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ECONOMIC FEASIBILITY OF SUPPLYING HYDROCARBON FUELS TO JERSEY BY PIPELINE - DRAFT REPORT

A Draft Report to States of Jersey

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.1 Introduction

The new Jersey energy policy seeks to develop optimal policies over the next 25 year horizon that minimises the total economic costs; ensures that the main export industries in the economy remain internationally competitive; evolve to meet environmental policy needs; and ensure that the distribution of the costs and benefits of any energy policy are equitable.

In this context, the remit of the pipeline module is to investigate the barriers and opportunities of importing all fuel oils and natural gas via pipelines to remove facility dependence at Jersey's fuel farm. Our economic analysis also considers other policy goals of the energy policy, notably the diversification and security of energy supply and a review of the current energy market structure. The analysis pays attention to economic efficiency, social equity, international relations and environmental concerns.

The module is particularly pertinent in the discussions about the future of the East of Albert area, and this report seeks to inform the ongoing discussions about the size of the future land footprint that would enable the States to unlock value currently trapped in the fuel tank farm.

This report presents the summary of our findings. We have analysed the cost of constructing and maintaining a pipeline for both oil products and gas, and the related benefits weighed against the do nothing option – defined as continuation of the status quo. We have also taken into account changes in consumption volumes, movements in fuel prices and the infrastructure and land footprint needs as per the original RFP request.

1.2 Oil pipeline summary results

The table below outlines the different scenarios we have looked at – the NPV of continuing the current system of weekly shipments of oil products versus different pipeline scenarios. It indicates that there is an investment case for constructing an oil pipeline.

Jersey's oil consumption in 2005 totalled 110,698 tonnes - even assuming a conservative forecast over the 25 years, the high costs of shipment makes it cost effective to explore the pipeline option in more detail. Moreover EU, UK and IOM International Convention for the Prevention of Pollution from Ships (MARPOL) mandates call for phasing out single-hulled vessels over the next decade or two. Coupled with the lack of demand for small cargoes of petroleum products and St Helier harbour limitations – the cost of shipping is likely to increase above our long term forecasts, further strengthening the case for a pipeline. Section 3 of this report discusses the oil pipeline scenarios in greater detail.

Figure 1 – Oil pipeline summary results

	NPV in £MM	Benefit/Cost over Do Nothing Option
Do nothing option	51	
Alternatives - pipeline scenarios		
Base Case Scenario: Central	30	21
High	38	13
Low	23	28
Caen Route	44	7
10 Days CSR	30	21

1.3 Gas pipeline summary results

In contrast to the oil pipeline module our analysis indicates that shipping LPG is preferable to the pipeline options. At 11,494 tonnes, Jersey's current LPG consumption volumes which have stagnated in recent years; are too small to warrant a strong investment case. However, as the dual pipeline option indicates, laying both pipelines and apportioning the savings to the natural gas pipeline makes it economically viable. Section 4 of the report discusses the natural gas pipeline scenarios in greater detail.

Figure 2 – Natural gas pipeline summary results

	NPV in £MM	Benefit/Cost over Do Nothing Option
Do nothing option	12	
Alternatives - pipeline scenarios		
Base Case Scenario: Central	22	-10
High	29	-17
Low	15	-3
Ste-Mere -Eglise Route	25	-13
10 Days CSR	41	-29
Dual pipeline lay	**11**	**2**

1.4 Land footprint reduction and other strategic benefits

Our analysis details the effects of pipeline construction on the land footprint. The first two oil pipeline scenarios assume a one day capacity for throughput purposes, while the last scenario assumes a ten days storage capacity. All three scenarios point to a reduction in land footprint. However, the reduction is dependent on the storage needs, which is a function of the security of supply obligations and fuel demand.

The estimates above are relatively conservative. The reduction in footprint in practice, even assuming a one day throughput is likely to be negligible. Multi-product oil pipelines require separate tanks at either end to enable the batching process, and consequently use up significant land footprint. Moreover, we analysed the effects of adopting either the EU/IEA recommended 90 days for non-petroleum product producers or the UK compulsory stocking requirement of 67.5 days, and both suggest significant reductions in the existing storage capacity.

The natural gas scenarios are slightly different. The first two assume a total elimination of storage facilities, while the last assumes a ten day storage capacity. This results in smaller bulk storage needs and therefore a reduction in the land footprint. As in the oil cases, the reduction depends on the security of supply needs of Jersey.

While the limited reduction in land footprint may negate the original political driver for the pipeline project, we believe there are other significant benefits to be taken into account. The threat to build in of itself is a potentially powerful tool in driving down shipping prices which are currently very high. In addition, the gas pipeline offers an opportunity to hedge against electricity prices or a potential negotiation tool with French energy company EDF since it affords the ability to generate electricity cheaply on island.

1.5 Structure of the report

This report proceeds as follows; section two reviews supply and consumption patterns of hydrocarbon fuels in Jersey. The section analyses product mix, shipments, market structure and stakeholders, as a prelude to the feasibility analysis

Section 3 discusses the long-term costs of the oil status quo – the costs of continuing oil shipments over the next 25 years. This is weighed against the cost of constructing and maintaining a pipeline routed from France over the same period. The section varies the project under several scenarios and takes into account other benefits of a pipeline project such as price differentials or savings between UK and France, and revenues from a reduced land footprint.

Section 4 examines the cost of continuing current LPG shipments. This is also weighed against the costs of constructing and maintaining a natural gas pipeline from France, and by extension the costs of converting LPG users' appliances and infrastructure to natural gas, as well as the price offsets between LPG and natural gas. The report varies the pipeline project under different scenarios taking into account changes in land footprint.

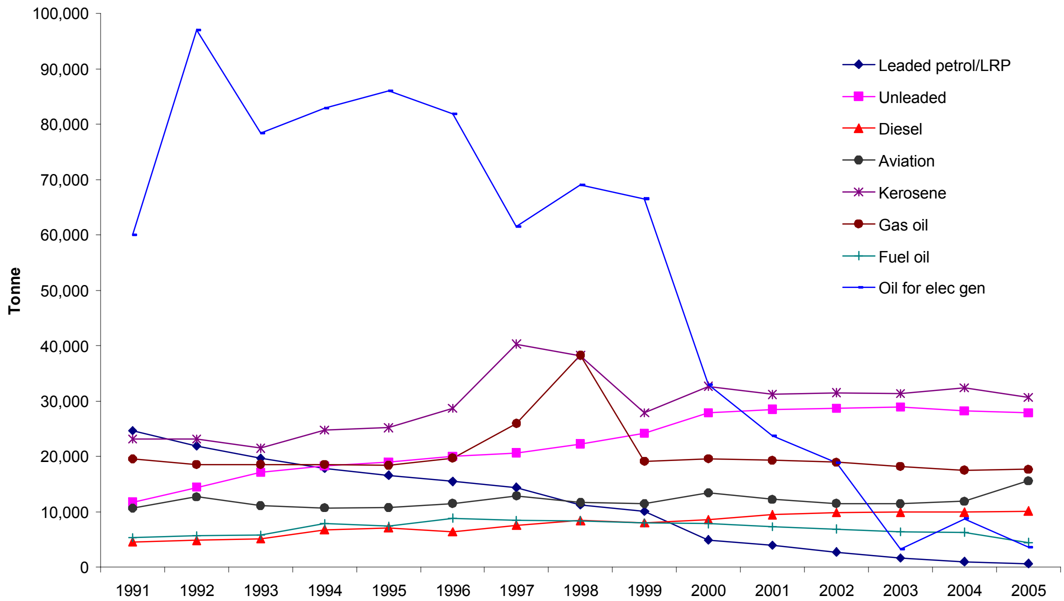
The final section highlights our recommendations. It also comments on steps to be pursued in the next stage such as the competitive reaction of fuel shippers, the strategic angles to the project, the need for more detailed engineering cost estimates.

2. REVIEW OF THE JERSEY ENERGY MARKET

2.1 Overall fuel consumption patterns and shipments

The island of Jersey currently imports all of its hydrocarbon energy needs. These include road fuels (leaded petrol/LRP, unleaded petrol, and diesel), aviation fuel, kerosene, gas oil, fuel oil, LPG and oil for electricity generation. The table below illustrates the total consumption volumes per annum between 1991 and 2005.

Figure 3 – Annual Consumption of Hydrocarbon Products in Jersey: 1991-2005



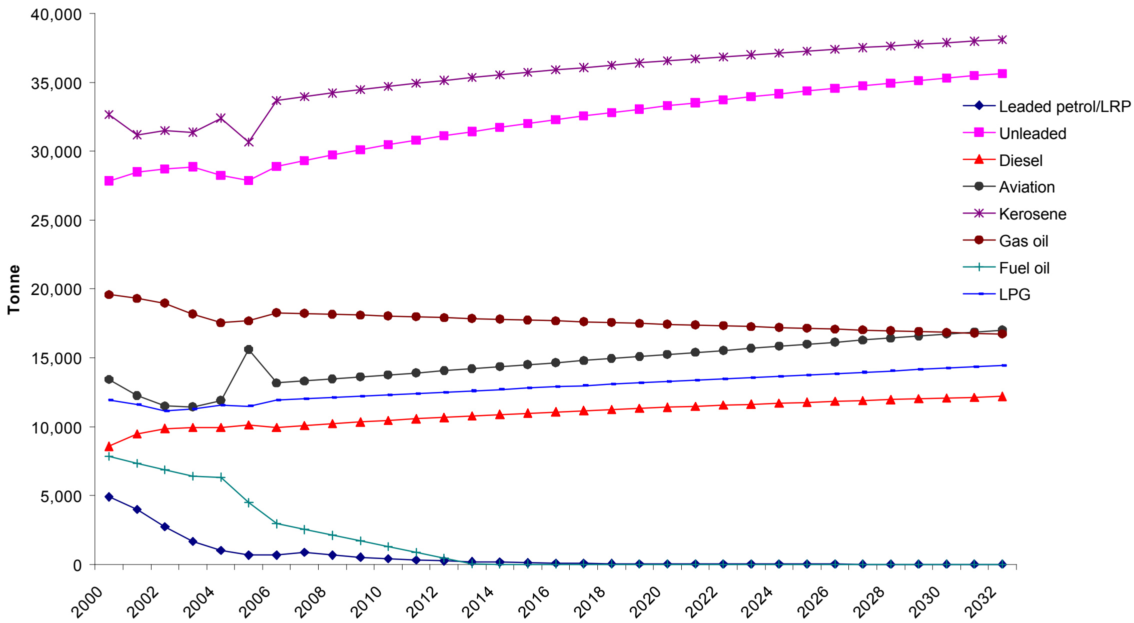
Source: Jersey Energy Trends 2004 & 2005, Jersey Statistics at www.gov.je/statistics

As the table shows, the market for petroleum products in Jersey is small - worth only about 0.2 % of the total UK market; and static – with little volume changes over the last three years except for major decline in consumption of oil for electricity generation and leaded petrol.

The construction of interconnectors to France has reduced the need for on-island electricity generation, therefore reducing consumption of oil for electricity generation to a trickle. In addition leaded petrol/ LRP consumption has declined from 24,663 tonnes in 1991 to 664 tonnes in 2005 as consumers have switched to unleaded petrol and diesel.

Our analysis of the patterns of consumption indicate that these volumes are unlikely to change significantly over the next 25 years, and may decrease as the corporate and individual responses to climate change takes effect in Jersey – in form of greater fuel efficiency and costing of carbon. Table 2 presents our long term forecast of consumption volumes from the regression relationships of historical data and accounting for long term trends.

Figure 4 – Annual Consumption of Hydrocarbon Products in Jersey: 2000-2032*



Source: Jersey Energy Trends 2005, Jersey Statistics at www.gov.je/statistics; Pöyry Energy Consulting forecasts

2.2 Oil products shipment and distribution

2.2.1 Fuel oils shipment

Oil products are imported by Esso and Shell Oil from the UK. Majority of the shipments come from the Esso refinery at Fawley in Southampton while some of Shell's shipments come from the Chevron's Pembroke refinery in Wales. Avgas is the only product sourced from outside the UK due to its specialist nature, and comes from Rotterdam in a milkround shipment route serving the Thames, Channel Islands and the Isle of Man.[1]

From the mainland refineries they are batched together in separate compartments and shipped in small tankers averaging 3,000 deadweight tonnes about once a week.[2] The frequency of the shipments depends on the size of the fuel farm at La Collette and the prevailing island demand for the individual product. Other constraints include the harbour berth for fuel oils and the seasonality of demand – aviation fuels for instance are shipped predominantly in the summer and kerosene

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[1] The ships used by Shell tend to be larger, given that they bring in more fuel overall, with a capacity of around 2,700 tonnes, while the ships used by Esso tend to be around 1,700 tonnes. The capacity of ships that can berth at Jersey is limited to around 3,000 tonnes due to shallow water berthing." - OXERA Consulting Ltd, *Fuel Prices in Jersey: A Report to the Industries Committee of the States of Jersey*, October 2001, hereafter OXERA Report

[2] Maritime capacity is usually expressed in deadweight tonnes – the weight of all cargo, fuel, water, ballast, stores, crew etc., which a seagoing vessel can carry. The deadweight is expressed in tons (2240 lbs.) or tonnes (metric ton of 1000 kilograms), Eurostat Statistical Concepts and Definition Database, http://forum.europa.eu.int/irc/dsis/coded/info/data/coded/en/gl007478.htm

mostly in the winter. Turnover by product varies from every 27 days for unleaded petrol to every 166 days for Avgas.[3]

2.2.2 Fuel tank farm and land footprint

At La Collette, the products are transported from the fuel jetty at the harbour to the tank farm. The tank farm is operated by the Jersey Fuel Consortium comprising of Esso and Shell as equity participants on a 40:60 percent basis and Total as a non-equity participant. BP was formerly an equity participant in the consortium, but the company pulled out of the Jersey market in 1996, selling its operations to Total and equity to Shell and Esso.

The oil shipments arriving are commingled. Stock draw-downs are reconciled using swaps and purchase agreements common in the mainland market. Total buys fuel from the other participants based on international market prices quoted on Platts and a mark-up for importation to the party in the consortium from which it purchases.[4]

The fuel consortium leases the tank farm land from the States of Jersey and pays an annual lease of about £150,000.[5] The last long term lease arrangement commenced on the 14th December 1979, and terminated on the 13th December 2000 and has not been re-signed since, despite the matter being deliberated by the assemblies. As a result, the current arrangements are on a rolling basis and the island is not tied to a long term contract that could increase the leverage of the three companies with adverse effects for new market entry and competition. Additionally, it allows the island room to re-configure land-use for the tank farm footprint, should it be economically viable to do so. However, it also means that the consortium has put on hold any long term investments in the tank farm due to lack of security for the investments, and that Total is unable to take an equity stake in the consortium.

Esso and Shell own separate office facilities, loading rack and tanker parking areas at the tank farm, while Total leases an office and parking space from the consortium and has a contractual agreement to use the loading racks operated by Shell. The facilities and tank farm cost about £276,000 a year to operate the facilities.[6]

2.2.3 Retail and distribution of oil products

The distribution of oil products in Jersey is dominated by three companies allied to the major companies. Esso has a long term exclusive contract to supply Petroleum Distributors Jersey (PDJ), a local affiliate, while Shell supplies the Fuel Supplies (Channel Islands) (FSCI), a wholly owned subsidiary company of Shell UK Oil. Shell however, maintains an arms-length trading relationship between the two units. The third distributor is Total Channel Islands (TCI), a unit of Total UK.

The three companies have long term solus ties and other arrangements with fuel forecourts, service stations and large customers and maintain significant island-wide fuel networks that compete with each other.[7]

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[3] Consultancy Solutions for the Oil Industry, *Review of the Current Arrangements for the Importation, Storage and Supply of Petroleum Products to the Distribution and Retail System in Jersey*, December 2004, hereafter Consultancy Solutions Report

[4] OXERA Report

[5] The Consultancy Solutions Report cites £134,630.88 as of 2004, which at the rate of Jersey inflation is about £148,842 in 2006.

[6] The Consultancy Solutions report also cites oil companies claiming that the operations costs for the facilities amounted to £250,000 in 2004, which at the rate of Jersey inflation is about £276,000 in 2006.

[7] There are currently 44 licensed petrol forecourts in Jersey, of which 38 sell petrol to the public. The remainder are for own commercial use. The geographical distribution of retail outlets is concentrated around St Helier. The forecourts are owned and operated by a total of 25 companies. The largest retailers are Roberts Garages and Le Riche Group, each of which owns and/or operates five forecourts.

2.3 LPG shipment and distribution

2.3.1 Current shipment and distribution arrangements

LPG consumption in Jersey has stagnated at about 11,000 tonnes a year and has declined slightly since 1991 – as figure 3 above indicates. In addition, prices have been constant with electricity and heating oils providing significant competition.

Jersey Gas Ltd has a monopoly on the distribution of LPG in the island. The company imports LPG from the ExxonMobil refinery at the Fawley Marine Sea Terminal in Southampton through Kosangas (Jersey) Ltd, a sister company owned by the International Energy Group. The shipments are contracted to Sigas Kosan LPG Carriers which delivers the LPG cargo in 1,000 tonne shipments.[8]

At the island, LPG shipment is delivered to the bulk storage terminal, from where it is piped via mains gas to customers around St Helier and via road hauliers to customers outside the pipeline network. To complement the pipeline distribution network, Jersey Gas operates a modern gas making plant at La Collette while Kosangas (situated at St John), provides an LPG filling and distribution service for those customers located beyond the mains network.

2.3.2 Bulk storage and land footprint

Jersey Gas has a 99 year lease with the States of Jersey for its bulk storage and plant facilities in La Collette and currently pays [£225,000] a year. The lease arrangement commenced on 1st May 1978 and will expire in 2077.[9] In addition, it costs about [£225,000] a year to operate the facilities.[10]

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[8]*Eitzen News*, November 2005, No. 4, a publication of Camillo Eitzen & Co ASA, operators of Sigas Kosan LPG Carriers (exclusive LPG shippers to the Channel Islands)

[9] States of Jersey, La Collette, St. Helier: modification of lease of land to Jersey Gas Company Limited, Lodged au Greffe on 21st June 2005 by the Harbours and Airport Committee at http://www.statesassembly.gov.je/documents/propositions/40010-46068-2162005.htm;

Jersey Gas Ltd, at http://www.jsygas.com/abo_gas.html

[10] The Jersey Gas leasing cost and operations costs are an approximation based on the International Energy Group results – Annual Report and Accounts for 2002 [still need to confirm numbers]

3. OIL PIPELINE

3.1 Main assumptions

Our analysis involved estimating the cost of continuing oil shipments over the next 25 years, weighed against different pipeline options. To do so we have assumed a 25 year lifetime costing for the pipeline, and a discount rate of 6% and inflation rates of 2.5% in line with Jersey projections. Other assumptions include state financing and tax exemption of the project.

3.2 Doing nothing -continue oil shipments: NPV of £51 million

3.2.1.1 Methodology

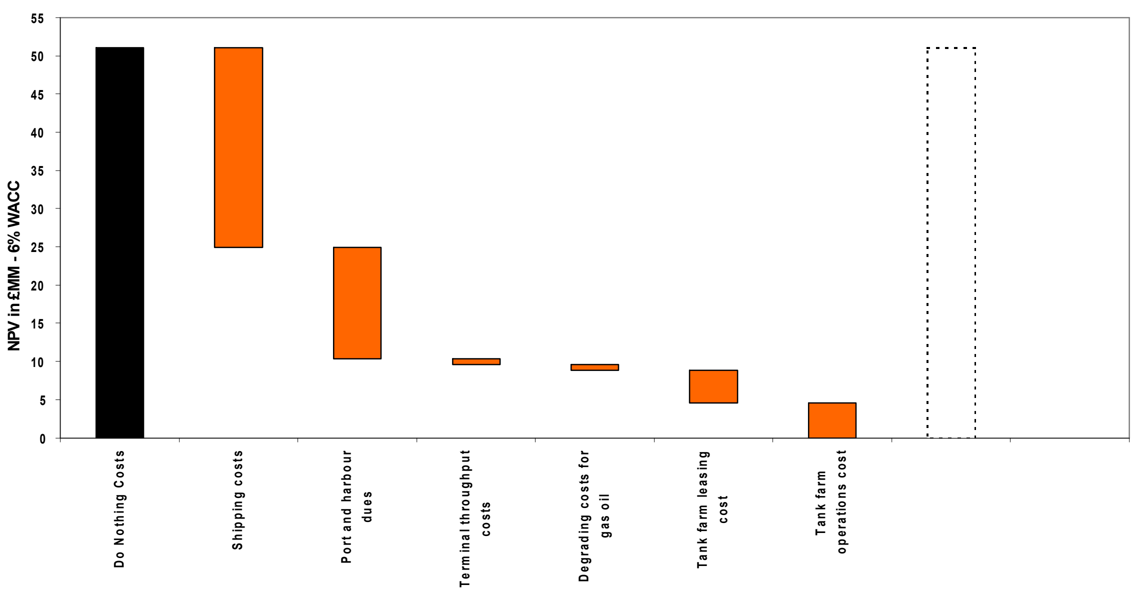
In this scenario we consider the costs of doing nothing – namely continuing current shipment of oil products. This involves maintaining the existing infrastructure and land footprint. To assess the cost of continuing shipments we have forecast the volumes of consumption and the relevant costs items over the next 25 years. Total do nothing NPV presented below is therefore the sum of shipping costs; port dues; terminal throughput costs; costs of continuing degrading gas oil and the tank farm leasing and operations costs.

Future consumption volumes are projected over the next 25 years using a regression relationship based on historical patterns and taking into account current patterns. Operations and leasing costs have been forecast using long term Jersey RPI forecasts. In general the costs are added up per year and discounted to the present, yielding the total cost for continuing the status quo.

3.2.1.2 Results

The NPV of continuing current shipments is £51 million. However the largest segment of this cost is shipping costs. We have used a cost per ton rate of £12.50 as of 2004 - used in the Consultancy Solutions report – this is then forecast at the rate of inflation to yield conservative estimates used throughout the model.

Figure 5 – Do Nothing Scenario: costs of continuing current shipments



3.3 Alternatives to doing nothing – building a pipeline

3.3.1 Base Case Central Scenario – NPV of £30 million

In the base case scenario we consider an oil pipeline routed from Cherbourg in the Manche region in France. We calculate the costs of construction, and maintaining the pipeline. In addition we take into account other incidental benefits such as reduction in land footprint.

3.3.1.1 Pipeline route map

The pipeline originates from an oil tank farm in Cherbourg. From Cherbourg it is routed to Carteret on the coast, about 37 km away. At Carteret the pipe is then routed undersea to La collette, St Helier in Jersey, for an additional 33 km, where it is connected to a small storage tank that will replace the existing fuel tank farm. The map below illustrates the proposed route.

Figure 6 – Cherbourg to Carteret, France - St Helier, Jersey

3.3.1.2 Engineering and environmental concerns

Despite the high-level view offered in the route map above, our analysis considered some of the key environmental and engineering challenges that will affect the distance and cost of the project. In particular, the Ramsar site and marine protection zone on the South East corner of the island off La Collette and a second Ramsar site at Les Pierres de Lecq (the Paternosters), 16 km due north of Gréve de Lecq on the north-west coast of Jersey and 22.4 km west of Normandy (France) may force changes in the length of the pipeline with considerable cost implications.[11]

Other considerations we looked at include the possible costs incurred from laying a pipe in a busy shipping corridor and the strong tidal waves that will require deeper trenching. The coastal shipping in the inshore traffic zone, to and from adjacent French ports is less busy than the nautical shipping

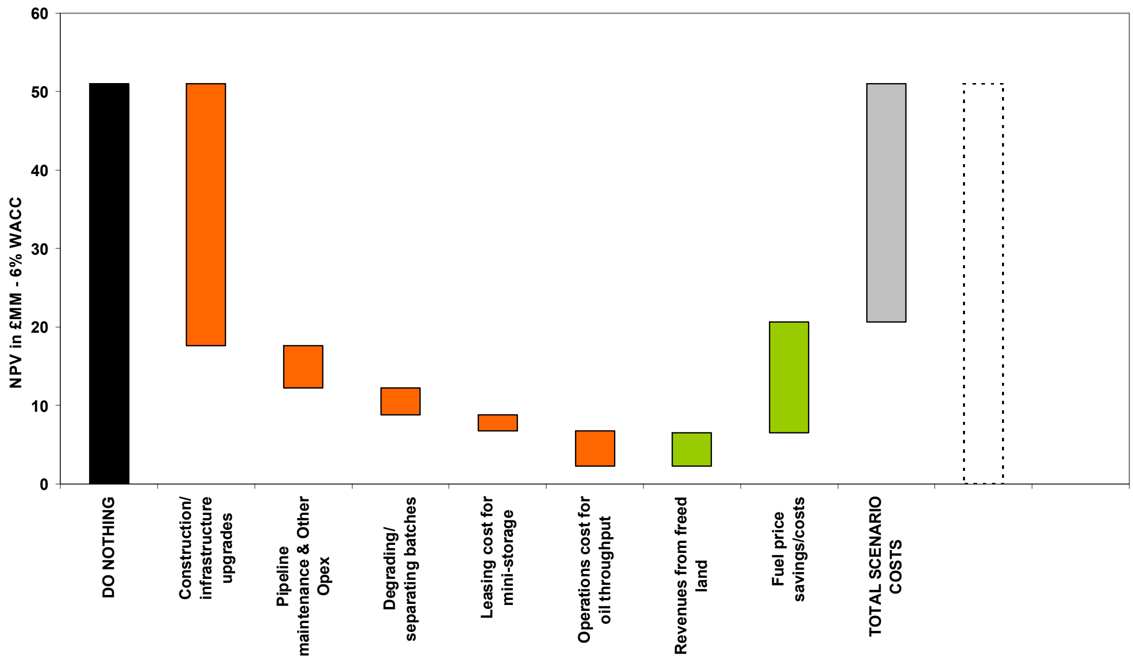
[11] Jersey's Coastal Zone Management Strategy

lanes in the main English Channel Casquets traffic separation scheme. The latter lies over 40 miles to the north west of the Island, and is a major passage for ports in the UK and Europe. In addition to shipping traffic, the tide, pent up between numerous sandbanks, flows with a terrific force in the Passage de la Deroute that the project will most likely require deep trenching. However, as noted, the exact route and costing will depend significantly on an engineering and environmental evaluation, although we are confident that this is unlikely to change the estimates provided in this report significantly.

3.3.1.3 Results

The figure below presents the base case results. The NPV is £30 million, which compared to the do nothing option results in a net benefit of **£21 million**. The succeeding sections explain the methodology and key assumptions in greater detail.

Figure 7 – Base Case Scenario: do nothing vs. building a pipeline



3.3.1.4 Construction costs

The annual consumption volumes in Jersey and the resulting flow rate calculations suggest 6-8 inches diameter pipelines would be suitable. However, our costing analysis assumes steel pipes 12 inches in diameter because the incremental cost of increased diameter is not significant when weighed against the scope for future increased loads. 12 inch diameter steel pipes are also more economically viable since they are a standard product in most steel mills - smaller diameter pipeline networks now largely use plastic. This choice of diameter also takes into account the weight/protective coating and any scour issues, which are significant problems for pipelines.

Given this background information, our analysis suggests onshore pipeline construction costs at £0.175 million per km. In addition, we have included miscellaneous civil works and pipelay costs of about £0.3 million for a small beach terminal and base station at Carteret.

For the offshore component, we use an estimated £0.35 million per km; £2.9 million for civil works at each shore crossing; and a further £11.6 million for pipelay, above water tie-in (AWTI) and shorepull costs. The shorepull costs include the costs of mobilizing and demobilizing marine vessels and equipment to lay the lines. Finally we have assumed an additional £0.58 million to upgrade the infrastructure at St Helier, for compressors and an onshore receiver.

3.3.1.5 Pipeline operations and maintenance costs

Pipeline maintenance is costed at 1% of total system construction as per industry norm. In addition, because the pipeline will transport multiple oil products, we estimate the cost of degrading or dealing with multiple products initially at 2.4 pence a litre and rising with inflation over the 25 year period. In order to carry multiple products or grades in the same pipeline, the different products are held in separate storage facilities at the pipeline origin and are delivered into separate storage facilities at the destination. Typically, the different grades are transported sequentially through the pipeline, and traverse the network as a single product. At the end of a given batch, another batch of a different grade follows. Product batches are butted directly against each other, without any device to separate them, and as a result, some but relatively little mixing occurs. The mixture is often downgraded and blended to the lower grade product.[12]

3.3.1.6 Price differentials/offsets between the UK and France

Our analysis briefly considered routing the pipeline from the UK, but instead opted to cost only the French option. This is because the nearest UK connection point is 165.2 km away implying additional construction and maintenance costs. Routing from the UK would also require thicker pipes, higher costs per km, larger number of compressors and higher pipeline accident risks -which considerably increases the cost without any compensating benefits.

However, we have taken into account the difference in oil product prices between the UK and France. On average, fuel is cheaper in France than in the UK, which implies a saving and advantage to the pipeline project. We have projected the cost savings per fuel product over the 25 years in consideration, with long term international oil prices and exchange risks taken into account and subtracted the present value from the total costs.

3.3.1.7 Reductions in land footprint

Our analysis also examined the effects of the pipeline on the fuel tank farm land footprint. The current tank farm in La Collette occupies a total of 195,195 square feet. This includes 24,000 square feet of car park area to the front of the site, and an additional rump left to maintain storage capacity for strategic purposes – yielding a total of 169,059 square feet.[13] The storage units have a capacity of 14,000 tonnes, about 13% of total annual consumption of 110,698 tonnes in 2005 – about 300 tonnes a day.

For the base case scenario we have assumed a single day tank space need. Because oil product distribution is by road in Jersey and this is not bound to change even under a pipeline scenario - unless pipelines are extended on-island, we assume for throughput needs, at least one day tank storage will be required. This implies tank capacity of 300 tonnes – 2% of current needs. Further, we assume that the current tank farm storage units occupies 60% of the 169,059 square feet, since the service bays (loading racks, offices) take up significant space and are unlikely to change given similar volume consumption. As a result, the land footprint will reduce by 51% and maybe far less given that batching in the pipeline network will require different tank spaces for each product.

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[12] Details on multi-fuel pipelines – US Department of Energy, Energy Information Agency, U*.S. Regions for Distribution of Petroleum and Their Key Pipelines* at http://www.eia.doe.gov/oiaf/servicerpt/ulsd/appendix_c.html

[13] States of Jersey, *La Collette Fuel Farm, St Helier: Lease to Shell UK Limited and Esso Petroleum company Limited*, Lodged au Greffe on 13th May 2003 by the Harbours and Airport Committee, at http://www.statesassembly.gov.je/documents/propositions/14326-9840-1352003.htm

3.3.2 High and Low Base Case Scenarios – NPV of £38 million and £23 million

We have varied the NPV of constructing and maintaining the oil pipeline in the base case scenario at +/-20%. This results in a NPV of £38 million for the high base case and a NPV of £23 million in the low base case scenario. Compared to the do nothing option, it translates to a net benefit of **£13 million** for the high base case and **£28 million** for the low base case scenarios.

3.3.3 Scenario 2: Caen Route – NPV of £44 million

Scenario two assumes similar costing metrics as the base case scenario. However it amends the routes and starting point of the pipeline further inland to Caen.

3.3.3.1 Pipeline route map

The pipeline in this scenario originates from the delivery terminal at Caen in France, where it connects to the LHP regional network. The LHP oil pipeline network is operated by Trapil SA which is owned by a consortium of oil companies -Total, Esso, Shell, BP and Pisto SAS. The terminal in Caen is connected via a 20 inch pipeline to the Esso refinery at Port-Jérôme, near Le Havre.[14]

From Caen, the pipeline is routed to St-Rémy-des-landes, a distance of about 109 km. At St-rémy-des-landes, the pipeline is laid undersea for an additional 33 km to St Helier, Jersey, from where it is connected as in the previous scenario to a small storage tank replacing the existing fuel tank farm at La collette. The map below illustrates the proposed route.

Figure 8 – Caen to St-Remy-des-Landes, France - St Helier, Jersey

3.3.3.2 Results

The route amendment results in an NPV of £44 million and a net benefit over the do nothing option of £7 million as shown below.

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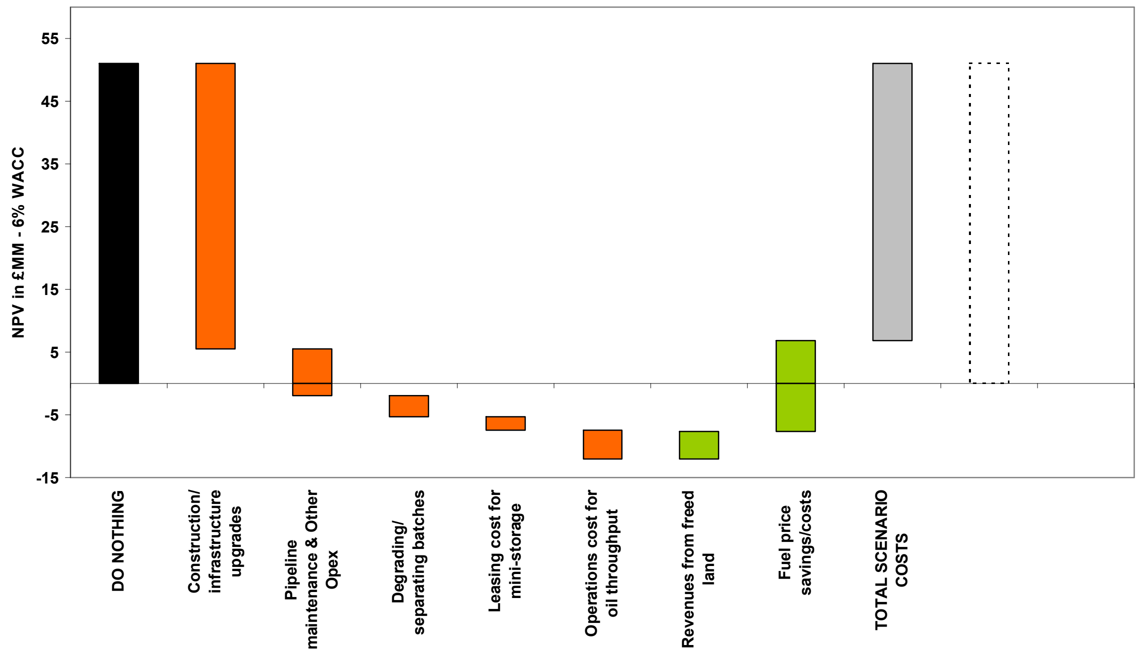
[14] Trapil SA LHP network connection points - http://www.trapil.fr/uk/pipelines_res_lhp.asp

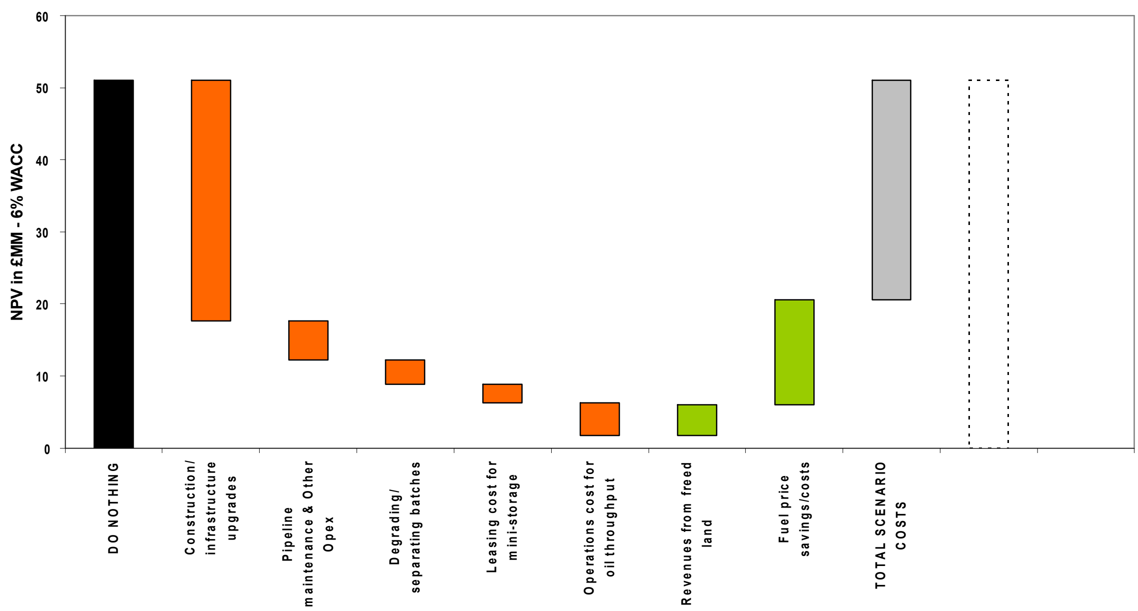
Figure 9 – Scenario 2 - Caen Route: do nothing vs. building an oil pipeline



3.3.4 *Scenario 3: 10 days CSR – NPV of £30 million*

Scenario three assumes exactly the same costing details and routes as the base case (with Cherbourg as the starting point). However it assumes a minimum compulsory stocking requirement (CSR) of 10 days for the tanks at St Helier (versus the one day arrangement under the previous scenarios). Compared to the NPV of doing nothing, this results in a net benefit of **£21 million** and is barely more expensive than the base case scenario.

Figure 10 – Scenario 3 - 10 days CSR: do nothing vs. building an oil pipeline



3.3.4.1 Reductions in land footprint

The previous scenarios assumed a one day tank farm space needs for throughput needs – this implies tank capacity of 300 tons or 2% of current capacity. This scenario examines a 10 day stocking obligation equal to 3,000 tons or 22% of current capacity.

Further, we assume that the tank farm storage units occupy 60% of the 169,059 square feet of the current space, since the service bays (loading racks, offices) take up significant space and are unlikely to change given similar volume consumption. As a result, the land footprint is reduced by 41% - 10% less than the one day constraint.

Current UK Compulsory Stocking Obligations mandates refiners to hold 67.5 days of stock, in line with EU and IEA directives for non-producers obligation of 90 days.[15] Applying either requirement to Jersey would lead to an increase in the La Collette tank farm – up to 1.5 times under the UK law. This implies that the land footprint will remain or decrease depending on the security of supply needs of Jersey.

3.4 Parity options

The options presented above indicate the potential benefits from building a pipeline. However when we vary other factors such as the discount rate, and the NPV of shipping, the calculus swings to parity or even in favor of continuing current shipments. For instance, assuming that no benefits accrue to the pipeline and therefore weighing only the costs results in £44 million – a reduced benefit of £7 million over the do nothing option.

Figure 11 – Alternatives options for oil pipeline

	NPVs	Excluding fuel offset/ savings	Excluding de-batching costs	CAPEX+OPEX only
Do nothing option	51	51	51	51
Alternatives - pipeline scenarios				
Base Case Scenario: Central	30	44	27	49
High	38	52	35	57
Low	23	37	19	41
Ste-Mere -Eglise Route	44	59	41	63
10 Days CSR	30	45	27	49

[15] DTI Consultation document on the future of Compulsory Stocking Obligations for oil, December 2003, at http://www.og.dti.gov.uk/consultations/conoilstocking.doc;
EC/EU Council Directive 68/414/EEC of 20 December 1968 - imposes an obligation on Member States of the EEC (EU) to maintain minimum stocks of crude oil and/or petroleum products

4. NATURAL GAS PIPELINE

4.1 Main assumptions

Our analysis for the gas supply involved estimating the cost of continuing current LPG shipments over the next 25 years, weighed against different pipeline options. As in the oil supply analysis, we have assumed a 25 year lifetime costing for the pipeline; a discount rate of 6% and inflation rates of 2.5% in line with Jersey projections. Finally, other model assumptions include state financing and tax exemption of the project.

4.2 Doing nothing -continue LPG shipments: NPV of £12 million

4.2.1.1 Methodology

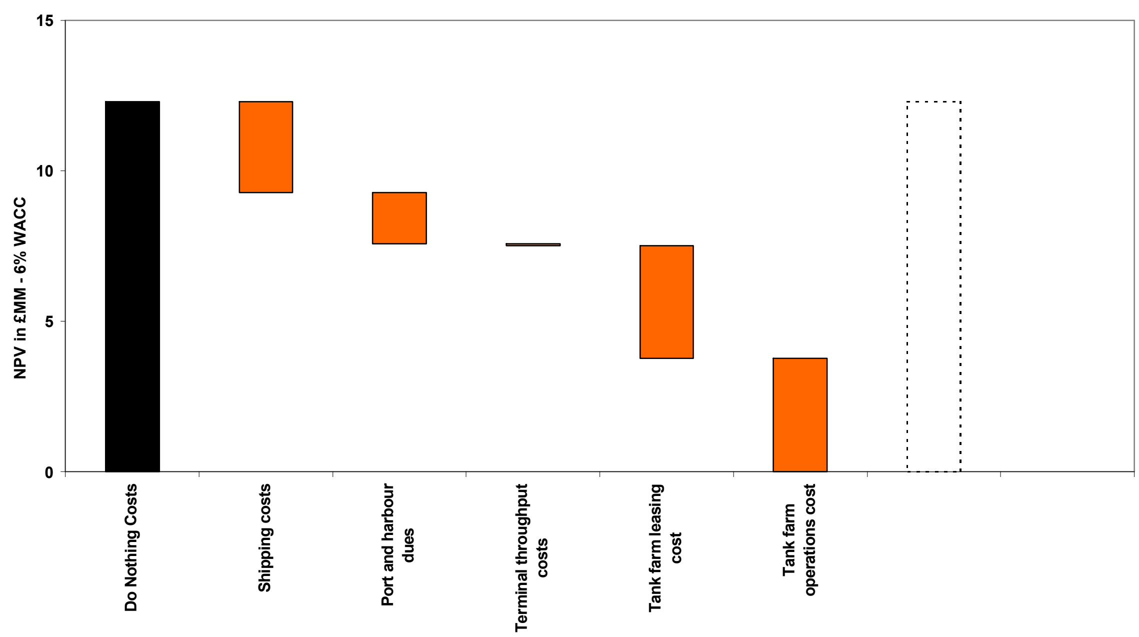
This scenario considers the costs of doing nothing defined as continuing LPG shipments. This involves maintaining the existing infrastructure and land footprint; continued shipping and port dues and terminal lease and operations costs. As in the oil products analysis, we have forecast the volumes of consumption and the relevant cost items over the next 25 years. Total do nothing NPV presented below is the sum of shipping costs; port dues; terminal throughput costs and the leasing and operations costs for the LPG bulk storage, cylinder filling and gas manufacturing facilities.

Future consumption volumes are projected over the next 25 years using a regression relationship based on historical patterns and taking into account current patterns. Operations and leasing costs have been forecast using long term Jersey RPI forecasts. As in previous cases, the costs are added up per year and discounted to the present, yielding NPV for continuing the status quo.

4.2.1.2 Results

The NPV of continuing current shipments is £12 million. As in the oil products analysis, the largest segment of this cost is shipping costs which use a similar conservative rate as the oil scenario.

Figure 12 – Do Nothing Scenario: costs of continuing current shipments



4.3 Alternatives to doing nothing – building a natural gas pipeline

4.3.1 Base Case Scenario – NPV of £22 million

In the base case scenario we consider a natural gas pipeline routed from Quettetot in France. We calculate the costs of construction, and maintaining the pipeline. In addition we take into account other incidental benefits such as reduction in land footprint, the benefits of switching from LPG to natural gas and the costs of conversion.

4.3.1.1 Pipeline route map

The natural gas pipeline in the base case is routed from the Gaz de France network at Quettetot to Carteret a distance of about 18 km. At Carteret the pipeline is then routed undersea to St Helier in Jersey, for an additional 33 km, where it is connected to the existing gas mains network. The map below illustrates the proposed route.

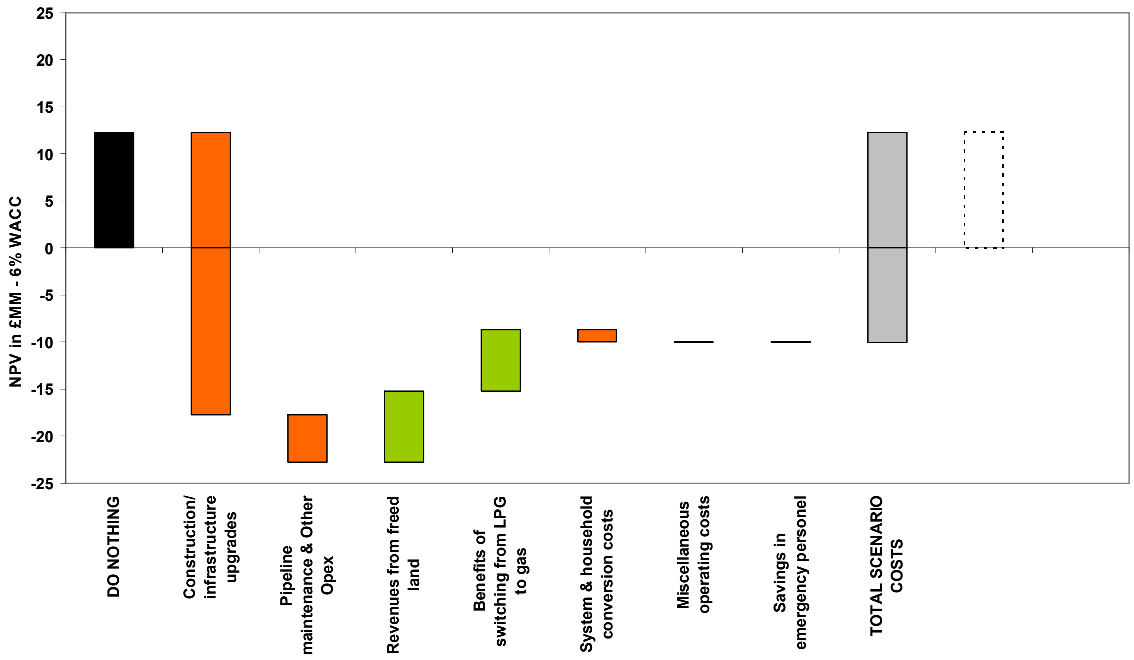
Figure 13 – Quettetot to Carteret, France - St Helier, Jersey

Source: Via Michelin route maps

4.3.1.2 Results

The figure below presents the base case results. The NPV is £22 million, which compared to the do nothing option results in a net cost of **£10 million**. The next sections explain the methodology and key assumptions in greater detail.

Figure 14 – Base Case Scenario: do nothing vs. building a pipeline



4.3.1.3 Construction and maintenance costs

The natural gas pipeline module uses similar assumptions detailed in the oil supply analysis. The costing assumes steel pipes 12 inches in diameter rather than 6-8 inches for the same reasons outlined earlier. Onshore pipeline construction costs are estimated at £0.175 million per km with additional expenditures for miscellaneous civil works, pipelay costs of about £0.3 million for a small beach terminal and base station at Carteret.

The offshore cost component comprises of construction costs at £0.35 million per km; an estimated £2.9 million for civil works at each shore crossing; and £11.6 million for pipelay, above water tie-in (AWTI) and shorepull costs and mobilizing and demobilizing marine vessels and equipment to lay the lines. In addition, we have assumed an additional £0.58 million for infrastructure upgrades, compressors, and an onshore receiver at St Helier. Pipeline maintenance are costed at 1% of total system construction as per industry norm.

4.3.1.4 Price differentials/offsets between the UK and France

As in the oil proposal, we briefly considered routing the gas pipeline from the UK, but opted to cost only the French option because of additional construction and maintenance costs detailed earlier. However, we have taken into account the difference in prices between LPG currently sourced from the UK and natural gas in France. We have projected the cost savings between the two over the 25 years in consideration, and subtracted the PV from the total costs.

4.3.1.5 Conversion costs – LPG to natural gas

Because natural gas is different from LPG, the pipeline project entails converting household appliances and the network to the new supply. Our analysis assumes 9,000 households in the island currently using LPG and a cost per household of £70 – the cost of sending in a technician to check appliances and minor re-working on connections. The cost per household comes from a similar conversion exercise conducted by Bord Gáis, a leading Irish energy provider that is currently converting households in NW Ireland from LPG and other sources to its gas pipeline network. In addition, we have assumed system-level infrastructure upgrades related to conversion of about £0.69 million.[16]

Besides the one-off terminal and appliance conversion costs, we have allowed for minimal additional maintenance costs arising during the transition period, but assume that new appliance stock post-conversion will not require any conversions. Further, we have modelled other benefits natural gas has over LPG. Natural gas is lighter than air. It dissipates more easily and is less flammable than LPG; thus we estimate that the island will accrue annual savings in emergency personnel man-hours due to fewer accidents. However, taken together, these sums are negligible to the overall cost-benefit analysis.

4.3.1.6 Reductions in land footprint

Our analysis for the base case scenario assumes that all LPG customers will be converted to mains gas. As a result, we assume that in the first two scenarios there will be no further need for bulk storage and the cylinder filling and manufacturing units. Consequently, there are no related storage costs or leasing costs. Instead we have added revenues resulting from freeing land footprint. The financial benefit accruing as a result of redeveloping the land is estimated at twice the lease cost for the same proportion of land – this is a very conservative and simple estimate.

4.3.2 High and Low Base Case Scenarios – NPV of £29 million and £15 million

As in the oil module, we have varied the NPV of constructing and maintaining the gas pipeline in the base case scenario at +/-20%. This results in a NPV of **£29 million** for the high base case and **£15 million** in the low base case scenario. Compared to the doing nothing option, it translates to a net cost of **£17 million** for the high base case and **£3 million** for the low base case scenarios.

4.3.3 Scenario 2: Ste-Mere-Eglise Route – NPV of £25 million

Scenario two assumes similar costing metrics as the base case scenario. However it amends the routes and starting point of the pipeline further inland to Ste-Mere-Eglise.

4.3.3.1 Pipeline route map

The pipeline in this scenario originates from the main Gaz de France transmission system running from Caen to Cherbourg. From the terminal at Ste-Mere-Eglise, it is routed to the coast at St-Remy-des-Landes a distance of 33km away. At St-Remy-des-Landes the offshore component runs to St Helier, Jersey, a distance of 32 km from where it is connected to a the existing gas mains network. The map below illustrates the proposed route.

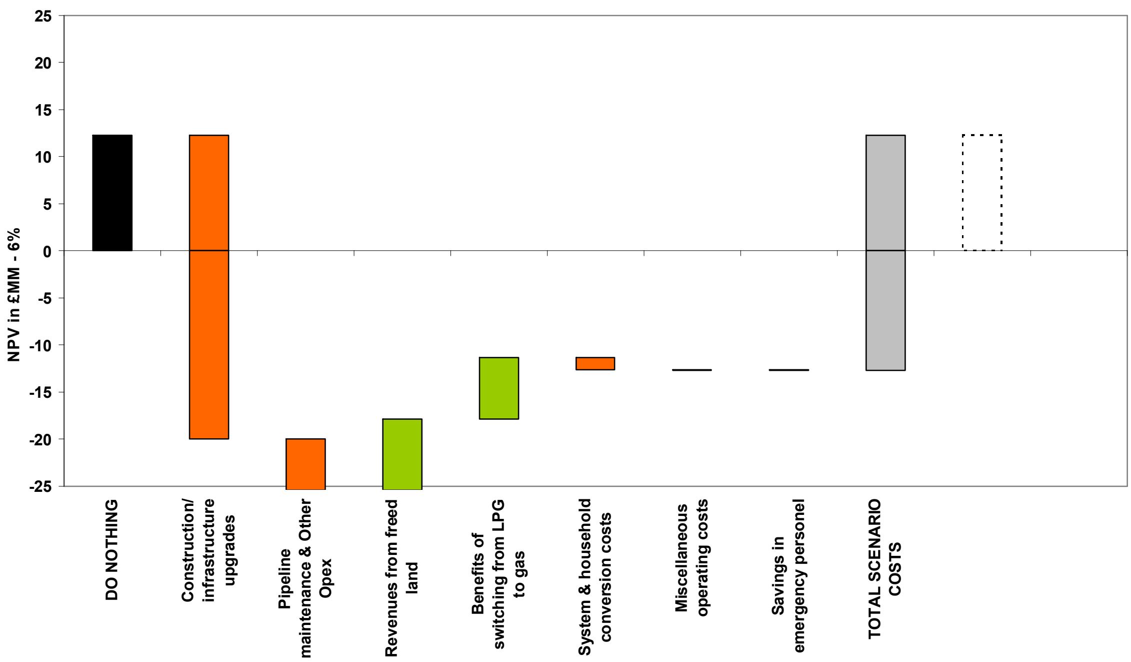
[16] Given that the total domestic gas consumption in 2005 was 71,800 MWh and the average consumption per household was 8,000 KWh, this implies about 8, 975 households – rounded to 9,000 gas households. Jersey Energy Trends 2005, p.10 Jersey Statistics at www.gov.je/statistics

Figure 15 – Ste-Mere-Eglise Route to St-Remy-des-Landes - St Helier, Jersey

4.3.3.2 Results

Scenario two results in a net NPV of **£25 million**, implying a net cost of **£13 million** compared to the NPV of doing nothing.

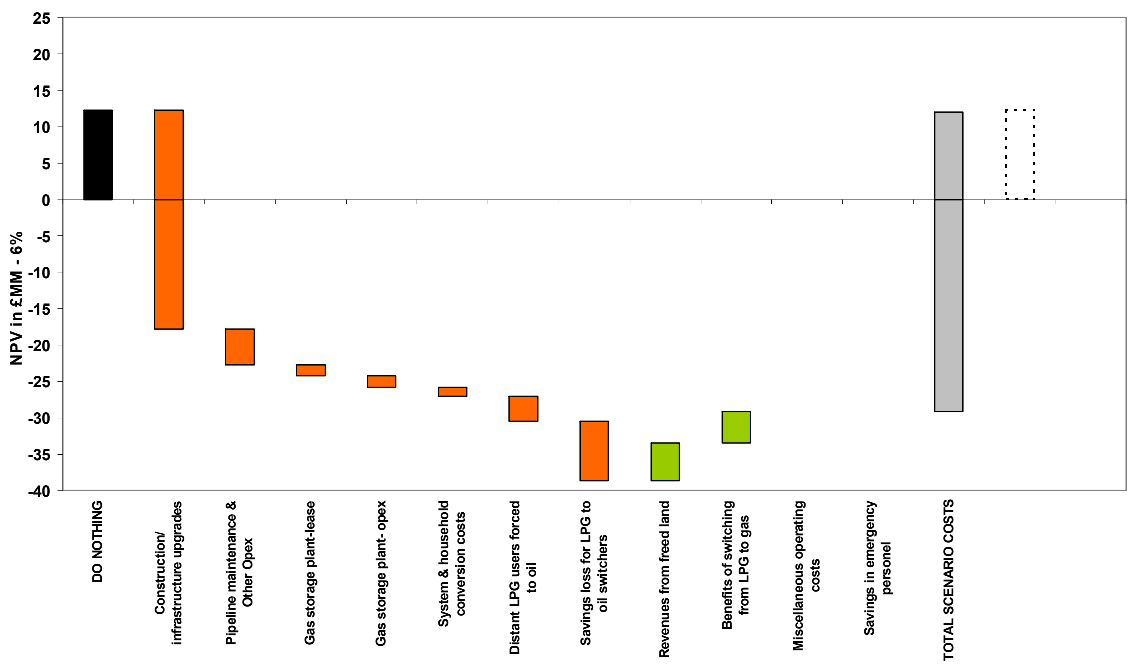
Figure 16 – Scenario 2 - Ste-Mere -Eglise Rte: do nothing vs. building a pipeline



4.3.4 Scenario 3: 10 days CSR – NPV of £41 million

Scenario three assumes exactly the same costing info and routes as the base case – routing the pipeline from the Gaz de France network at Quettetot. However it assumes that some gas bulk storage tanks at St Helier will remain to meet the compulsory stocking mandate of 10 days (versus none in the other two scenarios). It also assumes that some LPG customers not on the mains network will switch to oil instead. Compared to the NPV of doing nothing, this results in a net cost of **£29 million** and is much more expensive than either preceding scenarios.

Figure 17 – Scenario 3 - 10 Days CSR: do nothing vs. building a pipeline



4.3.4.1 Switching costs –distant LPG users converting to oil products

Natural gas or mains gas requires a developed pipeline system that is not currently available to all LPG users. As a result, we anticipate that some LPG customers outside St. Helier, who currently receive regular tank filling from trucks or buy bottled LPG will be forced to switch to kerosene or heating oil. Installing compressed or pressurised natural gas to service these customers is not economically feasible, given that an average CNG plant costs £300 million to build.

Cheaper CNG manufacturing technologies exist – often small units or fuelling stations pressing natural gas at 3,000 psi pressure with a compressor based system. Natural gas is transported through pipelines to refueling stations and compressed at a pressure of 3,000 psi with the help of specially installed compressors that enables it to be loaded as gas cylinders for vehicles. However, as far as we know, there are no large scale bottling installations that would replace the existing LPG bottling and manufacturing network.[17] As a result, we have only analysed the costs of LPG users switching to oil and not to CNG

[17] CNG Plants, at http://www.gas-plants.com/cng-plant.html

Our analysis assumes that an estimated 2,100 households will be affected (on average 24% of channel island gas users are served from bottled gas). The switching costs comprise of two parts – the opportunity costs of installed infrastructure (LPG bulk storage tanks; boilers) that will be discarded and the cost of installing new kerosene or fuel oil tanks and boilers for the affected households. The cost of uninstalling the LPG tank and the disused tank is estimated at £325 per household, while the cost of a new oil tank and installation is estimated at £1,285 per household. To be conservative we have ignored the costs of the boilers.

In addition, we have estimated the price differences between natural gas and oil products, for the 2,100 customers over a 25 year period. This implies missed savings opportunities and therefore a cost to the pipeline project.

4.3.4.2 Reductions in land footprint in scenario 3

Our analysis also examined the effects of the pipeline project on the land footprint of the bulk storage tank farm and other LPG facilities. Currently, the Jersey Gas facility in La collette comprises of a LPG/air gas manufacturing plant, bulk LPG storage tanks with 1,400 tonnes capacity offices, parking and service bays – occupying a total of 95,846 square feet. The land is leased from the States under long term leasing arrangement that will expire in 2077. In addition, Jersey Gas also maintains an LPG cylinder filling plant on a separate site at Les Ruettes, St John with 100 tonnes of LPG storage.[18]

Current storage capacity is about 12% of the total annual consumption – estimated from 11,494 tonnes a year or 31.5 tonnes a day. Assuming that Jersey opts for a security of supply obligation mandating 10 days of supply, this implies tank capacity of 315 tonnes – 22.5% of current capacity.

Given that a pipeline will negate the value of maintaining a manufacturing facility, and will result in lower storage space needs, there is therefore scope of reducing the land footprint. We assume that the LPG bulk storage units and manufacturing facility at St Helier occupy 60% of the 169,059 square feet – with the service bays and offices taking up the rest. The latter space needs are unlikely to change given similar volume consumption. As a result the pipeline project will free up the entirety of the Las Ruettes site, and 54% of the La Collette land footprint.

However, as in the oil supply case, if we assume UK Compulsory Stocking Obligations mandate of 67.5 days of stock and the German equivalent of 90 days, our analysis points to retaining or even increasing the bulk storage facility. As a result, the security of supply obligations will dictate whether land footprint remains constant or decreases.

There have been several discussions about relocating the Kosangas facility from St John to La Collette, primarily so that the bulk storage tanks could be supplied by fixed pipeline rather than road tanker. In 1993 for instance, the Island Development Committee participated in negotiations between Kosangas and Channel Island Welding Limited for the only parcel of land available at the time in La Collette. Discussions to transfer the long term lease from the Channel Island Welding Ltd to Kosangas were unsuccessful, and the site was subsequently redeveloped.[19]

Our analysis ignores lease constraints, negotiations with Jersey Gas and the cost of breaking the current long term lease – which as the Kosangas relocation example infers, could significantly influence the terms and financial viability of the project.

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[18] States of Jersey, La Collette, St. Helier: modification of lease of land to Jersey Gas Company Limited, Lodged au Greffe on 21st June 2005 by the Harbours and Airport Committee at http://www.statesassembly.gov.je/documents/propositions/40010-46068-2162005.htm;

Jersey Gas Ltd, at http://www.jsygas.com/abo_gas.html

[19] States of Jersey, *Relocation of Kosangas – question and answer*, Minutes of States Assembled, 16th March 1999, at http://www.statesassembly.gov.je/documents/minutes/31286-1147.htm

4.4 Dual lay of the oil and gas pipelines and other analysis

The dual lay option takes the base case central scenario – Quettetot origin and similar costing but assumes that the natural gas is laid alongside the oil pipeline. Laying both pipes together results in savings of about £12 million in mobilization and demobilization of the marine vessels and equipment that lay the lines. Apportioning all the benefits to the natural gas pipeline results in the total NPV of the pipeline amounting to **£11 million**, and swings the project to a net benefit of **£1.5 million** compared to the do nothing option.

In addition to the dual lay option, we also analysed other variances to the options presented, for instance the project cost under all scenarios -excluding the savings or benefits of switching from LPG to the cheaper natural gas. We also configure the analysis to include only the construction, maintenance and conversion costs. Finally an additional variant of scenario three excludes the costs incurred by those forced to switch from LPG to oil. These are presented in figure 18 below.

Figure 18 – Alternative analyses for natural gas pipeline project

	NPVs	Excluding LPG-gas savings	Scen 3 -excluding LPG to oil costs	CAPEX+OPEX only
Do nothing option	12	12	12	12
Alternatives - pipeline scenarios				
Base Case Scenario: Central	22	29		36
High	29	35		44
Low	15	23		29
Ste-Mere -Eglise Route	25	32		39
10 Days CSR	41	47	30	39

5. NEXT STEPS

5.1 Conclusions

The preceding analysis indicates to us that there is an investment case for constructing the oil pipeline. Consumption volumes are significant enough to make the investment worthwhile. Even varying for the discount rates and other key variables, continuing current shipments is still very expensive. In addition, we believe that there is no economic case for the natural gas pipeline on its own. The volumes of consumption are too small and static to warrant investment. However, when we consider a dual lay with the oil pipeline and factor in capacity advantages such as the ability to hedge against the current electricity supply, then natural gas likewise becomes more attractive.

Our analysis is based on several assumptions and high level cost estimates that are likely to change, given further refinement of the model inputs. For instance, given the budgetary and time constraints, we have used high level shipping costs for the do nothing option and construction per km metrics. As a result, we recommend further study of some key variables in order to arrive at more conclusive answers

Further, it should be noted that an investment case for Jersey is different from that of private parties. None of the oil companies in our opinion is likely to invest in the project. As the Consultancy Solutions report noted, the Jersey market does not match their current business models, and whilst profits can be made and there are no serious problems, their continued presence in Jersey will not be questioned at the corporate centre. Any significant capital expenditure requirements would trigger a serious review of their business commitment.

5.2 Issues arising

5.2.1 Shipping cost estimates

The viability of the pipeline project over the do nothing option hinges primarily on the shipping cost estimates. Our analysis uses cost per tonne metric of 12.50 as of 2004, sourced from Consultancy Solutions and projected using Jersey RPI forecasts. The table below presents different estimates.

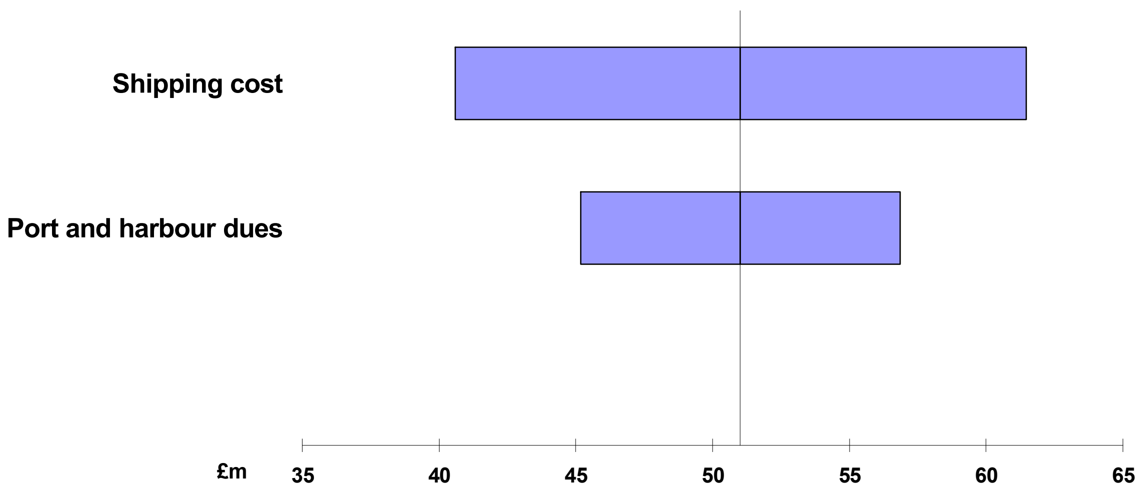
Figure 19 – Shipping cost estimates

Different cost estimates	Shipping Costs
Consultancy Solutions Report, December 2004 Freight rates under long-term charter with independent shippers, as used by Shell and Esso based on 3,000 tonne movements from Fawley refinery to La Collette.	7.00
Shell's costing of Avgas shipments and the price milkround shipper was seeking	15.00-80.00
Esso's costing of shipments to Jersey - approximately ten times the cost of sending product by pipeline to an inland UK terminal. Consultancy Solutions estimates Esso pipeline costs at £ 1 per tonne indicating freight rates of c. £ 10 per tonne.	10.00
Shell's costing of freight from Pembroke - in the order of 1.5 pence/litre or some £ 18/tonne	18.00
Consultancy Solutions modelling analysis to reflect the sourcing of primary products from both Fawley and Pembroke.	12.50
OXERA Report, October 2001 Comparison between heating oil margins in Jersey (10ppl) and the UK (7ppl) suggest that 3ppl represents the maximum additional costs of using sea transport and a relatively small storage facility -	31.41-42.54

As the table illustrates, it is difficult to ascertain agreeable shipping cost. Past studies that have examined this issue have come up with varying ranges, in part because it depends on the individual shipping company; the length of the contract; volumes and the negotiating position of the parties involved - to name a few salient variables.

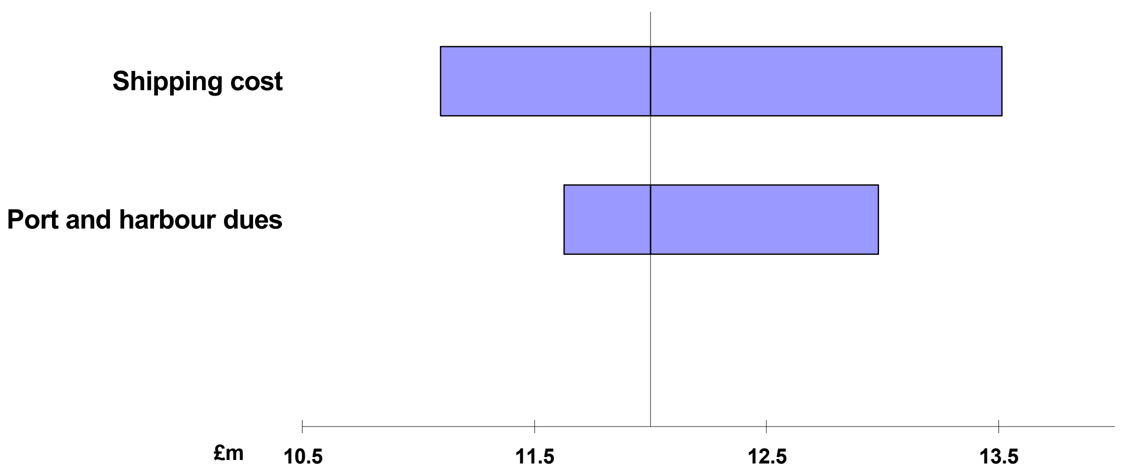
The tables below indicate the sensitivities of the total project cost to variance in shipping cost measured in cost per ton. Our stated cost uses shipping metrics of £12.50 per ton and ports and harbour dues of £7.00 per ton, however, by varying at +/-40%, the total cost of the projects show considerable variance as indicated.

Figure 20 – Do nothing option - cost sensitivity for oil pipeline project



Notes: 40% variance of shipping cost and port and harbour dues per tonne metrics

Figure 21 – Do nothing option - cost sensitivity for natural gas pipeline project



Notes: 40% variance of shipping cost and port and harbour dues per tonne metrics

Given the sensitivity and variance in shipping costs, we recommend a further analysis. One possibility is a detailed survey of shipping price quotations from companies around Europe on how much they would charge if this was a government tender for supply for all hydrocarbons in Jersey – this could result in the most transparent costing of shipping necessary for a final valuation.

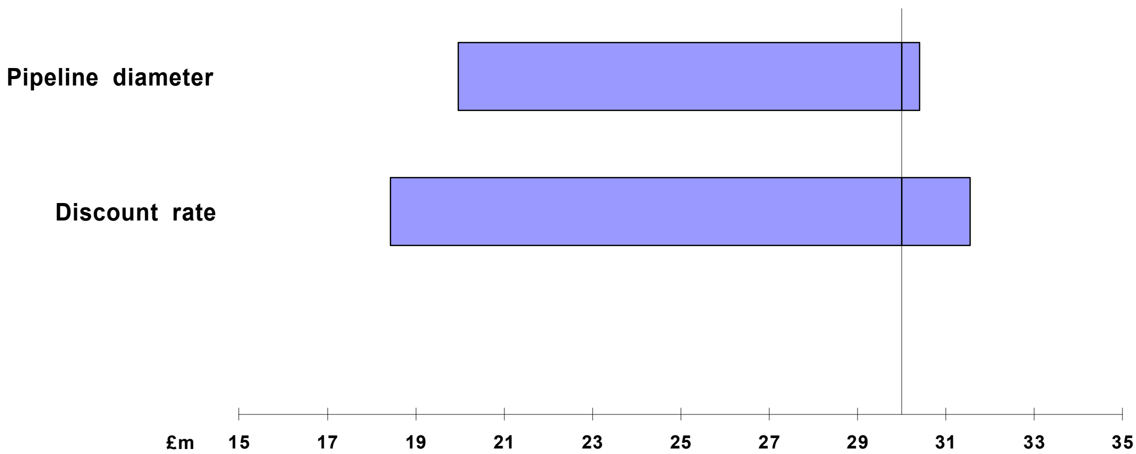
The pricing dynamics of shippers in response to the competitive threat of building a pipeline is also an important analysis that we recommend – there is a likelihood of shipping prices dropping significantly to forestall the project. If we had more time and resources we could have interviewed leading shipping companies to estimate the level and dynamics of competition for the Jersey market and to get better estimates for long term shipping metrics. This analysis is essential to the feasibility of the pipeline project, and could be coupled with a survey of shippers in general.

Other long term considerations will also inevitably influence shipping costs. For instance, the harbour at St Helier is limited to 3,000 dwt. The limited supply of oil tankers smaller that 5,000 dwt, inevitably pushes the pricing equilibrium higher. In addition, EU, UK and International Maritime Organization - International Convention for the Prevention of Pollution from Ships (MARPOL protocol) mandating double hull ships will influence the availability of tanker supply, with possibly large influence on freight charge increments.[20] We suggest a review of possible effects on long term shipping costs.

5.2.2 Construction cost estimates

Our analysis assumes specific aggregate distances, and cost per inch-per km metrics. These are high level metrics that will change, with a more detailed engineering assessment. The table below indicates the sensitivities of the oil pipeline project cost to the pipeline diameter chosen and to variances in the discount rate.

Figure 22 – Sensitivities of oil pipeline cost to diameter and discount rates



Notes: Discount rates are varied from 3-10%; and diameter of pipeline from 6-12 inches

[20] Relevant regulation include: Regulation (EC) No 417/2002 of the European Parliament and of the Council of 18 February 2002 on the accelerated phasing-in of double hull or equivalent design requirements for single hull oil tankers and repealing Council Regulation (EC) No 2978/94 [Official Journal L 64 of 07.03.2002]. Amended by: Regulation (EC) No 1726/2003 of the European Parliament and of the Council of 22 July 2003 [Official Journal L 249 of 01.10.2003]; Commission Regulation (EC) No 2172/2004 of 17 December 2004 [Official Journal L 371 of 18.12.2004]; International Maritime Organization - International Convention for the Prevention of Pollution from Ships, MARPOL 1973 as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) , and recent amendments in April 2004

Other significant drivers to the construction cost includes route deviations to suit the shore approach alignments at each end, additional costs resulting from non-standard seabed conditions and from dealing with obstacles or rocky areas which cannot be trenched during pipeplay. In addition, the environmental challenges resulting from the presence of the marine protection zone and the Ramsar site off La Collette; and the high tidal waves of the Passage de la Déroute have been considered but at a macro level. Further engineering assessment is likely to refine the costing per km metrics used. In addition, certainty about flow rates, and the security of supply needs of the island (e.g. compulsory stocking mandates) and other strategic input will dictate the diameter of the pipe, all of which are bound to influence the final cost estimates.

5.2.3 Strategic angle to the project

There are several important strategic angles to the project which we have been unable to properly quantify. For instance, the gas pipeline while not economically viable, except for a dual lay option, enables the island to construct a gas-powered plant that is more efficient and environmentally friendly than the current stand-by power station. In addition, it gives the island security of supply hedge in the event of accidents with the interconnectors or in future pricing negotiations with EDF.

5.2.4 Discount rates and financing costs

As noted earlier in the analysis, varying the discount rates and/or assuming private financing results in significant variations in the cost of the projects. However, we believe the overall outcome to build or otherwise is likely to be the same. Figure 22 details the cost variance for the oil pipeline assuming a range of 3-10% for the discount rate. The next step is probably exploring actual financing of the project.

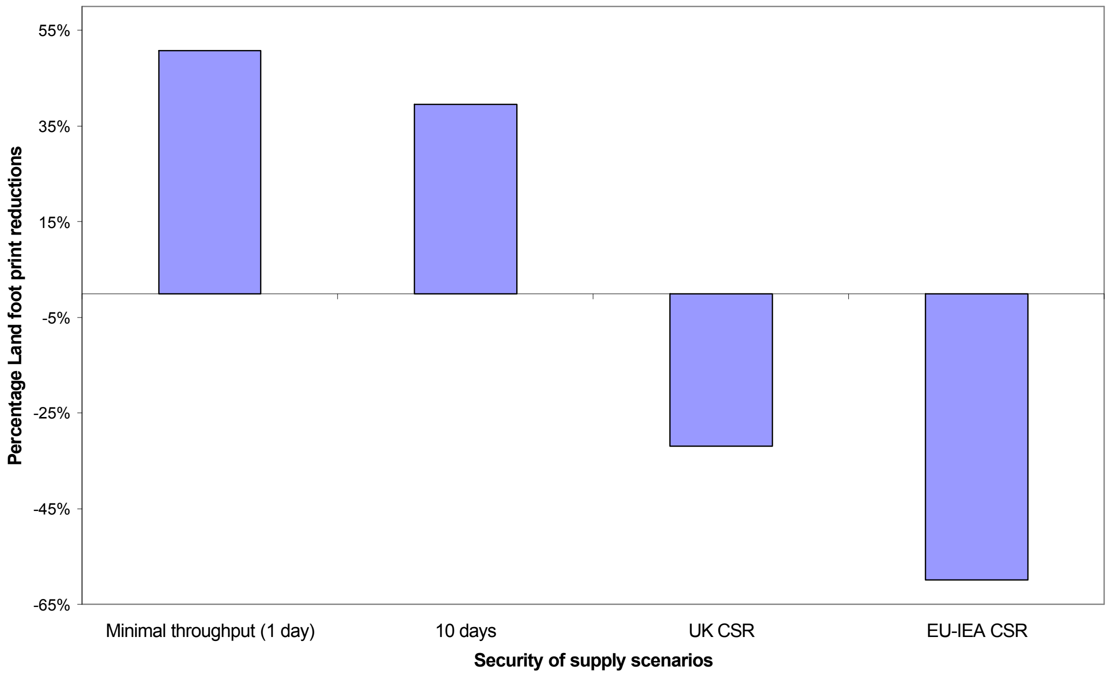
5.2.5 Land footprint reductions

Since the land implications for the two projects are an important political driver for this study, we considered this issue in detail. Our land footprint reduction calculations covered only the plot of land currently leased to Jersey Gas and the Fuel Consortium. We looked at the maps and island plans and made the assumption that most of the blast zone will eventually be reclaimed whether the pipelines are built or not - because the area surrounding the leased/ tank area is already earmarked as proposed site for industry (IC7); land for recreation (TR6) and the remaining part for the existing off-loading facility for aggregates and other developments – as detailed in the Jersey Island Plan 2002 – Town Proposals Map (Drawing No. 2-02/A). As a result, we have only considered the portion of land covered in NR13 leased to the fuel consortium and Jersey Gas and the Les Ruettes, St John facility held by Kosangas.

Given this assumption, we have calculated the portion of the leased land that will be freed as a result of pipeline build under different assumptions. In addition, we have added the opportunity cost of the freed land as a benefit to the pipeline project, using a very conservative methodology – simply estimating the rental earnings or opportunity cost from the freed land at twice the lease cost for the same proportion of land. For the purposes of this module, we believe this is suffice, although we recommend a more complex valuation of the freed footprint.

Moreover we also looked at land reductions under different security of supply scenarios, as mentioned earlier, notably one day (minimal throughput needs for the oil project); ten days, UK Compulsory Stocking Requirements and the EU-IEA suggested compulsory stocking obligation for non-producers. The table below presents all three, with the current set land footprint set at zero

Figure 23 – Land footprint reductions: current and alternative supply scenarios



5.2.6 *Supply from Le Havre, France*

With the exception of Avgas, Jersey's entire petroleum product needs currently come from UK refineries. We considered but have not taken into account the alternative of shipping fuel products from Le Havre, France. We are not convinced that there is a special reason for sourcing fuel products from Southampton and Pembroke in the UK rather than Le Havre, France, which is slightly closer and theoretically cheaper, both in terms of product prices and in shipping costs. This is an alternative the states could seek to pursue.

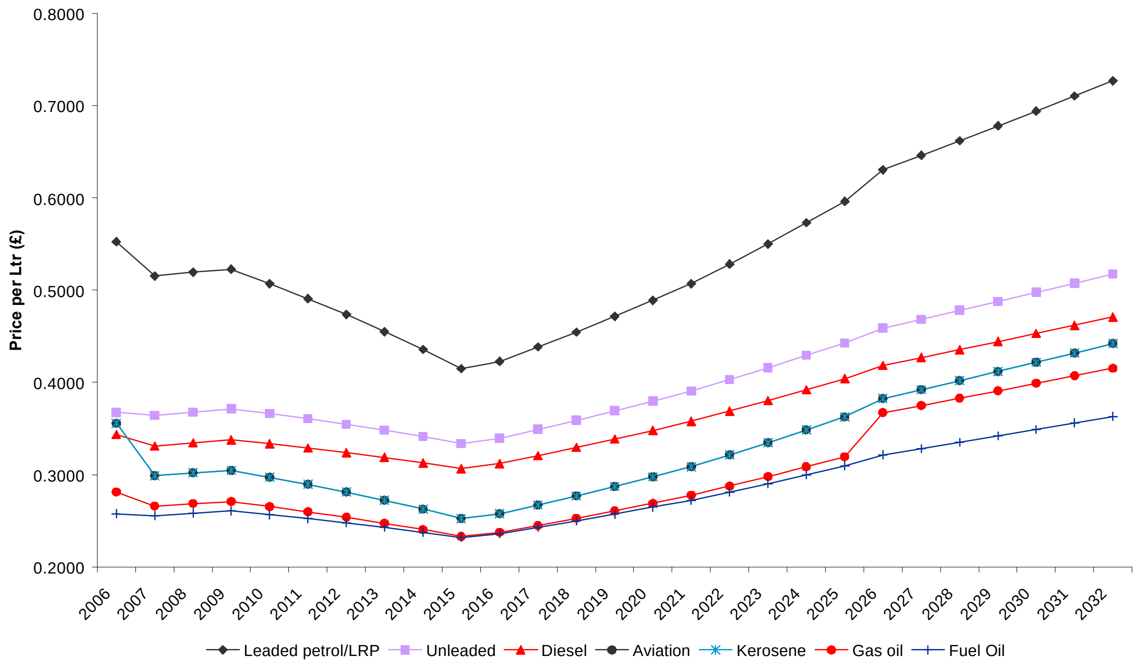
5.2.7 *Fuel price savings/ offset*

As the comment above points out, the prices pre and post tax of refined oil products differ between France and the UK. As a result, one of the likely benefits (or additional cost) as a result of the pipeline project is the ability to arbitrage any savings (or extra costs) from changing the source origin of the fuel. To model this benefit, we collected historic UK and French prices for each fuel item (diesel, leaded and unleaded petrol etc). We also collected global crude prices for the same period and long term projections from the US Department of Energy. Using the regression relationship for each fuel item, we made price projections for fuel items for each country, indexed to US DOE-EIA long term oil price projections.

Multiplying the price differentials by volumes gives us a proxy for the total savings (because French prices tended to be cheaper). However, there are problems with this analysis, chiefly the paucity of good reliable comparative pricing data – even though we relied on UK and French national agencies, any errors of a fraction of a penny, multiplied over four billion litres of consumption (25 years consumption), has the potential to change the results.

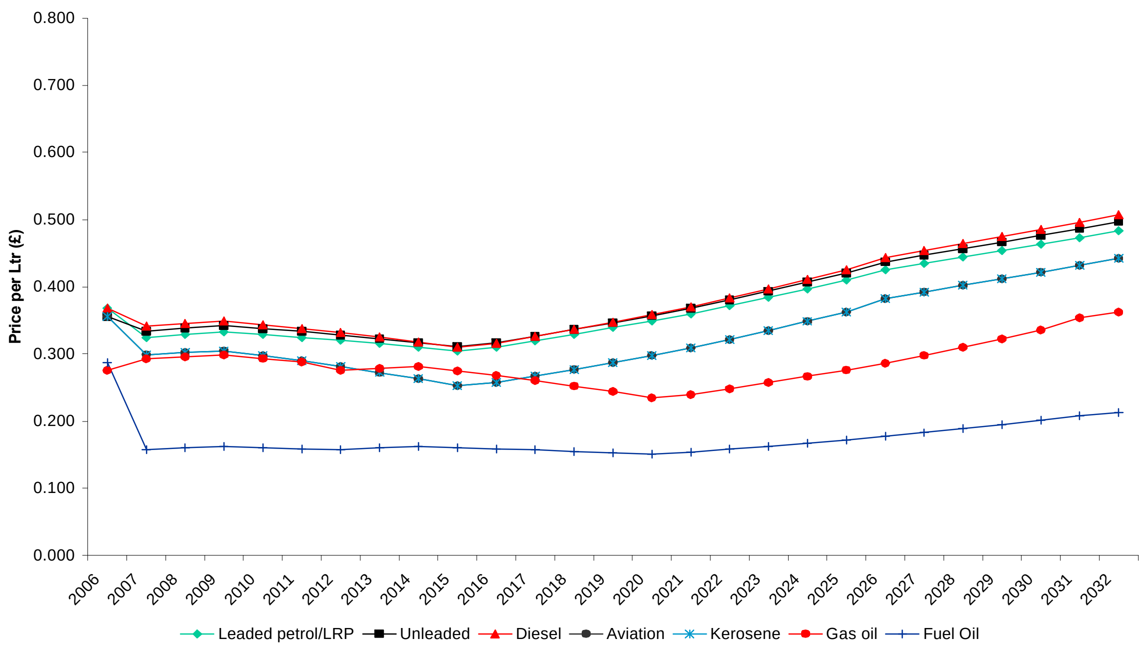
It is a useful variable in this analysis, but like the shipping cost metric case, also prone to significant variances in cost based on small changes. The tables below present our fuel price projections for France and the UK, and a key input in this analysis.

Figure 24 – UK oil prices used in fuel price projections



Source: UK DUKES, EU Oil Bulletin, IEA Energy Statistics, US EIA Energy Outlook 2006 and Pöyry projections

Figure 25 – French oil prices used in fuel price projections



Source: FMoE&NR, EU Oil Bulletin, IEA Energy Statistics, US EIA Energy Outlook 2006 and Pöyry projections

5.2.8 *The lifetime of the pipeline*

The average lifetime of an above ground pipeline is at least 20 years and an upper limit of 50 years when buried – most well maintained, pipelines typically last close to the upper limits. While this analysis has utilised a standard 25 year lifetime for the pipelines, we also considered the effects of extending the lifetime to 40 years. The implications in terms of cost are indicated in tables 26 and 27 below: For the 10 days

Figure 26 – Oil pipeline cost assuming 40 year pipeline lifetime

	25 yr NPV in £M	40 yr NPV in £M
Do nothing option	51	72
Alternatives - pipeline scenarios		
Base Case Scenario: Central	30	28
High	38	
Low	23	
Caen Route	44	43

Figure 26 – Natural gas pipeline cost assuming 40 year pipeline lifetime

	NPV in £M	40 yr NPV in £M
Do nothing option	12	17
Alternatives - pipeline scenarios		
Base Case Scenario: Central	22	22
High	29	
Low	15	
Ste-Mere -Eglise Route	25	17

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