Commission for Energy Regulation
An Coimisiún um Rialáil Fuinnimh

Common Arrangements for Gas Project

Preliminary Cost Benefit Analysis

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Utility Regulator
ELECTRICITY GAS WATER

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Executive Summary

This analysis is a supporting document to the initial discussions concerning the Common Arrangements for Gas (CAG) project. It provides a preliminary, high-level analysis of the estimated costs and benefits of implementing common arrangements between the gas networks in Ireland and Northern Ireland. The analysis is based on a number of assumptions, which are grounded in the Memorandum of Understanding signed by the regulatory authorities in both jurisdictions.

In essence, this analysis is based broadly on achieving harmonisation and integration of the arrangements governing gas transmission tariffing and operation, which includes connection policy, codes of operations, IT systems and system planning and development. An initial high-level estimate of the costs and benefits identifies clear benefits and efficiencies for both markets and market players in each jurisdiction. The principal *quantifiable benefits* identified in this analysis arise from added operational efficiencies in integrating network operation and IT systemisation. The project is also expected to deliver competition and security of supply benefits in both jurisdictions which at this early stage of the project and without further project scoping is difficult to quantify. In terms of other *qualitative market benefits*, the project is also expected to reduce barriers to entry, incentivise investment (such as in LNG and storage) and enhance transparency in the market, which will in turn enhance competition in both markets. It is expected that such unquantifiable benefits will be large.

The table below summarises the net present value of the preliminary, high-level quantifiable net benefits that may be expected from the establishment and implementation of common arrangements for gas. These values are calculated over two timeframes and using two discount rates to reflect the appraisal rates used in both jurisdictions. It should be noted that these figures do not include detail with respect to the harmonisation of gas retail arrangements. The approach has assumed that benefits will be realised in 2010. In order to make 2010 the base year, the future value of costs have been calculated to 2010.

Summary Table: Discounted Net Benefits of Proposed CAG Project

Discount Rate	**10 Years**		**20 Years**	
	€000's	£000's	€000's	£000's
5%	11,991	9,474	22,633	17, 880
3.5%	13,327	10,528	27,517	21,739

The figures above are based on a number of assumptions and are therefore subject to change following further project scoping and consultation. If harmonisation is not fully realised the assumed benefits and costs will differ from the figures presented.

1 Introduction

1.1 Purpose of Cost Benefit Analysis

The aim of this analysis is to draw some high level conclusions on the merits of developing and implementing common gas arrangements which will inform the decision making process in scoping the project. This analysis should only be viewed as a *preliminary* analysis but it should provide a useful indication of the expected benefits and the associated costs of developing the Single Gas Market arrangements.

This analysis considers the potential net benefits associated with the development of Common Gas Arrangements. The assumptions and underlining principles of this analysis are based on the statement of intent incorporated in the memorandum of understanding (MoU) signed by both regulatory authorities. That is to: "establish All-Island Gas Market Arrangements whereby all stakeholders can buy, sell, transport, operate, develop and plan the natural gas market north and south of the border effectively on an all-island basis. This means that variations in the price and conditions on which gas is bought and sold will be determined by market conditions and economics, not by variations in regulatory arrangements."

The focus of this analysis is to outline the associated costs and benefits in creating such arrangements and to quantify where possible the net benefits that are expected to arise from their implementation.

The identified costs and benefits and their associated figures should only be treated as rough estimates at this early stage of the project. Without a full scope of the project, it is difficult to ascertain the exact nature of the costs and benefits and where and how they will be distributed amongst the concerned stakeholders. More robust and precise estimates of common gas arrangements will not be forthcoming until the scope of the project is agreed, which will in turn allow for market and system modelling of the proposed arrangements.

The analysis is segmented into four principal sections. The first section details the approach used in the analysis; this is followed by a summary of the current market arrangements in Ireland and Northern Ireland and a brief outline of the proposed arrangements for the Single Gas Market. Section two contains the net benefit analysis, identifying and quantifying the costs and benefits associated with the different workstreams of the proposed project. Section three discusses the potential benefits of increased competition in the gas market. Section four concludes the findings of the analysis and presents the net present value of the project as a whole.

Again, this analysis provides only a preliminary analysis of the projected net benefits of the project. Further analysis will be carried out following detailed scoping of the Common Arrangements for Gas project.

1.2 Approach to Analysis

This analysis is underpinned by a number of principles. These principles are rooted in the projects core objectives as outlined in the MoU. In summary these are;

- To encourage a "single market" approach that does not create incentives to differentiate between different parts of the market on a member state basis
- To ensure that gas is bought and sold in competitive markets, at both wholesale and retail levels
- To ensure that Common Agreements for Gas deliver benefits to customers, north and south, and
- To control and eventually eliminate dominant positions from potentially competitive markets

For the purpose of conducting an analysis of the costs and benefits associated with developing and implementing Common Arrangements for Gas, this analysis makes a number of assumptions about the final structure of the arrangements. These assumptions are based on the proposals and commitments outlined in the MoU agreed upon by the regulatory authorities (RAs). It assumes that upon completion of Common Agreements for Gas arrangements will comprise of:

- Single transmission system operation
- Single transmission tariff methodology
- Single transmission connection policy
- Single approach to transmission system planning and development, and
- Single codes and processes for retail

In identifying and quantifying the costs and benefits, this analysis compares the proposed Common Arrangements for Gas with the current arrangements in operation in and between Ireland and Northern Ireland. Until such time as the project scope is more clearly defined it will be difficult to apportion the level of costs and benefits accruing to each jurisdiction and each of the market players such as producers, system operators, shippers and/or customers.

The costs have been developed by comparing projected operating costs of a combined system with those of the current operational arrangements. These projected operational costs are the costs of governing and administering the new arrangements. The possible costs involved in implementing the proposals have also been identified.

Typically these included cost associated with designing and implementing rules and procedures, system changes and consultancy and legal costs.

The benefits of the project have been identified and estimated in terms of the efficiencies arising from the common arrangements relative to the current arrangements and the avoided costs resulting from the harmonisation of the Irish and Northern Irish markets. The benefits of the project can be categorised largely as one of; 'market benefits', 'operational benefits' and 'avoided costs'.

The information and estimates used in conducting this analysis has been obtained from the various codes and policy documents in both jurisdictions and from discussions between the regulatory authorities and system operators in Ireland and Northern Ireland. In assessing the net present value (NPV) of the ongoing costs and benefits of the project, this analysis assumes a cost of capital of 5% and discounts this value over the first ten-years of the project. A 5% cost of capital was used to be consistent with the cost of capital approved by the CER in the Bord Gáis five-year revenue review, which was completed in 2007 for the period October 2007- September 2012. However, appendix 1 provides a summary of the net benefits of each work-stream over a ten and twenty year period using a 3.5% discount value, which is consistent with the values used in the Northern Ireland Practical Guide to the Greenbook. The approach has assumed that benefits will be realised in 2010. Therefore, in order to set 2010 as the base year, future values of costs have also been calculated to 2010. Again, as the project has yet to be clearly defined and scoped, the estimates used in this analysis are indicative only of the actual costs and benefits that will arise when the project is complete and the Common Arrangements for Gas are in place.

1.3 Overview of Current Arrangements

1.3.1 Physical System

Currently, the transmission systems in Ireland and Northern Ireland operate independently of each other with only some cooperation on cross border issues. Both systems share the use of assets at Moffat, which is used to import gas from the UK system. The pipeline splits at Twynholm, from which all gas going to Northern Ireland flows through the Scotland to Northern Ireland Pipeline (SNIP) and all gas going to Ireland flows through the Interconnectors (IC1 and IC2) via Brighouse Bay. Gas is transported through these pipelines and the onshore systems under different codes and by different system operators.

1.3.2 Network Operations

The Northern Ireland gas transmission network consists of three transmission assets:

- Scotland to Northern Ireland Pipeline (SNIP) owned by Northern Ireland Energy Holdings (NIEH) and operated by Premier Transmission Limited (a wholly owned subsidiary of NIEH)

- Belfast Gas Transmission Pipeline (BGTP) now owned by NIEH due to the purchase of Phoenix Natural Gas transmission assets on the 31st March 08. The system operation of the BGTP, through the establishment of a new company, Belfast Gas Transmission Limited (BGTL), is to be integrated into Premier Transmission Limited management structure over the coming year

- BGE(NI) hold and operate the third transmission asset – the North West Pipeline, which was built to service gas to the Coolkeeragh power plant and the South North Pipeline, but has extended the provision of gas to domestic and business customers in the area

Each transmission asset has its own individual network code: the Premier Transmission Limited Network Code, the BGE (Northern Ireland) Network code and the Phoenix Transmission Network code (to be renamed to align with the new Belfast Gas Transmission Limited company).

There are two distribution system operators within Northern Ireland: Phoenix Distribution Limited and Firmus Energy Distribution Limited. Each distribution operator has a separate and independent code of operations for transmission and distribution of gas within their territory. This reflects the market structure in Northern Ireland where there are multiple distributor/shippers off-taking a common transportation system. Modifications have been made to the codes to streamline the contents and harmonise network practices across the Northern Irish system. These include harmonising the nomination and allocation processes, developing a single balancing point and applying the same technical requirements for parties using the network.

The Irish transmission and distribution systems are currently operated by a single operator and governed by a single, unified code providing for the transportation of gas from entry point to customers' supply point. This reflects the Irish market model where there is a clearer separation of shipper / distributor functions. Currently only Bord Gáis Networks is responsible for the development, maintenance and safety of the Irish transmission and distribution networks. It is also responsible for the development of the Code of Operations, which outlines the rights and obligations of network users and governs the manner in which gas is transported and distributed

through and around the Irish network. The code largely addresses the same operational aspects as the codes in Northern Ireland, such as nominating, allocating, balancing, credit requirements, planning and emergencies, however, the detail of these aspects differ in each jurisdiction.

1.3.3 Gas Quality

There is also a slight discrepancy in the gas quality standard in each jurisdiction. Currently, legislation in Northern Ireland provides for a narrow gas quality specification of 47.2-51.41MJ/m^3. The BGE Code of Operations provides for a wider specification of 45.7-54.7MJ/m^3. This difference could have safety implications in the event of gas physically flowing from South to North.

1.3.4 Transmission Tariffs

Tariffs across Northern Ireland are charged on a postalised basis (i.e. all suppliers pay the same charge irrespective of where gas is exited), with a 50/50 capacity/commodity split. A decision has been made by the Northern Irish authorities to change to a 75/25 split in October 2008.

Since 2002, Irish tariffs have been charged on an entry/postalised exit basis, with a 90/10 capacity/commodity split. This will be under review during the coming year as part of the CER's commitment to review the transmission tariff methodology in light of the proposed connecting production and storage facilities. Any such review will be conducted in conjunction with the Common Arrangements for Gas (CAG) project.

1.3.5 Connection Policy

The transmission connection policy in Northern Ireland is a 100% deep connection charge, whereby each connecting party pays 100% of the cost of connection to the transmission system (there is currently no Industrial and Commercial customer directly connected to the transmission network in NI).

The connection policy in Ireland is slightly different to that in Northern Ireland and is subject to differences per category user. Large industrial customers such as power plants, pay 100% of the attributable costs of connecting to the transmission network. Medium to small industrial customers pay 30% of the cost of connection, with the remaining 70% added to the regulatory asset based and paid for by all gas customers. The connection policies in Ireland and Northern Ireland also differ slightly in their treatment of 'deep reinforcements'. In both jurisdictions, the relevant system operator is responsible for planning future reinforcements of the network. However, in Ireland, if a connecting party accelerates the need for reinforcement to an earlier date, the connecting party is responsible for the added costs of accelerating the reinforcement

only. In Northern Ireland, the connecting party becomes responsible for the total costs of the required reinforcement and not just the costs of accelerating the reinforcement.

1.3.6 Single System Planning and Development

BGN and PTL already communicate and interact quite closely with regards to network analysis, planning and development. Common figures for supply and demand are often used and information is freely shared. However, when it comes to planning and developing the systems each jurisdiction has regard only for its own system security. This is not the most effective way to plan and develop the systems and benefits can clearly be gained by considering the systems together from a security of supply viewpoint. Carrying out system planning and development would entail the development of a common security supply standard, the production of a joint gas capacity statement based on modelling the integrated system and a development framework for the market. These would form the inputs to strategic decisions such as whether or not to incentivise storage on the island and network investment decisions.

1.3.7 Retail

Both Ireland and Northern Ireland have fully liberalised supply markets but there are some differences in how they operate. In Northern Ireland the shipper is responsible for meter reading unlike Ireland where this function is carried out by BGN. There are also differences in the change of supplier rules and procedures. There is as yet no Supplier of Last Resort in Northern Ireland but this function is now established in Ireland. BGE has just completed a significant investment in developing and systemising the retail market rules and procedures and are introducing an automated market messaging system for the Change of Shipper and distribution functions such as requesting meter reads and site works. In Northern Ireland the Change of Shipper system is manual at present. In order to establish a common retail market, processes and procedures would need to be aligned and compatible systems will have to be introduced to allow shippers to easily access customers in either jurisdiction.

1.4 Overview of Proposed Arrangements

As provided for in the MoU, the current proposal for common gas arrangements entails the development of arrangements whereby all stakeholders can buy, sell, transport, operate, develop and plan the natural gas market, in both jurisdictions effectively on an all-island basis. Essentially, the project aims to deliver arrangements such that the buying and selling of gas around the island will be based on market conditions and signals.

In terms of achieving this aim and implementing these arrangements, the proposed project will firstly look to develop and implement procedures for the island supporting a single transmission system operation, a harmonised transmission tariff methodology, a single approach to gas quality, a single transmission planning and development process, a harmonised connection policy and harmonised retail processes and systems. The aim is that such arrangements would enhance the efficient operation of the networks, reduce the barriers to entry, increase competition in the gas markets, incentivise investment, provide for more efficient investment and planning of the transmission systems, enhance the security of gas supplies and reduce the potential for undue discrimination between network users, particularly electricity generators in the Single Electricity Market.

On a high level, the implementation of a harmonised transmission tariff methodology will require a decision on the best approach to harmonising the structure of the tariffs charged to network users across the island. Once the structure is decided, further supports will be required to implement this structure across the island. This may include the establishment of an administrator to collect and distribute the revenues of the respective system owners. It may also require legislative changes to define how tariffs are structured and levied. This analysis does not make any assumptions on the type of tariff methodology to be adopted across the island, however it does make an assumption that an administrator and the associated contracts and agreements will be required to levy and distribute the relative revenues between the asset owners/system operators.

A single transmission system operation aims to harmonise and integrate the processes and systems used to physically transport gas around the system (i.e. from any entry point to any exit point). Given the current structures and asset owners of the transmission assets, this may be best achieved by adopting a model similar to that in the UK, whereby a single code (the Unified Network Code in the UK) governs the transportation of gas around the network. This approach would not affect the rights of the asset owners and it would provide transparency and clarity for those seeking to transport gas across a number of networks. For the purposes of this analysis, it is assumed that single transmission system operation for the island of Ireland would include the development of a single code of operations, a single 'system administrator' and a single IT system through which shippers contract for gas capacity and transport gas across the integrated networks seamlessly.

In conjunction with operational synergies, network users and indeed producers of gas and generators of electricity may benefit from a single policy towards connection to the transmission system. Current discrepancies between the connection policies may distort investment signals to encourage more investment in one or other jurisdiction. The extent to which connection policies should be harmonised needs to be considered e.g. it is unlikely that this would include the connection policy towards new towns

where wider social considerations would need to be taken into account. Harmonisation will also require consultation with industry, the design, development and implantation of the harmonised policy and a level of coordination between system operators for modifications to the connection policy.

In terms of the development of the networks, an "all-island" approach would provide efficiencies in terms of system planning, investment decisions, security of supply provisions and informing the market of future development. There is currently significant communication between the system operators in both jurisdictions, however asymmetries still exist in the information and scenarios analysed when making network development decisions. A single approach towards planning and development should result in a more efficient decision making process for investment. Furthermore, as this will be on the basis of optimum operation of the integrated systems there is the potential for deferment of network reinforcement.

The actual formalities in developing a single approach towards network planning and development should be relatively easy as robust communication channels already exist between the system operators. This should be enhanced with the establishment of a single system administrator who can analyse requirements to provide an optimum plan for the integrated system.

The Irish and Northern Irish gas markets are very small by international standards. It is clear that the larger market obtained from combining the two markets would make the retail sector more attractive to new shippers. A common approach would result in operating efficiencies and would result in a larger cohesive and transparent retail gas market. Furthermore, a harmonised approach will enhance competition on the island for existing and potential market players.

The next section will outline and assess the identified costs and benefits of developing, implementing and operating these proposed arrangements before making an overall conclusion as to the net benefits of the project as a whole.

2. Cost Benefit Analysis

For the purpose of this cost benefit analysis, the initial figures estimated for the CAG project are discounted over a ten-year and twenty-year timeframe using two discount rates of 3.5% and 5%. As referred to previously, this reflects the different appraisal methodologies used in the two jurisdictions. These figures are presented in the summary table in Appendix 1. However, it should be noted that the tables presented throughout section 2 represent the Euro net present value of the estimated figures, discounted over a ten-year period at a rate of 5%.

2.1 Harmonised Transmission Tariff Methodology

The analysis of the development and implementation of a common transmission tariff methodology is based on the assumption that a single administrator function is established to collect and disburse the relevant revenues to the relevant asset owners. This function would be similar to the PSA arrangements currently in operation in Northern Ireland.

2.1.1 Costs

In developing a harmonised transmission tariff methodology for the island, an extensive review and consultation of the current arrangements and the most appropriate arrangements going forward will be required. This stems from the proposed connection of the Corrib gas field and the Shannon LNG Storage Facility between the years 2009-2012 respectively. This review and consultation will also need to examine the appropriate tariffing regime for the island, given the current discrepancy in the postalised and entry/exit regimes applied in Northern Ireland and Ireland respectively. This consultation process and the final design of a single transmission tariff methodology are estimated to cost the system operators and regulatory authorities in both jurisdictions approximately €1,015,000. This includes the identification of the various tariffing options available, an analysis and scoping of the impact of these options, consultation on the most appropriate option and the development of a methodology for tariffing on a single gas market basis.

The decision regarding the tariff methodology will require legal review and may require legislative and licence changes in Northern Ireland. This reflects the statutory provision for tariffs in Northern Ireland, a review and change of which is likely to cost approximately €210,000 in legal consultation and advice across both the regulatory authority and the respective department.

In terms of implementing the methodology with respect to the common gas arrangements, it is estimated to cost circa €330,000, which will include the development of an administrative function for calculating and distributing the tariffs

and revenues respectively. There will also be ongoing administrative costs involved in providing this function on a continuous basis, however, this cost is already incurred by the system operators in Northern Ireland and will not be an incremental cost of the project.

2.1.2 Benefits

The principle benefit of a harmonised transmission tariff methodology for the island is that it would facilitate single system operation. Other benefits include avoided once-off costs of market development. For example, it will avoid the once-off costs involved in developing tariffing arrangements for the South North Pipeline, for short-term capacity products and interruptible capacity projects – all of which are currently in the work plan for the respective system operators in both jurisdictions for the coming year. It also avoids the duplication of work-streams with regards to tariff development for both the system operators and the regulatory authorities in each jurisdiction. These avoided costs and efficiencies give rise to an approximate once-off saving of €480,000.

A harmonised transmission tariff methodology also facilitates and provides for on-going benefits to the gas market as a whole in the form of enhancing competition and providing transparency and clarity to the market participants. These market benefits will be examined further at a later stage of the analysis, which will take the market impacts of each work-stream into consideration and their collective impacts on the gas markets.

2.1.3 Net Benefits

The independent overall net benefit for the design, development and implementation of a harmonised transmission tariff methodology is a negative costing of €1,075,000. However, this figure does not include or consider the overall market benefits of incorporating a harmonised transmission tariff methodology and the extent to which this facilitates the operation of other aspects of the Single Gas Market, such as creating a level playing field for network users (particularly electricity generators), enhancing competition, incentivising new investment and reducing the barriers to entry to both gas markets.

Harmonised Tariff Methodology CBA ***Table 2.1***

Costs[1]	High[2]	Medium	Low
1.Design	€470K	€630K	€780K
2.Consultancy	€285K	€385K	€480K
3.Licence & Legislation	€155K	€210K	€260K
4.Implementation	€245K	€330K	€410K
Total Costs	€1,155K	€1,555K	€1,930K
Benefits			
5.Market Impacts	The implementation of a single tariff methodology into both markets will attract and incentivise investment thereby enhancing competition in both markets.		
6.Operational Savings	€600K	€480K	€360K
Total Benefits	€600K	€480K	€360K
Net Benefit	(€555K)	(€1,075K)	(€1,570K)

2.2 Single Transmission System Operation

In assessing the costs and benefits of integrated system operation and harmonising transmission arrangements a number of assumptions have been made to support this CBA. Firstly, it is assumed that an approximate capital cost of €600,000 will be incurred to reinforce the SNIP and increase the pressure levels along the pipeline so that the potential operational efficiencies can be realised. The analysis also assumes that the Corrib gas field will be in operation to provide sufficient gas to meet demand in the Republic of Ireland from 2010.

[1] All costs incurred during the development and implementation of the CAG project have been revised and calculated so that they are presented in 2010 prices (i.e. the future value of the costs were calculated at a rate of 5%)

[2] High case refers to the best outcome, i.e. lowest cost with highest benefits. The low case refers to the worst outcome, i.e. highest costs with lowest benefits. The medium case is the case referred to throughout the analysis.

There are a number of potential models which will support an integrated system operation function and these will be the subject of a consultation within the scope of the CAG project. For the purpose of this analysis it is assumed that a system operator will be required who will act as the contact point for all network users seeking to transport/access gas at any point of the integrated system. It has also been assumed also that the codes of operation will need to be aligned and possibly brought together in a common code.

2.2.1 Costs

The introduction of a single operation system will require significant consultation with market participants and is likely to be the most time consuming aspect of the project. The establishment and implementation of the system operator and the development of the code of operations will necessitate the termination of the current contracts between the various network users and their respective system operators and the development of new agreements, codes and contracts to accommodate the new market structure.

This body of work will involve considerable legal review and advice. It is anticipated that this will account for a large proportion of the overall project costs. It is currently estimated that the consultation, design, development and implementation of this new market structures, supporting functions and rules and procedures will cost in the region of €2,448,000. This cost does not include the establishment of a new independent grid control but assumes that an existing grid control will be expanded to an all-island basis and used to accommodate the all-island arrangements. Approximately €662,000 of this costing is related to the reinforcement of the SNIP, the remaining €1,786,000 will account for consultation and development of principles, business rules and the physical set-up of the market administrator and the code development. A further €992,000 has been provided for the legal costs required in developing the code and establishing the legal relationships between the different stakeholders particularly the new relationship between the transmission asset owners and the market administrator.

A provision must be made to address the current discrepancy in the approved gas quality standards in each jurisdiction. In order to allow gas to flow safely between the two systems it is important that a single standard is approved for the island. This may require physical infrastructure to treat the gas and to ensure that the gas entering the system is within the required specification. The provision of treatment facilities can be very expensive and the question as to how these are paid for need to be addressed. A cost of €110,000 has therefore been allowed to account for the development of a common gas quality standard and the approach to be taken in the context of a single gas market.

The total cost therefore of designing, developing and implementing single system operation arrangements is estimated to be €3.55 million over the two-and-half year time frame allowed for the project.

2.2.2 Benefits

Operational Impacts

With an integrated system operation function, the commercial boundaries currently in place will be removed and gas can flow optimally around the system. This will give rise to benefits in the form of operational efficiencies, which will reduce the levels of gas required to deliver transmission services and give rise to fuel saving in the area of 21GWh per annum, which at today's gas price equates to an approximate saving of €500,000 annually. Furthermore, these operational efficiencies will give rise to savings in the number of balancing actions currently undertaken by the three transmission system operators on a daily basis. A larger system will be more capable of 'absorbing' the behaviour of network users, thereby reducing the level of gas purchased by the system operators to balance the system on a daily basis. In effect, it is estimated that this will reduce the number of balancing gas contracts by around 50GWh per annum, with a net saving for the system of approximately €200,000 per annum, based on the current average price of balancing gas contracts held by transporters. Reduced balancing actions and overall fuel requirements to operate the transmission system will also give rise to a carbon savings in the area of 7,875 tonnes per annum. This will accrue a saving of approximately €150,000 per annum at today's price for carbon of €19/tonne. This translates into a net present value of €1.16 million over the first ten-years of the project going live.

Assuming that Corrib comes on-stream and if flows are maximised through the SNIP it is possible that the capacity of the interconnector inventory product could be doubled. This would provide a benefit to all users, under the current 'benefit sharing' rules applied to any revenues earned from the product, in the approximate range of €520,000 per annum. The added carbon cost of doubling this service will be netted off against the fuel savings made as a result of the enhanced system operation efficiency.

Optimising flows with an integrated system as proposed will also reduce the maintenance costs on the system as it reduces the number of constraints placed on the system, which will in turn reduce the stress placed on the assets. An integrated system will also provide enhanced security of gas supplies in both jurisdictions as any supply shortage will be balanced across the island as a whole and give each jurisdiction access to more assets from which gas supplies may be sourced.

Administrative Efficiencies and Cost Avoidances

A common transmission code will eliminate the need to develop arrangements to accommodate connection to and transportation along the South-North Pipeline. Also there will be efficiencies in introducing common products such as short-term capacity and interruptible products as required by Regulation EC1775/2005. Emergency arrangements can be streamlined between the relevant system operators in the two jurisdictions which will also reduce costs. These once-off cost avoidance benefits are estimated to be €600,000 across the three transmission system operators.

Single gas market operation will also provide administrative efficiencies on an ongoing basis both for network users and the system operators. Network users will benefit from communicating with one administrator as opposed to three transmission system operators. The system operators will benefit from a common code which will reduce the level of monitoring and administration required and streamline the code modifications process. These efficiencies are estimated to equate to an on-going annual saving of approximately €85,000.

All-in-all, it is estimated that the delivery of single system operation will provide benefits to the markets north and south in the area of €600,000 in once-off avoided costs and a further €1.3 million per annum in efficiencies and administrative savings. Over a ten-year period, the total net present value of these benefits equates to approximately €11.8 million combined across the two jurisdictions.

2.2.3 Net Benefit

Providing for the initial once-off costs in developing the required arrangements establishing single system operation of €3.5 million and the resulting operational benefits of €11.8 million, the estimated net present value of the net benefit for the island as a whole of implementing 'single system operation' at transmission level is estimated to be €8.3 million .

Single System Operation CBA ***Table 2.2***

Costs	High Case	Medium Case	Low Case
1.Design and Establishment of Single Administrator	€570K	€761K	€950K
2. Investment in SNIP for efficient operation	€495K	€662K	€825K
3.Consultation and drafting of Single Code of	€870K	€1,025K	€1,280K

Operations for transmission			
4.Legislation and review of legacy contracts	€840K	€992K	€1,240K
5.Harmonisation & implementation of gas quality standard	€80K	€110K	€135K
Total Costs	€2,855K	€3,550K	€4,430K
Benefits			
6.Efficiency of System Operation	€11,780	€9,420K	€7,100K
7.Avoided costs in developing arrangements for SNP	€750K	€600K	€450K
8.Incentivise competition and reduce costs on market participants	€820K	€656K	€490K
9.Carbon savings	€1,445K	€1,158K	€865K
Total Benefits	€14,795K	€11,834K	€8,905K
Net Benefit	€11,940K	€8,284K	€4,475K

2.3 Single IT Systems

The analysis of the costs involved in developing a single IT system to accommodate the Common Gas Arrangements, is based on the assumption that one of the current systems used by the system operators will act as the template for the new system. In effect, an existing system will be adapted to systemise the Common Gas Arrangements and subsequently extended out to all network users on the island.

2.3.1 Costs

Although it is assumed that new IT systems will not be required for common gas arrangements, some adaptation to the current system will be required. This arises as

a result of the requirement to systemise the tariffing methodology, integration of the two networks and code changes to accommodate the CAG project. It is estimated that this redesign and redevelopment may cost in the order of €992,000. A further cost will be incurred in providing IT training to all network users and in extending the system to newly integrated network users. This is expected to incur a further once-off cost of €187,000. The total cost of providing a single IT system to support harmonised operations is €1.18 million.

2.3.2 Benefits

Significant ongoing benefits are likely to arise as a result of the elimination of one IT system. These benefits are largely due to avoided licensing, maintenance and development costs. It is estimated that both BGN and PTL will combined save in the area of €600,000 per annum in avoided and shared licensing costs alone. A further €100,000 per annum would be avoided by the system operators in ongoing maintenance and redevelopment costs, which would be shared across both systems and system users under a Single Gas Market basis.

A further cost of €100,000 per annum would also be avoided in the development and systemisation of Code Modifications on an on-going basis as only one system will be involved. In total, the net present value of these combined ongoing savings is estimated to accrue to €6.2 million.

2.3.3 Net Benefit

Netting off the total once-off costs required to develop the IT system with the ongoing cost avoidances of maintaining and developing a single system as opposed to two, delivers a total net benefit of approximately €5 million from this work-stream.

Single IT Systems CBA ***Table 2.3***

Costs	High Case	Medium Case	Low Case
1.Alterations to current IT System	€740K	€992K	€1,240K
2. Roll-Out and training to shippers	€140K	€187K	€230K
Total Costs	€880	€1,179K	€1,470K
Benefits			
3. Avoidance of licensing & maintenance costs	€5,790K	€4,634K	€3,475K
4.Avoided development costs	€965K	€772K	€580K

5.Avoided Systemisation of Codes	€965K	€772K	€580K
Total Benefits	€7,720K	€6,178K	€4,635K
Net Benefit	€6,840K	€4,999K	€3,165K

2.4 Harmonised Connection Policy

This analysis has considered only the costs and benefits of a connection policy at transmission level. It is assumed that connection policies will continue to allow for varying distribution and local level connection policies in each jurisdiction.

2.4.1 Costs

Developing a standard connection policy for transmission in both Northern Ireland and Ireland will require considerable analysis of the various options available and their potential impact on the resulting charges for connection. Any agreed policy will require consultation with all existing and potential stakeholders. It is estimated that this stage of the project will incur a once-off cost of approximately €132,000, which is accounted for by some technical advice and consultation on the various options, but largely by the legal costs involved in developing a policy suitable for both jurisdictions.

Following approval of a common connection policy an administrative function may be required to administer and charge the connection policy according to the common gas arrangements. The principles and business rules of this administrative function will require further consultation with the market's stakeholders. Once established, the continuing operation of this function will incur an ongoing operational cost of approximately €10,000 per annum in administrative costs and in the monitoring and updating of the connection policy as required. This equates to a net present value of €77,000 over the first ten-years of the project. The estimated cost of designing, consulting and implementing this administrative function is €154,000.

2.4.2 Benefits

The principle benefit of a common connection policy is the elimination of any distortions and no perverse location incentives particularly for generators. A common policy will also facilitate the introduction of common tariffing arrangements and the common code. A harmonised connection policy will also provide once-off avoided costs for each of the transmission system operators in negating the requirement to develop an independent connection policy for the South North Pipeline. Combined, these quantifiable benefits equate to an approximate saving of €180,000, equally shared amongst the system operators in both jurisdictions.

2.4.3 Net Benefit

The net benefit in developing common connection policy at transmission level is a negative of €184,000. This is largely due to the technical analysis and legal advice that would be required to harmonise the current connection policies. However, this figure does not account for the market benefits that such a policy would deliver in terms of eliminating perverse incentives, providing transparency and reducing the administrative burden on potential customers seeking to connect in either market. Nor does the figure account for the contribution of the policy to the overall goal of the CAG Project. These qualitative benefits will be addressed later in the analysis when examining the collective impact of each work-stream on the actual gas markets in terms of competition, security of supply and transparency.

Harmonised Connection Policy CBA ***Table 2.4***

Costs	High Case	Medium Case	Low Case
1.Design and consultation of single policy	€95K	€132K	€165K
2.Implementation of Policy- standardisation of policies	€115K	€154K	€190K
3.Ongoing operational cost – administration and monitoring	€55K	€77K	€95K.
Total Costs	€265K	€364K	€450K
Benefits			
4.Market transparency and delivery of the CAG Project	The implementation of a 'Common Transmission Connection Policy' will remove a level of discrimination between network users at transmission level and will facilitate the full implementation of a 'Common Transmission Tariff Methodology' and the 'Common Code of Operations'.		
5.Operational – avoid costs in developing policy for SNP & administration of one policy	€225K	€180K	€135K
Total Benefits	€225K	€180K	€135K
Net Benefit	(€40K)	€184K	(€315K)

2.5 Single System Planning and Development

As a starting point a common security standard would be useful and this could be developed as part of the project with little or no expenditure. This would inform the planning and development decisions arising form a joint gas capacity statement. There could be technical consultancy required for this estimated at €33,000.

Currently Ireland produces an annual gas capacity statement and Northern Ireland produces an annual Pressure Report. In both cases, the modelling work is carried by by Penspen on behalf of BGE. Assuming that the modelling process and approaches remain the same, there will be no costs involved in formally establishing an integrated System Planning and Development function.

The main benefits that can be gained from a joint study is that the integrated system will be modelled rather than the two independent systems. This will indicate the optimum operating regime for the whole system and can be used to more accurately assess the operational benefits which will result from the common gas arrangements. It will also allow system planning on the basis of the integrated systems and will show whether investments can be deferred as a result of the more optimal operating regime. This work will be central to the CAG project and the systems operations function going forward.

The Joint Gas Capacity Statement will also be used to support decisions on issues of strategic storage. A report[3] has recently been completed on behalf of the relevant departments in Ireland and Northern Ireland reviewing the current options for storage on an all island basis. If it is decided that strategic storage is to be provided for the island then there is potential to make a cost saving of €100-€200 million. This is based on the average market cost of constructing a storage plant being between €400 million-€1 billion and the assumption that it would cost €400 million to build a strategic storage facility in each jurisdiction. Given the economies of scale involved in building strategic storage facilities, a facility to accommodate the demand in Ireland and Northern Ireland over a 10 day continuous period, as recommended by the report, is likely to cost €500 - €600 million, giving rise to a once-off capital saving of €100-€200 million across the two jurisdictions. As no decision has yet been made regarding the requirement or size for strategic storage these figures have not been included in the overall analysis.

[3] A study on a Common Approach to Natural Gas Storage and LNG on an all island basis - CSA

Single Planning and Development CBA ***Table 2.5***

Costs	High Case	Medium Case	Low Case
1.All island Modelling and Joint Capacity Statement		No additional Cost	
2. Development of security of supply standard	€25K	€33K	€40K
3. Strategic Storage Decision		Not included in calculation	
Total Costs	€25K	€33K	€40K
Benefits			
4.Ability to quantify operational efficiencies 5. Defer investment, rationalise network development		Not quantifiable – the benefit is the ability to assess benefits of Single Gas Market – the benefits themselves will accrue to operational and planning and development efficiencies	
6.Capital Cost Savings of Strategic Storage			
Total Benefits	-	-	-
Net Benefit	(€25K)	(€33K)	(€40)

2.6 Harmonised Retail Processes and Systems

Harmonised retail processes and systems would allow shippers from either jurisdiction to supply customers using common processes and would facilitate the development of competition in both jurisdictions. At this stage of the project, no assumptions have been made as to how this could be achieved. This will be developed as part of a wider

consultation and scoping of how the retail processes and systems in Ireland and Northern Ireland can be aligned.

2.6.1 Costs

At a high level, the development of harmonised retail processes and systems will involve, among others, the development of harmonised change of shipper, billing and metering processes. The Irish market has invested €37 million in systemising processes to facilitate competition in the gas market. The resulting systems can support large volumes of customer movement and will shortly provide automatic messaging for shippers. These processes are currently conducted manually in Northern Ireland. The latest Irish systems could be expanded and rolled-out to the Northern Irish market. Costing this role-out would require wider consultation on the scope of the retail work-stream; it would therefore be premature to quantify these costs at this stage of the project until further scoping of this work-stream is conducted.

2.6.2 Benefits

Using the already developed Irish IT systems for change of supplier, provision of meter readings and other services could provide once-off savings to Northern Ireland as they will not have to invest in the development and implementation of an automated system and could instead avail of an extension to the newly developed Irish systems. There will be on-going benefits for all market participants in using one system to support the harmonised retail processes (in terms of maintenance and licensing) and in managing and administering one retail modification forum and suite of processes.

Benefits are also likely to derive from the impact that a liberalised retail market would have on competition in the two markets and the resulting impact on gas prices charged to end customers. A larger market also will result in; lower transaction costs for suppliers wishing to operate in both areas, increased economies of scale and scope, reducing trading risk for participants operating in two areas rather than one. The net impact of these combined savings should encourage the entry of more players into the market, ensuring greater competition between existing and new participants.

Again, these savings and benefits cannot be quantified at this stage of the project until further scoping of the entire CAG and its impact on the retail market is carried out.

2.6.3 Net Benefit

It is not yet decided when Northern Ireland might need to automate their retail systems. This will by its nature be contemporaneous with the development of the

market and the other benefits associated with this increased competition will also accrue at this time. Therefore the summary table in Appendix 1 is included as illustrative but the figures have not been included in the overall analysis.

3 Market Impacts

This analysis of the CAG Project has endeavoured to assess the cost savings and efficiency gains that may arise upon completion of the project. However, it is also expected that the combined implementation of the work-streams identified will have an overall positive impact on competition in the market, the level of customer choice and new investment in the market. These benefits are inherently difficult to quantify, particularly in the absence of in-depth market analysis and modelling.

It is also expected, following communication with potential new investors into the Irish market, that the harmonisation of tariffs, connection policy and code of operations for transmission customers, combined with enhanced competition and a larger customer base, will provide greater incentives for investment on the island. Conditions set within an all-island market have the potential to attract new entrants. Indeed, the outcome of the all-island market is a present consideration for investors in existing infrastructure projects; both LNG storage at Shannon and natural gas storage in salt cavities at Larne. Both ventures are significant with preliminary investments estimated at €400 million for Shannon and €320 million for Larne.

New investment of course will further enhance the security of gas supplies and competition in both areas.

4 Conclusions

The establishment of Common Arrangements for Gas will not involve the same complexities or incur the same costs as those for the Single Electricity Market. The systems are physically linked, the system operators communicate regularly and cooperate on the planning and development of both systems. Formalising the relationships between the system operators, regulatory authorities and network users and the arrangements of delivering gas around the systems will however give rise to further efficiencies and cost avoidances in the overall operation of the two systems. These arrangements will eliminate the commercial and regulatory constraints currently creating barriers in the two markets.

The total net present value of the benefits of the Common Arrangements for Gas project equates to €18.6 million. This is largely due to the on-going operational efficiencies and cost savings that will evolve when the two systems are operated, balanced and maintained as one system. This figure of €18.6 million does not account for the wider competition (retail and wholesale), investment and security of supply benefits that are expected to fall from the improved and transparent market arrangements. These benefits are inherently difficult to quantify and would need significant modelling and analysis of the market.

The net present value of the total costs in implementing the complete project is estimated to be €6.7 million, which includes full harmonisation of the wholesale gas markets. The development of the Code of Operations and the IT Systems are the main contributors to this cost. The legal advice and drafting that will also be required to formalise the arrangements between the different stakeholders will also account for a large share of this costing.

In total, this high level analysis of the expected costs and benefits of the Common Arrangements for Gas project estimates that the net present value of the net benefit for the project is approximately €12 million, discounted over a ten-year period at a 5% discount value or €13.3 million discounted over a ten-year period at a 3.5% discount value. This figure makes a number of assumptions about the structure of the market arrangements to be implemented, and is therefore subject to change as further scoping of the project emerges and these assumptions are more accurately defined and established. It should be noted that the retail market has not been included in these figures.

A summary table of the preliminary net benefits for the CAG project is shown in Appendix 1. At this early stage of the project, these figures should only be viewed as indicators as to where the net benefits of the CAG project may accrue.

Appendix 1

Summary Table of Discounted Net Present Values over 10-Year and 20-Year Timeframes

Net Benefits	**10 Year Timeframe**				**20 Year Timeframe**			
	5%		3.5%		5%		3.5%	
	€000's	**£000's**	**€000's**	**£000's**	**€000's**	**£000's**	**€000's**	**£000's**
Harmonised Transmission Tariff Methodology[4]	(1,075)	(849)	(1,075)	(849)	(1,075)	(849)	(1,075)	(849)
Single Transmission System Operation	8,284	6,545	9,151	7,229	15,182	11,994	18,684	14,761
Single IT System	4,999	3,949	5,474	4,324	8,790	6,944	10,190	8,050
Harmonised Connection Policy	(183)	(145)	(190)	(150)	(231)	(183)	(249)	(197)
Single System Planning and Development	(33)	(26)	(33)	(26)	(33)	(26)	(33)	(26)
Harmonised Retail Processes and Systems								
Total Net Benefits	11,991	9,474	13,327	10,528	22,633	17,880	27,517	21,739

[4] Net Benefits remain the same across the two discount rates and the two timeframes as both the costs and benefits are once-off and therefore are presented in 2010 prices.