Downeast LNG

Question & Answer Briefing

July 2005

Overview

This Question and Answer (Q&A) Briefing Document was prepared to address potential questions regarding Downeast LNG's proposed development of a liquefied natural gas (LNG) facility in Robbinston, Maine.

The intent of the report is to provide initial answers to questions that the public may have. More detailed answers may be available by consulting other documents prepared by Downeast LNG, including:

- Regional Site Selection Study (Executive Summary)
- Sustainable Economic Development Plan
- Economic Development Impact Report
- Employee Commitment and Procurement Strategy
- Gas Supply/Demand Assessment
- Corporate Responsibility Statement

In some cases, detailed answers for questions are not immediately available. This is because they will be addressed by detailed studies to be carried out during the development and environmental permitting phases of the project. As soon as these answers become available, they will be made part of this document and released to all concerned.

Categories of Questions

1) **Project Overview**
2) **Downeast LNG's Development Approach**
3) **Site Selection and Environment**
4) **Economic Impact and Development**
5) **Site Development and Operation**
6) **Construction and Operation of an LNG Facility**
7) **Marine Safety and Fishing Issues**
8) **LNG Technology and Operation**
9) **Safety and Security**
10) **LNG Ships**
11) **Environment and Permitting**
12) **Emergency Response**
13) **The Gas Market in New England**

1. Project Overview

What is Downeast LNG proposing?

We are proposing to build a state-of-the-art, environmentally safe LNG receiving terminal in Robbinston, Maine. Initially, our facility will consist of a single storage tank, processing equipment, a new pier, and several small support buildings. We may build a second storage tank after operations begin.

Where do you plan to build this facility?

The proposed 80-acre site, known as Mill Cove, is near where the St. Croix River meets the Passamaquoddy Bay in Robbinston, Maine.

Why is the Robbinston site good for an LNG facility?

Downeast LNG has researched numerous potential LNG sites throughout Maine and New England[1] over the past year. Based on minimal environment impact, community support, and technical characteristics, we believe that our site in Robbinston, Maine is the best available site.

Why do we need an LNG terminal in Maine?

New England and Maine are in need of LNG to meet the growing demand for natural gas at a lower cost. In addition, pipelines in southern New England are at capacity, offshore gas supplies from Nova Scotia are declining, and even though other LNG terminals are proposed, it is not certain they will be built. The Mill Cove site was chosen after extensive analysis of numerous potential LNG sites. It is in close proximity to the Maritimes & Northeast Pipeline, with access to a deep-water channel to the ocean.

What are the environmental impacts of an LNG terminal?

No chemicals or other pollutants will be discharged into the St. Croix River or Passamaquoddy Bay. The plant is quiet, with lighting kept to a minimum.

LNG terminals have very low environmental emissions. There are very limited air emissions and only rainwater is drained from the site. There are almost no chemicals used in the process, although we do add "odorant" to the gas to give it a smell so that a leak can be detected (in its normal state, natural gas has no smell). This odorant is contained within the regasification plant and pipeline and is not detectable outside the facility.

[1] See Regional Site Selection Study Report for a detailed discussion.

Is LNG commonly used in the U.S.?

Yes. In the U.S., there are some 113 LNG facilities, most of them "peak-shaving" facilities, which store LNG for winter use. The Downeast LNG facility is essentially the same type of facility, but with a pier for marine deliveries. About one-third (40) of the country's LNG storage tanks are located in New England. During the coldest winter days, as much as 40 percent of New England's gas supply may come from LNG. That is because stored LNG can be quickly and easily turned back into natural gas and delivered through the existing pipeline grid.

What about security?

The project will meet or exceed every government security requirement. In light of the September 11, 2001 terrorist attacks, the U.S. Coast Guard and the Federal Energy Regulatory Commission (FERC) are constantly improving safety and security procedures for LNG marine import facilities and shipping. These federal efforts take into account the latest studies detailing best management practices for maximizing safety and minimizing security risks. Most elements of the nation's energy delivery infrastructure are undergoing similar safety and security reviews. Downeast LNG will work with federal regulators and local agencies to ensure that our facility and the ships that serve it are as safe and secure as they can be.

When did Downeast LNG begin looking at Maine and Washington County as a site for an LNG terminal?

We began our research in March 2004. Initially, our research focused exclusively on identifying communities that were receptive to LNG. This was done by speaking with groups working in the county, such as Sunrise Economic Development Council and Eastern Maine Development Corporation, regarding communities that had expressed an interest in developing an LNG facility. Thereafter, environmental and technical site conditions were reviewed to determine if the communities had the proper conditions to support an LNG terminal. These included, but were not limited to, proximity to pipeline, deepwater access (with no dredging), sufficient land for a terminal site, and minimal environmental impact.

Why is this project just now becoming public?

Simply put, we did not want to present our plan to the public until we had sufficient information to answer the initial questions that the public would ask. We believe it would have been inconsiderate to the community to announce our project without having a fairly detailed plan for the project. Equally important, it was only recently that we secured the legal rights to the land needed for the site, received the financial backing to develop the project, and completed some initial studies regarding its feasibility.

Who began Downeast LNG?

Downeast LNG is composed of a small but very experienced development team of energy project permitting and finance experts who understand what is required to develop an LNG terminal.

Dean Girdis founded Downeast LNG in March 2004.

Robert Wyatt began advising the project on site identification, environment, and permitting in July 2004, when he joined as a vice president of environmental affairs.

Who is Dean Girdis?

Dean Girdis is 41 years old, married, has two sons (6 and 8 years old), and lives in Washington, DC. He was born and raised in eastern Massachusetts. During his youth, he spent family vacations and summers in southern Maine, where he still has family.

He has 17 years work experience in economic development and energy. From 1988 to 1990, he served with the Peace Corps in Mali, West Africa, as a business development volunteer working primarily with agricultural enterprises. Thereafter, he has worked in the environment and energy sectors. He has 12 years of international consulting and energy project development experience in about 30 countries. He has worked with a wide range of energy technologies and projects including: fuelwood in Rwandan refugee camps; decentralized power for rural African villages; wind power in the U.S., Cape Verde, and Egypt; gas pipelines, LNG, and gas power plants throughout the world; and competitive strategy in the gas and power sectors. The vast majority of his project development work was with the World Bank in developing countries, with a strong focus on the relationship between energy projects and economic and community development. He has worked for a range of clients including national and multinational oil and gas companies, non-governmental agencies, the United Nations High Commissioner for Refugees, and CARE International.

Since 1998, he has worked in the LNG industry, with seven years experience in LNG supply, competition, and project and market development. While working with the World Bank and advising the Chinese government, he led a two-year study and formulated the development plan of the first LNG regasification terminal in China. Most recently, Mr. Girdis was a Director for three years at PFC Energy in the Gas & Power Group. In this position, he advised national and international oil and gas companies in the gas and LNG sectors.

Mr. Girdis was also an energy consultant at Arthur D. Little and an energy/environment consultant at Environmental Resources Management, where he worked on energy financing and economics, corporate strategy, natural gas development, energy infrastructure development, environmental impact assessments, and sustainable development.

He has a BSc in Entrepreneurial Studies (cum laude, 1986) from Babson College, Wellesley, MA, and an MSc in Rural Resources and Environmental Policy (with honors, 1993), from the University of London, England.

Who is Robert Wyatt?

Rob Wyatt has been a professional environmental consultant for 30 years. His primary expertise lies in the strategic and technical management and negotiation of major industrial development environmental permits; compliance with federal, state, and local regulations; and transactional due diligence. He has defined the scope of and managed hundreds of environmental studies and regulatory permitting programs for a number of Fortune 100 industrial clients. He has worked on projects in 39 states, Mexico, Saudi Arabia, Canada, and the Caribbean.

In the port development and LNG industry, Mr. Wyatt is best known for his work as the Environmental Affairs Development Manager for the Puerto Rico Transshipment Port Project of Governor Pedro Rosello, and the successful grassroots development of the EcoElectrica LNG Import Terminal and Cogeneration Power Plant Project in Puerto Rico. For EcoElectrica, Rob was responsible for: (1) environmental program direction, technical analysis, and management of investigations; (2) direction and performance of federal and Puerto Rico regulatory compliance programs including permit scheduling, applications development, and agency negotiations; (3) coordination of public interest group communications and relations; and (4) support of financial closure ($700 million). Mr. Wyatt managed the Project's Joint Federal and Puerto Rico Environmental Impact Study (EIS) and the simultaneous performance and negotiation of all permitting activities (more than 80 permits).

Mr. Wyatt has a Juris Doctorate from the South Texas College of Law (Houston, 1993) and a bachelor's degree (Marine Biology, cum laude, 1977) from the University of Miami.

Why did Dean Girdis found Downeast LNG?

Dean Girdis recently advised clients on the LNG business, including regasification terminal issues in the U.S. Being from New England, he closely followed proposed terminal developments in the region. He was particularly concerned by the site identification process, site development activities, and community issues related to LNG terminal development. Although some LNG developers had developed technically sound proposals, there appeared to be a disconnect between many projects' technical and commercial development objectives, environmental impacts, and community involvement and relations.

Dean believed a successful LNG project could be developed that would meet the growing clean energy needs of the region with minimal environmental impact, while promoting local economic and community development.

2. Downeast LNG's Development Approach

What is Downeast LNG's Approach?

Downeast LNG believes that the success of LNG projects hinges on two key components: 1) a developer who demonstrates a commitment to the community and support for local economic development, and 2) active participation by the community. We are confident that we can develop a commercially viable project while working with the community to ensure that residents are apprised of the project and play an active role in its development.

Given our experience with energy project development, we believe that our proposed LNG facility can serve as a catalyst for community and economic development. To demonstrate our commitment, Downeast LNG will prepare and implement an economic development plan *and* contribute up to $500,000 annually to support local economic development through business creation and job growth (see our *Sustainable Economic Development Plan*).

What are the objectives of Downeast LNG?

Downeast LNG has three objectives:

- Acquire the permits for and develop an LNG facility in Robbinston, Maine;
- Support and promote diversified economic development in Washington County and surrounding areas; and,
- Demonstrate that community involvement and participation can improve project development and address the needs of project stakeholders.

Who are the financial backers of the project?

Our financial backers are Kestrel Energy Partners, an oil and gas private equity investment firm based in New York. They are actively investing in this business sector and are committed to LNG project development.

Kestrel Energy and Dean Girdis are the owners of the project.

What does the proposed project consist of?

The proposed LNG terminal would include:

- An estimated 3,500' long (possibly less) pier with mooring dolphins for an LNG ship.
- A platform on the pier equipped with off-loading arms and one gas-loading arm, which creates a closed-loop system.
- One 160,000 m^3 capacity containment LNG storage tank.
- Submerged tank pumps (used to transfer LNG from storage tanks to pressurized pumps leading to the regasification unit, where the LNG is warmed and turned back into gas).

- Pressurized pumps (used to move the LNG from the submerged pumps into the warming unit).
- 180,000 mscfd water bath regasification units (used to warm the LNG and turn it back into a gas; very low emissions).
- Boil-off gas (BOG) compressors (used to recapture the heat produced in the regasification process).
- Cryogenic pipelines connecting the terminal with the pier
- All control security / safety, telecommunications, and monitoring systems to operate the terminal.
- Utilities.
- Support buildings and access road.
- Gas pipeline connecting the terminal to the Maritimes & Northeast Pipeline.

Has Downeast LNG met with any local non-governmental groups regarding the project or economic development?

Yes. We have met and spoken with the Sunrise County Economic Council (SCEC) in Machias and the Eastern Maine Development Corporation in Bangor since April 2004. We did this in an effort to identify potential communities interested in LNG, to better understand the needs of the communities, and to address the economic and community development needs for affected communities.

Downeast LNG is having discussions with SCEC on issues including LNG development in the county; interested communities; LNG project drivers and barriers; the social, economic, and political issues that impact local communities; and how best to work with communities to generate project support.

Will Downeast actually build the LNG facility?

Our project team is constantly expanding and we expect that one addition to our team will be a larger energy company that has extensive LNG terminal operating experience, LNG supply, and/or sufficient capital resources to build the facility.

What happens to Downeast LNG's commitments if it partners with another company?

All commitments and agreements made by Downeast LNG will be written into our permit applications, making the commitments legally binding. Any company that acquires an interest in Downeast LNG would be bound by the same commitments.

3. Site Selection and Environment

What was the site selection process?

We completed a separate regional siting analysis, *Regional Siting Report*, that evaluated 27 potential sites in New England, 14 of which were in Maine. We established a regional siting approach and methodology to evaluate these sites based on three conditions:

- Community issues.
- Marine environment.
- Land environment.

What community issues were considered?

The primary issues considered were:

- Demonstrated/voiced support by the community
    - Private or public discussions among citizens expressing support

- Active town officials
    - Willingness to work with project developers to identify sites
    - Interaction with key officials, including planning personnel
    - Identification of key project issues for the community

Why is local support so important?

In the traditional project development process, local support is often the least of a developer's concerns. This failure to address community concerns has caused many proposed LNG projects to fail or hit major roadblocks, due specifically to growing local opposition. In New England, for example, the Fairwinds LNG project in Maine failed in large part due to lack of support from the local community. Ongoing efforts in Rhode Island and Massachusetts are also encountering heavy opposition. Even if state and federal agencies (such as the Federal Energy Regulatory Commission) approve an LNG terminal, local forces can oppose permitting approval, which hinders project development.

In New England, where the independence and autonomy of local communities is so critical, it is essential—and fair—to secure local support and work with, not against, surrounding communities.

What marine issues were used for site evaluation?

Key issues in this regard are deep water (minimum 38 feet draft), sufficient turning basin for the ship, limited or no dredging required, and protection from waves. There are, however, few sites in the Northeast that offer such characteristics. The avoidance of impacts upon protected animal and plant species was also of particular importance.

In summary, issues considered were:

- Technical issues
  - Favorable wave regime.
  - Limited swells.
  - Sufficient draft (at least 38 feet of water at all times, ideally 45 feet).
  - Shipping channel with sufficient breadth and length (400 feet minimum).
  - Sufficient turning radius – 2,000 feet.

- Environmental issues
  - Minimum or no dredging required.
  - No major presence of endangered flora, e.g., eelgrass meadows.
  - Limited or no fishery activity including:
    - Aquaculture leases.
    - Lobster habitat.
    - Molluscan habitat.
    - Blood worm habitat.
  - Limited or no presence of:
    - Sea mammal habitat (otters, seals, and whales).

How much land is required for an LNG facility?

Land is often an issue that stymies LNG developers. In many cases, the focus has been on securing a large tract of land (50 to 100 or more acres) in a coastal location. An efficiently designed LNG regasification plant with two tanks and a throughput capacity of 500 mmcfd can, however, be sited on as little as 30 acres of land and still meet exclusion zone requirements. For example, the EcoElectrica LNG facility in Puerto Rico, with a similar throughput and storage capacity plus a separate power plant and desalination plant was sited on less than 36 acres.

What type of land environment and conditions were used for site evaluation?

The land issues that were considered included (but were not limited to) the following:

- Technical Issues
  - Undeveloped land in the project vicinity – 700 to 1,000 feet of radial distance from the center of tanks sufficient to meet thermal and vapor exclusion zones.
    - Ideally, few or no housing units within the exclusion zone radius.
  - Site availability – land available for purchase with appropriate zoning.
  - Existing infrastructure (roads, power, water, etc.).
  - Energy corridor commitment – access to gas transmission lines.
  - Flood-free zones.

- Environmental Issues
  - No significant presence of sensitive species.
  - No significant presence of sensitive ecosystems.
  - No significant wetlands on the site.

What other sites in Maine were considered?

We considered many sites in Maine, from Calais to Searsport.

We did not publicly discuss our interest in developing an LNG project with all the communities since many sites were later excluded due to land, marine, or community issues.

Were seismic issues evaluated?

Yes. The preliminary evaluation of seismic suitability was based on available literature and personal interviews with professional geologists. For a full development of an LNG terminal site, it is anticipated that extensive geo-technical and seismic studies would need to be completed.

What about archaeology issues at the site?

As in most of the environmental evaluations at this preliminary site selection stage, archaeology was also investigated primarily on the basis of available literature and interviews with various professionals or academics. In the case of the Preferred Site at Mill Cove, this type of screening identified the fact that there is a potential that archaeological resources exist within the 80-acre parcel of land. As such, the project will need to conduct on-site investigations to determine the existence of any such resource and any impact, if any, that project development would cause if implemented.

What about endangered species?

The research done to date does not indicate that there are endangered species or habitat on the Mill Cove site. Field investigations to verify this research have been commissioned for immediate implementation by a respected Maine consulting firm.

What about wetlands?

There are no apparent wetlands of significance on the land parcel that have been identified to date. Again, on-site investigations have been authorized to verify the existence and extent of any wetlands on site. The pier and its grounding at the property's water front land edge will of course need to be examined carefully to ensure a project design that eliminates or significantly reduces any potential impacts to the near shore environment. The Downeast team has been very successful at implementing such programs in previous project developments, especially at the EcoElectrica LNG Import Project.

What about tsunamis?

There has been talk about the potential for tsunamis generated by landslides, earthquakes, or volcanic activity in the Canary Island area, and its possible impact on the East Coast of the U.S. Given the protected and elevated location of the proposed Downeast LNG site, tsunamis would not pose a risk.

4. Economic Impact and Development

What economic impact would result from the proposed LNG facility?

Downeast LNG recently conducted an economic study to assess these types of potential impacts. The proposed LNG project will generate and support diverse economic development both in the construction and operation phases. Economic benefits, direct and secondary[2], will include job creation and increased business spending through the operation of the LNG facility. Secondary economic impacts are created through the provision of goods and services to the LNG facility and the subsequent increase in employment and business activity necessary to produce these goods and services. More employment in the region also creates new secondary jobs and business opportunities.

In Maine, the total annual economic impact during the 3-year construction phase is projected to be $180 million in economic value and 1,860 jobs created. During the 30-year operation phase, the annual economic impact is projected to be about $26 million in economic value and 299 jobs created.

Annual economic benefits are summarized below:

Annual Economic Benefits

Construction Phase (3 years)

- Direct local construction employment — 240 jobs
- Secondary employment created — 1,620 jobs
- Direct and secondary employment payroll — $54 million
- Expenditures (sales)[3] — $127 million

Operation Phase (30 years)

- Direct operation employment — 56 jobs
- Secondary employment created — 243 jobs
- Direct and secondary employment payroll — $9 million
- Expenditures (sales)[4] — $17 million
- Tax revenue (local, county, state) — $3-5 million

Will Downeast LNG conduct more detailed analysis of the economic impacts?

Yes. Downeast LNG will assess in greater detail the impact on businesses and communities during the construction and operation periods of the LNG facility through the preparation of the impact reports. Once these reports are completed, they will be made available for public review and comment.

[2] Secondary economic value and employment data was generated through use of the Maine Regional Output Simulation Model, Maine State Planning Office.
[3] Sales taxes are included in this total.
[4] Sales taxes are included in this total.

In addition, Downeast LNG is commissioning an independent economic impact assessment of the proposed project by a local institution. This assessment should be available within months.

How many construction jobs will be filled from within Maine?

There will be about 300 construction jobs over the 3-year construction period. We believe that about 80% of these jobs, or about 240 people, will be Maine hires.

What types of operating jobs will be created by the LNG facility?

A total of 45 to 50 supervisory, technical, and maintenance jobs at the LNG facility will be created, as well as about 16 tugboat jobs. We have adopted a local hiring preference plan (See *Employee Commitment and Procurement Strategy*) and expect to hire about 40 local residents for these positions at the LNG facility. We expect that all of the tugboat positions would be local hires. Benefits and health care will be standard.

Will there be increased municipal costs?

The construction and operation phases of the proposed LNG facility might cause an increase in some municipal costs. The cost increases would largely result from employee transit to and from the project site (e.g., creating roads and repair needs) and emergency service needs coincident with construction management and facility operation (e.g., police and fire protection). The developer would pay all additional municipal costs associated with the project.

Municipal services, such as those associated with schools or health care, are not likely to be substantively affected during construction or operation. The vast majority of construction workers are expected to be residents living within a 2-hour drive of the proposed. For those who do not reside locally, housing accommodations would be located in temporary facilities similar to the plan implemented for the Maritimes & Northeast Pipeline construction period.

What about commercial fisheries?

No significant impact is expected on fishing grounds access or use. Any loss or damage of fishing gear caused by the facility operations would be reimbursed by the developer.

What effect could an LNG facility have on homeowner property values immediately adjacent to the site?

In similar rural situations, properties within the local and adjacent communities have actually seen their values rise given the increase in housing needs, the elimination of property taxes, and a beneficial increase in the quantity and quality of community services.

If the opposite condition arises at our project, there will be compensation offered to all local properties immediately adjacent to the LNG facility (either on land or in close proximity to the pier) whose values are negatively affected during construction and/or operation of the LNG facility.

Will Downeast LNG pay any taxes?

Yes. Tax revenue will be generated during construction, through payroll taxes, and through business equipment taxes. Sales and employee taxes will also be generated during the operational phases of the project.

During plant operation, taxes will include local property taxes paid to Robbinston and Washington County and corporate taxes paid to the State of Maine.

What about the impact on tourism?

There may be a potential project impact on water-related recreation and tourism activities in the immediate vicinity of the proposed LNG terminal. We do not believe there will be any substantive impacts related to land-based tourism in the area.

This conclusion is based in part on the current operation, and recent expansion, of the Mack Point oil and cargo terminal in Searsport, Maine, which has a relatively strong tourist-based economy and does not appear to suffer from the location of the current terminal. Additionally, the expansion of Estes Head Port and the opening of the quarry at the Canadian Bayside Terminal have not had a discernible impact on the tourism/recreational industries.

Although the Downeast LNG terminal will be new to the region, both in terms of a land use commitment to an industrial project and in the type of industry (LNG fuel import), similar projects have actually diversified the tourism base. This is true in Puerto Rico (Guayanilla) and Spain (Bilbao) where the opportunity to see an LNG ship in transit is specifically made a part of country highlight tours.

What will the impact be on residents in Canada?

On the Canadian side of the river, there will be limited view shed opportunities. Depending on project configuration and vegetative screening, some or most of the facility will be visible on a great number of days. Because the river is 3.5 miles wide at the project site, the visual impact of the Downeast LNG facility structures would naturally be obscured or visually unremarkable on days in which fog, rain, or haze exist. The site also has a heavily vegetated background of higher elevation which will diminish it prominence when viewed from Canada.

In addition to the natural visual resource screening factors above, the project intends to maximize artificial screening devices to essentially eliminate or greatly reduce the project's visual impact to Canadian viewers. Artificial screening devices and techniques that may be used include the strategic placement or preservation of vegetation (e.g., tall

trees), limited clear cutting at the point of terminal land-sea juncture, low profile storage tank design, land-sky painting of the storage tanks, use of non-glare metal materials, and inward-focused lighting.

5. Site Development and Operation

How many acres are required for an LNG facility?

This depends upon the type of facility, but we expect to develop about 30 acres of the total 80 acres to be acquired for the project site. The remaining land will be left undeveloped.

Will there ever be a need for more acreage for the LNG facility?

We have no plans to build any additional facilities beyond the initial proposal presented to the community.

How close will the Downeast LNG facility be located to residences?

Downeast is still conducting a formal survey, but we estimate that about 20 inhabited homes are within a ½ mile radius of the proposed facility and less than 10 homes will be within a ½ mile of the docked tanker. The population density in Robbinston is about 19 people per square mile[5].

Who will pay the additional costs related to increased municipal services related to the project's operation?

Downeast LNG will cover all additional costs related to the project.

Who is responsible for decommissioning the facility when it's done operating?

Downeast LNG and its investment partners will be legally responsible for decommissioning of the LNG facility after it ceases operation. Downeast will cover the removal costs of the facilities and return the land to its original use unless another activity is viable and supported by the town.

Will on-shore activities be allowed near and/or around the LNG facility and the LNG ship when it is offloading?

All existing activities on land will be allowed.

Will road traffic on Route 1 be affected?

[5] http://www.maine.gov/local/washington/robbinston/

According to the 2003 Maine Transportation Count Book, approximately 2,730 cars travel daily in a northerly direction on Route 1, while 2,340 cars travel daily in a southerly direction.

Given the relatively low traffic volume, the construction and/or operation of the site are not expected to generate enough additional volume to impact current traffic flows. An in-depth analysis of the traffic loadings associated with the three-year construction period will be conducted to ensure that potential disruptions to traffic are mitigated and/or eliminated. Such mitigation might include the establishment of a commuter bus system for the facility's 300+ workers, so that Route 1 is not congested with individual vehicles during peak work hours or shift changes.

Is the school in Robbinston exposed to any inordinate risks?

No. The school will be more than ¾ miles away from the tank and about 1 mile from the tanker when it is docked.

Are any other schools, in the U.S. or Canada, in the exclusion or safety zone during transit of the ship?

No, not to our knowledge. The rules and determinations that define exclusion zones and the prevention of significant overlap with populated areas will be fully assessed by Downeast LNG and numerous governmental agencies, including the U.S. Coast Guard. Public review and comment will also be an integral part of this evaluation. A complete evaluation of the features encompassed by any exclusion zones to be established will allow for a more thorough understanding of this issue – including any plans to completely eliminate potential conflicts.

What about pipeline rights-of-way? How will the route be selected and land secured?

Downeast LNG has identified three preliminary potential routes to connect to the Maritimes & Northeast Pipeline system at the Baileyville compression station. We will be conducting further studies to assess the different options, both technical and environmental. All landowners will be compensated for any requests for rights-of-way.

When operational, how much noise will be generated by the facility?

Very little. The most frequently heard noises from an LNG terminal are those associated with the continuous flaring of excess boil-off gas (not proposed at Downeast LNG) and sounds associated with an LNG ship arrival and unloading of LNG (typical marine noises – tugboat engines, clanging, etc.). By law, all sounds generated at the plant must be kept within strict guidelines so as not to interfere with off-property receptors. The laws would be applicable to the Downeast LNG project

Will air and water quality be impacted?

Yes. It is not possible to build a structure on the land/water without some impacts to air and water. The key to ensuring an absolute minimum impact is to establish an excellent environmental management system that anticipates potential impacts and establishes, before impact realization, the best management and procedural controls available to eliminate and/or mitigate such impacts. The Downeast LNG team is very proud of its success in controlling environmental impacts during previous projects.

The impacts to air and water quality that might be associated with the project development will be extremely minor relative to almost all other industrial or commercial development activities. We know this because we have developed similar projects, and have seen the effectiveness of environmental management controls and permit conditions that are strictly enforceable. As we proceed with development planning and conducting public and governmental focus meetings, we will delineate the anticipated impacts and design measures to eliminate or substantially reduce potential impacts to air and water quality. These potential impacts and the measures to eliminate and/or mitigate them will be thoroughly assessed and documented in the project's Environmental Impact Statement (EIS) as well as its many permits and formal agreements.

What types of communities are hosting LNG facilities now in the U.S.?

Information for the five operating plants in the U.S. is presented below:

- An LNG Facility in Everett, MA, is sited in a town with a population density of 11,241 people per square mile[6].
- The Lake Charles LNG Facility in Lake Charles, LA, has a population density of 1,786 people per square mile.
- The Elba Island, GA, LNG facility is located near Savannah, with a population density of 1,760 people per square mile.
- The Cove Point, MD, facility is located in a rural area that is not densely populated.
- The EcoElectrica LNG Terminal located in Penuelas, Puerto Rico, is sited a short distance from the fishing towns of Guayanilla and Tallaboa.

The proposed Weaver's Cove LNG site in Fall River, MA, has about 1,200 housing units within a ½ mile of the tank and 12,000 people and 5,100 housing units within one mile.

The population density in Robbinston is about 19 people per square mile[7].

[6] http://www.house.gov/markey/Issues/iss_LNG_st040326.pdf
[7] http://www.maine.gov/local/washington/robbinston/

6. Construction and Operation of an LNG Facility

Will there be any dredging of the river bottom?

Downeast LNG's proposed site does not currently require any dredging, nor is dredging proposed in the future.

What will the operating hours be during the construction period?

Generally, construction hours will be limited to daylight hours to minimize inconvenience to residents. During winter periods of short daylight, the hours of construction will be consistent with that of the local community.

Where will construction workers live?

We expect that most of the 240 Maine residents employed as construction workers will live within a 2-hour drive of the facility.

The remaining 60 workers are likely to live within existing housing units in Washington County.

Will there be a lot of traffic and noise in the community during construction?

We expect traffic and noise to be extensively managed and kept to a minimum. All noise generation must be kept below specified regulatory levels; this is an important element of construction planning.

7. Marine Safety and Fishing Issues

What are safety and security zones?

Safety and security zones are put in effect when LNG vessels transit and dock in a harbor or inland waterway [8]. The intent of the safety and security zones is to protect the LNG ships from collisions or sabotage. The establishment of project-related safety zones could directly impact the access and use patterns of the existing waterway; as such, these marine traffic "exclusions" or "restrictions" can become a concern for local fishermen and other waterway users. An additional concern is the potential for LNG ship damage to fishing equipment during the course of a ship's transit through bay and river waters.

How large will these zones be for transit of the ships?

The size of the safety zone applied to an LNG ship while it is in transit is a major determinant of the impact on the fishing industry. The zone includes parameters for how close—sideways, in front, and in back of—other ships can be to the LNG ship during its passage through a bay or river.

Radial Zone (Sides):
A number of factors, including the low ship traffic in the Downeast LNG site area, are expected to result in a relatively limited impact as far as restrictions related to safety and security zone establishment. Downeast LNG expects that the traffic control rules most likely to be imposed upon its ship operations would be similar to (or less restrictive than) than those for Cove Point LNG in Chesapeake Bay, MD. At Cove Point, a 500-yard "clearance" safety zone (nearly 1/3 of a mile) is applied while LNG vessels are in transit. The Cove Point LNG facility has more ship traffic than Passamaquoddy Bay, including tankers, cargo, crab, and pleasure fishing vessels.

A larger safety zone is applied in Boston Harbor, but there are several factors that influence the need for a larger area that do not apply to the Downeast LNG project: the LNG ships in Boston must transit through a ship channel with considerable commercial traffic, significant critical infrastructure, and large population centers along the channel shores.

Distances In Front and Astern (Behind):
Operation plans that have been approved for most LNG ships to date also require that all other vessels remain clear of the main ship channel two miles ahead and one mile astern of the LNG tankers during transit. This is not significantly different than the best operating practices of most ship operations involving other cargo types (e.g., petroleum carriers). The application of this type of traffic restriction is typically not found to be significant to other water users.

[8] 33 CFR 3.05-10.

What will the security zone be around the dock?

A security zone is established to circumscribe an area around an LNG ship while it is at port and unloading the LNG cargo. Depending on specific site conditions and facility characteristics, these areas may range from 100 to 1,000 yards.

What are the potential impacts on fishery activities due to LNG ship transit?

Potential impacts on fishing (scalloping, lobstering, and clamming) could result from the project if traps are damaged during the transit of LNG ships or if the LNG ship safety/security plans imposed by the U.S. Coast Guard create limited access to fishing grounds.

Normally, fishery impacts due to limited access have not been the case at other U.S. LNG terminal operations. In the case examples surveyed and known to Downeast LNG (e.g., Chesapeake Bay, MD; Guayanilla Bay, PR; Columbia River, OR (proposed)), there has been no substantive (or projected, in the case of Oregon) impact on local fisheries.

What is the impact of the jetty on fisheries?

The proposed jetty could have positive impacts on fisheries. For example, the current pier at the Cove Point LNG Facility has become an excellent habitat for a range of species, and is now used by crabbers to set traps, and by party fishing boats[9]. The photo below shows a fisherman holding a stripped bass on a party boat at the LNG pier.

This result, however, is only due to the project's detailed planning and accommodation of local fishery practice requirements (e.g., allowing small vessel transit under a long LNG pier, allowing continuous access to river waters alongside the main ship channel). This type of productive planning stemmed from meetings hosted by the developer and

[9]Captain Jim's Photo Gallery, http://www.azinet.com/captjim/gallery.htm and http://www.dnr.state.md.us/fisheries/fishingreport/fishingrptArchive/frarchives2005/0420chesapeake.asp

attended by local fishermen and U.S. Coast Guard authorities. For the Downeast LNG Project, a similar accommodation of interests is expected and foreseeable, given the small fishery population in the area.

Will fishery and recreational activities be allowed near the LNG ship when it is in transit?

Some water-borne activities will be restricted only during ship transit and offloading, about once a week. Ship transit from Head Harbor Passage to the pier is expected to take less than 2 hours, and offloading about 12–14 hours.

What areas of the Passamaquoddy Bay will be affected by shipping restrictions?

Downeast LNG is conducting a complete ship operations planning effort with local authorities to fully determine the answer to this question. At this time, we expect only the area immediately adjacent to the pier will be impacted through the construction of the pier. We have not identified any major marine impact related to the operation of the LNG facility.

What happens if fishing gear is damaged or lost because of the LNG ship?

In the event of damage to fishing equipment (e.g., lobster trap damage) caused by ship transit, it typically falls upon the project owner to compensate for the direct cost of damages, so long as the equipment was not improperly placed in the path of customary ship transit routes. The potential for this type of impact depends on the fishing practices of the local industry relative to trap placement or other potential transit route obstacles. In most locales, the placement of lobster traps within a designated shipping lane is prohibited. However, the project area does not include specifically designated shipping lanes, and future restrictions, if any, will be determined starting with a preferred basis of "no interference with fishing practices" if at all possible.

Can Head Harbor and Western Passage accommodate LNG ships?

At present, about 120 to 140 commercial ships transit through Head Harbor Passage each year. Some vessels are over 600 ft. long and have drafts as deep as 40 feet.

Of this total, about 60 to 70 ships pass through the Western Passage and transit by the proposed Downeast LNG site in Robbinston on the way to Bayside Marine Terminal in St. Stephens, New Brunswick. All ships transiting both passages do so without the tug escort that an LNG ship will have, though tugs are used for the docking of other commercial ships. LNG ships also have powerful steering systems as well as bow thrusters to allow them more maneuverability than other ships.

Are high tides, currents, whirlpools, wind, and fog a concern?

Although the tides are quite high in the area (Eastport has a mean tide variation of 18.4 ft., and a maximum tide variation of 20.9 ft.), they do not present an obstacle for either the transit of the ship or safe dockage. The proposed Irving LNG facility in New Brunswick is in an area of higher tides (St. Johns has mean tide variation of 23.1 ft., and a maximum tide variation of 30 ft.). Transit through Head Harbor passage will be with the tides.

Currents are not an issue at the proposed pier site, as they are estimated to be less than 5 knots. Currents in Head Harbor passage are also not an issue in transit for the ocean-going vessels that carry LNG.

Wind and fog conditions do not appear to be a major issue at the proposed pier. At times of high wind or significant fog, the transit of Head Harbor passage may be limited, and access to the LNG ship by the pilot could also be limited.

What about the impact on right whales in the Bay of Fundy?

Current ship traffic to St. Johns, Estes Head, and Bayside Marine does not appear to have affected whales. No impact is expected on right whales during transit of the ships serving Downeast LNG. We do, however, intend to study this question more thoroughly during the formal Environmental Impact Statement (EIS) process and consultation with various environmental agencies and conservation groups. An important part of this study effort will be to determine the exact measures that should be taken if right whales, or any other large marine mammals, happen to be encountered during transit. It is not uncommon to have “spotters” on the bow of an incoming/outgoing ship to ensure that safe passage is made through areas populated by marine mammals (e.g., EcoElectrica LNG, Puerto Rico).

There are no critical habitat or conservation areas near the project site or transit routes. Critical habitat for the right whale is centered south off of Cape Cod, though there are conservation areas in the Bay of Fundy and off the coast of Nova Scotia.

What are the jurisdictional issues pertaining to the transit of Canadian waters?

Downeast LNG’s understanding is that there are no existing limitations regarding the transit of Canadian waters by LNG tankers calling on a U.S. port. Based upon our discussions with the Canadian Coast Guard, there is no specific LNG shipping regulations in Canada. We also understand that the regulations passed in the 1970s restricting the transit of crude oil tankers through Head Harbor passage to the proposed Piston Refinery at Shackford Head were rescinded by the government.

The International Boundary Waters Treaty Act of 1909 between the U.S. and Canada and the United Nations Conventions of the Law of the Seas support the transit of Canadian waters by LNG tankers calling on a U.S. port (and vice versa). These two pieces of legislation support the currently proposed LNG facility in Vancouver, British Columbia, which will accept LNG ships that pass thorough U.S. territorial waters.

International Boundary Waters Treaty Act, Chapter I-17
"An Act respecting the International Joint Commission established under the treaty of January 11, 1909 relating to boundary waters.

Article I: The High Contracting Parties agree that the navigation of all navigable boundary waters shall forever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels, and boats of both countries equally, subject, however, to any laws and regulations of either country, within its own territory, not inconsistent with such privilege of free navigation and applying equally and without discrimination to the inhabitants, ships, vessels, and boats of both countries."

The UN Convention on the Law of the Sea, Part II, Section 3. Innocent Passage in the Territorial Sea
"Article 17, *Right of innocent passage:* Subject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.
Article 18, *Meaning of passage.*
Article 19, *Meaning of innocent passage."*

How does the U.S. Coast Guard coordinate with Canadian agencies? What are the rules governing transport safety?

There are established cooperative procedures between the U.S. and Canadian Coast Guards. A Memorandum of Understanding (MOU) for LNG escort between the U.S. and Canadian Coast Guards will likely need to be established, similar to an existing MOU for the transit of U.S. waters by LNG ships calling upon the Kitimat LNG facility in Vancouver, British Columbia.

8. LNG Technology and Operation

What is Liquefied Natural Gas (LNG)?

LNG, the abbreviation for liquefied natural gas, is the liquid form of natural gas.

What is natural gas?

Natural gas is a combustible, gaseous mixture of simple hydrocarbon compounds, usually found deep in underground reservoirs formed by porous rock. The main ingredient in natural gas is methane (CH_4), along with minor amounts of other gases, including ethane, propane, butane, and pentane. Natural gas is one of the cleanest burning fuels, producing primarily carbon dioxide, water vapor, and small amounts of nitrogen oxides when combusted. It is among the most efficient fossil fuels for the production of power with little global warming impact.

What is natural gas used for?

Natural gas is used to generate power, heat homes, or cook. Increasingly, natural gas is used to produce power throughout the United States and to replace more polluting fuels such as coal and fuel oil.

How do you liquefy natural gas?

Natural gas is turned into a liquid by processing it in a liquefaction plant, where it is cooled to 260 degrees below zero Fahrenheit. Once the natural gas is converted into LNG, it can be transported and stored at atmospheric pressure in insulated tanks that are similar to large thermos bottles.

Why is natural gas liquefied?

Natural gas is converted to a liquid to reduce its storage volume. LNG takes up 1/600th of the volume of natural gas. LNG is safer, easier, and less expensive to transport and store than natural gas. Moreover, inexpensive natural gas from other countries can be transported on tankers from overseas where there are large quantities of natural gas that cannot be transported by pipelines. Japan, Korea, and Taiwan receive almost 100 percent of their natural gas from LNG imported by tankers.

Is there a lot of natural gas available?

Total world natural gas reserves are greater than 5,000 trillion cubic feet. The discovery of new reserves has increased at a faster rate than consumption. The total of the world's gas reserves is equivalent to about two hundred times the annual consumption in the U.S., though the vast majority of gas is located in other countries.

What is the operating history of LNG regasification terminals?

There are more than 40 LNG marine receiving terminals located throughout the world, predominantly in Japan (24), but also in South Korea (3), Taiwan (1), China (1), Belgium (1), Spain (2), France (2), Italy (1), Portugal (1), Turkey (1), the Dominican Republic (1), and the U.S. (6). Within about 5 years, there are likely to be more than 60 LNG marine terminals.

Many of these terminals, particularly most of those in Japan and South Korea, operate in urban locations near heavily populated areas. LNG has an excellent operating history throughout the world. All of these facilities have been operating without serious public safety incidents, some for as long as 40 years.

Is LNG commonly used in the U.S.?

Yes. In the U.S., there are already about 110 LNG facilities. In New England, there are 46 LNG storage tanks located in 31 communities.

Some of these LNG facilities also have the capability to liquefy natural gas in the summer. When the demand for gas rises, LNG can be quickly vaporized (warmed up) back into its natural gas form and delivered to a pipeline grid. During the winter, as much as 40% of New England's gas supply may come from LNG.

What countries produce LNG?

Major LNG producers include Australia, Trinidad, Algeria, Malaysia, Nigeria, Oman, the United Arab Emirates, Brunei, and Qatar. New production plants have been developed in Norway and Egypt, with other proposed projects in Angola, Equatorial Guinea, Russia, Iran, and Yemen.

How is LNG transported?

LNG is transported in specially built, state-of-the-art tankers. Worldwide, there are about 130 of these ships, with about 50 on order or under construction. These ships are designed to carry only LNG. Although LNG tankers appear to resemble oil tankers, they are much more advanced and better constructed. All LNG tankers have double hulls. The LNG is stored within two other internal containers to protect against leaks and to keep it cold. New storage systems within the ships are also being introduced, including "membrane" systems where the LNG is transfused into a honeycomb-like material.

LNG tankers are among the strongest, safest, and most technologically advanced ships in the world. They are equipped with sophisticated cargo monitoring and control systems and bow thrusters for increased maneuverability. LNG shipping has an excellent safety record: no major accidents in more than 30 years, **and no release of LNG during a total of about 40 million miles traveled on 45,000 voyages.**

How does an LNG terminal work?

LNG is transported by ship and delivered to LNG terminals, where it is pumped into insulated storage tanks. Once it is warmed and returned to its original state, the converted natural gas is odorized for send-out. The following presents a more detailed description of this process:

Reception – Tankers berth along the unloading pier, where they transfer LNG to an onshore tank. In order to maintain the pressure in the tanks on board the tanker, a volume of boil-off[10] gas is sent out from the storage tanks to serve as a load balance.

Storage – Tanks typically used in the storage and regasification of LNG are constructed using a double wall method to ensure stability and safety. Typically, the tank's outermost layer (known as the outer shell) is constructed of pre-stressed concrete, while the inner shell is constructed from a nine percent nickel alloy. (Nine percent nickel alloy inner shell construction is the world standard in the storage of LNG.) In order to further enhance stability of the tanks, all entries (nozzles and gauges) are built into the top of the tank rather than on the sidewalls.

Send Out – Generally, each tank is fitted with two submerged pumps, which transfer LNG to six pressurized pumps. The LNG is then warmed in regasification units. Before being sent out, the natural gas is metered and odorized.

How is LNG changed back into natural gas?

LNG is changed back into natural gas simply by heating it. At LNG facilities, this is done in heat exchangers called vaporizers. LNG is pumped from the storage tanks to the vaporizers, where it is then heated and turned back into its gaseous form – natural gas. This is called regasification. Heat for the vaporizers will come from the burning of small amounts of natural gas.

How does LNG behave if it is released to the environment?

LNG is always much colder than the temperature outside (-260 degrees), even if it is minus 20 degrees outside. If LNG is released into the environment, the temperature of the air and ground or surface that LNG is resting on will cause it to heat up and turn it back into natural gas. This process is called vaporization. This vapor, or natural gas, mixes and moves with the air. As it moves, it mixes more and more with the air which causes it to become dispersed, or less concentrated, as it moves away from the area where it was released. Vaporized LNG leaves no residue behind.

What are the potential hazards of LNG and natural gas?

The low temperature of LNG can freeze burn human skin if the two come into contact (similar to frostbite). It can also cause some materials, such as common steel, to

[10] Boil-off is the gas that forms from LNG in storage.

become brittle and break. This is why special materials and procedures are used to store and handle LNG. These hazards only exist very near the point of LNG release.

Do LNG and natural gas contribute to global warming?

Use of natural gas for power generation is more efficient than other fossil fuels, and leads to far lower carbon emissions. Carbon emissions for natural gas used in a single-cycle gas turbine for power generation are 22% lower than fuel oil, about 43% lower than coal, and 45% lower than wood and wood waste. Using a combined cycle turbine for gas, as opposed to a pulverized coal unit, would generate carbon reductions of 60%. Natural gas for home heating, as opposed to firewood, has even lower carbon emissions. The table below presents the carbon content of natural gas as compared to other fuels.

CO_2 Fuel Emission Factors

Fuel type	tons CO_2 / MWh fuel used	kg CO2 / metric tons fuel used	kg CO_2 / liters fuel used
Liquid fossil			
Gasoline / petrol	0.2493	3135	2.34
Kerosene	0.2572	3150	2.58
Distillate fuel (No.1, No.2, No.4 fuel oil and diesel)	0.2664	3142	2.68
Residual fuel oil (No.5, No.6 fuel oil)	0.2783	3117	3.12
LPG/Propane	0.2275		1.54
Gaseous fossil			
Natural gas (dry) based only on single cycle turbine	0.2018		
Solid fossil			
Anthracite coal	0.3539	1926	
Bituminous coal	0.3403	2466	
Peat	0.3813		
Biofuels			
Wood and wood waste	0.3617	1907	

Source: www.GHGProtocol.org: The Greenhouse Gas Protocol Initiative's (World Resources Institute and World Business Council for Sustainable Development) Stationary Combustion calculation tool. Values from the Intergovernmental Panel on Climate Change (IPCC) and where noted, the Energy Information Administration (U.S. Department of Energy) and the United Kingdom Department of Environment, Transport, and Regions.

Do LNG or natural gas contribute to air pollution?

The U.S. has improved air emissions from power plants in large part as a result of the increased use of natural gas instead of coal. As noted below, the use of natural gas results in substantially lower emission levels:

- SO_2 (sulfur dioxide) 99.8% reduction
- NOx (nitrogen oxides) 80% reduction
- PM (particulate matter) 80% reduction

9. Safety and Security

Refer to "Marine Safety and Fishing Issues" for questions regarding ships and marine safety.

Is LNG explosive?

LNG is not explosive. When LNG is heated and reverts to its gaseous form, the gas is not explosive if it is unconfined. If natural gas were trapped in a confined storage space, with oxygen present, the natural gas could explode if it were accidentally ignited.

Is LNG flammable?

LNG is not flammable. LNG cannot burn because it doesn't contain oxygen or air. LNG *vapor* (natural gas) is flammable, but only when mixed with air in a narrow range of concentration (at least 5% but not more than 15% of a natural-gas-to-air mixture). If the natural gas concentration is lower than 5%, it cannot burn because its concentration is not sufficient to be a flammable "fuel." If the natural gas concentration is higher than 15%, it cannot burn because there is insufficient oxygen. Therefore, the fire hazard of LNG vapor (i.e., natural gas) depends on there being a release of LNG; then the LNG vaporizing and mixing with air in a very narrow gas-to-air ratio of 5% – 15%; and finding an ignition source. Without these events occurring, there is no flammability.

Is LNG stored under pressure?

No. LNG is stored at "atmospheric" pressure, the same air pressure that we live at normally each day.

Does LNG dissipate once it vaporizes?

Several LNG spill studies have demonstrated that high winds rapidly dissipate the LNG vapor, and low winds (or no wind) keep the flammable vapor cloud very close to the source of the spill. Because LNG is not stored under pressure, even if there was a leak or failure of the storage tank and also of its containment system (which has never happened in the past 40 years), the LNG would evaporate quite slowly, reducing any risk to the surrounding community.

Is Downeast LNG's proposed project the safest option for storing LNG?

The proposed Downeast LNG project is similar to more than 40 operational marine LNG facilities worldwide. Land-based LNG storage tanks are the safest part of the LNG supply chain, with no major incidents over the past 40 years. Most recent LNG safety studies have focused on LNG ships and their transit routes and docking. Our proposed project will accept LNG deliveries only once a week, offloading in 14 hours.

How large is the thermal radiation/exclusion zone?

The thermal radiation zone for the tank will be about 850 to 1,000 feet from the center of the tank.

What is an exclusion zone?

An exclusion zone is a dedicated safety area. It is no different in concept than normal industrial practices that require the prohibition of numerous people or facilities from a certain distance to maximize safe operating and emergency response conditions. In the case of LNG storage, the establishment of these zones is a precaution against allowing non-plant personnel or buildings to close to the storage tank. This is really not a whole lot different than allowing people to congregate or live next to a large gasoline or LPG storage tank.

How is an exclusion determined and by whom?

Exclusions zones are determined by defining, under a worse case scenario, how much area might be affected by a total loss of the storage tank's containment system, most particularly the roof, and the possible ignition of the vaporizing LNG leak/spill. As with any fuel, if there is an ignition source, the natural gas vapor that is in the appropriate flammability range, will burn and generate heat. The amount of heat that can be generated by such a spill/leak and subsequent ignition, as well as the area that that heat occurs, can be easily calculated. Once calculated, the area that may potentially have enough serious heat or fire to cause substantial harm to humans and/or buildings can be determined and appropriate "exclusion zones" thus established.

Should I worry about LNG's potential hazards?

Over the past few years, there has been a lot of misinformation regarding LNG. This is because LNG tankers and storage facilities hold a lot of stored energy, and people assume that this energy can be released in an instant. The fact is that LNG doesn't explode when spilled onto water or the ground.

The final purpose of LNG—as well as other fuels—is to be burnt as a source of energy. Many fuel sources can burn, though not all substances that burn explode.

Failure to understand how LNG is transported and handled, as well as the characteristics of LNG—especially how it burns—can lead some people to overestimate the hazards. The reality is that LNG, based on its safety record and characteristics, is one of the safest and most environmentally friendly energy sources available today.

Most people do not even know that there are more than 110 LNG storage facilities in the U.S., most of them in the New England area. People who work with LNG on a daily basis also voluntarily live and play next to the same place they work. People who live near an LNG facility often fish and sail at and near the terminal. This says a lot about the reality of LNG safety.

Are there government safety procedures?

The government plays a significant role in siting most energy production and distribution facilities, and regulates all aspects of LNG transportation, unloading, storage, and distribution. The siting, design, construction, and operation of our proposed facility will be regulated by many federal agencies, including the Federal Energy Regulatory Commission (FERC), the Department of Transportation, and the Coast Guard. In addition, many state agencies will be involved, and the community will have the opportunity to participate in and comment on the proposed project during the approval process.

Downeast LNG will meet or exceed every government security requirement.

Does Canada have the same or more stringent safety procedures relative to LNG terminals and/or shipping requirements?

Canada does not have any specific regulations pertaining to the transport of LNG by ship. For LNG terminals, it often defers to U.S. regulations.

What happens if an LNG tank fails?

Should a tank ever fail and a leak result, fire is possible, but only if there is both the right concentration of LNG vapor in the air *and* a source of ignition. Since such a combination rarely exists, explosions are highly unlikely. According to the Federal Energy Regulatory Commission (FERC), "LNG is not explosive. Although a large amount of energy is stored in LNG, it cannot be released rapidly enough to cause the overpressures associated with an explosion." FERC adds, "LNG vapors (methane) mixed with air are not explosive in an unconfined environment."

LNG ships have emergency shutdown systems that can identify potential safety problems and shut down operations. They prevent or significantly limit the amount of LNG that could be released. Fire and gas detection and fire fighting systems help to address the risk of fire. The detection equipment is so sensitive that it can detect leakage through a hole the size of a pinhead. Special operating procedures, training, and maintenance further contribute to safety.

What happened at the Cleveland LNG terminal in 1944?

The most serious LNG accident occurred more than 50 years ago, during World War II, in Cleveland, OH. According to the U.S. Bureau of Mines report, due to rationing, the nickel content of an inner storage tank was reduced to 3.5% (today's standard is 9%). Shortly after its use began, the LNG tank became brittle and failed, spilling LNG that traveled into a sewer system. LNG evaporated and ignited, killing 128 people and injuring 225.

The Bureau of Mines report showed that the accident was due to low temperature embrittlement of 3.5% nickel steel tank, which is no longer used. In addition, the tanks

were located next to a heavily traveled railroad station and a bombshell stamping plant, both of which probably accelerated crack propagation in the inner tank shell.

The ignition of two unconfined vapor clouds of LNG did not result in explosions. The only explosions occurred in the sewers. Today's safety regulations and codes require multiple containment systems and the use of modern materials, making such an accident virtually impossible.

What happened at the LNG liquefaction plant in Algeria in 2004? Could this happen here?

No, such an accident cannot happen at the Downeast LNG regasification facility, because the technology used is very different. A regasification plant, such as Downeast LNG's proposed plant, warms LNG to a vapor and then feeds it into the pipeline. A liquefaction plant, such as the one in Algeria, has many components that are not found in a regasification plant, including boilers.

According to the Federal Energy Regulatory Commission (FERC) and Algerian sources, on January 19, 2004, a blast occurred at Sonatrach's LNG liquefaction[11] facility, in Skikda, Algeria, that killed 27 workers and injured 56 others. Preliminary findings of the accident investigation suggest that cold hydrocarbons leaked and were fed to a high-pressure steam boiler by the combustion air fan, causing an explosion inside the boiler fire-box. This resulted in a larger explosion of hydrocarbon vapors in the immediate vicinity.

There are major differences between the equipment involved in the Skikda accident and the proposed Downeast LNG facility (e.g., high-pressure steam boilers that power refrigerant compressors will not be used here, nor are they used at any LNG facility with the U.S.).

What would happen if an LNG facility was attacked?

The design of a full containment LNG storage tank involves a very thick outer wall of reinforced concrete with additional layers of steel and insulation inside. This makes it very hard to breach the storage tank, even with a missile. In the unlikely event that this happened, however, the likely result would be a liquid spill and a large fire. Because of built-in safety systems, the impact of the fire would be almost completely confined within the boundaries of the site.

[11] Liquefaction is a highly technical process involving numerous facilities to make gas into LNG. This is very different from the regasification process that Downeast LNG will use, which is very simple and does not include the complexity of the liquefaction process.

10. LNG Ships[12]

What is the estimated ship frequency for the Downeast LNG Project?

Downeast LNG expects to receive, on average, one ship per week. In the summer, the frequency could decrease to one ship every ten days. In the winter, a ship could possibly arrive every 5 days.

How big are LNG ships? How long will they stay in port?

Most LNG ships use spherical (Moss) tanks, and they are easily identifiable as LNG ships because the top half of the tanks are visible above the deck. The typical LNG carrier can transport about 125,000 to 138,000 cubic meters of LNG, or about 2.6 to 2.8 billion standard cubic feet of natural gas. The typical carrier measures some 900 feet long, is about 145 feet wide, needs about 38 feet of water depth, and costs about $160 million. This ship size is significantly smaller than that of a Very Large Crude Oil Carrier (VLCC). LNG tankers are less polluting than other shipping vessels because they typically burn natural gas as a fuel source for propulsion.

A ship can typically offload its cargo in about 12-14 hours.

What is the safety record for LNG ships?

LNG has been delivered across the oceans for about 45 years without major accidents or safety problems, either in port or on the high seas. In that time, there have been more than 45,000 LNG carrier trips, covering more than 40 million miles.

Today, more than 150 LNG ocean tankers safely transport more than 110 million metric tons of LNG annually to ports around the world. In the year 2000, one LNG cargo entered Tokyo Bay every 20 hours, and one entered Boston Harbor every week. Japan relies exclusively on imported LNG for its natural gas.

What agency provides oversight of LNG ships?

The U.S. Coast Guard (USCG) is responsible for ensuring the safety of marine operations at LNG terminals and of tankers in U.S. coastal waters. It regulates the design, construction, manning, and operation of LNG vessels and the duties of LNG ship officers and crews. USCG rules often incorporate the International Maritime Organization standards and codes for the construction and operation of ships.

[12] Several questions and answers are excerpts from the Center for LNG Facts and Houston Law Center.

What does the Coast Guard do to ensure the safety of LNG ships?

The Coast Guard:

- Inspects LNG ships, including foreign flag vessels, to ensure that they comply with safety regulations.
- Works with terminal and ship operators and host port authorities to ensure that policies and procedures conform to required standards.
- Works with operators to conduct emergency response drills and joint exercises to test response plans.
- Ensures that operators have adequate safety and environmental protection equipment and procedures to respond to an incident.
- Determines the suitability of a waterway to transport LNG safely.
- Creates safety rules for specific ports. For example, in cooperation with port captains, it sets port safety zones and may require tug escorts. A buffer zone is required for each tanker.

What equipment is used to make LNG ships safe?

The ship-handling safety features include sophisticated radar and positioning systems that enable the crew to monitor the ship's position, traffic, and identified external hazards. A global maritime distress system automatically transmits signals if an onboard emergency occurs requiring external assistance. Most LNG ships also have bow thrusters, greatly increasing the maneuverability of the ships.

In addition, some LNG ships use velocity meters to ensure safe speeds when berthing. When moored, automatic line monitoring helps keep ships secure. When connected to the onshore system, the instrument systems and the shore-ship LNG transfer system act as one, allowing emergency shutdowns of the entire system both from the ship and from shore.

Would an LNG ship be attacked by terrorists?

Like many parts of our transport and energy infrastructure, an LNG ship is a potential target. It is important to remember, however, that the frequency (number of port visits) of LNG ships is far lower than crude oil, petroleum product, or fertilizer vessels. For every LNG tanker docking at a U.S. port, there are about 100 crude-oil, oil product, or fertilizer vessels, about half of which are single-hulled, coming into U.S. ports.

According to the Department of Transportation, Maritime Administration, the frequency of LNG port calls is far lower than that of other vessels transporting explosive and flammable cargoes. In 2003, as presented in the table below, LNG total port calls were 220, with a volume of 14 million tons. This compares to product and crude tanker port calls of 18,503, with a volume of 1.4 billion tons.

In New England, there were 56 LNG port calls, as compared to 803 port calls for crude and product tankers.

	Calls	Capacity (tons)
Product Tanker	10,998	415,615,484
Crude Tanker	7,505	923,753,206
LNG	220	13,957,071
Other Gases	706	21,062,247
Product Tanker, BOSTON	336	12,737,349
Crude Tanker, BOSTON	3	302,362
LNG, BOSTON	57	4,202,695
Product Tanker, PORTLAND	148	4,512,376
Crude Tanker, PORTLAND	205	23,378,630
Product Tanker, PORTSMOUTH	77	3,075,263
Product Tanker, SEARSPORT	34	1,077,269

Note: this table does not include fertilizer vessels.

What happens if an LNG tanker is attacked?

LNG tankers are much less vulnerable than crude, petroleum product (gasoline), or fertilizer vessels because of the ship's double-hull construction and separate storage tank design. LNG ships are also better built than crude or petroleum product vessels. Moreover, LNG ships are escorted by the Coast Guard, whereas virtually all other vessel traffic into U.S. ports is unescorted.

Unlike other vessels, LNG doesn't come in contact with either of the double hulls. There's never been an incident where LNG has escaped into the water from a ship’s cargo tanks. A second key difference is the nature of LNG compared to other fuels: LNG doesn't explode. For example, an attack on a gasoline tanker could produce an explosion, fire, and environmental damage from the unburned spilled fuel. An attack on an LNG tanker probably would produce a shipboard fire that would burn at lower temperatures and more slowly than a petroleum fire. That's because LNG, which is kept at extremely cold temperatures, absorbs heat from the surrounding environment and evaporates. The resulting vapor, when mixed with air and ignited, burns slowly, like the pilot flame in a stove.

Are there any examples of actual LNG spills on water and the resulting impacts?

Yes. Shell published (in-house) "Accidents and Emergency Procedures - Methane Vessels" originally in 1976. As documented in the report, in 1973, Shell carried out LNG jettison trials on its new (at the time) 75,000 cubic meter LNG carrier, “Gadila.” The tests were performed at sea, about 70 miles west of St. Nazaire. Detailed observations were made of the event. In a series of tests, a total of about 600 cubic meters of LNG at a temperature of minus 165 Celsius were discharged overboard at the stern (this class of ships was designed for stern-loading in Brunei). The results indicated that the vapor clouds formed were low-lying, with well-defined boundaries. At the sea surface, no liquid LNG pool or ice formations could be observed, nor were any vapor "explosions" detected. In all cases, the vapor clouds dispersed rapidly after completion of each discharge.

11. Environment and Permitting

What is the permitting process for an LNG facility?

The regulatory framework surrounding a significant LNG terminal project proposal in the U.S. can be very complex when compared to most energy projects. This complexity is marked by competing and overlapping jurisdictions in matters defined by federal and often independent state National Environmental Policy Act (NEPA) programs, as well as the regulatory programs implementing individual permit regulations (e.g., Army Corps of Engineers, Environmental Protection Agency, Coast Guard, etc). It is not uncommon for an LNG project to require 50 or more permits and a comprehensive Environmental Impact Statement (EIS) before site construction can be initiated. Each of these major permitting steps also involves significant public comment and involvement.

What is involved in an Environmental Impact Statement (EIS)?

An EIS for a proposed LNG project covers a wide range of project design, regulatory, environmental, and socioeconomic issues, including those addressed by other agency permitting processes. Because an EIS's process of interactive evaluations is so important, LNG firms employ recognized experts in key resource areas, such as biology, water, noise, safety, and transportation.

In conducting studies and preparing the necessary background materials for inclusion in the EIS, Downeast LNG will use both in-house and outside experts to ensure that our environmental review is as thorough and accurate as possible. The scope of the review will be based on our knowledge of the affected resources, as well as public and agency scoping. We expect that our work will be extensively scrutinized by both the government and the public.

Resource areas that will be addressed in the EIS include:

<u>Natural Components</u>

- Geology and Soils
- Seismicity
- Freshwater Resources
- Terrestrial and Wetland Ecology
- Marine/Riverine (River-Related) Ecology
- Special Species
- Meteorology
- Air Quality

<u>Human Components</u>

- Noise
- Land Use
- Recreational Resources
- Visual Resources

- Socioeconomics
- Transportation
- Cultural Resources

Policy Components

- Need for the Project
- Assessment of Alternatives
- Land Use Mandates
- Environmental Justice
- Species Protection
- Public Safety
- Resource Commitment

Could there be ecological damages?

In the case of a spill of LNG on water, there would be minimal impact as the LNG would vaporize. In the case of a large spill, the scope of ecological damage would be dependent on a number of factors – especially the water depth and quantity of water in the spill area as well as the amount and type of marine fauna present in the immediate area of the spill. The reason for this variable answer is simple:

- If a large amount of LNG was to be spilled in a very shallow and small water body, it can be expected that the thermal fluctuation caused by the vast amount of LNG would harm temperature sensitive species. If species were put in direct contact with the LNG for almost any amount of time except a few seconds, they would be harmed by the –260 degree temperature of the LNG. Case in point: LNG safety demonstrations often exhibit a small aquarium with a goldfish in it, while small amounts of LNG are poured into the aquarium. The goldfish is happy as a clam as the LNG lays on top of the water and vaporizes to harmless natural gas—so long as the amount of LNG poured into the aquarium is not vastly superior to the amount of water in the aquarium.

- If a large amount of LNG was to be spilled in a deeper and larger water body, as has been done in experiments, it is possible that no species would be affected unless they came into direct contact with the super cold LNG during the spill.

Could LNG tankers endanger marine life?

LNG tankers are no different than any other ship or boat in the water when it comes to interactions with marine life. One significant difference may, however, exist between some boaters and LNG ship operators: LNG ships are not driven recklessly or with total disregard of marine life. At the EcoElectrica LNG facility, extra care is taken to avoid sea turtles and manatees, both of which are slow moving animals. In the case of the manatee, the depth and structure of the pier was established to ensure that a manatee could not be squished if it came between the pier and a docking vessel or under the

LNG ship as it moved to the pier or out to sea. Turtle “spotters” were even placed onboard LNG ships at EcoElectrica to allow a change in course or slowing down of the LNG ship to avoid collision with the turtle.

These requirements may seem extreme to some, but the LNG industry takes wildlife protection very seriously and always seeks to be a good environmental steward.

12. Emergency Response

If there is an accident, who will pay for the accident response?

Downeast LNG would pay into an accident response bond fund. We are in the process of determining the total cost of the bond fund and identifying the entity responsible for its administration.

What emergency response equipment is required, and who will pay for it?

Downeast LNG will pay for all necessary equipment, training, and coordination efforts, including hazards communication, etc. If another LNG facility comes into service within the area covered by our response obligations—and it receives benefit from our provision of the equipment and services—it will be expected to contribute or provide equal and separate equipment and programs.

13. The Gas Market in New England

Why do we need LNG in New England?

New England and Maine are in need of LNG to meet the growing demand for natural gas at a lower cost. Key issues in New England include:

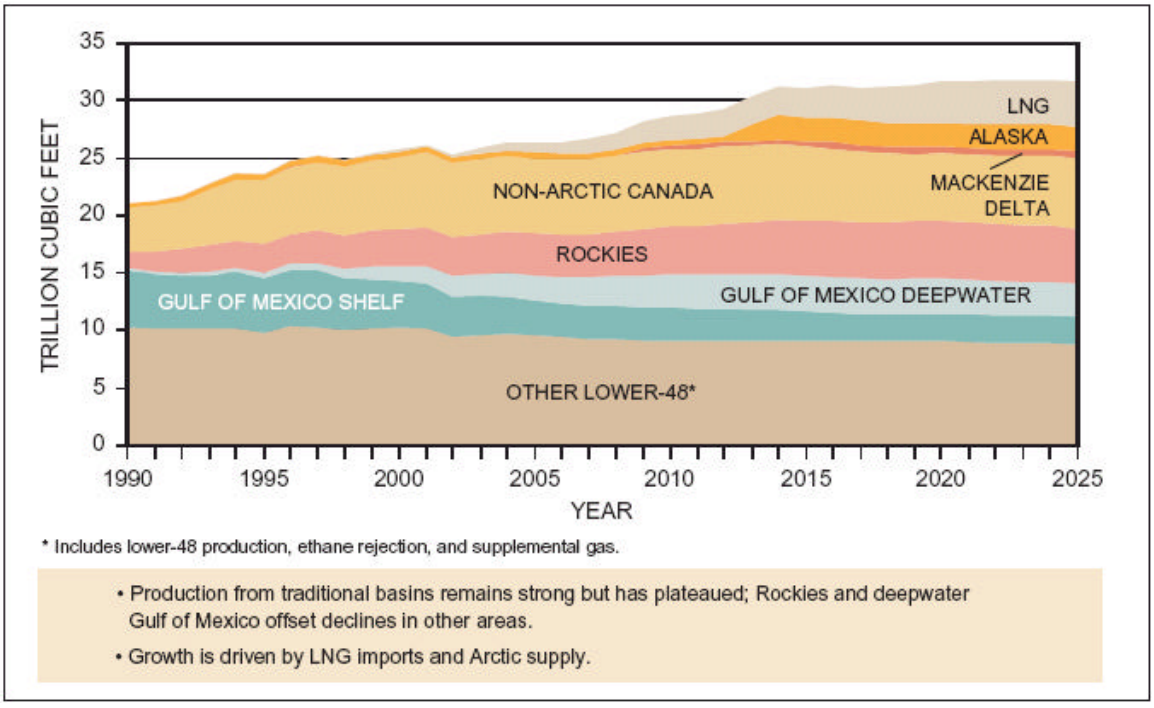
- Sustained high gas prices due to growing Northeast gas demand.
- Declining gas production in Canada, particularly from offshore gas supplies near Sable Island, Nova Scotia.
- Gas pipeline supply constraints - an inability to bring more gas into the Northeast from the major southern New England gas pipelines.
- Difficulty in building new gas pipelines.
- Large quantities of competitively priced gas (LNG) from other countries.

Don't we produce enough gas in the U.S.? Can't we import more from Canada?

The North American natural gas market is characterized by the following conditions:

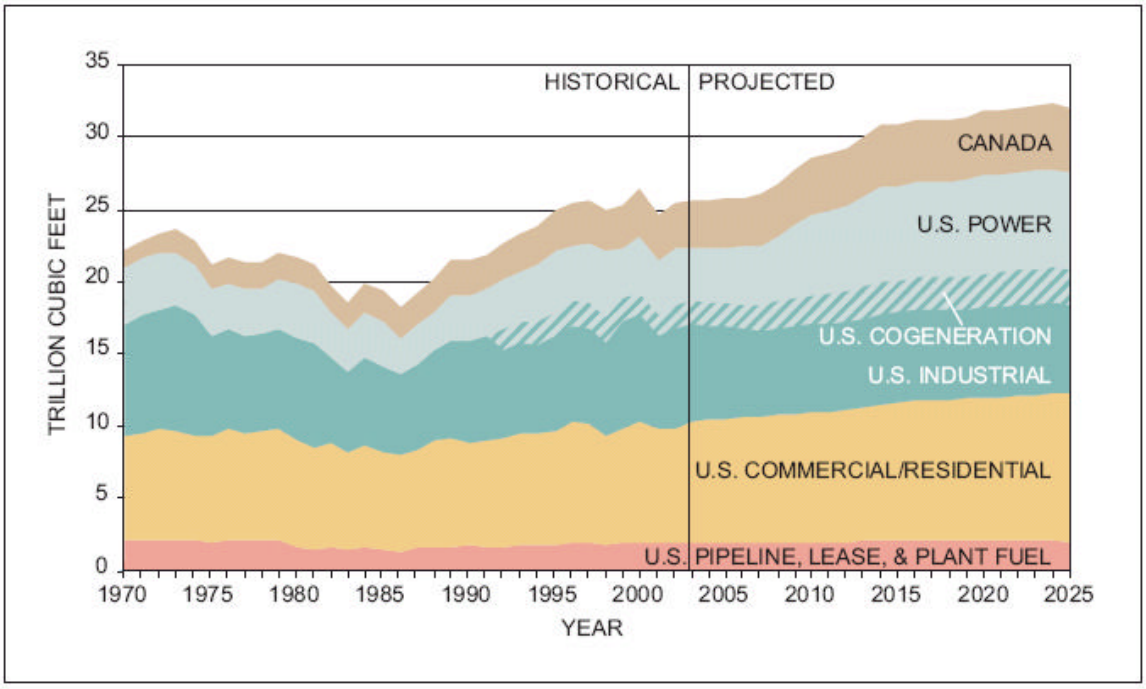
- Declining domestic gas production throughout the lower 48 states and offshore since the late 1990s.
- Expected future decline of gas imports from Canada due to declining production and increased demand in Canada.

The figure below is extracted from a recent National Petroleum Council study on gas supply and demand in North America.



How fast is gas demand growing and what sectors are driving demand?

The Energy Information Administration of the Department of Energy sponsored a study by Energy and Environmental Analysis, Inc., which forecast that U.S. and Canadian gas consumption would grow to about 32 trillion cubic feet[13] by 2020, an increase of about 25%. As is presented below in a chart from the National Petroleum Council, all sectors of the economy—residential, commercial, industrial, and power generation—will contribute to this growth. However, the power generation sector will contribute well over half of the total incremental demand. Importantly, much of the increase will come from increased use of generation capacity that has already been built.



How much gas do we need in New England?

In New England, average annual demand is about 2,200 million cubic feet per day with peak demand of about 3,700 million cubic feet per day. Gas demand will continue to grow, reaching a peak monthly demand of about 4,200 million cubic feet per day and an average monthly demand of about 2,500 million cubic feet per day by 2010 (based on the National Petroleum Council study analysis). An additional study by the Energy Information Administration, Department of Energy, projects 1.6% annual growth in New England over the next 20 years, which amounts to about 720 million cubic feet per day of new demand.

With declining gas production at Sable Island and increasing gas demand in the Maritimes Provinces of Canada, total incremental gas requirements in the region could

[13] The proposed Downeast LNG facility would import about 180 billion cubic feet per year of gas, about 3% of the incremental demand growth of 6 trillion cubic feet. Total incremental demand is equivalent to 33 similar sized LNG terminals.

be more than 1,500 million cubic feet per day by 2015, or three times the capacity of our proposed terminal.

How much gas does Maine consume?

Total gas demand in Maine has risen from 121 million cubic feet per day in 2000 to about 225 million cubic feet per day in 2004, with about 90% of the gas used for the production of electricity. Gas demand for power production in the state has almost tripled, from 74 million cubic feet per day in 2000 to about 200 million cubic feet per day in 2004. This demand is likely to continue to grow. Maine has five gas-fired power plants located in Veazie, Bucksport, Jay, Rumford, and Westbrook.

What sources of energy does Maine currently use to produce power?

Maine consumes about 22,000 MWh of electricity annually, with a total installed capacity of 4,288 MWs. As of 2002, natural gas contributed to 60% of the total energy used in power generation, up from less than 1% in 1993. Other generation sources included petroleum at 5%, hydropower at 12%, and wood waste at about 20%. Wind and solar power generation are negligible.

Energy Source	1993	1997	2002	Annual Growth Rate 1993-2002 (Percent)
Coal	549,170	612,223	603,938	1.1
Petroleum	1,863,091	2,485,207	1,229,485	–4.5
Natural Gas	9,878	3,446	13,503,963	123.1
Other Gases	4,788	5,073	48	–40.0
Nuclear	5,739,866	0	0	NM
Hydroelectric	3,245,779	3,647,932	2,767,848	–1.8
Other Renewables	4,201,700	3,579,526	4,429,751	.6
Total Electric Industry	**15,614,272**	**10,333,407**	**22,535,033**	**4.2**

Source: EIA/DOE, Maine Energy Profile, Table 5. Electric Power Industry Generation of Electricity by Primary Energy Source, 1993, 1997, and 2002 (Megawatt hours).

Major power plants in Maine are presented below. Note that the Veazie 500 MW gas power plant is not included in the list below.

Plant	Energy Sources	Operating Company	Net Capability (MW)
Maine			
1. William F Wyman	Petroleum	FPL Energy Wyman LLC	825
2. Westbrook Energy Cent	Gas	Calpine Eastern Corp	506
3. Maine Independence St	Gas	Casco Bay Energy Co LLC	494
4. Rumford Power Associa	Gas	Calpine Corp	254
5. Champion Clean Energy	Petroleum, Gas	IPC Bucksport	176
6. Androscoggin Energy C	Petroleum, Gas	Calpine Androscoggin Energy	130
7. Great Northern Paper	Hydro	Great Lakes Hydro America LLC	125
8. Somerset Plant	Petroleum, Other	S D Warren Co	115
9. Millinocket Mill	Other, Petroleum	Great Lakes Hydro America LLC	103
10. Mason Steam	Petroleum	FPL Energy Mason LLC	98

Source: EIA/DOE, Maine Energy Profile, Table 2. Ten Largest Plants by Generating Capability, 2002.
http://www.eia.doe.gov/cneaf/electricity/st_profiles/maine.pdf

Have gas prices risen over the past few years in Maine?

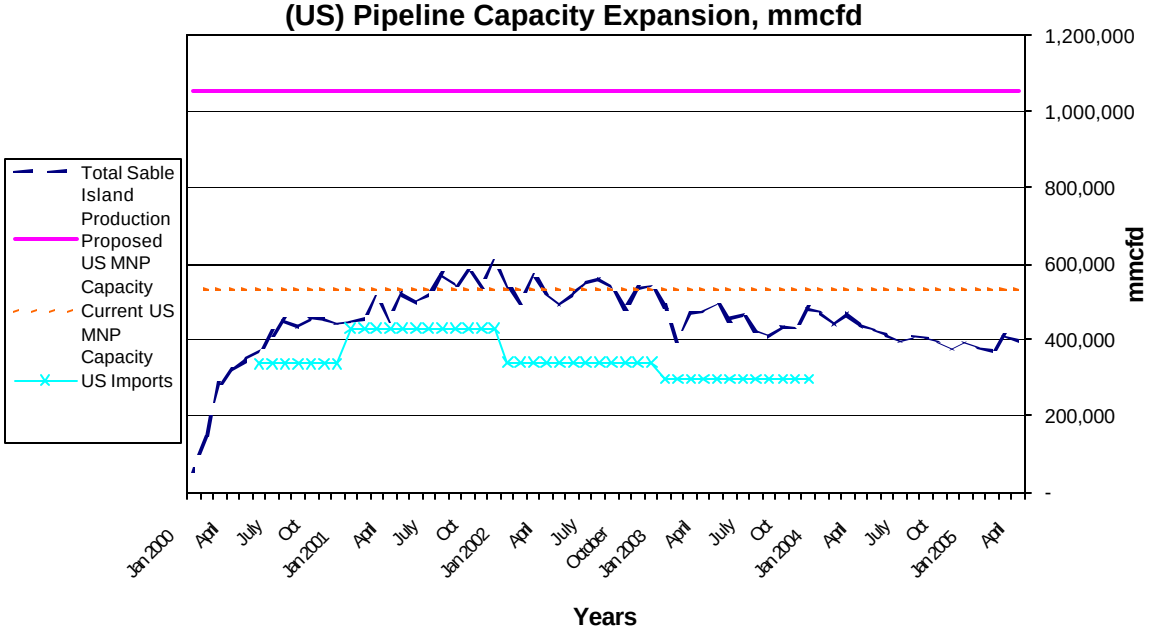
With growing demand and less supply, the average annual gas price has risen 82% over the past four years. The city-gate price (price delivered to a city, e.g., Portland) was $5.30 thousand cubic foot (MCF) in 2000, rising to $9.66 MCF in 2004. Most recently, it was $11.00 MCF in March 2005.

What is happening with the offshore Sable Island facility, which imports gas to New England through the Maritimes & Northeast Pipeline?

Most industry analysts, including current offshore operators in Nova Scotia, expect Sable Island to continue its quicker-than-anticipated production decline. Its production is not expected to last beyond 2015. A key indicator of this decline is the increasing penetration of seawater into the producing gas wells, pointing to reduced well pressure and falling production.

The figure below indicates the long-term trend line of falling production. Most recently, current production continued to decline with October 2004 – April 2005 average production at about 380,000 million cubic feet per day, a more than 35% decline from peaks in late 2001/early 2002 of 570,000 million cubic feet per day. As a result of production decline, imports have fallen from a high of 430 million cubic feet per day (annual average) in 2001 to under 300 million cubic feet per day (average annual in 2003 – a 30% decline).

Declining Sable Island Gas Production and Maritimes&Northeast (US) Pipeline Capacity Expansion, mmcfd



Source: NMP, EIA-DOE, Nova Scotia Gas and SOEP

Will gas from a Maine-based LNG facility be less expensive than Canadian gas?

Natural gas from a Maine-based LNG facility will provide a lower supply cost as compared to either Sable Island (Nova Scotia) gas or LNG imported from Canada. Any gas from Canada is subject to a Canadian postage stamp tariff on the Maritimes & Northeast Pipeline of about $0.44. A Maine-based LNG facility would pay only the U.S. tariff (which Canadian gas sources would pay as well). Total gas price savings could be about 13% on the imported price of LNG. New England gas and power consumers will save, at a minimum, more than $80 million annually due to lower natural gas prices, and as a result, lower power prices.

Can the other proposed LNG projects in New England and the Maritime Provinces meet our gas demand needs?

There are a number of proposed LNG terminals in the Northeast U.S./Canada in various permitting and development stages. The demand picture in the region is robust, however, and can not be met by the potential supply from the proposed terminals.

Downeast LNG also believes that most of these sites, particularly those in the U.S., will encounter difficulty in obtaining all of the necessary permits. (We believe, however, that the proposed Irving Oil LNG terminal in St. John, New Brunswick, Canada *will* be built.)This assessment is based on evidence that growing local opposition may be sufficient to stop the development of the projects, and on site-specific issues associated with some of the sites, including urban locations, environmental impact of dredging, and safety prohibitions.

What about the offshore LNG terminals proposed in Massachusetts, off Cape Ann and Gloucester?

There are two proposals, Northeast Gateway Project and Neptune LNG, which will dock LNG ships with regasifiers on-board about 12 miles off the coast. These proposals would be located in federal waters. The track record of this technology is not well established. Concern has been expressed that the weather conditions, specifically maximum wave height for docking, off the New England coast are much more severe that those in the Gulf of Mexico, possibly testing the technological limits of offshore loading of LNG in this location. Additional issues have been raised by fishermen who are concerned with access to fishing grounds and the impact of the proposed undersea pipeline.

What about increasing the use of renewable energy?

Over the past twenty years, the production cost of alternative energy, particularly wind-generated electricity, has fallen dramatically. The federal government and many states, such as Maine, have introduced incentives to promote renewable energy. This includes tax incentives from the federal government and the establishment of Renewable Portfolio Standards, a minimum percentage target for renewable electricity generated by a power company or in a state.

In Maine, according to the Database of State Incentives for Renewable Energy (Dsire):

> "The State of Maine Public Utility Commission (PUC) adopted a Renewable Resource Portfolio Requirement rule on September 28, 1999 (effective November 4, 1999) pursuant to the state's 1997 electric utility restructuring law. The rule requires electric providers to supply at least 30% of their total retail electric sales in Maine with electricity from eligible renewable resources.
>
> Eligible resources must be a 'small power production facility' that produces electricity using only a primary energy source of biomass, waste, renewable resources, or a combination of these resources and has a production capacity of 80 megawatts or less including any other facilities at the same site. A renewable resource may also be a generation facility of 100 MW or less that uses fuel cells, tidal power, solar arrays and installations, wind power installations, geothermal installations, hydroelectric generators, biomass generators, or generators fueled by municipal solid waste in conjunction with recycling. In addition to renewables, the portfolio standard can be met with 'efficient resources,' specifically, qualified cogeneration facilities."

There are limitations for expanding renewable energy beyond these targets including technical issues related to the transmission of decentralized energy production (isolated wind generators) to urban demand centers.

One of the greatest barriers to expanding renewable energy generation has been wide-scale opposition to wind, small-scale hydro, and biomass. All three options have encountered and continue to encounter opposition in Maine.

What is the experience of wind power in Maine and New England?

In some locations, wind power is less expensive than power generated with coal, fuel oil, or even gas. The proposed Mars Hill project in Northern Maine is the most advanced wind power project under development in the state. In June 2004, the Maine Department of Environmental Protection approved the permit for a 50 MW wind farm on Mars Hill in Aroostook County. However, the project has encountered opposition from opponents, including the Maine Audubon Society, which sought to stop the project due to concern about the risk to birds. The project, if constructed, would meet about 1% of Maine's electrical power demand.

Similarly, the proposed 420 MW Cape Wind project sited offshore in Nantucket Sound has also encountered opposition from boaters and residents due to concern over issues such as visual impact.

Are tidal power or wave turbines a power generation option?

Tidal power or wave turbines have not been commercially or economically proven for wide-scale application. There are some ongoing efforts in Maine to install small-scale wave turbines as demonstration projects. Unfortunately, commercial applications significant enough to meet Maine's power needs are many years away.

In addition, tidal power could significantly impair navigation, impacting other commerce activity and the natural environment. It is important to note that past efforts to develop tidal or wave power in Maine and in other locations have met with opposition.