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The Final Word on Winter in New England's Energy Markets

Christophe G. Courchesne
Senior Attorney
CLF New Hampshire
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With the vernal equinox past, it's time to look back on winter in the New England energy markets.

Despite dire predictions and some of the worst winter weather on record, there wasn't a crisis. Modest market shifts made a huge difference, driving down prices, assuring the lights stayed on, and calling into question the wisdom of the region making big new bets on gas pipelines and transmission infrastructure.

In this three-part paper, Conservation Law Foundation senior attorney Christophe Courchesne runs down the market data on what happened this winter, offers a few explanations, and explores the lessons we should take from the experience as the region looks to its energy future.

Part I: The Difference a Year Makes

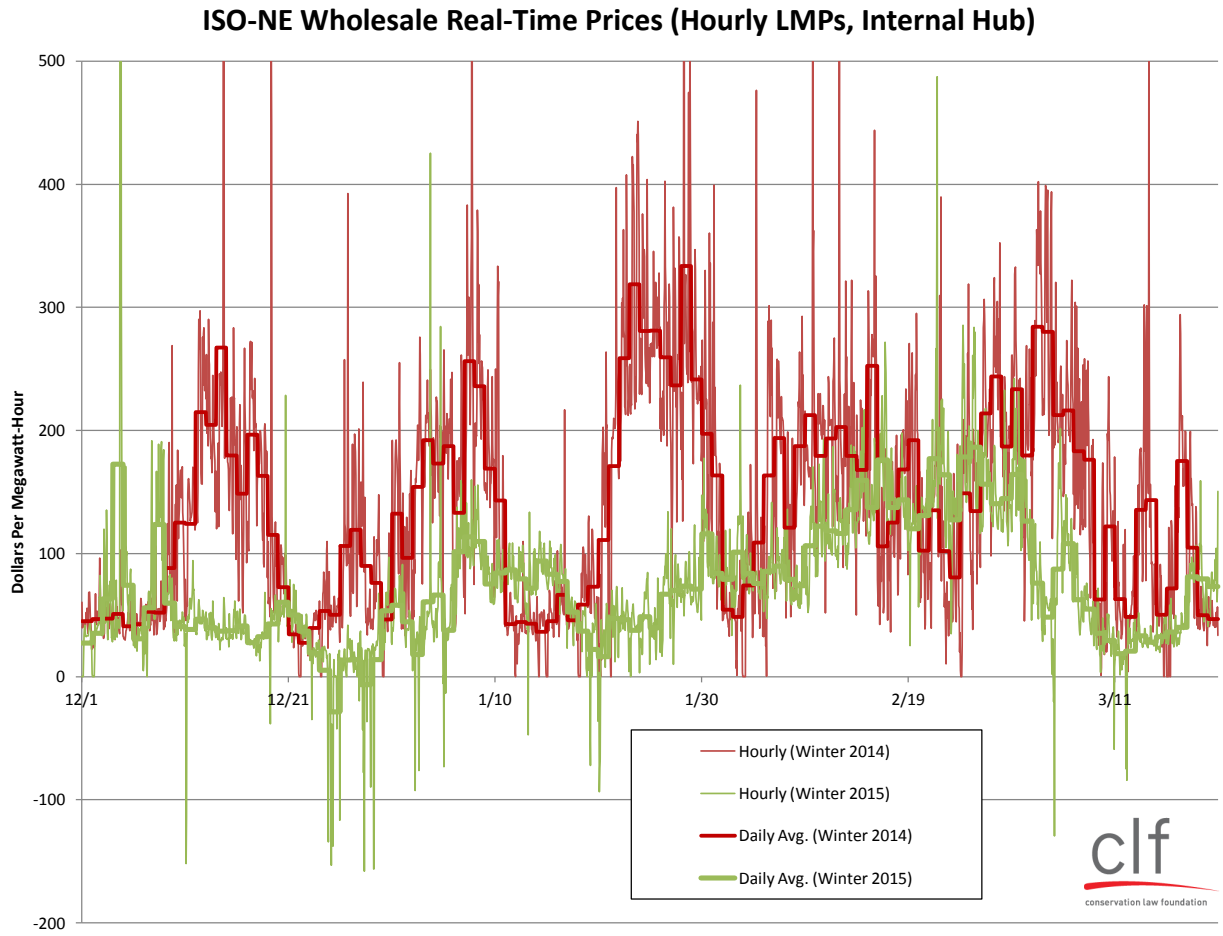
Last year, after a very expensive winter in New England's wholesale energy markets, many were predicting the worst this winter. Ever higher prices. Economic ruin and job losses. Maybe even rolling blackouts on the coldest days. As the leaves were changing colors, electric utilities throughout New England locked in winter power purchases at double the rates most were paying last summer. The newspaper articles and radio stories almost wrote themselves and even went national, as it seemed everyone was talking about energy costs and the apparent culprit—a severe deficit of gas pipeline capacity to transport cheap Marcellus shale gas from the mid-Atlantic and Midwest to heat New England's buildings and to power our gas-heavy power plant fleet on cold days.

In mid-January, CLF was among the first to see that the supposedly inevitable New England winter energy crisis was fizzling. Natural gas and wholesale power prices were down compared to last year's prices—way down. Gas from better-utilized pipelines and shipments of liquefied natural gas were amply supplying power plants, even on cold days. Despite higher electric bills, lower oil and gasoline prices were helping many consumers pay less overall for their energy needs than last winter.

Overall, from December 1 to March 20, prices were down 45%.

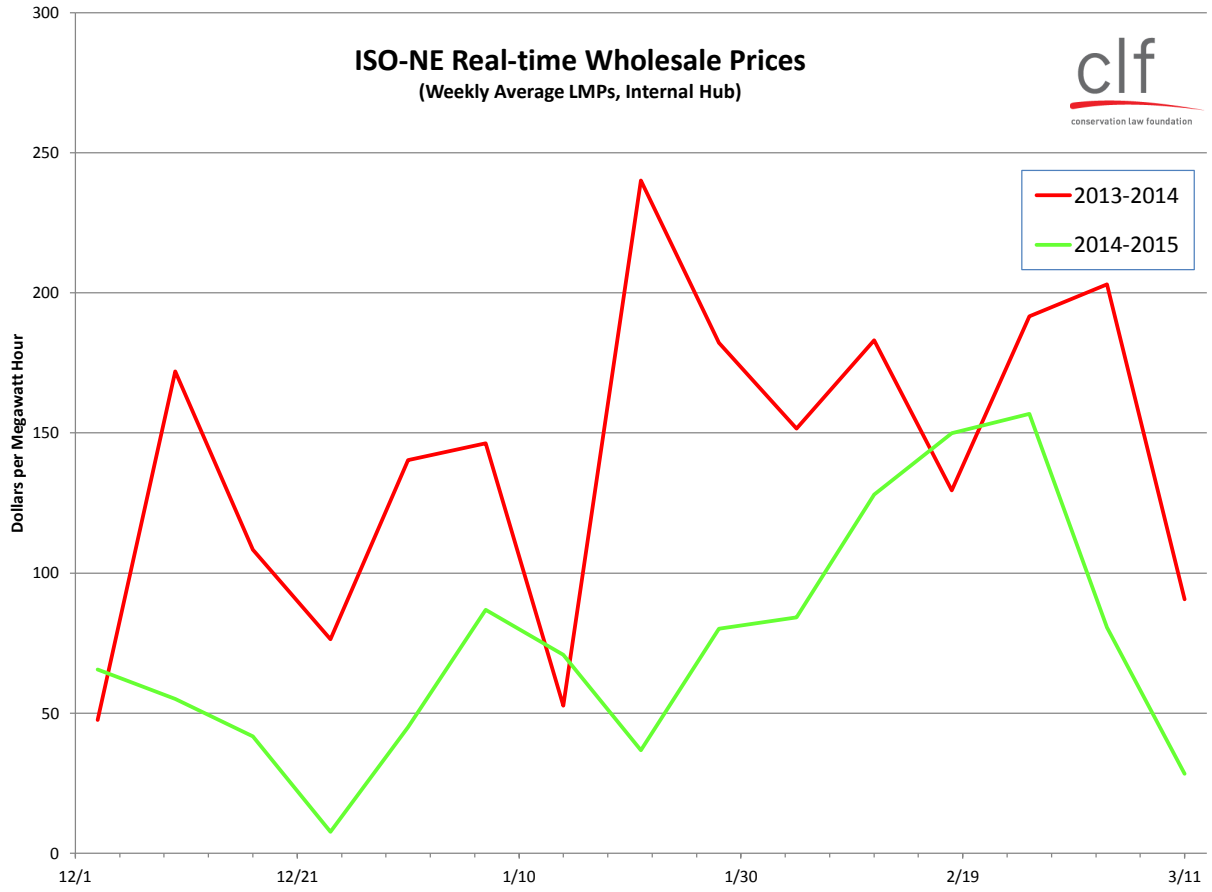
Little did we know at the time that February would be among the coldest and stormiest in recorded New England history. While we can expect more weather extremes like this in future years thanks to climate change, February tested the system in ways that, if the pre-winter fears were borne out, would have brought us the full parade of horribles: rolling blackouts, even higher gas and power prices than last year, and major harm to the region's economy.

In the end, as week after week of cold and snow battered the Northeast, prices in the energy markets did go up. But they didn't match last year's peak prices. Here is the final version of my chart showing hourly and daily average wholesale electricity prices on the New England electric grid, comparing last year's and this year's prices.

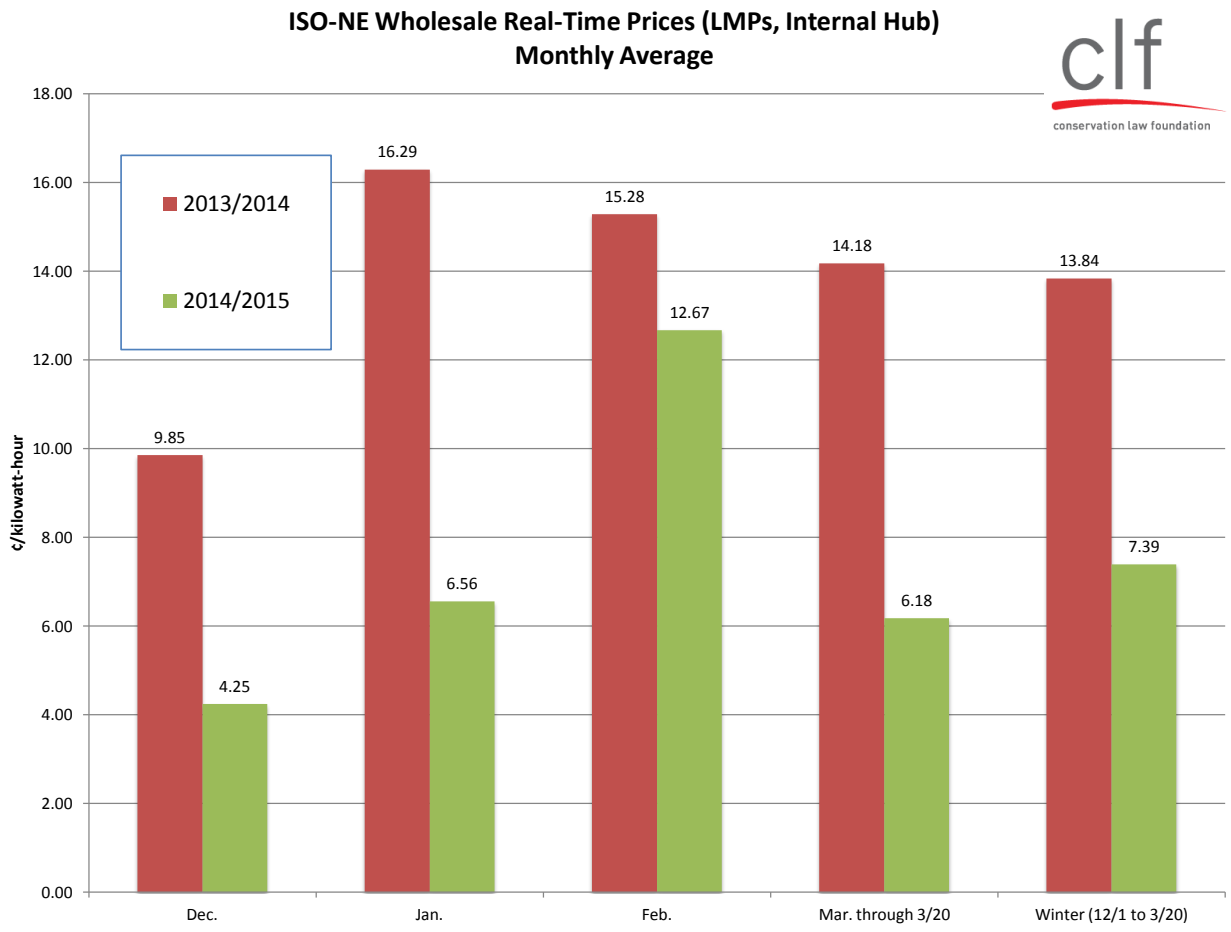


(Keep in mind that $10 per megawatt-hour is the same price as 1 cent per kilowatt-hour. Typical homes use between 500 and 750 kilowatt-hours of electricity per month. The prices I'm analyzing relate only to the supply of electricity from power plants; electric bills also include a charge per kilowatt-hour to deliver the power through the transmission and distribution system and other fees and charges.)

In the end, despite the jump in prices in February, the peak weekly wholesale power price in New England was much lower than last winter, and the lowest winter peak in three years. In fact, that peak weekly price—about 15 ¢/kwh in late February—was less than some retail rates that utilities locked in last fall, not just for the winter but for the first six months of 2015. That's how wrong last year's predictions about winter prices were.



It's true that the cold drove up February power and natural gas prices, likely making the month the most expensive of the year. As a result, the region's oil and coal power plants were temporarily able to compete, running more than in other seasons, when they barely run at all. But however you look at this winter—day-by-day, week-by-week, or month-by-month—wholesale power prices were below last year's prices.



Overall, from December 1 to March 20, prices were down 45%. That's despite the fact that this winter was colder overall than last year, with a temperature in the Boston area about 4°F below historical averages and 1.5°F colder than last year.

These lower wholesale prices mean that it is very likely that next winter's retail electric prices will be lower than this year's—power futures for next January and February are now trading between 10 and 12 ¢/kwh, with the other winter months of December and March lower than that. We are already seeing dramatic reductions in retail electric prices for this summer; National Grid announced that its supply rate for Massachusetts customers will drop from 16 ¢/kwh to less than 9 ¢/kwh on May 1, and the New Hampshire utility Liberty Utilities announced summer rates of less than 7 ¢/kwh, down 55% from its winter rates.

In terms of reliability, the region's electric grid didn't miss a beat, despite unfortunately timed outages at the Pilgrim nuclear power plant that took that station offline for many days and the fact that four large non-gas power plants that were available last year—Mount Tom, Norwalk Harbor, Vermont Yankee, and Salem Harbor—are now retired. In the brutal cold and higher priced days of February, ISO-NE never once activated its long chain of alerts and precautions, known as Operating Procedure No. 4, that is triggered when system reliability is at immediate risk.

Why did the markets have such a different winter this year? I will tackle that question in the next part of this paper.

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Part II: Why This Winter Was Different

As late as last fall, many observers and traders watching the New England energy markets were predicting a repeat of last year's very expensive winter, or worse. By January, CLF was able to post an update showing that those predictions weren't materializing. In fact, the expected energy crisis was fizzling, with much lower wholesale power and natural gas prices than last year and no signs that gas-fired power plants were struggling to get fuel. We laid out a series of market shifts and changes that were making a difference.

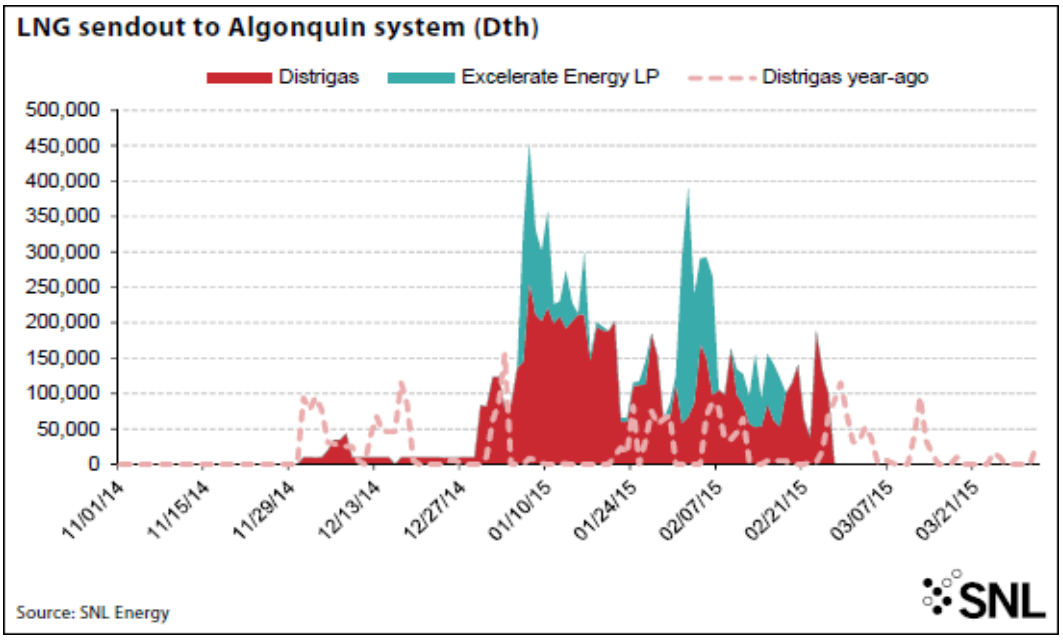
As I mentioned in the first part of this paper on this winter in New England's energy markets, February was a major test for New England's energy system. It was the coldest February in modern times, with bitter cold, record-breaking snowfall, and no "February thaw" whatsoever. Adding to retirements of several major non-gas power plants in 2014, some of New England's remaining non-gas power plants experienced outages or problems. The whole Northeast was much colder than normal, driving record natural gas demand for heating and electric generation. On

February 2, New England set an all-time record for daily gas demand of 4.21 billion cubic feet.

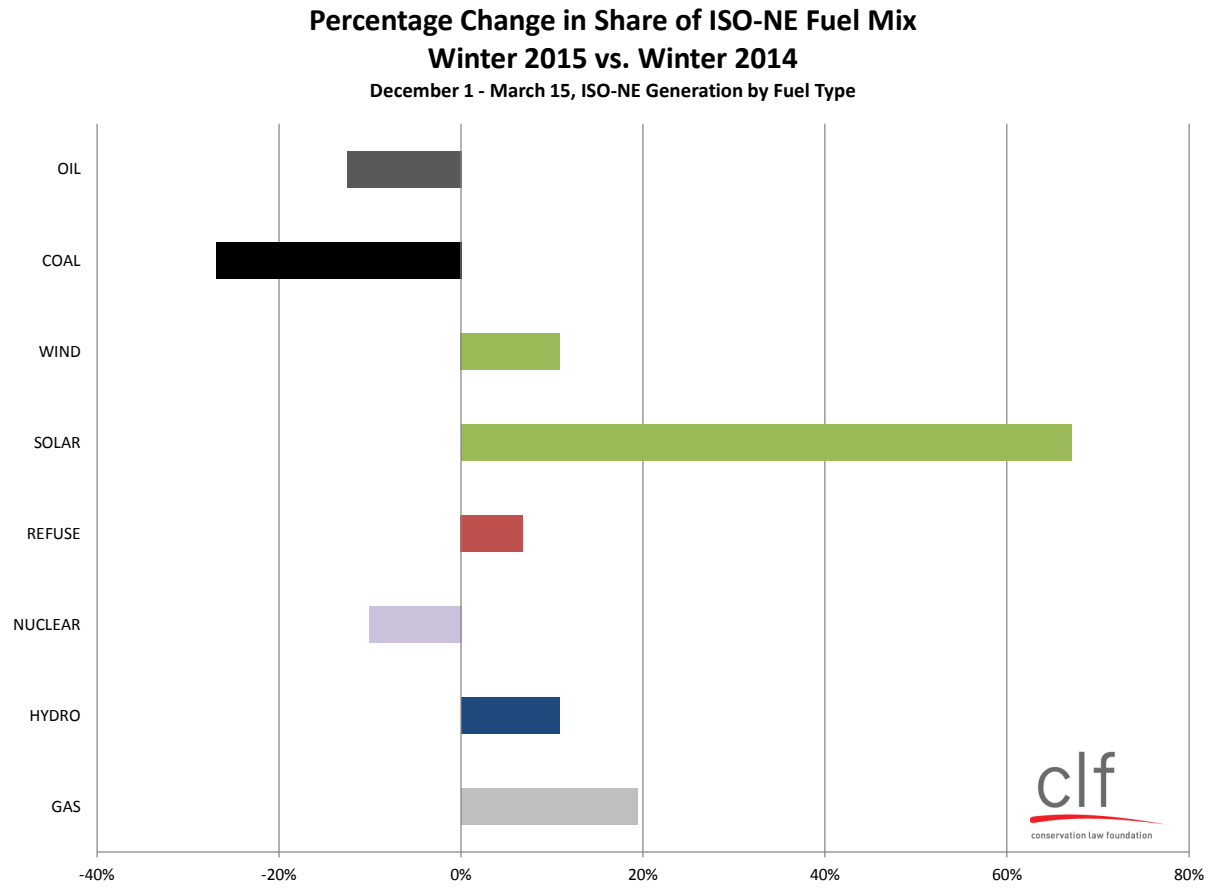
Despite the challenges, the factors we identified in January helped keep prices in check and the lights on for the balance of the winter

This year confirmed that market-priced LNG can calm the markets, reducing volatility and scarcity concerns.

Major deliveries of liquefied natural gas to Boston helped ease gas supply concerns and last year's pattern of speculating traders bidding up daily natural gas prices to astronomical levels on fears of shortages and delivery problems. On the coldest days, as the SNL chart below shows, LNG added as much as 10% to New England's inbound gas deliveries, much more than last winter. Since 2013, CLF has identified additional LNG deliveries using existing infrastructure as a cost-effective way to help meet the region's peak winter energy needs. This year confirmed that market-priced LNG can calm the markets, reducing volatility and scarcity concerns. As my colleague Greg Cunningham told the Boston Globe, New England's existing LNG infrastructure could be even more fully utilized in the future; for example, it's clear that the system would have benefited from additional deliveries in late February.



Thanks to the global crash in oil prices, fuel oil was available for about half last year's price, moderating the price of liquefied natural gas, which is linked to oil prices. During the coldest weather, especially in February, lower oil prices directly lowered power prices as well because, with oil cheaper than spot-market gas, oil-fired power plants (or gas-fired power plants with the capability to run on oil) were setting electric market clearing prices. While it's not good news that more-polluting resources like oil and coal plants were able to run, they did not run as much this winter as last winter (even accounting for dual-fuel oil demand):



And regional grid operator's ISO-NE market changes implemented in December, including hourly offers and re-offer opportunities, improved price transparency and formation, which clearly helped dampen and lessen the duration of cold weather price spikes. Other gas-electric coordination steps encouraged by the Federal Energy Regulatory Commission also made a difference. What we saw in March is

a rapid drop in prices from February levels, something that didn't happen last year in similarly cold weather.

This winter, we also saw reasons to worry less about two other concerns: the very real and legitimate hardships of this winter's high retail prices for ordinary customers and the ongoing retirements of older power plants.

> Our region's growing energy efficiency and solar investments will also moderate peak demand and keep overall electric demand flat.

With lower oil prices, households and businesses also have been paying much less for oil and petroleum fuels this winter. A January government estimate puts these savings in 2015 at $1500 for the average family that both drives and heats with oil, and at $750 for the average family that drives and heats with other fuels. These savings are totally offsetting (and more) the $30 to $50 monthly increases in average electric bills that some New England households are facing through the first part of the year. And as noted in the first part of this paper, summer electric rates are on the way down; when 2015 is over, average electric supply rates for the year will be higher than in 2014, but by far less than the eye-catching percentages cited in the news reports announcing this winter's retail increases.

And in February, ISO-NE held its annual auction to buy electric generating capacity to meet the region's electric needs three years from now. As my colleague Jerry Elmer noted at the time, that auction successfully procured an overall surplus beyond the very high "installed capacity requirement" that ISO-NE has determined is appropriate. With somewhat higher prices than past auctions, ISO-NE's capacity market is serving its purpose—to ensure that new power plants, especially wind and natural gas, will be replacing the plants set to retire in the next few years. Another signal of a strong market for new resources came earlier this month, when 16,000 megawatts of *new* generating capacity (an amount equivalent to nearly half of the region's power plant fleet) expressed an interest in

participating in next year's capacity auction for 2019-2020. Analysts are expecting capacity prices to decline in future auctions as these new power plants compete against each other, as acknowledged in ISO-NE's plan to count behind-the-meter solar generation in calculating that demand and its energy efficiency forecast.

With this winter behind us, what are its lessons for future winters—and our region's energy future? With massive proposals for new energy infrastructure on the table, with supposed goals of solving our winter energy problems, what should New England do next? I will explore these issues in the next part of this paper.

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Part III: Some Lessons from a Calm, Cold Winter

With the winter behind us, New England can look to its energy future with the benefit of what we learned as predictions of crisis fizzled and historic cold tested the region's energy system. In the first part of this paper, I explained the data showing that New England energy markets this winter were much less expensive and volatile than during the winter of 2014. In the second part, I identified some reasons for this turnaround: market shifts that increased imports of liquefied natural gas and lowered fuel prices, and reforms that improved energy market rules and procedures. In this final part, I offer a few of this winter's lessons, with important implications for the billion-dollar decisions on the future of our energy system that are now pending in state houses and government agencies around New England.

#1: With the savings this winter, the benefits of big bets on new infrastructure just got more questionable.

This winter's most important lesson was that we can significantly reduce winter volatility and prices by more wisely using and upgrading the infrastructure we already have. Wholesale prices were way down, and electric reliability wasn't at risk, despite the coldest February on record. But there was virtually no new energy infrastructure on the system; in fact, it was just the opposite: four large non-gas power plants retired before cold weather set in.

This lesson is not a new concept: CLF made this point well before the winter when we raised questions and released documents on the New England governors' energy infrastructure "grand bargain" to subsidize new gas pipelines and power lines. At the time, an advocate of the Governors' plan called CLF's perspective "very dangerous." It looks like we weren't so off target.

In the next few years, several incremental gas pipeline projects will come online, adding to the region's capacity by 10%. Although these projects' capacity is not dedicated to power plants, it is intended to meet peak heating needs of gas users in a decade or more, meaning that in the short-term most of the new capacity will

be available to serve electric generation. These projects should help ease some of the stress that cold winter weather places on our increasingly gas-dominated electric system. If the region's many clean energy advocates can help it, we will also continue to accelerate investment in our cheapest resource—energy efficiency—and local, zero-carbon renewable projects like wind and solar that help reduce demand for fossil fuels, in the winter and year-round.

In the meantime, we need to move past panic over illusory energy shortages and the idea that building every costly energy project on the table will inevitably lower costs. Unfortunately, these are the very arguments we continue to hear in favor of spending billions on new energy infrastructure now. According to these arguments, the winter was a minor, lucky reprieve from the dire trend of higher prices driven by insufficient gas pipeline capacity and power plant retirements. From this perspective, there are huge risks of "inaction," with "action" meaning large new ratepayer-funded bets on new gas pipelines and also new power line infrastructure.

But all infrastructure is not created equal: there are promising approaches to addressing winter challenges that make greater use of existing infrastructure and that are tailored to meet market needs. In CLF's view, we should favor these

approaches first and evaluate any big new investments—especially those funded by the public and with major ramifications for climate, the environment, and local communities—with extreme caution and exacting scrutiny.

Some of the more important questions to answer: do the supposed benefits (lower wholesale electric prices) outweigh the costs (of constructing new projects with financing from electric customers)? Do alternatives to big new infrastructure provide a better bargain by providing similar benefits but lower costs? While a number of studies completed before this winter have been cited as evidence of benefits, those studies posit that new infrastructure will lower wholesale energy prices by more than the cost of the infrastructure. However reputable or independent the authors of these studies may be (and many are far from the latter), their numbers are based on speculation about what energy markets will do in the future—speculation that will certainly be wrong in one direction or another.

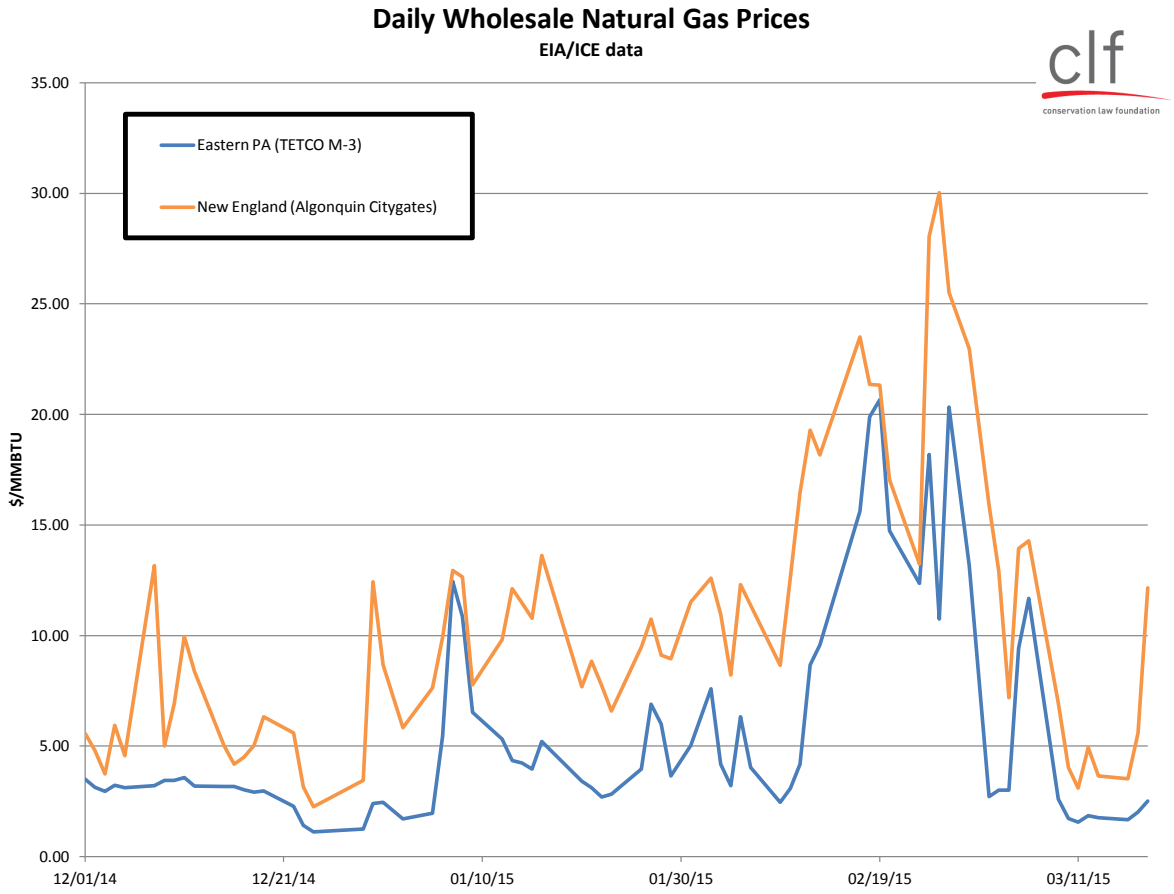
This winter suggests that wholesale prices can come down a lot without big new projects subsidized by electric customers, with modest approaches that cost much less. If that's true, the money devoted to new infrastructure would add to customer bills with little benefit, at a time when across New England (in New Hampshire, Vermont, Massachusetts, and Maine just this month) proven strategies to advance our clean energy future like efficiency and renewables are at risk of being deprived of the public policies and support they need.

#2: Gas pipelines aren't a panacea in cold weather.

To some, February's cold weather and higher wholesale market prices still prove the need for much more pipeline capacity to feed gas-fired power plants. So what should we make of this February's higher prices?

While New England typically had higher natural gas prices than other parts of the country, the whole Northeast—including areas with robust, brand-new pipelines and closer access to Marcellus shale gas—experienced price spikes during the month, as wave after wave of Arctic air boosted heating and electric demand. Here are snapshots of electric market prices in New York and the mid-Atlantic spiking higher than in New England during February's cold weather:

This was a more modest repeat of the same phenomenon last January during the "polar vortex" cold spell. The following chart compares natural gas prices at a hub in eastern Pennsylvania with New England prices.



Clearly, both New England and the rest of the country have considerable room for improvement in coordinating the gas and electric markets to ensure timely, predictable, and cost-effective delivery of gas to power plants when heating and electric needs are both high. The benefits of additional LNG imports and ISO-NE's modest efforts this winter are strong evidence that better use of existing gas infrastructure and additional market improvements—including ISO-NE's forthcoming "pay for performance" changes to the forward capacity market—can help meet our cold weather challenges. With so many market variables, it is not clear that adding huge amounts of pipeline capacity will necessarily or cost-effectively reduce market prices, as the infrastructure studies that use data from before this winter so confidently predict.

Nor is it clear that more pipelines will consistently price oil or coal out of the market during the coldest weather. As I pointed out in the second part in this paper, New England's dirtier power sources actually ran less this winter than last winter, and we can better avoid using them at all by improving the gas supply and storage products available to gas-fired generation and deploying more no-carbon (and winter-peaking) resources like wind.

#3: Scare tactics aren't helpful; finding solutions that don't break the bank or worsen the true crisis of climate change should be the objective.

With high retail electric bills making headlines and arriving in real customers' mailboxes, this winter provided fertile ground for arguments that the region's energy costs pose an existential threat to its economy and competitiveness. The term "energy crisis" was everywhere (and still is). There are two big problems with this frame for our winter energy challenges.

The first is that it's a gross exaggeration. As I've shown in this paper, there wasn't a "crisis" in New England's energy market this winter, whether we're talking about energy supplies, the reliability of the electric grid, or wholesale energy costs. That's why I tracked wholesale energy data all winter with a facetious Twitter hashtag, "#winterenergycrisis," with a goal of showing that reality was diverging from the rhetoric.

Certainly wholesale energy costs were quite high last winter, and retail electricity prices (set last fall on the fear of the same thing happening again) were quite high this winter. CLF believes that the region can and should work on market and policy solutions, including needed infrastructure. But calling these problems a crisis creates the false impression that we need to mobilize a massive, all-hands-on-deck response; after this winter's modest market changes made such a big difference, it's hard to see any wisdom or prudence in reacting this way.

The second problem with the "crisis" frame for winter energy costs is that the alarm is deeply misplaced. It detracts from graver threats to our region's economy, like this winter's crippling of Greater Boston's public transportation infrastructure.

At the very top of the list is the undeniable crisis facing the region and beyond: climate change.

As we seek to address the climate crisis, we should avoid building more of the same long-lived, polluting, and costly systems we have today than are absolutely needed, whether as a supposed solution to winter energy costs or otherwise. **Our focus should be speeding the transition to an innovative, self-sufficient, much cleaner, less volatile energy market that is less—not more—reliant on fossil fuels from outside New England.** From this perspective, the ongoing retirements of inefficient, polluting power plants are not a strategic risk, as ISO-NE describes them; they are an opportunity and a necessity.

Whether impelled by legal requirements like Global Warming Solutions Acts or federal climate regulations, or by the clarion calls of disappearing wildlife, coastal destruction, and increasingly extreme weather, our region's leaders should be devoting their efforts to building an affordable, decarbonized energy future that stops making climate change worse. Our cleanest resources—efficiency and renewables—are affordable and getting more cost-competitive all the time. Moving us to an energy system with those resources at the center should be New England's most pressing priority.

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Conservation Law Foundation (CLF) protects New England's environment for the benefit of all people. Using the law, science and the market, CLF creates solutions that preserve natural resources, build healthy communities, and sustain a vibrant economy region-wide. Founded in 1966, CLF is a nonprofit, member-supported organization with offices in Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. Visit us at www.clf.org and follow us on Twitter @TheCLF.

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Photos: Sap buckets on maple trees on a dirt road in Pomfret, Vermont; two kids cross country skiing in a snow storm on a woods road near Greenville, Maine; skiers at Jiminy Peak ski resort in Hancock, Massachusetts; a young bull moose in a bog near the Connecticut River in Pittsburg, New Hampshire. All copyrights: Jerry and Marcy Monkman/EcoPhotography.