NEW ENGLAND ENERGY LANDSCAPE UPDATE

Since Issuance of:

The Economic Impacts of Failing to Build Energy Infrastructure in New England, August 2015

OCTOBER 3, 2016

PREPARED FOR:

New England Coalition for Affordable Energy

PREPARED BY:

Daymark Energy Advisors

SPONSORED BY COALITION MEMBERS:

The AIM Foundation

Connecticut Business & Industry Association

Business and Industry Association of New Hampshire

DAYMARK ENERGY ADVISORS
ONE WASHINGTON MALL, 9TH FLOOR | BOSTON, MA 02108
TEL: (617) 778-5515 | DAYMARKEA.COM

DAYMARK ENERGY ADVISORS

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

In August 2015, Daymark Energy Advisors[1] (Daymark) and the Economic Development Research Group (EDR) prepared a report for the New England Coalition for Affordable Energy (the Coalition)[2], *The Economic Impacts of Failing to Build Energy Infrastructure in New England*. The August 2015 report was prompted by business and industry concerns about high prices and price volatility that led to development of the Coalition.

That report examined a five-year horizon through 2020 and found that energy costs could be $5.4 billion higher in the absence of new infrastructure based on specific assumptions about natural gas pipelines, electric transmission lines and electric generation fueled by wind and natural gas (see Table 1 and Figure 1 from August 2015 report below). The impacts on jobs, capital investment and personal income were also modeled.

Table 1. Summary of 2015 Study Infrastructure Assumptions (Through The Year 2020)

Infrastructure Type	Constrained Case (No New Infrastructure)	Unconstrained Case (New Infrastructure Added)
Natural Gas Pipeline Additions	3.9 Bcf/day constant[3], no pipeline additions	Additional supply of 1.7 Bcf/day from new pipeline(s)
Transmission Imports	None	500 MW in June 2018
Renewable Generation	None	1,360 MW of new wind generation over the study period
Non-Renewable Electric Generation	None	920 MW in June 2019

[1] At the time of the August 2015 report, Daymark Energy Advisors was known as La Capra Associates, Inc. The firm changed its name in November 2015.

[2] The Coalition, sponsored by the American Petroleum Institute (API), was formed to advocate for the expansion of all types of energy infrastructure in New England to facilitate lower energy costs, protect jobs and grow the economy. Members include major business and labor organizations in New England.

[3] This represents a maximum value that was observed in the database of pipeline flows and was used in the modeling.

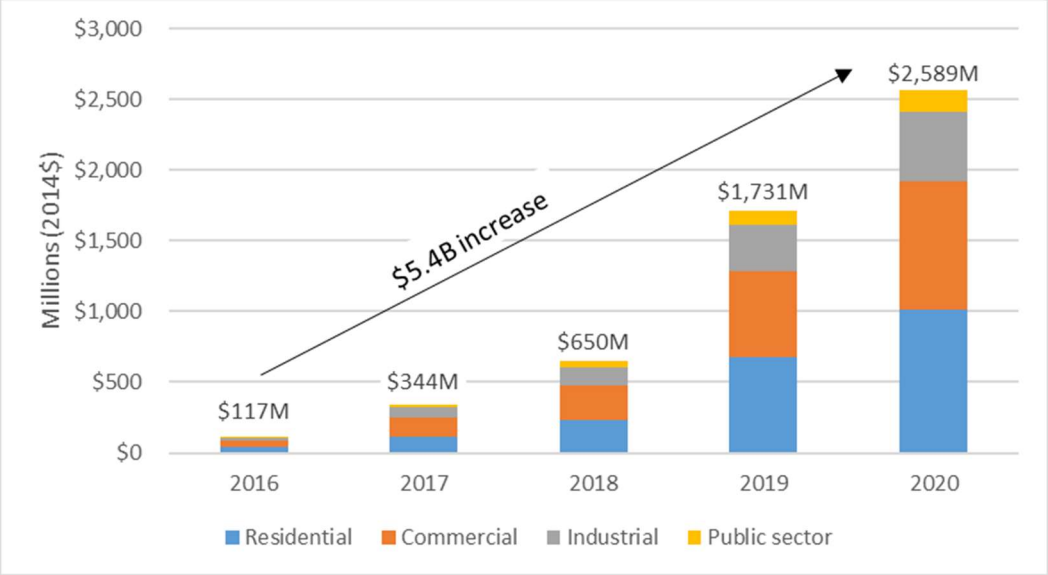

Figure 1. Net Annual Energy Cost Increases by Sector, with Constrained Infrastructure (from 2015 Report)

This report surveys the major issues and developments in the energy landscape impacting the New England region since August 2015. The report discusses the potential consequences of these developments on the cost of energy to consumers and regional competitiveness. It is fair to say that the current energy landscape is in flux and that there is a high degree of uncertainty regarding outcomes over the next three to five years and beyond.

In general, the observed changes fall into three broad categories: state policies on electricity supply mix, electricity market drivers, and natural gas infrastructure.

1.1 State policies on electricity supply mix

State policies influencing the future electricity supply mix will impact the broader competitive wholesale markets going forward.

Several states have promoted policies focused on supporting the expansion of the renewable energy market and on increasing investments in renewable resources. These activities are motivated largely by regional de-carbonization objectives. While de-carbonization is clearly an important goal for the region and beyond, these policy-based efforts and associated price-supports can lead to investments in new resources that are not otherwise economic in the existing ISO New England (ISO-NE) administered wholesale markets. Any associated impacts on wholesale electricity prices can affect

downstream competitive retail prices, merchant capital investment decisions, and the timing of resource retirements.

Additionally, in the past year, nearly every New England state has made modifications to its net metering policies and tariffs. These policy changes will lead to greater consumer ability to produce their own power and sell the excess power generated back to the utility. The increased penetration of distributed systems with net metering is raising questions about the long term viability of the existing utility cost recovery model, concerns about cross-subsidization, compensation for stand-by service, and distribution system planning and reliability.

1.2 Electricity market drivers

Transformation in the electricity market is likely to impact the timing of investment decisions that can affect price volatility and reliability.

The electricity markets are undergoing transformation. Older oil and coal units are retiring. Since the August 15 report was issued, the Pilgrim Nuclear Power Station announced its retirement in 2019. A substantial amount of additional electricity generating capacity is considered at risk of retirement and will need replacement. The majority of new resources being built in New England are natural gas-fired plants, wind farms or solar PV installations. The continued addition of these low operating cost resources has put downward pressure on energy prices. Moreover, the costs of building conventional natural gas-fired plants and wind and solar projects has declined substantially over the past five years. At the same time, the uncertainty around the winter peak pricing of natural gas delivered to New England has been increasing and, even as wind and solar installed costs fall, most of these projects still receive some form of direct or indirect federal or state subsidy.

Design efforts to better integrate public policy preferences into the wholesale energy markets may require adoption of new rules and change how prices are set in the energy and capacity markets. Over the longer term, additional changes to the Regional Greenhouse Gas Initiative (RGGI) program, or compliance strategies associated with federal regulations to address climate change, may impact both energy prices and longer term investment decisions and costs.

1.3 Natural gas infrastructure

Pipeline delays and cancellations may expose the New England region to continued seasonal price volatility and intermittent price spikes.

Natural gas infrastructure development in New England has been greatly impacted over the past year. Major projects that would have brought gas from Marcellus and other low cost supply regions have been cancelled or delayed. A major effort by the Access Northeast Expansion (ANE) project to allow electric distribution companies to contract for gas pipeline capacity has hit legal obstacles in Massachusetts and is now highly uncertain in other states. The Algonquin Incremental Market (AIM) project is still on schedule and should be in-service by the end of this year. However, the potential for other significant pipeline expansions into New England is highly uncertain.

Outside the region, New York has been delaying the pipeline expansions occurring in the state due to environmental-related permitting. In addition, supplies of gas from the Canadian Maritimes continues to decline. Both of these developments will add pressure to New England supplies, particularly in peak winter periods.

The impacts to the market may not be seen immediately, as natural gas prices have remained relatively low over the last year due to a mild winter and excess fuel supply, leading to lower wholesale market electric prices. If the region experiences a very cold winter, however, natural gas prices will likely spike as pipeline capacity becomes restricted and oil-fired units and liquefied natural gas (LNG) will be needed to support the demand.

1.4 Summary of findings

Developments over the past year in New England and adjacent regions have introduced additional uncertainty to the timing and composition of infrastructure additions to the regions over the next five years.

Uncoordinated policy and market actions may lead to greater electricity and natural gas price volatility in the near term and suboptimal investment decisions in the longer term, with the potential for adverse jobs and disposable income impacts for New England consumers and businesses in the 2019-2020 period and years immediately following.

Overall affordability and price volatility remain important issues in the next three to five years for the following reasons:

- The evaluation of the submissions to the three-state clean energy RFP is ongoing. The timing, quantity, and cost of new policy-supported renewable resources (e.g., off-shore wind and hydro-electric power per the recently passed Massachusetts energy legislation) are uncertain. Both of these efforts have the potential to be large and impactful on the wholesale electricity market, retail rates, carbon-dioxide emissions, and jobs. Given the time required to complete procurements and construction, the impacts are not likely to be realized until 2020 and beyond.

- While it did not assume a particular pipeline project would be built from the projects under development, the August 2015 report did assume an economic level of natural gas pipeline additions sufficient to meet natural gas LDC and regional electric reliability needs. With the suspension of the Northeast Energy Direct project and delays to the Access Northeast project, the pipeline assumptions in the August 2015 report are not likely to be realized until after 2020, impacting both electricity prices and the availability and cost of natural gas for heating.

- LNG will continue to be an important supplemental fuel to meet peak electric generation requirements. LNG is purchased on the spot market and prices are set in a competitive world market. World LNG prices have been low recently, in large part because of low world oil prices (LNG is generally priced against distillate fuel oil). Increased demand for LNG on the world market, supply disruptions, or price increases would all translate into higher delivered LNG prices in New England, most directly impacting periods when natural gas pipelines are constrained and competitive fuel alternatives are unavailable.

- The retirement of coal, oil, and nuclear generation and its anticipated replacement with natural-gas fired and renewable generation will put continued pressure on the natural gas delivery system into New England.[4] The integration of wind resources as capacity (i.e., resources on which the region relies to assure delivery adequacy) will require continued investment in transmission. Finally, the reliance of the region proportionally on more intermittent resources, such as wind and solar, may increase the short-run cost of operating the power system.

[4] In recent years, several major New England capacity resources have retired or announced planned retirements, including Salem Harbor, Brayton Point, Mt. Tom, Norwalk, Vermont Yankee, and Pilgrim. These units together account for 3,100 MW of retiring capacity, equivalent to approximately 12% of New England peak load in 2015.

While all of these issues were considered in the August 2015 report, recent policy developments suggest more aggressive pursuit of renewable power and other clean energy goals, increasing the likely pace of these changes.

Over the longer term, the policy actions and initiatives noted above and discussed below have the clear potential to address near-term price pressures if policy makers and regulators ensure that policy-supported projects are cost-effective and that policy-driven schedules are realistic and followed.

In light of these findings, we recommend to the Coalition and to energy planners the following:

1. **Energy and Planning Strategies.** Pursue a regional approach to forecasting future energy price impacts and resulting economic consequences. The goal of any such study should be to understand and articulate the implications of the policies of the several states on New England as an integrated region in order to provide appropriate context for a discussion of the potential net benefits of investments in infrastructure to reliably meet New England's environmental and economic goals. This systemic view would allow for assessment of the gains available to New England's energy economy via the maximization of the resource and technical advantages of each state as part of a broader regional economy.

2. **Adopt Greater Planning Consideration of both Short-Term and Long-Term Implications on Prices.** As the mix of energy supply resources is expected to undergo significant changes over coming decades, we suggest a two-step process for regional planning. We propose a regional process that would consider economic, environmental and reliability impacts and consequences over the near-term, which might be defined as the next five to ten years, as well as over the longer term, which would cover a period defined by the outer limits of policies and legislation to address climate change.

   We suggest a study that examines the impacts of the proposed policies on the resource mix, and the size and economy of the marketplace. The analysis ideally would characterize the benefit-cost of alternative approaches to meeting regional policy goals, assessing, for example, gains from trade, changes in productions costs, changes in wholesale market prices, ratepayer impacts, and changes in the demand for electricity and competing fuels.

2. STATE POLICIES ON ELECTRICITY SUPPLY MIX

Over the past year, the New England states have continued to pursue policies intended to influence the electricity supply mix in the region. These policy efforts include mandated procurement of specific resource types, strengthened renewable portfolio standards, and modified net metering rules. The policies work to provide direct or indirect price support to certain technologies or energy resource types that are not otherwise economic on the basis of revenues available through the wholesale electricity markets, but that, nonetheless, are deemed net beneficial by policy-makers when non-monetized environmental and economic development benefits are considered. The addition of policy-supported resources to the region's electricity supply portfolio will have a mixed impact on regional electricity prices.

- Clean energy procurements. There were two major developments in the past year requiring clean energy procurements. The Clean Energy RFP, jointly issued by Connecticut, Massachusetts, and Rhode Island in November 2015, sought proposals for large clean energy projects, including hydroelectric resources. Bids were submitted in February 2016 with project sizes up to 1,250 MW. In the second development, Massachusetts enacted major legislation requiring the procurement of 1,600 MW of offshore wind capacity and the equivalent of approximately 1,000 MW of all-hours hydroelectric or other renewable resources (potentially via new transmission).
- Renewable Portfolio Standard (RPS) policies. Each New England state now has a mandatory RPS policy, with Vermont converting a statutory goal to a mandatory policy in July 2015. In the past year, the primary change to these policies occurred in Rhode Island, where the state enacted an aggressive increase in the RPS law. The prior policy reached a maximum requirement of 14.5% in 2019. The new law escalates the requirement over time, reaching 40% in 2035.
- Net metering. Almost all the New England states have taken some measure to address net metering of distributed generation in the past year. The escalating rate of development of particularly rooftop solar PV has pushed cumulative net metering levels to the statutory caps in many states. As solar proponents seek increases in the caps and utilities seek alternative compensation methods, states have responded in different ways. Generally, the states have been looking to increase the total capacity caps and require the responsible state agencies to evaluate alternative pricing and compensation methods.

In general, these policies represent efforts by the states to encourage the development of certain resources through partial subsidization by ratepayers. The policies create a requirement for distribution companies or load-serving entities to procure energy from a certain type of resource in order to achieve a certain policy goal, such as reduced emissions, or supporting new technologies.

These procurements largely replace energy purchases from the wholesale markets. The purchases under these policies are also typically in the form of long-term fixed contracts (e.g. a 20-year contract with an offshore wind facility), whereas market-based energy supply for these entities is normally purchased on a short-term basis from the market or a medium-term (6-12 months) fixed contract with an energy marketer.

For the most part, the cost of these renewable or clean energy contracts to customers exceeds the recent average wholesale market price of energy in ISO-NE, so these legislative efforts amount to a subsidization of resources that is funded ultimately by ratepayers. Supporters of these efforts argue that one of the benefits of the long-term contracts is that they can protect ratepayers from the risk of future increases in energy prices (e.g., due to increasing natural gas prices). The implicit premium charged for this insurance is the subsidy paid by the ratepayers, if such contract prices are higher than market.

Beyond the impact on the ratepayers supporting these resource mix initiatives, the addition of renewable resources with low or no fuel costs has the effect of lowering market energy prices because the added energy displaces generation with higher operating costs. While this provides a benefit to buyers in the spot energy market, there are some consequences that will be discussed in Section 3 of this report.

Finally, these resource mix policies have a strong influence on the viability of new large scale transmission projects. Daymark's 2015 report identified several such proposed projects, including Northern Pass, the Green Line project, and the New England Clean Power Link. Most of these proposals are designed to bring Canadian hydropower or additional wind power from Maine, New York, or Canada to load centers in southern New England. With the recent drop in energy prices, there is less economic incentive for these projects to proceed without subsidy. The developers are therefore likely to hold off on further development unless they can secure long term contracts.

2.1 Clean energy procurements

2.1.1 Three-state Clean Energy RFP

On November 12, 2015, a coalition of New England states consisting of Massachusetts, Connecticut, and Rhode Island issued the Clean Energy RFP.[i] The RFP requests proposals for new clean energy projects and transmission to deliver the energy.

While the RFP accepted proposals of any size greater than 20 MW, the intent of the RFP was to provide an opportunity for states to collaborate on larger projects that may not otherwise be built if supported only by one state. As stated in the RFP, the states sought projects that would "enable parties in each state to achieve their respective state's clean energy goals more cost effectively than if each state were to proceed unilaterally while also complying with the applicable legal requirements of each state."

The different states requested specific quantities of energy according to several contractual structures. In total, the RFP requested up to 3,567 GWh of energy from new renewable Class I RPS-eligible resources or hydropower (termed "Qualified Clean Energy" in the RFP).

Bids were submitted on January 28, 2016. The RFP received a strong response with more than two dozen individual bids submitted. The largest proposals included renewable energy projects with incremental transmission upgrades. These projects generally involved combinations of wind and solar resources in Maine or New York totaling between 400 MW and 1,250 MW of installed capacity, with new transmission to deliver the energy to the procuring states. Hydro-Quebec also submitted a bid for hydroelectric energy bundled with the Northern Pass Transmission project.

The results of the RFP were initially intended to be complete on July 26, 2016, but the evaluation is still ongoing. Without a final decision from the procuring states on the selected projects, it is not possible to know how the Clean Energy RFP will impact the electric markets. In the near term, it is not likely feasible for any of the larger projects to be online before 2019 due to the development, siting, and construction of the transmission projects. Therefore, only the small scale projects have the potential to impact near-term energy markets. The medium- to long-term impacts will depend on the type of projects selected (solar, wind, hydro, storage, etc.), the amount of energy delivered, and the location of the projects.

In addition, the cost recovery treatment of any associated transmission upgrades will affect the market impact. The proposals were submitted as though the transmission upgrades will be paid for by the procuring entity via a separate tariff, but the development of any major new infrastructure will require ISO studies that could potentially result in broader, system-wide allocation of costs of the proposed transmission upgrades, or of additional upgrades deemed necessary by the ISO due to the Clean Energy RFP projects. These potential costs to the market will not be known for some time after the projects are selected.

The market impacts of the projects will vary by state. The states procuring energy as a result of the RFP will likely have a fixed energy contract, the effect of which will be relatively straightforward to retail customers and will be dependent on the fixed contract price of the winning bids. But the addition of these price-taking energy resources to the grid will lower the wholesale prices system-wide. The magnitude of the effects will depend on several factors, including location of the projects, production profile, and future system-wide wholesale costs (based on fuel prices, marginal units, etc.).

2.1.2 Massachusetts H. 4568

On August 8, 2016, Massachusetts Governor Charlie Baker signed into law H.4568, "An Act to Promote Energy Diversity."[ii] The legislation has several components, the primary of which are the requirement for distribution companies to jointly procure up to 1,600 MW of offshore wind capacity between 2017 and 2027, and jointly procure 9,450 GWh/year of clean energy (Class I renewables or hydro) through staggered procurements beginning no later than April 1, 2017.

The legislation requires Massachusetts distribution companies to jointly and competitively procure offshore wind capacity beginning no later than June 30, 2017. The procurements must be for at least 400 MW each, and must happen at least every two years. The total capacity procured should be 1,600 MW by June 30, 2027.

There are several off-ramp provisions included in the legislation if bids are not competitive, and other provisions otherwise limit project eligibility (e.g. resources within 10 miles of inhabited areas, such as the Cape Wind project, are not eligible).

The legislation provisions related to the clean energy procurements are intended to help finance clean energy projects by supporting them with a long term contract. The provisions require staggered procurements beginning in 2017, with a total of 9,450

GWh/year by 2022. This is equivalent to around-the-clock energy from a 1,078 MW resource or transmission intertie.

The procurements under the primary components of the legislation will begin next year, but the incremental resources likely won't impact the New England resource mix for several years. Therefore, it is difficult to accurately assess or quantify the potential near-term market impact. However, assuming that the provisions of the legislation are implemented as enacted, the legislation could have significant impacts to both Massachusetts energy costs, as well to the broader ISO-NE market.

In Massachusetts, the new contracts for the offshore wind, as well as the additional (potentially imported) clean energy will be borne directly by ratepayers. Whether this results in a net cost or net benefit over status quo depends on the bids submitted once the RFPs are issued.

The primary impact to the broader ISO-NE market will likely be the reduction of wholesale power costs due to the addition of resources with no fuel cost and capital costs supported through policy-driven energy contracts and preferential tax treatment.

In addition to the influx of price-taking energy, this legislation has some potential to impact the ISO-NE capacity market and resource mix. The offshore wind projects will receive some capacity credit, and if the clean energy requirement results in a new transmission tie and Canadian hydro, as anticipated, the imports will likely clear the capacity market as new resources. This additional capacity will likely have a depressive effect on capacity market clearing prices.

2.2 RPS policies

State RPS policies continue to be the primary instrument to modify the electricity resource mix. With Vermont's mandatory RPS policy passing in summer 2015, all New England states have active policies. Table 2 below provides a high-level summary of the requirements; each policy contains highly detailed requirements and qualification criteria for resources, as well as unique policy details that may not be included here.

Table 2. Summary of New England Renewable Standards[iii]

STATE	RPS TARGET	CARVE OUT TARGETS
Rhode Island	RPS target raised to 40% by 2035 – old target was 14.5% by 2019.	No specific technology minimums or carve-outs.
Connecticut	RPS target 27% by 2020 – including 4% from C&I waste heat recovery or conservation.	Class I: 20% by 2020 Class I or Class II: 3% by 2010 Class III: 4% by 2010
Vermont	RPS target raised to 75% by 2032 – old target was 55% (Renewable Energy Standard established by Act No. 56 in 2015).	Distributed generation and energy transformation categories created that rise to 10% and 12%, respectively, by 2032.
Massachusetts	RPS Class I annual target increase raised from 1% to 2% per year (11% in 2016). RPS Class II minimum RPS standards of 3.6% from renewable resources and 3.5% from waste energy.	Class I Solar Carve-Out stopped accepting new applications. Class II Solar Carve-Out supporting up to 1,600 MW of solar installations.
New Hampshire	RPS target of 24.8% by 2025.	Solar-electric: 0.3% by 2014 Existing hydro: 1.5% by 2015 Existing biomass: 8% by 2017 New renewables (including thermal): 15% by 2025
Maine	RPS target of 40% by 2017.	Class I (new resources): 10% by 2017 Class II (existing resources): 30%

Rhode Island is the only state which modified its RPS in a meaningful way in the past year, as legislators recently approved an aggressive increase in the state's RPS law.[iv] The 2004 legislation required an escalating portion of renewables, reaching 16% in 2019. This original law was relaxed slightly in December 2014, to set the maximum requirement at 14.5% in 2019. The new legislation continues the escalation, eventually requiring 40% renewables by 2035. The new law included increased powers for the Public Utilities Commission (PUC) to determine whether the RPS requirements should be delayed in any year.

This represents a significant proportional increase in Rhode Island that will drive additional demand for clean energy development. The near-term impact will be minimal because of the gradual escalation, but over time it will represent a significant portion of energy costs in the state. However, given Rhode Island's small load, the regional impact will be muted.

2.3 Net metering

Each New England state has a set of provisions related to net energy metering, which permits consumers to connect small behind-the-meter generation resources and offset their consumption. Most of the net metering provisions contain a cap on total interconnected capacity for the resources. As the development of these resources continues, several states have surpassed the original caps and have passed legislation to increase these caps. Table 3 below summarizes these aggregate program caps and recent actions taken by the states.

Table 3. Summary of New England Net Energy Metering Regulations[v, vi]

STATE	PREVIOUS CAP	CURRENT SYSTEM CAP
Rhode Island	Block Island Power Company and Pascoag Utility District limited to 3% of peak load. No limit for other utilities.	No change
Connecticut	No limit specified.	No change
Vermont	Limit based on greater of most recent full calendar year peak demand or 1996 peak demand.	No change
Massachusetts	Public entity: 5% of load Private entity: 4% of load --Based on utility historical peak load	Public entity: 8% of load Private entity: 7% of load
New Hampshire	50 MW	100 MW
Maine	1% of utility load	No change

The following sections provide details on these caps, as well as other legislative efforts related to net metering.

2.3.1 Maine

The Maine legislature passed a significant bill in 2016 that would have replaced the existing solar net metering policy with a set of solar development targets for different customer classes, along with a replacement compensation mechanism. The legislation, however, was vetoed by the governor, but work continues on a compromise solution with sufficient support to override another veto. The total solar development targeted in the legislation was 248 MW, procured between 2017 through 2021. The total impact of the legislation is relatively small compared to ongoing efforts in other states.

2.3.2 Massachusetts

Massachusetts also passed a bill to increase the cap on net metering, from 5% of historical peak load to 8% of historical peak load. The legislation also directed the DOER to modify the method of funding the state's solar incentive program (SREC II) to lower the cost to consumers and give preferential treatment to certain project types.

This legislation will likely continue the pace of solar development in Massachusetts. While it limits the compensation for some larger projects, overall the new rules will continue the strong development of solar in Massachusetts, at least until the new caps are reached. Stakeholders in the state are still working on a more permanent compensation scheme for future solar development.

2.3.3 New Hampshire

The New Hampshire legislature has also addressed net metering limits. Legislation enacted earlier this year increases the cap on total net metering capacity from 50 MW to 100 MW, and directed the New Hampshire PUC to open a proceeding to develop a new net metering tariff.

2.3.4 Rhode Island

The Rhode Island legislature revised the state's net metering law, providing additional funding mechanisms, creating a program for community-based net metering projects, and doubling the cap for traditional systems from 5 MW to 10 MW.

2.3.5 Vermont

In September 2016, the Vermont Public Service Board finalized revisions to the state's net metering rules. The new rules reduce the compensation to many net-metered projects and limit the sizes and locations where net metered projects are permitted. Overall, this revision will generally have a dampening effect on solar PV development in the state.

3. ELECTRICITY MARKET DRIVERS

There are several key drivers that continue to influence trends in the electricity markets. There is a dynamic relationship between energy pricing and the type of generating capacity that is economic to build or maintain in the ISO-NE system, and there are drivers external to the New England markets that effect the investment decisions and

energy pricing in the region. The interrelationship of these multiple elements is critical to anticipating directional trends in these markets.

The primary element is wholesale electricity pricing. Wholesale prices in ISO-NE have been declining for several reasons in recent years as a result of several discrete forces in the market. One factor is the state-driven clean energy policies discussed in the preceding section. While the contract prices for renewables are generally higher than wholesale market prices, when these resources deliver the wind, solar, or hydro energy to the grid, it is at the bottom of the pricing stack. Therefore, these resources displace higher marginal priced units and lower the wholesale prices.

In addition to increases in this type of supply, wholesale energy prices are primarily impacted by fuel prices. Natural gas is the dominant fuel in New England throughout most of the year. During the winter peak periods, generators fueled by oil can be the price-setting resource. Both fuels have been declining and have seen historic lows in the past 12 months and contributed to lower wholesale electricity prices in the 2015-16 winter than the region experienced in winters of the recent history (see Figure 2 below).

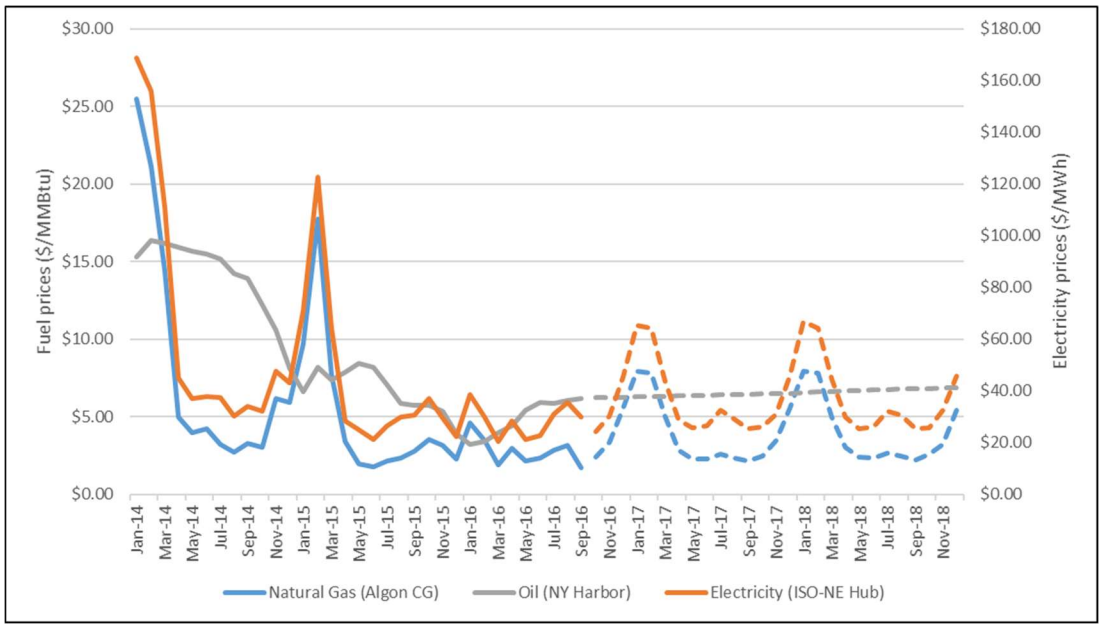

Figure 2. New England fuel, electricity prices 2014-2018 (actuals and forwards)[vii]

Capacity market price formation is a second element which is directly impacted by and indirectly impacts energy prices. The lower wholesale electricity market prices experienced over the past few years in New England is creating challenging economic

conditions for some generators. As an example, the Pilgrim Nuclear Power Station recently announced that it will be retiring in 2019. The need for significant safety upgrades along with lower forecasted energy prices and lower capacity market revenues contributed to the decision to retire the unit. This retirement will eliminate a large component of ISO-NE's non-gas/non-oil dispatchable capacity. This retirement will also put upward pressure on capacity market pricing. All new non-renewable generation that has cleared the ISO-NE Forward Capacity Auction (FCA) has been primarily natural gas-fired resources.

This upward pressure on capacity market pricing will be challenged as the cost of renewable capacity continues to decline. Figure 3 below tracks the overnight capital cost of various types of capacity over the past five years. Wind and solar resources have demonstrated rapid declines. While estimates of offshore wind costs have remained constant, those are likely to similarly decline once developers gain experience with actual installations.

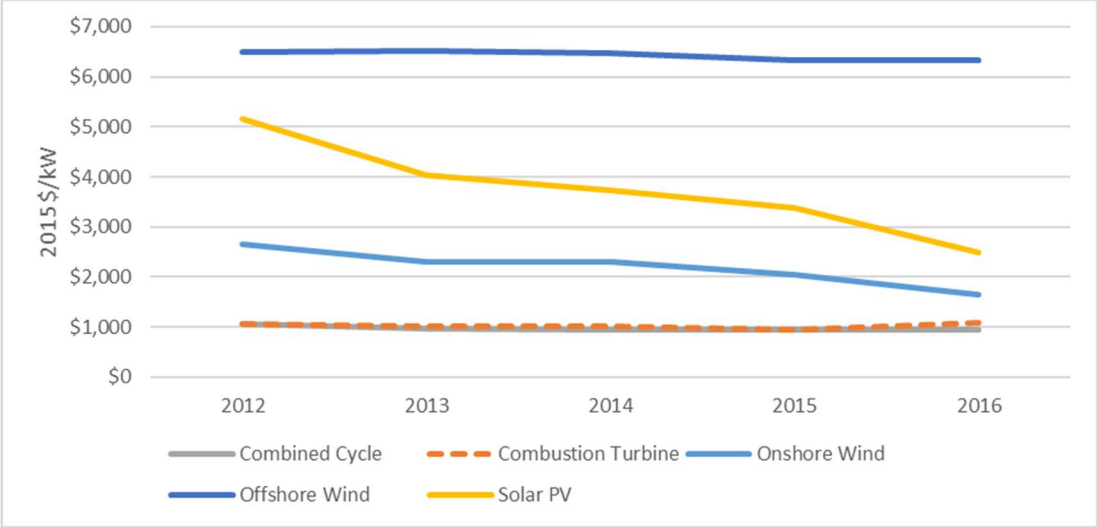

Figure 3. Overnight capital costs for new installed capacity (2015 $/kW)[viii]

Finally, in addition to the dynamics of the internal ISO-NE markets, there are other external drivers impacting the outlook on pricing which have seen developments in the past year.

- Carbon pricing policies. The New England states have been subject to carbon pricing under the RGGI program.[ix] RGGI places external pressure on the ISO-NE markets by introducing an incremental marginal cost for fossil fuel-fired

resources. The program continues to be strong, and there have been recent discussions of expanding the program to allow trading with other regional programs, including the California-Quebec program. On the national level, the Clean Power Plan (CPP)[x] is currently subject to legal uncertainty. If it is implemented as proposed, it would likely have only a minimal impact on New England, since the RGGI compliance targets are at least as stringent as the CPP.

- Climate agreements and policies. As world leaders continue to formulate approaches to address climate change, the United States has entered into agreements to reduce greenhouse gas emissions. Both the Paris Agreement[xi] and the North American Climate, Clean Energy, and Environmental Partnership[xii] represent national approaches to climate issues which will necessarily effect the energy sector once compliance plans are developed. On a local level, Massachusetts Governor Charlie Baker issued an order[xiii] on September 16, 2016 directing several actions related to climate change planning and the state's Global Warming Solutions Act (GWSA), which was enacted in 2008. It is not clear that any of these climate policies will push the region towards clean energy resources more quickly than the other policies in place, but they represent an alternative compliance structure that could impact future policymaking.

These components can each have the impact of increasing or decreasing future energy prices, depending on circumstances. The recent developments point to a period of lower pricing on the wholesale energy markets in the near-term horizon. But it is the complex dynamics of the energy and capacity market relationships, along with the impact of external drivers, that determine the long-term impact.

The following sections provide additional detail on some of these drivers.

3.1 Natural gas pricing

As the primary price-setting fuel for the New England energy market, trends in the price of natural gas are critical to electricity prices in the region. After three winters of prolonged periods of high basis prices,[5] the 2015-2016 winter showed significantly fewer spikes in natural gas prices due to a mild winter and excess fuel supplies. Figure 4 below depicts both the Algonquin Citygates prices and Henry Hub prices.

[5] The natural gas basis price reflects the difference between the commodity price of fuel, typically indexed at the Henry Hub location, and the delivered price of fuel to New England at the Algonquin hub. High basis indicates a period when the pipeline capacity was not sufficient to deliver enough natural gas, and the market prices increase due to short supply.

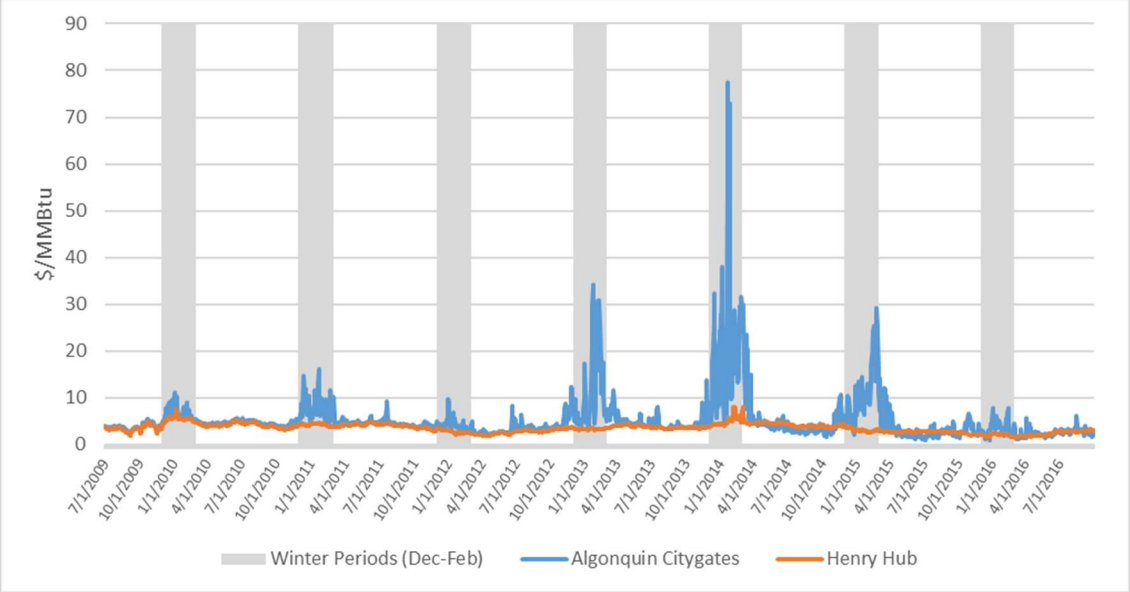

Figure 4. Natural gas price comparison, Henry Hub and New England delivered ($/MMBtu)

The lower fuel prices have contributed to a continued decline in market energy pricing in the region.

3.2 Pilgrim Nuclear retirement

The Pilgrim Nuclear Power Station, a 680 MW plant, was commissioned in 1972 and was relicensed in 2012 for an additional 20 years. In late 2015, Pilgrim's owner announced plans to retire the plant after a federal inspection in which the plant's safety rating was downgraded to the lowest level. The required upgrades would cost $45 to $60 million to a plant already facing reduced revenues, primarily due to lower market prices driven by low natural gas costs and increased renewable penetration. This confluence of factors led to the decision to close the plant by 2019.

With the retirement of Pilgrim, New England will only have three operating nuclear units left to serve the region's increasing electricity needs and will further concentrate the natural gas portion of the resource mix. This trend has been seen in other areas of the country, with nuclear units facing increasing economic pressures from low energy revenues. In New York, for example, Entergy has stated intentions to retire the FitzPatrick nuclear plant due to insufficient market revenue, though efforts are underway to provide financial assistance to keep the plant operational.[xiv]

3.3 Clean Power Plan

The U.S. Supreme Court stayed the implementation of the CPP on February 9, 2016, pending judicial review.[xv] Even though the CPP has not been implemented, the Environmental Protection Agency (EPA) has encouraged states to continue their work on reducing carbon pollution and will provide any assistance or guidance.

Under the CPP there is an optional state participation program, the CEIP, offering incentives in the form of additional allowances or Emission Rate Credits (ERCs) for early investments in renewable energy generation and demand-side energy efficiency that generate MWhs that are carbon-free or cause energy demand to fall during 2020 and 2021.[xvi] The program is designed to incentivize wind and solar projects because of their quicker implementation and because of concerns raised around the CPP shifting away from zero-emitting technologies.

The compliance costs associated with the CPP include energy efficiency measures and costs for monitoring, reporting, and recordkeeping requirements.[xvii] The energy efficiency program costs are ultimately paid by ratepayers of each utility.

In addition to the compliance costs, the CPP will impact markets for goods and services produced by sectors using the energy inputs from electricity, natural gas, and coal in the production process or that supply the sectors that use these energy inputs due to supply and demand changes.[xviii] Demand for new generation or energy efficiency will lead to production and profit changes to firms that supply goods and services to these sectors/areas.

3.4 RGGI

The New England states, New York, Maryland, and Delaware participate in RGGI as a regional effort to limit carbon emissions in the electric sector. The regional emissions cap in 2016 is 86.5 million tons of CO_2 per year and this cap will decline by 2.5% each year through 2020.[xix]

Although RGGI is a mature program, there have been discussions over the past year regarding potential changes. New York Governor Cuomo has discussed linking the system in the northeast with the California-Quebec trading platform to provide an impact over a wider geographic region and provide more permit trading opportunities.[xx]

The primary discussions regarding RGGI are related to the interaction between the program and regional CPP compliance. The CPP allows state-specific rate goals or state-

specific mass goals. The total mass goals of the nine RGGI states is about 79 million tons of CO_2 emissions by 2030 for existing resources and 80 million tons of CO_2 emissions by 2030 for new and existing resources combined.[xxi] The current 2020 cap on the RGGI program is about 78 million tons (with banked allowances, the effective cap is closer to 56 million tons), so depending on the final CPP provisions, New England states may not need to exceed RGGI obligations to comply with the CPP.

If the CPP survives legal challenges, future discussions of RGGI will relate to how the program adapts to the CPP, and whether it persists after the federal legislation takes effect. Given the timeline of the CPP as written, and the delays resulting from legal challenges, it is likely that the near-term impact of RGGI has not changed.

3.5 Climate and clean energy policies

3.5.1 Paris Agreement

The Paris Agreement was formally committed to by the United States and China in September 2016. Under the Paris Agreement, the U.S. is pledging to cut emissions by 26% to 28% by 2025, compared to 2005 levels.[xxii] The CPP was going to be the leading piece of legislation to help the U.S. achieve that goal, but with it being held up in the U.S. Supreme Court, Congress may need to provide additional legislation to reach this target. The Paris Agreement will likely have limited impact in the New England region due to the stringent requirements under RGGI.

3.5.2 North American Climate, Clean Energy, and Environmental Partnership

The North American Climate, Clean Energy, and Environmental Partnership was announced by the heads of state of Canada, the U.S., and Mexico in June 2016. The partnership has a broad array of environmental and infrastructure goals, but the most relevant to the energy markets is to promote collaboration on the development of clean energy resources in North America. The primary metric is a joint energy goal of 50% clean energy or energy efficiency by 2025. This agreement will have minimal impact due to its non-binding nature.

3.5.3 Massachusetts GWSA

The 2008 Massachusetts Global Warming Solutions Act set targets for the state to reduce greenhouse gas emissions. In May 2016, the Massachusetts Supreme Judicial Court issued an order declaring that the state has not made enough progress towards

the GWSA goals. In September, Governor Baker signed an executive order directing state agencies to develop specific, yearly goals to reduce GHG emissions and comply with the GWSA targets. These goals and programs are due to be developed early in 2017. Given the ambitious GHG reductions called for by the GWSA, the compliance plans could likely impact the power sector.

4. NATURAL GAS INFRASTRUCTURE

Natural gas-fired generation continues to be a major, and growing, resource in the New England energy mix, and the primary price-setting resource in the markets. The recent growth in natural gas capacity has continued, with 1,300 MW of new dual-fuel (gas/oil) resources clearing in the 2016 ISO-NE Forward Capacity Auction and in-service dates required by June 2019.

The region has experienced natural gas pipeline constraints for several years, with a large economic consequence.[xxiii] Despite this history, and the continuing increase in reliance on natural gas, there has been very minimal tangible progress towards developing new natural gas pipeline capacity in the past year.

The August 2015 report discussed economics as a primary obstacle to pipeline investment. In the past year, political opposition has become the principal factor preventing infrastructure development. The AIM project is still on schedule and should be in-service by the end of 2016. Other major development projects, however, have been cancelled (Kinder Morgan's Northeast Energy Direct[xxiv]) or delayed (Spectra's Access Northeast Expansion[xxv]) due to permitting, regulatory, or legislative setbacks. In the wider region, New York has been delaying the pipeline expansions occurring in that state due to environmental-related permitting.[xxvi]

Table 4 summarizes several projects discussed in Daymark's 2015 report and includes any status update.

Table 4. Natural gas pipeline project status

Project Name	Capacity (MMcf/d)	2015 Expected In-service Date	New In-service Date	Current Status	Notes
Algonquin Incremental Market (AIM)	342	Nov. 2016	Nov. 2016	Under construction	Spectra expects to meet in-service date
Atlantic Bridge Pipeline	133	Nov. 2017	Nov. 2017	Completed FERC environmental review	New target of NY environmental agencies
Access Northeast (ANE)	925	Nov. 2017	Nov. 2018*	Delayed	Utilities have withdrawn application in MA and RI
Northeast Energy Direct (NED)	1,200	Nov. 2018	-	On hold	Kinder Morgan has stopped work and funding
Portland Continent to Coast (C2C)	182	Nov. 2016	-	On hold	Importing additional Canadian gas from Quebec

* While Spectra has not officially announced a change to the expected in-service date, the recent withdrawal of the state applications suggests the project will be further delayed.

The lack of progress is not a result of lack of regional effort. The primary economic obstacle to developing new pipeline for consumption by electricity generators continues to be the lack of firm commitments. In an attempt to address this specific challenge, there have been several state initiatives to support pipeline development by requiring electric distribution companies (EDCs) to contract for firm pipeline capacity and resell the capacity to electric generators on a short-term basis, essentially providing the long-term revenue stability the pipeline developers lack.[xxvii]

In addition to the failure to develop new pipeline infrastructure in New England, there are new threats to supply from outside the region. Pipeline capacity through New York is critical for New England to access the low-cost Marcellus shale supply, but political opposition in New York is now threatening new infrastructure projects.[xxviii] In addition, supplies of natural gas from Canada are declining drastically as offshore production in the Canadian Maritimes decreases.[xxix]

Taken together, the developments regarding natural gas infrastructure over the past year indicate that there are many developers hoping to develop projects, and there is great demand for increased capacity, but the particularities of project financing and capacity contracting have prevented the proper economic incentives for development. Some states have attempted to resolve the market disconnects, but opposition from several

parties and legal hurdles have prevented progress.[xxx] In addition, external threats to low-cost supply are developing due to policy efforts in New York, and supply economics in the Canadian Maritimes. Regional parties continue to try alternative methods to address winter supply shortages through, for example, LNG storage initiatives.[xxxi]

In the short term, the region could continue to be subject to energy price volatility driven by natural gas shortages. The medium- to long-term impact depends on the success of some of the initiatives that are still ongoing.

The following sections provide more detail on these issues.

4.1 AIM project status

Spectra is on target to complete the AIM project this November, in time for New England's heating season. The project will add 340 MMcf/d of capacity into the New England market. The project has been beset by protests from environmental groups and political opposition. Despite protests, the AIM project has received all necessary approvals and continues progressing with construction with FERC dismissing comments and requests to halt progress.

As of the weekly status report filed with the FERC on September 21st, Algonquin is on track to meet their November deadline. On September 16th the Algonquin pipeline project had a serious violation and non-compliance with FERC environmental standards while installing a section of the AIM pipeline in a wetland area.[xxxii] This caused a minor halt in progress while the problem was addressed, but since then Spectra has apologized to the FERC and engaged with its contractors in retraining. This led opponents to submit additional FERC filings to halt construction in September 2016, so the ultimate impact on the project timing remains to be determined.

4.2 Algonquin Access Northeast Expansion and EDC contracting capability

The ANE project has been delayed from its original on-stream date mentioned in our original report from November 2017 to fourth quarter 2018. Algonquin has been able to secure sufficient long term contracts using an alternative approach – contracting with EDCs. Algonquin has executed memoranda of understanding with seven EDCs – Eversource's four electric distribution companies in Connecticut, Massachusetts and New Hampshire, and National Grid's three electric distribution companies in Massachusetts and Rhode Island. Following the memoranda of understanding,

Eversource and National Grid applied state-by-state across New England to allow their EDCs to subscribe for long-term pipeline capacity.

This approach is the result of regional acknowledgement that current methods of natural gas contracting generally leave electric generators unable to access fuel during cold winter periods when natural gas is needed to heat homes and businesses. Electric generators purchase daily interruptible capacity or pipeline capacity re-sold on the secondary market by firm shippers, such as utilities. This capacity becomes scarce on cold winter days leading to the historically observed price spikes and fuel switching. Generators currently will not purchase long-term firm pipeline capacity as they cannot pass the cost onto customers and are not willing to take on the significant risk of 20-year contracts. This creates a problem as pipelines will only expand into the market with long-term firm contracts with customers.

The ANE project attempted to resolve this issue by agreeing to long-term contracts with EDCs, essentially requiring that electric customers commit to the capacity that would serve natural gas-fired generators. However, the legality of this contracting structure has faced legal challenges and is currently uncertain.

- Massachusetts. In an October 2015 Order, the Massachusetts Department of Public Utilities (DPU) ruled that it possessed the authority to consider and potentially approve electric utilities contracts for capacity on long haul natural gas pipelines as a way to improve reliability in the region. Eversource and National Grid filed the contract capacity on ANE.[xxxiii] On August 17th, however, the Supreme Judicial Court (SJC) of Massachusetts ruled that the DPU was not authorized under state law to determine if EDCs could contract capacity on interstate pipelines. The SJC determined that the DPU order from October was invalid in light of statutory language, stating it would expose ratepayers to financial risks that original regulations sought to protect them from.[xxxiv] Following this judicial decision, Eversource and National Grid withdrew their applications in Massachusetts. Legislative efforts are underway to attempt to permit the contracting authority.
- Rhode Island. National Grid took the EDC contract to the RI DPU on June 30th and was expecting a 120-day review process. Following the Massachusetts SJC judgment and the potential that Massachusetts EDCs may not be allowed to contract capacity (they account for ~60% of the proposed capacity) Rhode Island

delayed the decision from Oct 28th to the beginning of 2017, and since then National Grid announced it will withdraw its filing.[xxxv]

- Connecticut. In June 2016, Connecticut's Department of Energy and Environmental Protections (DEEP) issued a final Request for Proposals for natural gas capacity pursuant to their act concerning affordable and reliable energy.[xxxvi] The DEEP began evaluating the bid in July, and there has been no mention of changing the process since the Massachusetts SJC decision.[xxxvii]
- Maine. Although Maine is not involved in the ANE project, it is worth noting that in July 2016, the Maine PUC approved a plan authorizing EDCs to purchase capacity on natural gas pipelines; this was despite a report from the Maine PUC Staff opposing the proposal. The proposal was in accordance with the Maine Energy Cost Reduction Act which allowed EDCs to enter into gas supply contracts for up to $75 million per year (as long as it's in the public interest). However, the PUC approval contained the condition that four other New England states must also allow similar contracting. With the Massachusetts action, the likelihood of a pipeline supported by Maine EDCs is greatly reduced.[xxxviii]

4.3 Kinder Morgan NED project

The largest project looking to move supply from the growing Marcellus basin into the New England market is the NED, which was put on hold in April 2016. After significant opposition by environmental interests, landowners in Massachusetts and New Hampshire, and political opposition from the Massachusetts Attorney General and numerous State Senators, Kinder Morgan announced that it was unable to secure sufficient contractual commitments from customers and is suspending work and spending on its NED poject.[xxxix] Kinder Morgan stated the project was not economic at a cost of $5 billion and a return of only 6% unlevered after tax. The market section of the pipeline, which required greenfield pipeline builds in Massachusetts and New Hampshire, had significant political risk, and Kinder Morgan was unable to secure sufficient long-term contracts for the southern supply section of the pipeline which brings Marcellus shale gas to the northeast.

4.4 New York state policy

New York Governor Andrew Cuomo has explicitly directed his state's agencies to attempt to get the FERC to stop pipeline projects in that state on environmental and safety grounds. In May 2016, the Constitution Pipeline, which would move Marcellus gas to power generators in New York and Connecticut, was denied the necessary regulatory permits under the New York Clean Water Act, despite having the necessary Federal approvals from the FERC. This rejection threatens the ultimate viability of the project and Constitution Pipeline is attempting to sue the state of New York to overturn the ruling.[xl]

In addition, while the Algonquin Pipeline crosses only 34 miles of New York State (the smallest geographical footprint of any state Algonquin Pipeline crosses), New York has attempted to block the Algonquin Incremental Market expansion project through actions at the FERC. Though the project is intended to increase capacity to New England, it requires pipeline expansions in New York.

New York was ultimately unsuccessful in its challenge to the Algonquin project,[xli] but it is likely that similar efforts will continue. The result of the Constitution Pipeline and related lawsuits will provide an indication of the likelihood of projects like ANE or NED going forward, as they both will need to go through New York State.

4.5 Canadian supply

Northern New England has historically been reliant on baseload natural gas from offshore Canada. This supply has been declining quickly and may disappear completely in the coming years. Natural gas supply from Nova Scotia has fallen drastically, from highs of 450 MMcf/d as recently as 2014 to only half of that in July 2016.[xlii] Decommissioning of some of the Canadian offshore platforms will begin as early as next year, according to ExxonMobil.[xliii] While there is technical potential to expand these fields, current market prices are too low to justify further investment. Declining supply will not only impact the amount of gas serving Northern New England but will also result in the Canadian Maritimes being required to source gas from imports through New England, increasing overall demand levels within the region. This will continue to tighten supply into the New England market.

4.6 Other new pipeline projects

In announcing its proposed merger with Enbridge, Spectra stated that it is "committed to assuring that Access Northeast remains on track to meet strong demand in Massachusetts and New England to bring to the region the energy that is so desperately needed." While there have been no related announcements of new projects, the merger may lead to additional synergies and infrastructure solutions in New England with Enbridge's significant storage capacity in Canada.

Smaller incremental pipeline expansions such as the Portland Natural Gas Transmission System's "Coast to Coast" project could almost double the existing 180 MMcf/d of natural gas import capacity from Quebec, bringing the total closer to 300-350 MMcf/d. This pipeline did not originally receive the required commitments in 2013 but delays in the ANE and NED project could revive interest in incremental expansions between now and 2020. The project itself also requires only additional compression which has only a modest incremental footprint compared to looping pipelines.

4.7 LNG

LNG imports into New England have been the marginal supplier during peak winter months. However, the LNG facilities in New England[xliv] and the Canaport facility in New Brunswick[xlv] have very little contracted gas and are required to buy spot cargoes on either month ahead or season ahead basis.[6] The ISO-NE Winter Reliability Program has supported imports at both the Canaport and Everett facilities[xlvi], but both are operating at well below capacity. Delays in pipeline projects, combined with export facilities coming online in the US gulf coast this year,[xlvii] could lead to additional cargoes at the facilities during the winter months. Declines in the price of LNG are also leading to declining delivered prices; whereas prices were once upwards of $14/MMBtu, more recent winter prices are closer to $6-7/MMBtu in New England and could decrease even more if US gulf coast imports arrive in New England tied to a Henry Hub (gulf coast) price.[xlviii]

[6] Both the Distrigas terminal in New England and the Canaport facility in New Brunswick have some long-term contracts, though they are limited in their volumes. Canaport has sold most of its LNG portfolio to Shell and has only one long-term supply contract for 100,000 Mt/year until 2023 (approximately 32 MMcf/d each year over the winter period). Aside from the contract with the Mystic River 8 & 9 power plant extending to 2027, and smaller contracts with utilities out to 2024, Distrigas's contracts with customers are generally negotiated before the beginning of each winter season and last only for that winter term.

5. IN CLOSING

The New England region is balancing several issues: reliability, cost and affordability, climate impacts, and economic development and competitiveness. Policy developments over the past year in New England and adjacent regions to address infrastructure needs have introduced additional uncertainty to the timing and composition of infrastructure additions to the regions over the next five years. This uncertainty translates into greater electricity price uncertainty and the potential for greater adverse jobs and disposable income impacts for New England consumers and businesses in the 2019-2020 period and years immediately following, as compared to the estimates in the August 2015 report. Overall affordability and price volatility remain important issues in the next three to five years. The resolution of this uncertainty depends in large measure on the implementation of policy, cost effectiveness of investments and timing.

NOTES

[i] New England Clean Energy RFP. https://cleanenergyrfp.com/

[ii] Massachusetts H. 4568 "An Act to Promote Energy Diversity." https://malegislature.gov/Bills/189/House/H4568

[iii] Database of State Incentives for Renewables & Efficiency (DSIRE). http://www.dsireusa.org/

[iv] DSIRE: Rhode Island Renewable Energy Standard. http://programs.dsireusa.org/system/program/detail/1095

[v] "2016 New England State Energy Legislation." NEPOOL. http://www.nepool.com/uploads/Legislative_Update_20160913.pdf

[vi] DSIRE: Net Energy Metering Programs. http://programs.dsireusa.org/system/program?type=37&category=2&

[vii] Source: SNL Data.

[viii] Annual Energy Outlook, U.S. EIA, Table 8.2, 2012-2016.

[ix] Regional Greenhouse Gas Initiative. https://www.rggi.org/

[x] "Clean Power Plan for Existing Power Plants." U.S. EPA. https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants

[xi] "Paris Agreement." European Commission. http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm

[xii] "North American Climate, Clean Energy, and Environment Partnership Action Plan." Whitehouse.gov https://www.whitehouse.gov/the-press-office/2016/06/29/north-american-climate-clean-energy-and-environment-partnership-action

[xiii] Massachusetts Executive Order No. 569. "Establishing an Integrated Climate Change Strategy for the Commonwealth." http://www.mass.gov/eea/docs/executive-order-climate-change-strategy.pdf

[xiv] "Entergy Announces Closure of FitzPatrick Nuclear Power Plant." Power Magazine (November 2, 2015) http://www.powermag.com/entergy-announces-closure-of-fitzpatrick-nuclear-power-plant/

[xv] "Clean Power Plan for Existing Power Plants." U.S. EPA. https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants

[xvi] "Clean Power Plan: Clean Energy Incentive Program." U.S. EPA. https://www.epa.gov/sites/production/files/2015-08/documents/fs-cpp-ceip.pdf

[xvii] "Regulatory Impact Analysis for the Clean Power Plan Final Rule." U.S. EPA. (October 23, 2015), p. ES-8. https://www3.epa.gov/ttnecas1/docs/ria/utilities_ria_final-clean-power-plan-existing-units_2015-08.pdf

[xviii] Id., p. ES-24.

[xix] "RGGI Fact Sheet." Regional Greenhouse Gas Initiative. https://www.rggi.org/docs/Documents/RGGI_Fact_Sheet.pdf

[xx] "Proof that a price on carbon works." New York Times (January 19, 2016). http://www.nytimes.com/2016/01/19/opinion/proof-that-a-price-on-carbon-works.html

[xxi] "Key Items for 2016 Program Review Stakeholder Discussions: Program Elements and EPA Clean Power Plan (CPP)" Regional Greenhouse Gas Initiative. http://www.rggi.org/docs/ProgramReview/2016/11-17-15/Key_Discussion_Items_11_17_15.pdf

[xxii] "U.S. and China formally commit to Paris Climate Accord." Scientific American (September 6, 2016) http://www.scientificamerican.com/article/u-s-and-china-formally-commit-to-paris-climate-accord/

[xxiii] "New England's known need for more natural gas pipelines." *Forbes* (June 26, 2016). http://www.forbes.com/sites/judeclemente/2016/06/26/new-englands-known-need-for-more-natural-gas-pipelines/#5066e3017d6f

[xxiv] "Kinder Morgan suspends work on Northeast Energy Direct gas pipeline." Boston.com (April 20, 2016). https://www.boston.com/news/local-news/2016/04/20/kinder-morgan-suspends-work-northeast-direct-energy-gas-pipeline

[xxv] "Court kills pipeline tariff in Mass, RI still Considering." RIFuture.org (August 17, 2016). http://www.rifuture.org/mass-court-kills-pipeline-tariff.html

[xxvi] "New York presses FERC to penalize Constitution over 'unpermitted construction'" SNL Financial – Subs. Req. (May 17, 2016). https://www.snl.com/interactivex/article.aspx?id=36535666&KPLT=6&s_data=si%3d2%26kpa%3d2c1d1eec-d855-4a50-a28f-870f9bb58796%26sa%3d

[xxvii] "Massachusetts Regulators Endorse Pipeline Contracts" RTO Insider (October 8, 2015). http://www.rtoinsider.com/mass-natural-gas-capacity-contracts-18225/

[xxviii] "New York presses FERC to penalize Constitution over 'unpermitted construction'" SNL Financial – Subs. Req. (May 17, 2016). https://www.snl.com/interactivex/article.aspx?id=36535666&KPLT=6&s_data=si%3d2%26kpa%3d2c1d1eec-d855-4a50-a28f-870f9bb58796%26sa%3d

[xxix] "Exxon-Mobil to receive millions for Sable gas decommissioning" CBC News (June 25, 2015). http://www.cbc.ca/news/canada/nova-scotia/exxon-mobil-to-receive-millions-for-sable-gas-decommissioning-1.3127145

[xxx] "Mass. Ruling creates hurdle for pipeline expansion" Hartford Business Journal (August 18, 2016). http://www.hartfordbusiness.com/article/20160818/NEWS01/160819898/mass-ruling-creates-hurdle-for-pipeline-expansion

[xxxi] "LNG prices expected to stay low on oversupply worries" Ship and Bunker (September 16, 2016). http://shipandbunker.com/news/apac/914986-lng-prices-expected-to-stay-low-on-oversupply-worries

[xxxii] "FERC slams Algonquin pipeline over serious violation on the Hudson River" Peekshill Patch (September 9, 2016). http://patch.com/new-york/peekskill/ferc-slams-algonquin-pipeline-over-serious-violation-hudson-river

[xxxiii] "Massachusetts DPU: EDCs Can Contract for Gas Pipeline Capacity" Energy Manager Today (October 7, 2015). http://www.energymanagertoday.com/massachusetts-dpu-edcs-can-contract-gas-pipeline-capacity-0116553/

[xxxiv] "Mass. Ruling creates hurdle for pipeline expansion" Hartford Business Journal (August 18, 2016). http://www.hartfordbusiness.com/article/20160818/NEWS01/160819898/mass-ruling-creates-hurdle-for-pipeline-expansion

[xxxv] "Court kills pipeline tariff in Mass, RI still Considering." RIFuture.org (August 17, 2016). http://www.rifuture.org/mass-court-kills-pipeline-tariff.html

[xxxvi] "DEEP Says RFP Process Will Bring Cleaner, More Affordable, and More Reliable Energy to CT Families and Businesses." CT DEEP (June 6, 2016). http://www.ct.gov/deep/cwp/view.asp?Q=581414&A=4808

[xxxvii] "DEEP Announces Next Steps on RFPs for Clean Energy Resources and Natural Gas" Connecticut Department of Energy and Environmental Protection (March 10, 2016). http://www.ct.gov/deep/cwp/view.asp?Q=578024&A=4808

[xxxviii] "Maine PUC Endorses Gas Pipeline Contracts" RTO Insider (July 25, 2016). http://www.rtoinsider.com/maine-puc-natural-gas-pipeline-contracts-29283/

[xxxix] "Kinder Morgan suspends work on Northeast Energy Direct gas pipeline." Boston.com (April 20, 2016). https://www.boston.com/news/local-news/2016/04/20/kinder-morgan-suspends-work-northeast-direct-energy-gas-pipeline

[xl] "New York presses FERC to penalize Constitution over 'unpermitted construction'" SNL Financial (May 17, 2016). https://www.snl.com/interactivex/article.aspx?id=36535666&KPLT=6&s_data=si%3d2%26kpa%3d2c1d1eec-d855-4a50-a28f-870f9bb58796%26sa%3d

[xli] "FERC Says Environmental Impacts of Pipeline Expansion Are Insignificant" NYACK Patch (January 23rd, 2015) http://patch.com/new-york/nyack/ferc-says-environmental-impacts-pipeline-expansion-are-insignificant

[xlii] "Offshore Activity- Production Data" Canada-Nova Scotia Offshore Petroleum Board (Updated as of August 2016). http://www.cnsopb.ns.ca/offshore-activity/production-data

[xliii] "Exxon-Mobil to receive millions for Sable gas decommissioning" CBC News (June 25, 2015). http://www.cbc.ca/news/canada/nova-scotia/exxon-mobil-to-receive-millions-for-sable-gas-decommissioning-1.3127145

[xliv] "Distrigas Signs Number of LNG Supply Deals" LNG World News (May 11, 2015). http://www.lngworldnews.com/distrigas-signs-number-of-lng-supply-deals/

[xlv] "Repsol, Shell agree 10-year LNG Supply deal to Canaport terminal" Platts (February 27, 2013) http://www.platts.com/latest-news/natural-gas/madrid/repsol-shell-agree-10-year-lng-supply-deal-to-8183268

[xlvi] "Distrigas to Fulfill Multiple LNG Contracts with Gas Utilities in New England; One Agreement Spans 10 Years of Supply" Business Wire (May 11, 2015) http://www.businesswire.com/news/home/20150511005685/en/Distrigas-Fulfill-Multiple-LNG-Contracts-Gas-Utilities

[xlvii] "Gulf Coast Booming with propane, butane and now LNG exports" Fuel Fix (August 24, 2016). http://fuelfix.com/blog/2016/08/24/gulf-coast-booming-with-propane-butane-and-now-lng-exports/

[xlviii] "LNG prices expected to stay low on oversupply worries" Ship and Bunker (September 16, 2016). http://shipandbunker.com/news/apac/914986-lng-prices-expected-to-stay-low-on-oversupply-worries

"Spot LNG Price Statistics report" Japanese Ministry of Economy, Trade and Industry (Updated as of August 2016) http://www.meti.go.jp/english/statistics/sho/slng/

"LNG Monthly 2016" Department of Energy (Updated as of September 16, 2016). http://energy.gov/fe/listings/lng-reports