

The Proposed 'Clean Energy Resources' Bill:

Potential costs and other implications for Massachusetts consumers and the state's and region's electric system

Susan F. Tierney, Ph.D. Analysis Group, Inc.

April 1, 2014



The Proposed Clean Energy Resources Bill:

Potential costs and other implications for Massachusetts consumers and the state's and region's electric system

> Susan F. Tierney, Ph.D. Analysis Group

Executive Summary

In recent months, considerable attention has been paid to the possibility that Massachusetts and the other New England states will contract to buy hydroelectric power supply from Eastern Canada. Endorsing this view, a new bill – <u>the 'Clean Energy Resources' bill</u> – was recently introduced in the Massachusetts legislature.

I wish I could agree with the proposed policy, because it sounds so appealing and because I so strongly agree with the importance of moving toward electricity supplies with lower carbon emissions. In fact, I recognize that hydro power from Eastern Canada may have value for Massachusetts under some circumstances. But unfortunately, this particular bill is too much, too fast, too costly, and too risky for the state's consumers.

The Massachusetts 'Clean Energy Resources' bill (H 3968) would require the state's electric utilities to solicit power from large hydro and renewable energy resources. The solicitation would be for 20-25 years' worth of power in an amount equivalent to one-third of Massachusetts' total electricity use. The bill lays out a complex procedure for procurement and review of potential contracts, and would rush the solicitation to occur by the end of 2014.

Such a new contract would be underwritten by the state's electricity consumers, shifting the risk of power supply to them even though the state previously declared such risks to be borne by suppliers and not ratepayers, as part of the reasoning for the state's restructuring of its electric industry a decade and a half ago. This would reverse that policy – something that seems ill-conceived at a time when electric consumers are already finding it attractive to generate power locally on their own premises. The risk-shifting that underpins this bill's approach would create powerful incentives for some customers to go off grid, leaving the rest to pick up the costs.

Indeed, there's no reason to believe that power from provincially owned Canadian utilities will be "cheap," as assumed by various observers. Hydro Quebec and Nalcor are the two Eastern Canadian utilities toward whom this bill's policy is directed. Their economic interests, understandably, are to provide value to their parents, the Provinces of Quebec and Newfoundland and Labrador, more than to New England consumers. It would be foolish – and bad business for their provincial shareholders – to sell the power at anything but the going price of electricity. At the average price of power in 2013 (around \$55 per megawatt-hour), the contract would commit the Massachusetts

utilities (and their ratepayers) to spend over a billion dollars a year for 20-25 years, to buy at least 18.9 million megawatt-hours ("MWh") a year.

Plus, providing a commitment to provide at least one-third of Massachusetts' electricity needs for several decades will likely require that new hydroelectric dams are built to ensure the capacity is available for export over that entire 20- to 25-year period. The price offered to Massachusetts would have to reflect such investment costs. It would surprise me to learn that such investment would not end up raising the price tag for Eastern Canadian hydro purchases to above the \$1 billion annual cost noted above. Moving that much power into the New England grid would also require substantial investment in electric infrastructure, adding further to the price tag (even if it isn't directly reflected in the contract price, but rather ends up flowing through higher transmission rates paid by consumers). The price tag for one of those lines, Northern Pass, has been estimated to be well over \$1 billion by itself, which would add more than \$40/MWh to the cost of the electricity purchased from Hydro Quebec and possibly much more if additional portions of the line are buried, as many are urging. When considered in total, the costs of the power and the transmission delivery will not come cheap for Massachusetts consumers.

I know that Massachusetts is looking for ways to reduce reliance on natural gas to generate electricity, and to lower carbon pollution from power plants in the state and region that supply our electricity. However well-intentioned those goals are, this bill is not the way to reach the state's goals. It will lead to unintended, adverse consequences here in New England.

The enormous size and long length of the contract combined with the speed with which such a large supply source would be procured is unprecedented. This amount of power is not needed in the region at this time, and the bill – if enacted and implemented – would send the signal to private investors that Massachusetts is willing to rush to enact and implement public policy that fundamentally changes the rules of the game in one short six-month period. There is no transition accommodated by this approach.

Local power plant owners – some of whom also provide significant quantities of power with no or little carbon pollution – have invested tens of billions of dollars here for the right to compete to serve consumer electricity demand reliably and efficiently, while driving dramatic reductions in emissions. Those power generators would be right to complain that this bill would undermine the overall investment climate to the detriment of consumers, as well as their own companies.

The most cost-effective way to meet the state's carbon emissions targets is through nondiscriminatory regulations that allow any resource that can qualify to compete. This is the hallmark model that has been used in virtually every successful emissions market in the world, including the Regional Greenhouse Gas Initiative that all New England states participate in today. This particular bill makes a giant step in the other direction. This bill is not the path forward.



The Proposed Clean Energy Resources Bill:

Potential costs and other implications for Massachusetts consumers and the state's and region's electric system

> Susan F. Tierney, Ph.D.¹ Analysis Group

Report

In late February 2014, the '<u>Clean Energy Resources</u>' bill was filed in the Massachusetts General Court. It would require that, by the end of 2014, the state's investor-owned electric utilities² solicit proposals from energy suppliers to provide an amount of power equaling one-third of the state's total electricity use for a 20-25 year period. The only electric supplies that would be eligible are new renewable energy resources and conventional hydroelectric supplies. The bill lays out a complex procedure to rush the solicitation to occur by the end of 2014.³

The bill's language – "to facilitate the Commonwealth's clean energy goals" – suggests an intention to direct Massachusetts' utilities to move aggressively to implement the program envisioned in the recent statement of Governor Deval Patrick and the other New England governors to pursue hydropower imports and to develop the electric transmission infrastructure to deliver it.⁴ The bill appears to provide a mechanism to authorize the state to enter into such long-term import contracts with hoped-for goals of reducing reliance on natural gas and using Canadian hydropower to balance intermittent generation from wind and solar generating resources.⁵ And it seems aimed at supporting the implementation plans under the Global Warming Solutions Act, to "expand access to new clean energy resources and imports [and]....to provide a large contribution of GHG [greenhouse gas] reductions"⁶ in anticipation of the targets embedded in Massachusetts law.⁷

However well-intentioned and seemingly appealing on first blush, the approach outlined in this bill is destined to have negative cost and other unintended consequences for Massachusetts consumers and the state's economy. It is too much, too fast, too costly, and too risky, with far too many troubling implications for Massachusetts.

First, such a new contract would be underwritten by the state's electricity consumers, shifting the risk of power supply to them even though the state previously declared such risks to be borne by power suppliers and not ratepayers, as part of the reasoning for the state's restructuring of its electric industry a decade and a half ago.⁸ This would reverse that policy – something that seems ill-conceived at a time when electric consumers are already finding it attractive to generate power locally on their own premises.⁹ The risk-shifting that underpins

this bill's approach would create powerful incentives for some customers to go off grid, leaving the rest to pick up the costs.¹⁰

Also, the scale and pace of the procurement is unprecedented, at least in my memory of the last 30 years in New England's electric industry.¹¹ It is entirely misaligned with the amount of new capacity or energy needed in the market. Notwithstanding the valuable goal of having low-carbon energy resources into the mix, the act of introducing into New England a new increment of resources (at least 18.9 million megawatt-hours ("MWhs") a year for 20-25 years) equivalent to one-sixth of the total electricity production in New England in 2013 and one third of Massachusetts' own consumer demand,¹² will introduce significant dislocations into the industry and shift risk to Massachusetts ratepayers who would underwrite the financial commitments in the contract.

There's no reason to believe that Canadian power will be cheap, as some would suggest.¹³ Hydro Quebec and Nalcor are the two provincially owned Canadian utilities for whom this policy is directed. Their economic interests are to provide value to their parents, the Provinces of Quebec, Newfoundland and Labrador, more than to New England consumers, and it would be foolish – and bad business for their provincial shareholders – to sell the power at anything but the going price of electricity. At the average price of power in 2013 (around \$55 per MWh), the contract would be over a billion dollars a year to buy at least 18.9 million megawatt-hours a year.

Plus, providing a commitment to provide at least one-third of Massachusetts' electricity needs for 20-25 years will likely require that new hydroelectric dams are built to ensure the capacity and minimum energy requirements are available for export over that entire period. The price offered to Massachusetts would have to reflect such investment costs (which are not likely to be supported by the \$1 billion annual energy cost mentioned above). Moving that much power into the New England grid would also require substantial investment in electric infrastructure, adding further to the price tag (even if it isn't directly reflected in the contract price, but rather paid for by consumers through higher transmission rates). The price tag for one of those lines, Northern Pass, has been estimated to be well over \$1 billion by itself, which would add more than \$40/MWh to the cost of the electricity purchased from Hydro Quebec, and possibly much more if additional portions of the line are buried as many are urging.¹⁴ When considered in total, the costs of the power and the transmission delivery will not come cheap for Massachusetts consumers.

There are other financial risks and unintended economic consequences of a procurement strategy that rushes to solicit and potentially sign up such a large quantity of new supplies that would displace one-third of the state's power supply through long-term contracts in one fell swoop. These other economic impacts and risks include: the cost implications of having ratepayers pay directly for transmission facilities to enable electric-energy imports without looking at the combined energy and delivery costs to determine whether there are net benefits of the latter;¹⁵ the potential costs associated with mitigating the reliability impacts of such a large import of power on the operations of New England's system;¹⁶ the challenges of using imports to integrate renewables in New England;¹⁷ the potentially expensive way to achieve carbon emission reductions; and the macroeconomic implications of sending Massachusetts' dollars out of region to pay for power from Canadian sources, rather than keeping them in the state.

The energy system in Massachusetts, like almost every other part of the U.S., depends heavily on private companies and capital markets to provide the investment and other resources needed to keep electricity as affordable and reliable as possible while also becoming increasingly clean. A healthy and sustainable investment climate is an essential ingredient for achievement of our economic, environmental and other goals for the power system. Enactment and implementation of this bill runs counter to that climate. Despite the appearance that the Clean Energy Resources bill would rely on a market-based solicitation to procure new renewable or hydroelectric resources as one-third of the state's electricity supply, this bill is not market friendly. Through an extremely aggressive schedule, it would solicit contracts for one third of Massachusetts' total electricity demand, at a point in time when such quantities are not needed and when the addition of such will adversely affect the proper functioning of the region's electricity market. Local power plant owners – some of whom also provide significant quantities of power with no or little carbon pollution - have invested tens of billions of dollars here for the right to compete to serve consumer electricity demand reliably and efficiently. Those power generators would be right to complain that this bill would undermine the overall investment climate to the detriment of consumers, as well as their own companies.

For these reasons, I think this bill is ill-conceived. I do not reach that conclusion lightly. Like many others, I have long supported state and federal policies that move our energy systems toward a much-lower carbon profile. As a former environmental cabinet officer and utility regulator in Massachusetts, I have a healthy respect for the ability of states to fashion policies that fit the particular economic, environmental, social, and other conditions and aspirations of their leaders and citizens. I recognize that Massachusetts' adoption of the Global Warming Solutions Act five years ago signaled an important step in addressing the costs of climate change. With the Green Communities Act, the state sought to pursue the potential benefits that can arise with investment in clean energy.¹⁸

Indeed, I have previously testified on behalf and in support of Massachusetts utilities that have entered into long-term (10-15 year) contracts for an amount of power equal to 3 percent of their loads.¹⁹ Those contracts similarly shifted risk to consumers, with any above-market costs being paid through the distribution rates charged to all consumers by the utilities. Those utilities were allowed to charge ratepayers for the negative impacts of the contracts on the utility balance sheets. In my view, however, it is one thing to add a long-term commitment equaling 3 percent of total demand, with compensation to utilities for their role in signing 10-15 year contracts, and another thing altogether to add an amount of power equivalent to one third of the state's total demand. This goes too far in shifting risk and costs to today's and tomorrow's electricity consumers.

One illustrative example of the costs of a procurement of these types of resources can be found here in New England. In early 2011, the Vermont electric utilities signed a contract with Hydro Quebec to supply electric energy between November 2012 through 2038, starting at a price of approximately \$58.02/MWh²⁰ <u>plus</u> the cost of the transmission line to get the electricity to Vermont. In 2012 when the contract commenced, Vermont consumers ended up paying approximately 38 percent more for power delivered on the Quebec side of the Highgate transmission line as compared to the average wholesale price of power in Vermont (of approximately \$40/MWh, during this period). For that one year, the premium paid for imported power was \$21 Million in 2012 plus the cost of the Highgate transmission line.²¹

In early 2011 when the contract was signed, natural gas forward prices for January 2012 were approximately \$4.70 per mcf, \$5.17 for January 2013, rising to \$5.84 in January 2015 and gradually rising beyond that.²² These serve as proxies for the trends in forward electricity prices in New England, given the high dependency of New England's electricity system on power plants that use natural gas and the strong correlation of natural gas and wholesale electric energy prices. Given changes in natural gas prices that have changed since 2011-2012 when this contract was signed by the parties and approved by regulators, it is reasonable to assume that this contract price is not likely to be the same one that Hydro Quebec would offer to Massachusetts utilities for the quantity and term of power being jointly solicited by them. It does suggest that Hydro Quebec has offered long-term contract prices into the New England market at no less than the long-term wholesale price, and in fact at a premium.

Even when looked at through the narrow carbon-emission-reduction prism of the Commonwealth's Global Warming Solutions Act, this proposal is a costly manner of achieving low GHG reductions, if that's the purpose. There are in-state and in-region, zero-carbon, baseload resources: If the goal of this legislation is to reduce GHG emissions, that goal can most cost-effectively and efficiently be met through non-discriminatory regulations that allow any resource that can meet the emissions criteria to compete to serve consumer demand.²³ This is the hallmark model that has been used in virtually every other successful emissions market in the world, including carbon-reduction markets.

Clearly, one of the goals of the Clean Energy Resources bill is to introduce significant quantities of electricity with low operating costs into New England's wholesale market, in an attempt to lower day-ahead and real-time energy prices. This phenomenon is often call "price suppression," and using it as a goal of an out-of-market contract (as opposed to having it be an outcome of a market-based contract) is likely to undermine market principles and market outcomes in New England.

The amount of price distortion that would occur with a new injection of 18.9 million MWh of 'price-taking' supply would be significant. This amount of power is not needed for reliability. Nor is it known to be economical in light of the full cost (including transmission and the need to mitigate the local reliability issues). Moreover, in the long run, it may hasten the point at which the New England wholesale electricity market construct would no longer be sustainable.

The New England State energy officials (through their regional organization, the New England States Committee on Electricity ("NESCOE")) seems to understand this risk:

Some Potential Risks: A significant change to New England's resource mix [through significant quantities of new hydropower imports] is not without risk. One category of risk relates to the potential implications on New England's current generation fleet. Specifically, increasing in any substantial way the level of hydro imports could have the effect of displacing existing generation units that provide service in New England today and that are needed, whether by operating characteristic or geographic location, to reliably operate the regional power system. Increasing hydro imports has the potential to depress the current New England generating fleet's energy margins, placing the continued operation of those units at risk.²⁴

As mentioned above, this bill's enactment and implementation would send clear messages to the investment community that Massachusetts is willing to use certain policies to undermine the viability of other energy investments in a short six-month period. This could backfire, in the sense of helping to lead to an investment climate friendly to modernizing the electric system in the state and region.

Unfortunately, the proposed "Clean Energy Resources" bill would trade off the one set of goals (rapid adoption of significant quantities of imported hydroelectric energy) for another (support for a healthy investment climate and robust electric industry in the state and in the New England region, to which its electricity industry is inextricably tied). The enormous size and

long length of the contract combined with the speed with which such a large supply source would be procured is unprecedented, and is misaligned with the amount of new capacity or energy needed in the market. The timing, pace and provisions of the bill are neither sensible nor efficient. The time frame for the administrative procedures needed in advance of the solicitation is hasty, especially in light of the extraordinary quantity of power to be solicited and the potential complexity of proposals. Based on my experience in monitoring competitive power procurements, this haste will undoubtedly affect the quality of the bids.

Given that the bill anticipates a speedy joint procurement that will depend upon bids from suppliers with clean energy resources well into development and permitting and which will depend upon transmission capacity additions for delivery into New England, this procurement does little to solve the chronic chicken and egg problem that challenges supplies of remotely located renewable resources to distant load centers. The haste worsens the disconnection between that solicitation schedule, and the status of infrastructure capability. Again, this will undoubtedly adversely affect the quality of bids, the likelihood that the solicitation will be fruitful and lead to the hoped-for outcomes to which the state's leaders aspire. Further, the bill introduces multiple examples of unclear instructions that will undoubtedly create significant questions for potential bidders and a field day for attorneys challenging the results of the process.

I know that Massachusetts is looking for ways to reduce reliance on natural gas to generate electricity, and to lower carbon pollution from power plants in the state and region. However well-intentioned those goals are, this bill is not the way to them. The bill would introduce many unintended costs and financial risks for Massachusetts consumers and its utilities, and would wreak havoc on the state's and region's electric industry. That electric system is surely in transition. This is well known to many in the industry, and I and others have written about the elements of the changes that are underway.²⁵ Unfortunately, this bill would not move it forward in a sustainable way.

So what should happen going forward? How does Massachusetts facilitate competitive, costeffective electricity supplies that are environmentally responsible and reliable? It should take advantage of the clean energy *and* market-based principles that Massachusetts and other New England states have been at the forefront of pursuing, and provide transitional approaches that respect both of those approaches, rather than supporting one at the peril of the other.

I encourage the state to view options through a lens that reflects the economic, policy, technical, technological, and market realities of the state's and region's electric systems, which include:

- A regional electric system, regulated by the federal government, built off of market principles (some of which require reforms in order to operate in a genuinely competitive way), intended to be neutral with regard to picking winners and losers, and relying on private markets to identify the types of resources able to supply consumers' electricity requirements efficiently and reliably;
- State policies that point to greater reliance on generating resources that emit increasingly fewer carbon pollution, but that needs other resources (including natural-gas-fired capacity, nuclear generation, and demand-side resources) to accommodate the full suite of system requirements reliably and affordably;
- An outlook for relatively flat demand, in light of the states' commitment to pursuing cost-effective energy efficiency and supporting distributed generation (e.g., through net metering policy and other state incentives) with implications for the ability of the system to smoothly absorb massive new quantities of supply imported into the region;
- A generating fleet that relies on natural gas and a market design that causes natural gas to set prices in the vast majority of hours in the short-term electricity product markets – and, in combination with an outlook for low average natural gas prices going forward;
- An increasing set of zero-carbon resources that tend to be price takers, contributing to price suppression in the wholesale energy markets;
- An overall set of conditions that will tend toward lower levels of capacity utilization (e.g., with more renewable resources, whose intermittency leaves them with lower capacity factors; and with need for the system's dispatchable resources to operate less as they provide less energy overall and increasingly supply balancing services for nondispatchable renewable energy);
- A technological toolkit that does not yet allow for sufficient commercially available and competitively priced electricity storage and/or load-shifting capabilities to help mitigate the asset-utilization problem any time soon;
- A market where even suppliers of large quantities of zero-carbon electricity supply (e.g., nuclear generation provided by Vermont Yankee) have recently decided to exit New England's market because of adverse market conditions; and
- A system which, in the end, still needs to produce sufficient revenues across all shortterm and long-term product markets and across an adequate base of resource suppliers in ways that meet the requirements of private investors on which virtually the entire asset base depends.

As policy makers consider adding new policies that affect features of the system, they need to ask whether the elements of the overall markets and public policy add up to a system capable of producing a sustainable outcome. Often we take for granted that investors will support the system that we want and need. But to sustain their interest, we need to make sure that the dollars and cents add up, as we hope for a system that evolves with the needs of the 21st century.

If the numbers don't add up and therefore prevent key actors from remaining financially viable, then we should work to design reforms that will keep the goal of maintaining a sustainable electricity market in mind.

Fortunately, the New England states' energy officials have expressed caution about the potential risks and unintended consequences of executing a competitive procurement – outside of wholesale electric markets – that results in long-term contracts for power (such as those anticipated by the Clean Energy Resources bill). Borrowing from NESCOE's own listing of such risks, I encourage Massachusetts policy markets to take actions that:

- Allow markets to efficiently allocate society's resources, identify economic opportunities, and satisfy consumer needs
- Avoid material distortions to New England's wholesale markets, which as ISO-NE cautions in other contexts, may present significant unintended consequences and reliability challenges;
- Insulate New England's ratepayers from generation and transmission costs and risks that investors have indicated an intent to fund and undertake....²⁶

Again, borrowing from the language of NESCOE, this would mean avoiding action (such as enactment of the 'Clean Energy Resources' bill) that would:

- [award a r]atepayer subsidy to some resources but not all, vis a vis long-term contracts, [thus creating] market distortions and allegations regarding government selecting, by virtue of RFP [Request for Proposals] eligibility, winners and losers in a competitive market context;....
- distort the competitive marketplace in favor of the resources that receive the benefits of using any new transmission that is not market participant funded, to the detriment of existing resources that incurred merchant risk;
- [have w]holesale capacity market implications due to FERC
 [Federal Energy Regulatory Commission] orders protecting existing generation resources from economic harm associated with out-of-market subsidization of selected resources;
- [s]hift costs of non-PTF [Pool Transmission Facilities] transmission to ratepayers unless transmission is market participant funded;
- [s]hift project risks from investors to ratepayers, including the risk
 of the contract, over its life, being above market (unless contract has
 market tracker that precludes prices from going some level above
 market);

- [the p]otential to create power system reliability risks due to displacement of other resources from the market; ...
- [lead to b]enefits associated with reduced prices in the energy market [that] may [need to] be given back through increased prices in the capacity market.²⁷

Consistency with these principles would lead logically to the conclusion that the Clean Energy Resources bill would undermine an economically as well as environmentally sustainable environment for the electric industry in Massachusetts. I respectfully encourage policy makers to reject it.



Summary of The Clean Energy Resources Bill

On February 21, 2014, Massachusetts state Representatives Mark J. Cusack and Barry R. Finegold filed a new bill: the "Clean Energy Resources" bill. If enacted, the bill would establish new requirements on investor-owned electric utility companies and provide new authorities for various state agencies.

Specifically, the bill would authorize the state and the investor-owned utilities to enter into contracts to secure more than a third of the state's electricity supply from hydroelectric energy and/or renewables (potentially doubling the amount of renewables and hydro power supply relative to the Renewable Portfolio Standard ("RPS") requirements for 2020). The *minimum* annual contract amount – 18.9 million MWhs of electricity for 20 to 25 years – is equivalent to 35 percent of total electricity sales in Massachusetts in 2013.²⁸ This is more than 10 times the current long-term contracting requirement (3 percent), and is in addition to it. The default requirement is that the utilities jointly solicit the 18.9 million MWhs, with the potential to do so through an individual solicitation under certain circumstances. The solicitations would be required to take place prior to the end of 2013, with significant procedural steps anticipated to occur before then.

Briefly, the bill (provided in full in the following section of the appendix) includes new definitions and requirements, with some uncertainty about how the provisions interact or would be interpreted by the utilities and the state agencies. My comments are noted in italics:

New definitions:

- o "Clean energy generation sources" includes
 - o Class 1 RPS eligible renewable energy generation resources
 - Hydroelectric generation [with no requirement that such hydro resources be new]
- A "long-term contract" is one with a term of 20 to 25 years.
- A contracting method includes:
 - a contract for renewable energy only; [note that this definition does not include hydropower]
 - a contract for renewable certificates ("RECs") [these relate to the attributes of Class 1 renewables, without the energy generated at them];
 - and a contract for a combination of both RECs and renewable energy [*again, neither definition includes hydropower*].
- Each electric utility's pro-rata of the jointly solicited power would be based on its energy demand relative to the combined energy demand of the utilities.

New requirements:

- Two agencies the Massachusetts Department of Public Utilities ("DPU") and the Department of Energy Resources ("DOER") each must adopt regulations to effectuate the new law (prior to the joint solicitation). [Normal administrative procedures require some numbers of month (at a minimum) to design, propose, allow comments on, and then issue final regulations] The new regulations must:
 - allow clean energy generation developers to submit proposals for long-term contracts that are for RECs only, renewable energy, or both.
 - require that the DPU review and approve any contract before it may become effective, and that the DPU consider both costs and benefits of such contract(s) and base its determination on whether the contract is a "cost-effective mechanism for procuring renewable energy generation source(s) on a long-term basis taking and:
 - provides enhanced electricity reliability in Massachusetts;
 - is cost effective to Massachusetts electric ratepayers over the contract term;
 - create additional employment and economic development in Massachusetts;
 - is from clean energy sources that are:
 - substantially likely to become operational by having the appropriate state and local permits in place. [*This is unclear about the required status of permitting as of the time that proposals would be submitted, versus as of the date of the DPU review.*]
 - o able to demonstrate that the sources' projects are able to secure financing.
 - associated with a transmission project scheduled to deliver capacity to one of the nodes within the "Internal Hub" of the New England grid operator (ISO New England). [*This delivery location could be interpreted in many ways*.]
 - comes from clean energy generation sources that are either renewable resources qualified by DOER as Class 1 resources and/or emit no more than 775 lbs of GHG per MWh. [*This emissions rate could prevent certain if not most biomass resources from submitting proposals*]
- With respect to the joint solicitation:
 - The utilities must select a "reasonable" method of soliciting long-term contracts in consultation DOER and the Attorney General ("AG") prior to issuing the solicitation, with that method must use a competitive bidding process only and one that *may* include [but does not necessarily have to be] "one developed by a regional organization in coordination with other New England States, from clean energy generation developers using a competitive bidding process only." [*This has to occur prior to the issuance of a joint solicitation, so time is needed to build this in after any enactment of the bill.*]
 - During the seven months from June 1, 2014, through December 31, 2014, the utilities must solicit proposals for at least 18.9 million MWh a year from clean energy sources capable of generating that amount each year. [*In theory, 18.9 million MWh a year could be*

supplied from resources with 2,160 MW of capacity on a 24/7 basis each week of each year for 20-25 years, with equivalent delivery capability through a transmission line.]

- Any resources selected through the joint solicitation would be assigned to the different utilities on a pro-rata basis, related to their share of these utilities' total energy demand.
- If, prior to the joint solicitation, an individual utility chooses to do so, it may fulfill its responsibility through an individual competitive solicitation that is independent from the joint solicitation provided that the DPU approve that approach as more cost-effective than the joint process. [*This step will require time built in for DPU approval of such a proposal, between the time the DPU issues its enabling regulations and the time the utilities issue their joint proposal all of which has to take place before the end of 2014.*]
- Regarding agency roles in the solicitation process:
 - The DOER coordinates it, along with the evaluation of submitted proposals.
 - The AG makes recommendations on any contracts within 45 days of their filing at the DPU, with the DPU taking the AG's recommendations into account.
- Regarding the costs associated with any approved long-term contract:
 - The costs associated with any approved contracts would be charged to all distribution customers of the utility through a uniform fully reconciling annual factor in distribution rates, subject to DOPU review and approval of the department of public utilities. The reconciliation process shall be designed so that a distribution company recovers all costs incurred under such contracts. [*The costs of any long-term clean energy supply contracts would be added to the utility's wires charge, increasing that charge by a potentially significant amount, in light of the size of the minimum procurement (each companies' pro-rata share of an amount equal to 35 percent of total Massachusetts electricity sales.*]

New actions subject to the discretion of the electric utilities:

Provided *reasonable* proposals have been received as a result of the solicitation, the utility *may* enter into *cost-effective* long-term contracts to *facilitate* the Commonwealth's clean energy goals. A distribution company *may* decline to consider contract proposals having terms and conditions that it determines would require the contract obligation to place an unreasonable burden on the distribution company's balance sheet, and may structure its contracts, pricing or administration of the products purchased to mitigate impacts on the balance sheet or income statement of the distribution company or its parent company, subject to the approval of the department of public utilities; provided, that such mitigation shall not increase costs to ratepayers. [*Apparently, each individual utility may exercise its own discretion with regard to whether a contract is cost-effective, whether it would place an unreasonable burden on the company's balance sheet, and what form of mitigation would offset that burden while not adding costs to consumers. In light of other provisions of the bill, it is not clear what happens if utilities were to reach different conclusions regarding each one's pro-rata share of a jointly solicited contract.]*

Additional new authorities:

- The DOER must consult with the distribution companies as to the timetable and method for solicitation and execution of such contracts which takes place prior to the utilities jointly selecting a method, which shall occur after June 1, 2014. [*This step adds additional procedural time prior to the issuance of a joint solicitation.*]
- If the utilities cannot agree on a winning bid, the AG, in consultation with DOER and DPU, must make a final, binding determination of the winning bid. [*It is highly unusual if not unique for the AG to determine the identity of the winning bid, and to render a binding decision for a contract whose counterparty(ies) would be investor-owned utilities, and raises potential conflicts for the AG in subsequent advocacy for its own position in the DPU's review of the contract. That said, the utilities apparently are not bound to enter into a contract they find is not cost-effective or that would impose too large a burden on its balance sheet.]*
- Authorize the Secretary of Energy and Environmental Affairs to designate a regional organization, in coordination with other New England States, and/or through a process coordinated by the ISO New England, to solicit proposals for transmission in furtherance of clean energy generation contracts. [*It is unclear what it would mean for the Secretary to so designate an organization to conduct a coordinated solicitation for transmission, in terms of what steps (e.g., cost/benefit analyses, cost-allocation considerations, approvals of transmission tariffs and siting proposals) would follow upon such designation.*]
- The bill states that the Act and its implementation by Massachusetts agencies and companies shall be subject to the rules, orders and regulations established by the Federal Energy Regulatory Commission ("FERC"). [Apparently, this means that even without litigation of federal pre-emption issues, the state would be establishing the FERC's authority over such contracting and contracts.

ENDNOTES

² Hereafter I will refer to these investor-owned electric distribution utilities as the "utilities," even though there are also municipally owned electric utilities in Massachusetts.

³ My summary of the bill is in the Appendix. The actual bill can be found at: https://malegislature.gov/Bills/188/House/H3968.

⁴ December 5, 2013, Statement of the New England Governors' Commitment to Regional Cooperation on Energy Infrastructure Issues: "These investments will also serve to balance intermittent generation, reduce peak demand, and displace some of the least efficient and most polluting fossil fuel generation, enabling the states to meet clean energy and greenhouse gas reduction goals while improving the economic competitiveness of our region."

⁵ See, for example, New England States Committee on Electricity ("NESCOE"), "Incremental Hydropower Imports Whitepaper: Considerations, Options and Market Overview Regarding the Potential to Increase Hydropower Imports from Eastern Canadian Provinces to New England," Fall 2013 (hereinafter "NESCOE Hydro Imports White Paper"), pages 44-45.

^s Massachusetts Executive Office of Energy and Environmental Affairs, "Global Warming Solutions Act: 5-Year Progress Report," December 30, 2013.

⁷ Under the Global Warming Solutions Act of 2008, Massachusetts has adopted a target of reducing its greenhouse gas emissions 25 percent by 2020, and 80 percent by 2050.

⁸ As described in a recent whitepaper published by NESCOE, the principles that guided the states' approach to restructuring the electric industry were:

- "Market mechanisms are preferred over regulation to set price where viable markets exist.
- Risks of business decisions should fall on investors rather than consumers.
- Consumers' needs and preferences should be met with lowest costs.
- Electric industry restructuring should not diminish environmental quality compromise energy efficiency, or jeopardize energy security."

NESCOE Hydro Imports White Paper, pages 7-8.

⁹ I was a utility regulator in Massachusetts and a federal policy maker at the eve of electric industry restructuring in the 1980s and 1990s. I note the parallel that exist between then and now, with regard to the availability of electric technology that allows certain customers to go "off grid" for at some of their power supply and to avoid paying utility rates as a result. Then, it was large industrial customers who found it worthwhile financially to invest in (or threaten to invest in) on-site combined heat-and-power ("CHP") systems, in order to supply much if not all of their own electrical and process-steam requirements. Now, it is these customers as well as commercial and residential customers that are eligible to install such on-site CHP and/or solar and/or wind facilities. Then, such developments created significant tension in the traditional utility business model at the time; and the same may be increasingly the case going forward, depending on pricing, technology, policy and other developments.

¹⁰ The Clean Energy Resources bill is antithetical to the retail market design in Massachusetts. In Massachusetts, retail customers have the right to choose their electricity supplier, although all consumers take "wires services" (distribution service) from their local utility. The utility provides basic bundled service for those customers not choosing a supplier, and they do so through all-requirements supply contracts from competitive suppliers for relatively short-term periods of time and that are approved by state regulators. The risk of customers leaving basic service and choosing to buy power from another supplier is borne by the supplier holding the basic-service supply contract, not by the utility. Customers that choose to supply on-site power (such as through a solar panel or energy efficiency) end up paying lower costs for their own electricity from the grid, and the utility makes up any lost revenues from those customers through DPU-approved revenue decoupling mechanisms.

Now consider the potential unintended consequences of having the electric utility enter into a 20-25 year contract for one third of their customers' demand and with the contractual commitment such that the electric utility is allowed to recover any out-of-market

¹ Susan Tierney is a managing principal at Analysis Group in Boston, and formerly assistant secretary for policy at the U.S. Department of Energy, Massachusetts' Secretary of Environmental Affairs and a commissioner at the Massachusetts Department of Public Utilities. Knowing that she is a supporter of efforts to lower the carbon emissions from the power sector as well as of competitive markets, the New England Power Generators Association approached her to assess and write a statement on the 'Clean Energy Resources bill.' Over nearly two decades, she has worked for a wide variety of clients, including customers, environmental groups, states, transmission companies, grid operators, electric and natural gas utilities, competitive suppliers, power generators, and others.

costs through its distribution rates. One potential outcome is that if out-of-market costs end up being high (as they were recently in Vermont after the state's utilities signed long-term supply contracts with Hydro-Quebec. Note that in Vermont, customers do not have the option to choose their retail suppliers), as they do in Massachusetts. Putting this cost in distribution rates may create a stronger financial incentives for customers to generate on-site power and go off-grid. While that might lead to certain efficiency benefits, it could also lead to high amounts of revenues losses to the utility that would need to reconciled and recovered from other customers through revenue decoupling mechanisms. The contract raises real tensions with the state's net metering and revenue-decoupling policies.

Another potential outcome is that over the course of the 20-25 year contract, adverse balance sheet impacts could arise for Massachusetts' utilities holding the contracts, that were not anticipated at the time the contracts were entered into and approved by the DPU, with such impacts then raising the cost of capital for those utilities (with impacts on consumers). Such could arise given the very-large size of the contractual obligations and the uncertainty surrounding long-term business model and revenue-generation issues for local utilities. Note too that the Clean Energy Resources bill introduce a false dichotomy: utilities would not be required to sign contracts that they think would burdens their balance sheet, and they can mitigate such burdens but only in ways that don't raise costs on consumers. Almost by definition this is a non-starter: a 20-25 year contract will have an impact on the utility's balance sheet, and the way to mitigate it would raise costs (e.g., through cost of debt in a rate case; or through the 3 percent compensation approach in the Section 83 of Green Communities Act).

¹¹ In the mid-1980s, the New England utilities entered into a firm, long-term (10-year) contract with Hydro Quebec for 7 million MWh of power a year, to be delivered over the new Hydro Quebec Phase II high voltage direct current transmission line from Quebec to New Hampshire, starting in 1990. This amount of power represented 6.7 percent of total New England electricity sales in 1990 (7 million MWh out of total demand in 1990 of 104 million MWh for the six New England states). The transmission line was for 2000 MW with a 1800 MW converter terminal in New Hampshire. Sources: U.S. Congress, Office of Technology Assessment, *Electric Power Wheeling and Dealing: Technological Considerations for Increasing Competition*, OTA-E-409, May 1989, Box 6-A, page 188; Energy Information Administration, 826 data for the six New England states for 1990.

¹² Energy Information Administration, 826 electricity data for Massachusetts and the New England states.

¹³ Editorial page, Boston Globe, "Mass. must welcome hydropower, even as it promotes wind, solar," March 15, 2014. http://www.bostonglobe.com/opinion/editorials/2014/03/16/mass-must-welcome-hydropower-even-promotes-wind-solar/50ZQ90wTL3faEZVzU9AGoK/story.html

¹⁴ As of 2010, the "preliminary conceptual cost estimate for the Northern Pass transmission project proposal is \$1.1 billion." Lisa Shapiro and Heidi Kroll, "Preliminary Economic and Fiscal Impacts of the Proposed Northern Pass Transmission Project," prepared for Northern Pass Transmission LLC, October 2010, page 5. <u>http://northernpass.us/assets/permits-and-approvals/</u> <u>NH Economic Impact Study.pdf</u>. More recently, Northern Pass's website indicates that the Northern Pass is a \$1.4 billion construction project. <u>http://northernpass.us/benefits-to-nh.htm</u>.

¹⁵ It will take new transmission infrastructure to deliver at least 18.9 million MWh into New England over a 20-25 year period. Although recent proposals such as the Northern Pass project (smaller in size that what would be needed for delivery of this particular amount of supply) was proposed through a construct that would have the supplier (i.e., Hydro Quebec) pay for the transmission, the Clean Energy Resources bill seems to anticipate that this solicitation would entertain proposals where someone else besides the supplier pays for the transmission. Notably, the states have recently indicated their desire to support investment in transmission infrastructure in New England through a process that de-links payments for transmission with the prices supplies delivery over it. (See the December 2013 statement of the New England Governors and the January 2014 request by NESCOE to the ISO New England.) This is a change in posture from positions taken by New England policy makers as recently as 4-5 years ago. Such an approach would mask the total cost implications of imported power relative to alternative resources (including others with low-carbon profiles) in the market.

From consumers' point of view, all related costs matter to the bottom line. Massachusetts regulators and energy officials know this well. Notably, Massachusetts regulators focus on integrating the costs of delivered power when they review the costeffectiveness of energy efficiency relative to supply options (including their avoided generation, transmission and distribution costs). Also, Massachusetts regulators have previously embraced the point about the need to compare "delivered power" with alternatives when they approved the Cape Wind contract, in part based on my own testimony on this very point.

The Clean Energy Resources bill, combined with other actions to boost transmission investment to carry significant increases in imports of clean energy resources, would end up shifting costs from energy markets (e.g., through hoped-for price suppression impacts on wholesale energy prices) to other parts of the electricity bill (i.e., transmission costs picked up and paid through the ISO New England transmission tariff, and distribution costs that would be required to pick up any out-of-market costs associated with

the procurement of 18.9 million MWh). Without seeing the full effect of such cost (and risk) shifting, it will be very difficult if not impossible to see the full costs of alternative approaches.

These outcomes have been noted by NESCOE, when it reviewed the advantages and disadvantages of different approaches to structuring additions to the transmission grid: "Potential to shift risk of investment from project sponsors to ratepayers; New England states may prefer not to identify a transmission path for new resources absent a competitive process; New England has long indicated an interest in evaluating all-in costs of transmission and generation combined; Building and funding a transmission line provides no guarantee about ultimate costs to consumers (there is no basis to assume the costs of hydro to New England consumers will approximate the cost of hydro available to Canadian consumers); Potential to distort the competitive markets in favor of a resource that receives the benefits of the new transmission line, to the detriment of existing resources that incurred merchant risk." NESCOE Hydro Imports White Paper, page 54.

¹⁶ NESCOE has recognizes that there are indirect costs associated with significant reliance on imported power, because the grid operator in New England will need to keep significant local resources operating in real time in reserve, to provide instantaneous back-up power in the event of loss of a large quantity of supply from outside the region: "[I]ncreasing the extent to which New England relies on large quantities of power from distant resources over long transmission lines presents the risk of massive system failure and corresponding power loss, whether by a weather event, an act of terrorism, a technological failure or something as simple as a tree falling. Careful study of the technical implications of potential large-scale transmission expansions will enable evaluation of whether and how major new transmission facilities can be designed to preserve system reliability and avoid the potential for major disturbances in one area of the network from spreading to others. Risks associated with transporting power over very long distances, and associated costs, are minimized when generating resources are located close to load." NESCOE Hydro Imports White Paper, pages 47-48

¹⁷ The states' energy officials (through NESCOE) have also observed the existence of such challenges associated with using remote hydro in a different control area and delivered by high-voltage direct current ("DC") lines to be used for balancing (or integrating) intermittent renewable energy locally in New England: "At a conceptual level, using controllable hydro resources to "firm up" wind[fn] and therefore fully utilize transmission infrastructure appears attractive. While technically feasible, the benefits associated with combining intermittent renewable resource output with hydro power depend on several factors. The respective locations of the wind resource, the hydro resource, the existing transmission grid, and the new interconnecting transmission all significantly affect the economics of pairing wind and hydro. The notion of pairing intermittent wind output with hydro power for firm delivery becomes complicated when the resources are in separate transmission grids, cross international boundaries, and/or require conversion from DC to AC [alternating current]. While balancing is a control area function[fn], NERC reliability standards do not preclude the use of imported resources to balance. Doing so presents complexities, however, and New England would need to work out protocols, procedures and so forth with the control area on the other end of the transmission line. For intermittent wind output and hydro power to be successfully paired in conjunction with DC transmission technology[fn], the resources may need to be balanced on an AC system before being converted to DC. If the resources are not balanced before being converted to DC, a multiterminal transmission configuration is necessary. Converter stations at each terminal are relatively expensive, such that DC is primarily considered for long-distance applications. It may not be cost effective to design a DC line with multiple terminals along the route to accommodate the collection of intermittent resource output." NESCOE Hydro Imports White Paper, pages 37-38

¹⁸ In the past two years, I have co-authored studies that examine the economic impact to Massachusetts of the initial years of its participation in the Regional Greenhouse Gas Initiative and of its implementation of the Green Communities Act of 2008. See: Paul Hibbard, Susan Tierney, and Pavel Darling, "The Impacts of the Green Communities Act on the Massachusetts Economy: A Review of the First Six Years of the Act's Implementation," March 4, 2014; and Paul Hibbard, Susan F. Tierney, Andrea M. Okie, Pavel G. Darling, "The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States: *Review of the Use of RGGI Auction Proceeds from the First Three-Year Compliance Period*, November 15, 2011.

¹⁹ Testimony of Susan Tierney:

- Before the Massachusetts Department of Public Utilities, Investigation as to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid for approval by the Department of Public Utilities of two long-term contracts to purchase wind power and renewable energy certificates, pursuant to G.L. c. 169, § 83 and 220 C.M.R. § 17.00 et seq.
 – Docket D.P.U. 10-54 (the Cape Wind contract proceeding), prefiled direct testimony (filed June 4, 2010), rebuttal testimony (filed September 1, 2010), testimony under cross examination (September 8, 13, 14, 23, 24, 2010); and
- Before the Massachusetts Department of Public Utilities, in the Petition of NSTAR Electric Company for Approval of a Proposed Long-Term Contract for Renewable Energy with Cape Wind Associates, LLC Pursuant to St. 2008, c. 169, §83, Prefiled Direct Testimony, March 30, 2012; testimony under cross-examination, August 2, 2012.

²⁰ http://vtdigger.org/2011/01/15/hydro-quebec-contract-set-at-5-8-cents-a-kilowatt-for-2012/.

Tierney Report on Potential Costs and Other Implications of the 'Clean Energy Sources' Bill (April 1, 2014)

²¹ If Hydro Quebec were to price energy delivered via the proposed Northern Pass line in a similar way, the delivered cost would be approximately \$100/MWh since the cost of Northern Pass' transmission line is at least \$40-\$45/MWh (and that, combined with the ~\$58/MWh in the Vermont contract, would be roughly \$98-\$103/MWh. (The source of the \$100/MWh cost of the transmission line is from the PA Consulting study, "Electricity Market Impacts of the Northern Pass Transmission Project, June 2012, page 5,) To put the \$110/MWh hydro energy in perspective, the on-peak and off-peak prices of power in ISO-NE forward markets as of January 2011 (the period during which the Vermont/Hydro Quebec contract was signed) were the following, for electricity deliveries to the Massachusetts Hub:

Prices as of 1/2011:	Price/MWh:	Price/MWh:
	On-peak	Off-peak
2011	\$54.08	\$42.08
2012	\$54.49	\$42.98
2013	\$55.88	\$44.23
2014	\$58.15	\$46.50
As of this writing, the forward energy market prices for ISO-NE are:		
Prices as of 1/2011:	Price/MWh:	Price/MWh:
	On-peak	Off-peak
2014	\$72.52	\$54.03
2015	\$72.94	\$54.79
2016	\$64.38	\$47.60
2017	\$58.28	\$42.00

Actual average prices delivered to the Massachusetts Hub was \$46.68/MWh in 2011 and approximately \$36.09/MWh in 2012 and approximately \$56.06 in 2013. Sources: The ISO-NE annual forward prices are from MWE Group/NYMEX, as reported on SNL Financial. The actual average prices in ISO-NE are from ISO-NE, 2012 Annual Markets Report, 2012, page 10; ISO-NE press release, "2013 Wholesale Electricity Prices in New England Rose on Higher Natural Gas Prices," March 18, 2014.

²² NYMEX natural gas futures for Henry Hub, as of March 2011. SNL Financial.

²³ Note a recent study conducted to examine the cost and operational implications for California consumers of achieving a 40percent or 50-percent renewable target found, among other things, that this may not be the most cost-effective manner to accomplish GHG reductions, if that is the goal. (I served on the four-person expert panel that peer-reviewed the study.) See: Dan Arvizu, Severin Borenstein, Susan Tierney, and Stephen Wright, "Report of the Independent Advisory Panel Regarding the Five California Utilities' Study of Integration of Renewable Energy into California's Electric System: 'Investigating a Higher Renewables Portfolio Standard in California'," January 2014; Energy and Environmental Economics, Inc. ("E3"), "Investigating a Higher Renewables Portfolio Standard in California," January 2014.

²⁴ NESCOE Hydro Imports White Paper, pages 47-48.

²⁵ See my testimony before the Federal Energy Regulatory Commission in the Matters of Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators," Docket No. AD13-7-000, re: considerations for the future, September 9, 2013; supplemental comments filed January 1, 2014.

²⁶ NESCOE Hydro Imports White Paper, page 48-49.

²⁷ NESCOE Hydro Imports White Paper, page 55.

²⁸ Energy Information Administration, 826 electricity data for Massachusetts.