

Natural Gas Pipeline Project:
Potential Gas Acquisition Strategies

A report prepared for
Enemalta Corporation

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Natural Gas Pipeline Project: **Potential Gas Acquisition Strategies**

Executive summary

Enemalta asked John Gault SA to estimate the lower end of the range of prices at which ENI Gas & Power might be willing to sell natural gas delivered to power plants in Malta, via the proposed Gela-Malta subsea gas pipeline. Enemalta also asked John Gault SA to estimate at what price Enemalta might be able to acquire natural gas directly from other suppliers in the event that Enemalta itself should decide to own and operate the Gela-Malta pipeline. Finally, Enemalta asked John Gault SA to inquire whether potential gas suppliers other than ENI Gas & Power might be willing to invest in the Gela-Malta gas pipeline and in the conversion of Enemalta power plants to use natural gas.

The purpose of this exercise is to assist Enemalta in evaluating such alternatives as:

1. Whether to enter into negotiation with ENI Gas & Power for the construction of the Gela-Malta pipeline and for the supply of natural gas under long-term contract; or
2. Whether to consider constructing the pipeline alone or in cooperation with partners, thus enabling the purchase of natural gas directly from other suppliers; or
3. Whether to pursue other options for obtaining natural gas.

Our research led to the following conclusions:

1. Our best estimate of the minimum price at which ENI Gas & Power might be willing to sell natural gas delivered to Enemalta's power plants via the proposed Gela-Malta pipeline is approximately US\$4.15 per million btu. This price is relevant for the first quarter of 2004 and assumes a long-term contract in which the price would be indexed to the prices of petroleum products. This price allows

ENI Gas & Power a 7.5% dcf return on its equity invested in the Gela-Malta pipeline, but allows for no other margin or markup.

2. If Enemalta, either alone or with partners, were to own and operate the pipeline delivery system, the most economical means of acquiring pipeline natural gas would be to acquire natural gas directly from Libya, but at the moment the Libyan National Oil Company (NOC) is not contemplating additional gas sales. The delivered cost of such gas, were it to be available, should be comparable to our best estimate of the minimum purchase price from ENI Gas & Power indicated above.
3. The alternative which *a priori* appeared next-most-attractive, namely direct acquisition of pipeline natural gas from the Algerian national oil company Sonatrach, appears impractical for several reasons, in particular the difficulty of acquiring capacity on the Trans Tunisian Pipeline Company (TTPC) pipeline across Tunisia.
4. Pipeline natural gas flowing to Malta from any source passing through Italy (i.e. from any source other than the Green Stream pipeline) would have to transit the Italian natural gas grid operated by Snam Rete Gas, and pay the relevant tariffs. The current tariff structure discourages the importation of Algerian gas for use in Sicily (or, by extension, in Malta). If Enemalta were to acquire gas from such other sources, the most practical solution would be to arrange a swap for Libyan gas.
5. The Algerian national oil company Sonatrach indicated no willingness to co-invest in the Gela-Malta pipeline or in the conversion of Enemalta's power plants to use pipeline natural gas. The Libyan national oil company NOC said that it was prepared to consider such a proposal several years ago, and that it would still be willing to consider such a proposal.
6. Sonatrach, however, would be willing to sell Enemalta liquefied natural gas (LNG) and to co-invest in an LNG receiving, storage and regasification terminal in Malta as well as in the conversion of Enemalta's power plants, in return for a take-or-pay contract for delivery of LNG. The term of this contract could be as

little as 10 years. Preliminary calculations indicate LNG may offer Enemalta both cost and other advantages over pipeline deliveries of natural gas.

A number of important assumptions underlie the calculations in this report and are described herein. These assumptions are appropriate for the purposes to which the price and cost estimates presented here are to be used, namely, comparing various alternatives. However, all such assumptions should be re-examined and more detailed price and cost calculations undertaken if and when Enemalta decides to enter into negotiation with a potential supplier of natural gas.

Natural Gas Pipeline Project: Potential Gas Acquisition Strategies

Background

Enemalta is considering the possibility of substituting natural gas for fuel oil currently used in its power plants. The natural gas would be imported via a subsea pipeline from Gela, Sicily.

The substitution would have several potential advantages, including environmental benefits and the achievement of higher thermal efficiencies in Combined Cycle Gas Turbines (CCGTs).

The decision to carry out this substitution will depend, in part, upon the relative cost of natural gas compared with other fuels.

The report entitled "Malta Gas Project: Feasibility Study Final Report" (referred to hereafter as the "Feasibility Study"), dated July 2003, calculates the "market value" of natural gas at the power plant fence as the price which would yield the same total expenditure on fuel as would the use of fuel oil and gasoil.

An appendix to the Feasibility Study (Enclosure 9) contains an outline of a possible natural gas supply agreement on take-or-pay terms in which the price of the natural gas would be the sum of:

1. A commodity charge expressed in € per million btu, consisting of a base price indexed to the changing prices of Gasoil, Low Sulphur Fuel Oil, and Heavy Fuel Oil, and also indexed to Inflation;

2. A capacity charge expressed in € per year, intended to cover both the investment costs and the operating costs of the dedicated subsea pipeline; and
3. A second capacity charge, also expressed in € per year, intended to cover financing procured by the seller of the natural gas for the conversion of Enemalta's power plants to use natural gas.

The numerical amounts of each element in the price formulae are not specified and have not been negotiated.

The "market value" for natural gas delivered to Enemalta power plants for the first year of operation of the Gela-Malta pipeline (assumed to be 2005) was calculated in the Feasibility Study as \$3.30 to \$3.70 per million btu based upon assumed prices for Brent crude oil of \$19.00 to \$22.00/bbl. Brent crude oil prices are today considerably higher, ranging from \$28.90 (average for the second half of 2003) to about \$32.50/bbl (end-March 2004). A rough extrapolation of the "market values" for natural gas calculated in the Feasibility Study would, at these higher crude oil prices, suggest values in the range of \$4.90 to \$5.50/mmbtu.

The "market value" calculated in the Feasibility Study clearly constitutes an upper bound for the price of natural gas, because Enemalta would have little or no incentive to convert to natural gas if the price were higher than this "market value". The incentive to Enemalta to switch fuels will increase to the extent the price of natural gas falls below this "market value".

This report estimates the lower bound of possible natural gas prices, and compares various alternatives for Enemalta to acquire natural gas in the most economical fashion.

Minimum price for gas delivered by ENI Gas & Power

The first alternative to be examined is the potential supply of natural gas to Enemalta by ENI Gas & Power, as envisaged by the Feasibility Study and its Enclosures.

The Memorandum of Understanding (Enclosure 1 of the Feasibility Study at paragraph 5, "Definitive Agreements") provides that in the event Snam or any other affiliate of ENI Spa has access to natural gas from Libya in amounts exceeding the presently contracted 8.0 bcm/year, Enemalta will have the option to negotiate the purchase of natural gas from such excess quantity.

The proposed configuration of the Gela-Malta subsea natural gas pipeline strongly suggests that natural gas from Libya would be the most economical source. The planned route of the Gela-Malta pipeline begins at the terminus of the so-called "Green Stream" pipeline now under construction from Libya to Sicily. Natural gas delivered from Green Stream into the Gela-Malta pipeline would not need to pass through the Italian natural gas grid operated by Snam Rete Gas.

The effective minimum price at which ENI Gas & Power might be willing to deliver natural gas to Enemalta power plants would be the sum of (1.) the price ENI must pay for gas it acquires, (2.) the cost to ENI of moving the gas from the point of acquisition to Gela, Sicily, and (3.) the cost to ENI of moving the gas from Gela, Sicily, to Malta, via the proposed Sicily-Malta pipeline.

Our best estimate of the current price under the contract between Libya and Agip (Libya) for gas to be transported via the Green Stream pipeline is approximately \$3.12 per million btu. This estimate is based upon secondary sources and upon our own calculations. This estimate pertains to the price that would be applicable during the first half of 2004 under a price escalation formula tied to the average prices of gasoil and low sulfur fuel oil during the second half of 2003.

This would be the price at which natural gas would be delivered at Mellitah, Libya, to enter the pipeline were the pipeline flowing today. This price pertains to the 8.0 bcm/year already committed by Agip to Edison (4 bcm/yr), Gaz de France (2 bcm/yr), and Energia SpA (2 bcm/yr). We assume that, were ENI Gas & Power to obtain access to supplemental gas volumes beyond the current 8.0 bcm/yr, the price would be similar.

Our own calculations as well as secondary sources indicate that the cost of moving natural gas via the Green Stream pipeline from Mellitah to Gela will be on the order of \$0.50 to \$0.60/mmbtu.

Our estimate of the cost of moving natural gas from Gela to Malta via the proposed subsea pipeline is approximately \$0.45 to \$0.50/mmbtu. This estimate is based upon the capital costs (\$98.6 million to \$106.0 million) and operating costs identified in the Feasibility Study. It is based also upon the following assumptions:

- Debt/equity ratio 70:30
- Interest rate on debt 5.00%
- Debt repayment period 20 years
- Return on equity 7.5% dcf
- No income tax
- No inflation

It may appear surprising that the cost of moving natural gas from Gela to Malta is virtually the same as for moving gas through the much longer and deeper Green Stream pipeline from Mellitah to Gela. The smaller volume of the Gela-to-Malta pipeline offsets, however, the greater capital and operating costs of the Green Stream pipeline.

In summary, the minimum price at which ENI Gas & Power might be willing to deliver gas to the power plants of Enemalta under all of the simplifying assumptions stated above would be, during the first half of 2004, in U.S. dollars per million btu:

	<u>Best estimate</u>	<u>Range of uncertainty</u>
Purchase price at Mellitah	\$3.12	\$3.00 to \$3.25
Transport Mellitah to Gela	\$0.55	\$0.50 to \$0.60
Transport Gela to Malta	<u>\$0.48</u>	<u>\$0.45 to \$0.50</u>
Total	\$4.15	\$3.95 to \$4.35

Within this range of uncertainty, our best estimate would be \$4.15/mmbtu. This price would allow the owners of the subsea Gela-to-Malta pipeline to earn a rate of return of 7.5% on their equity investment, a rate similar to that allowed by regulatory authorities on pipelines subject to tariff regulation. No allowance is made here for ENI Gas & Power to receive a markup on the natural gas itself, to which ENI Gas & Power may argue it is entitled for its role as wholesaler or broker.

Sensitivities

The above estimate of the cost of transport from Gela to Malta depends critically upon the underlying assumptions. The sensitivity of the calculated transport cost to varying assumptions, leaving all other assumptions unchanged, was tested as follows (costs are again in US\$/mmbtu):

	<u>Estimated Cost</u>
Assumptions as stated above	\$0.48
Sensitivity 1. Debt/equity ratio of 80:20	\$0.47
Sensitivity 2. Half of the debt is a grant	\$0.34
Sensitivity 3. Capital outlay is 20% less than estimated	\$0.39
Sensitivities 1, 2 & 3 combined	\$0.26

The higher debt/equity ratio in Sensitivity 1 may be acceptable to lenders if they judge the risks (both technical and commercial) to be low and properly assigned, and if the pipeline owners have strong balance sheets. The conversion of half of the debt into a grant (Sensitivity 2) is more a political than an economic question, but Malta may be able to achieve some element of grant (or benefit from a preferential interest rate on debt) as a new member of the European Union. This possibility is mentioned in the Feasibility Study at page 7.

The likelihood of capital costs being reduced by 20% (Sensitivity 3) should be considered as low. The capital costs (at roughly \$100 mm) estimated in the Feasibility Study do not appear excessive compared with other gas pipeline projects, although no exactly comparable project exists. The following table compares capital cost per mile in several natural gas pipeline projects:

Gela-Malta	Sicily-Malta	0.5	About 1.00
South Caucasus	Azerbaijan-Turkey	7.0	1.65
Medgas	Algeria-Spain	8.0	2.04
Galsi	Algeria-Sardinia	8.0	2.18
Green Stream	Libya-Sicily	8.0	2.94
Blue Stream	Russia-Turkey	16.0	4.49

Note: all figures are approximate; dollars of different years are used; the South Caucasus pipeline is onshore; the Green Stream and Blue Stream pipelines reach particularly great water depths; most of the pipelines include the cost of compression stations while none is included for Gela-Malta.

On the other hand, it is fairly common in large capital projects for the prices of materials and equipment quoted by suppliers at the feasibility study stage to be somewhat higher than the prices which can be achieved when the materials and equipment supply contracts are later negotiated.

No sensitivity was performed for the initial simplifying assumptions concerning income tax and inflation. Both income tax and inflation may be introduced into the calculation later if required. It is assumed that the pipeline company owning the Gela-Malta pipeline would be created in a jurisdiction where taxes are minimized. Had inflation been included in the above estimates, the transportation charge in real terms would have been slightly lower in each case.

If Libyan gas is not available

Given the potential for the development of additional natural gas reserves both onshore and offshore Libya, it would be surprising if ENI Gas & Power were unable in coming

years to acquire additional volumes beyond the 8.0 bcm/yr currently contracted for delivery via the Green Stream pipeline. Even without further exploration, Libya already has an estimated 1,300 billion cubic meters of natural gas reserves, although most of these reserves remain undeveloped. The Green Stream pipeline, when completed, will have the capacity to carry 11.0 bcm, i.e. 3 bcm beyond the currently contracted volume.

Should no additional natural gas (beyond the 8.0 bcm already contracted) become available from Libya, ENI Gas & Power would most likely seek to repurchase Libyan gas for delivery to Malta from one of the three current buyers of Libyan Green Stream gas: Edison, Gaz de France or Energia.

However, in the unlikely event that ENI Gas & Power is unable to acquire Libyan gas either directly or indirectly, where else might ENI Gas & Power acquire natural gas for delivery to Malta?

One possibility would be Algeria, which has long stated its intention to increase its natural gas exports both via pipeline and in the form of LNG.

The current price (during the first quarter of 2004) at which ENI acquires natural gas at the Algerian-Tunisian border is in the range of \$3.00 to \$3.50 per million btu. In fact, ENI has two contracts, one with a price toward the lower end of this range, and the other with a price near to the upper end of this range. The prices at which ENI acquires natural gas from Algeria are escalated with the price of a basket of crude oils (one of the two contracts) or with the prices of gasoil, low sulphur fuel oil, and high sulphur fuel oil (the other of the two contracts). In each of the contracts, the price is recalculated at the end of each calendar quarter, using as a reference the average prices of crude oil or petroleum products during the preceding calendar quarter.

A number of costs are incurred by ENI in transporting this gas to Sicily. The tariff of the Trans-Tunisian Pipeline (TTPC) is approximately \$0.30 per million btu. In addition, a royalty of 5.25% of the Algerian-Tunisian border price is payable to the government of

Tunisia. And a tariff of approximately \$0.30 is paid to the Trans-Mediterranean Pipeline Company (TMPC) for transportation from Cap Bon, Tunisia, to Mazara del Vallo, Italy.

Moving the gas from Mazara del Vallo to Gela also would incur costs. If ENI Gas & Power were to use the Snam Rete Gas network, ENI Gas & Power would need to pay entrance and exit fees, as well as a throughput charge. We have estimated these charges using the 2003-2004 gas year tariffs published by Snam Rete Gas (see below).

A caveat must be added concerning the Snam Rete Gas tariffs. As currently structured, these tariffs discourage the importation of Algerian natural gas for use in Sicily or Southern Italy. The exceptionally high entry fee at Mazara del Vallo (compared with other entry points) reflects an assumption that most Algerian gas must travel a greater distance to the major gas markets in Northern Italy. When queried about this anomaly, Snam Rete Gas responded that, if a significant market for Algerian gas were to materialize in Sicily (and, by extension, in Malta), the tariff structure would have to be reconsidered. Therefore our estimates of the tariffs ENI Gas & Power would need to pay to move Algerian gas to a node in Sicily may exceed the amounts which will later be determined.

It should be borne in mind that, even if ENI Gas & Power were to acquire Algerian natural gas in order to fulfill a commitment to deliver pipeline natural gas to Malta, this Algerian gas would almost certainly be swapped with one of the three buyers of Libyan gas: Edison, Gaz de France, or Energia. Under such an arrangement, ENI Gas & Power would receive the roughly 0.5 bcm per year of Libyan gas at Gela (to be transported to Malta) and would deliver an equivalent amount of Algerian gas to its trading partner elsewhere, either inside or outside Italy according to the trading partner's requirements. The proportion of the Snam Rete Gas tariff paid by each of the swap partners would be subject to negotiation and would depend upon where the swapped gas is delivered.

In summary, then, the minimum price at which ENI Gas & Power might be willing to deliver pipeline natural gas from Algeria to Enemalta's power plants would be (in US\$ per million btu):

Purchase price (Algerian-Tunisian Border)	\$3.00 to 3.50
TTPC tariff	\$0.30
Royalty paid to Tunisia	\$0.16
TMPC tariff	\$0.30
Snam Rete Gas entry fee (Mazara del Vallo)*	\$0.17
Snam Rete Gas exit fee (Sicily)*	\$0.01
Snam Rete Gas variable charge*	\$0.19
Transportation Gela to Malta	<u>\$0.45 to \$0.50</u>
Minimum delivered price	\$4.68 to \$5.23

*Based upon the 2003-2004 tariff, and assuming throughput of 0.5 bcm/year.

Even if the Snam Rete Gas tariffs were to be significantly reduced, this estimated cost is considerably higher than the range of \$3.95 to \$4.35 estimated above for gas acquired directly from Libya. Clearly, ENI Gas & Power would require a significantly higher price in Malta if it were unable to purchase Libyan natural gas directly for delivery to Enemalta.

The possibility that ENI Gas & Power might deliver to Enemalta natural gas from other sources, such as Italian natural gas from the Pô Valley, or imported natural gas from Russia or from the Netherlands has not been separately examined as part of this study. Almost certainly any such gas would be moved to Gela via displacement (swap) rather than physically, and Enemalta would still receive gas originating in Libya. However, it appears from a superficial examination that such gas could not be delivered to Gela at a price competitive with Libyan gas acquired directly from the Libyan NOC.

Therefore our estimate above appears to be confirmed, that the *lowest* price at which ENI Gas & Power would be willing to deliver natural gas to Enemalta power stations in Malta, with reference to the first quarter of 2004, would be approximately \$4.15 per million btu.

If Enemalta is an owner of the pipeline

The second alternative examined is the potential cost of natural gas delivered to Enemalta's power plants if Enemalta were to own and operate the pipeline from Sicily and gas were purchased from suppliers other than ENI Gas & Power.¹

It is essential to examine this alternative for several reasons:

- (1.) Enemalta needs to know what alternatives might be available if ENI Gas & Power seeks too high a price during negotiations for a natural gas supply agreement with Enemalta;
- (2.) Enemalta may prefer, for security reasons, to be at least part-owner of the subsea Gela-Malta pipeline, to guarantee accessibility to the pipeline for gas purchased from third-party suppliers; and
- (3.) Enemalta may desire to supplement any long-term gas supply agreement (i.e. for volumes beyond the take-or-pay minimum) with occasional opportunistic spot purchases when the spot price is below the contract price, and for this purpose Enemalta will need to preserve the right to move such gas to Malta via the pipeline.

An additional potential benefit to Enemalta of examining other potential sources of natural gas besides ENI Gas & Power is to learn whether Enemalta may find partners willing to participate with Enemalta as shareholders of the pipeline and, perhaps, as co-owners of power generation facilities in Malta.

A priori, it would seem highly desirable for Enemalta to retain as much freedom as possible to purchase at least a portion of their natural gas from the lowest cost source of supply rather than being tied to one exclusive supplier for 100% of their requirements. As

¹ It is of course possible that EU market-liberalization rules will require third-party access to the Gela-Malta pipeline regardless of ownership, as the pipeline will connect two EU member states. A judgment concerning interpretations of EU rules and regulations, and possible derogations, is beyond the scope of the present study.

European natural gas markets are liberalized, and as the size of the natural gas spot market expands, it should become possible for significant users of natural gas such as Enemalta to develop their own gas acquisition strategies, combining term and spot supplies to best advantage.

At the moment, with no pipeline gas trading “hub” in Italy, such an approach may appear premature. Yet the expected growth of Italian gas consumption and the emergence of new gas traders and importers in the Italian market, combined with market liberalization rules designed to reduce the relative role of ENI, suggest that in the not-too-distant future gas buyers will face new opportunities to reduce their costs.

Direct purchase from Libya

The most obvious potential alternative source of natural gas for Enemalta would be to purchase gas directly from the Libyan National Oil Company (NOC).

As noted above, the 8.0 bcm/year scheduled for delivery via the Green Stream pipeline has already been sold to Agip (Libya), which in turn committed the gas to Edison, Gaz de France, and Energia. NOC states that the Green Stream pipeline (of which NOC is 25% owner, with Agip owning the remaining 75%) has a design capacity of 11.0 bcm/yr, but that Libya’s official gas reserves of 1,300 billion cubic meters are not yet developed to the point of considering new sales.

At the moment, therefore, NOC is not in a natural gas marketing mode, and is not open to discussing any new natural gas export sales contracts. On the other hand, the “long-term strategic partnership” announced between Shell and NOC on 25 March 2004 focuses on natural gas exploration and development, particularly in the Sirte Basin. This could lead to future opportunities for direct purchase of Libyan gas, but probably not in the time-frame necessary for Enemalta’s immediate decision concerning the Gela-Malta pipeline.

There is no basis for estimating the price at which Libyan natural gas could be acquired by Enemalta at Mellitah as no such gas is available; we can only assume that the price should be similar to the price being paid by Agip (see above). The cost of moving the gas to Enemalta's power plants would be approximately the same as estimated above for Libyan gas purchased via ENI Gas & Power.

Direct purchase from Algeria

In contrast to Libya's NOC, Algeria's national oil company Sonatrach is eager to market additional natural gas. Algeria has announced plans to increase annual natural gas exports from about 60 bcm currently to about 85 bcm by 2007 and to about 120 bcm by 2020.

In response to our inquiry, Sonatrach stated that it would be willing to sell pipeline natural gas to Enemalta under a long-term contract at the same price at the Algerian-Tunisian border as it sells natural gas to ENI Gas & Power, i.e. in the range of \$3.00 to \$3.50 per million btu at today's petroleum prices, subject to the same price indexation and volume take-or-pay provisions. However, Sonatrach would not be willing to sell pipeline natural gas to Enemalta on a delivered basis either in Sicily or in Malta, and Sonatrach would not be interested at this time in investing in the Gela-Malta pipeline.

The reason for this is quite important: ENI Gas & Power controls access to the TTPC pipeline, which currently operates at capacity (about 3.5 mcm/hr.) in winter months. Subject to present TTPC capacity limitations, Sonatrach is unable to ship via TTPC all of the natural gas which buyers wish to purchase. TTPC is not operated as a common carrier and, because it is outside the EU, appears to escape EU rules compelling third-party access.

Last year, ENI Gas & Power solicited formal requests from shippers wishing to reserve space in the event the capacity of TTPC were to be expanded. After receiving the formal requests, ENI Gas & Power announced that it had changed its mind and had postponed expansion of the TTPC pipeline. This postponement was widely interpreted to result from

a potential oversupply of the Italian gas market in the medium term. At least some of the shippers who had requested space on an expanded TTPC protested this reversal of plans. Some are seeking ways to compel ENI Gas & Power and/or TTPC to reinstate the expansion or to compensate them.

Enemalta, if it purchased pipeline natural gas from Sonatrach delivered at the Algerian-Tunisian border, would face the same obstacle of obtaining space in the TTPC pipeline. Indeed, Enemalta may have to join the waiting line behind those who last summer submitted formal bids to reserve space should TTPC expand. Moreover, any new purchaser of Algerian natural gas for transport via the TTPC will need to negotiate separately a royalty (“forfait fiscal”) agreement with Tunisia.

If ample capacity were available on the TTPC pipeline, Enemalta should be able to acquire natural gas from Sonatrach at the Algerian-Tunisian border and move the gas to its power plants at approximately the same cost as estimated above for Algerian gas via ENI Gas & Power, namely \$4.68 to \$5.23 per million btu. This is subject to all of the assumptions stated above as well as the assumption that Enemalta could arrange financing for the Gela-Malta pipeline. As a practical matter, Enemalta would almost certainly arrange a swap of its Algerian gas for Libyan gas, rather than moving Algerian gas physically to Malta.

Other potential sources of pipeline natural gas

Enemalta could, of course, approach other potential suppliers of natural gas, for example Gazprom in Russia. This option would require Enemalta to arrange transportation for the natural gas from the nearest Gazprom node (for example, at Baumgarten, Austria) to an entry point into the Italian gas grid (most likely Tarvisio), and then transportation from the entry point to an exit point in Sicily. All of the same caveats concerning the transportation of Algerian natural gas through the Italian grid also apply to the movement of Russian gas. This option has not been pursued as a part of this study, but could justify later investigation in detail.

Various natural gas trading companies have appeared in Italy in recent years who also may be considered as potential suppliers of pipeline natural gas to Enemalta. These companies would arrange, on their own account and at their own risk, the acquisition of natural gas (e.g. from Russia or from the Netherlands) as well as the entire chain of transportation contracts from the source of supply to Sicily for entry into the Gela-Malta pipeline, *provided* that the Gela-Malta pipeline is constructed so that it connects to a delivery node of the Italian gas grid. Alternatively, and more likely, such suppliers would strive to achieve a swap arrangement, exchanging Russian, Dutch or other gas for Libyan gas to be delivered to Enemalta.

Finally, Enemalta could approach any of the three companies who have committed to take Libyan gas via the Green Stream pipeline: Edison, Gaz de France, or Energia SpA. It is possible that these companies have not yet entirely resold or committed their forthcoming volumes of Libyan gas. However, it is unlikely that Enemalta could negotiate a lower price than could be achieved via ENI Gas & Power, because these companies represent a further intermediary between ENI Gas & Power and Enemalta: they would insist on some margin for their services.

The LNG option

Although not a part of the mandate for this study, the option for Enemalta to acquire natural gas in the form of LNG may well be worth detailed examination.

During our discussions with Sonatrach concerning pipeline natural gas (see above), we learned that Sonatrach would be willing to sell LNG to Enemalta for a price in the range of \$3.10 to \$3.20 “or a little bit less” per million btu (f.o.b. Skikda). This LNG price range is tied to prices of crude oil and petroleum products during the last quarter of 2003, and of course is adjusted each calendar quarter in relation to petroleum prices. Such a sale would have to be under a long-term contract (which could be for as little as 10 years) with standard take-or-pay terms. Sonatrach also stated that it would be ready to sell the

gas on a c.i.f. basis and to invest in the receiving, storage and regasification facilities in Malta as well as in the conversion of Enemalta's power plants to use natural gas.

The cost of transporting the LNG to Malta could be as low as \$0.20 per million btu depending upon the size of the cryogenic vessel utilized and the possibility of scheduling deliveries so that no vessel need be dedicated exclusively to the Algeria-Malta route. A large vessel will have the lowest shipping cost per million btu but also will require larger LNG storage facilities at the Malta terminal. Utilization of the larger LNG vessels currently in use (140,000 to 150,000 cubic meters) would entail about 6 shipments per year to deliver approximately 0.5 bcm of regasified natural gas, but this would require considerable LNG storage capacity at the receiving terminal. If smaller vessels were used, more frequent shipments would be necessary and smaller storage capacity would be required. The cost estimate assumes use of an existing LNG carrier rather than a newly built vessel.

The cost of reception, storage and regasification of the LNG may be roughly estimated at about \$0.40 per million btu. The capital cost of a receiving terminal would be approximately the same as for the Gela-Malta pipeline (around \$100 million, excluding any port modification costs if required), but such a terminal would be capable of handling 1 bcm/year; if this terminal were used to its capacity, the cost per million btu would be only around \$0.20.

The estimate of \$0.40 per million btu for reception, storage and regasification (excluding any port modification charges) ignores any potential subsidies. We understand that recently constructed LNG receiving facilities in the EU received subsidies amounting to up to 40% of the construction cost. The availability of such subsidies should be explored further if Enemalta chooses to pursue this LNG option.

Therefore, as a preliminary estimate, the cost to Enemalta of regasified natural gas at the receiving terminal in Malta would be not greater than the lowest price ENI Gas & Power

would be willing to accept for Libyan natural gas delivered via the proposed Gela-Malta subsea pipeline.

	<u>Estimated cost, \$/mmbtu</u>
Purchase price of LNG, f.o.b. Skikda	\$3.20
Transport to receiving terminal Malta	\$0.20
Storage and regasification	\$0.40
Total cost of regasified LNG, at terminal	\$3.80

Once a reception, storage and regasification facility is built on Malta, Enemalta would have access to a large number of potential suppliers and to an expanding spot market for LNG. Potential suppliers could include Algeria, Libya (if Shell develops new LNG capacity, as envisaged in its recent MOU with NOC), Egypt, and, at a higher but still competitive transportation cost, Nigeria, Trinidad, Qatar, Abu Dhabi and (soon) Iran. Indeed, it is possible that some of these other suppliers may be willing to make a similar offer of downstream investment to that proposed by Sonatrach.

The storage facility for LNG can be sized to provide the necessary back-up capacity in case of a delivery interruption. Sufficient LNG storage capacity could offset the need to maintain emergency supplies of substitute liquid fuel (petroleum products). An interruption of LNG delivery is in any case unlikely given the large number of potential suppliers. For example, following the explosion and fire at Algeria's Skikda gas liquefaction facility in January, Sonatrach obtained LNG from other sources to continue supplying its customers on an uninterrupted basis, and did not invoke *force majeure*.

Conclusions and Recommendations

1. Enemalta should seriously consider pursuing the LNG option, at least to the extent of exploring the costs of LNG from potential sources, such as Sonatrach. Others who should be contacted include BP, BG and Gaz de France (all of whom will soon have access to LNG from Egypt), Shell (with LNG from Nigeria and perhaps one day from Libya) and Qatar. Each should be asked to make a preliminary offer on a common basis, including co-investment in the receiving,

storage and regasification terminal as well as the conversion of Enemalta's power plants.

2. If the LNG option does not seem entirely satisfactory, Enemalta should evaluate the degree to which the company, if it does acquire pipeline natural gas, would like to preserve a right to purchase at least some gas directly from third-party suppliers. This will help to determine the extent to which Enemalta needs to be a co-owner of the Gela-Malta pipeline, or alternatively needs to insist upon third-party access rights as part of the negotiation with ENI Gas & Power.
3. If Enemalta decides to pursue pipeline natural gas via the Gela-Malta pipeline, Enemalta should consider approaching (in coordination with ENI Gas & Power) Libya's National Oil Company (NOC) which has expressed at least a willingness to review an opportunity to become a co-investor in the Gela-Malta pipeline and in the power plant conversions.
4. If Enemalta opens negotiations with ENI Gas & Power for the supply of natural gas via the Gela-Malta pipeline, Enemalta should seek a base price close to the minimum estimated above, equivalent to \$4.15 per million btu in the first quarter of 2004, subject to escalation as previously noted. Enemalta should also seek as wide a take-or-pay margin as possible, thereby enabling Enemalta to acquire some portion (perhaps 15% to 20%) of its gas requirements from third parties when the offered price is below the ENI Gas & Power contract price.
5. As negotiations progress with ENI Gas & Power, and as information concerning costs, taxes, interest rates, debt terms, applicable regulations, possible subsidies, and other matters become better defined, Enemalta should continuously refine its projections of pipeline cash flow and its estimates of the hypothetical pipeline tariff. As background and support to any negotiations, Enemalta will need up-to-date estimates of the rates of return ENI Gas & Power will earn from the project and from any of its constituent elements.