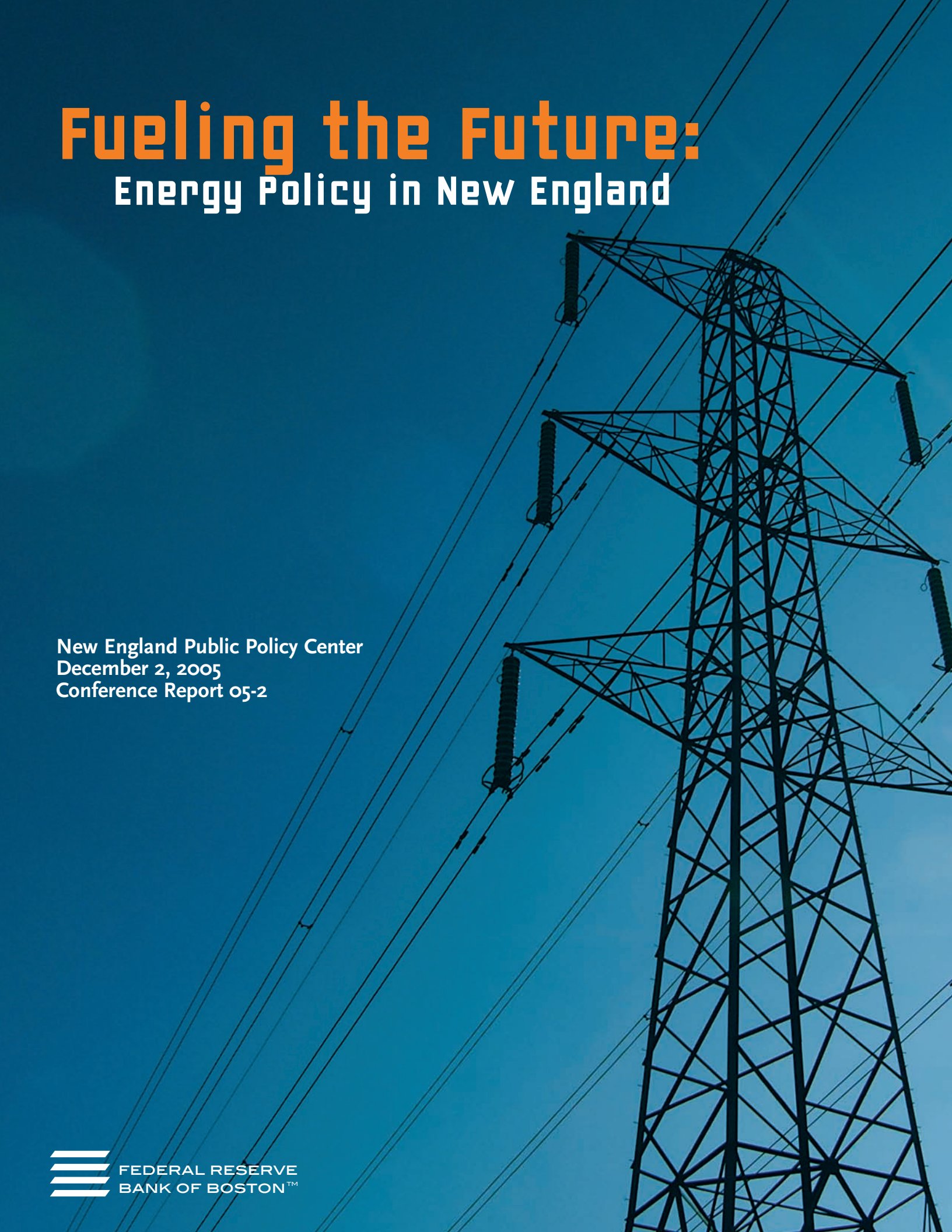
Fueling the Future:
Energy Policy in New England



New England Public Policy Center
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New England Public Policy Center
Federal Reserve Bank of Boston
600 Atlantic Avenue
Boston, MA 02210

New England Public Policy Center
at the Federal Reserve Bank of Boston

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By Antoniya Owens

Executive Summary

On December 2, 2005, the New England Public Policy Center at the Federal Reserve Bank of Boston hosted its first policy symposium, "Fueling the Future: Energy Policy in New England." Through presentations and a panel discussion, the forum brought together legislators, regulators, business leaders, researchers, and policy advisors in a discussion to highlight the challenges and opportunities in New England's energy situation and to help the region identify potential solutions through more effective energy policy.

Several major themes emerged at the event. First, strong leadership and long-term regional planning are needed to overhaul the region's energy decision-making mode and to ensure future resource stability and system reliability. The current mechanism, which strives to accommodate the interests of all stakeholders and to ensure that nobody loses, has stalled discussions. It must be rejected in favor of a stronger decision-making model whose outcomes, while less satisfactory to some, are at least visible and meaningful. Second, the costly and lengthy process of siting energy infrastructure needs to be streamlined. We must clarify market rules and modify regulatory mechanisms of approval in order to identify those elements that are needed and cost-effective, and to encourage investments in them—one of the main ways to improve the reliability of the region's energy system. Third, the lack of indigenous resources in the region and the uncertainty of its future fuel supplies should encourage New England to strengthen the long-term reliability of its energy system by maintaining fuel diversity, increasing the use of renewable energy sources, improving energy efficiency, and reducing demand. Finally, conference participants agreed that global climate change is an overarching factor that needs to inform any discussion of energy policy. Proceeding in a "business-as-usual" mode is not a viable option. We need to adjust to a future with a carbon-constrained economy in order to achieve meaningful progress simultaneously on the energy, economic, and environmental fronts.

Introduction

On December 2, 2005, the New England Public Policy Center at the Federal Reserve Bank of Boston hosted its first policy symposium, "Fueling the Future: Energy Policy in New England." The conference brought together legislators, regulators, business leaders, researchers, and policy advisors in a discussion aimed at identifying key energy policy issues in New England as well as their potential solutions. As Boston Fed President Cathy Minehan noted in her opening remarks, energy policy is an issue that affects every part of the region; needs clearer information, analysis, and discussion; and has a measurable impact on the region's economy and potential for growth. Through presentations and a panel discussion, the forum highlighted the challenges and opportunities in New England's energy situation, helping the region continue its tradition of innovation and creativity in resolving its energy policy issues. This report summarizes the proceedings of the conference.

Major Themes

The presenters at the conference included economists, policy researchers, regulators, environmental activists, and business leaders. While each of the participants explored issues and shared insights from his or her own unique perspective, several common themes emerged from the discussion.

• Conference participants agreed that in order to overhaul the region's inefficient energy decision-making and planning mechanisms, we need strong leadership and long-term planning on the regional level. The current post-deregulation period suffers from the absence of coherent regional long-term planning for both supply- and demand-side resources. After deregulation, planning was delegated to the market, but the slow pace of restructuring has left the planning function overlooked. Business leaders and government officials must work together to devise new regional approaches to resource planning in order to eliminate the current gridlock and to resolve the concerns that dominate the region's (and the nation's) energy future. Furthermore, most participants concurred that the "there-should-be-no-loser" model, which strives to accommodate the interests of all stakeholders, has stalled the current discussions. It must be replaced with a more effective decision-making model which, through strong leadership, accomplishes outcomes that may be less than pleasing to all sides, but that achieve visible progress, nevertheless.

• The reliability of the region's energy system, both now and in the future, depends on more efficient siting of energy infrastructure. Currently, an overly long and costly process for approving and siting new facilities is impeding infrastructure development in all energy sectors, whether electricity generation, transmission, liquefied natural gas infrastructure, or renewable sources. The problems have become particularly serious in electrical generation because of uncertainties created by the slow and incomplete transition to deregulation. Market mechanisms are imperfect, regulatory rules are unclear, and investors are unwilling to commit to long-term projects with uncertain returns. We need to clarify market rules, improve incentives, and modify regulatory mechanisms of approval and decision making in order to encourage the growth of the infrastructure necessary to ensure system reliability.

• Fuel diversity, energy efficiency, and demand reduction are important steps in securing a stable and reliable energy system in New England. The lack of indigenous resources in the region and the uncertainties surrounding its future fuel supplies should encourage New England to work towards meeting its energy needs through increased use of renewable sources, greater energy efficiency, and demand growth controlled through demand-side management programs.

• Finally, global climate change, a serious and imminent concern, is an overarching factor that needs to inform any discussion of energy policy. Conference participants agreed that proceeding in a business-as-usual mode is not an option in view of the increasing environmental and scientific concerns about climate change and of expectations of growing demand and uncertain supply of traditional fossil fuels. Whether through innovation and deployment of new technologies or through mandatory carbon emission limits, we need to adjust to a future with a carbon-constrained economy. Our energy, environmental, and economic futures are intrinsically linked; no meaningful progress can be made without integrating all three.

National and Regional Overview

Keynote Address:

The National Energy Context

Guy F. Caruso, *Administrator,*
Energy Information Administration,
U.S. Department of Energy

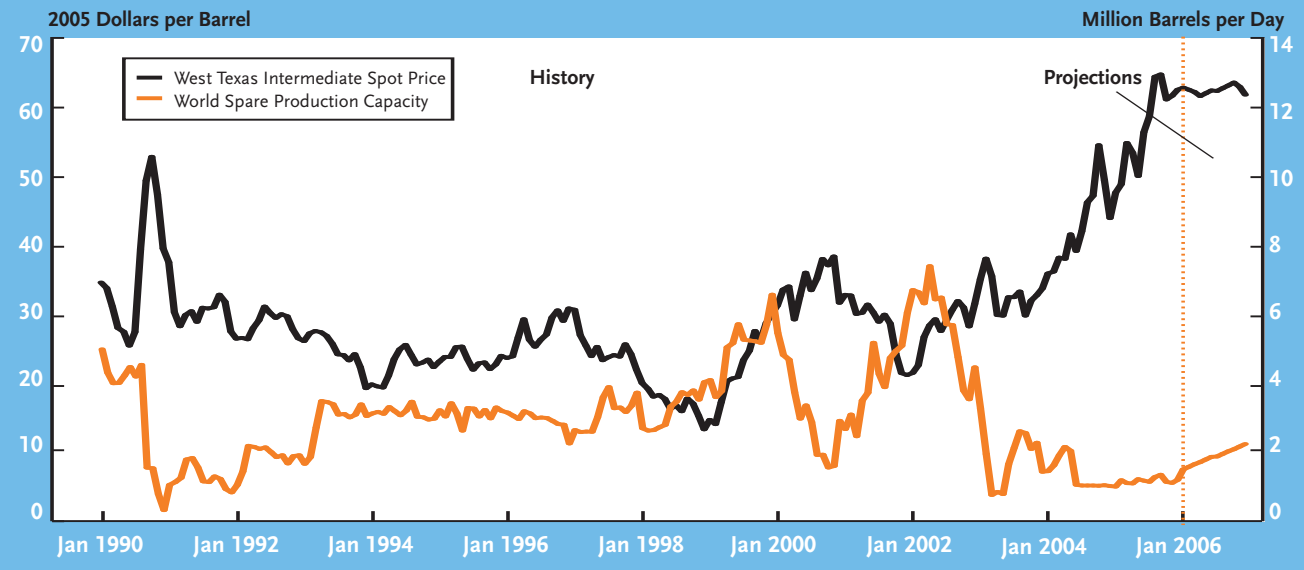
The conference began with a keynote address by Guy Caruso, head of the Energy Information Administration, whose remarks provided an overview of the nation's energy situation as well as its short- and long-term outlook. His remarks were based on Energy Information Administration (EIA) projections to 2025, which use a business-as-usual baseline that assumes no changes in existing rules, regulations, and policies.

At the outset of the presentation, Caruso briefly summarized the energy situation in New England in comparison with the rest of the nation. New England lacks indigenous energy sources and relies heavily on imports of petroleum as well as, more recently, natural gas. Compared to the nation as a whole, the region is much more dependent on petroleum, but it uses much less coal since it has relatively few coal-fired electrical generation plants. The composition of home heating fuels also differentiates New England from the rest of the country: Half of New England's households heat their homes with oil, as compared to only 7 percent nationwide. In addition, the role of natural gas has been growing in the overall energy needs of the region, especially in electricity generation. Thus, Caruso focused his comments primarily on crude oil and natural gas.

In laying out the short-term projections, Caruso first highlighted the crude oil situation. In contrast to the preceding three decades, rising world oil prices in 2004 and 2005 were driven less by special events or supply disruptions than by the strong and growing demand for oil (caused by solid global economic growth) and by infrastructure that is inadequate to keep up with this demand. Caruso indicated that we are currently operating in a very tight world oil market with significant declines in global spare capacity over the past few years; this, in turn, has resulted in price volatility. Until new investment increases capacity and flexibility in the world oil market, the prices of crude oil and, consequently, of refined oil products are expected to remain high and volatile (see chart below). Continued geopolitical instability in major oil-supplying regions, such as Iraq, Nigeria and Venezuela, also contribute to uncertainty in world oil markets.

In the United States, the national energy infrastructure experienced significant set-

Tight global markets result in high crude oil prices



Source: Energy Information Administration Short-Term Energy Outlook, November 2005.

backs this past year in both crude oil production and refinery capacity due to the devastating natural disasters of Hurricanes Katrina and Rita. Crude oil prices in the United States will remain high in the short term, since the global crude oil production was already at 98 percent of capacity at the time the hurricanes hit and the recovery of shut-in[1] capacity is likely to be slow.[2] Although refinery capacity is expected to recover more rapidly, its devastation has affected the supply and hence the prices of refined products, especially distillate products such as diesel fuel and heating oil (due to the specific types of refineries that were damaged). That heating oil prices will continue to be high over the next several months is not welcome news in New England.

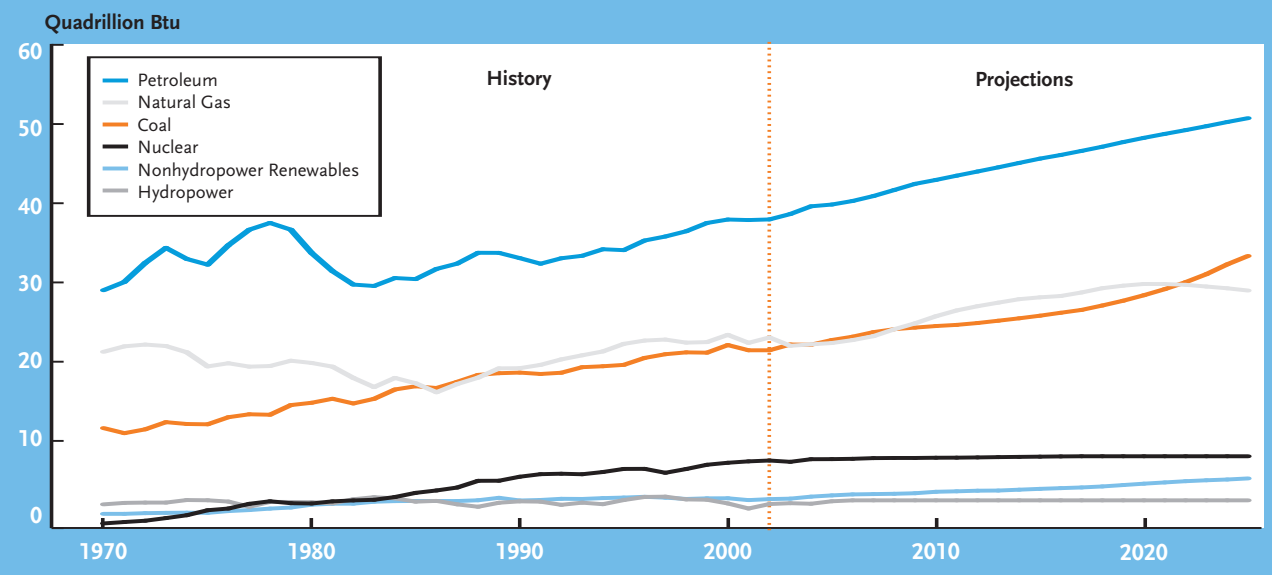
Caruso noted that Hurricanes Katrina and Rita have had a significant impact on natural gas production as well, and recovery has been slower than expected. Twenty percent of the natural gas production capacity in the Gulf Coast continues to be shut-in, and full recovery is not expected until at least the second quarter of 2006. Naturally, this has led to a substantial and steady increase in natural gas prices through the whole supply chain, from the wellhead all the way to homes and businesses. For instance, this winter, households that use natural gas for home heating will face a 40-percent increase in their heating bills.

Furthermore, Caruso pointed out that, unlike crude oil, natural gas operates in a regional rather than a global market. As a result, there are few readily available additional gas imports to draw upon during unforeseen declines in domestic supply. Indeed, our main source of natural gas, Canada, already has little or no excess supply available in the short term. And the market for the other potential source of extra gas, liquefied natural gas (LNG), is not sufficiently developed in the United States to relieve drastic and unexpected supply reductions.

Moving on to long-term projections, Caruso discussed the price levels and fuel composition likely to characterize the nation's energy future for the next 20 to 25 years. World oil prices will remain high, above $40 per barrel—considerably higher than the real long-range price in the past. Fossil fuels will continue to dominate our energy supply in the next two decades (see chart below). Petroleum will lose some market share to natural gas, but it will still account for about 40 percent of total energy consumption in the United States by 2025. While the past 20 years have been characterized by increasing use of natural gas for electrical generation, the projections to 2025 show a slowing, and ultimately declining, demand for natural gas as a source of electricity due to anticipated high and rising natural gas prices. Coal is expected to take

The United States will remain heavily dependent on petroleum

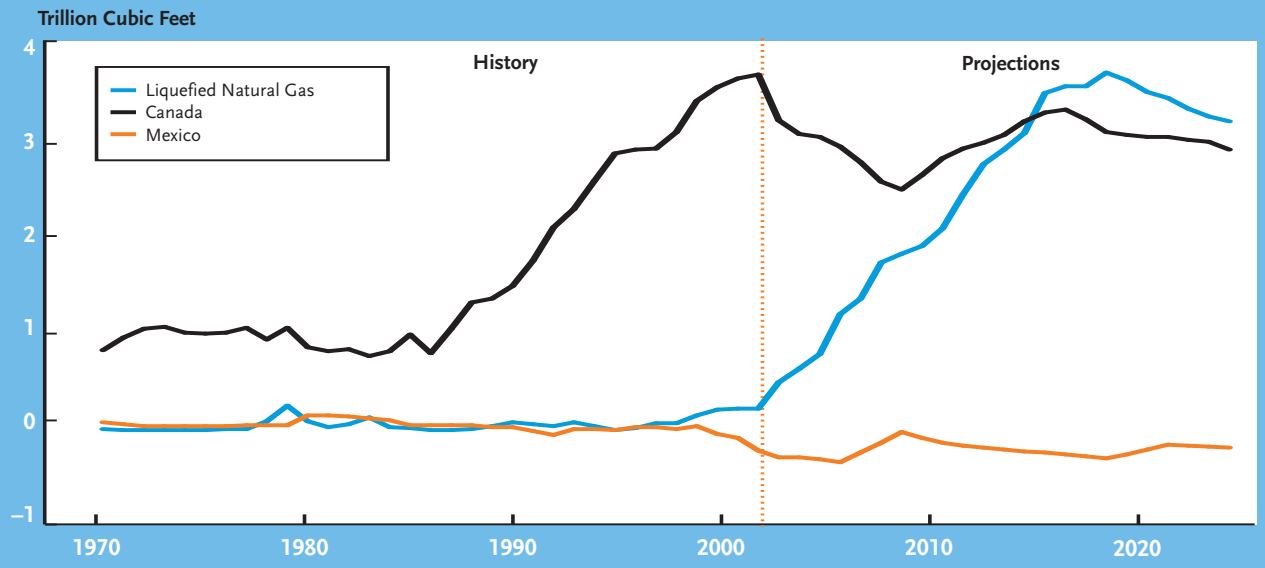
U.S. energy consumption by fuel, 1970–2025



Source: Energy Information Administration Annual Energy Outlook, 2005.

The importance of LNG will continue to grow

U.S. net imports of natural gas, 1970–2025



Source: Energy Information Administration Annual Energy Outlook, 2005.

over some of the market share of gas in electric power generation, except in New England.

In total energy consumption, the heavy dependence of the Unites States on foreign oil is likely to continue, with imports accounting for nearly 60 percent of U.S. oil supply. EIA anticipates that a more robust world market for natural gas will develop, assisted by substantial development of LNG infrastructure. Natural gas wellhead prices are expected to decline a bit and remain moderate and stable until 2010, largely due to increased LNG coming from the Caribbean, Africa, the Middle East, Russia, and Norway. Within the United States, as consumption outgrows domestic supply, imports of natural gas will increase steadily. Since Canada cannot keep up with this pace of growth, the nation will necessarily depend more on LNG for its natural gas needs (see chart above). Additional gas supplies are expected from two new domestic sources as well: the Alaska natural gas pipeline and unconventional gas produced from sandstone formations, coal bed methane, and shale gas in the Rocky Mountains. However, after 2010, prices are projected to start rising gradually, because supplies from foreign imports and unconventional domestic sources will likely be insufficient to meet increased demand and to offset conventional resource depletion.

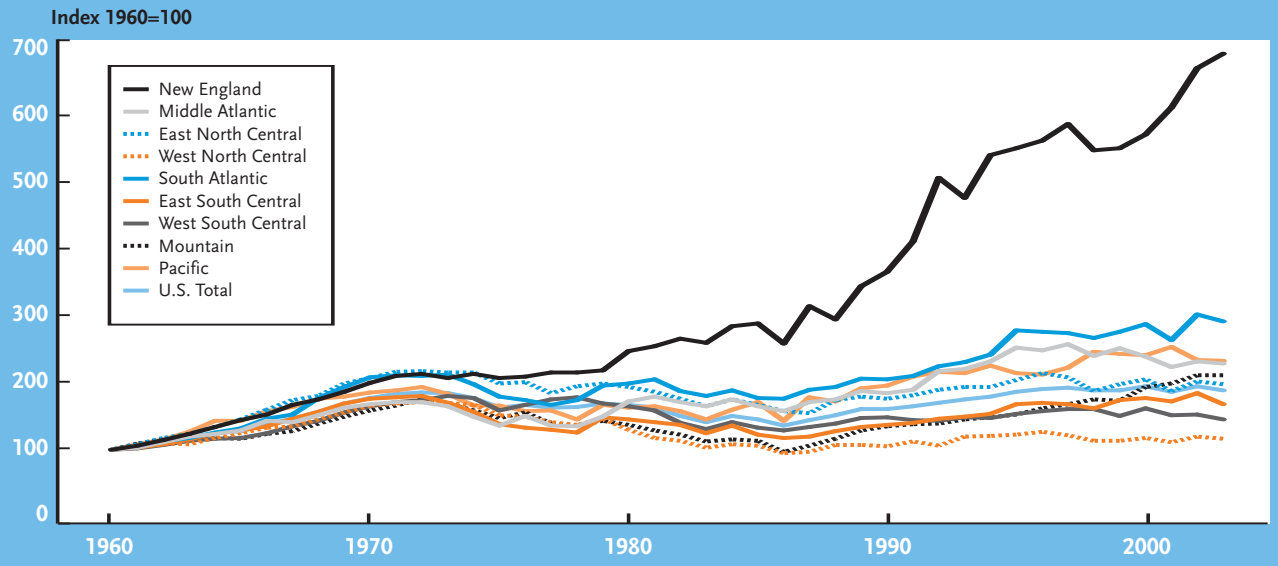
At the end of his presentation, Caruso briefly summarized the world energy projections. Energy consumption is expected to shift towards developing countries and emerging economies, especially those in Asia. By 2025, emerging economies will account for one-half of world energy demand (up from one-third today), because of expected strong economic growth in developing Asia. For the same reason, world demand for oil and gas will also continue to grow. The global fuel-use mix will remain basically unchanged, with fossil fuels accounting for nearly 90 percent of total energy consumption. OPEC will continue to be a crucial oil supplier; Iran, Qatar, and Russia will be key for natural gas. Thus, globally and in the long run, oil and gas supplies are likely to remain vulnerable due to limited resource availability, insufficient infrastructure investment, and geopolitical uncertainties.

The Challenge of Energy Policy in New England

Carrie Conaway, *Deputy Director, New England Public Policy Center*

Carrie Conaway's presentation provided an overview of the current energy policy issues in New England. She began with a discussion of the demand and supply of natural gas in New England as an illustration of the kinds of energy problems the region cur-

New England's natural gas consumption is growing quickly relative to other regions



Source: Energy Information Administration.

rently faces. New England's natural gas consumption is increasing much faster than the rest of the nation, rising by 80 percent in the last 15 years, compared to 20 percent nationwide (see chart above). This growth in consumption was attributable to a combination of market and policy factors, including: declining prices; reliable imports from Canada and Mexico; attractive physical qualities, such as low carbon emissions and fuel efficiency; relatively easy permitting for new gas-fired electrical generation facilities; and new policies aimed at improving air quality and supporting domestic natural gas markets. While these factors applied nationwide, they made natural gas particularly attractive for New England, a region with high prices, relatively strict environmental standards, and a tradition of local control over facility siting.

When compared to other U.S. regions, natural gas consumption in New England was very low historically and has only recently risen to near the national average. At the same time, however, the region has relatively little natural gas infrastructure to support this increased demand, which raises concerns about whether New England's growing demand for gas may soon outstrip its ability to acquire sources of supply. Some have expressed concern that New England is becoming too dependent on natural gas, which could reduce the reliability of the region's energy system. ISO New England, the independent system operator that monitors the region's wholesale electrical markets, has reported that there is "adequate but not ample supply of natural gas over the next five years." With nationwide demand for gas growing as well, competition for supply will increase, which will likely raise prices and worsen the region's capacity constraints.

Conaway argued that the issues the region faces with respect to natural gas are not unique to gas markets, but rather demonstrate the broader problem of ensuring energy system reliability for the region. She defined reliability in the short run as having a system that works well on a day-to-day basis and recovers quickly from interruptions. In the longer run, reliability means having the right infrastructure in the right place at the right time. Establishing a reliable system requires an interaction of both markets and public policy. She said, "Firms will invest in a reliable system to a certain extent, but as a society we have an interest in having a more reliable system than what private firms may provide; one with more backups and stopgaps to help prevent problems from escalating."

Conaway moved on to discuss what policymakers can do about promoting the reliability of New England's energy system.

One key strategy for ensuring reliability is fuel diversity. Since it lacks indigenous fossil fuel sources, New England cannot afford to be overly reliant on any one fuel, whether natural gas or any other. As a result, it has historically been a national leader in using a diverse set of fuels to meet its energy needs, and its policy should focus on maintaining this diversity. With respect to natural gas, policymakers could work to increase its supply or to reduce its demand. More broadly, the region should consider promoting the use of renewable energy sources, which are naturally abundant in New England, and encouraging the development of new technologies. On the other hand, Conaway argued, it is also important to reduce demand, which decreases the amount of capacity needed to serve the same number of customers and thus helps increase reliability. Two possible ways to achieve this goal are promoting energy efficiency, which reduces overall demand, and ensuring that retail customers face the real-time price of energy, which reduces demand in peak periods.

Conaway also emphasized the importance of increased investment in and easier siting of energy infrastructure in promoting system reliability. This is particularly critical in the area of electrical generation, where generators currently face insufficient incentives to invest in new generation. The current deregulated market structure does not allow prices to rise high enough during peak periods to reflect the real value of electricity at those times, which impedes firms from earning enough revenue to recoup the fixed costs of their investments. To solve this problem, ISO New England has recently proposed a locational installed capacity (LICAP) market, which would pay both existing and new generators to provide capacity, with payments higher in the parts of the region with greater capacity needs. However, this proposal has drawn criticism from numerous stakeholders, who feel it will be costly and will not guarantee that sufficient capacity will be available when it is actually needed.

Infrastructure siting is equally complicated, because the benefits of new facilities accrue regionally or even nationally, but the costs are mainly borne locally. There is currently little coordination among federal, state, and local governments in evaluating proposals and making siting decisions that both serve regional needs and address local concerns. And local siting boards, where much of the authority to site facilities resides, tend to be more sensitive to local than to regional concerns. At the extreme, the current process could sacrifice regional reliability for the sake of local control. Until coordination among stakeholders and different levels of government occurs, the region will continue to build insufficient infrastructure, which could undermine system reliability.

Governments and markets must work together, argued Conaway, to ensure a reliable energy system and thereby the overall economic health of the region. Firms will need to build the right infrastructure in the right place at the right time, and governments will have to play an active role in enhancing reliability through policies that address fuel diversity, demand growth, and infrastructure investment and siting. She concluded that without the assurance of an energy system that can meet immediate demands along with long-run needs, the region puts its economic prosperity at risk.

Panel Discussion

Moderator: Susan F. Tierney, *Managing Principal, Analysis Group, Inc.*

Susan Tierney, moderator of the panel, presented a brief overview of what she views as the significant tensions dominating the energy landscape. In her view, there is a major disconnect between the nonchalant attitude of consumers toward their energy use and the multitude of challenges faced by the complex industry in charge of providing energy services. Another tension exists between markets and outcomes: We have chosen to rely on markets as our preferred means for shaping the forces that produce our energy supplies, and yet we are not pleased with the outcomes of these markets: carbon emissions, the lack of fuel diversity, and so on.

There is also tension in other areas. We demand economic progress and environmental progress at the same time. We focus more on short-term issues in energy, looking past important, longer-term questions that

need to be addressed in securing our energy future. We do not agree about whether we should reach our energy goals by developing our supply infrastructure or by targeting energy efficiency and demand reduction. As consumers, we want low prices, but we also want "all these other things as well."

Tierney agreed with Conaway that the dynamics of infrastructure siting are a significant source of tension as well. The final tension defining our energy debate, according to Tierney, is the question of whether we should continue to operate in a business-as-usual mode or adjust to a carbon-constrained economy. Looking at Caruso's projections of growing coal and petroleum demand, Tierney concluded that the business-as-usual scenario is not an option. With that, she handed the discussion of the challenges of energy policy over to the panel.

Nora Mead Brownell, *Commissioner, Federal Energy Regulatory Commission*

Nora Brownell opened the panel discussion by arguing that we do not treat the energy and environmental debate as one of economic development and social well-being. As a result, we tend to make short-term, either/or, winner-versus-loser decisions, which prevents us from successfully resolving the energy problems facing us. She then discussed what she considered to be the major challenges in our energy present and future, as well as potential solutions.

Brownell argued that one of our biggest problems is that we are a nation of short-term thinkers. We plan quarter to quarter, which makes it difficult to invest in the long-term, expensive, and big projects required for infrastructure building and development. In order to secure our infrastructure needs and hence our energy system's future, we must change our thinking to consider both the short and the long term; we need to invest in our future and define our legacy.

Second, Brownell observed that new information technology has made it possible to manage the grid in a way that enables the deregulation of electric power generation. However, this has not been accompanied by changes to the jurisdictional models of regulation to reflect the new regional character of the markets. New regulating and decision-making mechanisms are needed to reflect the fact that the markets are now regional, interdependent, and interconnected. No regional planning is done: Action is still taken state by state, locality by locality. Brownell suggested that New England follow the example set by the governors of several western states, who have used regional thinking to address issues such as leveraging coal and wind assets and developing renewable technologies. Quitting the either/or mode, discussing the issues, recognizing that they are all integrated, and planning how to address them as a region is what New England needs to do as well, argued Brownell.

Another issue is the need to empower customers to plan for their future and improve their energy and economic opportunities by giving them better information. Currently, most customers don't have access to technology like real-time meters that would enable them to make informed choices about their energy use. Supplying customers with such real-time information gives them real choices in shaping their behavior and their own energy future. Further, Brownell noted that the extremely slow pace of transition to deregulation in electrical markets has created tremendous uncertainties. In many aspects—such as market rules, cost recovery, facility siting, decision-making processes—these uncertanties have exacerbated the lack of investment in new energy infrastructure. Last but not least, Brownell pointed to the lack of harmonization in energy and environmental policies as another problem. The issues are strongly interconnected, yet they are typically considered separately. This creates a significant tension between the way we live now and the need to consider carbon emission issues in developing our future energy plans.

Brownell then moved on to discuss potential solutions to the challenges of our energy present and future. She felt that the Energy Policy Act of 2005, passed last August, was a step in a positive direction, as it recognized the need to promote new technologies, build infrastructure, and improve regional solutions. To encourage investment in multistate electricity transmission infrastructure, we also need to create better incentives for investment, intro-

duce risk-sharing mechanisms, and promote the development of new transmission technologies. In addition, Brownell suggested that the process for improving transmission infrastructure could emulate that for natural gas pipeline infrastructure, where the Federal Energy Regulatory Commission (FERC) has clear authority, but works with stakeholders to resolve their issues and ensure successful development.

Last, Brownell argued that mandatory reliability standards are a crucial tool in providing better information and reducing uncertainties. The Energy Policy Act of 2005 gave the responsibility for mandatory reliability standards in electricity to FERC. Brownell argues that this will force people to invest more in the reliability of the system and will provide better information about its realities, including its inefficiencies and misdirected investments.

In closing, Brownell stressed the need for making informed political decisions that take into consideration all facets of the issue, arguing, "Political decisions that ignore the economics and the finances will never, never work." She argued that there is a pressing need to recognize that "the price of doing nothing is greater than the price of doing something," as consumers face very painful price levels in the upcoming winter months. We must act now and decisively, and take the opportunity to do the right thing.

Richard Cowart, *Director, Regulatory Assistance Project*

Richard Cowart began by stating the main thesis of his remarks: More of the same is not good enough. He likened the energy system in place in New England to a supertanker, one that is growing larger at the rate of 15 percent per decade. Said Cowart, "Unfortunately, that tanker is headed for rough seas right now, at best. And on our current heading, we're actually headed for a collision course with both world energy markets and global environmental realities." Cowart pointed out that in order to lower the region's energy prices, reduce the massive flow of dollars that leave the region to purchase fossil fuels, and moderate our impact on the environment, we will need to change the supertanker's course. Merely expanding its size would only lead to "a tougher course correction later, or a bigger collision."

Cowart outlined four major issues that, in his view, frame the debate about transforming the region's energy future. First, he focused on the electricity supply situation in New England and argued that the region's power supply has been "on autopilot" since restructuring took off in 1994. He noted that people had widely hoped that the deregulated markets themselves would produce the right resource mix to serve the region over the long run. Cowart noted that building over 10,000 megawatts of natural-gas-fired generation hardly amounts to achieving an appropriate resource mix. He agreed with Brownell's argument that the absence of regional and long-term planning is a problem and added that the region does not have anything set up to replace the integrated resource planning process in effect prior to deregulation. Regulated utilities, in charge of all stages of electricity supply—generation, transmission, and distribution—once engaged in thoughtful long-term planning for supply, transmission, and demand-side investments in order to reliably and efficiently meet future power needs. Since deregulation, however, the long-term planning perspective provided by the old system of regulated utilities has been absent, whereas the need for such planning, both at the regional level and among load-serving entities, has remained urgent.

Increasing reliance on natural gas for generation is proving detrimental to the region, Cowart argued, in view of the fact that we are faced with a lack of indigenous conventional supply resources and high world energy prices that we can't control. Coupled with continuous load growth and changing energy market conditions, there is a real possibility of unreliable service during peak conditions. The experience last winter with gas-on-gas competition has led ISO New England to warn of the risk that, during cold snaps, the region might not be able to heat its homes and meet electric demand at the same time.

The second big problem, in Cowart's view, is global climate change. There is a growing scientific consensus on the problem of climate change. Conditions like melting ice sheets, increased desertification, and stronger hurricanes provide just

some of the warning signs that we must adapt our energy system to soften our impact on climate conditions. Increased fossil fuel use in New England, whether for transportation, buildings, or electricity, is running headlong up against the need to change course on global warming.

Third, Cowart argued that the obvious answer to both energy supply uncertainties and environmental concerns is "the aggressive and persistent delivery of energy efficiency, peak load management, and renewable generation to the power grid." He noted that New England has a high potential for energy efficiency and use of renewables. Recent studies by the New England Demand Response Initiative and the Northeast Energy Efficiency Partnerships indicate that the right combination of energy efficiency strategies and load management could offset 80 to 100 percent of the region's load growth over the next decade.

Cowart further observed that although the region has the resources necessary to address its challenges, there are a number of problems in tapping them. These problems, he asserted, are "of our own making." One problem is the mismatch between the regional reach of power markets and the regional need for reliability, on the one hand, and, on the other hand, the fact that generation and demand management decisions are made by "individual actors guided by state regulation." Cowart argued that this problem is compounded by the ISO's reliability policies, which favor supply expansion and do too little for demand reduction. Further, he argued, the ISO's policies are economically inconsistent. The locational marginal pricing (LMP)[3] model adopted during restructuring is intended to reflect the geographic value of electricity. But the massive building of new transmission capacity that the region is currently pursuing in effect erases the price signals created through the LMP model. Cowart concluded that the ISO's regional support for reliability is important, but that regional funding should be available not just for pure physical expansion of capacity, but also for strategic generation and demand management solutions.

The second problem "of our own making" is at the state level and involves a number of state-created barriers that impede the deployment of demand-side resources—such as end-use energy efficiency or load management programs whose purpose is to reduce electricity demand or shift it to non-peak time periods. We do not plan long-term for the resource portfolio that will best serve the states and the region, because "we are stuck in no man's land on restructuring." Whereas wholesale competition has taken off successfully, retail competition has stalled. The vast majority of retail customers are served by default service, which, unlike the pre-deregulation utility franchises, currently has no long-term resource planning. Cowart argued that we need to recognize the default service as the "new utility franchise." State regulators and legislators need to step in and create rules for portfolio management by those franchise operators on a least-cost basis. In addition, they need to fix the "throughput" problem that still links the region's utility profit margins to their volume of sales. Utility profits are typically linked to their sales level such that even small increases in electricity sales translate into significantly higher profits. This creates an incentive for utilities to sell more power even when it is not in their customers' best interests, and to overlook demand-side management programs, distributed generation, and end-use efficiency as means of meeting demand and increasing reliability.

Cowart concluded his speech by pointing to the Regional Greenhouse Gas Initiative (RGGI) as a good example of successful collaboration of environmental and energy regulators. In RGGI, representatives of seven Northeastern states are working together to limit growth in and, over time, reduce carbon emissions from the region's power sector. More initiatives like RGGI are needed to help secure the region's and the nation's energy future.

Paul Joskow, *Professor of Economics and Management, Massachusetts Institute of Technology*

Paul Joskow's comments focused on three issues: electricity, electricity markets and regulations, and the linkages between electricity and natural gas. In his view, the most important change in the region's energy sector in the last decade has been restructuring in the electric power sector.

In the 1990s, five of the New England states moved to a deregulated, "liberalized" model, rejecting both regulation of vertically integrated utilities and integrated resource planning. In the old model, New England faced the highest electricity prices in North America; power plants were inefficient and had persistent excess capacity; and resource decisions were suboptimal in hindsight. To correct these wrongs, the region "made a bet on competition and supporting regulatory institutions." Joskow argued that New England needs to focus its efforts and resources on ensuring the ultimate success of the deregulation process.

The deregulation process has raised a number of public policy challenges in New England over the last decade. Joskow expressed strong agreement with Brownell that the transition here has been long and slow and is still incomplete, and that if the region is intent on making deregulation work, it needs to focus on trying to improve the competitive markets and the regulatory institutions that support them. In his view, this poses several challenges.

First, it is very important to improve the incentives to invest in new generating capacity and to retire the old and inefficient infrastructure. He expressed concerns that the existing wholesale market institutions do not provide adequate incentives for investment in new capacity that satisfies regional reliability standards, since, at present, there is almost no new capacity under construction in the region. Joskow cited a number of studies from the New England, New York, and Pennsylvania–New Jersey–Maryland electrical markets indicating that markets do not create sufficient incentives to invest in "the last increment of peaking capacity required to balance supply and demand." This situation is exacerbated by the fact that ISO New England provides special incentives to keep old and inefficient capacity in operation, in order to make sure enough capacity is available to respond to reliability problems. Joskow recognized that potential solutions to these problems (such as LICAP) have been examined and are controversial. But it is still imperative to resolve the issues quickly and efficiently, if for no other reason than that the lack of consensus over what the market design will be in the future acts as a major deterrent to new investment. Joskow also agreed with Cowart that reductions in demand should be compensated equivalently to increases in capacity for their contributions to improving reliability.

The second challenge is to increase investment in new transmission capacity in order to relieve congestion, maintain reliability, and promote regional competition. This should be accomplished by improving incentives and removing unreasonable regulatory barriers to investment. More investment in transmission capacity would "make it possible to have a real regional market that's really competitive and that doesn't require various interventions by the ISO or by regulators to deal with market power problems and local reliability problems." Joskow noted that the region has actually done better than most other regions in this respect, partially because it has a good regional transmission planning process, run by the ISO. However, there are still barriers to effective transmission investments, such as the long and costly process of obtaining state approvals for building transmission facilities and the disagreements over who pays for these facilities. In terms of transmission incentive programs, Joskow criticized FERC for not developing a performance-based transmission regulatory program with well-designed incentive regulation mechanisms. He saw no hope of such a program on a national level and argued instead that states need to work together with the ISO to develop the needed regulatory mechanisms.

Third, Joskow argued that we need to recognize and effectively respond to the linkages between gas and electricity markets. In the past decade, there has been a lot of investment in natural-gas-fired generation, since facilities were relatively cheap and easy to build and gas prices were forecast to remain at their 1990s real levels. However, in response to Conaway's earlier question, Joskow argued that the region is not overly reliant on natural gas. The real issue, in his view, is that gas prices largely determine the price of electricity, since the wholesale market in New England clears with natural-gas-fired generation 85 percent of the time. The linkage between electricity and gas became even more apparent during the cold snap of 2004, when the markets

for natural gas performed well, whereas those for electricity performed poorly. The ISO is working to mitigate incompatibilities between the operations of both markets. However, according to Joskow, a number of other issues still need to be addressed, the foremost of which is allowing wholesale electricity prices to rise high enough to cover the marginal cost of generating electricity. If this is not done, it will still be more profitable, especially in extreme winter conditions, for generators to sell their gas supplies rather than to use them to generate power.

Joskow also identified some important issues with long-term incentives. In terms of natural gas infrastructure, both consumers and generators are reluctant to sign long-term gas delivery contracts, which indicates problems with the incentives for investment in pipelines and storage capacity and for increasing fuel diversity. He also argued that additional LNG facilities, by bringing more gas into the region, could be crucial for reducing prices and increasing reliability.

Last, Joskow agreed with Cowart that the current retail competition model is unsustainable. It was designed to give consumers meaningful choice in selecting a supplier, managing their risks, and having real options for load management such as demand-side management and real-time pricing. But it is currently stuck, with the majority of residential and small commercial customers still using default service through their local distribution companies. In Joskow's view, it is imperative that we resolve this situation by either making retail competition work or choosing an alternative approach. He concluded, "A system in which we pretend to have retail competition but we really don't, and continue to put constraints on distribution companies in the hope that it will somehow magically emerge, is both harming consumers and providing distorted incentives to the wholesale market."

Mindy Lubber, *President, Ceres, Inc.*

Mindy Lubber started by noting that in her decades-long work on promoting renewable energy and energy efficiency, she has witnessed only discouragingly modest advancements. Because of the impending impact of global climate change, proceeding with business-as-usual, tweaking the system, and making progress inch by inch is no longer a reasonable option. It leads to slow and piecemeal progress and is not viable from a scientific, environmental, economic, or financial perspective. She said, "Global climate change… is the 900-pound gorilla that's going to inform and impact every decision we make on energy policy, and not factoring it into every discussion and every decision we're making on energy policy is an omission that can no longer happen." Lubber argued that global climate change is a real, dramatic, and growing problem with broad implications for the strength and stability of every part of our energy, economic, and financial systems. Thus, Lubber argued, any discussion of energy policy that doesn't take the costs of global warming into consideration is missing a critical point.

Dealing with climate change presents both opportunities and challenges. First, Lubber noted that we need to consider policy changes with immediate impact on the electric power industry. Under the current system, building coal-fired plants is still economically viable, if not even attractive, given industry financials. Yet, in a few years, regulatory conditions may change rapidly and render such plants obsolete, resulting in tremendous stranded costs. Agreeing with Brownell, Lubber argued that prolonged uncertainty of regulatory policies harms businesses and diminishes prospects for change. She also added that a community of economic and financial stakeholders, such as investors, economists, and financial leaders, has been vocal in calling on companies to put a cost on carbon and to plan their energy strategies in recognition of the impact they will soon feel from operating in a carbon-constrained economy.

Echoing Cowart and Joskow, Lubber argued that one way to adapt successfully to the prospects of carbon constraints is to engage in effective demand-side management. To their arguments that demand-side and supply-side approaches should be compensated equally for their contributions to a reliable and strong energy system, Lubber added that demand-side management is also important from an economic standpoint. Since many of the technologies involved in conservation and energy efficiency could be developed in the region,

demand-side management may actually contribute to job creation and economic growth in New England in addition to improving its energy security and stability.

Another important step in adjusting our energy system to global climate challenges is encouraging the use of renewable energy. Lubber acknowledged progress in this respect, citing the development of renewable portfolio standards and the new incentives in the 2005 Energy Policy Act. However, we need more policies to promote the use of renewables. One option is incentives for encouraging the private sector to invest in renewables. Another is streamlining and facilitating the process of siting facilities for renewable energy. This needs to be done more efficiently and with more involvement from the local community throughout the entire process. Lubber noted that the siting problems surrounding Cape Wind are an unacceptable situation, as it discourages businesses from investing in renewable energy infrastructure. We should also support and invest in new technologies, such as carbon sequestration, that will enable the elimination of old, inefficient, and polluting generation facilities. And we need to eliminate uncertainty from "the rules of the game" by introducing mandatory caps on carbon as clear guidelines that inform the rest of our energy policy.

In summary, Lubber argued that if we want to achieve a superior energy policy and escape the "patchwork" of state laws and regulations, we must consider the cost of carbon in every decision on our energy future.

Nickolas Stavropoulos, *President, KeySpan Energy Delivery*

Nick Stavropoulos agreed with a theme expressed by the other panelists: The energy future of New England is closely linked with the economic future and environmental future of the region and is key in advancing "the growth and stability of the region over the long term." And since New England has no native fuel sources, the economic future of the region depends on its ability to continue to bring in fuel supplies from other regions. Developing our natural gas infrastructure, whether pipelines or LNG, is critical if we are to continue to deliver natural gas to a region that is so heavily import-dependent.

Stavropoulos argued that there are two primary issues we face in securing the energy future of the region: encouraging generators to buy firm gas delivery contracts and diversifying supply sources overall.

The fact that natural gas plays a significant role in the region's electricity generation has important environmental benefits, as the fuel is cleaner-burning, with fewer particulate matter emissions. However, currently most of the electric power generators rely on interruptible contracts for natural gas delivery—that is, contracts in which gas delivery may be curtailed or ceased under certain circumstances, such as peak demand periods. As Joskow explained earlier, there are distorted incentives that underlie this situation, most important of which is the fact that generators cannot charge a high enough price in extreme weather conditions to cover their marginal cost of producing electricity with the suddenly more expensive natural gas supplies. Thus, generators currently have no economic incentives to purchase firm delivery contracts. The result is situations like the cold snap of 2004, in which gas distribution companies with firm contracts received all of their supply, whereas the supply for generators was interrupted. Similar events in the future may harm the reliability of the electric system and lead to blackouts across the region. They could also harm the region's economic competitiveness, particularly in attracting biomedical and pharmaceutical firms, which depend on reliable electricity for their operations. Said Stavropoulos, "So I submit to you, the model is broken. Companies are willing to invest in infrastructure for this region, but the power generators are not incented to take advantage of that additional capacity." Stavropoulos urged that all involved parties—investors, regulators, and state and federal officials—need to work together to change the paradigm and to create the right incentives for generators to become "equal partners in the region's gas infrastructure equation." Specific ways to achieve that could include appropriate pricing schemes and advance purchase arrangements that enable the generators to lock in supplies at lower prices and reduce their vulnerability to gas-price volatility.

The second critical issue, according to Stavropoulos, is the need to diversify the

energy supply to New England. Currently, there are concerns about the dangers of almost every source of energy, whether coal, nuclear, LNG, or wind power. But shunning such a wide array of possible energy sources does not bode well for the region. "Folks, we have to pick one," he asserted. Stavropoulos particularly stressed the need for additional LNG terminals. He argued that if we continue to decline such proposals due to local impact and environmental or security issues, a terminal will inevitably be built sooner in Atlantic Canada. New England customers will then face even higher prices for natural gas, which would further harm the economic competitiveness of businesses in the region relative to the rest of the country.

Stavropoulos closed by stressing the importance of encouraging energy efficiency and conservation. Energy efficiency needs to be a part of every energy discussion, and the right incentives need to be in place so that energy suppliers can be compensated for lost revenues associated with energy efficiency.

In closing the panel, Tierney concluded that stakeholders in the energy future of the region and the nation seem to be stuck on many issues. Among other things, they are stuck on creating incentives for building efficient infrastructure and other long-term commitments; stuck on promoting carbon emission limits through programs like RGGI; and stuck on siting facilities, whether LNG terminals or wind farms like Cape Wind. To the panelists, she posed the broad question of how to go about breaking the multiple stalemates and bottlenecks and actually solving the issues.

According to Paul Joskow, progress on most fronts seems to be stuck due to the fact that most decisions involve winners and losers; and whereas winners are dispersed and their gains are long-term, losers are highly concentrated, easily activated, and very vocal. He stressed that getting over the gridlock would require "leadership from our elected officials," both regionally and nationally. There is a growing need for strong leaders willing to address the issues and find ways to engage all parties—winning and losing. Nora Brownell added that strong leadership from the business community is crucial in resolving differences, as well. Furthermore, Lubber noted, it is important to depolitize the issues; "bring in new players," such as the businesses and investors; make sure that the public understands the broader implications of the debate; and highlight the urgency of the situation so that we can come up with solutions sooner rather than later. Cowart pointed out that many of the problems we face come from demand growth. Thus, our leaders first need to address the issue of increasing demand and create resource-neutral incentives to mitigate its growth. Last, Joskow suggested that rather than reinventing the wheel, policymakers here need to look at how similar issues have been resolved in other regions and countries. For example, retail competition works well in other countries, and wholesale markets perform even better. Learning from the mistakes that these countries have made and replicating their successes could be an effective way out of the logjam.

Concluding Address

The Role of State and Local Governments

Henry Lee, *Director, Environment and Natural Resources Program, Kennedy School of Government*

Henry Lee, the closing speaker of the conference, added a new tension to those laid out by Tierney at the beginning of the panel. On the one hand, there is the policy of seeking agreement and negotiating among all stakeholders on all decisions, so that there are no losers in any case. Because the energy debate involves very complex and difficult issues, with multiple parties involved in each one, it takes a long time to arrive at decisions, and the decisions themselves may be far less than optimal. Yet, there is an increasing urgency to make these decisions within the next 12 to 18 months. This situation results in a tense gridlock that blocks all progress.

Lee outlined six specific issues that need to be considered. First, he agreed with Cowart and Lubber that global climate change is a major factor that needs to inform the energy debate. Recognizing that the world will soon need to address the risks of

global warming, Lee noted the strong possibility that the United States will adopt limits on greenhouse gas emissions in the next decade. He argued that New England should prepare for this policy and embrace it as an opportunity both for local entrepreneurs and innovators willing to take the appropriate risks and for the economic development of the region as a whole.

Second, Lee described what he believed to be a crisis in the natural gas situation. Contrary to last decade's perceptions that natural gas is cheap and plentiful, we are now witnessing rising and volatile prices and realizing that domestic supplies of natural gas are not as abundant as previously thought. If demand for natural gas, the preferred fuel for both space heating and electric generation, continues to grow, supply beyond today's levels needs to come through one of three scenarios. One possibility is to open offshore areas to drilling. Significant gas reserves are likely available off the coasts of Florida, California, and the mid-Atlantic. However, entrenched environmental opposition and political attitudes toward offshore drilling make this a very slim possibility, at least in the near term. The second option is to pursue coal gasification. There have been significant technological improvements in coal gasification in recent years, and several gasification plants are being developed both in the United States and overseas. The 2005 Energy Policy Act includes new incentives for research and development of this technology. However, while this process is much cleaner and thus preferable to conventional coal burning, it is still in relatively early stages of development and its prospects of being widely adopted in the near future are slim. It has much more potential over the long term, and it will likely be implemented in coal-producing regions first. The third scenario, which is the most viable and economically attractive in the short term, is the development of more LNG terminals. In agreement with Joskow and Stavropoulos, Lee argued that we should not allow environmental or security concerns to stop us from developing more LNG infrastructure, because of LNG's potential to significantly increase supplies and reduce gas prices. Furthermore, if the region opts for expanding its current LNG infrastructure, it should consider it not in terms of adding isolated facilities, but in terms of creating a whole network of supply and delivery terminals. For an excellent example, Lee pointed to the LNG system in Japan, which with its 23 terminals is a model of high reliability and efficiency, lower prices, and stronger ability to weather external shocks (such as last year's tsunami, which halted all Japan-bound LNG deliveries from Indonesia).

Another critical issue we are facing, Henry Lee argued, is the tremendously difficult and ineffective process of infrastructure siting. This problem has been growing in recent decades and affects not only LNG terminals, but also the siting of transmission facilities and renewables. Lee argued that we are largely stuck in this policy gridlock due to the mode of decision making we have embraced. Negotiating a mutually accepted decision and pleasing all stakeholders is inefficient and unproductive. "This 'there-should-never-be-a-loser' concept is not going to work if we're going to get… facilities sited," he said.

The fourth issue that pervades our energy present and future is our seemingly insatiable demand for oil. Lee agreed with Caruso that, with the oil market being both global and tight, any supply fluctuation anywhere in the world affects oil price levels in the United States. Lee specifically pointed to potential geopolitical instabilities in the Middle East as a major source of disturbance. Since the majority of oil imports in 2015 are projected to come from OPEC, we are not only dependent on whether the OPEC countries are able to produce oil, but also, and more critically, on whether they will have the political will to invest in increasing production to the new levels needed to meet global demand. Said Lee, "You have to ask yourself, given the politics and the economics, is that going to happen? And if it doesn't, you are looking at much higher oil prices." Such uncertainty of supply should act as a strong incentive to reduce the nation's dependence on petroleum. The nation as a whole is overly dependent on oil for transportation, and New England also heavily uses oil for heating. According to Lee, reducing our reliance on foreign oil supplies will be one of the "real national challenges" over the next decade.

Energy efficiency is the fifth policy that

we need to consider as a potential solution to our energy troubles. Energy efficiency is always brought up during debates on energy policy, but the government has never fully embraced it, perhaps because reducing demand lacks the luster of a new power plant or refinery, argued Lee. But reducing demand is the cheapest source of energy we have. We need to support the development and implementation of new technologies to increase energy efficiency as a key strategy for securing a balanced energy future.

The last issue outlined by Lee is how New England should shape its own energy future. A cradle of high-technology enterprises, product development businesses, and top research universities, the region should embrace the ever-stronger need for energy efficiency and innovation as an opportunity to adjust, develop, and prosper. It has the talent and capacity to lead the structural shift towards a more sustainable national energy future through research, development, and deployment of new technologies.

Lee concluded his speech by arguing that our current troubles are not due to the specific mechanics of electricity generation or natural gas delivery, but rather due to a broader governance problem—the ability to make decisions fairly and efficiently and to implement policies that provide the right incentives. A first step to solving the governance problem is to change how we make decisions. Lee argued again for the need to eliminate the current gridlock by rejecting the "no-loser" approach, which paralyzes investment decisions. Second, there is an urgent need for a strong leader who is able to pull people out of the unproductive consensus-and-agreement mode and put forth timely and effective decisions. This may require serious reassessment of how our government approaches and resolves the energy challenges facing New England.

Endnotes

[1] Shut-in refers to capacity that is closed temporarily due to repair, cleaning, inaccessibility to a market, etc. (EIA).

[2] Nearly 30 percent of daily oil production capacity still remains shut in as of January 2006.

[3] Locational marginal pricing (LMP) is a market-pricing approach, in which the locational marginal price is the least marginal cost of supplying the next increment of electric demand. The prices are determined by supply bids and demand offers, submitted by market participants, and reflect both the cost of production and the cost of delivery of power.

Conference Presenters

Nora Mead Brownell, Commissioner, Federal Energy Regulatory Commission

Guy F. Caruso, Administrator, Energy Information Administration, U.S. Department of Energy

Carrie Conaway, Deputy Director, New England Public Policy Center, Federal Reserve Bank of Boston

Richard Cowart, Director, Regulatory Assistance Project

Paul L. Joskow, Elizabeth and James Killian Professor of Economics and Management and Director, Center for Energy and Environmental Policy Research, Massachusetts Institute of Technology

Henry Lee, Lecturer in Public Policy and Jaidah Family Director, Environment and Natural Resources Program, John F. Kennedy School of Government, Harvard University.

Mindy S. Lubber, President, Ceres, Inc

Nickolas Stavropoulos, Executive Vice President, KeySpan Corporation and President, KeySpan Energy Delivery

Susan F. Tierney, Managing Principal, Analysis Group, Inc.

New England Public Policy Center
Federal Reserve Bank of Boston
600 Atlantic Avenue
Boston, MA 02210

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