Mandating Low-Carbon Fuels to Reshape a Regional Electricity Market

David O'Connor

The national policy debate over how to reduce carbon emissions while preserving the integrity of wholesale electricity markets heard a jarring message from the Northeast this summer. In a region known for first creating and then defending competition in its wholesale electricity market, the largest consuming state, Massachusetts, passed legislation that requires distribution utilities to purchase carbon-free electricity under long-term contracts for up to 30 percent of the state's electricity supply.

The bill also has the potential to instigate profound changes to the design and operation of the region's wholesale electricity market.

Despite charges by incumbent generators and large consumers that the bill would undermine competition and discourage new competitors from entering the market, Democratic legislators found common ground with Republican Gov. Charlie Baker to enact a sweeping "clean energy" bill. It has the potential to transform the profile of fuels used to generate power while significantly reducing the state's carbon footprint. The bill also has the potential to instigate profound changes to the design and operation of the region's wholesale electricity market.

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NEW ENGLAND MARKET SERVES UP TROUBLE

The roots of this legislation reach back at least to the winter of 2013–14, when a lengthy stretch of cold weather revealed that the region's growing dependence on natural gas for power could cause dramatic spikes in electricity prices.

That winter, the demand for natural gas to produce both space heating and electricity doubled its price and forced the region's ratepayers, who normally spend about $3 billion for electricity in the winter months, to shoulder a bill for more than $5 billion.[1] The use of natural gas to generate electricity had reached almost 50 percent of the region's fuel supply on an annual basis, and in the winter went even higher. The need to diversify the fuels used to provide power, particularly to use less natural gas, was becoming both more obvious and more urgent.

Evidence was mounting that indicated state energy policy needed to change.

The governor at the time, Deval Patrick, a Democrat in the last year of his second term, filed legislation that would have mandated imports of Canadian hydropower equal to 2,400 megawatts. Promising legislative negotiations bogged down over demands by legislators representing coastal towns. These legislators wanted similar contracting opportunities for offshore wind farms whose onshore development activities they believed would revitalize their dormant local economies. They succeeded in preventing Patrick's proposal passing before the legislative session came to an end in the summer of 2014. Nevertheless, evidence was mounting that indi-

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cated state energy policy needed to change if it was to address serious problems the wholesale market seemed unable to solve.

The most obvious of these problems was that Massachusetts faced a formidable challenge to meeting its previously legislated goals to reduce carbon emissions. Under the state's Global Warming Solutions Act, it is legally obligated to reduce its carbon emissions to 25 percent below the 1990 level by 2020 and to 80 percent below that level by 2050.[2] At the end of Governor Patrick's term, it was becoming clear that these daunting targets could not be met without dramatic reductions in emissions caused by electricity consumption. Admittedly, the region's cap-and-trade program, combined with the lower energy use caused by the economic recession from 2007 through 2010, had steadily reduced fossil emissions. But to meet the state's legally obligated levels, the rate of reductions would have to be larger and faster for many years to come.[3] The state's previous commitments to comparatively small purchases of in-region renewable energy, averaging about 7 percent of the state's annual power consumption over the last seven years, would not be enough.[4]

Legislators could not avoid the conclusion that something had to be done.

The sense of urgency only intensified when, in the fall of 2015, the owner of the 680-megawatt Pilgrim nuclear power plant announced plans to retire the plant by 2019. The Pilgrim station is one of only three nuclear plants remaining in operation in the region. It generates 17 percent of Massachusetts's power and alone provides 57 percent of the state's carbon-free power.[5] Even before this disturbing announcement, the region was already facing retirements of several thousand megawatts of largely coal- and oil-burning plants. If all these power sources were replaced by new natural gas–fired plants, as had been the case throughout the previous decade, the region would see its dependency on natural gas grow to unprecedented levels and emissions of carbon increase rather than decrease.[6]

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POLICYMAKERS SPARK A DEBATE

In January 2015, when the legislature commenced a new session, several bills were filed that would mandate large, long-term purchases by distribution utilities of power supplies from hydroelectric dams in Canada.

In a notable example, the state's newly arrived Republican governor, Charlie Baker, in one of his first actions, filed a bill quite similar to the one proposed by his predecessor to increase supplies of hydropower imported to the region from Canada. Another would have required imports of power from wind farms located in the ocean, south of Cape Cod. Overall, these bills reflected a growing consensus that long-term commitments were needed to purchase supplies of electricity that would significantly reduce carbon emissions, stabilize wintertime electricity prices, and reduce the region's dangerous overreliance on natural gas for power.

Incumbent power generators vigorously opposed all versions of long-term contracts for clean energy. They claimed these would undermine competition in electricity markets, cause consumers to pay higher prices for electricity, and put at risk the jobs of thousands of local power plant operators.[7]

By contrast, advocates for hydropower imports produced a study that claimed to show that hydro and wind power would very likely reduce energy costs for Massachusetts consumers. This study claimed that imports would substantially reduce both the demand for and price of natural gas during winter months. Even after the cost of the new transmission needed to deliver the hydropower from Canada was taken in account, the study showed that consumers would still save on electricity rates. And as advocates pointed out, this economic benefit did not account for the large environmental benefit of reducing carbon emissions by millions of tons per year.[8]

Nevertheless, disagreements between the state's House and Senate over solar energy policy prevented constructive negotiation on other energy legislation for almost a year. Finally, in April 2016, a compromise was reached on a restructuring of the state's solar incentives, clearing the way for work to commence on a clean energy imports bill. In May, the House produced its version of the imports bill, and a few weeks later in June, the Senate enacted its

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version. These were dramatic developments and encouraging to advocates. However, as with the solar bill, differences over energy policy between the House and Senate produced two very different proposals.

Reconciling them was going to be difficult.

HARD BARGAINING OVER LEGISLATIVE DIFFERENCES

The House bill partially accommodated the governor's bill by requiring that 1,200 megawatts of hydroelectricity and onshore wind power be imported annually from Canada. However, the bill made up the difference by requiring utilities also to purchase 1,200 megawatts of power from offshore wind farms, reflecting the influence of coastal legislators. The bill envisioned the creation of what would be the first ocean-based wind farms in the coastal waters of the United States. While the power from them would almost certainly be more expensive than conventional sources, legislators claimed it would fall quickly as the industry reached scale, and would provide urgently needed economic development in their coastal communities. The House leadership embraced that vision.

The Senate bill reflected a similar underlying consensus on the need to dramatically boost imports of both hydropower and offshore wind generation. However, that bill differed from the House bill in substantial ways. The amounts of power to be procured were much larger: 1,600 megawatts of hydropower and onshore wind power as well as 2,000 megawatts of offshore wind power. Moreover, the Senate bill included several other provisions that had been considered and rejected by the House. The most controversial of these was one that would prevent electric ratepayers from funding the expansion of the region's natural gas pipeline capacity.[9] That provision was strenuously opposed by Governor Baker and raised the specter that he might veto rather than sign a bill that contained it.

Undaunted, the House and Senate each named three legislators to a conference committee and charged it with reconciling the two bills. Confidential negotiations dragged on for weeks, and tension steadily grew. By the middle of July, with only two weeks left in the legislative calendar, there was still no agreement on a compromise bill. If no agreement was reached and a bill was not enacted by the July 31 end of the session, legislative rules would effectively preclude action on similar legislation for at least a year, until mid-2017.

The negotiations over the last details continued into the morning hours of July 31. Finally, late that evening, in a moment of high drama and considerable relief for advocates, a compromise bill emerged. As the clock approached midnight, first the House then the Senate voted to approve it.

The bill was immediately sent to Governor Baker, who signed it into law a few days later.

LONG-TERM CONTRACTS FOR CARBON-FREE POWER

The historic bill requires the state's distribution utilities to enter into long-term contracts to purchase power from 1,200 megawatts from hydroelectric dams and onshore wind farms as well as from 1,600 megawatts of offshore wind farms. Taken together, these contracts will eventually provide the equivalent in carbon-free electricity for about one-third of the electricity consumed annually in Massachusetts for up to 20 years. Contracts may cover the costs of power and renewable energy credits, as well as the transmission needed to deliver the power to New England.

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In the case of hydropower and land-based wind power, solicitations must begin prior to April 2017 and may be "coordinated and issued jointly with other New England states." Contracts sufficient to achieve delivery of the specified amount of power are to be executed before December 2022. Proposals that include hydropower must "guarantee energy delivery in winter months." To be approved, contracts must be found by state regulators to be a "cost effective mechanism for procuring low cost renewable energy on a long-term basis." Hydro and wind generating facilities operating in both New England and Canada will be eligible to provide the power.

In the case of offshore wind, solicitations must begin by June 2017 and be accomplished through several procurements every two years

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of at least 400 megawatts each, until the total 1,600 megawatts has been put under contract. To be approved by regulators, subsequent procurements must yield prices equal to or less than the prices of the previous procurement. Contracts for the full 1,600 megawatts are to be executed by 2027. To be eligible, projects must be located in federally approved ocean areas south of the islands near Cape Cod.[10]

WINNERS AND LOSERS

Not surprisingly, potential Canadian suppliers of power under the envisioned long-term contracts such as Hydro Quebec and Nalcor Energy applauded the legislature and Governor Baker for enacting the legislation. Likewise, the three offshore wind companies Dong Energy, Deepwater Wind, and Offshore Megawatts, were equally enthusiastic. More broadly, environmental and clean energy advocates praised the legislation.

Utilities expressed their readiness to implement the bill and execute the required contracts. They were relieved that the final version of the bill did not include a prohibition on funding the expansion of natural gas pipelines through electric rates. They still hoped to accomplish that, too.[11]

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The incumbent generators remain deeply concerned by this (and similar legislation enacted by other states in the region). These generators believe that it will distort competition among generators in the wholesale electricity market by favoring those with state-mandated, long-term contracts. Legislators clearly were not intimidated by these disquieting predictions.

There seemed an unspoken conviction that the current design of the wholesale electricity market prevented it from responding effectively to the problems of growing dependency on natural gas for power and the carbon emissions that come with it.

RESHAPING A WHOLESALE MARKET TO ACHIEVE CARBON REDUCTIONS

Immediately after passage of the Massachusetts bill, the regional congress of electricity market participants began a large-scale, consultative process among its members.

The process seeks to reach agreement among market participants on changes to the market that will deliver the carbon reductions sought by the New England states. The goal is to devise ways to do that through technology-agnostic competition rather than state-mandated, technology-specific contracts. Already proposals have surfaced in the process that would create a regional "forward clean energy market" or would add a "cost of carbon" to clearing prices in the short-term energy market.[12] It remains to be seen if a consensus can be reached among the diverse participants, but there is clearly broad agreement that the reduction of carbon emissions must become a defining objective, and a reliable outcome, of the region's electricity market in the future.

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While it is difficult to make predictions about the practical impact of the new Massachusetts law, there can be little doubt that it will bring about significant changes to the profile of fuels used to produce the region's power and the carbon footprint that goes with it. The law will reduce the amount of natural gas used to generate electricity for Massachusetts consumers, particularly in the winter months when demand for gas for space heating is high. This reduction, in turn, will most likely lower wintertime prices for natural gas and reduce the chances that consumers will be slammed by unavoidable price spikes. The same effect will increase significantly the amount of carbon-free electricity consumed in the commonwealth and thereby make a continuing contribution to meeting the state's goals for reducing greenhouse gas emissions from energy consumption.

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of the region's wholesale electricity market. But the early indications are promising. Incumbent generators seem determined to take action that will reliably reduce carbon emissions.

Understandably, generators want to establish their own, market-based competitive process for doing so. Nevertheless, the prospect is for them to put a price on carbon that will favor the dispatch of low carbon generation and encourage entry to the market by low-emitting plants. If that can be done, the market participants would fill the void left by lack of federal carbon reduction legislation.

State legislators and governors will be relieved to have the responsibility for delivering low-carbon electricity taken off their shoulders.

And if so, state legislators and governors will be relieved to have the responsibility for delivering low-carbon electricity taken off their shoulders.

NOTES

1. See the ISO-NE report comparing New England's energy consumption in the winters of 2013–14 and 2014–15 at http://isonewswire.com/updates/2015/4/7/new-england-power-system-performed-well-through-winter-20142.html.
2. See the Massachusetts Global Warming Solutions Act at https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298.
3. See Autodesk, Eileen Fisher, Seventh Generation, Staples, Inc., Stonyfield, Thornton Tomasetti, & VF Corporation. (2016, August 2). *90+ companies and investors call on Northeast and Mid-Atlantic governors to double down on their efforts to cut carbon emissions*. Ceres. Retrieved from https://www.ceres.org/press/press-releases/90-companies-and-investors-call-on-northeast-and-mid-atlantic-governors-to-double-down-on-their-efforts-to-cut-carbon-emissions; Jackson, M. (2016, August 8). Pioneering cost-cutting program turns 10: What now, RGGI? *NRDC.* Retrieved from https://www.nrdc.org/experts/jackson-morris/pioneering-carbon-cutting-program-turns-10-what-now-rggi.
4. See the Massachusetts' Department of Energy Resources' 2016 report on renewable and alternative energy portfolio standards. Retrieved from http://www.mass.gov/eea/docs/doer/rps-aps/rps-aps-2014-annual-compliance-report.pdf; pp. 4–5.
5. See Pilgrim Nuclear Power Station. (2016, April 14). *Entergy intends to refuel Pilgrim in 2017; cease operations on May 31, 2019*. Press release. Retrieved from http://www.pilgrimpower.com/operational-update/; We must preserve nuclear power plants: Offshore wind, hydro are fine, but need to safeguard nukes. *Commonwealth Magazine.* Retrieved from http://commonwealthmagazine.org/environment/we-must-preserve-nuclear-power-plants/; and the US Energy Information Administration's Energy Profile for Massachusetts, http://www.eia.gov/state/analysis.cfm?sid=MA#73.
6. See ISO-NE report on Massachusetts' natural gas infrastructure (https://www.iso-ne.com/about/regional-electricity-outlook/grid-in-transition-opportunities-and-challenges/natural-gas-infrastructure-constraints) and retiring power plants (https://www.iso-ne.com/about/regional-electricity-outlook/grid-in-transition-opportunities-and-challenges/power-plant-retirements); 4,200 MW have recently or soon will be retired, and another 6,000 MW are at risk of closing. See Dalton, J. (2016, April 5). *Analysis of benefits of clean electricity imports to Massachusetts customers.* Massachusetts Clean Electricity Partnership. Retrieved from http://www.masscleanelectricity.org/wp-content/uploads/2016/04/Power-Advisory-Mass-Clean-Electricity-Partnership-Clean-Energy-Import-Study-Final.pdf.
7. See New England Power Generators Association. (2016, May 4). NEPGA response to Massachusetts Clean Electricity Partnership Report. Retrieved from http://nepga.org/2016/05/nepga-response-to-massachusetts-clean-electricity-partnership-report/, which claims utility purchases of hydropower from Canada will increase electricity costs by to Massachusetts ratepayers by $777 million each year; NEPGA's website (HydroTruthMA.com), which is part of its ad campaign against imports of hydropower; Marotte, B. (2016, May 15). New England lobby group attacks bid by Hydro-Québec to sell power in U.S. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/report-on-business/new-england-lobby-group-attacks-bid-by-hydro-quebec-to-sell-power-in-us/article30027335/.
8. See Dalton, J. (2016, April 5). *Analysis of benefits of clean electricity imports to Massachusetts customers.* Massachusetts Clean Electricity Partnership. Retrieved from http://www.masscleanelectricity.org/wp-content/uploads/2016/04/Power-Advisory-Mass-Clean-Electricity-Partnership-Clean-Energy-Import-Study-Final.pdf, which showed that hydro and onshore wind power imports to New England would produce more than $170 million in net savings annually in energy costs and reduce carbon emissions by 7 million tons annually, the equivalent of taking 1.5 million cars off the road.
9. At the time, that financing strategy had already been approved by the governor's utility commission, although it was the subject of litigation before the state's Supreme Judicial Court.
10. This location requirement effectively excludes the Cape Wind project from eligibility for the offshore wind power contracts because of its location in near-shore Nantucket Sound.
11. However, their enthusiasm proved to be short-lived. Only two weeks after the clean energy law was signed, the Supreme Judicial Court ruled that the funding mechanism was not allowed under current state law (http://masscases.com/cases/sjc/474/474mass278.html). The court said the funding mechanism would conflict with previous legislation that restructured the state's electric industry to shift the financial risk of power generation investments from ratepayers to competitive generators. Gas pipelines specifically developed for the purpose of fueling generation were found to be a form of "generation" under the prior law and therefore not eligible for funding by electric ratepayers.
12. See NEPOOL. (n.d.). *Integrating markets and public policy (IMAPP)*. Retrieved from http://nepool.com/IMAPP.php.

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