THE NEW ENGLAND COUNCIL

The Economic Imperative For Additional LNG Supplies In New England

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The proposed siting of liquefied natural gas infrastructure in New England has generated much controversy recently. To ensure that regional energy needs are considered in this timely debate, the Council's Energy and Environment Committee prepared this report, *The Economic Imperative for Additional LNG Supplies in New England*.

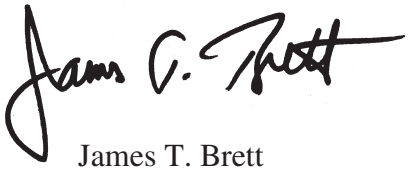
The future of New England's economy is linked to a reliable, reasonably priced and diverse supply of energy. New England has experienced a dramatic increase in demand for natural gas, rising 70 percent from 1993 to 2003. Not only is natural gas used to heat 2.1 million residences and 240,000 industrial and commercial businesses in New England, but 42% of the region's natural gas is used to generate electricity.

As you will learn from this report, New England needs more LNG infrastructure including import terminals before 2010 in order to meet increasing demands or face inadequate supplies. Multiple projections from the federal government and private forecasters indicate that before 2010, demand will equal or exceed the region's ability to supply natural gas.

The report also notes that additional LNG infrastructure in the region will moderate the price volatility of natural gas that has forced businesses and consumers in New England to pay at least $500 million more for electricity every year. The high cost of natural gas is beginning to take a toll on New England's economy -- particularly in the manufacturing sector where natural gas bills have doubled over the last year.

The time to meet these challenges is now. Given the lead-time it takes to permit and construct new natural gas infrastructure facilities, actions deferred or undertaken now will significantly influence the region's economic growth for years to come.

I want to express my sincerest thanks to the Council's Energy and Environment Committee and to all Council members and friends who participated in the preparation of the report.



James T. Brett
President and CEO

Executive Summary

Over the past decade, New England's economy has become increasingly reliant on natural gas because of its environmental benefits and efficiency of use. It is now the preferred fuel for electricity generation, manufacturing processes, and heating homes and businesses. An adequate supply of natural gas is therefore vital for maintaining the region's economy and ensuring its future economic growth.

Because of increasing demand, both nationally and regionally, natural gas supplies have tightened, delivery capacity has become constrained and prices have risen to an all-time high. Accordingly, a range of opinion leaders from elected officials to business associations as well as independent government agencies have called for the development of additional natural gas infrastructure, including "liquefied natural gas" or LNG facilities.

In this current environment, The New England Council, a consistent advocate for a reliable, secure and economic supply of energy for the region, undertook this assessment of natural gas demand and supply within the region to: consider the role of natural gas in supporting economic growth; address the need and timing for additional supply/infrastructure; and identify the most realistic option(s) for expanding the supply/infrastructure.

Prepared under the direction of The New England Council's Energy and Environment Committee, The Council relied on publicly available data and a range of studies recently published on this important energy source.

The Council has concluded that there is an economic imperative for additional supplies of natural gas in the region – requiring the construction of new LNG import facilities somewhere in New England within the next several years. Specifically:

- **Additional supplies of natural gas are needed before 2010.** This is a clear and present need, fueled by the convergence of three factors: a growing reliance on natural gas for electricity generation (expected to generate close to 50% of New England's electricity by 2010); enduring high and volatile natural gas prices, which put the region at a competitive disadvantage; and on peak winter days, the region's pipeline system is already at 90% capacity and constrained at key points.

- **LNG is the most realistic supply/infrastructure option.** Other options reviewed may prove attractive over the long-term, but when considered against near-term need either: won't be able to deliver enough natural gas in time to close the aforementioned supply gap *before* it becomes problematic; or can't guarantee the quantity of supply or capacity that can be committed to New England; or don't match the economics of a source of supply located close to the source of demand.

- **Additional LNG infrastructure construction is required now.** Delays in decision-making could be costly in an absolute dollar sense. It has been estimated that the economic consequences of a 2-year delay in natural gas system infrastructure construction planned for the region – pipeline or LNG – will cost New England

customers approximately $3 billion by 2010 in higher natural gas prices. Given the lead-time to permit and construct new natural gas infrastructure facilities, actions deferred or undertaken now will significantly influence the region's economy for years to come.

Numerous LNG projects are being pursued in New England and The Council encourages support for those that fully satisfy and complete the federal approval as well as state permitting processes. The Council is confident of LNG technology's overall safety given: its proven track record; the positive judgments from repeated independent assessments; and ongoing rigorous regulatory oversight. New LNG projects are subject to an extensive assessment process by federal regulators and must meet the permitting requirements established by numerous federal and state agencies. It is the responsibility of this open process to assure safety, assess environmental issues and equitably resolve local concerns on a case-by-case basis.

LNG facilities should not be narrowly viewed as the "third rail" of natural gas consumption. Rather they should be broadly considered as the third leg of an "infrastructure supply stool" that also features traditional supplies from North American basins and pipeline capacity.

Economic Growth and Natural Gas Supply

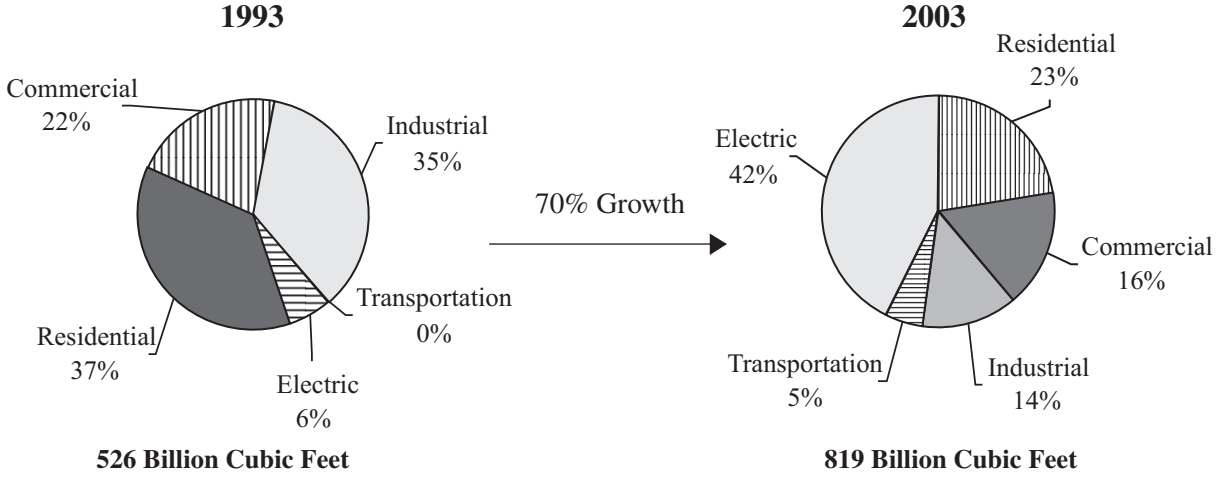
The Federal Energy Regulatory Commission, the New England Governors' Conference, as well as the Governors of Massachusetts and Rhode Island, have all stated that additional supplies of natural gas are needed in the region by 2010. Most recently, ISO New England, the independent operator of the region's electricity grid, stated that additional gas supplies will be required by 2008 at the latest. Three market trends highlight this need.

Economy's growing reliance on natural gas. From 1993 through 2003, demand for natural gas in New England increased by 70%[1] – equivalent to a compounded rate of about 5.4% per year – inextricably tying the region's economy, supply of jobs and quality of life to a sufficient supply of natural gas.

As shown in Figure 1, about 42% of the region's total natural gas consumption is used to generate electricity, the main reason for the dramatic increase in demand over the past decade. Lower facility costs, high efficiency technologies, and air quality considerations have made natural gas the fuel of choice for electricity generation. Since 1998, more than 20 natural gas-fired generating plants have been built throughout New England, doubling the amount of electricity produced by this fuel source in the region.

Figure 1 – New England Natural Gas Consumption Trends

The region's reliance on natural gas for electricity generation has increased dramatically



Source: Energy Information Administration, U.S. Department of Energy

By 2010, natural gas is expected to generate close to 50% of New England's electricity. According to ISO New England, the region's dependence on natural gas may be even higher in certain areas due to transmission constraints and the unavailability of diverse fuel generating

[1] U.S. Department of Energy, Energy Information Administration.

resources.[2] For example, reliance on natural gas for electricity production in the Boston area is forecast to reach approximately 80% by 2010.[3] New England is now the second most dependent region on natural gas for electricity generation (behind Texas, which is also the largest natural gas producer in the country).

In addition to electricity generation, according to the Northeast Gas Association, natural gas is used in the region to:

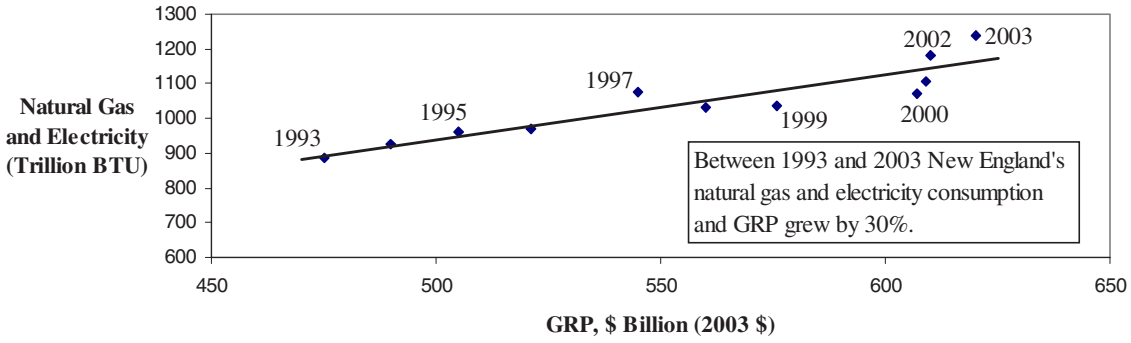
- Heat one-third of all homes (2.1 million residences). In New England, natural gas is the predominant heating fuel for new home construction.

- Provide space/process heating to over 240,000 commercial/industrial customers.

The federal government projects the region's reliance on natural gas to grow by 1.4% per year through 2020.[4] This is likely a conservative estimate given the trend of the last decade. In fact, over just the next few years, the operation of new electricity generating plants is expected to increase gas consumption by approximately 12%.[5] Given these growth projections, it is imperative that an adequate supply of natural gas is in place.

Historically, there has been an undeniable relationship between energy consumption and overall economic activity in the region. During times when energy supply has been sufficient and costs have been predictable, the economy has grown with a corresponding increase in energy consumption. Figure 2 shows this relationship through the lens of electricity and natural gas consumption. Clearly, between 1993 and 2003, the combination of *both* natural gas and electricity consumption increased in tandem with New England's Gross Regional Product (the region's gauge of economic health).

Figure 2 - N.E. Economic Growth vs Electricity/Natural Gas Consumption



Source: Energy Information Administration, U.S. Department of Energy

[2] ISO New England Attachment to "New England Natural Gas Infrastructure", Federal Energy Regulatory Commission, Staff Report, December 2003.
[3] ISO New England Attachment to "New England Natural Gas Infrastructure", Federal Energy Regulatory Commission, Staff Report, December 2003.
[4] U.S. Department of Energy, Energy Information Administration.
[5] U.S. Department of Energy, Energy Information Administration.

A tenuous balance exists between natural gas supply and demand. New England has no native supply of natural gas. Natural gas is transported via pipeline from south-central U.S, western and eastern Canada and from the Caribbean to an LNG import terminal in Everett, Massachusetts.

New England relies on five pipelines to supply natural gas from the Gulf Coast and Canada:

- Algonquin Gas Transmission System
- Tennessee Gas Pipeline System
- Iroquois Gas Transmission System
- Portland Natural Gas Transmission System
- Maritimes & Northeast Pipeline.

Industry analysts believe that U.S. and Canadian natural gas production from traditional basins has plateaued.[6] Frontier basins in the Gulf of Mexico, the Rocky Mountains, Alaska and Artic Canada are expected to be developed, but those developments are at least five to ten years away and will not meet all of the nation's future demand for natural gas.[7] Moreover, New England will have to compete with other regions in the United States and Canada for these supply sources.

Today, a tenuous balance exists between natural gas supply and demand, mostly during winter peak demand days when more than double the typical amount (during the winter months) of natural gas is needed to not only heat homes, schools and businesses, but to generate electricity. A FERC report, dated December 2003, found that while the natural gas infrastructure in New England has kept up with demand, little buffer exists in the system to meet extended cold periods in the peak winter months. In addition, little redundancy or interconnectivity in the pipeline system makes it particularly vulnerable should any component fail.[8]

According to FERC, any delay in the construction of planned infrastructure in New England or underestimation of demand during the months from December through February could result in insufficient capacity to meet demand. Monthly pipeline load factors currently exceed 90% three months of the year – indicating the pipelines have little capacity to deal with future growth or unforeseen situations. FERC has recommended the construction of additional peak-shaving and satellite storage LNG facilities, as well as expansion of LNG deliveries.[9]

FERC's recommendation was validated on January 15, 2004 when New England experienced record natural gas and electricity demand because of extreme cold weather – gas utility demand was 12% higher than the previous record, exceeding demand levels not expected by local gas distribution companies until 2006. Very high natural gas demand for both heating and electricity

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[6] National Petroleum Council Report, September 2003.

[7] "An Updated Assessment of Pipeline and Storage Infrastructure for the North American Gas Market", Prepared for the INGAA Foundation, Inc., July 2004.

[8] "New England Natural Gas Infrastructure", Federal Energy Regulatory Commission, Staff Report, December 2003.

[9] "New England Natural Gas Infrastructure", Federal Energy Regulatory Commission, Staff Report, December 2003.

generation combined with tight supply markets caused the region to come close to exhausting gas pipeline capacity at different points – and pushed the electricity grid close to its limits.

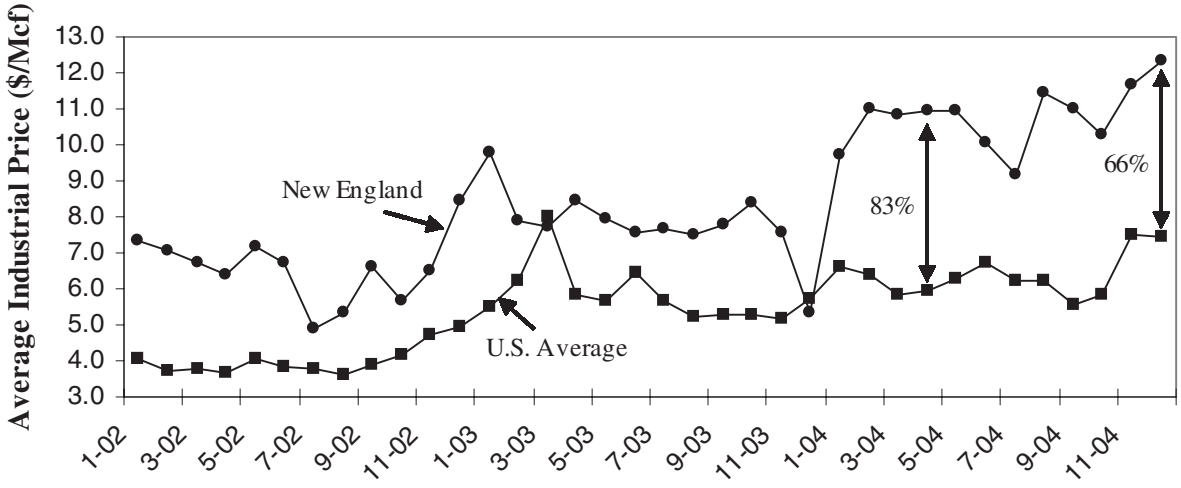
This situation caused both the Northeast Gas Association and ISO New England to ask for conservation and caused real-time electricity prices to rise to nearly $1,000/MWh (or more than 20 times the average energy clearing price historically paid in the month of January based on ISO data) and day-head gas prices to increase nearly ten times their typical levels.[10] The imbalance between supply and demand cost the region's consumers tens of millions of dollars in increased electricity and natural gas costs and will continue to do so if no action is taken to increase supplies.

To help mitigate this situation, the Distrigas LNG import facility accelerated supply shipments– providing enough energy on each day of the cold snap to heat more than one million homes.[11] A feature of appropriately sited LNG facilities, like Distrigas, is that they can directly feed supplies to key demand points in the local and regional market and respond to peak demand requirements.

High and volatile prices from supply imbalances. New England has always had higher natural gas prices than the rest of the country because of its lack of indigenous supplies – the region is literally at the "end of the energy pipeline". This means that New England's cost of natural gas reflects both the fuel commodity and extensive transportation. In 2003, New England consumers (all sectors combined) paid 30% more for natural gas than the rest of the nation.[12] As shown in Figure 3, this places manufacturing facilities, in particular, at a disadvantage with

Figure 3 – Natural Gas Prices for Manufacturers (2002-2004)

New England manufacturers have paid up to 83% more for natural gas than the rest of the nation



Source: Energy Information Administration, U.S. Department of Energy

[10] "Final Report on the Electricity Supply Conditions During the January 14–16 Cold Snap", ISO New England, October 12, 2004; "Post Operational Assessment of New England's Interstate Pipeline Delivery Capability During the January 2004 Cold Snap", Levitan & Associates, Inc.

[11] Northeast Gas Association.

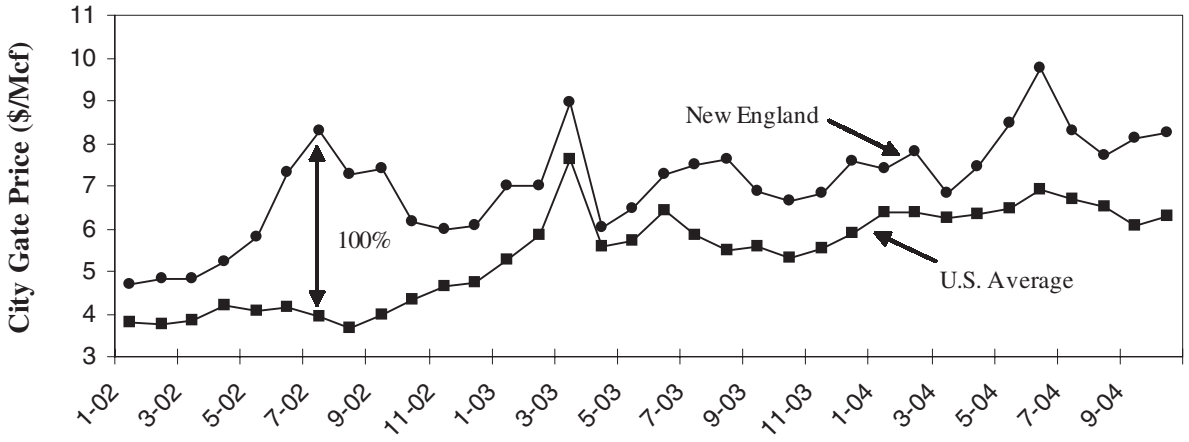
[12] U.S. Department of Energy, Energy Information Administration, natural gas statistics by state, sector.

nation-wide competitors and causes the region to be less attractive to businesses looking to locate new facilities and jobs in New England.

Natural gas prices are currently at an all-time high – the result of a fundamental shift in the supply and demand balance tied to changing consumption patterns, adequacy of supply inventories and other market factors. As shown in Figure 4, natural gas prices in the region fluctuate substantially from month-to-month, making investment planning unpredictable for both businesses and manufacturing facilities. New England's unpredictable weather can be the largest single factor affecting natural gas demand and price – and only adds to the volatility shown in Figure 4.[13]

Figure 4 – Price Volatility of Natural Gas (2002-2004)

Natural gas prices fluctuate dramatically by month --- up to 30%



Source: Energy Information Administration, U.S. Department of Energy

During high price periods, natural gas packs a double economic punch to New England consumers and the economy because when the price of this fuel increases, so does the price of electricity. Indeed, the impact on electricity extends far beyond the amount of generation that is natural gas-fired. As the dominant fuel used to generate electricity, natural gas facilities set the market-clearing price (or spot market price) for the commodity (even from facilities not fueled by natural gas) almost 20 hours per day. Thus, the high and volatile price of natural gas has also led to a doubling of the spot market price of electricity at times during the last several years.

Since natural gas prices escalated in 2001, New England consumers and businesses have paid at least $500 million more for electricity every year.[14] Because no other region is as dependent on natural gas as New England to generate electricity (except Texas), this cost increase puts businesses located in New England at a competitive disadvantage.

[13] Northeast Gas Association. "The Outlook for Natural Gas in the Northeast for the Winter Heating Season, 2004-2005".

[14] Calculation by Polestar Communications & Strategic Analysis based on ISO New England data.

It is undeniable that the balance between the supply and demand of natural gas is tenuous and that the consequences are both tangible and costly. High natural gas prices impact all consumers: depressing disposable personal incomes; decreasing manufacturing production; and lowering housing starts. Because this commodity plays such a prominent role in home heating, electricity generation and production of consumer products, sustained higher natural gas prices reduce economic growth, resulting in lower job creation and a higher unemployment rate. Nationally, according to the Industrial Energy Consumers of America, between 2001 and 2004, natural gas price volatility cost U.S. consumers over $140 billion and more than 3 million manufacturing jobs.[15]

The high cost of natural gas is already beginning to take a toll on New England's economy – particularly in the manufacturing sector where many companies have seen their natural gas bills double over the past year, without any increase in overall energy usage. In today's competitive world, manufacturers cannot raise prices to compensate for rising energy costs in New England. In testimony before the U.S. Senate Environment and Public Works Committee, Rhode Island Governor Donald Carcieri noted that some of Rhode Island's largest employers and oldest companies are already grappling with the consequences of high-energy costs and considerations of layoffs and job relocation are beginning to be manifested.[16]

As natural gas prices are generally regressive, lower-income households are frequently impacted the most as those households spend a much higher percentage of total income on energy. With funding for the Low Income Home Energy Assistance Program (LIHEAP) under pressure, high-energy prices represent a threat to human health and welfare.

LNG as a Supply/Infrastructure Option

Based on a review of supply and infrastructure options, new LNG infrastructure located within the region is the most realistic near-term option for bringing substantially more natural gas into New England and needs to be the centerpiece of a balanced energy strategy going forward.

LNG assures a reliable, diverse and secure natural gas supply. For decades, LNG has been vital in maintaining a balance between the region's natural gas supply and demand. Overall, LNG comprises nearly 20% of New England's total year-round natural gas supply – and substantially more during winter peak demand periods when it provides about 30% of the supply.[17] As shown in Table 1, some local distribution companies rely on LNG to provide up to 44% of peak day supplies. The value of LNG storage was recently confirmed as Yankee Gas Services Company received approval for and began construction of a new 1.2 billion cubic feet (Bcf) storage facility in Waterbury, Connecticut.[18]

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[15] "The Implications of the Natural Gas Crisis to Consumers," Industrial Energy Consumers of America, October 13, 2004.

[16] Testimony of The Honorable Donald L. Carcieri, Governor of the State of Rhode Island and Providence Plantations, before the United States Environment and Public Works Committee, March 24, 2004.

[17] Northeast Gas Association.

[18] Yankee Gas Services Company Press Release, October 18, 2004.

Table 1
LNG is a Critical Component of the Region's Energy Supply

Company	LNG as Percent of Winter Peak Day Supplies (%)
Bay State Gas	23
Connecticut Natural Gas	30
KeySpan	36
NE Gas Co.	38
NSTAR	44
Southern Connecticut Gas	23

Source: Northeast Gas Association; Data for Winter 2003-2004

It is not an overstatement to conclude that without the existing LNG infrastructure, the region would suffer severe natural gas delivery curtailments and possibly electricity shortages during the winter.[19] It is therefore of concern then, that some opinion leaders consider LNG facilities as a "third rail" of natural gas consumption rather than a third leg of an "infrastructure supply stool" that also features traditional supplies from North American basins and pipeline capacity.

Today, LNG is delivered by tanker from the Caribbean country of Trinidad and Tobago through Boston Harbor to the Distrigas terminal in Everett – one of four on-shore LNG import facilities in the continental U.S.[20] In operation since 1971, the terminal has a storage capacity of 3.4 billion cubic feet. LNG is also transported by truck to storage tanks owned by local gas distribution companies throughout New England. The Distrigas terminal is connected to the interstate pipeline network as well as the local natural gas distribution system. It also supplies fuel for the largest natural gas-fired power plant in New England. The Everett LNG facility essentially acts as a virtual pipeline for the regional natural gas system.

Unlike other areas of the country, the region's geology does not permit natural gas storage in underground caverns or reservoirs. Many local gas distribution companies fill LNG storage tanks during the summer through truck shipments from Everett to supplement pipeline gas supplies during the winter heating season. A few companies have the capability to fill their storage tanks by liquefying natural gas drawn directly from the interstate pipeline grid. In either case, LNG supplies can balance the system on very short notice.

There are 46 local utility-owned LNG storage tanks located in 31 communities in five New England states with a total storage capacity of almost 15 billion cubic feet.[21] Liquefaction is available at storage tanks operated by five local distribution companies (LDC), although the total liquefaction capability at the LDC level is quite limited in comparison to the sendout capability of the Distrigas facility in Everett.

[19] In some instances, LNG is also available to provide total supply for a specific pipeline on a limited basis in the event of a service interruption because of maintenance or mechanical failure.
[20] The other import terminals are located in Maryland, Georgia and Louisiana.
[21] Northeast Gas Association.

LNG is plentiful and an economically competitive supply source. Ninety-six percent of the world's natural gas reserves are located outside of the U.S. The world's reserves can satisfy 60 years of projected world-wide needs and natural gas is being discovered faster than it is being consumed.[22] LNG is an economical way to ship natural gas from remote locations to customers and in many instances is the only way these reserves can be tapped.

LNG costs have decreased significantly during the past several years, making imports price competitive with domestic pipeline supplies.[23] According to the Gas Technology Institute, over the past decade, liquefaction costs have decreased up to 50%.[24] In addition, construction costs for LNG tankers have also decreased since the mid- 1980s.[25]

A Safe and Proven Commodity. A recent government report prepared by the U.S. Department of Energy and Sandia National Labs serves as a valuable tool for understanding LNG safety and security issues as well as risk mitigation measures appropriate for its shipment.[26] FERC has stated that the report provides a scientifically supported validation that the risks of LNG are very low and manageable.[27] The U.S. Department of Energy also reaffirmed that based on the study's findings, LNG can continue to be safely transported as long as appropriate safety and security measures are taken.[28]

Federal regulations require LNG facilities and transportation systems to incorporate multiple safety systems to ensure protection of surrounding communities and the natural environment and to reduce occupational hazards to employees and contractors.[29] The U.S. Coast Guard has developed site-specific management and emergency plans for all U.S. ports that receive LNG deliveries and enforces safety and security zones around LNG tankers to prevent interference from other vessels. In addition, new maritime and anti-terrorist regulations require all vessels and ports worldwide that engage in international trade to comply with new security standards.

The ability to safely and reliably ship LNG is proven every day in Japan, which relies on this imported commodity for virtually all of the natural gas that it consumes. In Tokyo Bay alone, more than 400 shipments per year – at least one every day – arrive to fill five terminals operating in that area.

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[22] "The Global Liquefied Natural Gas Market: Status & Outlook", U.S. Department of Energy, Energy Information Administration, December 2003.

[23] "U.S. LNG Markets and Uses: June 2004 Update", U.S. Department of Energy, Energy Information Administration.

[24] The Global Liquefied Natural Gas Market: Status & Outlook", U.S. Department of Energy, Energy Information Administration, December 2003.

[25] "Introduction to LNG", University of Houston Law Center, Institute for Energy, Law & Enterprise, January 2003.

[26] "Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water", U.S. Department of Energy, Office of Fossil Energy and Sandia Labs, December 2004.

[27] Pat Wood, FERC Chairman comments on Sandia Report, December 22, 2004.

[28] U.S. Department of Energy comments on Sandia Report, December 20, 2004.

[29] There are three primary LNG-specific codes and standards that form the basis of regulating safety and security issues for LNG facilities in the U.S. They include: 49 CFR Part 193 "Liquefied Natural Gas Facilities: Federal Safety Standards"; National Fire Protection Agency (NFPA) 59A "Standard for the Production, Storage and Handling of Liquefied Natural Gas; 33 CRF Part 127 "Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas".

In the U.S, as in the rest of the world, LNG has an excellent safety record in all its facets – shipping, trucking and storage. During the past four decades, not a single member of the public has suffered any injury, nor has any public property been damaged as a result of an LNG accident.

Proposed LNG infrastructure within the region faces uncertainty. In order to attain the level of LNG imports needed to sustain projected natural gas demand, the chairman of FERC has estimated that at least two of the roughly dozen LNG facilities proposed in the northeast must be built by 2010.[30]

The approval process for new LNG import facilities, whether onshore or offshore, in the U.S. is lengthy and expensive.[31] Once a potential site has been identified, developers assess the project's feasibility and conduct detailed engineering, safety, and environmental studies. Public input is also solicited through community meetings as well as meetings with local agencies and planners. Results of preliminary studies, which can sometimes take years to complete, are included in the formal application filed with the government agencies responsible for reviewing the environmental impact of LNG facility construction and operation. Generally, it takes a minimum of 14-months from the date a formal application is filed for a project to be approved by FERC and state permits may add additional time.

Given the lead-time required for infrastructure development, the actions or inactions of today will determine whether the region will have additional LNG supplies before 2010 when demand is expected to equal or exceed supply capacity. A project announced today and successfully permitted will not be capable of supplying LNG to this region for several years – any delays would only further the supply risk.

It has been estimated that the economic consequences of a two-year delay in natural gas system infrastructure construction planned for the region – pipeline or LNG – will cost New England customers $3 billion thru 2010 in higher natural gas prices.[32] In short, the near-term actions regarding additional LNG facilities or pipeline expansion will have long-term benefits or consequences.

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[30] Patrick H. Wood III, Chairman of the Federal Energy Regulatory Commission, *Boston Globe*, September 14, 2004, "2 New Gas Plants Needed for N.E. "

[31] FERC in coordination with the U.S. Department of Transportation and the U.S. Coast Guard has the main responsibility for approving onshore facilities; the U.S. Coast Guard and the Maritime Administration oversee permits for offshore facilities. The Fish and Wildlife Service, the Minerals Management Service and the Army Corps of Engineers also have roles in the permitting process as well as state and local agencies.

[32] "An Updated Assessment of Pipeline and Storage Infrastructure for the North American Gas Market: Adverse Consequences of Delays in the Construction of Natural Gas Infrastructure", Prepared for the INGAA Foundation, July 2004. The study found that delays in pipeline and LNG terminal construction will reduce the available supply of natural gas to the market which will raise natural gas prices to all consumers.

Alternative Infrastructure/Supply Options

There are several alternatives or options to constructing LNG import terminals in New England as a way of closing the growing gap between natural gas supply and demand. Clearly, new LNG projects must not be considered in isolation, but in comparison to the alternatives. Moreover, LNG projects within New England should not be seen as the only option nor should any or all of the alternatives.

It is important to emphasize that given the complexities of permitting and constructing major energy projects in and into New England, there is no guarantee that a particular solution which may be more politically or publicly palatable will, in fact, succeed in the marketplace.

The infrastructure/supply options outlined below are important over the longer term – in fact, several of them may play significant roles in the region's energy security and economic well being. On the other hand, the options either (or in certain instances in some combination): won't be able to deliver enough natural gas in time to close the aforementioned supply gap *before* it becomes problematic; can't guarantee the quantity of supply or capacity that can be committed to New England; or don't match the economics of a source of supply located close to the source of demand.

Upgrading/Expanding Existing Pipeline Infrastructure. Upgrades for existing pipeline systems into New England have been announced in recent months – signaling positive market interest in meeting the region's growing demand. Pipeline enhancement projects announced for New England are designed to move additional supplies from the Gulf and storage areas, as well as potential LNG supplies that would be derived from proposed terminal projects in eastern Canada. These projects vary from incremental in size to potentially fairly significant.

Clearly, the more links New England's natural gas infrastructure system has the better, to increase supply source diversity, delivery capability, and reliability, as well as helping to ease existing constraint points.

Pipeline infrastructure can be expensive, particularly in an area like the Northeast that has a permitting and construction lead time of several years on average (although varying by the project dimensions). Furthermore, depending on the project and location, delays can extend the process considerably, even after primary regulatory approvals have been issued.

There is also the obvious factor that distance means more consumer cost. For instance, it has been estimated that if an LNG facility were built hundreds of miles north of the central Boston market, it would require upgrading of existing pipeline capacity which could cost consumers up to hundreds of millions of dollars more every year compared to facilities located within the marketplace.[33]

[33] Estimate based on additional pipeline infrastructure that would be needed based on deliveries of 800,000 Mcf/day using tariff rates proposed by M&NE in its Phase IV filing since withdrawn (U.S. rate of $0.75 Mcf per day). It should be noted that M&NE expects these rates to decline with an expansion.

In addition, because of the highly seasonal nature of natural gas demand, much new pipeline capacity would likely sit idle in periods of mild weather, leading to reduced utilization of the infrastructure and higher costs in the marketplace (although gas for power generation in the summer months does help to balance somewhat the intensive heating season demand in New England).

New Pipelines from New Supply Sources. Because natural gas production from traditional domestic supply basins in the U.S. and Canada is projected to decline, supplies from "frontier" regions will need to be developed. The development of these resources will require large capital commitments and the construction of major pipeline infrastructure projects costing the region's consumers hundreds of millions of dollars every year for the additional transportation costs.

Given the scale and complexity of such projects, the timing of supply production is highly uncertain and could be well beyond the timeframe needed to fill the region's more near-term supply and demand gap. For example, the U.S. Department of Energy estimates that the Alaskan gas line will not reach the lower 48 states until 2016. Furthermore, demand for natural gas is growing in other regions of the nation as well, including neighboring regions to New England. So, the region would have to compete, by paying even higher prices, for the acquisition of sufficient supplies in a competitive natural gas market.

Canadian LNG Import Terminals. Supplies from a Canadian LNG terminal(s) may be a viable part of the region's energy future. Several LNG import facilities have been proposed in eastern Canada. With a smooth permitting and construction process, one or more could be in commercial service before 2010.

It is still uncertain, however, if these facilities will deliver enough natural gas to fully close New England's near-term supply gap. One likely limiting factor that could constrain the level of exports to the region is the increasing demand from electricity generating plants being constructed or planned in eastern Canada. For instance, the Province of Ontario has made a commitment to significantly reduce its heavy reliance on coal-fired electricity generating plants (at least one large coal-fired generation facility has been closed already) and not surprisingly, large natural gas-powered generating plants have been proposed. As noted earlier, electricity generating plants consume large quantities of natural gas and those planned for eastern Canada could draw heavily from the proposed LNG facilities. In short, New England faces tangible competition for these proposed sources of LNG from neighboring markets.

It is also certain, as discussed above, that transporting LNG from Canada will cost more than LNG delivered from within New England. One estimate – later withdrawn – stated the cost to New England consumers of importing LNG from a new facility in Canada in comparison to one located within the region could be as high as $400 million per year.[34] This higher price includes the cost of enhancements to existing pipeline infrastructure (as cited above) and/or new

[34] Estimate based on additional pipeline infrastructure that would be needed based on deliveries of 800,000 Mcf/day using tariff rates filed by M&NE in its Phase IV filing, since withdrawn. (U.S. rate of $0.75 Mcf per day, Canadian rate of $0.58 Mcf per day.) It should be noted that M&NE expects these rates to decline with an expansion.

additional pipeline infrastructure that would be needed to transport the natural gas to the metropolitan areas where the demand is highest.

Energy Conservation and Efficiency. New England has consistently been a leader in energy efficiency. For the past two decades, electric and gas utilities as well as large energy users have aggressively implemented energy conservation and efficiency programs, investing more than a hundred million dollars per year.[35] A recent study conducted by the American Council for an Energy-Efficient Economy identified several New England natural gas utility conservation programs as being the best in the nation.[36]

Efficiency gains have been important to the nation and to New England and need to be continued. For example, on average, natural gas use per residential customer has been declining by about one percent per year since 1980.[37] According to the American Gas Association (AGA), average home gas usage has declined by more than 20% between 1980 and 2001. These gains have been achieved through enhanced appliance efficiency and more energy efficient home construction. AGA projects that residential gas usage will continue to decline by an additional 8% though 2020.[38] Such measures while important to slow energy demand, have uncertainties concerning consumer adoption, timeframe and costs and will not be able to make up for the natural gas supply shortfall the region will face before 2010. Experience has shown that improving efficiency serves to slow demand growth but cannot stop it over the long-term.

Non-natural Gas-fired Generation of Electricity. This option does not have the ability to forestall the need for additional natural gas supplies before 2010. Electricity growth is expected to continue at a 1.2% per annum rate.[39] Currently, the predominant type of generation facilities being built in New England are those fueled by natural gas. Coupled with the predicted electricity growth rate, natural gas demand will increase by 1.35% per year – not including growth from residential, industrial and commercial customers – which represents a significant amount of natural gas demand that will need to be off-set. In addition, there is some uncertainty regarding the future operation of several generating facilities throughout New England that do not rely on natural gas, and should they be retired, the demand for natural gas will be even higher.

The alternatives to natural gas-fired generating plants (excluding conservation) include coal, renewables and nuclear facilities, which do not appear likely to expand in New England over the next five to ten years. Given the demands for reductions in CO_2 emissions, it appears unlikely that a coal plant would be built in this region any time soon. If renewable projects like Cape Wind are built, then about one *every year* would be required to keep pace with electricity

[35] "2002 Energy Efficiency Activities in Massachusetts", Division of Energy Resources, noted that participating electricity customers and ratepayers invested $138 million in 2002 to achieve energy savings. This cost does not include similar costs for energy efficiency programs sponsored by gas utilities.

[36] "Responding to the Natural Gas Crisis: America's Best Natural Gas Energy Efficiency Programs", American Council for an Energy Efficiency Economy, December 2003.

[37] Northeast Gas Association.

[38] "Forecasted Patterns in Residential Natural Gas Consumption 2010 - 2020", American Gas Association.

[39] U.S. Department of Energy, Energy Information Administration.

demand. Construction of renewable facilities should have already begun to off-set the need for new LNG facilities. Similarly, one new nuclear plant would be required every five years to meet increasing electricity demand, but one has not been ordered in the United States in almost 30 years. Moreover, the lead time for a new nuclear plant would certainly be on the order of five to seven years at the very least.

Electricity conservation is an option and a desirable one based on principle alone. But, as reported in the 2001 New England Council's Energy Report, electricity conservation has already been highly successful in New England. Moreover, all classes of consumers are using more electricity simply because it is the fuel of the high-tech age. It would take several years *at least* for a meaningful, broad scale and region-wide electricity conservation program to take hold.

Conclusions

Additional Supplies of Natural Gas Are Needed. Three trends support the generally accepted view that New England has a need for additional natural gas supplies within the next several years to meet expected demand before 2010:

- **Growing reliance on natural gas for electricity generation.** From 1993 to 2003, demand for natural gas in New England increased by 70% – a trend that is expected to continue, but at a more moderate rate.[40] Almost all of this recent growth has been for electricity generation, which now consumes 42% of the region's natural gas, firmly linking the region's electricity supply to natural gas supply. The options for lessening this dependency, aside from massive energy conservation, are limited to the construction of new coal, renewables and/or nuclear facilities, which are not likely over the near-term.

  There is also an undeniable relationship between economic growth and electricity/natural gas consumption. Between 1993 and 2003, the demand for these commodities increased in tandem with New England's Gross Regional Product. Natural gas is vital to the region's 21st century economic growth for space heating, manufacturing and for fueling electricity generating plants.

- **High and volatile natural gas prices.** The price of natural gas in New England (as well as nationally) has almost doubled over the past several years. According to the Industrial Energy Consumers of America, between 2001 and 2004, natural gas price volatility cost U.S. consumers over $140 billion and more than 3 million manufacturing jobs.[41] In New England, the high cost of natural gas has increased the cost of electricity by at least $500 million per year since 2001[42] and has substantially increased costs for heating homes and businesses as well as for manufacturing. As in the past, the domestic and international markets are expected to respond to the high prices with increased production and

[40] U.S. Department of Energy, Energy Information Administration.
[41] "The Implications of the Natural Gas Crisis to Consumers," Industrial Energy Consumers of America, October 13, 2004.
[42] Calculation by Polestar Communications & Strategic Analysis based on ISO New England data.

infrastructure construction. Such market action will temper the price increases but the timing and magnitude of the impact are difficult to predict.

The region is particularly sensitive to high and volatile natural gas prices as, on average, New England consumers already pay 30% more for the commodity than other regions because of its geographic location and lack of indigenous supplies. Further imbalances between natural gas supplies and demand will have even more significant consequences in terms of jobs, the economy, and quality of life.

- **Constrained pipeline supply capacity during peak winter days.** On peak winter days, the region's natural gas pipeline system now operates at 90% capacity, meaning there is little room, if any, in the pipeline system to accommodate future peak demand growth or unforeseen circumstances. During a recent cold snap in January 2004, the supply system was stretched to its capacity at key points to meet demand. There were considerable economic consequences compared to other regions, as during peak hours during the cold snap, electricity spot market prices increased by a factor of more than 20 (based on the average energy clearing price historically paid in the month of January) and natural gas prices increased by a factor of 10.[43]

The "warning flag" regarding the need for additional near-term supplies of natural gas has already been raised by both federal and state officials. In December 2003, an analysis of the region's natural gas system by the Federal Energy Regulatory Commission (FERC) and U.S. Department of Energy concluded that construction of new infrastructure will be needed to meet demand by 2010.[44] In testimony before the U.S. Senate Environmental and Public Works Committee, Rhode Island's Governor Donald Carcieri testified that the Northeast may no longer be able to offer industry a competitive venue unless the rising cost of energy is addressed, and that considerations of layoffs and job relocation are beginning to manifest due to rising natural gas and electricity prices in Rhode Island.[45] In addition, in early March 2005, Massachusetts Governor Mitt Romney stated that additional natural gas supplies would be needed by 2010 in New England.[46]

LNG is the Most Realistic Supply/Infrastructure Option. Based on a review of options, new liquefied natural gas (LNG) infrastructure located in New England is the most realistic near-term option for bringing substantially more natural gas supplies into the region and needs to be the centerpiece of a viable energy strategy going forward.

Used in New England for decades, LNG currently provides approximately 20% of the region's annual consumption of natural gas, increasing to 30% during winter peak demand periods –

[43] "Final Report on the Electricity Supply Conditions During the January 14-16 Cold Snap", ISO New England, October 12, 2004.
[44] "New England Natural Gas Infrastructure", Federal Energy Regulatory Commission, Staff Report, December 2003.
[45] Testimony of The Honorable Donald L. Carcieri, Governor of the State of Rhode Island and Providence Plantations, before the United States Environment and Public Works Committee, March 24, 2004.
[46] "Romney Backs LNG Terminals Off Gloucester", *Gloucester Daily Times*, March 10, 2005.

through 46 storage tanks and five liquefaction facilities. Its costs are competitive with other domestic and imported natural gas supplies.

Additional LNG regional infrastructure with access to the commodity's growing world market would help diversify energy supply and stabilize costs. Moreover, new import facilities would also bring additional storage to the region and could provide a vital backstop to the existing infrastructure during periods of extreme cold weather.

Additional LNG Infrastructure Construction is Required Now. The New England economy faces many long-standing economic challenges. The region competes for investment and new job opportunities against other regions and internationally. A growing gap between available supply and demand has and will continue to raise the region's price for natural gas, putting the region's businesses at a competitive disadvantage and increasing the cost of energy to many households.

Delays in decision-making could be costly in an absolute dollar sense. The economic consequences of a 2-year delay in natural gas system infrastructure construction planned for the region – pipeline or LNG – will cost New England customers approximately $3 billion by 2010 in higher natural gas prices.[47]

Given the lead-time to permit and construct new natural gas infrastructure facilities, actions deferred or undertaken now will significantly influence the region's economy for years to come. New England state governments – and the region as a whole – need to support the development of LNG infrastructure projects to maintain economic competitiveness and quality of life.

The time to review and approve LNG projects is now – a position shared by others, including the New England Governors.

> "[S]ince many of these developments will require several years of program expansion or facilities permitting and construction, state policies to encourage and develop these [natural gas supply] initiatives need to be implemented in the very near future." [48]

The Council has therefore concluded that there is an economic imperative for additional supplies of natural gas in the region – requiring the construction of new LNG import facilities somewhere in New England within the next several years.

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[47] "An Updated Assessment of Pipeline and Storage Infrastructure for the North American Gas Market: Adverse Consequences of Delays in the Construction of Natural Gas Infrastructure", Prepared for the INGAA Foundation, July 2004.

[48] "Meeting New England's Future Natural Gas Demands: Nine Scenarios and Their Impacts", A Report to The New England Governors, The Power Planning Committee of The New England Governors' Conference, Inc. March 1, 2005.

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