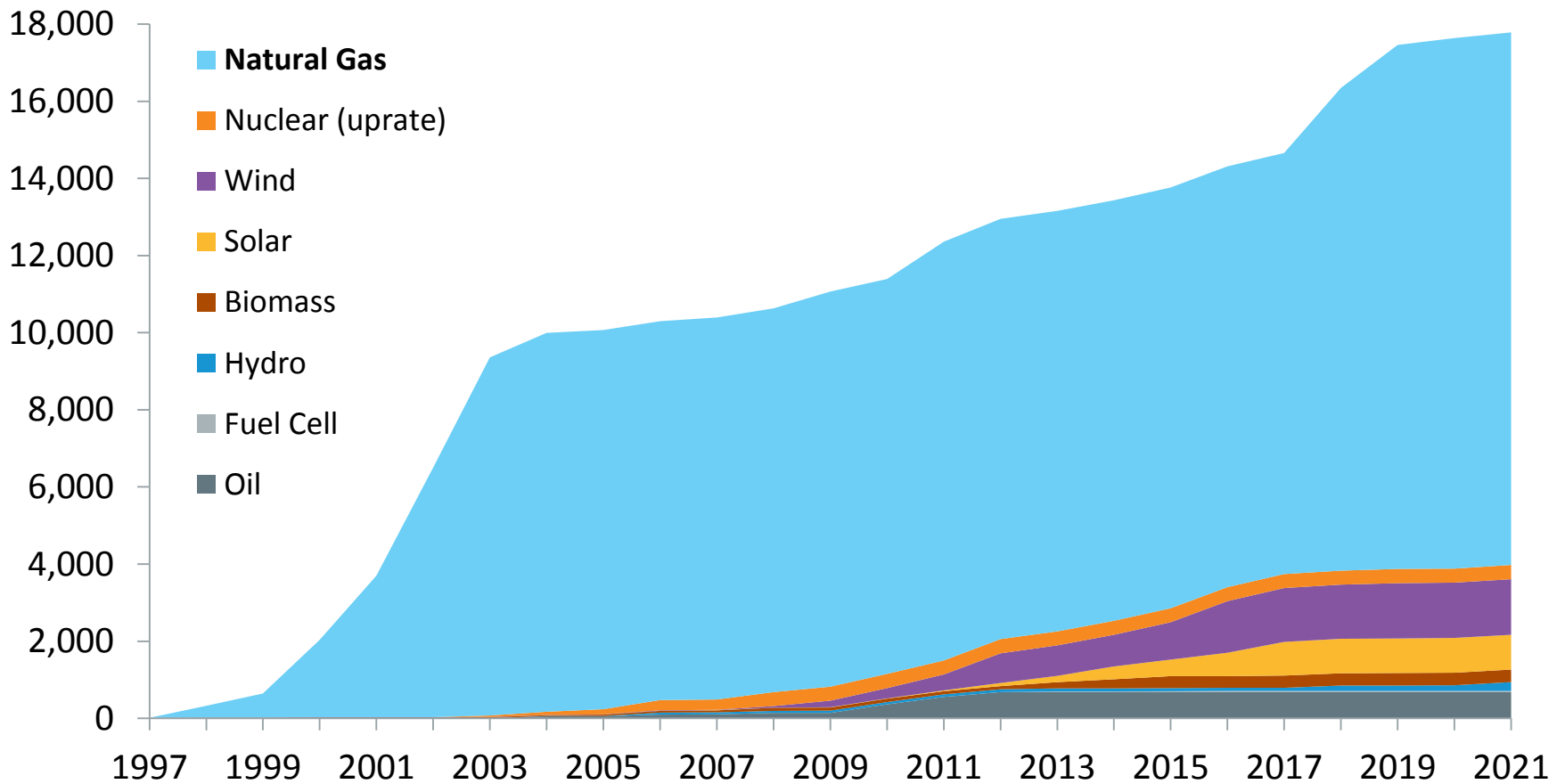
# Natural Gas and Wholesale Electricity Prices Are Linked

Monthly average natural gas and wholesale electricity prices at the New England hub

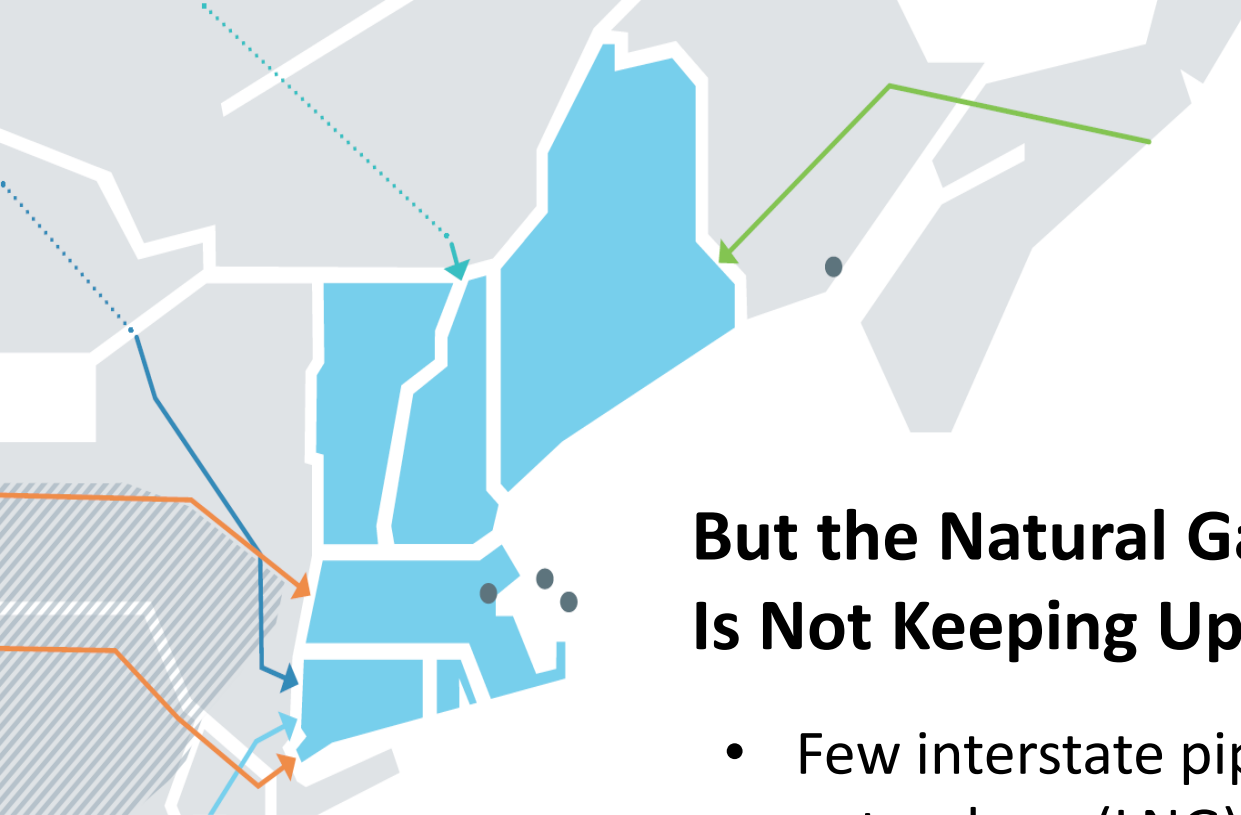


# Natural Gas Is the Dominant Fuel Source for New Generating Capacity in New England

Cumulative New Generating Capacity in New England (MW)

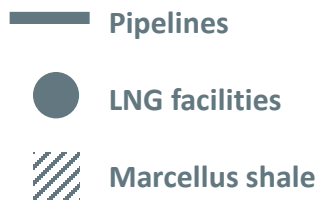


Note: New generating capacity for years 2018 – 2021 includes resources clearing in recent Forward Capacity Auctions.

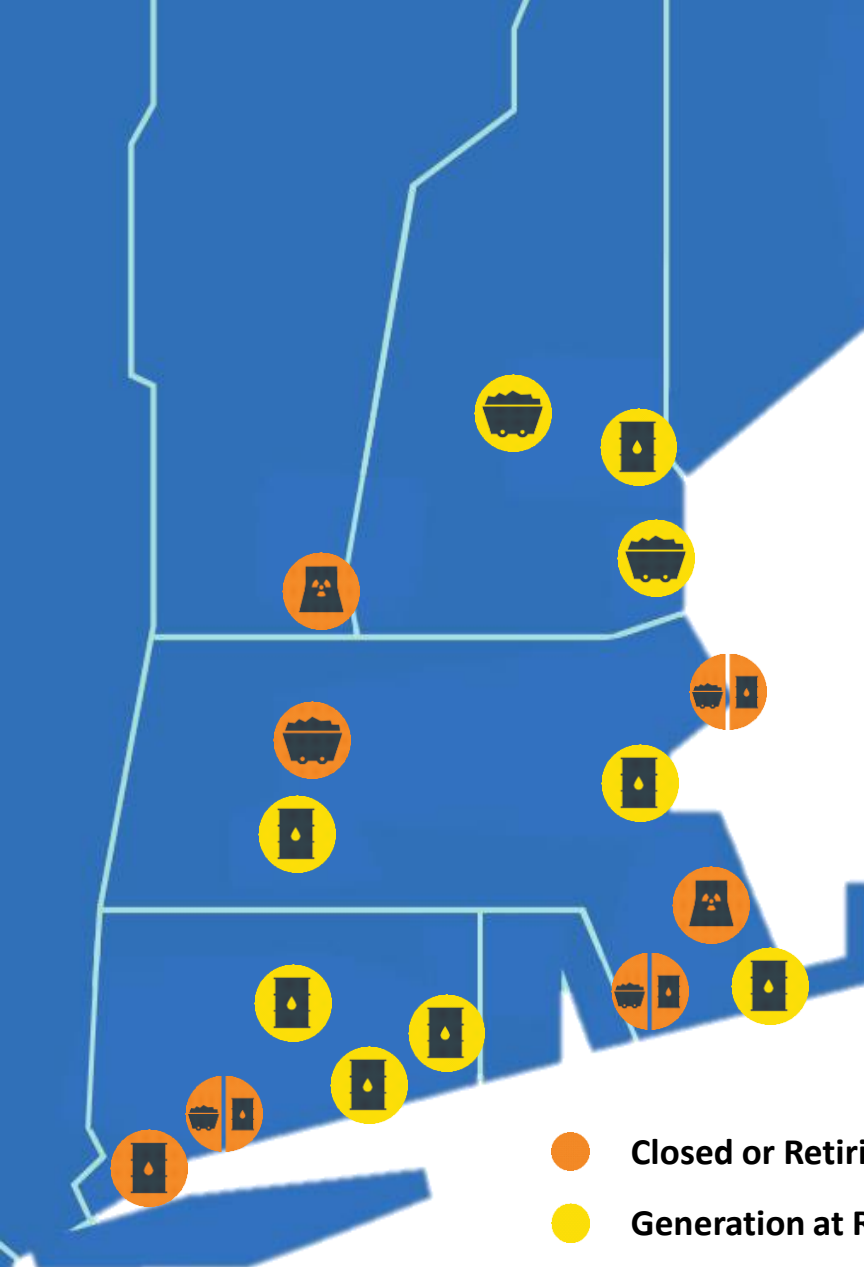


## But the Natural Gas Delivery System Is Not Keeping Up with Demand

- Few interstate pipelines and liquefied natural gas (LNG) delivery points
- Regional pipelines are:
  - Built to serve heating demand, not power generation
  - Running at or near maximum capacity during winter



Source: ISO New England

A map of New England (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island) is shown in blue. Various power generation icons are placed across the map. A legend at the bottom indicates that orange icons represent 'Closed or Retiring' and yellow icons represent 'Generation at Risk'. The icons include symbols for coal (a train car), oil (a barrel), natural gas (a flame), and nuclear (a radiation symbol).

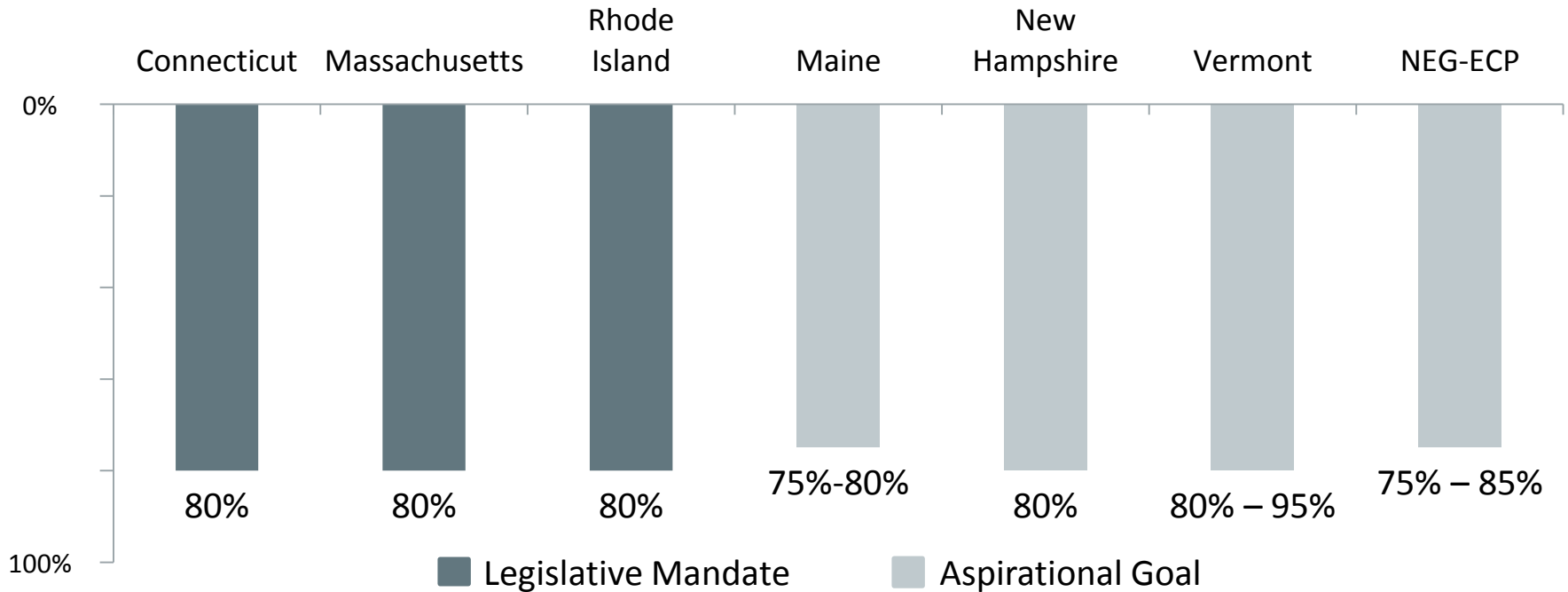
## Since 2013, More Than 4,600 MW of Generation Have Retired or Announced Plans for Retirement in the Coming Years

- More than **5,000 MW** of remaining coal and oil are at risk of retirement
- These resources have played a **critical** role in recent winters when natural gas supply is constrained in New England

● Closed or Retiring  
● Generation at Risk

# States Have Set Goals for Reductions in Greenhouse Gas Emissions: *Some Mandated, Some Aspirational*

Percent Reduction in Greenhouse Gas (GHG) Emissions Economy Wide by 2050\*



The New England states are promoting GHG reductions on a state-by-state basis, and at the regional level, through a combination of legislative mandates (e.g., CT, MA, RI) and aspirational, non-binding goals (e.g., ME, NH, VT and the New England Governors and Eastern Canadian Premiers).

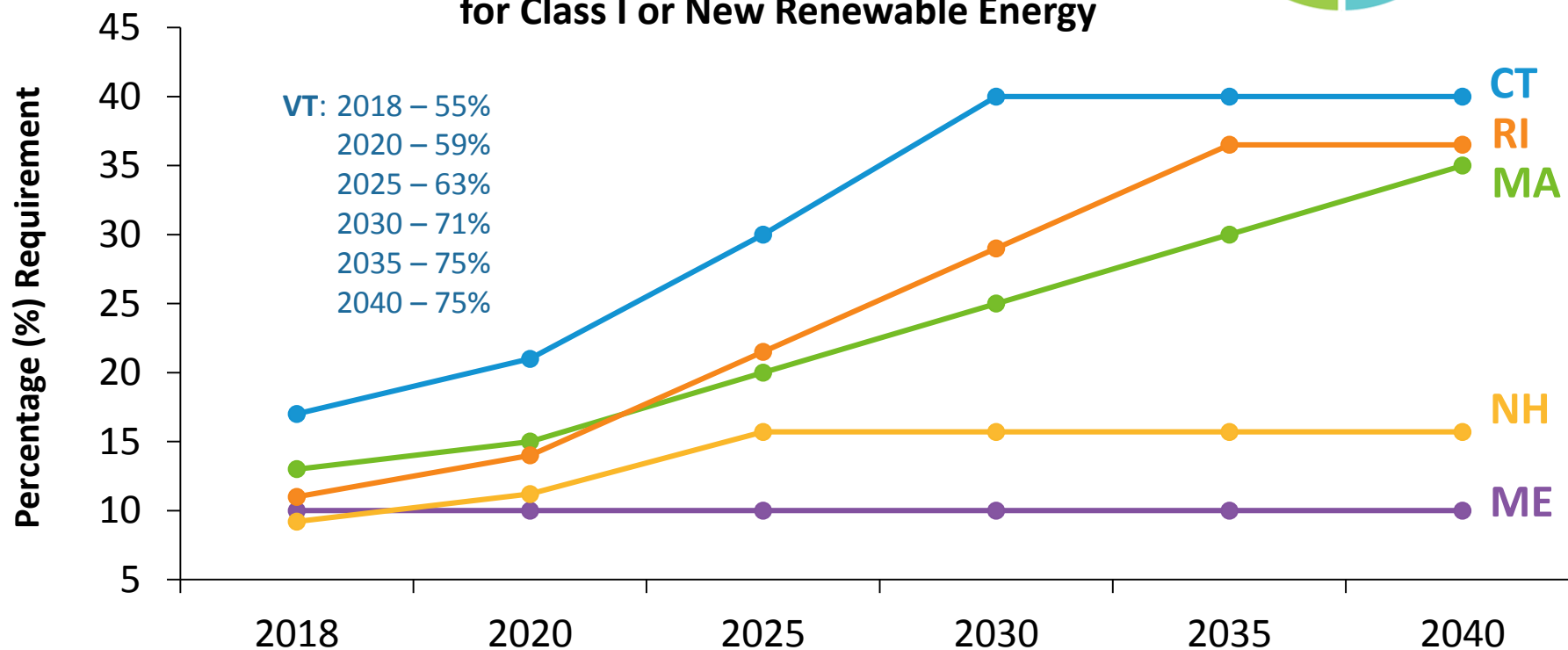
\* MA, RI, NH, and VT use a 1990 baseline year for emissions reductions. CT and the NEG-ECP use a 2001 baseline. ME specifies reductions below 2003 levels that *may* be required “in the long term.” For more information, see the following ISO Newswire article: <http://isonewswire.com/updates/2017/3/1/the-new-england-states-have-an-ongoing-framework-for-reducin.html>.

# Renewable Energy Is on the Rise

State policy requirements are a major driver



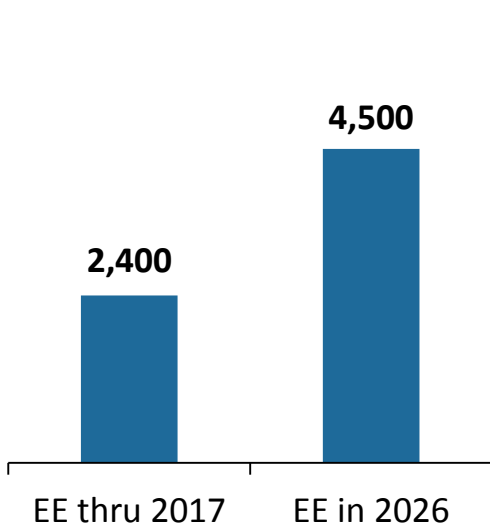
## State Renewable Portfolio Standard (RPS)\* for Class I or New Renewable Energy



Notes: Connecticut's Class I RPS requirement plateaus at 20% in 2020. Maine's Class I RPS requirement plateaus at 10% in 2017 and expires in 2022 (but has been held constant in this chart for illustrative purposes). Massachusetts' Class I RPS requirement increases by 1% each year after 2020 with no stated expiration date. New Hampshire's percentages include the requirements for both Class I and Class II resources (Class II resources are new solar technologies beginning operation after January 1, 2006). New Hampshire's Class I and Class II RPS requirements plateau at 15.7% in 2025. Rhode Island's requirement for 'new' renewable energy plateaus at 36.5% in 2035. Vermont's 'total renewable energy' requirement plateaus at 75% in 2032; it recognizes all forms of new and existing renewable energy and is unique in classifying large-scale hydropower as renewable.

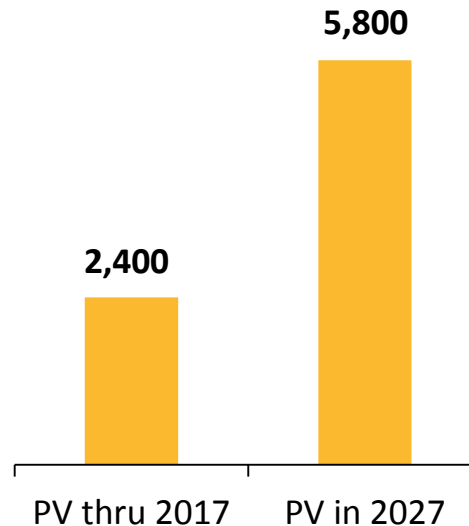
# Energy-Efficiency and Renewable Resources Are Trending Up in New England

## Energy Efficiency (MW)



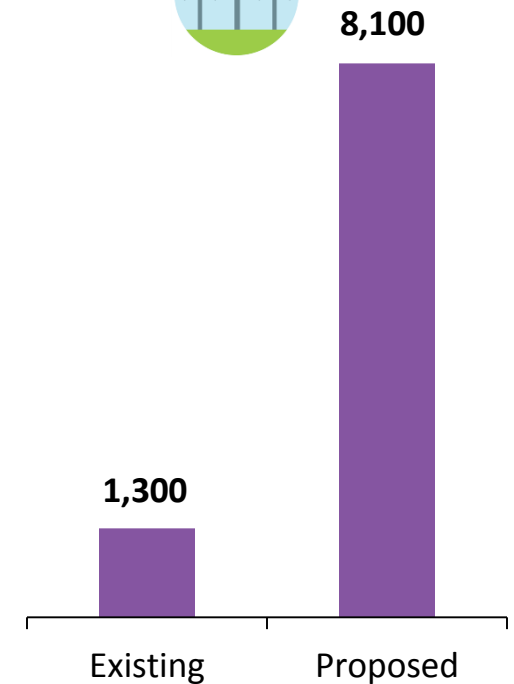
*Final 2017 CELT Report*, EE through 2017 includes EE resources participating in the Forward Capacity Market (FCM). EE in 2026 includes an ISO-NE forecast of incremental EE beyond the FCM.

## Solar (MW)



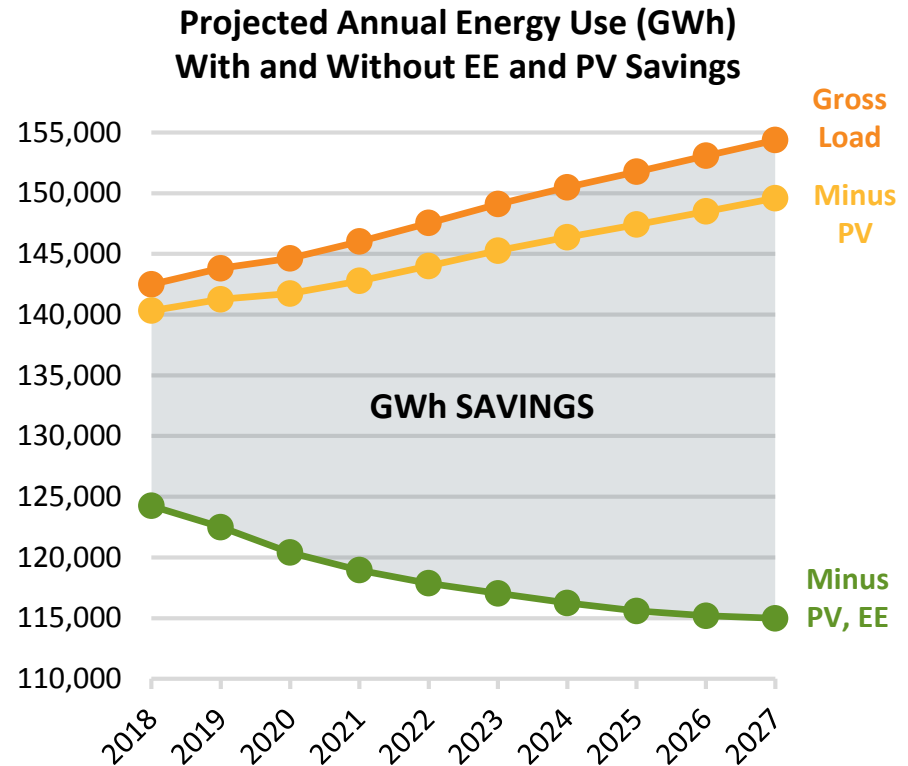
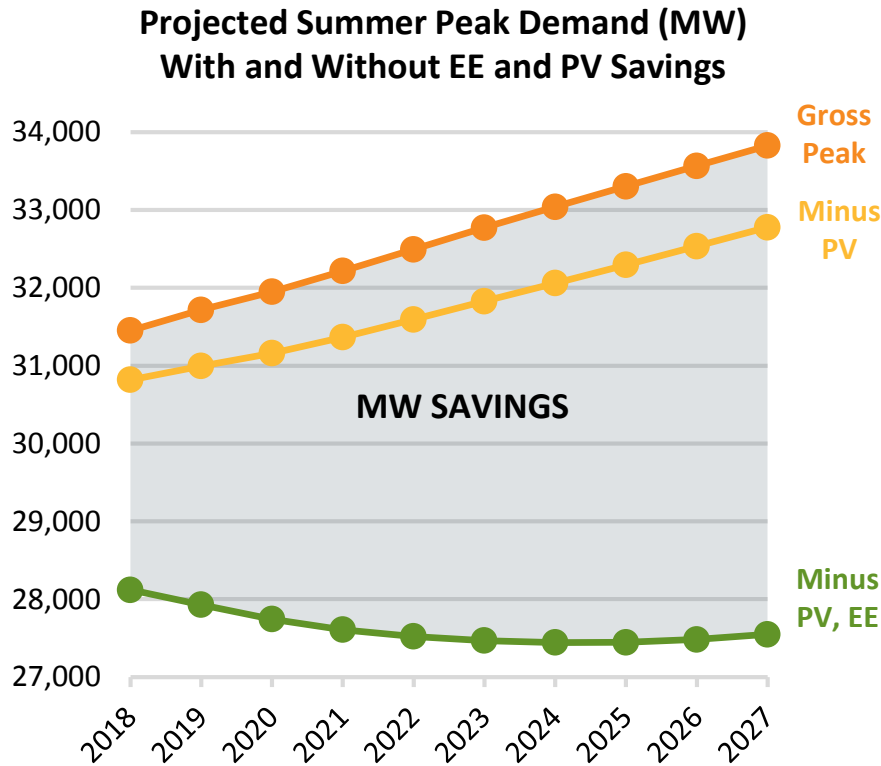
*Final 2018 ISO-NE PV Forecast*, AC nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter."

## Wind (MW)



Nameplate capacity of existing wind resources and proposals in the ISO-NE Generator Interconnection Queue; some wind proposals include battery storage.

# Energy Efficiency and Behind-the-Meter Solar Are Reducing Peak Demand and Annual Energy Use



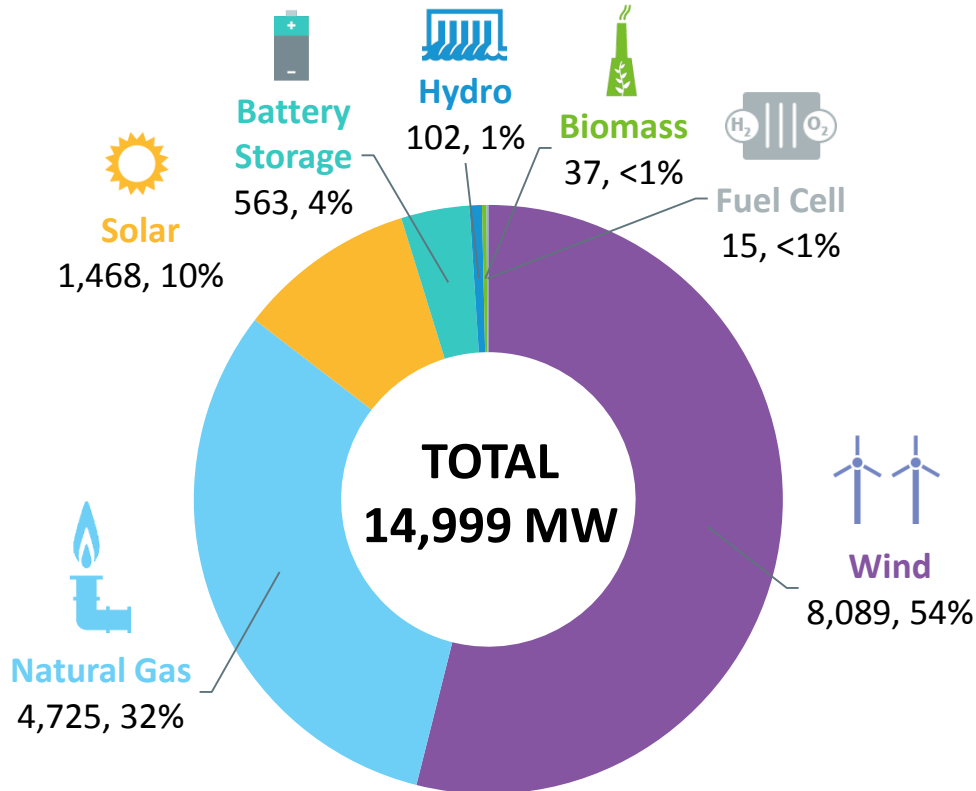
- The gross peak and load forecast
- The gross peak and load forecast minus existing and anticipated “behind-the-meter” (BTM) solar PV resources
- The gross peak and load forecast minus existing and anticipated BTM solar PV and energy efficiency

Note: Summer peak demand is based on the “90/10” forecast, which accounts for the possibility of extreme summer weather (temperatures of about 94° F).  
 Source: [ISO New England 2018-2027 Forecast Report of Capacity, Energy, Loads, and Transmission](#) (2018 CELT Report) (April 2018)



# Wind Power and Natural Gas Dominate New Resource Proposals in the ISO Interconnection Queue

## Proposals by Type



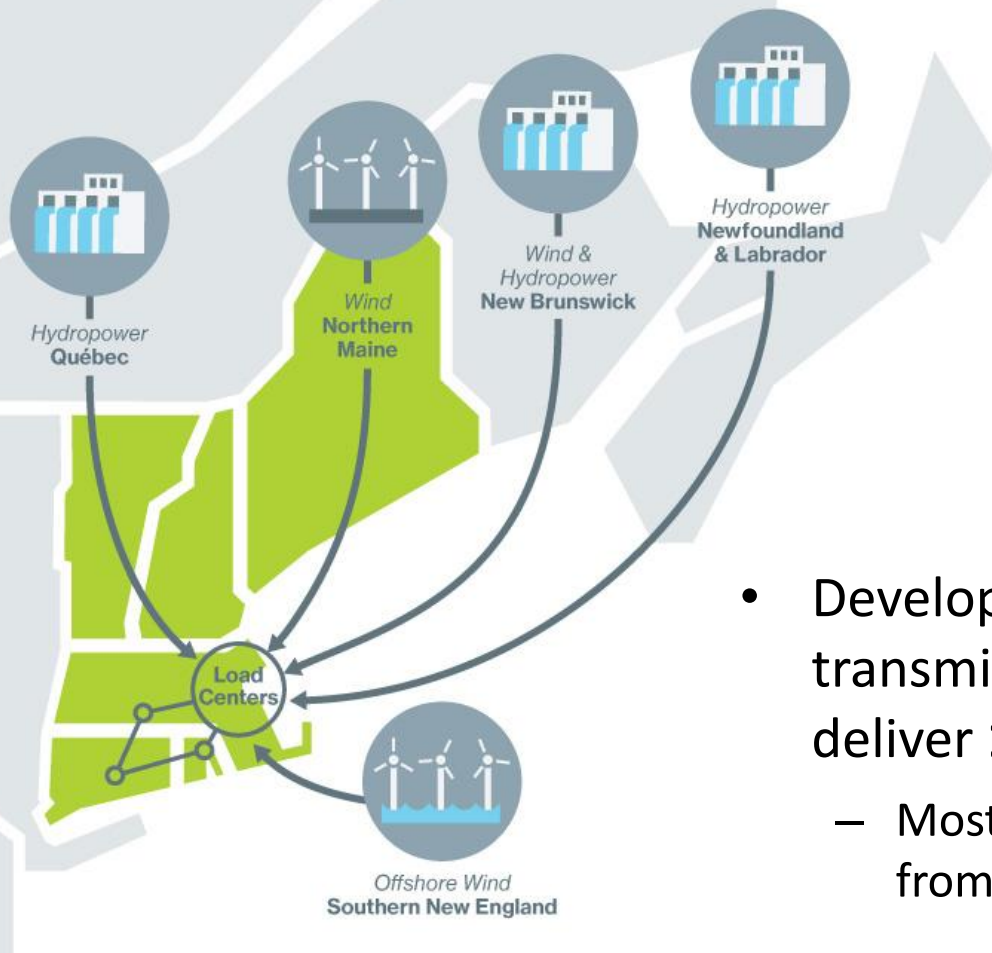
## Proposals by State

State	Megawatts (MW)
Massachusetts	6,191
Maine	4,643
Connecticut	2,674
Rhode Island	1,125
New Hampshire	213
Vermont	153
<b>Total</b>	<b>14,999</b>

Note: Some natural gas proposals include dual-fuel units (oil); some wind and solar proposals include battery storage; megawatts represent nameplate capacity ratings; megawatts have been rounded for each proposal.

Source: ISO Generator Interconnection Queue (April 2018)  
FERC and Non-FERC Jurisdictional Proposals

# Developers Are Proposing Large-Scale Transmission Projects to Help Deliver Clean Energy to Load Centers



*Map is representative of the types of projects announced for the region in recent years*

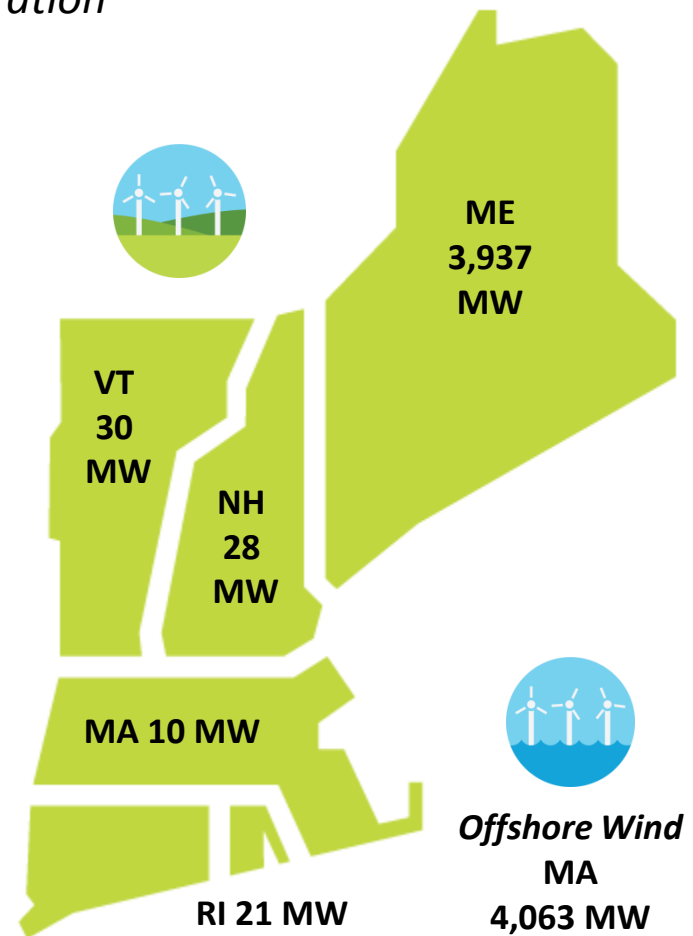
- Developers are proposing **18** elective transmission upgrades (ETUs) to help deliver **15,000+ MW** of clean energy
  - Mostly Canadian hydro and onshore wind from northern New England
- Wind projects make up **54%** of proposed new power resources, but most are remote
- Massachusetts has plans to contract for **1,600 MW** of offshore wind

Source: [ISO Interconnection Queue](#) (April 2018)

# On- and Off-Shore Wind Is Being Proposed

*Represents more than half of proposed generation*

- Nearly **8,100 MW** of wind proposed
- Majority of wind proposals in Maine and off the coast of Massachusetts



Source: ISO Generator Interconnection Queue (April 2018)  
FERC and Non-FERC Jurisdictional Proposals; Nameplate Capacity Ratings

Note: Some wind proposals include battery storage.

# New Energy Storage Technologies Are Coming On Line

- **20 MW** of grid-scale battery storage projects have come on line since late 2015
- More than **500 MW** of grid-scale energy storage are requesting interconnection
- New England has a successful history of operating the region's two large pumped-storage facilities, which can supply **1,800 MW** of power within 10 minutes for up to 7 hours

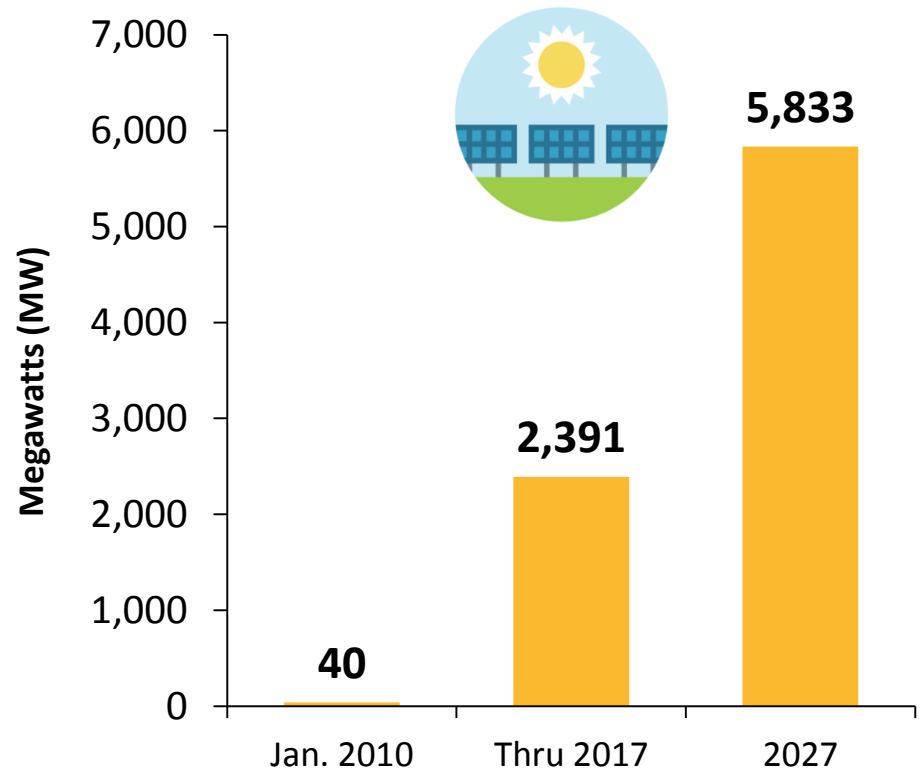


# ISO New England Forecasts Strong Growth in Solar Photovoltaic (PV) Resources

December 2017 Solar PV Installed Capacity (MW<sub>ac</sub>)

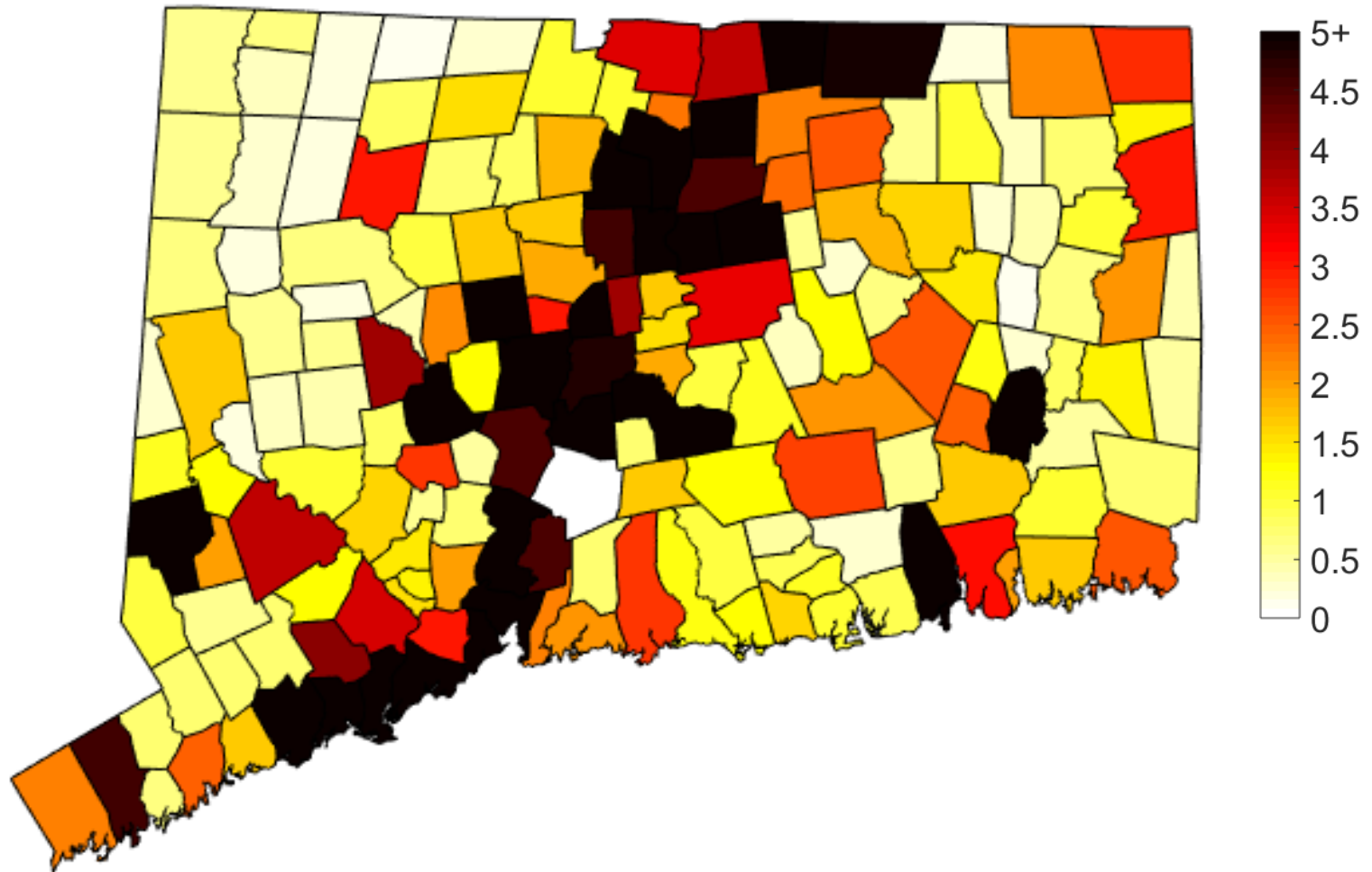
State	Installed Capacity (MW <sub>ac</sub> )	No. of Installations
Connecticut	365.6	29,512
Massachusetts	1,602.3	78,047
Maine	33.5	3,598
New Hampshire	69.7	7,330
Rhode Island	62.2	4,148
Vermont	257.2	9,773
<b>New England</b>	<b>2,390.5</b>	<b>132,408</b>

Cumulative Growth in Solar PV through 2027 (MW<sub>ac</sub>)



Note: The bar chart reflects the ISO's projections for nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter." Source: [Final 2018 PV Forecast](#) (March 2018); MW values are AC nameplate.

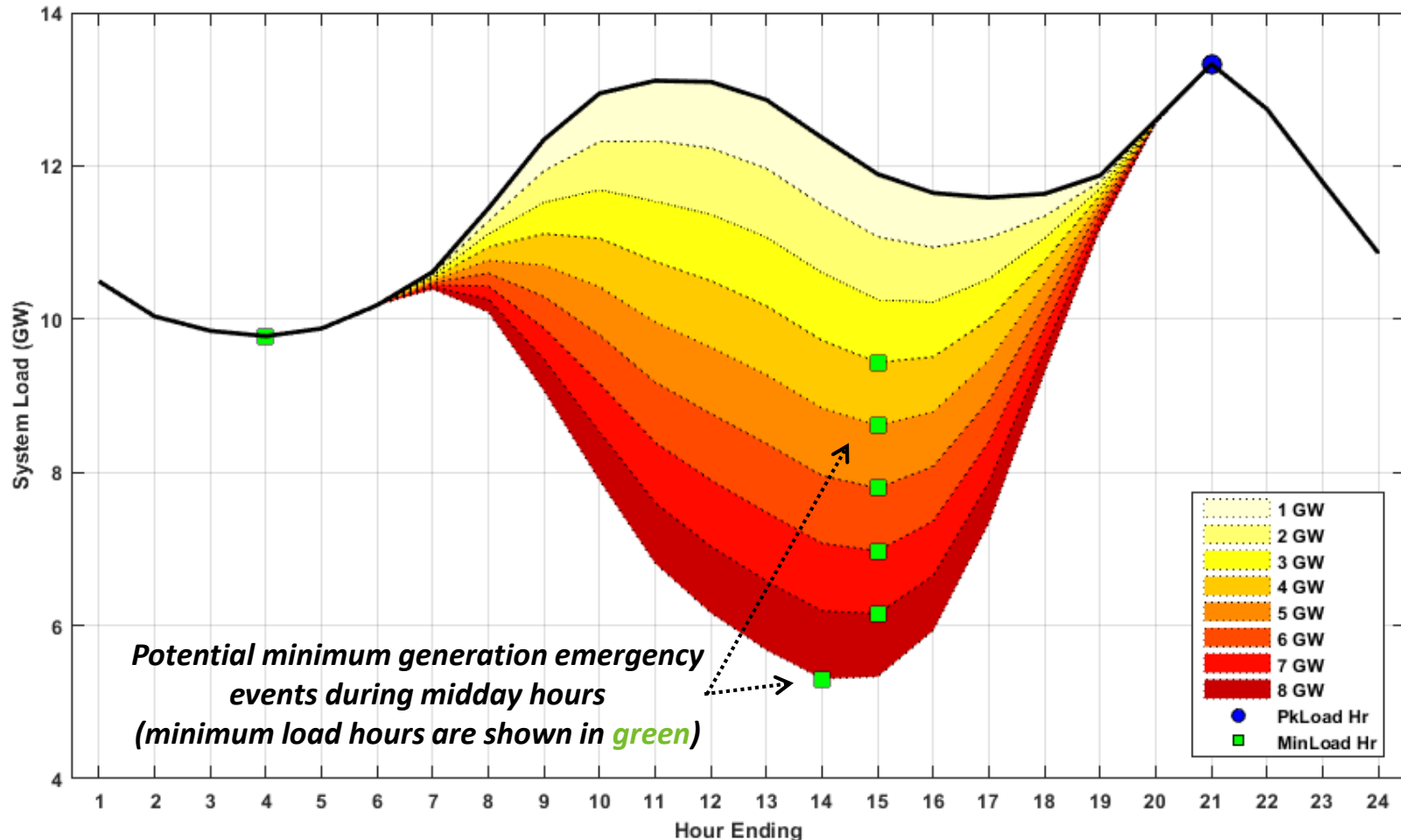
# Connecticut Installed Solar PV “Heat Map”



Note: Heat map reflects solar PV installed through December 2017.

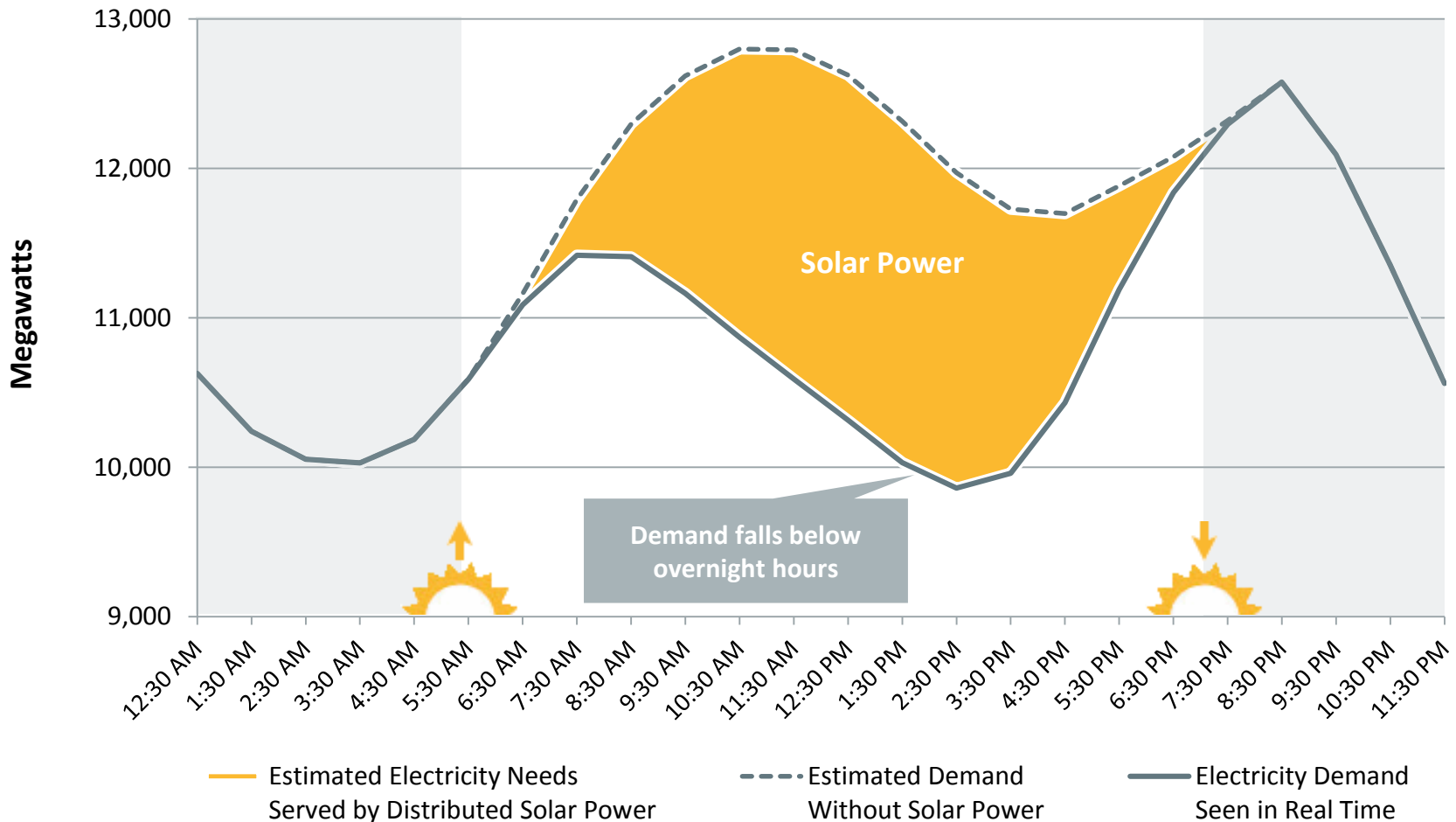
# Solar in Spring/Fall Displaces Generation and Increases Need to Back Down Generation in Low-Load Hours

Sunday, April 20, 2014



# Historic Dip in Midday Demand with Record-High Solar Power Output on April 21, 2018

At 1:30 p.m., behind-the-meter solar reduced grid demand by more than 2,300 MW





# Addressing Fuel-Security Risks Is Vital to Ensuring Reliability through the Grid's Rapid Transformation

- Launched in the fall of 2016, ISO New England's Operational Fuel-Security Analysis (OFSA) was released in January 2018
- The analysis examines **23** possible fuel-mix combinations during the 2024-2025 winter, and quantifies each case's **fuel-security risk**
  - *i.e.*, the number and duration of energy shortfalls that would require implementation of emergency procedures to maintain reliability
- The study assumed **no** additional natural gas pipeline capacity to serve generators would be added during the study timeframe
- The study seeks to illustrate the **range of potential risks** that could confront the power system if fuel and energy were constrained during the winter



# Study Suggests Six Major Conclusions



- 1. Outages:** The region is vulnerable to the season-long outage of any of several major energy facilities.
- 2. Key Dependencies:** As we retire more resources, reliability becomes heavily dependent on LNG and electricity imports; more dual-fuel capability is also a key reliability factor.
- 3. Logistics:** Timely availability of fuel is critical, highlighting the importance of fuel-delivery logistics.
- 4. Risk:** All but four of 23 scenarios result in load shedding, indicating a trend towards increased fuel-security risk.
- 5. Renewables:** More renewables can help lessen fuel-security risk but are likely to drive oil-and coal-fired generator retirements, requiring high LNG imports to counteract the loss of stored fuels.
- 6. Positive Outcomes:** Higher levels of LNG, imports, and renewables can minimize system stress and maintain reliability; delivery assurances for LNG and imports, as well as transmission expansion, will be needed.

# Recent Cold Weather Period Reinforces Findings in *Operational Fuel-Security Analysis (OFSA)*

- During the recent cold weather period (from December 26 to January 8), gas and oil **fuel price inversion** led to oil being in economic merit and base loaded, leading to rapid depletion of the region's oil supply
- Fuel delivery **logistics** became a concern
  - Heating customers get priority for oil and gas
  - Storms can delay trucked oil and LNG tankers
  - Truck drivers face restrictions on driving time
- With oil being base loaded, **emissions** limitations became a concern for several oil-fired generators



# A “Hybrid Grid” Is Emerging

The region is changing how it generates, delivers, and uses electricity

- Large grid-connected power resources + thousands of small “behind-the-meter” resources
- Changes in how much grid energy people use and when they use it
- Significant amounts of variable generation and some battery storage
- Two-way grid communications



# FOR MORE INFORMATION...



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[ISO Express](#) provides real-time data on New England's wholesale electricity markets and power system operations

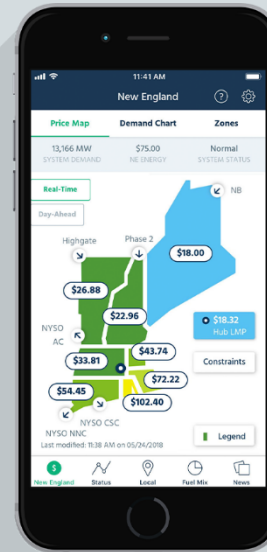


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# Questions





- ii. Mr. Jordan asked what the license class attrition rate was. Mr. O'Connor noted that the pass rate for those taking the exam was 100%. Prior to the exam, Dominion had only removed 1 candidate out of last 43 from the program.
- iii. Mr. O'Connor also introduced two members of Millstone Emerging Leader program – a maintenance electrician and an Instrumentation and controls (I&C) technician. They were attending the meeting as a professional development opportunity.
- iv. Mr. Semancik noted that the organization still had a management position for a Performance Recovery Director. Mr. O'Connor noted that the station was performing at a high level and some changes may occur after the fall refueling outage. However, he stated that this director position is providing additional capacity in performance improvement and would be expected to continue in a similar role. CDR James asked how performance was measured. Mr. Holt noted that there was an extensive set of metrics for each station maintained by the Institute of Nuclear Power Operators (INPO). Key performance metrics are aggregated and Millstone has a composite score of 100%. He also noted that it has been over 500 days since the last human performance event, over 200 days since the last equipment reliability rest, and the station has a high safety culture.
- e. NRC Findings – 10 Green (very low safety significance) Non-cited Violations (NCVs) in 2017 and 7 Green NCVs in 2018
  - i. Mr. Sheehan noted that one violation in the Design Basis Assurance inspection involved failure to test some auxiliary feedwater valves. He asked if the other similar valves have been test. Mr. O'Connor replied, "Yes."
- f. Mr. O'Connor discussed Dominion's progress in completing commitments contained in the NRC Security Confirmatory Order. Most (25) commitments had been completed, five remain and are on schedule to complete in 2019.
  - i. Mr. Jordan asked if any of the NCVs were related to security. Mr. O'Connor stated that one was in access controls.
  - ii. Mr. Semancik noted that some of the security issues related to lack of armorer resources and asked how that was addressed. Mr. O'Connor noted that there was now a single Dominion armorer in addition to 1 security contractor armorer on each security shift.
  - iii. Mr. Jordan asked if safety culture information was tracked for long term contractors (G4S, D&Z, etc.). Mr. O'Connor stated that safety culture information is tracked down to the department level and that long term contractors are tracked as separate departments. They also conduct independent safety culture assessments.
  - iv. Mr. Semancik asked if there was any management accountability exercised. Mr. O'Connor replied that there were some changes in the management team of the security contractor. He also noted that Dominion management was added to each shift.
- g. Mr. O'Connor discussed significant license amendment requests including:
  - i. Change to testing requirement for control element assemblies (CEAs) at Unit 2. Specifically, Millstone requested relief from requirement to exercise (move) the CEAs at the end of last operating cycle. Dominion had noted that 2 of the electrical coils that move the CEAs had failed and risk of failure was higher if



moved. Dominion has replaced all of the CEA coil stacks in the control group and has plans to replace all of the coil stacks over the next four maintenance refueling outages with new high temperature coils.

1. Mr. Woolrich asked what the failure mode was and if it was a lifetime issue. Mr. O'Connor stated the failure mode was overheating and that it was not a lifetime issue. The electrician present added that the lifetime of the failed coils was 40 years and the new coils have a 60 year life. The failure occurred from slow degradation leading to electrical short circuits. Mr. O'Connor noted that the overheating resulted from ventilation fan issues that have been corrected
  2. Mr. Jordan noted that Millstone 2 has had similar problems in past and asked if anything was identified in corrective action system search. Mr. O'Connor stated he was not sure and would have to check.
- ii. Unit 2 extension to the test interval for the containment integrated leak rate test from 10 years to 15 years.
  - iii. Revision to action requirement for failures of the Unit 3 Control Building Ventilation Radiation Monitors. Rather than require plant shutdown, Dominion is requesting allowance to start the filter system automatically activated by the radiation monitors.
  - iv. Request to change the testing frequency for spare charging pump. Currently, Millstone must take the operating pump out of service to test the spare.
    1. Mr. Semancik asked if there would still be some minimum testing frequency. Mr. O'Connor stated that the pump would still require full performance testing at least every 18 months.
- h. All NRC performance indicators (PIs) for Millstone are Green.
- i. Mr. O'Connor discussed two Environmental Impact events.
- i. Voluntary report of leak in an underground auxiliary condensate pipe containing tritium that was reported because Dominion could not verify that less than 100 gallons leaked. Failure occurred from a combination of high temperature and high chlorides in the line. Millstone removed the piping section from service and is installing a new double-walled pipe with built in leak detection.
    1. Mr. Jordan asked what the ratings of the original pipe were. Mr. O'Connor stated he thought that they were 300F and 300 psi, but would need to check.
    2. Mr. Jordan asked if the pipe was in the underground piping inspection program. Mr. O'Connor stated that it was in the program and classified as a medium risk pipe. The decision to inspect was a risk informed decision based upon the medium risk and elevated tritium levels in nearby monitoring wells.
    3. Mr. Jordan asked if they had seen a decrease in tritium levels in the wells since the repair. CDR James asked what the back-up plan was if this did not result in lowering levels. Mr. O'Connor stated that levels had dropped but were still being monitored. Many variables impact the tritium levels. More investigation would be needed if levels remained high.
  - ii. Leak in a discharge pipe that was identified by elevated tritium in a ground monitoring well. The leak resulted from over-temperature to a fiber wound

pipe. An alternate discharge pipe was put in service and a permanent change to move the discharge to a path inside the turbine building is being implemented.

1. Mr. Woolrich asked why this wasn't visibly detected. Mr. O'Connor replied that they did not put all the clues together. Mr. Sheehan asked how it was detected. Mr. O'Connor replied that the personnel monitoring ground wells noted the difference and evaluated plant evolutions proximate to the changes in tritium levels.
  2. Mr. Semancik stated that he did not see the leak reported in the annual Environmental Report. Mr. O'Connor said he would need to verify.
  3. Mr. Woolrich asked why groundwater didn't leak into the pipe. Mr. O'Connor noted that there was a 15 psid differential pressure.
- j. Dominion's assessment of Safety Culture. Mr. O'Connor noted improving trends in safety culture assessment.
- i. Mr. Sheehan asked about the trend in allegations. Mr. O'Connor noted that only one was on the NRC website and that internal allegations were very low. Station management regularly meets with Employee Concerns representative to discuss action on allegations.
  - ii. CDR James noted the military conducts similar surveys and asked how the survey differentiates between perceptions and problems. How many other behavioral surveys are conducted? Mr. Holt noted that the safety culture survey focuses on attitudes, behaviors, and engagement. Dominion also conducts an ethics survey in a similar fashion. Participation is about 50%.
- k. Summary of Dominion's Internal Oversight assessment of performance and findings. Mr. O'Connor stated that corporate oversight structure has changed to align the corporate functional area managers (CFAMs) under oversight as well as auditors. He stated that internal oversight was aligned with external input.
- l. Mr. O'Connor discussed the Unit 2 Unusual Event resulting from a false alarm on a failed smoke detector inside containment. All containment fire detectors were being repaired and tested this fall during the maintenance and refueling outage.
- m. Mr. O'Connor noted that Millstone is making two changes to its emergency response.
- i. Upgrading Emergency action levels Tables to latest industry guidance to streamline and simplify emergency classification. Expect to submit in late 2019.
  - ii. Implementing overwater protective action recommendations in response to NRC regulatory information summary issue. Expect these to be implemented end of 2018.
- n. Mr. Connor noted that Dominion continues to invest in safety and reliability and discussed near term modifications to be implanted in next refueling outages:
- i. Unit 2 (Fall 2018) – replacing Pressurizer Pilot Operated relief Valves (PORVs) to a flanged configuration that can be pre-tested to reduce seat leakage; replacing 1 of 4 channels of obsolete reactor protection system (RPS) bistable modules. Will use the removed units as spares while they verify reliability of new modules; replacing one train of DC-to-AC inverters; and, installing a new transformer open phase detection system
    1. Mr. Sheehan asked if the new RPS modules were digital. Mr. O'Connor stated they were reverse engineered analog units and not digital.
  - ii. Unit 3 (Spring 2019) – replacing the Normal Station Services Transformer. Also replacing Reactor Coolant Pump seals whose failure resulted in a reactor trip in

2016. Dominion is not satisfied with seals lasting only 3 to 4 years and a root cause evaluation determined that premature failure was caused by a manufacturing defect that resulted in static charge buildup at low boron concentrations and discharges that etch the tight tolerance (0.005 mils) seal faces.

- o. Mr. O'Connor discussed issue with Unit 2 Moisture Carryover and proposed calorimetric change. Dominion has noted 15 MWe loss at Unit 2 over 15 years. After troubleshooting, they identified that the actual moisture content of secondary steam was 1.2% (measured) vice 0.4% assumed in calculation of power (calorimetric). Dominion wanted to change the calculation to 1%, but NRC had concerns that Dominion did not understand the degradation mechanism. Dominion will be conducting more troubleshooting this fall during the refueling outage. Mr. O'Connor also noted that moisture content is not routinely measured across the industry.
- p. Mr. O'Connor discussed performance of Dominion's Offsite dose assessment team. He stated that recent drill performance issues resulted from the team not properly using computers and not properly communicating issues. This resulted from retirement of dose assessments subject matter experts. In response, Dominion is improving the procedure and enhancing the training by moving it within an accredited training program.
- q. Mr. Sheehan asked if action were being taken in accordance with the License Extension plan for the units operating past 40 year original license. Mr. O'Connor stated that the plans do not require specific replacements except for electrical components (EEQ) that scheduled and that every maintenance activity includes life extension inspections.
- r. Reviewed open items for Dominion follow-up:
  - i. Previous corrective actions for coil stacks
  - ii. Design parameters on the original auxiliary condensate pipe that leaked
  - iii. Environmental Report discussion of discharge pipe leak.

#### **4. NEAC Business**

##### **a. NRC Correspondence Reviewed since past meeting.**

The list of NRC Correspondence was reviewed. One comment from NEAC was related to NRC environmental qualification inspection.

- i. U.S. Nuclear Regulatory Commission Analysis of Licensees' 2017 Decommissioning Funding Status Reports dated May 8, 2018.
  - 1. Dominion Nuclear Connecticut, Inc. Millstone Power Station Units 2 and 3 Decommissioning Funding Status Report Serial 18-052 dated May 30, 2017.
- ii. Millstone Power Station – Design Bases Assurance Inspection (Teams) Report 05000336/2018010 and 05000423/2018010) dated July 13, 2018
- iii. Millstone Power Station, Units 2 And 3 – Security Inspection Report 05000336/2018410 and 05000423/2018410 dated July 23, 2018
  - 1. Mr. Semancik CT DEEP reviewed Security-Related version.
- iv. Millstone Power Station – Integrated Inspection Report 05000336/2018002 and 05000423/2018002 and Independent Spent Fuel Storage Installation Inspection Report 07200047/2018001 dated July 27, 2018.

- v. NRC Letter to Mr. Paul Gunter, Beyond Nuclear, Director's Decision Under 10 CFR 2.206 RE: Le Creusot Forge components dated August 2, 2018.
  - vi. Millstone Power Station – Cyber Security Inspection Report 05000336/2018403 and 05000423/2018403 (Public Version) dated August 23, 2018.
    - 1. Mr. Semancik CT DEEP reviewed Security-Related version.
  - vii. Millstone Power Station, Units 2 and 3 – Updated Inspection Plan (Inspection Report 05000336/2018005 AND 05000423/2018005) dated August 28, 2018.
  - viii. Dominion Nuclear Connecticut, Inc. (Millstone. Power Station Units 1, 2, and 3, and ISFSI); Virginia Electric And Power Company (North Anna Power Station, Units 1 and 2, ISFSIs, and Unit 3; Surry Power Station Units 1 and 2, and ISFSIs); Dominion Energy Kewaunee, Inc. (Kewaunee Power Station and ISFSIs): Request for Threshold Determination under 10 CFR 50.80 (EPID L-2018-LR0-0005) dated August 29, 2018.
  - ix. Millstone Power Station, Unit 2 – Operator Licensing Examination Approval dated September 4, 2018
  - x. Requalification Program Inspection – Millstone Power Station, Unit No. 2 dated September 4, 2018.
  - xi. Millstone Power Station, Unit NO's. 2 and 3 – Alternative Requests Rr-04-27 and Ir-3-38 for the Use of Encoded Phased Array Ultrasonic Examination Techniques in lieu of Radiography (EPID L-2018-LLR-0011) dated September 17, 2018
- b. **Other material reviewed** – NEAC reviewed the following information related to nuclear industry and trends.
- i. Dominion Energy Nuclear Connecticut, Inc. Millstone Power Station Unit 3 2017 Annual Environmental Protection Plan Operating Report (Serial 18-174) dated April 3, 2017.
    - 1. Dominion Energy Services, Inc. letter to CT DEEP, Re: Discovery of Degraded Pipe Associated with the Unit 3 Condensate Polishing Facility (DSN 001C-6) (D18819) dated September 8, 2017.
    - 2. Millstone Non-Emergency report Form (NERF) 20170022 dated September 6, 2017
  - ii. Dominion Energy Nuclear Connecticut, Inc. Millstone Power Station Units 1, 2, and 3 2017 Annual Radiological Environmental Operating Report (Serial 18-175) dated May 1, 2018
  - iii. Dominion Energy Nuclear Connecticut, Inc. Millstone Power Station Units 1, 2, and 3 2017 Annual Radioactive Effluent Release Report (Serial 180-176) dated May 1, 2018
  - iv. NextEra Press Release, “NextEra Energy Resources and Alliant Energy agree to shorten the term of the Duane Arnold Energy Center power purchase agreement; Alliant Energy customers to save hundreds of millions of dollars,” dated July 27, 2018.

- v. Millstone Non-Emergency report Form (NERF) 20180049 dated August 2, 2018.
  - 1. New England Radiological Health Compact (NERHC) action request 2018-0001
  - 2. NRC Backgrounder on Tritium
  
- c. Discussion of new Chairman. Chair Ryan noted that as a CT legislator, he may need to vote on legislation affecting Millstone. Members stated that they did not see a conflict of interest and agreed Rep Ryan could continue as chair.
  
- d. Rep Ryan noted that with resignations of Mr. Klancko and Mr. Dixon, three openings on NEAC existed and solicited input for perspective members. NEAC members agreed to look for qualified candidates to forward the Rep Ryan.
  
- e. Mr. Jordan requested discussion on whether NEAC was still necessary. NEAC was formed during a period of poor performance at Millstone and the station has demonstrated a period of sustained good performance. Mr. Semancik noted that eliminating NEAC would require statutory action and that DEEP believes that NEAC provides public confidence in safe operations at Millstone. Other members did not support elimination NEAC.

**5. Public Comment**

- a. Two members of the public were in attendance. There were no questions from the public.

**6. Adjournment**

Motion was made by Mr. Jordan and seconded by CDR James to adjourn; no objections; unanimous vote in favor; meeting adjourned at 8:30 PM.

# Millstone Power Station NEAC Presentation

# Safety

- **Safety is our first priority**
- **Commitment to protect the health and safety of the public**

# Millstone Status

## Millstone Unit 2

- **509 days online**
- **98.5% Capacity Factor YTD**

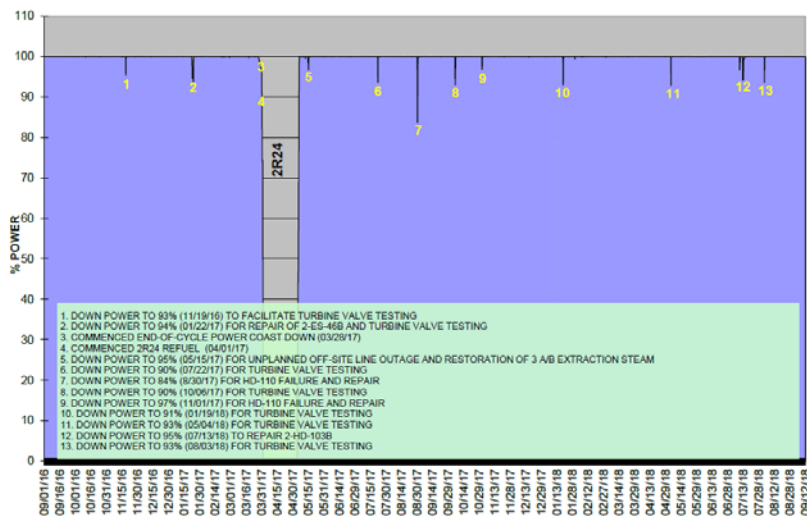
## Millstone Unit 3

- **316 days online**
- **100% Capacity Factor YTD**

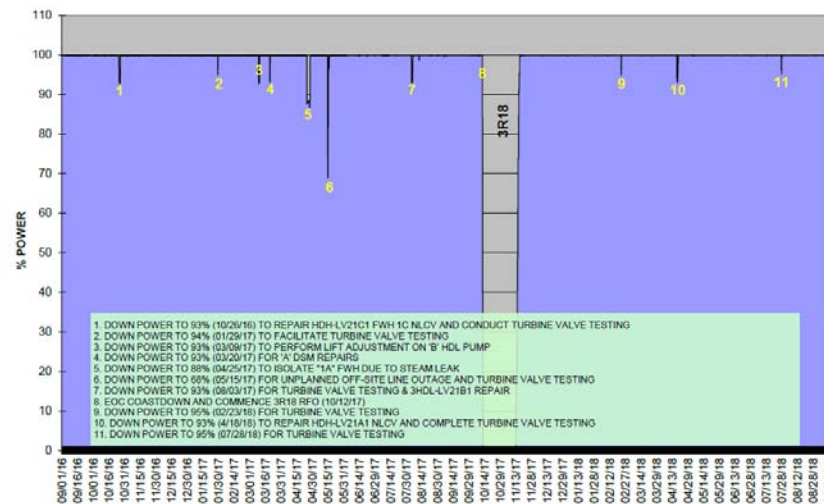


# No Unplanned Shutdowns for More Than 2 Years

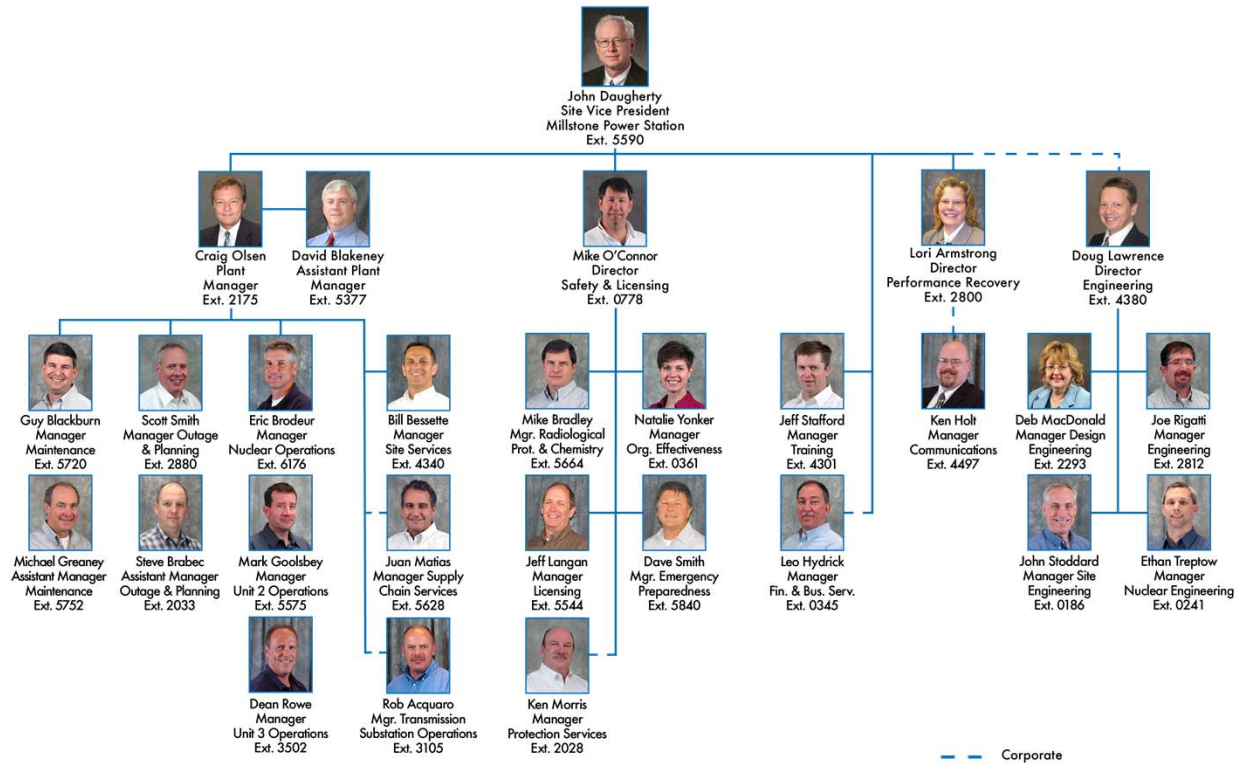
## Unit 2



## Unit 3



# Sustainable Staffing



- Staffing levels
- Hiring effort
- Ops Pipeline

# **NRC Findings**

**Station is in the Licensee Response column**

**10 GREEN Non-cited Violations Identified in 2017**

All are of very low risk significance

All are in our corrective action system.

**7 GREEN Non-cited Violations Identified in 2018**

All are of very low risk significance

All are in our corrective action system.

# **Millstone Response to NRC Security Confirmatory Order Progresses**

- **Millstone has completed 25 of 30 corrective actions**
  - 21 have been inspected satisfactorily by NRC
  - Four more will be inspected in October
- **5 corrective actions remain to complete**
- **Expect to complete remaining actions in 2019**
  - These actions involve communicating lessons learned to the industry

# License Amendment Requests

## Significant License Amendment Requests Approved by the NRC

- Unit 2 – Technical Specification (TS) Surveillance Requirement 4.1.3.1.2 for Control Element Assembly 39 (LAR 333)

## Significant License Amendment Requests Pending Approval by the NRC

- Unit 2 – Extension of Integrated Leak Rate Testing (ILRT) Interval to 15 Years (expect NRC approval in September)
- Unit 3 – Revise TS Action Statement for Loss of Control Building Inlet Ventilation Radiation Monitor Instrumentation Channels
- Unit 2 – Relief request for charging pump testing (pending approval in October)

# Millstone NRC Performance Indicators

Performance Indicators



Unit 2 Second Quarter 2018 NRC Performance Indicators

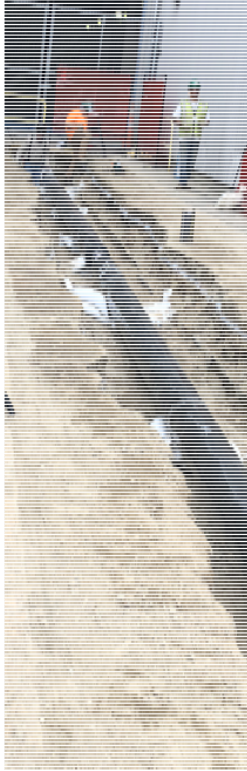
Performance Indicators



Unit 3 Second Quarter 2018 NRC Performance Indicators

# **Environmental Impacts**

- **Voluntary Ground Water Protection Report**
- **Condensate polishing discharge pipe**

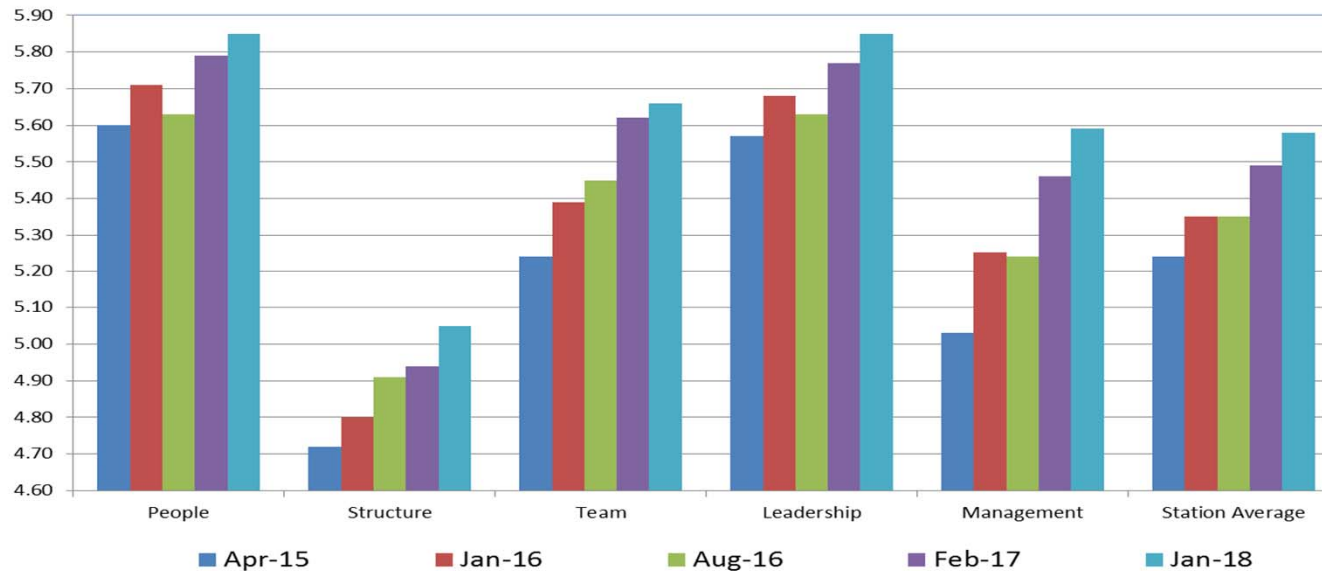


Replacement piping installation



# We Monitor and Drive Continuous Safety Culture Improvement

## Millstone Culture Survey Results



# Millstone Oversight Summary

- Performance
- Findings

## **Emergency Plan Event Declaration**

- **Aug 2017 – Unusual Event at Unit 2**
  - **Containment smoke detector failed**
  - **Entry determined it was a false alarm**

# Offsite Emergency Plan Changes

- SAMG and EAL Tables
- Overwater PARs

# **We Continue Making Improvements Increasing Safety and Reliability**

- **Unit 2 Refueling Outage Scope**
- **Unit 3 Refueling Outage Scope**

# Other Issues

- **Unit 2 Moisture Carryover**
- **Offsite Dose Assessment Performance**
- **Unit 3 RCP Seal Performance**

## Contact Information

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Phone: 860-440-0132

**NUCLEAR ENERGY ADVISORY COUNCIL**  
**December 13, 2018 6:00 PM**  
**Simulator Training Building**  
**Millstone Power Station**  
**Waterford, CT**

**MINUTES**

**Members Present**

Rep Kevin Ryan, Chair

Alternate Chair Mr. Jeffrey Semancik representing DEEP Commissioner Klee

Mr. Craig Salonia            Mr. James Sherrard

Mr. Bill Sheehan            CDR Royce W. James, Ph.D.

Members not present:

Mr. Tom Nebel            Mr. R. Woolrich

Mr. A. Jordan

**1. Call to Order of Meeting**

NEAC Chair Rep. Ryan called the meeting to order at 6:04 PM at Simulator Training Building at the Millstone Power Station, Waterford, CT.

**2. Approval of Minutes of the September 25, 2018 NEAC meeting.**

A motion was made to approve the minutes by Mr. Sheehan and seconded by Mr. Sherrard. Minutes were approved without any corrections or objections.

**3. Program – Review of annual NEAC Report.** Chairman Ryan discussed the 2018 Annual NEAC report to the General Assembly. Mr. Semancik recommended that the report format could be shortened to the Council's perspectives. The Council agreed to a modified version of the report indicating that the NRC information is contained in their correspondence and that more detailed minutes that are included as attachments to the report capture the interactions of the Council and the specific areas of oversight.

- a. Rep Ryan reviewed the report recommendations. Based upon discussion, the Council agreed to the following modifications:
  - i. Delete Council recommendation 5 as Dominion Energy has completed voluntary actions to demonstrate that the structural integrity of the Millstone Unit No. 2 pressurizer was not compromised by any potential manufacturing irregularities resulting from fabrication at the Creusot Forge.
  - ii. Retain other recommendations.
    1. Mr. Semancik agreed to provide Rep. Ryan with proposed wording for statutory changes.
- b. The Council agreed that the report should also highlight the following:
  - i. Improved performance at Millstone as indicated by NRC performance indicators and review of regulatory actions.



- ii. Importance of Millstone for regional grid fuel security as indicated by ISO New England
- iii. Note the work culture improvements made by Dominion while recognizing that continued vigilance should be maintained to ensure sustainability of actions.
- c. Rep. Ryan noted that he would forward draft report to the Council members with the changes agreed to when complete

#### 4. NEAC Business

##### a. NRC Correspondence Reviewed since past meeting.

The list of NRC Correspondence was reviewed. One comment from NEAC was related to NRC environmental qualification inspection.

- i. Millstone Power Station, Unit No. 2 - Issuance of Amendment No. 335 Regarding Revision to the Integrated Leak Rate Type A and TYPE C Test Intervals (EPID L-2017-LLA-0316) dated September 25, 2018.
- ii. Millstone Power Station, Units 2 and 3 - Closeout of Generic Letter 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools" (CAC NOS. MF9431 and MF9430; EPID L-2016-LRC-0001) dated September 26, 2018.
- iii. Millstone Power Station, Unit 1 - Closeout of Generic Letter 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools" (EPID L-2016-LRC-0001) dated September 26, 2018.
- iv. Millstone Power Station Units 2 and 3-Staff Assessment of Response to 10 CFR 50.54(f) Information Request Flood-Causing Mechanism Reevaluation (EPID NOS.000495\05000336\L-2015-JLD-0011 AND 000495\05000423\L-2015-JLD-0012) dated October 3, 2018
- v. Millstone Power Station, Unit No 3 -Alternative Request P-06 for 'C' Charging Pump Test Frequency (EPID L-2018-LLR-0078) dated October 4, 2018.
- vi. Millstone Unit 3 - LAR Modifying the TSs for the Control Building Ventilation Inlet Instrumentation – Request for Additional Information (EPID: L-2018-LLA-0099) dated October 4, 2018.
- vii. Notice of Meeting with Dominion Energy Nuclear Connecticut, Inc. Regarding a Planned License Amendment Request to Adopt 10 CFR 50.69 for the Millstone Power Station, Unit No. 2 dated October 25, 2018.
- viii. Millstone Power Station – Biennial Problem Identification and Resolution Inspection Report 05000336/2018011 and 05000423/2018011 dated November 8, 2018.
- ix. Millstone Power Station – Biennial Problem Identification and Resolution Inspection Report 05000336/2018011 and 05000423/2018011 dated November 8, 2018.
- x. Millstone Power Station, Unit Nos. 2 and 3-Alternative Requests Related to the Fifth and Fourth 10-Year Interval Pump, Valve, and Snubber Inservice Testing Programs, Respectively (EPID L-2018-LLR-0012 - through EPID L-2018-LLR-0022) dated November 13, 2018.

- b. **Other material reviewed** – NEAC reviewed the following information related to nuclear industry and trends.
    - i. PURA Implementation of June Special Session Public Act 17-3 (Docket No. 18-05-04) Proposed Interim Decision dated November 16, 2018.
    - ii. Email, “NEAC question follow up,” from Michal O’Connor, Director of Nuclear Safety and Licensing, Millstone Power Station, to Jeff Semancik, Director, Radiation Division DEEP dated December 13, 2018. (copy attached)
  - c. **Discussion of Council vacancies.** The Council discussed the status open positions. Three vacancies in the statutorily required positions were identified.
    - i. Mr. Semancik noted that he has been contacted by two qualified individuals interested in joining the Council. He also noted another qualified individual had expressed interest.
    - ii. Rep. Ryan agreed to discuss filling vacancies with appointing authorities.
5. **Public Comment**
- a. No members of the public were in attendance.
6. **Adjournment**
- Motion was made by Mr. Sherrard and seconded by Mr. Sheehan to adjourn; no objections; unanimous vote in favor; meeting adjourned at 7:14 PM.