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OVERVIEW OF ISSUES COMMON TO STRUCTURING, NEGOTIATING AND DOCUMENTING LNG PROJECTS

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Natural gas has become the fuel of choice throughout the world, primarily because of its high efficiency and environmental benefits compared to its main fuel competitors: crude oil and coal. Over the period 1987-1996, natural gas consumption expanded at a rate of 25% percent compared to crude oil's expansion of consumption by only 13%. The International Energy Agency recently predicted that gas demand will increase faster than any other primary energy source and that natural gas' share of world energy use will increase to 30% from 20% by 2020.¹

Nations that have insufficient natural gas resources often choose to purchase liquefied natural gas ("LNG") transported by sea rather than natural gas delivered by pipeline. The world LNG trade has risen steadily since 1965 and annual deliveries of LNG have doubled over the last ten years. LNG exports are expected to rise by more than 7% per annum during 1995-2005, especially given the fact that four new projects (Ras Laffan, Nigeria, Oman, and Atlantic) commenced deliveries of LNG within the last year.

This paper is intended as an overview of issues common to structuring, negotiating and documenting LNG projects. It will first describe LNG and its safety record, how the maritime LNG industry developed, LNG's importance, and the "LNG chain." Next, it will discuss how a typical LNG project is structured, the reasons why a particular structure is chosen, the critical contractual agreements utilized in these structures, and some common structuring issues. A brief discussion will then follow of some issues common to negotiating and documenting LNG projects. Lastly, this paper will note trends in the LNG industry of possible importance to those structuring, negotiating or documenting LNG projects.

I. THE LNG INDUSTRY

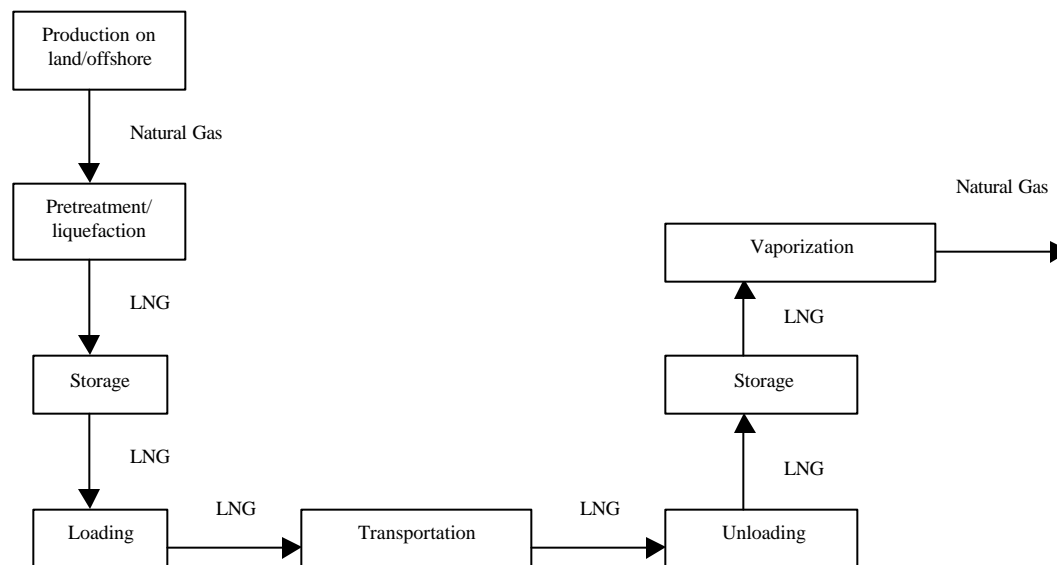
A. WHAT IS LNG?

LNG is simply natural gas that has been cooled to approximately -161°C (-260°F) to its liquid state via a special cooling process. In order to liquefy natural gas, it must first be produced from a field and then piped to an LNG facility. The gas then goes through a liquefaction process that, in addition to cooling the gas, removes the small quantities of nitrogen, oxygen, carbon dioxide, sulfur compounds, and water that are typically found in "pipeline" natural gas. Experience shows that people outside the industry often confuse LNG and LPG. Natural gas (and therefore LNG) consists mainly of *methane* (typically 90%² or more), while LPG (liquefied petroleum gas) consists of the heavier hydrocarbons *butane* and *propane*. The LNG and LPG industries are considerably different in terms of process, shipping, safety, and players. Moreover, LNG is not the same as NGL (natural gas liquids), which is essentially condensate.

¹ Source: Oil & Gas Journal (Online Story), June 14, 2000.

² In addition to methane, LNG may also contain ethane, propane and heavier hydrocarbons, depending on the original composition of the gas.

The simplified process natural gas goes through to become LNG and to return to regasified natural gas can be illustrated as follows:



In the liquefaction process, the LNG is cooled in huge refrigeration units called “trains.” Basically, liquefaction involves the removal of heat by passing compressed natural gas across surfaces cooled by another gas in order to reduce the temperature of the natural gas. Several liquefaction processes have been developed. Among them, two of the most prevalent are the Air Products (APCI) and the Phillips Cascade technologies. Although the APCI liquefaction process technology has been selected for the vast majority of LNG plants, one of the most recent plants to come on stream, Trinidad and Tobago's one-train Atlantic LNG project, used the updated Phillips Cascade technology. Moreover, using more than one liquefaction process may be economical, depending in part on the size of the project.

After the liquefaction process is complete, the substance is compacted to where it occupies only 1/600th of its gaseous volume. LNG is stored as a "boiling cryogen," a very cold liquid at its boiling point for the storage pressure. Because LNG must be kept very cold in order to remain a liquid, storage in insulated tanks is necessary, both while awaiting shipment and while on board special LNG tankers.

The average LNG Tanker holds 125,000-138,000 cubic meters of LNG, the equivalent of approximately 60-65 Olympic swimming pools. LNG which evaporates during the journey is used by the tanker to fuel its engines. At the receiving terminal in the importing country, the LNG is unloaded from the tankers and then, after storage, regasified by the buyers of the LNG in a “regasifier” specially equipped to convert the liquefied product into pipeline-quality natural gas. After regasification, the resulting gas is piped to power plants and other natural gas users. The possible usage of regasified natural gas is no different than that of normal pipeline natural gas; regasified natural gas is used in a variety of ways in homes, businesses, power plants, industrial factories, and even cars.

B. IS LNG DANGEROUS?

In early years, LNG was criticized as being extremely dangerous. The book *FROZEN FIRE: Where Will It Happen Next?*, published in 1970 by Friends of the Earth (San Francisco), concluded that LNG is a "lethal gamble" because there is a real risk that "an entire city will be leveled by an LNG accident, and that tens of thousands of people will die."³ Safety concerns raised by such allegations likely

³ Source: Frozen Fire, page 20

contributed to the refusal to allow the importation of LNG into Los Angeles in the early 1980s even though the United States had been exporting LNG from Alaska to Japan since 1969 without any serious safety incidents.

The reality is quite different than that originally claimed by LNG's critics. LNG's inherent nature and advances in cryogenic technology have enabled the LNG industry to develop an enviable safety record. LNG is odorless, colorless, non-toxic and non-corrosive. Because LNG is mostly methane, it is lighter than air and will easily disperse if there is a gas leak. When mixed with air or vaporized, it burns in a narrow range of concentration (5%-15%). Shell and other major LNG companies have spent millions of dollars carrying out research into the physics and chemistry of the dispersion and combustion of LNG, which resulted in a better understanding of the true hazards of LNG. The LNG industry was also a major beneficiary of NASA's and the aerospace industry's heightened understanding of cryogenics and cryogenic storage. Liquid gas systems are designed and constructed in compliance with very high standards to ensure integrity, reliability and safety. The International Maritime Organization, a division of the United Nations, has published since 1983 the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), which is observed by shipyards that build LNG tankers.

Today, little debate exists concerning the safety of the LNG industry. In fact, the superior safety record of the LNG industry was one of the main rationales behind the International Maritime Organization's decision in 1996 to separate the liabilities under the HNS Convention⁴ of the LNG industry from those of the crude oil and LPG industries. A 1993 study found that since the startup of overseas LNG transport, the world fleet landed 1.4 billion tons of LNG in 18,300 voyages over a distance of 36.6 million miles without a single fatality or major incident. The survey also found that LNG tanker safety for the study period (1977-91) was measurably better than that for oil and chemical tankers.

C. HOW DID THE LNG INDUSTRY DEVELOP?

As noted in the following chart⁵, almost three quarters of the LNG trade is dominated by Asian importers, with Japan being the largest importer by far.

LNG Importing Countries, 1999

Importing Country	Million Metric Tons	% of Total	% Change over 1998
Japan	50.801	55.82	+ 5.14
Korea	12.802	14.07	+23.75
France	7.404	8.13	+ 0.69
Spain	5.432	5.97	+ 21.51
Taiwan	3.939	4.33	+2.45
United States	3.451	3.79	+ 90.24
Belgium	2.927	3.22	- 5.61
Turkey	2.179	2.39	-12.87
Italy	2.072	2.28	+ 40.27
Greece (started 11-1999)	-	-	-
Total	91.007	100.00	+9.35

⁴ See International Convention on Liability and Compensation for Damage in Connection with Carriage of Hazardous and Noxious Substances by Sea (1996).

⁵ Source: *An Overview of the Global Baseload LNG Industry - Markets, Projects, Economics*, Institute of Gas Technology (April, 2000)

Existing exporters as of 1996 are shown on the following chart⁶:

LNG Exporting Countries, 1999

Exporting Country	Million Metric Ton	% of Total	% Change over 1998
Indonesia	28.555	31.38	+ 6.67
Algeria	19.183	21.08	+ 4.22
Malaysia	14.802	16.27	+ 3.67
Australia	7.254	7.97	- 0.34
Qatar	6.329	6.95	+ 80.06
Brunei	6.088	6.69	+ 5.24
Abu Dhabi	5.100	5.60	- 1.71
Trinidad & Tobago	1.539	1.69	-
U.S.	1.303	1.43	- 3.48
Libya	0.693	0.76	+5.80
Nigeria	0.161	0.18	-
Oman (started 4-2000)	-	-	-
Total	91.007	100.00	+ 9.35

The “maritime” LNG industry (as opposed to LNG transported by road) has a very interesting, albeit relatively brief, history. Methane was first liquefied in 1845, and LNG technology continually evolved over the next century. As an experiment, in 1959 the “Methane Pioneer” carried the first maritime LNG cargo from Louisiana to the United Kingdom. This successful trial supported the commencement of the first international LNG trade in 1964 between Algeria and the UK. The successful Algeria-to-Europe trade (which now includes Belgium, Italy, France, Spain, Greece, Turkey and the United States but no longer the UK) captured attention. Natural gas producers with no local markets and natural gas users with a shortage of indigenous gas supplies began to consider LNG seriously.

Japan’s decision in the late 1960s to import LNG from Alaska and the 1973 oil shock fueled the expansion of the LNG industry in the early years. By the end of 1979, Japan was importing LNG from Alaska, Brunei, Abu Dhabi and Indonesia, all under long-term take-or-pay contracts closely tied to crude oil prices. Most of the early LNG export projects were either equity financed or relied on significant government support from Japan, the financially stronger country. Asia’s continued economic growth in the 1980s and the popularity of combined-cycle gas turbines for power generation in developing countries further increased the demand for LNG. In the 1980s Malaysia and Australia became LNG suppliers as several countries began the switch to importing LNG, most notably South Korea and Taiwan.

Major reductions in the cost of LNG plants after the second oil crisis in 1986, the decision of developing Middle East countries to commercialize their gas reserves, and the shortage of excess supplies at existing LNG plants allowed several new LNG plants to emerge in the 1990s. Qatar’s Ras Laffan and Qatargas projects were structured and developed quickly between 1991 and 1995, with Ras Laffan being so well received that it achieved breakthrough financing via a \$1.2 billion bond offering, the largest ever by a Middle East company. Backed by Korea’s apparently insatiable demand for LNG, Oman’s LNG project was successfully launched with the signing of a long-term sales contract in 1996. The Oman project and the Atlantic project of 1995 in Trinidad and Tobago were both project financed at very competitive rates. Lastly, after some thirty years of discussion, the Nigerian LNG project was finally developed in the mid-1990s based on equity financing from Shell and the other project participants. Although the Asian economic crisis of 1997-98 slowed down LNG demand, the list of new LNG importers has recently grown. At present, there are 38 receiving terminals operating in the ten LNG importing countries mentioned above. Deliveries commenced in mid-2000 into Ecoelectric, a new Puerto Rico LNG import facility, and importers in Dabhol, India (led by ENRON of the United States) are

⁶ Source: *An Overview of the Global Baseload LNG Industry - Markets, Projects, Economics*, IGT (April, 2000)

presently constructing the necessary LNG receiving terminals to import LNG from Oman and Abu Dhabi. Moreover, Portugal agreed in 1999 to begin directly importing Nigerian LNG. Additional possible import projects (including, for example, China, Brazil, Northern Taiwan, and other portions of India) appear to be moving towards finalization.

As the following table shows, many companies are now involved in LNG export projects.

COMPANIES AND NATIONAL OIL COMPANIES PARTICIPATING IN LNG EXPORT PROJECTS⁷

COMPANY (or National Oil Company)	EXISTING EXPORT PROJECTS
AGIP	Nigeria
BHP	Australia North West Shelf
BP Amoco ARCO	Abu Dhabi, Australia North West Shelf, Indonesia (Badak), Trinidad and Tobago
Chevron	Australia North West Shelf
ExxonMobil	Indonesia (Arun), Qatar (Qatargas and Ras Laffan)
Lasmo	Indonesia (Badak)
Marathon	Alaska (Kenai)
Phillips	Alaska (Kenai)
Shell	Australia North West Shelf, Malaysia, Brunei, Oman, Nigeria
TotalFinaElf	Abu Dhabi, Qatar (Qatargas), Indonesia (Badak), Nigeria, Oman
Woodside Petroleum	Australia North West Shelf
British Gas	Trinidad and Tobago
Cabot LNG	Trinidad and Tobago
Chinese Petroleum Corporation	Indonesia (Badak)
Itochu	Qatar (Ras Laffan), Oman
Korean Companies	Oman, Qatar (Ras Laffan)
Marubeni	Qatar (Qatargas)
Mitsui	Abu Dhabi, Australia North West Shelf, Qatar (Qatargas), Oman
Mitsubishi	Malaysia I & II, Brunei Australia North West Shelf, Oman
Nissho Iwai	Qatar (Ras Laffan)
Partex	Oman
Repsol	Trinidad and Tobago
Abu Dhabi National Oil Co. (U.A.E.)	Abu Dhabi Gas Liquefaction Company
Sonatrach (Algeria)	Arzew, Camel, Skikda
Brunei Coldgas	Brunei LNG
PERTAMINA (Indonesia)	Arun, Badak
Sirte Oil Co. (Libya)	Marsa el Brega
Petronas (Malaysia)	Malaysia LNG Sdn. Bhd. Malaysia LNG Dua
Qatar General Petroleum Co.	Qatar Liquefied Natural Gas Co. Ras Laffan LNG Co.
National Gas Co. of Trinidad and Tobago	Trinidad and Tobago
Nigeria National Petroleum Co.	Nigeria
Government of Oman	Oman LNG

Competition among LNG exporters is presently fierce, as recent discoveries of nearby natural gas reserves have enabled almost every existing plant to entertain expansion plans. Discoveries of huge natural gas reserves in remote locations have further increased the competition among exporters and ensured LNG importers a security of supply for many years to come. Several new “greenfield” export projects (i.e. projects that are not the expansion of an existing plant) are under development, including the following:

⁷ Source: *An Overview of the Global Baseload LNG Industry - Markets, Projects, Economics*, IGT (April, 2000), as revised by the author.

GREENFIELD LNG EXPORT PROJECTS UNDER DEVELOPMENT

Country	Greenfield Project	Lead Developers
Angola	Angolan LNG	Texaco
Australia	Gorgon	Shell, ExxonMobil, Texaco, Chevron
Australia	Darwin	Shell, Woodside Petroleum
Indonesia	Tangguh	BP Amoco ARCO, PERTAMINA
Russia	Sakhalin	Shell, Mitsui
United States	Alaskan North Slope	BP Amoco ARCO, Phillips Petroleum, Marubeni
Venezuela	Venezuela LNG 1	ENRON
Venezuela	Venezuela LNG 2	Shell, ExxonMobil, Mitsubishi, PDVSA
Egypt	Egyptian LNG	BG International, Edison
Egypt	Egyptian LNG 2	BP Amoco ARCO, Snam
Iran	Iranian LNG	Petronas, Reliance, National Iranian Oil Co.,
Norway	Snohvit LNG	Statoil
Yemen	Yemen LNG	ExxonMobil, TotalFinaElf, Hunt

D. WHY IS THE LNG INDUSTRY IMPORTANT?

The LNG industry is important simply because known reserves of natural gas (today's fuel of choice) are often not located near potential customers. Although most natural gas is consumed in the area it is produced, more than 20% of gas is traded internationally. The difficulty lies in the fact that more than half the world's gas reserves are located in seven countries that are remote from markets: Russia, Iran, Kazakhstan, Saudi Arabia, Qatar, Turkmenistan, and Australia. Even though these reserves (as listed on the following Table)⁸ are remote, they have been and will be developed via long-haul pipelines and LNG.

Proved Gas Reserves (1999)

Country	Proven Reserves (TCF)	Country	Proven Reserves (TCF)
1. Russia	1,700	14. Uzbekistan	66
2. Iran	812	15. Kazakhstan	65
3. Qatar	300	16. Canada	64
4. United Arab Emirates	212	17. Mexico	63.5
5. Saudi Arabia	204	18. Netherlands	63
6. United States	164	19. Kuwait	52
7. Venezuela	142.5	20. Libya	46
8. Algeria	130	21. China	48
9. Nigeria	124	22. Australia	45
10. Iraq	110	23. Norway	41
11. Turkmenistan	101	24. Ukraine	40
12. Malaysia	81	25. Egypt	31.5
13. Indonesia	72		
Total World			5,100

From the exporter's standpoint, the LNG industry enables developing countries with abundant natural gas reserves and limited local markets to commercialize those reserves to the benefit of the country's people. Indonesia, for example, presently exports more than \$4 billion worth of LNG, and the

⁸ Source: U.S. Department of Energy (EIA) (1999), citing Oil and Gas Journal (1999).

revenues from the two existing projects make up a vital part of the Indonesian Government's budget. Likewise, Qatar is expected to become one of the richest nations (per capita) by 2010 on the strength of LNG and oil revenues.

The importer compares whether LNG is competitive with any available pipeline gas supplies. If the importer is a power company that utilizes many fuels, the importer will compare the cost and efficiency of LNG to other fossil fuels (such as coal and oil) and with other alternative sources of energy (nuclear and hydroelectricity). Because natural gas is the fuel of choice for efficiency, environmental and other reasons, power companies in particular look for sources of natural gas, including by LNG, that will ensure a stable supply.

Large reserves of natural gas (generally more than 7 trillion cubic feet) that are remote must be evaluated on a case-by-case basis to decide if LNG development is preferable to other gas-monetization possibilities. These other uses include delivery to market by pipeline or local production of alternative export products such as methanol or fertilizer. If the distance to market is more than 1,000-2,000 miles, if borders of uninvolved countries must be crossed, or if pipeline construction costs are prohibitive, LNG shipped by sea is likely to be the preferred route over a pipeline. Whereas pipelines have the disadvantage of absolute point-to-point rigidity, the LNG business often offers better flexibility and improved security of supply: sellers are able to sell to multiple destinations, and buyers are able to buy from multiple sources and to divert cargoes to alternative destinations when necessary. A purchaser who could not support construction of a single pipeline can combine with other similarly situated purchasers to help launch an LNG project. For instance, in 1973 six Japanese electric and gas companies joined together to purchase sufficient LNG to support the construction of two LNG plants in Indonesia; the resulting "1973 Sales Contract" remains the largest single LNG sales contract now in effect.

At the present time only about 25% of internationally traded gas moves as LNG, so LNG's role as a niche fuel is likely to continue for the foreseeable future. However, the success of the LNG trade to date will continue to encourage countries with large but remote gas reserves and nations that have insufficient natural gas resources to jointly develop new LNG projects. For example, the Yemen LNG Project, the largest industrial venture ever undertaken by Yemen, is finalizing plans to export LNG. India turned to LNG to satisfy its high demand for natural gas after failing to fill its needs via pipeline gas (a memorandum of understanding between the Indian company GAIL and the National Iranian Gas Company for pipeline gas has long been dormant due to the Pakistani government's veto of a proposed pipeline route through its waters). At least six new LNG receiving terminals are slated for construction in India over the next five years; one is already under construction as part of a massive LNG-and-power project being undertaken by ENRON.⁹ Last year, one expert predicted that India, which currently imports no LNG, will be importing up to 20 million tons of LNG between 1999 and 2004.¹⁰

E. WHAT IS THE LNG CHAIN?

LNG is not yet traded as a commodity. To understand the LNG industry of today and the issues common to structuring, negotiating and documenting LNG projects, one must appreciate the inter-related "chain" of LNG activities and facilities. In a chain, the success of the overall project is dependent on the success of each individual link. For LNG projects to come to fruition, all project activities and facilities must be coordinated through joint, long-range planning. Contractual agreements setting forth the integrated duties and responsibilities of each of the participants in the chain are necessary, as is flexibility

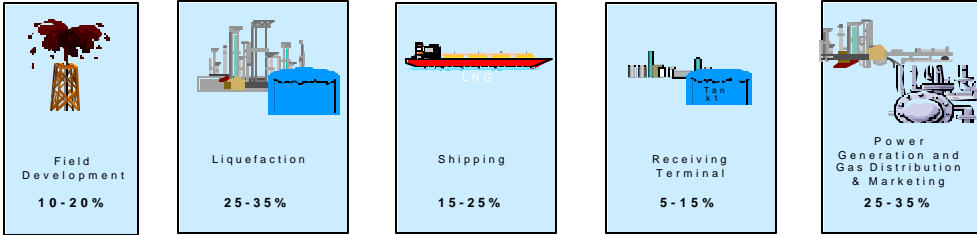
⁹ Source: Oil & Gas Journal, June 19, 2000

¹⁰ Source: Oil & Gas Journal, April 1, 1999

on the participant's part to resolve problems through long-term solutions that maintain the strength of the project as a whole.

LNG projects are typically developed as an integrated chain of dedicated facilities and activities - from gas production, transmission, liquefaction and storage in the exporting country, to marine transport, and, finally, to regasification and distribution in the importing country. The following chart includes typical estimates of the distribution of costs in the LNG chain.

LNG COST CHAIN



In a typical 5 million tons per annum case in Asia, the following costs have been historically representative:

Field Development	2 Billion US\$
Liquefaction	2 Billion US\$
Shipping	1-2 Billion US\$
Terminal	1-2 Billion US\$
Distribution/Marketing	4+ Billion US\$

Obviously, where the investment is in billions of dollars, buyers must have a reliable supply and sellers must have stable buyers.

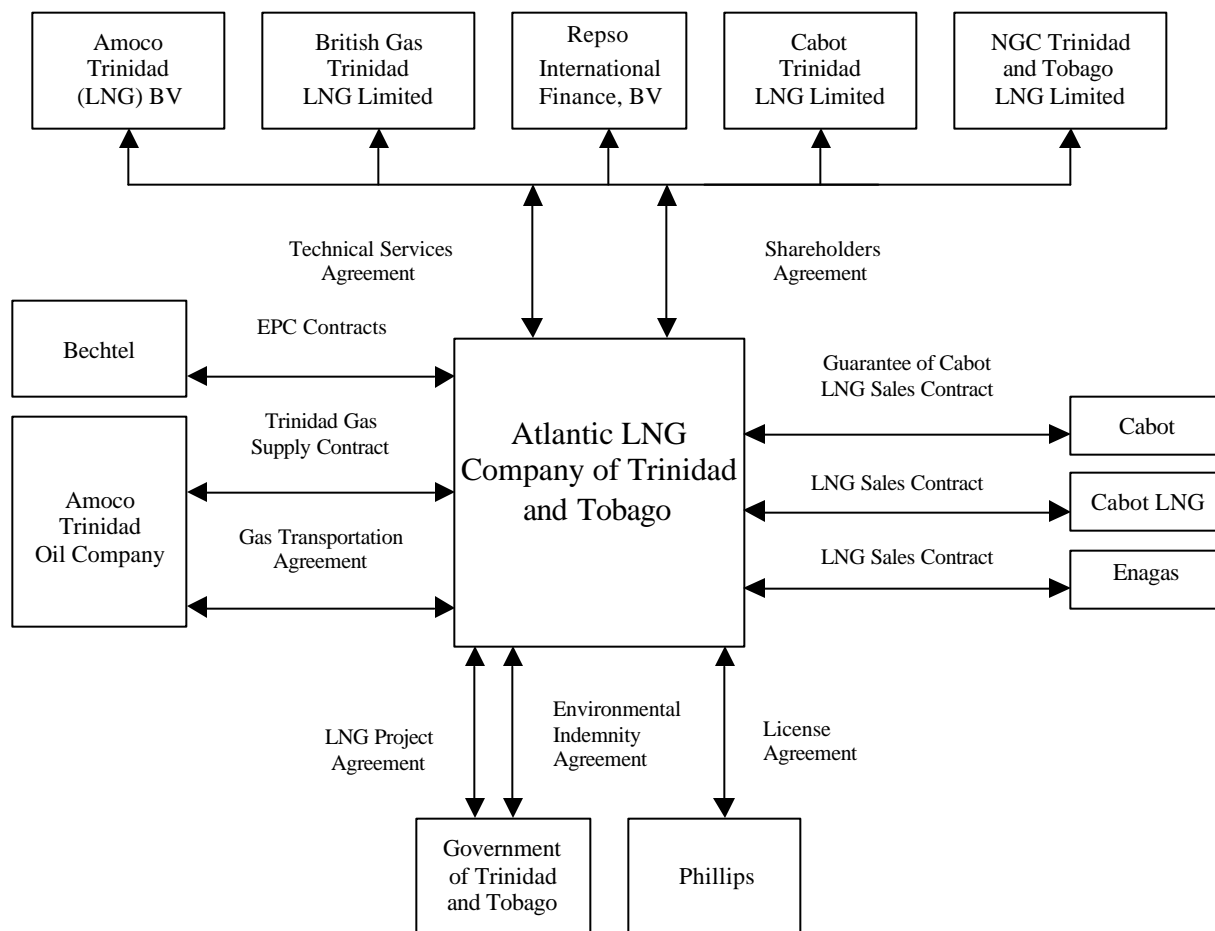
An LNG facility is often dedicated to a single LNG trade. If LNG cannot be delivered by the seller and/or received by the buyer, the seller may be unable to secure immediate sales to “cover” itself and the buyer may be unable to find alternative supplies on short notice. Failure to properly coordinate activities could have severe commercial effects throughout the remaining parts of the chain. This interdependency results in all parties being exposed to all risks in the LNG chain since failure in any part of the chain affects all other parts. For example, in the Indonesian Train E Project completed in 1990, although the liquefaction plant had been completed on schedule, a delay in completion of the receiving facility in Taiwan forced the postponement of LNG shipments.

II. ISSUES COMMON TO STRUCTURING LNG PROJECTS

A. HOW ARE TYPICAL LNG EXPORT PROJECTS STRUCTURED?

Because of its size, the interdependency of the LNG chain, and the multitude of players and issues, an LNG project is one of the most complex of energy ventures. Each project is uniquely structured, as there is no one pattern of participation, gas supply, revenue sharing, financing, transfer pricing, etc. Nevertheless, trends have developed in the industry over the last 25 years such that one of three forms is generally utilized for structuring the LNG exporter's project. Although options such as a "Tolling Company" or a "Non-Incorporated Joint Venture" are also available, exporters undertaking LNG projects in recent years have overwhelmingly chosen to utilize the "Project Company" structure.

Under the Project Company structure, the participants become shareholders in a new company (usually incorporated in the country where the gas is located) that finances and owns the LNG plant. The project company purchases gas from upstream producers, liquefies the gas, and resells the LNG to third-party purchasers. Thus, the project company is the entity that receives revenue from the LNG sale, and such LNG sales revenues are passed back to the participants through shareholder dividends. The owners of gas reserves also profit from the separate sale of their feed gas, and such upstream profits are routinely taxed at a rate that varies from the Project Company's overall tax rate. The following is a graph illustrating the Project Company structure used for the first train of the Trinidad and Tobago Atlantic LNG project.



The Project Company structure has also been utilized recently for projects in Nigeria, Malaysia, Qatar, and Oman. Because the assets and liabilities of the LNG project are confined to a separate entity to which the shareholders contribute significant equity, the Project Company structure is very conducive to financing. Trinidad's Atlantic LNG, Qatar's Ras Laffan, and Oman LNG collectively raised several billion dollars of commercial bank and/or bond financing utilizing the Project Company structure. This vehicle has proved very flexible, as parties are able to participate in parts of the LNG chain but not in others. For example, as a marketing mechanism, Ras Laffan chose to make certain Japanese companies shareholders for Class B shares in the project company in order to segregate revenues from the first train's sales to Japan from sales supplied by subsequent trains.

However, from the viewpoint of the participants other than the host government, the Project Company structure has also had its drawbacks. Because a project company is established to own and supply a certain number of trains, future expansion plans are not addressed at the time of initial structuring. Negotiations for such expansions can be time consuming and distracting. Moreover, as foreign participants in projects such as Brunei, Malaysia and Abu Dhabi have found, when the time comes to expand the initial phase of the LNG plant, agreement on expansion or extension of the initial phase typically comes at the price of a smaller equity share for the foreign participants. For instance, in 1977, when the first two trains were built, the Abu Dhabi National Oil Company's share was 51%; when agreements were signed in 1997 on extension of the project, its share was increased to 70% and the foreign participants' shares were correspondingly decreased.

An alternative structure that has been very successful in Indonesia is the "Tolling Company." When the first LNG projects commenced in Indonesia in 1973, it was decided that the Indonesian government would finance and own the two LNG plants and that such plants would be operated on a non-profit basis. Although for obvious liability reasons separate companies (P.T. Badak and P.T. Arun) were incorporated to operate the two LNG plants and liquefy the gas, neither company purchases natural gas from upstream producers nor resells the LNG to third-party purchasers. Instead, under the Indonesian version of the Tolling Company structure, the national oil company PERTAMINA and its production sharing contractors jointly market the LNG to buyers, with the final sale being solely in the name of PERTAMINA. Since the company liquefying the gas does not make a profit, all revenues are generated to PERTAMINA and the foreign participants at the upstream level according to the equity splits set forth in the relevant production sharing contracts. Even though since the mid-1980s the Indonesian government no longer funds the construction of LNG trains, the Tolling Company structure has successfully supported the limited recourse financing of four new trains at a cost of more than \$3 billion. Despite the accomplishments of the non-profit tolling company structure in Indonesia, however, the Tolling Company structure has yet to be duplicated elsewhere.

Projects in Alaska and Australia followed the "Non-Incorporated Joint Venture" structure approach, reportedly due to legal, tax and marketing considerations. For example, each participant in the Northwest Shelf Project in Australia owns one sixth of the LNG plant, supplies one sixth of the LNG and is entitled to one sixth of the revenues. Woodside Petroleum, one of the participants in Northwest Shelf, is appointed the Operator of the venture on behalf of the all participants. Neither the Alaska (Kenai) project nor the Australia project chose to obtain third-party financing. The Non-Incorporated Joint Venture approach, which is common for upstream oil and gas ventures but more rare for downstream ones, may be a suitable choice for projects in countries where (i) the government takes a more passive role (e.g. royalty or tax only); and (ii) a well-known legal system (such as those which exist in the United States and Australia) covers such ventures.

The above discussion has focused on how LNG exporters have established the gas supply, liquefaction and marketing facets of their LNG schemes. Transportation has been handled in a variety of ways, depending in part on the desire of the importer's government to support its shipbuilding industry, the availability and cost of non-dedicated LNG tankers in the world market, the willingness of importers and exporters to take maritime risks, the desire to make the transportation segment a separate "profit center" and the need to control excess shipping capacity to make advantageous short-term sales or purchases. For example:

- Export participants in some LNG projects have chosen to charter rather than take any ownership interest in the necessary LNG tankers, whereas other projects have chosen to have ships owned by the project or its participants.
- Some LNG exporters insist on selling on a delivery ex ship basis (i.e. delivering the LNG to the buyer's unloading port) while others allow LNG purchasers to purchase on an FOB basis and assume responsibility for the cargo at the LNG plant.
- Many Japanese gas companies have no objection to owning LNG tankers as a way to reduce costs and control their offtake patterns, while Japanese electric companies have been very reluctant to take any responsibility for shipment of their cargoes.

Recent projects view transportation as a means of greatly reducing costs and making LNG more competitive. The cost of Nigerian LNG, for instance, has no doubt been significantly lowered due to the use of older vessels that were purchased by Shell in the late 1980s and early 1990s when the values of LNG tankers were depressed because of an oversupply of LNG transportation capacity.

B. WHAT AGREEMENTS ARE KEY TO TYPICAL EXPORT LNG PROJECT STRUCTURES?

The exact agreements necessary for implementing an LNG project will to a great extent be a consequence of the structure chosen by the LNG exporter - either Project Company, Tolling Company, Non-Incorporated Joint Venture, or an alternative structure.

Even though practice varies between countries, the key agreements in the Project Company structure include following:

- Project Development Agreement covering overall structure of the project
- Documents establishing Project Company (Articles, By-Laws, etc.)
- Shareholders Agreement for Project Company
- Technical Service Agreements between Project Participants and Project Company
- Feed Gas Sales Agreements between Gas Owners/Producers and the Project Company
- LNG Sales and Purchase Contracts between Project Company and Buyers
- Financing Agreements between Lenders and Project Company
- LNG Plant Construction Agreement between Project Company and EPC Contractor
- Time Charters or Voyage Charters (if tankers not owned by Project Participants)

- Shipbuilding Agreements and Ship Operation Agreements (if tankers owned by Project Participants)

For the Tolling Company structure (as being implemented by Indonesia), the key agreements include the following:

- Production Sharing Contract (PSC)
- Principles of Agreement supplementing the PSC for LNG project purposes
- Joint Operating Agreement between/among Production Sharing Contractors
- Documents establishing Tolling Company (Articles, By-Laws, etc.)
- Shareholders Agreement for Tolling Company (confirming non-profit status)
- Plant Use and Operation Agreement between PERTAMINA and Tolling Company
- Processing Agreement between/among Tolling Company and gas owners/producers
- Technical Service agreements between/among PSC Project Participants and Tolling Company
- Gas Supply Agreements between/among Gas Owners/Producers and PERTAMINA
- LNG Sales and Purchase Contracts between/among PERTAMINA and Buyers
- Financing Agreements between/among Lenders and Trustee Borrower
- LNG Plant Construction Agreement between PERTAMINA and EPC Contractor
- Time Charters or Voyage Charters (since tankers are not owned by Project Participants)

The key agreements in the Non-Incorporated Joint Venture Company structure (as being implemented in Australia) include the following:

- Joint Venture Project Agreement covering overall structure of the project¹¹
- Service Agreements between/among certain Project Participants and Operator
- Gas Recycling Joint Venture Agreement between/among Joint Venture Participants
- LNG Plant Operation Agreement between Plant Operator and Joint Venture Participants
- LNG Sales and Purchase Contracts between each Joint Venture Participant and each Buyer
- LNG Plant Construction Agreement between Plant Operator and EPC Contractor
- Shipping Agreement covering overall shipping structure
- Documents establishing Shipping Company (Articles, By-Laws, etc.)
- Shareholders Agreement for Shipping Company between/among all Joint Venture Participants
- Shipping Service Agreement between Shipping Company and separate Management Company
- Time Charters (for tankers not owned by Joint Venture Participants)

¹¹ See North West Gas Development (Woodside) Act 1979 (Western Australia).

C. WHAT ARE SOME ADDITIONAL COMMON STRUCTURING ISSUES?

The scope of this overview does not allow for a thorough listing or discussion of the multitude of issues that arise in structuring an LNG project. However, in addition to the issues addressed above, the following are examples of significant structuring issues that confront LNG lawyers and others responsible for implementing an LNG project:

- 1) Project Participation. What entities will participate in the project? What form will that participation take? These are central structuring questions. Gas suppliers, LNG purchasers, the exporting country's government, trading companies and many others vie for an ownership interest in the export project, either through the LNG plant or otherwise. Likewise, the exporting country's government and local individuals, as well as LNG buyers and gas suppliers, at times attempt to gain an interest in LNG vessels. Furthermore, a multitude of players may seek to own an interest in the LNG receiving terminal and related power and distribution facilities. For example:
 - a) *LNG Purchasers*. In the last decade many LNG purchasers (or their agents) have sought to acquire an interest in LNG plants and projects. Such investment has come through a variety of ways, including
 - ownership of a production sharing contract interest (e.g. Chinese Petroleum Corporation's 1990 acquisition of a 20% interest in the Indonesian Sanga Sanga Block);
 - ownership of shares in the company owning an LNG Plant (e.g. Kogas' 5% investment in the Oman LNG Project);
 - ownership of shares in the company operating the LNG plant (e.g. the Japanese buyers' investment in the company operating the Indonesian LNG plants at Bontang and Arun);
 - ownership of LNG vessels (e.g. Nissho Iwai's ownership of interests in LNG tankers used in Asian trade); and
 - formation of a strategic alliance tying participation in the LNG plant with additional LNG purchases (e.g. Repsol and BP Amoco's 1998 Strategic Alliance for the Trinidad and Tobago LNG trade).
 - b) *Government Oil and Gas Company*. Obviously, the local government will, given its typical ownership interest in the natural gas, choose to participate in the export phase of the project. Issues often arise, however, when the financial condition of the Government Oil and Gas Company does not allow it to support the project in the same manner as the other participants.
 - c) *Other Local Companies*. LNG projects are prestigious and profitable. Companies with significant local political leverage often seek to become involved in the project, through ownership of an LNG tanker, participation in the production sharing contract or license, or as a major supplier or contractor. Their introduction, especially at a late stage in the process, can severely complicate the structure, especially if the local company's balance sheet requires support or financial guarantees.
 - d) *Trading Companies*. Particularly in the Asian trade, trading companies play an important role in facilitating the sale of LNG. These trading companies do not purchase the LNG

but assist in identifying the market and in finalizing the details of the trade. Most LNG projects in Asia have at least a small percentage that is owned by a trading company based in the main importing country. For example, Mitsui and Mitsubishi are Japanese trading companies that together own a one-sixth interest in the Australian Northwest Shelf Project, and a Korean company, SK Corporation, owns an 8.38% interest in the developing Yemen LNG Project.

- 2) Extensions. As mentioned above, future expansion plans are often not addressed by the project sponsors from the outset. In particular, in the event the parties decide to structure the project so that all gas suppliers (existing or additional) will participate in the same manner as they did for the initial phase of the project, well-considered approaches to such expansions will be needed. Discussions on the expansion of the Atlantic LNG Project, for example, took more than one year before agreement could be reached between the Trinidad and Tobago government, the LNG Project owners, and gas suppliers.
- 3) Sanctions. Some countries that have an abundance of natural gas reserves (e.g. Libya and Iran) are subject to certain governmental sanctions which may prevent certain companies from participating in the project. For instance, the United States Iranian Transactions Regulations (31 CFR Part 560) issued on Sept. 11, 1995, prohibit U.S. energy companies and their foreign branches from:
 - investing in Iran;
 - entering into any contract for management responsibility over petroleum resources in Iran;
 - financing the development of petroleum resources located in Iran;
 - purchasing, selling, transporting, swapping, brokering, or facilitating the trade in goods of Iranian origin; or
 - exporting any technology, goods or services to Iran.

Because the Iranian Transactions Regulations apply only to U.S. companies and their foreign branches, the Iran-Libya Sanctions Act (ILSA) was passed unanimously by the U.S. Congress and signed into law in August 1996. ILSA imposes mandatory and discretionary sanctions on non-U.S. companies which invest more than \$20 million annually in Iranian oil and gas sectors. Nevertheless, non-U.S. companies appear to be proceeding with development of the Iranian gas fields despite ISLA restrictions.

- 4) Governmental Approval Issues. The decisions of the LNG purchaser's government with regard to the site of the receiving terminal may affect other parts of the LNG chain and the overall structure. On at least two occasions the importing country's government has, after much debate, been unwilling to approve the necessary facilities to import LNG. The first instance occurred in Los Angeles in the early 1980s. The second instance happened in Italy in 1996 when the Italian state electricity utility, ENEL, decided not to build an LNG receiving terminal on the coast of Tuscany and attempted to canceled its LNG sales contract with Nigeria LNG Ltd. Thereafter, Nigeria LNG brought a breach of contract suit against ENEL for \$13 billion in damages (reportedly the largest claim ever brought under English law). ENEL claimed the force majeure clause of the contract allowed it to cancel the contract due to increased expenses associated with compliance with environmental conditions for the LNG receiving terminal. Fortunately, the case was quickly settled, with the parties agreeing that the

Nigerian LNG would be shipped to France instead, in exchange for Russian gas diverted by French buyers to Italy.¹²

- 5) Tax Issues. Whether the Tolling Company, Non-Incorporated Joint Venture, Project Company or another approach is followed, tax issues (Income tax, VAT on processing, transportation taxes, transfer pricing issues, double taxation, etc.) often have a great influence on the final structure adopted. A thorough analysis of such issues is needed from the outset to avoid delays and surprises. Depending on the degree to which governments desire to obtain the economic benefits of an LNG project, governments may be willing to help ameliorate an adverse tax environment. For example, the Alaskan state government recognized in 1997-1998 that its fiscal system hindered the development of the North Slope LNG Project, and the state government examined ways to redesign its fiscal system in an effort to make the proposed project more competitive. Whether such tax holidays will continue may in part depend on the leverage of the parties in project structuring negotiations. The first train of the Atlantic LNG Project received a ten year corporate tax holiday and total VAT relief, but the deal reached in early 2000 between the participants for the second and third trains withdrew such tax exemptions.

III. ISSUES COMMON TO NEGOTIATING AND DOCUMENTING LNG PROJECTS

The host of agreements necessary to implement an LNG project ensure that there is no shortage of challenging issues for LNG negotiators and lawyers to address. The following are illustrative issues that often end up being the focal point of negotiations and/or documentation efforts:

- A. Force Majeure Risk. Despite the fact that force majeure events are rare, an inordinate amount of negotiation time is devoted to allocating force majeure risk. In LNG Sales and Purchase Contracts, the norm is to include a detailed list of events that will qualify as force majeure events and therefore suspend a party's performance obligations during such force majeure period. Because the majority of recent LNG projects have been project financed, lenders in particular are very concerned about the circumstances which could result in the LNG buyer being relieved from its obligation to take or pay for LNG. Force majeure issues that regularly receive considerable attention during negotiations and during sales contract performance include the following:
- the extent to which the force majeure clause will cover the facilities of the LNG buyer's customers;
 - the LNG buyer's obligation to continue to pay seller's transportation costs during a force majeure event preventing the buyer from taking LNG;
 - the extent to which negligence prevents a party from claiming force majeure;
 - whether the depletion of recoverable reserves is a force majeure event or a breach of seller's reserves warranty;
 - whether the party not affected by the force majeure event will be allowed to terminate the sales contract if the period of force majeure is lengthy;
 - whether delay in construction of the facilities or vessel will be a covered event;

¹² International Litigation News (Euromoney Publications) (1998).

- how remaining LNG supplies will be allocated between the buyer under the sales contract and other purchasers of LNG from the LNG plant;
- how remaining LNG purchases will be allocated between the seller under the sales contract and other exporters of LNG to the buyer's receiving facility;
- the extent to which the parties are obligated in later years to purchase (or sell, as the case may be) quantities that could not be timely delivered or received due to force majeure;
- the extent to which political events will constitute a force majeure;
- whether payments during a disputed force majeure period will be escrowed with an independent party while a determination of the validity of the force majeure claim is resolved; and
- whether vessels should be covered by the force majeure clause when lost or damaged while carrying LNG in a separate trade.

Force majeure risk is also addressed in important project documents, such as Time Charters, Financing Agreements, Construction Contracts, Gas Supply Agreements, and the buyer's gas and power sales agreements. For example, it may be necessary for the time charterer to establish a standby letter of credit in favor of the vessel owner to secure the time charterer's obligations to pay hire during a force majeure preventing utilization of the LNG tanker. Counsel and negotiators must carefully craft and harmonize these agreements to ensure that a sensible and workable allocation of force majeure risk is achieved.

B. Maritime Issues. Experience has shown that maritime issues affecting the LNG trade are frequently downplayed by negotiators and counsel at the commencement of sales contract negotiations; eventually, maritime issues often rise to the forefront of the negotiations. In fact, in some cases maritime issues may even prevent the LNG sale from being finalized, such as in the case where there is a clash between the LNG exporter's policy to only sell on a delivery ex ship basis (i.e. where seller provides transportation and bears the risk of loss) and the LNG importer's policy to only purchase on an FOB basis (i.e. where buyer provides transportation and bears the risk of loss). If the seller will provide transportation, the issues that often provide difficulty include:

- the method of calculating the fee to be charged to buyer for LNG transportation, particularly if such fee will be based on seller's actual transport cost;
- the extent to which buyers will participate in negotiations and other discussions between the LNG transporter and the seller;
- the size and capacity of LNG tankers and of the corresponding terminals that will berth and unload vessels;
- which party will pay to upgrade the tanker or berthing terminal to ensure compatibility between the two;
- the extent to which buyer will pay any liability of seller under the International Maritime Organization's convention dealing with liability for hazardous and noxious substances;¹³
- whether buyer will pay demurrage or excess boil-off if it does not timely berth and unload seller's LNG tanker;
- how to continue to use older vessels under the sales contract; and

¹³ See International Convention on Liability and Compensation for Damage in Connection with Carriage of Hazardous and Noxious Substances by Sea (1996).

- seller's contractual liability for damages occurring in the unloading port when seller has no liability for such damages under local tort law.

Even in the case where the buyer will provide the LNG transportation, significant transportation and maritime issues must be resolved for the trade to commence. Critical maritime points to address in an FOB trade include:

- the liability regime that will govern buyer's use of the loading facilities and any financial guarantees that must be provided by buyer or its vessel owners;
- the size and capacity of LNG tankers and of the corresponding terminals that will berth and load vessels;
- which party will pay to upgrade the tanker or berthing terminal to ensure compatibility between the two; and
- whether seller will pay demurrage or excess boil-off if it does not timely berth and load buyer's LNG tanker.

Especially since a shortage of readily available excess LNG tanker capacity presently exists, in both an ex ship and an FOB trade it is important that negotiators and draftsmen closely tie the obligations in the sales contract with the availability of transportation (e.g., start-up of the LNG plant, delivery of new vessels, capacity of the vessel, dry-docking of the vessel, and other unavailability of the vessel).

C. Community Relations. Depending on the location of the LNG plant or LNG receiving terminal, a variety of local community issues may arise. Project developers must be keenly aware of the concerns of such local populations and the project participants' plans to address them. Even during the relatively short history of the LNG trade, receiving terminals have been cancelled or adversely affected due to local opposition by fisherman and environmentalists, and LNG plants have been adversely affected by labor issues or have been threatened by rebels who view the LNG plant as a government target. Obviously, it is not possible to find a solution to all community relations issues, but much progress can be made through constant monitoring and flexibility. For instance, negotiators and counsel should take into consideration the following:

- whether revenues in connection with the development of the natural gas resources are shared by locals under legislation or contract in a fair manner over the long term;
- whether special insurance (e.g. social responsibility insurance) is needed to protect local inhabitants in case of an LNG safety incident;
- the role local contractors will play in project development, either in compliance with contractual minimum local content rules or otherwise;
- ways to minimize environmental effects and other adverse effects from population shifts caused by the project's labor needs;
- whether local permit requirements could jeopardize timely completion of construction;
- how valid rights-of-way for the gas transmission system can and should be acquired from a multitude of owner claimants and thereafter legally enforced;
- proper controls over the construction contractor's responsibility for community relations; and

- ways to enhance and develop the local community to the mutual benefit of the project and the local community (such as construction of infrastructure and related industries, paying allowances to qualified teachers, providing clean water sources, etc).

For example, although Nigeria is known to be a challenging place in which to implement oil and gas projects, Nigerian LNG Ltd. successfully completed construction of its new LNG plant in 1999 with no apparent community relation problems. According to a Nigerian LNG spokesman, being successful in community relations requires a “continuous, sustained effort and a significant allocation of time from senior line management.”¹⁴ In this regard, Nigeria LNG adopted an Indigenous Contracting Policy under which the LNG project company will, during the production phase, favor the use of community contractors over other Nigerian contractors, and Nigerian contractors over foreign contractors; the company will also sponsor training of local businesses that lack the necessary capabilities or expertise. With regard to revenue sharing, the Malaysian project is a good illustration of local participants being given a larger share over time. For the first phase of the project established in the early 1980s the local state government of Sarawak had only a 5% participation interest; when the second phase started in the early 1990s the share allocated to the Sarawak government was doubled to 10%. Community development issues often persist; for years the Indonesian provinces in Sumatra and East Kalimantan have pressed the national government for a larger portion of revenues derived from the Arun and Bontang LNG plants.

D. Pricing Disputes. Buyers of LNG wish to ensure that the quantity purchased under a particular contract remains price-competitive over the long term with other sources of LNG and with alternative fuels. Sellers, on the other hand, wish to see the highest value possible received for their product so that development costs and any financing costs can be reimbursed along with seller receiving an acceptable rate of return for the risk taken. These differing points of view not only result in lengthy debates in connection with sales negotiations but they may also impact other project activities. For instance, Qatar’s Ras Laffan project issued bonds worth \$1.2 billion in 1996 based on the underlying sales contract with Korea having a minimum sales price. When the minimum sales price was dropped by the seller and buyer in subsequent negotiations for an expansion of contractual volumes, the bondholders protested; eventually, some of the project sponsors were pressed to provide additional financial support. In either the Atlantic or Pacific trade, the potential for major pricing disputes interrupting the receipt of revenues could negatively impact the ability of the sponsors to project finance the LNG plant. Sales contracts in the Atlantic typically tie the sales price of the LNG to the price at which the LNG buyer is able to resell the regasified product in the importing country; the net-back approach of course requires significant documentation of the LNG buyer’s resale in order to calculate the LNG price and determine other contractual obligations and protections in this regard. Although the Asian LNG trade is yet to follow such a net back pricing approach, the Asian market has had its share of pricing issues to overcome, including:

- disputes over the tie between government-established export crude oil prices and market prices;
- complications caused by seller and buyer being unable to agree to periodic contract sales price revisions;
- compensation for changes in LNG quality due to the introduction of LPG extraction from the LNG;

¹⁴ Source: Twelfth International Conference & Exhibition on Liquefied Natural Gas, Paper 4.5 (Perth, Australia 1998)

- agreement on the proper adjustment to price based on U.S. inflation; and
 - adjustments to the price based on contractual provisions requiring price comparability between Japanese and non-Japanese importers.
- E. Governmental Action. Since government approvals of an LNG project are always a condition precedent to finalizing the project, such approvals should be obtained early to avoid unfavorable impacts. The extent of such approval could be as simple as a one page letter from a Governmental Minister approving the project or as complicated as comprehensive legislation. For example, to launch the Australian project the Western Australian state government enacted the North West Gas Development (Woodside) Act in 1979. The official purpose of the 1979 act was to ‘ratify an Agreement between the State of Western Australia and Woodside Petroleum Development Pty. Ltd., Woodside Oil Ltd., Mid-Eastern Oil Ltd., North West Shelf Development Pty. Ltd., BP Petroleum Development Australia Proprietary Limited and California Asiatic Oil Co. relating to the production of natural gas and condensate and the establishment of a treatment and liquefaction plant and to matters related thereto.’ Since 1979, the North West Shelf Development Act has been amended three times in order to ratify modifications made by the project sponsors to their development agreement. Moreover, if a Government Oil and Gas Company is involved in the project, the documents which will serve as the foundation of the project should envision the privatization of the government company during the life of the project or other significant changes in the governmental oil and gas environment. The parties should seriously consider adding a stabilization provision to the underlying agreement with the government, such that if a governmental authority takes any action (e.g. privatization of the Government Oil and Gas Company) which adversely affects the financial results the other project participants would otherwise have realized for the project, the Government would be contractually obligated to take whatever action is necessary to reverse such action or correct such adverse effect. For example, if efforts underway in Indonesia to alter the fundamental basis of the 1971 National Oil and Gas Law and the role of PERTAMINA are ultimately successful, those changes could require the renegotiation of key agreements relating to the Indonesian LNG trade.
- F. Construction Completion Risk. Given the preference today to project finance the construction of the LNG plant, it is imperative that negotiators and counsel ensure that the construction completion risk is properly addressed. Sensible liquidated damages and performance warranties are needed to ensure the Contractor is properly motivated to complete the construction timely to the highest standards, while at the same time allowing the contractor to manage the level of risk it assumes. Typical liquidated damage levels in recent LNG plant construction contracts generally range between 10-20 percent of the lump-sum EPC contract price. If the LNG project is not an expansion of an existing plant, the liquidated damages level may need to be higher in order to support project financing.
- G. Financing. The 1996 bond offering by Ras Laffan ushered in a new era in LNG plant financing. Although the current state of the bond market does not appear favorable for additional LNG bond offerings, the success of the LNG industry and its huge appetite for funds will inevitably lead to further bond offerings to finance LNG plants and other facilities. In addition to being mindful of potential inter-creditor issues between commercial banks, bondholders and export credit agencies, negotiators and counsel for LNG project sponsors should also consider the following finance issues, for example:
- parent guarantees and other financial support of financing;
 - restrictions on use of facilities imposed by financiers;

- sales contract quantity and take-or-pay flexibility provisions that adversely affect loan coverage;
 - requirements to disclose proprietary information in connection with financing and any liability to creditors for misrepresentation in connection with such disclosure; and
 - the length of time to complete financing arrangements and whether any delays in their completion could be grounds for renegotiation or termination of the sales contract.
- H. Decision-Making in Project Company. Given the divergence of participants in an LNG export or import project, negotiators and counsel should not fail to put into place clear and well-conceived decision-making provisions in relation to the project company (e.g. addressing who will be the voice of the project for marketing purposes, how budgets and other capital costs will be approved, how expansions of the project will be decided, whether the parties will operate through employees or secondees, etc.). Although the LNG industry is growing rapidly, it is a relatively small community. Disputes among the LNG project participants regarding decision-making not only consume valuable internal resources of the companies involved, they also tarnish the reputation of the project for reliability. The inherent long-term nature of LNG projects commands that participants give considerable attention to keeping healthy working relationships.
- I. Law Applicable to Contracts. The choice of the law that will govern the contractual agreements for the LNG project will have significant effects on negotiations and documentation. Consideration should be given to whether the law chosen clearly provides the necessary legal foundation.
- J. Letters of Intent. Given the long lead times necessary to negotiate the various documents needed to implement an LNG project, Letters of Intent, Heads of Agreement, memoranda of understanding and other preliminary understandings are often signed. Such preliminary understandings aid in cementing the relationship between the parties concerned and focusing the participants on immediate issues to be addressed. However, counsel and negotiators should carefully monitor the use of such letters of intent and preliminary understandings to determine the extent to which they are enforceable. Often such documents do not contain choice of law provisions or language clarifying if the parties intend that the preliminary understandings are to be binding. Experience has shown that letters of intent, especially in LNG marketing, are often considered by the parties as non-binding expressions of interest. Nonetheless, careful drafting in this regard would reduce the risk that companies who have taken actions in reliance on such Letters of Intent to their economic detriment (e.g. preinvested in unnecessary project assets or actions) would later commence litigation to recover their losses if the project is terminated.

IV. LNG PROJECT TRENDS

The first thirty years of the LNG business were dominated by a few players who carried out projects that relied on long-term arrangements with large utility-based companies in relatively developed countries. If a seller wished to expand its trade, an abundance of excess shipping capacity was generally available. In the coming years, the situation may be very different. Today, LNG is fast losing its “club” reputation with more and more companies choosing to partake. For instance:

- Approximately 40 different energy companies have interests in existing or planned LNG export projects;

- There was a time when only three or four “majors” could be the lead sponsor of an LNG project; in 1998 it was noted that more than ten companies are vying for the lead sponsor role¹⁵;
- The new Phillips Cascade liquefaction technology and other proposed technologies have helped to lower costs and increase competition;
- A multitude of EPC contractors are now bidding on construction of LNG plants as opposed to only 2-3 in past years;
- Over 130 LNG vessels should be in service by the end of 2000 compared to approximately 80 in 1990;
- Buyers as well as sellers are now providing shipping;
- Numerous shipyards are capable of constructing LNG tankers; and
- Various project financing methods are available as an alternative to government financing or equity.

Persons structuring, negotiating and documenting LNG projects over the coming decade should closely monitor the following developments:

- A. Emerging markets: While LNG will continue to be demanded in the traditional markets, much of the growth in future demand will come from emerging economies such as India, China, Portugal, the Philippines, and Brazil. The “accepted” way of structuring, negotiating and documenting deals with the traditional markets will have to be reexamined to guarantee that the unique needs of emerging markets are satisfied.
- B. Development of a "Spot" LNG Market and Market Intermediaries. The expanding list of LNG buyers and the ability of LNG exporters to produce quantities above their contractual commitments has led to some companies entering into “spot” (i.e. cargo-by-cargo”) LNG cargo deals. For example, Australia and Abu Dhabi have recently sold spot cargoes for importation into the United States while Gaz de France agreed to purchase a spot cargo from Qatar. Also, in 1999, a Shell subsidiary purchased an LNG cargo from Malaysia for delivery into the United States. For years, ENRON has been one of the biggest proponents of the development of a different LNG market, stating that in its view “market intermediaries which bring needed risk management and aggregation skills to this chain, and which are willing to participate in the significant equity cost of developing LNG supplies and markets, can be invaluable in ensuring the growth of LNG in the new millennium.”¹⁶ ENRON has been successful in opening new markets to LNG, by purchasing a portion of Cabot LNG’s supply from Trinidad and Tobago for its \$600-million, 507-MW, LNG-fired combined-cycle cogeneration power plant.
- C. Environmental Regulation. The sharp reduction in greenhouse gas emissions dictated by Kyoto COP3 (the Third Convention of Parties of the United Nations Framework on Climate Change) and the continuing movement of countries away from coal could also increase LNG growth. It has been estimated that if the level of Japanese natural gas-fired electric power

¹⁵ Source: Twelfth International Conference & Exhibition on Liquefied Natural Gas, Paper 1.3 (Perth, Australia 1998)

¹⁶ Source: Eleventh International Conference & Exhibition on Liquefied Natural Gas, Paper 1.7 (Birmingham, England 1995)

baseload is realized in order to fulfill the Japanese government's commitment to COP3, demand for LNG in Japan could jump by a further 20 million tons by 2015.¹⁷

- D. Independent Power Projects. Much gas demand growth in both traditional and emerging markets is likely to be anchored by independent power projects ("IPPs"). Sellers will undoubtedly be asked to share in the commercial and force majeure risks associated with such IPPs. Flexibility with regard to LNG pricing may also be expected.
- E. Gas to Liquids (GTL) Technology. Recent successes in GTL could make this a source of competitively priced premium fuel. Further technological developments could launch remote natural gas to GTL as well as LNG development.
- F. Floating LNG Plants and Receiving Terminals. Continuing advancements in developing acceptable floating LNG technology are taking place, although no floating LNG plant or receiving terminal has been constructed to date. If successful, floating technology could open up more markets to LNG as well as allow even smaller gas reserves to be monetized. Floating technology may also reduce financiers' concerns about political risk in certain countries, since the main financed assets could be removed from the country and used elsewhere in the event of a loan default.

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¹⁷ Source: Oil & Gas Journal, July 13, 1998