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May 2013

**Oil and gas
exploration
in Ireland**

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Table of Contents

Section	Page
Executive Summary	5
1. Report Terms of Reference	14
2. Report Context	16
3. Ireland's Performance in Attracting Mobile Oil & Gas Exploration Investment	21
4. Potential National Economic Return from the Oil & Gas Industry	49
5. Report Findings & Suggestions for Improvement	66
Appendices	73

Executive Summary

Executive Summary

Report Terms of Reference

PwC was commissioned by Providence Resources plc to prepare an independent review of the relative attractiveness of the operating environment for off-shore exploration in Ireland, as well as the ability of the State to derive significant economic advantage (beyond immediate tax take) from a major oil or gas find.

Report Context

Ireland has a stated national policy of promoting oil and gas exploration in Irish waters through the creation of a stable and attractive policy environment. This policy was set out clearly in the 2007 White Paper “*Delivering a Sustainable Energy Future for Ireland*” and again in the Programme for Government 2011 – 2016.

The oil and gas industry is a global business. Ireland competes with a host of countries in the developed and developing world for capital investment. This is similar to the situation in respect of mainstream FDI, where Ireland has enjoyed major successes. The factors which influence the global investment decisions of oil and gas exploration industries are, however, distinct from those for more mainstream FDI. Key considerations are:

- the likelihood of a commercial oil or gas find;
- the attractiveness of the current policy environment (licensing, fiscal and planning terms);
- the medium to long-term stability of the policy regime; and
- relative costs of exploration, development and production.

This Irish regime has been the subject of considerable debate and controversy in recent years, with concerns pertaining primarily to safety and environmental implications of development projects as well as the extent to which the State will achieve a commensurate return relative to risk on discovered resources. Concerns raised in respect of the industry include: Ireland’s fiscal terms are too generous; Ireland will get no real economic advantage (tax take aside) from a major find; Ireland could impose landing and onshore refinement obligations without negatively impacting exploration activity; Ireland could and should impose changes on the tax terms attaching to existing licences; and oil companies are sitting on large areas of the Irish offshore where they know there are vast resources.

Overview of the Irish Policy Regime

To support the attainment of Ireland’s oil and gas policy, the State has put in place:

- 1. an enabling body**, i.e. Department of Communications, Energy and Natural Resources (DCENR)/Petroleum Affairs Division (PAD). They are responsible for the promotion, regulation and monitoring of oil and gas exploration and development in Ireland;
- 2. a licensing regime** - under standard licensing arrangements, exploration companies are subject to minimum levels of exploration activity in time-constrained phases; and
- 3. a specialist fiscal policy** – 25% corporation tax + 0 - 15% Profit Resource Rent Tax (depending on profitability of the field).

Evaluation of Ireland’s Market Performance

The offshore oil and gas industry in Ireland has operated with limited success over the past 40 years.

A very small percentage of Irish waters is under active exploration. The demand for exploration licences is low in absolute and relative terms, with only 6% take up of the licence area offered in 2011, constituting only 2% of the entire Irish designated offshore area.

Irish performance is weak in terms of the number of global players present, relative to countries such as Norway and UK, where most of the major global players hold exploration licences.

Executive Summary

Probability of making a Commercial Discovery



Explanation of Ireland's Performance

Ireland has posted a relatively poor performance in the attraction of exploration investment to Irish waters. To understand Ireland's performance to date, one needs to carefully consider the criteria applied by the industry when choosing a global location for the investment of available funds for hydrocarbon exploration. Primary among these criteria are listed in the table below:

Key Criteria Considered by Global Players	Key Findings
1 What is the likelihood of making a commercial discovery?	There has only been four commercial discoveries in Ireland to date. All four discoveries were gas, including Kinsale (1971); Ballycotton (1989); Seven Heads (1973) (but not considered commercial at the time); and Corrib (1996). Based on historical experiences, the probability of making a commercial discovery in Ireland is low (1 in 32) compared with the UK (1 in 6) and Norway (1 in 7).
2 Is the planning and regulatory regime conducive to doing business?	High-profile planning issues have damaged Ireland's reputation as a credible location of exploration investment. In spite of legislative changes (i.e. the Strategic Infrastructure Act, 2006 and Petroleum Safety Act, 2010) and licencing improvements (e.g. the introduction of licencing options in the 2011 Atlantic Margin licencing round) since the Corrib project, the general industry perception is that the regulatory and planning process is still overly complex, needs to be streamlined, requires more technical expertise, and lags behind countries such as the UK and Norway in terms of transparency and timeliness. A clear communication strategy for improvements effected to date, as well as a future development road map could succeed in substantially addressing these issues.
3 What are the likely exploration, development and production costs?	Ireland's challenging offshore environment and relatively undeveloped industry means higher costs for oil and gas companies. Few Irish specialist suppliers and lack of offshore infrastructure (at the production stage) also mean higher costs than elsewhere.
4 How will profits be taxed?	Ireland's fiscal regime is significantly more attractive than that of the most established players in the oil and gas exploration market e.g. UK and Norway, and on a par with that of other sector tier players e.g. France and Portugal. There is a broad correlation between state of establishment of the industry, levels of production and the maximum headline rate of taxation.
5 How stable is the fiscal regime?	Certainty on future fiscal treatment in the event of a commercial discovery is also a key consideration. While Ireland has not introduced retrospective taxation, the debate on the issue of the tax treatment of the industry has engendered a degree of industry nervousness on the matter which, in many respects, offsets the benefits of an otherwise attractive fiscal regime.
6 Will the State underwrite my risk in any way?	Although not as critical as the considerations above, public policies which help mitigate and/ or underwrite investment risk are very attractive to oil & gas exploration interests. Initiatives include: (i) provision of detailed seismic data – Ireland offers relatively limited seismic data to would-be investors, however there are a number of initiatives under way; (ii) subject to meeting licence terms and assuming no profit from production activity, the full or partial reimbursement by the State of exploration costs - in Norway the State underwrites the exploration costs of unsuccessful oil and gas exploration companies to the tune of 78%. In Ireland, these costs can only be written off against tax if a subsequent commercial discovery results in profit.

Executive Summary

How Attractive is Ireland?

Based on extensive consultation and research, a summary assessment has been undertaken of the attractiveness of Ireland as a location for mobile exploration investment relative to those two jurisdictions which have relatively high headline rates of taxation, i.e. the UK and Norway. This assessment confirms that Ireland is a less attractive location for oil and gas industry investment than the UK or Norway, both of which have substantially higher headline rates of taxation. The factors underpinning this assessment are as follows: low success rates in absolute and relative terms; the perception that Ireland presents significant planning and regulatory challenges; relative high exploration, development and production costs; uncertainty regarding the future fiscal regime; limited risk mitigation strategy and no risk sharing.

Certain of Ireland's competitive constraints are within the gift of policy makers (e.g. planning and regulatory regime, stable fiscal regime), albeit with potentially significant associated costs, while others are simply a function of geology and the current state of development of the oil and gas industry.

Figure - Evaluation of the Relative Attractiveness of Ireland to the Oil & Gas Industry

Investment Criteria		<i>Ireland</i>	<i>Norway</i>	<i>UK</i>
1	What is the likelihood of making a commercial discovery?	●	●	●
2	Is the planning and regulatory regime conducive to doing business?	●	●	●
3	What are the likely exploration and development costs?	●	●	●
4	What annual tax rates will apply to profits?	●	●	●
5	How stable is the fiscal regime?	●	●	●
6	Will the State underwrite my risk in any way?	●	●	●

Executive Summary

Profile of National and Local Benefits

Both Norway and UK had major commercial finds early on, in the early 1970s. Different approaches were taken to the development of the industries in these jurisdictions, but both have reaped major economic benefit.

On a much smaller scale, even though there has been limited success offshore Ireland, the oil and gas industry is already supporting employment in Cork City, Kinsale and Killybegs. On the foot of the Kinsale Head development: direct jobs and a significant number of indirect jobs were created; the availability of gas e.g. the development of the entire national gas grid and NET (a fertiliser plant in Cork); the development of a notable cluster of chemical and pharmaceutical companies in Cork Harbour. The gas field was also a catalyst for companies such as the PM Group and Mainport to grow into global companies.

Norway – Oil & Gas Statistics

- **250,000** - direct, indirect and induced jobs in Norway
- **45,000** - people employed in Stavanger region
- **€61,700** - the average salary in Norway (€36,000 in Ireland)
- **69,000** - recent job openings in Norway
- **23%** - industry contribution to Norway's GDP
- **2nd** - highest GDP per capita in the OECD

UK – Oil and Gas Statistics

- **440,000** – 340,000 (direct, indirect and induced jobs) & 100,000 (exporting goods and services) jobs in the UK
- **137,300** – direct, indirect and induced jobs in the Aberdeen Shire
- **15%** - higher (Aberdeen salaries) than the average earnings in the UK
- **15%** - industry contribution to the Scottish GVA
- **1,000** - companies in Aberdeen that operate wholly or predominately in the energy sector

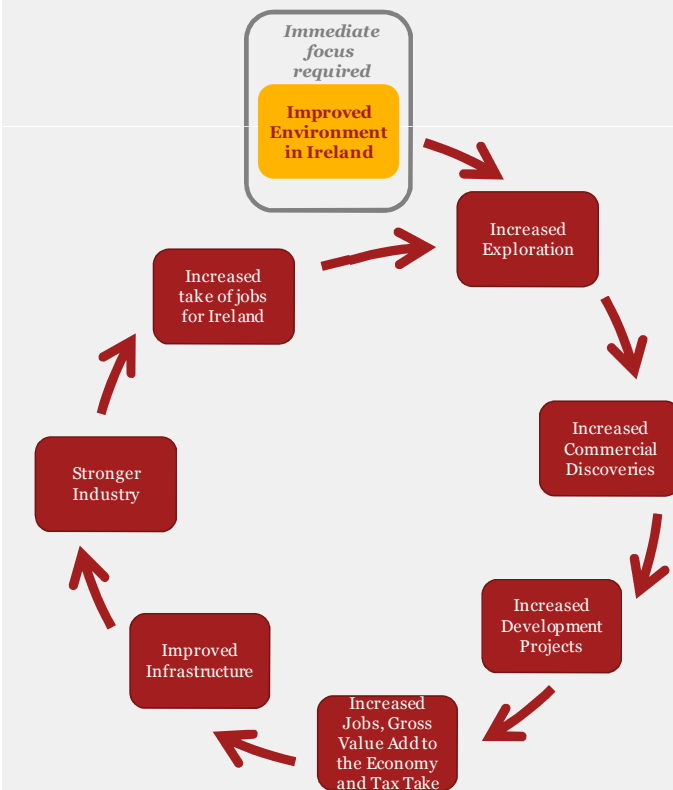
Potential Economic Benefits to Ireland

Assuming the existence of significant hydrocarbon reserves in Irish waters, more intense exploration activity will be required before the full potential of the industry can be realised. A piecemeal effort as exists at present means that, even in the event of a major discovery, many of the economic benefits will flow to specialist providers of product and services located outside the State. Domestic service providers should put plans in place to ensure that they are well positioned to compete for this work and capitalise on the opportunities that may arise.

Potential Economic Benefits to Ireland (cont'd)

It is obvious, other things being equal, that the incidence of commercial discovery will rise with exploration activity. The oil and gas industry is highly specialised in terms of its supply needs and a minimum critical mass of activity is typically required before serious economic benefits (stemming from the establishment of a substantial indigenous industry) can start to flow. The typical development cycle of the industry is being stalled in Ireland at the earliest stages.

Figure - Industry Development Cycle



Executive Summary

Potential Economic Benefits to Ireland (cont'd)

To profile the scale of potential benefit, the PwC team worked with Providence Resources Plc to profile additional Irish economy, expenditures should its technical discovery at Barryroe prove to be commercially successful. Estimates were prepared for two scenarios, the first of which assumed the current state of development of the supply industry onshore. The second assumed a more developed supply industry, on foot of a series of commercial discoveries in a short time period.

Even within existing supply constraints, a major commercial discovery would deliver significant benefits to the Irish economy, i.e. close to 800 jobs per annum in the production (operation) phase. The potential return is, however, much greater where there is an established supply base – particularly one which can cater to the needs of the industry in its development/construction phase.

The estimated corporate and PRRT return from a commercial discovery of the anticipated scale of Barryroe is estimated at €4.5 billion over its full project life (recognising the general industry norm of a write down on Capex), before any regard is had to other forms of taxation.

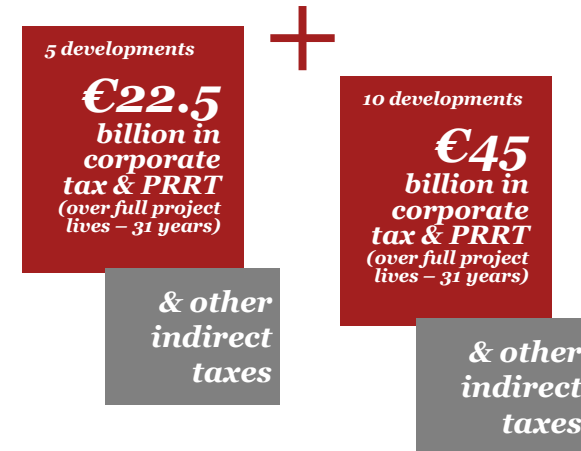
If Ireland were to have ten commercial fields of the scale of Barryroe operating at any given time, and there was an established supply base, there would be a potential to generate an average of 13,500 jobs a year during the development phase (10 years) and 11,500 jobs a year during production (25 years*). It should also be noted the salaries in the oil and gas sector are typically higher than the average e.g. the average salary in Aberdeen is 15% higher than the UK average, due to the high salaries in the oil and gas sector.

Ireland is largely dependent on imported energy sources. The country has an unusually high dependence on oil, of which 100% is imported. An oil and gas industry of scale is likely to have a significant positive impact on Ireland's security of supply. Ireland could become more self sufficient and the requirement to bring in oil or gas would be less, leading to a positive impact on the balance of payments (balance of exports and imports).

*The development and production phases overlap.

Figure - Jobs Potential of an Established Oil & Gas Industry

	FTEs per annum (direct, indirect and induced)
Development (Construction) Phase	
5 projects	6,706
10 projects	13,413
Production (Operations) Phase	
5 projects	5,680
10 projects	11,359



To place this in context, the annual corporate tax take in Ireland in 2011 was €4.5 billion

(Source: Revenue, Annual Report 2011).

Executive Summary

As mentioned earlier, a number of concerns have been raised in respect of the industry in recent years in relation to the Irish oil and gas sector regime. Based on the analysis in this report, these concerns have been revisited in the table below and overleaf.

Concerns	PwC Observation
Ireland's fiscal terms are too generous	<p>The maximum headline rate of tax in Ireland is low relative to other European countries with high rates of oil and gas exploration, development and production activity. Fiscal terms are, however, set at a level to attract exploration activity and normally rise in line with success in industry development, which coincides with an attractive operating environment - particularly high rates of commercial discovery. The Irish operating environment is not attractive in relative terms and this is reflected in very low levels of interest in exploration licences relative to the experience of other European countries e.g. Norway and the UK, in spite of what are generally considered favourable fiscal terms.</p> <p>The Irish headline rate of tax is in line with countries with similar circumstances e.g. France, Portugal and Morocco.</p> <p>Moreover, using headline rates of tax to gauge relative fiscal system generosity is, perhaps, overly simplistic. In the case of Norway, for example, high rates of tax co-exist with substantial production income and a commitment on the part of the State to underwrite the exploration risks of private sector interests to the tune of 78% as well as with a very significant State investment in the acquisition of seismic data, which allows for informed assessments of discovery potential.</p>
Ireland will get no real economic advantage (tax take aside,) from a major commercial discovery	<p>Until such time as a critical mass of activity exists in the sector (which will require the unlocking of an exploration demand), Ireland will be unable to fully exploit the economic potential to a level such as Scotland and Norway, which has an established indigenous supply base to the industry. This said, it is clear that Ireland is currently benefiting economically from the oil and gas industry (as evidenced in the case studies of Kinsale and Killybegs) and would derive significant benefit from the development and production of a single major commercial discovery. New jobs created in the sector would be incremental. The full economic potential, which it should be noted is not predicated on a refinement capability, will be less than is possible until such time as exploration activity increases.</p>
Ireland could impose landing and onshore refinement obligations, without negatively impacting exploration activity	<p>The imposition of landing and onshore refinement obligations is prohibited under EU legislation. Additional points of note are as follows:</p> <ul style="list-style-type: none"> • currently there is only one refinery in Ireland, Whitegate Refinery, Cork. The refinery is operated by Philip 66, who have guaranteed to operate it until 2016. There is uncertainty regarding the future of the refinery post 2016; • economies can derive major economic advantage even without onshore refinement; and • at this juncture, the issue is not whether current levels of exploration activity would be impacted, rather the question should be if levels of activity could be grown to the levels of key competitors.

Executive Summary

Concerns	PwC Observation
Ireland could impose changes on the tax terms attaching to existing licences	<p>As with any Sovereign State, Ireland could impose retrospective taxation on existing exploration licences and, in this manner, derive a greater tax return from their production activities. Retrospective tax measures have been introduced in a number of credible oil and gas industry locations, with varied impact on location attractiveness. Retrospective tax initiatives, and speculation around same which is almost as damaging, have the potential to seriously deter investor interest in a location, particularly in circumstances where that interest is tenuous at best – as is presently the situation in Ireland. All expert observers advise against retrospective taxation, but there is an acceptance that as the overall attractiveness of the operating environment improves, then the tax arrangements imposed on new licences can become more onerous.</p> <p>In summary, Ireland is simply not coming from a position of strength and the imposition of retrospective taxation would be ill-advised if the national policy objective of putting in place an attractive and stable policy environment for the industry is to be achieved. Moreover, a significant and ongoing speculation on this matter has the potential to have negative consequences for the Irish proposition in the industry.</p> <p>It should also be noted, a key feature of Ireland’s tax regime is the 12.5% standard corporation tax. The low corporate tax rate is one of the cornerstones of Ireland’s industrial policy and over the past number of years the Government have provided reassurance to both indigenous companies and multinationals operating in Ireland in relation to the continued 12.5% corporation tax rate. Retrospectives tax changes on the oil and gas sector could potentially alter the perception of Ireland’s stable corporate tax regime.</p>
Oil companies are sitting on large areas of the Irish offshore where they know there are vast resources.	<p>In common with the regimes of other countries, and reflecting the fact that exploration companies have to invest very significant sums in exploration activity, licences do facilitate industry players assessing the potential of a licences area for up to 15 years before declaring it commercially viable. However, exploration licences, carry significant exploration obligations which must be met if the licence is to be retained and/ or penalties are to be avoided. Licences must be surrendered if they are not active or if the licensed exploration programme is not being implemented and furthermore at the end of each phase a certain percentage of the acreage must be surrendered.</p> <p>Regarding the claim that companies are aware of vast resources in Irish waters, PwC are not in a position to comment on this matter, however it is noteworthy that DCENR receives a copy of all seismic and well data and has the same information as the companies. In more recent years, DCENR has real time access to drilling operations. If it were the case than companies are aware of vast resources, however, and it was widely known, one might expect higher levels of licence interest.</p> <p>While research funded by DCENR has estimated (yet-to-be-proven) reserves of 10 billion barrels of oil equivalent (bboe) in the Irish offshore, significant drilling activity would be required to test the accuracy of this estimate.</p>

Executive Summary

Key Findings

1. Ireland is underperforming relative to other European players in the attraction of exploration investment from the oil and gas industry.
2. This underperformance is partially attributable to factors beyond the control of policy makers, but there are important policy contributors.
3. The oil and gas industry has the potential to transform local and national economies, but a critical mass of activity is needed before a substantial indigenous supply base can develop.
4. This critical mass of activity does not currently exist in Ireland, nor will it exist until exploration demand is unlocked and success rates improve.
5. Notwithstanding this, Ireland is already deriving some economic advantage from the industry.
6. The policy experience of Scotland suggests that huge State investment is not always required, however an “enabling” environment is essential to drive industry development.

Suggestions for Improvement

1. Clearly developed and communicated strategy, targeted at key stakeholders and the general public.
2. A more transparent, streamlined and timely regulatory and planning process.
3. A predictable and stable fiscal regime to end industry uncertainty.
4. Provision of relevant depth of seismic information/ data to enable investment decisions.
5. Proactive Cabinet support and endorsement for the development of the sector could have a real impact.
6. Industry engagement in developing and delivering upon the strategy for Ireland.

Given the potential for the Irish economy of a major hydrocarbon find, there is a window of opportunity between now and the next licensing round to ensure that the issues and constraints identified, that are within the gift of policy makers, are addressed. This will enable Ireland to fully pursue the investment opportunities available, and to ensure that Ireland is in an optimum position to unlock the economic potential of the oil and gas industry.

Chapter 1

Report Terms of Reference

1. Report Terms of Reference

PwC was commissioned by Providence Resources Plc to prepare an independent review of the relative attractiveness of the operating environment for off-shore exploration in Ireland, as well as the ability of the State to derive significant economic advantage (beyond immediate tax take) from a major oil or gas find.

Allied to the above, it was required that the report covered the following: details of the emerging nature of the offshore industry in Ireland, noting the current Government objectives for development in this area; a top-line look at international case studies; what needs to be put in place to assist the development of an industry; the rationale behind the current tax regime in terms of incentivising investment; and the potential in terms of employment and financial value to the exchequer.

The approach included consultations with key players in the oil and gas industry in Ireland, including representatives from the Department of Communication, Energy and Natural Resources (DCENR)/Petroleum Affairs Division (PAD), the Irish Offshore Operators Association, Enterprise Ireland, Kinsale Energy and a range of other oil and gas exploration companies and companies associates with the industry, as well as a detailed desk-based analysis. PwC would like to extend its sincere thanks to all of those individuals and organisations who contributed to this research, details of which are attached as Appendix 1.

The remainder of this report comprises four additional chapters, the next of which provides introductory context to the oil and gas industry and to related Irish policy. Chapter 3 profiles and explains Ireland's performance in the attraction of mobile oil and gas exploration investments, while Chapter 4 examines the potential national economic return that could be achieved from an established oil and gas industry.

Conclusions and suggestions for improvement are presented in Chapter 5.

Chapter 2

Report Context

2.1 Report Context

Ireland has a stated policy objective of “creating a stable attractive environment for hydrocarbon exploration and production”

In common with many other countries, Ireland has a national policy of promoting oil and gas exploration in Irish waters through the creation of a stable and attractive policy environment. This policy is set out clearly in the 2007 White Paper “Delivering a Sustainable Energy Future for Ireland”, and restated in the Programme for Government 2011 – 2016. This long standing approach aims to:



“We will incentivise and promote off-shore drilling and streamline planning and regulatory process for bringing ashore these reserves and seek to maximise the return to the Irish people”.

(Source: Programme for Government 2011 – 2016)

- maximise levels of exploration activity in Irish waters;
- increase levels of production activity; and
- ensure a fair return to the Irish State.

The term “stable” has a particular resonance in the oil and gas industry, where medium to long-term policy and fiscal certainty is needed to counter-balance the significant financial risks attaching to almost all operational stages.

The Irish objective of promoting exploration activity is achieved through a long-established licensing regime, whereby the operator assumes full exploration risk in return for lease on the resources, the profits from which are subject to a specialist tax regime.

Licensing is the most commonly used model for promoting oil and gas exploration in the developed world. Alternative models used to promote oil and gas exploration are described in Appendix 2.

Ireland near the bottom of EU chart for energy independence

The Journal.ie... IRELAND IS MORE reliant on imported energy than almost every other country in the European Union, according to new figures published this morning. Data con generate

The UK is becoming increasingly dependent on imported gas

The UK is becoming increasingly dependent on imports. It is forecast that the UK will import approximately 80% of its natural gas by 2016, much of it as LNG. The UK has diversified its energy sources. (Source: Irish Academy of Engineering, Feb 2013)

95% of Ireland's Energy supply is imported

Approximately 95% of Ireland's gas supply is currently imported from the UK via a single entry point at the Moffat. The capacity limits of the Moffat entry point are expected to be reached by July 2012. (Source: Network Development Statement 2011/2012)

Ireland's gas storage capacity is only 17 days

Ireland has limited gas storage capacity – 17 days versus 50 day average in Western Europe. (Source: Gas Infrastructure Europe)

Unacceptable Risk

The Irish Academy of Engineering report, 'The future of Oil and Gas in Ireland', February 2013, points out that Ireland's dependence on a single source of gas supply and a system with anticipated capacity constraints for most of the country's gas supply is an unacceptable risk and that a long-term strategy is required to ensure the security and diversity of Ireland's gas supply. The report also highlights that while Ireland continues to implement a long term strategy in terms of reducing the country's oil dependence, that is imperative that a reliable oil infrastructure is maintained to deliver secure and cost effective energy.

(Source: Gas Infrastructure Europe; Eurostat STAT/13/23; Gaslink Network Development Statement 2011/2012; Irish Academy of Engineering, Feb 2013; The Journal.ie)

2.1 Report Context

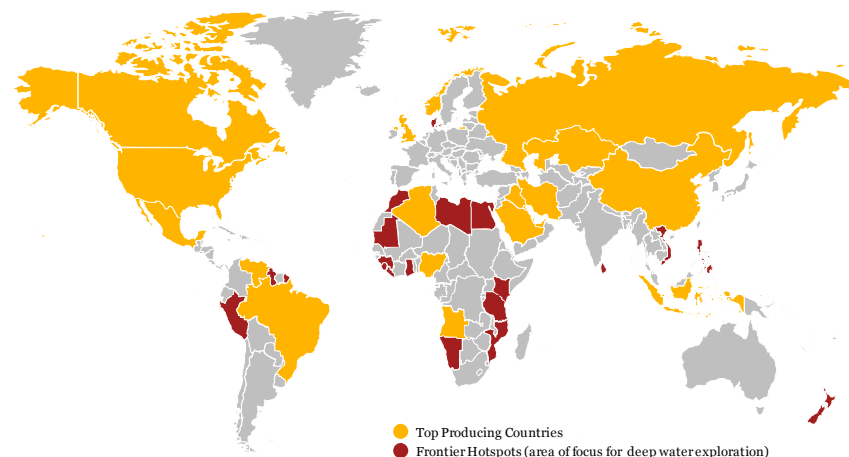
Countries compete for the attraction of mobile exploration investment

Ireland competes for the capital investment of global oil and gas exploration companies with a host of countries in the developed and developing world (see Figure 1). This is similar to the situation in respect of mainstream FDI, where Ireland has enjoyed major successes. The factors which influence the global investment decisions of oil and gas exploration industries are, however, distinct from those for more mainstream FDI. Key considerations are:

- the likelihood of a commercial oil or gas find;
- the attractiveness of the current policy environment, particularly licensing, fiscal and planning terms;
- the multi-annual stability of the policy regime, with high upfront investment costs and long project lifecycles (see Figure 2 overleaf) making this a particular issue in the oil and gas industry;
- relative costs of exploration, development and production.

For the industry in aggregate, levels of global investment are influenced by forecast developments in the price of oil and gas relative to full life-cycle costs. The outlook for oil and gas prices can vary significantly, depending on factors such as global levels of economic activity and rates of adoption of new energy sources. The emergence of shale gas, and in recent times, shale oil (see Box 1) has led to speculation of a sustained depression in the average cost of hydrocarbons. Such developments can have important implications for global investment levels reflecting, among others, reduced lender appetite.

Figure 1 – Global Oil Producing Countries and Deepwater Exploration Hotspots (Ireland does not Feature)



(Source: US Energy Information Administration, Richmond Energy Partners, 2012)

Box 1 - Shale Oil & Gas

Shale oil is petroleum produced or extracted using techniques other than the conventional oil well method. Organic matter within the rock is converted into synthetic oil or gas which can be used as a substitute for conventional crude oil.

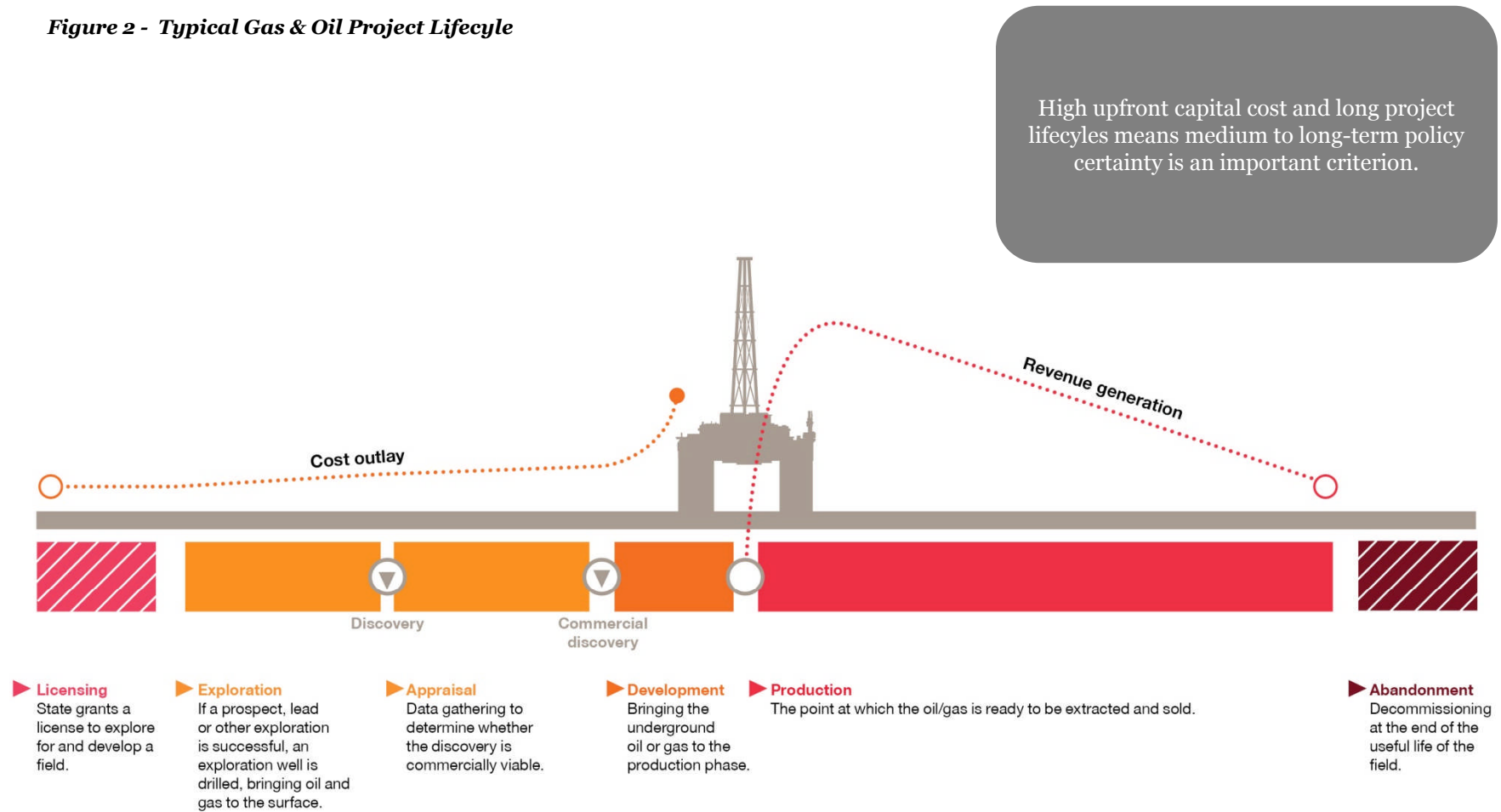
Shale Oil is rapidly emerging as a significant and relatively low cost unconventional resource in the US. PwC estimate that this increase **could reduce oil prices in 2035 by between 25% and 40%**, reflecting significantly lower production prices than those associated with the development of complex “frontier” projects such as are on offer in Ireland.

Shale gas is a natural gas that is found trapped within shale formations. Shale gas has become an increasingly important source of natural gas in the United States since the start of this century, and interest has spread to potential gas shales in the rest of the world.

2.1 Report Context

Typical project life cycle is long and entails significant investment risk

Figure 2 - Typical Gas & Oil Project Lifecycle



2.1 Report Context

The Irish regime has been the subject of much debate

Reflecting a long-standing policy of promoting hydrocarbon exploration and production, the Irish government has put in place a licensing, fiscal and planning regime to attract and support mobile oil and gas exploration investment. Key features of this regime are as follows:

- Department of Communications, Energy and Natural Resources/Petroleum Affairs Division (PAD) an enabling body;
- a licensing regime that includes a low-cost option for market entry;
- agreed work programmes with timed drilling obligations for exploration licences; and
- 25% corporation tax, with an additional profit resource rent tax of 0-15% (graded on the basis of profitability).

Additional detail is provided in Chapter 3.

This regime has been the subject of considerable debate and controversy in recent years, with concerns pertaining primarily to the environmental implications of development projects as well as the extent to which the State will achieve a fair return on discovered resources. With regard to the latter, concerns raised include but are not limited to the following:

- Ireland's fiscal terms are too generous;
- Ireland will get no real economic advantage (tax take aside) from a major find;
- Ireland could impose onshore refinement obligations without negatively impacting exploration activity;
- Ireland could and should impose changes on the tax terms attaching to existing licences; and
- oil companies are sitting on large areas offshore Ireland where they suspect there are vast resources.

Testing the veracity or otherwise of these concerns advised the research process which underpins the balance of this report.

Chapter 3

Ireland's Performance in Attracting Mobile Oil & Gas Exploration Investment

3.1 Introduction

This chapter describes and explains Ireland's current and historical performance in the attraction of the mobile investment of oil and gas exploration and production companies. It comprises four additional sections, the next of which provides a high-level overview of the current policy regime for oil and gas exploration and production in Ireland.

Section 3.3 assesses our relative performance in the attraction of oil and gas exploration activity in recent years, while Section 3.4 seeks to explain this performance through a systematic evaluation of our relative strengths and weaknesses on the criteria used by private industry to choose locations for exploration investment. Based on this evaluation, a summary assessment of our competitive proposition vis-a-vis Europe's two leading oil and gas jurisdictions (i.e. Norway and the UK) is provided in Section 3.5, recognising that unlike Ireland, both countries have mature industries with high production levels.

3.2 Overview of Irish Policy Regime

Policy regime comprises promotional, regulatory and fiscal elements

Ireland's stated policy is to create a stable and attractive environment for hydrocarbon exploration and production. To support the attainment of this, the State has put in place:

1. an enabling body, i.e. Department of Communications, Energy and Natural Resources (DCENR)/the Petroleum Affairs Division (PAD);
2. a licensing regime; and
3. a specialist fiscal policy.

In outline structure, this is broadly in line with policy regimes in other jurisdictions albeit with very important differences of detail which are described in Section 3.4.

These are now described in turn.

DCENR (PAD)

DCENR/PAD is responsible for the promotion, regulation and monitoring of onshore and offshore oil and gas exploration and development in Ireland. Its role is to maximise the benefits to the State from exploration for, and production of, indigenous oil and gas resources, while ensuring that activities are conducted safely and with due regard to their impact on the environment and other resource users. An objective is also to secure industry assistance towards building up the local related infrastructure. This is achieved, in large part, through the design, implementation and promotion of an exploration licensing system, details of which are provided overleaf.

There are currently twelve people working in the PAD in DCENR and this team is supported by a number of external consultants with expertise in a range of relevant disciplines.

Figure 3 – Key Responsibilities of DCENR (PAD)

Promotion	Regulation	Monitoring
<ul style="list-style-type: none"> • Provide stimuli for exploration efforts. • Carry out joint industry research/surveys and data-gathering. • Identify areas with hydrocarbon potential. • Release basic geological, geophysical and well data to the industry. 	<ul style="list-style-type: none"> • The allocation of acreage to private enterprise under various types of licences (through licensing rounds or open door application process) to explore and produce. • Agree work programmes with operators which are appropriate for the type of authorisation and the area to be licensed while taking account of both the operator's and the State's interests. 	<ul style="list-style-type: none"> • Ensure that agreed work programmes are carried out in accordance with good practice, having particular regard to safety, the environment and other sea users. • Ensure there is effective liaison with the industry. • Maximise the opportunities for Irish businesses to participate in exploration activities.

DCENR/PAD set up the Petroleum Infrastructure Programme (PIP) in 1997. PIP presently comprises two sub-programmes: the active Petroleum Exploration and Production Promotion and Support (PEPPS) and the now completed PIP (1997 - 2002) sub-programmes. The overall aim of PIP is to promote hydrocarbon exploration and development activities by: strengthening of local support structures; funding of research data gathering and 'land-based' research in Irish offshore areas and providing a forum for co-operation amongst explorationists and researchers. PIP is funded by oil companies with licences offshore Ireland and the PAD.

3.2 Overview of Irish Policy Regime

Licensing regime seeks to balance national policy and State interest with the commercial and competitive realities of the industry

The Irish licensing regime was first introduced in 1975 and has evolved considerably in the interim period. Further information on the types of licences on offer in Ireland can be found in Appendix 3. In contrast to certain other European jurisdictions, the State does not provide would-be exploration companies with a substantial body of data which could considerably inform the likelihood of an exploration find. Rather, exploration companies are (under the terms of a petroleum prospecting licence) enabled to undertake their own data gathering to inform their levels of interest in accepting an exploration licence, with the State supporting the company with data which it may have available from the prospecting activity of other exploration interests (the confidentiality period is generally four years in the Irish Sea and seven years in the Atlantic Margin basin).

Reflecting important differences in demand levels, there are two distinct approaches to the licensing of exploration in the Atlantic margin basin and the Irish Sea, as follows:

- in the Atlantic margin basin, “frontier” licences are granted in periodic licensing rounds, the details of which are advised to the industry 12 months in advance of the closing date; and
- in the Irish Sea, by contrast, there is an “open door” application process.

Figure 4 – Types of Exploration Licences in Ireland

EXPLORATION	
Petroleum Prospecting licence	1-3 years
Licensing Option	Up to 3 years
Exploration licence*	Standard (<200m)
	Deepwater (>200m)
	Frontier (where designated)
Reserved Area Licence**	Same terms as an exploration licence

* Duration of phases is indicative ** Used to ‘protect’ lessee

Under standard licensing arrangements, exploration companies are subject to minimum levels of exploration activity in time-constrained phases (see Figure 4). For standard and deepwater exploration licences, the holder is obliged to carry out a work programme which must include the drilling of at least one well in the first phase.

The cost of drilling a well is substantial (e.g. exploration wells in the Atlantic range from €30m to €120m+), with the implication that exploration companies must be significantly committed to the activity to accept a licence. Similarly, under frontier licences the holder must commit to at least one exploration well before progressing to Phase 2.

These relatively onerous obligations were felt by policy makers to be constraining licence demand in Ireland and, for this reason, two-year licensing options were introduced for the Celtic Sea in 1998 and for the Atlantic margin in 2011. There are no drilling obligations under these options, meaning that they are a low-cost option for market entry. By extension, however, they are not a very sound indicator of levels of global investment interest in Ireland.

3.2 Overview of Irish Policy Regime

Ireland's fiscal regime has evolved considerably since 1975

Key provisions of the specialist fiscal regime for the oil and gas industry in Ireland are shown in Figure 5.

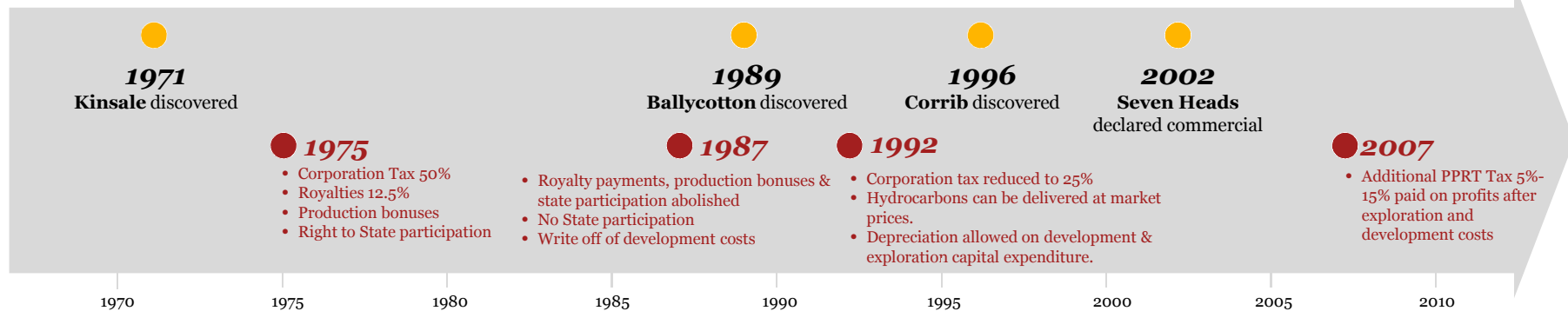
Figure 5 – Current Fiscal Regime

Country	Corporate Tax Rate	Profit Resource Rent Tax	Maximum Tax Rate	Write down of Capex
Ireland	25%	<p>+ 0 - 15%</p> <p>(graded on the profit ratio, which is defined as rate of profits less 25% corporate tax divided by the accumulated level of capital investment)</p> <ul style="list-style-type: none"> • 15% tax where profit ratio exceeds 4.5 • 10% tax where profit ratio is between 3.0 and 4.5 • 5% where profit ratio is between 1.5 and 3.0 • no change where profit ratio is less than 1.5 	40%	A company may claim relief for both successful and abortive exploration expenditure, but not for such expenditure incurred more than 25 years before the petroleum trade commences. Once the petroleum trade commences (that is, when commercial extraction begins), all exploration expenditure (subject to the 25 year rule) is deemed to have been incurred on the day the trade commences and is available for offset against petroleum profits. Accordingly, this represents an accelerated depreciation measure as there is an immediate write-off for exploration costs against profits earned.

This regime has changed considerably since it was first introduced in 1975, when the fiscal terms attaching to licences were much more onerous than is presently the case. The period between 1987 and 2007 saw a series of changes introduced to the fiscal regime, against a backdrop of declining interest, to render it more attractive to oil and gas exploration companies, with a new progressive taxation (based on profitability) introduced in 2007 to ensure that the State's interest in a large commercial discovery was protected, i.e. Profit Resource Rent Tax or PRRT.

A timeline of developments is provided in Figure 6.

Figure 6 – Key Policy Changes & Discoveries



(Source: PwC derived)

3.3 Evaluation of Irish Market Performance

The demand for exploration licences in Ireland is low in absolute and relative terms, with only 6% take up of the licence area offered in 2011, constituting only 2% of the entire Irish designated offshore area

The success which Ireland has enjoyed in the attraction of mobile capital in the form of mainstream FDI (e.g. ICT, pharmaceuticals) is not replicated in the oil and gas exploration sector. Rather, exploration licence demand (a clear forerunner to any form of development or production activity) has been low relative to:

- the number of blocks or size of the area on offer; and
- the performance of other European jurisdictions.

The most recent licensing round for the Atlantic margin in 2011 aimed to boost the level of exploration activity off the Irish coast, and offered up the entire Atlantic seabed for licensing options. As indicated, licensing options do not require the same level of commitment to drilling activity as exploration licences. 13 licensing options were awarded. Whilst encouraging, it did not generate significant interest from international companies with proven track records in exploration success, with only one top 50 global player awarded shares in a licence (see page 28 for detail). The total area covered by the applicants was just over 15,000km². This constitutes 6% of the area on offer and 2% of the entire Irish designated offshore area (see Figure 7).

In the same year, two exploration licences were granted in the Celtic Sea.

Figure 6 - Number of Exploration Licences Granted in Ireland

Year	Exploration Licences Granted	Licensing Options Granted
1994 *	7	n/a
1995*	11	n/a
1996	1	n/a
1997*	12	n/a
1998	0	1
1999*	2	3
2000	0	5
2001	0	1
2002	0	0
2003	0	10
2004*	3	8
2005*	6	3
2006*	4	1
2007*	5	2
2008	5	2
2009*	1	1
2010	0	2
2011*	2**	13
2012	0	6
Total	59	56

*Licensing Round Year.

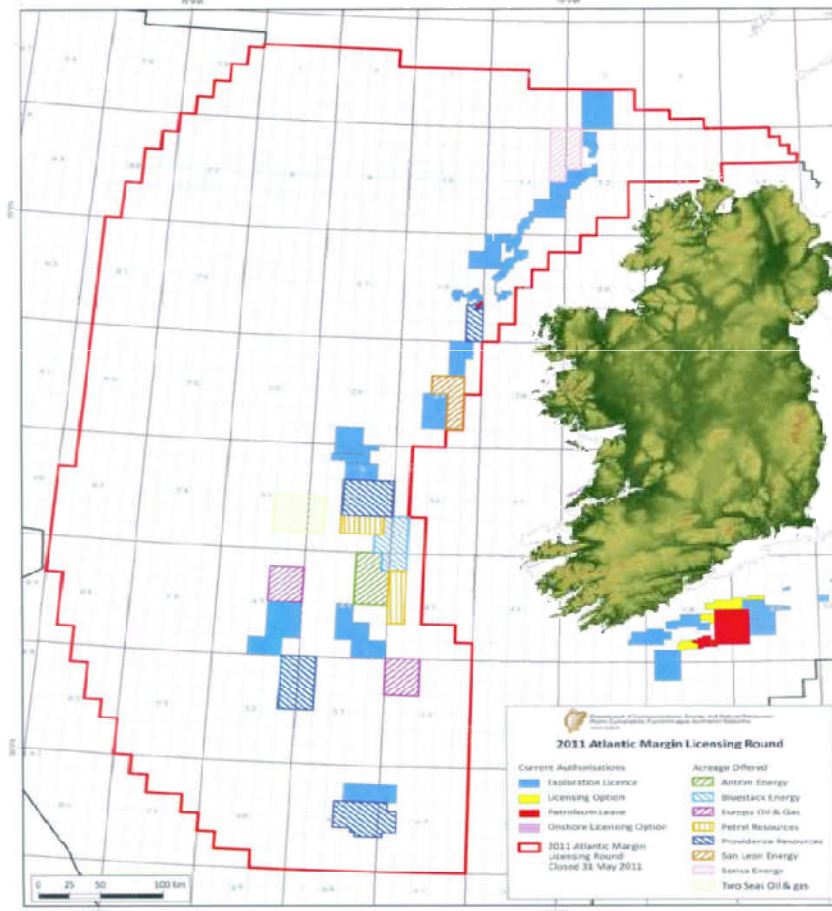
**The two exploration licences granted in 2011 are in the Celtic Sea.

(Source: DCENR/PAD)

3.3 Evaluation of Irish Market Performance

A very small share of Irish waters are under active exploration

Figure 7 - Irish Waters under Exploration Licence (2011)



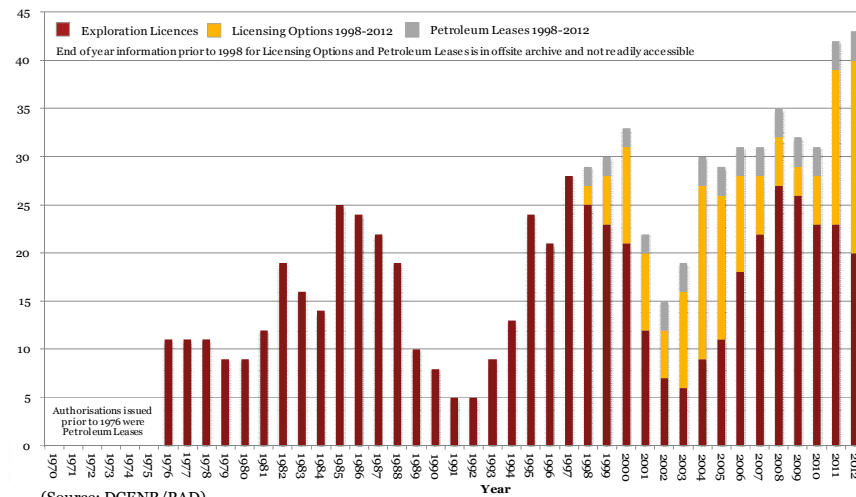
(Source: DCENR/PAD)

Figure 7 shows that a very high share of Irish waters are not under active hydrocarbon exploration. At the end of 2012, there were 43 licences or licensing options in place as follows:

- three petroleum leases, i.e. Kinsale/Ballycotton, Seven Heads and Corrib shown in **red** in Figure 7;
- 20 exploration licences, shown in **blue**;
- 20 licensing options, indicated by striped boxes.

Notwithstanding a series of policy changes aimed at enhancing Irish competitiveness in the global market for exploration investment, there has been relatively limited progress in real terms (see Figure 8).

Figure 8 – Exploration Activity in Irish Waters (1970-2012)



(Source: DCENR/PAD)

3.3 Evaluation of Irish Market Performance

Irish performance is weak relative to the UK and Norway

Figure 9 compares Irish performance in the attraction of exploration investment in the most recent Atlantic Margin licensing round of 2011 with equivalent performances in Norway and the United Kingdom.

Figure 9 - Profile of Demand for Exploration licences (Ireland, Norway and UK Compared)

Most Recent Licensing Round	Licence Obligations*	# Licences Applied for	# Licences granted	# Blocks Offered	# Unique Applicants (including partners)	of which, Indigenous	of which, Global Interests (Top 50)
Ireland, 2011	Modest Work Programme (Licensing Options)	15	13	1,017 (+55 part blocks)	12	4	1 (Repsol)
Norway, 2012	Extensive Work Programme	n.a.	51	86	40	12	11
UK, 2012	Extensive Work Programme	224	167	2,788	72	26	12

(Source: DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change)

Key findings are as follows:

- in absolute terms, the level of demand for licences in the most recent Atlantic Margin licensing round (i.e. 2011) was significantly less than for the most recent licensing rounds of Norway and the UK;
- related, the number of licences awarded relative to the number of blocks offered was smallest in Ireland; and
- levels of interest among the global players in the industry were significantly less in Ireland than the UK or Norway e.g. in Ireland of the 13 licensing options awarded in 2011, only one had top 50 global player interest, Repsol. It should be noted that Repsol hold a 40% interest in the licensing option, with Providence Resources (Irish) holding 40% and Sosina Exploration (British) holding the other 20%.

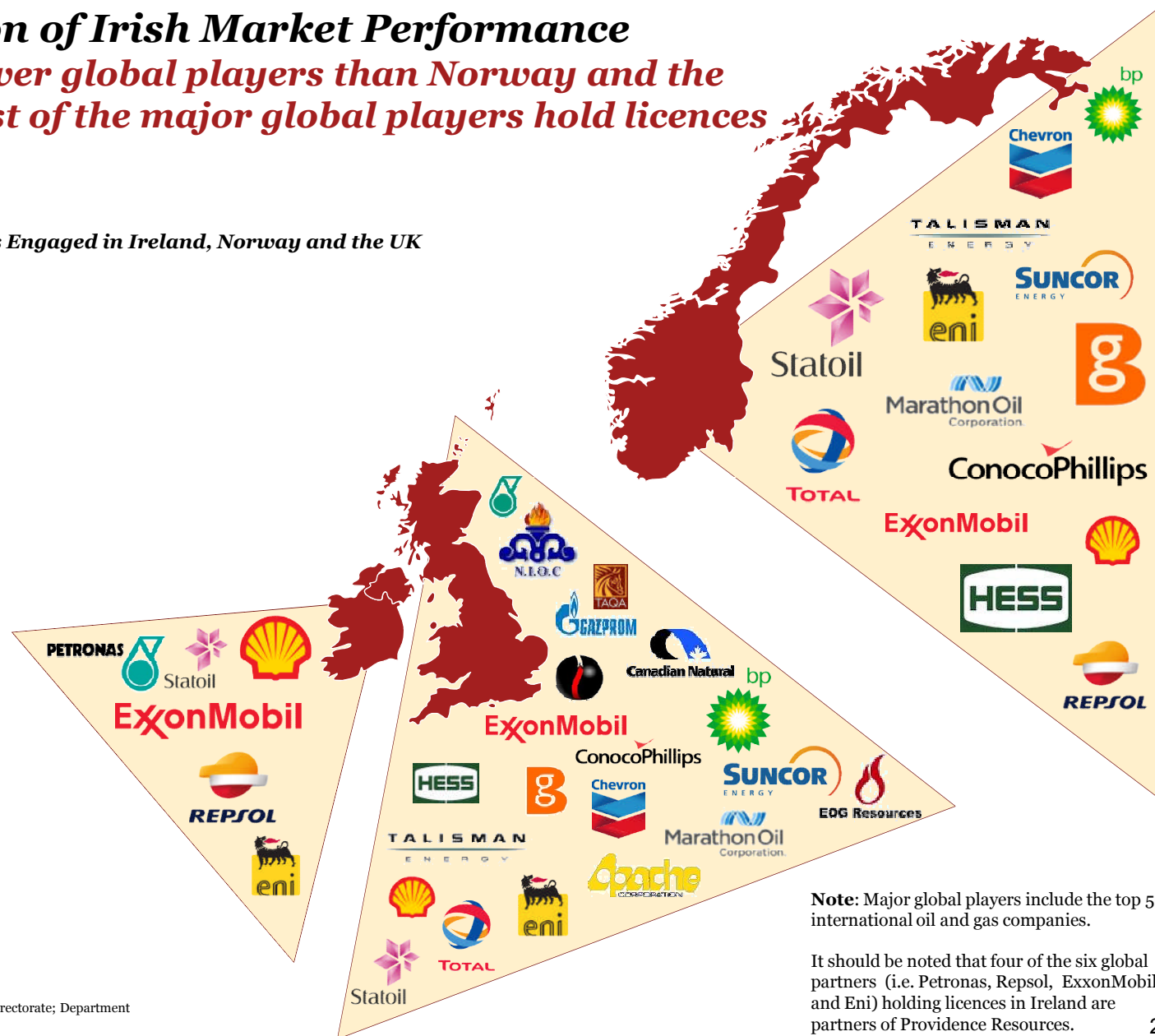
Indeed, an apparent dearth of primary interest among global players in the Irish market is unique. Those global players present typically “piggy-back” the efforts of indigenous interests. Specifically, of the 43 licences currently in place, Irish companies have interests in 28 of them and top 50 global players have interests in eight. Twelve are held by other players (neither Irish companies nor global interests).

** It is important to note the 2011 round in Ireland was for licencing options only (modest work programme), however the UK and Norway had full licencing rounds (extensive work programmes).*

3.3 Evaluation of Irish Market Performance

Ireland has fewer global players than Norway and the UK, where most of the major global players hold licences

Figure 10 – Global Players Engaged in Ireland, Norway and the UK



(Source: DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change)

3.4 Explaining Ireland's Performance

Location investment criteria extend well beyond fiscal terms

Notwithstanding a stated policy objective of promoting oil and gas exploration in Irish waters, coupled with the putting in place of a specialist policy regime, Ireland has posted a relatively poor performance in the attraction of exploration investment to Irish waters.

To understand Ireland's performance to date, one needs to carefully consider the criteria applied by the industry when choosing a global location for the investment of available funds for hydrocarbon exploration. Primary among these criteria are the following:

1. what is the likelihood of making a commercial discovery?
2. is the planning and regulatory regime conducive to doing business?
3. what are the likely exploration, development and production costs?
4. what annual tax rates will apply to profits?
5. how stable is the fiscal regime?
6. will the State underwrite my risk in any way?

The unique nature of the industry, i.e. major upfront investment costs with high attendant risk, means that the attractors for mainstream FDI do not fully apply. The remainder of this chapter seeks to explain Ireland's performance having regard to each of these criteria in turn.

Overleaf each of the six criteria listed in Figure 11 have been assessed using the traffic light system as below:

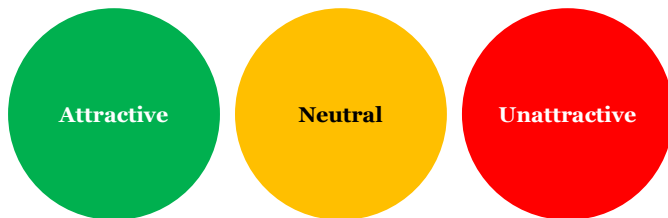
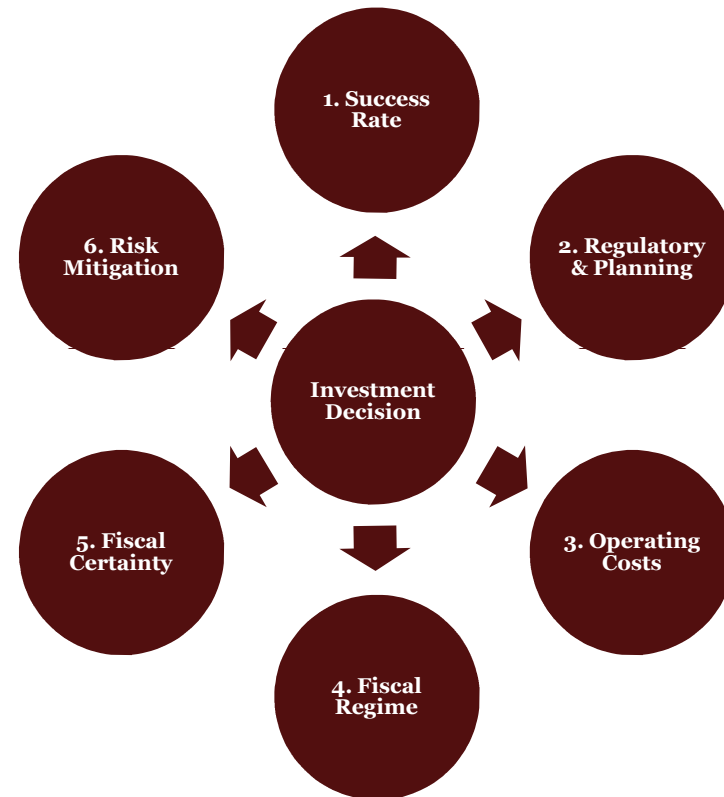


Figure 11 – Criteria for Selecting Exploration Sites



Please note: the criteria above do not all have an equal weighting in terms of importance.

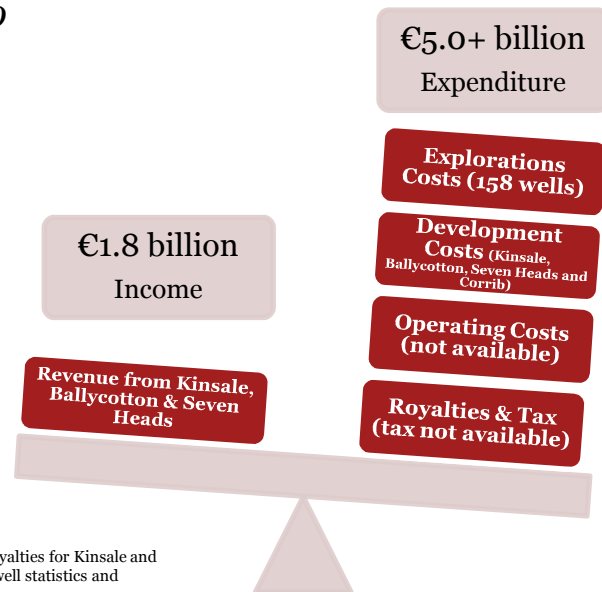
3.4 Explaining Ireland's Performance

Financial returns on industry investment have been poor, with estimated aggregate losses of over €3 billion



Rates of return on industry investments in exploration activities in Irish waters have been poor from the time when exploration first began in 1970 to the time of writing. PwC's best estimates of investment returns between 1975 and 2012, which are heavily influenced by the deferred realisation by Shell and partners of a return from the Corrib gas field in spite of a major investment programme (i.e. expenditure of approximately €2.4 billion to the end of 2011) and excludes a number of major categories of costs (e.g. tax), are shown in Figure 12. It should be noted that Irish Offshore Operator Association estimate that exploration costs to date are in the region of €3bn in today's money. However, the expenditure figures below are actual costs for exploration and development.

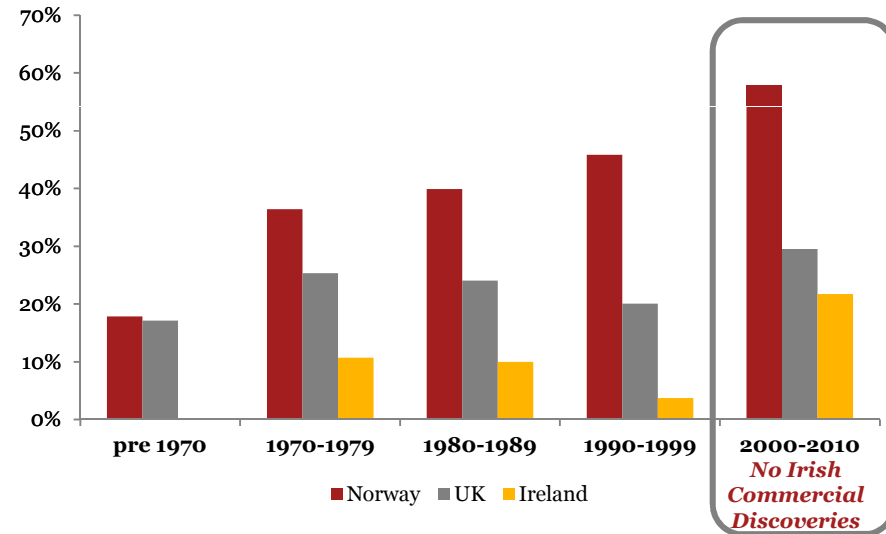
Figure 12 – Estimated Investment Return based on Actual Costs (1970 to 2012)



(Source: PwC derived based on Royalties for Kinsale and Ballycotton Fields, DCENR/PAD well statistics and various industry sources)

While the outlook for returns has improved in recent times with an uplift in the reported number of discoveries, there is no certainty as none of the Irish discoveries in the 2000s have yet been declared commercial or capable of generating revenue (see Figure 13).

Figure 13 - Probability of Making a Discovery (includes commercial and non-commercial discoveries)



(Source: DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change)

An overview of the locations of discoveries in Irish waters (commercial and otherwise) is provided in Figure 14 overleaf.

3.4 Explaining Ireland's Performance

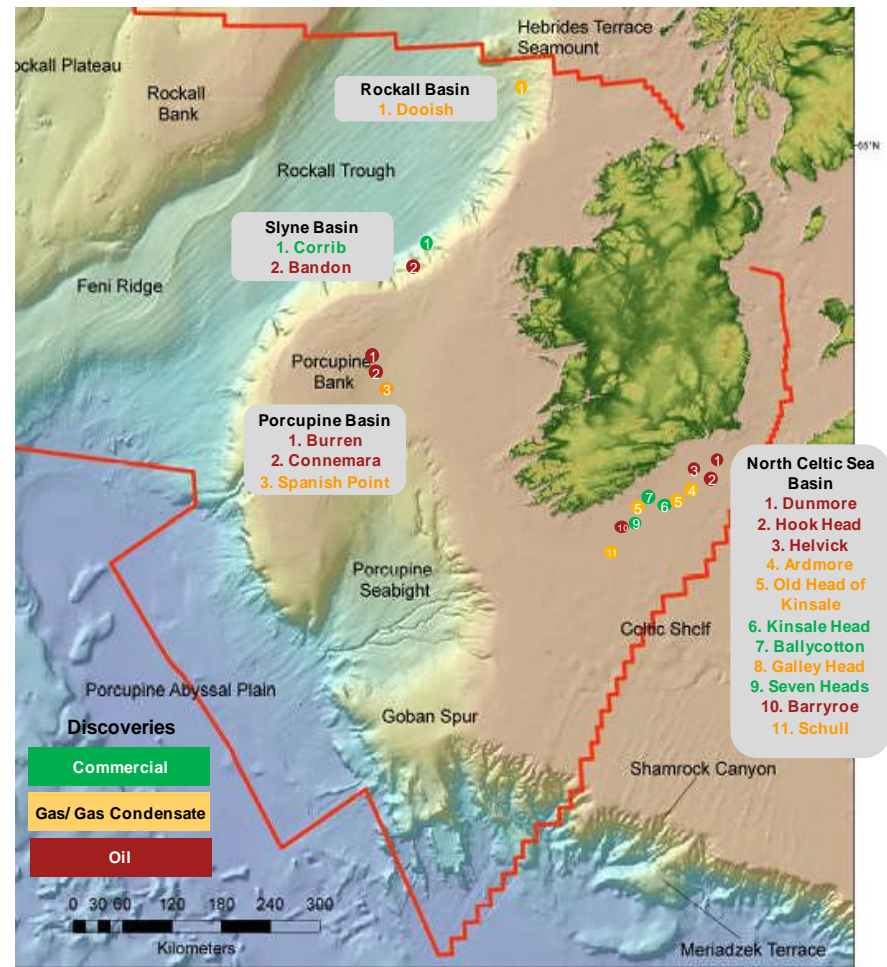
If recent non-commercial discoveries are declared commercial, Ireland's attractiveness to potential investors would improve



In the past 10 years (since 2002), 17 wells were drilled and five discoveries were made. None have, however, been declared commercial or capable of returning a profit as yet. It should be noted two of the five discoveries were “re-discoveries” as hydrocarbons had been initially discovered in the 70s and 80s and since 2011 only one well (appraisal) has been drilled.

In 2011, Providence Resources announced a successful appraisal well, Barryroe, off the South Coast of Ireland. ExxonMobil and partners (Eni, Providence Resources, Sosina Exploration and Repsol) are due to start exploration on the Dunquin prospect in 2013, and Chrysoar and partners (Providence Resources and Sosina Exploration) are preparing for an appraisal well on the Spanish Point discovery.

Figure 14 - Key Discoveries & Fields (1970 – 2012)



(Source: Petroleum Affairs Division; Marine Institute)

3.4 Explaining Ireland's Performance

Norway and the UK have enjoyed much higher success rates, Ireland has only had four commercial discoveries to date



As indicated, success is measured in a phased manner, with the likelihood of making a discovery (even if not viable) known as the technical success rate and the probability of making a discovery that can deliver profit known as the commercial success rate. The latter is, clearly, of greatest interest to investors.

There has been 129 Exploration Wells and 29 Appraisal wells drilled in Ireland since 1970. There has only been four commercial discoveries in Ireland to date. All four discoveries were gas, including Kinsale (1971); Ballycotton (1989); Seven Heads (1973, but not considered commercial at the time); and Corrib (1996).

Based on historical experiences, the probability of making a commercial discovery in Ireland is low (1 in 32) compared with Norway (1 in 7) and the UK (1 in 6). The number of wells drilled over the last ten years has been very low, averaging less than two a year. See Appendix 4 - Exploration and Appraisal Wells Drilled (1970 – 2012)

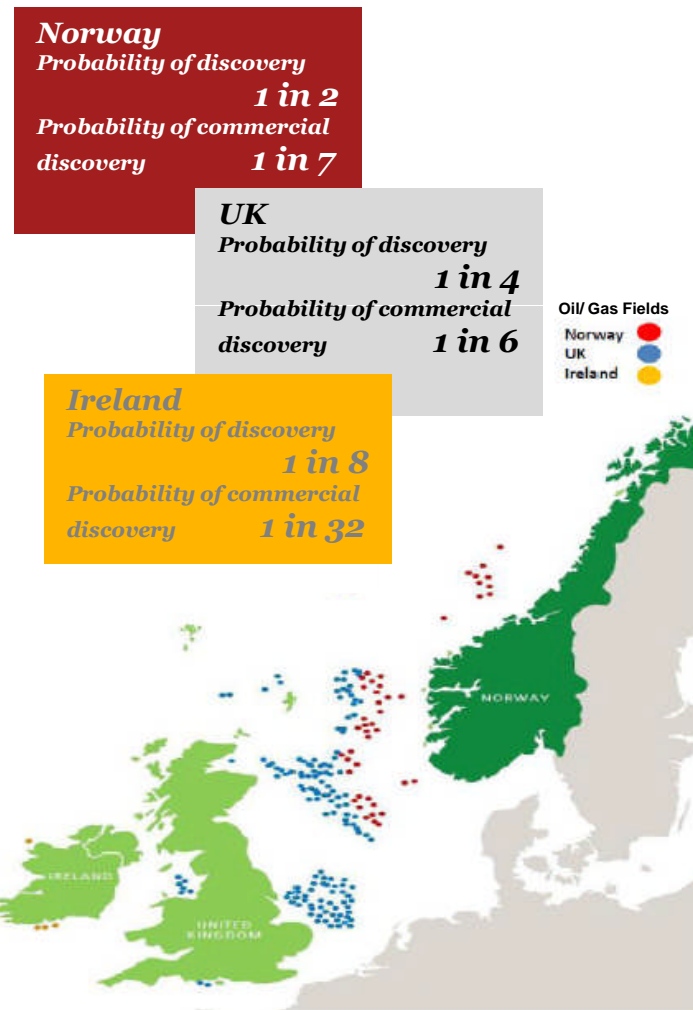
The size of the field size is also an important determinant of profit potential. Oil finds in Norway are larger than in the UK and the size of the gas finds in Norway are considerably bigger than those found in the UK or Ireland.

Figure 15 - Exploration Activity and Discoveries (late 1960's– 2012)

	Norway	UK	Ireland
Exploration Wells	899	2,408	129
Seismic Surveys Undertaken	2D - 2,090,663 km 3D - 868,167 km2 4D - 7,532 km2	n/a	2D - 370,703 km 3D - 14,118 km2
Discoveries	423	565	17
Commercial Discoveries	128	397	4
Average field size	80 mmbbl - Oil 1,080 bcf - Gas	56 mmbbl - Oil 336 bcf - Gas	na - Oil 362 bcf - Gas

(Source: DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change; Irish Offshore Operators Association)

Figure 16 - Probability of Making a Discovery



3.4 Explaining Ireland's Performance

High-profile planning issues have damaged Ireland's reputation as a credible location for exploration investment

2.
Regulatory
& Planning

The major elements of the current regulatory and planning regime which oil and gas companies consider when evaluation a location for investment are the licensing and planning regimes. With regard to the former, industry consultations indicate a broad level of satisfaction with the licensing regime as it stands with the recent introduction of licensing options for the Atlantic margin round attracting a renewed industry interest albeit with a small investment commitment.

By contrast, and excluding any consideration to the specific details of the case, high profile planning issues in respect of the Corrib gas field have reverberated loudly across the global industry and resulted in negative perceptions of Ireland.

More recently, the Kish Bank Basin situation (Dalkey Island Prospect) has compounded industry concerns in relation to the regulatory and planning regime.

Case studies of both situations are provided overleaf.

An overview of the policy network with which Providence Resources had to engage in respect of its Dalkey licence is shown in Figure 17.

Figure 17 – Government Departments & State Agencies involved in the Providence Resources Dalkey Licence (Kish Bank Basin)



(Source: PwC derived)

*It should be noted that the The National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaelteacht is responsible for the protection and conservation of Ireland's natural heritage and biodiversity.

3.4 Explaining Ireland's Performance

Corrib gas field development costs are four times higher than envisaged at €2.43 billion to end-2012

2.
Regulatory
& Planning

Case Study 1 – The Corrib Gas Field

The Corrib Gas Field was discovered in 1996 by Enterprise Oil whose assets were subsequently taken over by Shell. Gas was originally expected to flow from the field in 2003, but a very significant planning controversy arose with the result gas is not expected to flow from the field until late 2014 or early 2015, nineteen years after the field was discovered.

The controversy, which caused considerable distress and cost to all of the parties involved, materially changed the commercials of the Corrib discovery. At the end of 2011, the total spent on the project amounted to €2.43 billion with final development costs expected to be €3 billion compared with an original estimate of €800 million.

The Corrib Gas Field controversy had its origins in a planning system which was less than perfect and which provided little certainty to the oil industry in planning development projects.

It has reverberated widely across the global oil and gas industry and was frequently cited as a reason for not considering Ireland for foreign direct investment by industry experts consulted by PwC for this study.

“Failure of Government and state departments and authorities to act as independent interlocutors in respect of this project. Political interference in the statutory process has caused a sub-optimal configuration of the project.” (Source: Póbal le Chéile submission to the Joint Committee, 2012)

Case Study 2 – Dalkey (Kish Basin)

In February 2013, Providence Resources surrendered its foreshore licence for an area in the Kish Bank Basin, near Dalkey, offshore Dublin citing legislative flaws, the associated risk of legal challenge and related delay to its planned exploration activities as the reason.

Providence Resources complied with all environmental and planning regulations in applying for, and receiving, the foreshore licence, but was subsequently frustrated in obtaining a definitive legal view on licence status as a result of the incorrect transposition of certain elements of the EU's Environmental Impact Assessment Directive into Irish legislation in 1999.

Providence Resources had undertaken extensive consultations. Consultations took place with a range of agencies, groups and individuals including: Dun Laoghaire Rathdown County Council; local TDs; local businesses, community and clubs; and local residents. Copies of all the relevant application documents were placed in Dun Laoghaire and Dalkey Garda Stations. A newsletter explaining the proposals in layman's terms, accompanied by a non-technical summary of the applications documents was produced and placed in the Garda Stations as well as being made available on a dedicated page on the company's website.

In all, several months of intensive statutory and non-statutory consultations and a considerable spend, resulted in the loss of the licence on a technicality.

3.4 Explaining Ireland's Performance

In spite of improvements, the Irish regulatory and planning process is still regarded by the industry as overly complex

Operating companies need to be sure that if they make a discovery, they will be able to start generating revenues from the find in a reasonable timeframe. In order to bring a hydrocarbon discovery into production in Ireland, there are a number of formal documents and approvals that must be obtained from various national bodies. See Figure 18.

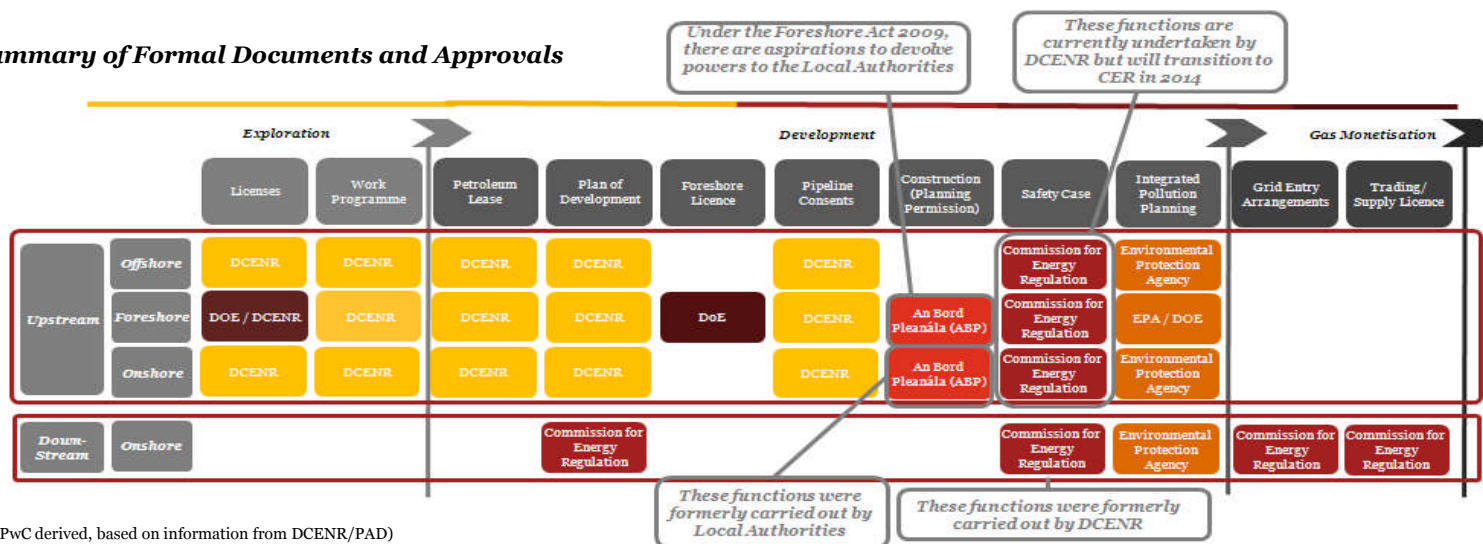
Post the issues with the Corrib project, DCENR recognised that there was a requirement for change and a number of legislative changes were made to help improve the Irish system. Previously local authorities (as is currently the case in the UK) were responsible for onshore planning permission and this has now transferred to An Bord Pleanála (Strategic Infrastructure Act, 2006). From 2014, the Commission for Energy Regulation (CER) will take over the responsibility from PAD for the regulation of safety of petroleum exploration and production (Petroleum Safety Act, 2010).

Work on a General Scheme of a Bill to modernise the foreshore consent process and integrate it within the planning system (via An Bord Pleanála) is being advanced as a priority business for the Department of Environment in 2013.

However, reflecting the untested changes made to date (particularly in relation to planning), industry are apprehensive that resolution steps taken to date are sufficient. The general industry perception is that the regulatory and planning process is still overly complex, needs to be streamlined, requires more technical expertise and competencies, and lags behind countries such as the UK and Norway (see Appendix 5 and 6), in terms of transparency and timeliness. It is generally recognised this is partially due to lower levels of industry activity.

In summary, Ireland is trending behind leading European jurisdictions on this criterion.

Figure 18 – Summary of Formal Documents and Approvals



(Source: PwC derived, based on information from DCENR/PAD)

3.4 Explaining Ireland's Performance

Ireland's challenging offshore environment and relatively undeveloped industry means higher costs for oil and gas companies

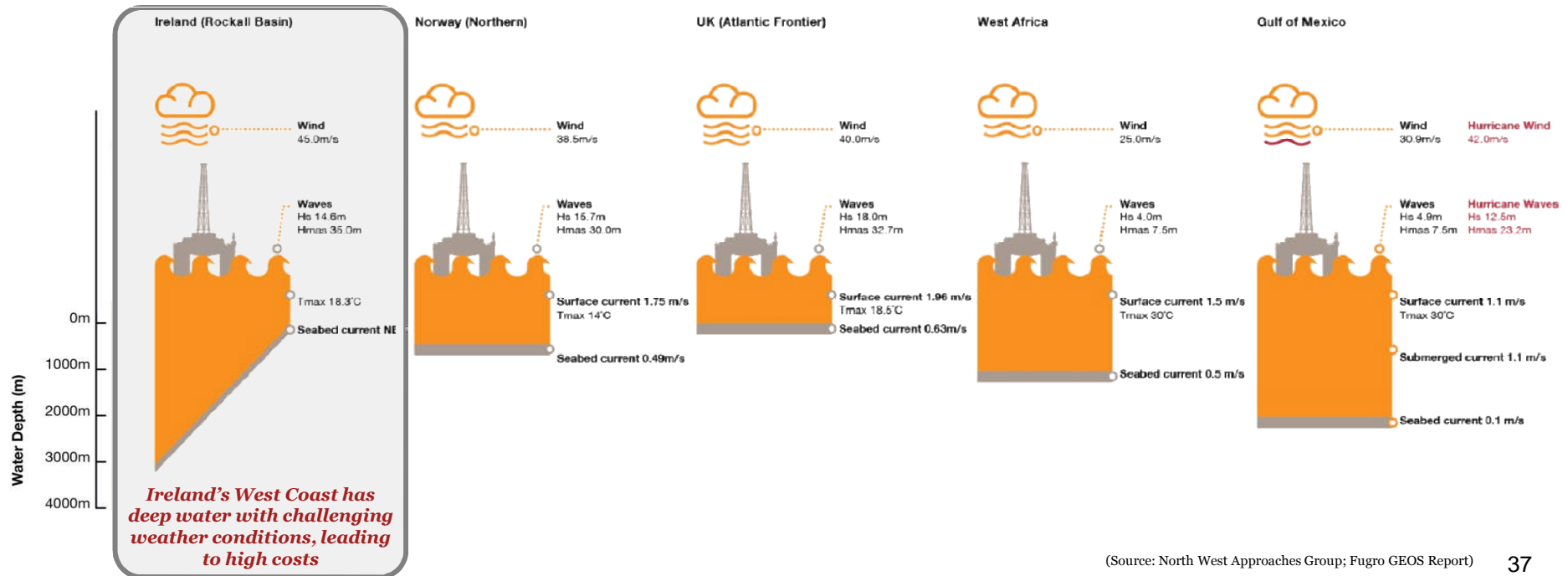


Environmental Conditions

The west coast of Ireland presents a challenging offshore environment in terms of water depth, wind and waves. Figure 19 compares maximum conditions on the west coast of Ireland (Rockall Basin) with a range of other deep water hydrocarbon basins. The Irish west coast has the deepest water, the highest winds and the highest waves, all of which translate to higher costs which, in turn, reduce the relative likelihood of a technical discovery translating to a commercial discovery.

However, the Irish West Coast is coming more in reach due to technological advances which allows for drilling and production in deep water basins. Nevertheless, deep water drilling costs are still higher reflecting, in part, the need to source equipment from remote locations. DCENR estimate the cost of drilling a single hole in the deeper water basins off the west of Ireland could cost over €100 million. This is considerably higher than in the Irish Sea or the Norwegian or UK continental shelves.

Figure 19 – Deep Water Field Developments – Comparison of Basin Conditions



(Source: North West Approaches Group; Fugro GEOS Report)

3.4 Explaining Ireland's Performance

A lack of offshore infrastructure and few Irish specialist suppliers also mean higher costs than elsewhere

Pipeline Distribution Network (see Figure 20)

- There are no oil pipelines offshore Ireland. The gas pipeline network is owned and operated by BGE. It consists of 13,403km transmission and distribution networks. Producers can chose to link into the network at almost any point in the network.
- Unlike offshore UK and Norway which have vast and well established networks of oil and gas pipelines, Ireland does not have an extensive network of offshore pipelines. Therefore the cost of development in Ireland is considerably more expensive as operators do not have the option to hook up to an existing pipeline.
- Gas can be delivered into the onshore network via existing processing facilities at Inch (Cork) or Bellanaboy (Mayo), subject to agreement with terminal owners (Marathon and Shell respectively).
- Two interconnector pipelines link Ireland with Scotland. Currently no regulatory provisions are in place for the export of gas.

Specialist Equipment

- Specialist equipment represents a significant cost in the exploration, development and production phases of the oil and gas lifecycle. It includes rigs, drills, support vessels, and fire and safety equipment.
- Ireland does not have any major indigenous suppliers, unlike the situation in Norway and the UK.
- Specialist equipment is generally sourced from abroad and transported to the offshore site e.g. the rig for the Dunquin project travelled from Africa. There is a high cost associated with transporting these rigs.
- The time-lag to get a discovery to market, however, allows for specialist industry to ramp up where required. There are a number of Irish firms which would be able to ramp up in the event of a major oil or gas find e.g. some engineering companies.

Figure 20 – Pipeline Network Ireland and UK



(Source: www.theodora.com)

- Oil pipeline
- - - Oil pipeline (planned under construction)
- Gas Pipeline
- Products Pipeline
- - - Products Pipeline (planned/ under construction)

3.4 Explaining Ireland's Performance

The maximum Irish headline rate of tax is low relative to leading oil and gas producing nations such as the UK and Norway



The fiscal terms attaching to the oil and gas industry, which extend beyond headline rates of tax to include considerations such as rules regarding the tax write-down of exploration costs, are also an important consideration in choosing a location for oil and gas exploration. Ireland's fiscal regime is significantly more attractive than that of the most established players in the oil and gas exploration market (i.e. UK, Norway and the Netherlands) and on a par with that of other sector tier players (see Figure 21 and Figure 22).

Figure 21 - High-level Overview of Fiscal Terms for Oil & Gas Exploration

Country	Headline Tax Rate	Maximum Tax Rate	Losses	Write down of Capex	Royalties Payable	Public /Private Risk Sharing
Ireland	25% (+ up to 15% PRRT)	40%	Carry forward of losses for offset against profits arising on the same trade, indefinitely. Potential for carry back and group relief in certain instances.	100% allowances for exploration expenditure and development expenditure subject to certain criteria being met.	None	-
Norway	28%, plus 50% Special Tax (78%)	78%	Carry forward of losses for offset against profits arising on the same, indefinitely with interest.	The value of deductions comprise of depreciation (100% of investments linear over 6 years in 78% tax basis), plus an additional uplift (30% uplift (7.5% each year for four years) in 50% special tax basis). The combined write down means a deduction for 130% of the capital costs or, in other words, the capital costs attract tax relief at an effective rate of 93%.	None	<ul style="list-style-type: none"> • Direct investment in producing fields • Refund of tax value of unsuccessful well.
UK	30%, plus 32% supplementary charge (62%)	75% for pre'93 fields	Carry forward of losses for offset against profits arising on the same trade, indefinitely. Potential for carry back and group relief in certain instances.	100% allowance for exploration expenditure and development expenditure subject to certain criteria being met.	None	-
Netherlands	25% + 50% State Profit Share (SPS) levy (a surface rental tax also applies of up to €703 per kmz)	70%	3 year carry back, indefinite carry forward	Immediate write-off for exploration costs for certain capital investments relating to qualifying gas fields. An investment allowance of 25% is also available against the 50% SPS levy for certain capital investments.	0-8%	-

(Source: Ernst & Young 2012 Global Oil and Gas Tax Guide)

3.4 Explaining Ireland's Performance

Ireland's maximum headline rate of taxation is closer to that of France, Portugal and Morocco where there is low production rates



Figure 21 - High-level Overview of Fiscal Terms for Oil & Gas Exploration (Cont'd)

Country	Headline Tax Rate	Maximum Tax Rate	Losses	Write down of Capex	Royalties Payable	Public /Private Risk Sharing
Ireland	25% (+ up to 15% PRRT)	40%	Carry forward of losses for offset against profits arising on the same trade, indefinitely. Potential for carry back and group relief in certain instances.	100% allowances for exploration expenditure and development expenditure subject to certain criteria being met.	None	-
France	36.1%	36.1%	Indefinitely, the amount which can be offset against profits in a given year is capped at 50% of those profits.	Various rules depending on type of expenditure	0-20% (for pre 1980 wells) 1-12% (for post 1980 wells)	-
Portugal	25% (and surcharges of 4.5-6.5%)	31.5%	Carry forward period of 5 years but limited to 75% of the taxable profit assessed in the relevant fiscal year.	Up to 5 years	None	-
Morocco	30% (Ten year corporate tax holiday on discovery. After 10 years, the corporate tax rate is 30%. A 10% branch remittance tax is imposed on profits remitted to the head office of a non-resident)	30%	Tax losses may be carried forward for 4 years from the end of the loss-making accounting period. However, the portion of losses that relate to depreciation may be carried forward indefinitely. Losses may not be carried back.	Capital allowances are generally available over a 4-7 year period.	Depends on water depth: 7%-10% for oil and 3.5-5% for gas. The first approximately 2.1 million barrels of oil production and 11 billion cubic feet of gas production are exempt from Royalty.	During exploration phase, licensee operates and bears 100% of the costs to earn a 75% interest (25% to Moroccan government). Once a discovery is made, the area covered by the discovery is converted into an exploitation concession. Under this concession, licensee (75%) and Moroccan government (25%) each pay their share of costs.

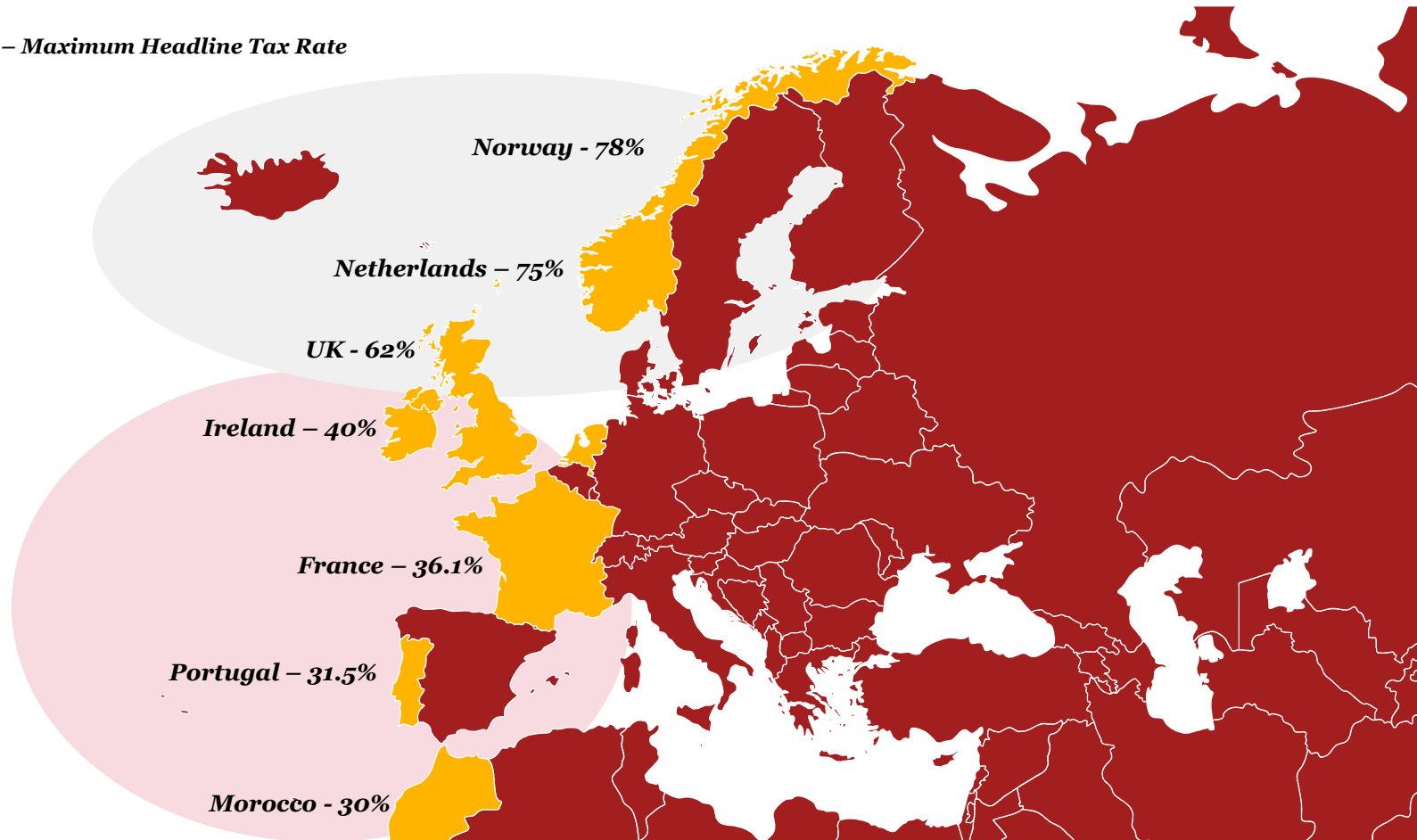
(Source: Ernst & Young 2012 Global Oil and Gas Tax Guide)

Some alternative tax and non-tax fiscal regimes are described in Appendix 7. The evolution of the UK and Norway fiscal regimes are outlined in Appendix 8.

3.4 Explaining Ireland's Performance

There is a broad correlation between state of establishment of the industry and the maximum headline rate of taxation

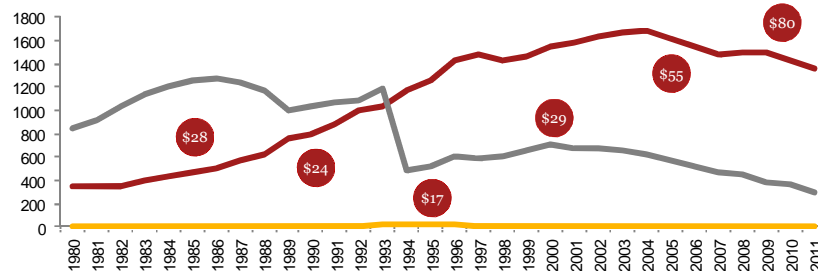
Figure 22 – Maximum Headline Tax Rate



3.4 Explaining Ireland's Performance

Norway's tax take is high in line with production rates. Despite decreasing production in the UK tax was increased, but subsequently had to introduce counteractive tax breaks

Figure 23 - Production Rate (million barrels of oil equivalent / Brent Oil Price (\$ per barrel)



Norway

Norway had commercial finds early on, leading to significant production levels from the outset of the industry. This has allowed the fiscal system introduced at the beginning to remain relatively stable over time.

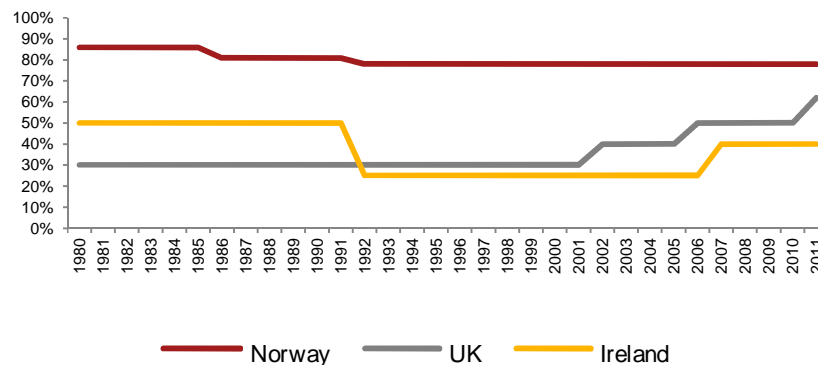
UK

In contrast to the Norwegian Government the British government moved quickly to adopt a fast depletion policy. Production rates are currently lower than they were in the 1990s. Governments have introduced successive tax hikes since 2001. In its Budget 2011 the British Government increased the corporation tax on the oil and gas sector by 12%, bringing it up to 62%. The UK Select Committee warned that the decision to increase the tax, less than a year after they had undertaken to provide a “stable” tax regime in the sector, may weaken the Government’s credibility. The State subsequently introduced tax breaks to offset the negative impact of the retrospective taxation.

Ireland

Ireland has not produced any oil to date. In 1992, corporation tax was reduced from 50% to 25%, on the basis that extracting resources from Irish water was difficult and oil companies needed further encouragement to come to Ireland. The tax regime was reviewed again in 2007 and an additional profit resources rent tax added (PRRT) to ensure a greater return to the State, while maintaining the incentive for companies to explore in offshore Ireland. Despite the tax rate, Ireland still has no oil production.

Figure 24 –Tax Evolution (Headline Maximum Tax Rate)



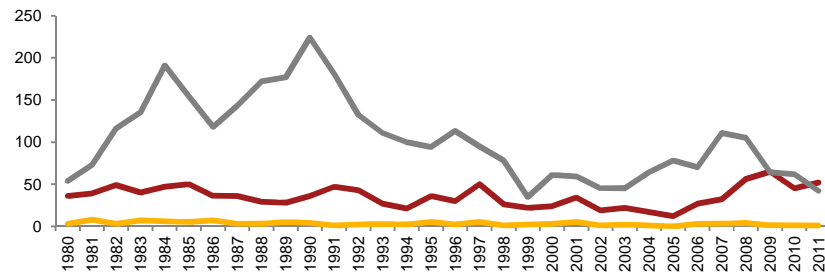
(Source: US Energy Information Administration; Forbes; DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change)

3.4 Explaining Ireland's Performance

Fiscal terms are often used to encourage investment when there are competitive challenges in other aspects of the environment



Figure 25 – Exploration Activity (Exploration & Appraisal Wells)



Norway

The number of exploration wells drilled per annum has remained relatively stable over the years due to early and continued commercial finds and the controlled exploitation of Norway's national assets. Since 2005, the Norwegian government underwrites failed exploration activity.

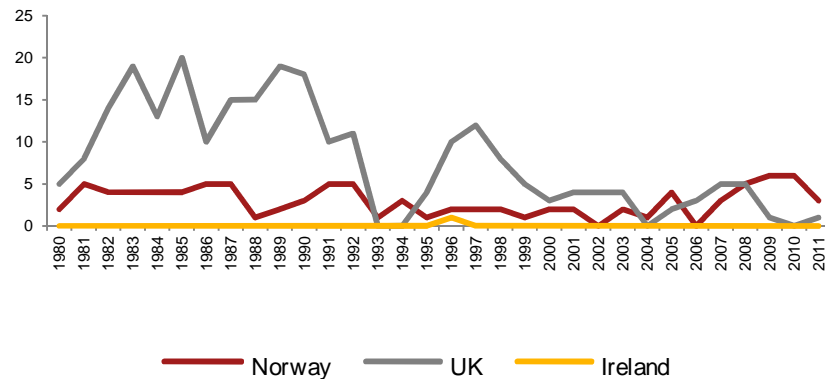
UK

Exploration activity was very high in the 1980s in line with commercial success, and is now decreasing. However, demand for licences is still high i.e. 224 applied for in the 2012 round.

Ireland

Exploration activity has always been much lower than in Norway and the UK due to a lack of commercial discoveries. The number of exploration licences in Ireland was at its lowest in 1992, at which point the corporation tax was reduced. The changes were introduced to attract greater exploration activity. However, this did not transpire and only 23 wells were drilled between 1993 and 2007, when PRRT tax was introduced. Since then, only four exploration wells have been drilled. Changes in the Irish fiscal systems over the years have not had the required impact, pointing clearly that there are other issues at play.

Figure 26 – Successful Wells (Year of Discovery)



(Source: DCENR/PAD; Norwegian Petroleum Directorate; Department of Energy & Climate Change)

3.4 Explaining Ireland's Performance

Certainty on future fiscal treatment in the event of a commercial discovery is also a key consideration

For many years, the leading practice in planning for and executing major oil and gas capital projects was based on building or spending one's way into the market. However, there is a renewed focus on the complete life cycle of a capital project. Oil and Gas companies focus on predictability, transparency and reliability.

The fiscal bargain is the trade of the investors capital, technology, and know-how in return for a share of the profits of the development. It is recognised that investors place a good deal of value on fiscal stability and certainty. There are four distinct ways in which governments can increase their take and assert greater control over the natural resources after the investment risk has been assumed by the private sector interest. These are shown in Figure 27.

Figure 27 – Methods for Adjusting Tax Take

Increase take for future investments (usually not instituted through legislation)
e.g. Gulf of Mexico, Angola, Indonesia

Renegotiation of individual contracts (usually under threat of licence revocation or refusal to grant permits)
e.g. Russia, Kazakhstan, Libya

Retrospective increase (increase take for existing as well as future investments)
e.g. UK, Alaska, Alberta Canada, Russia, Nigeria, China

Renegotiation and outright nationalisation (usually applied to the whole oil and gas sector)
e.g. Venezuela

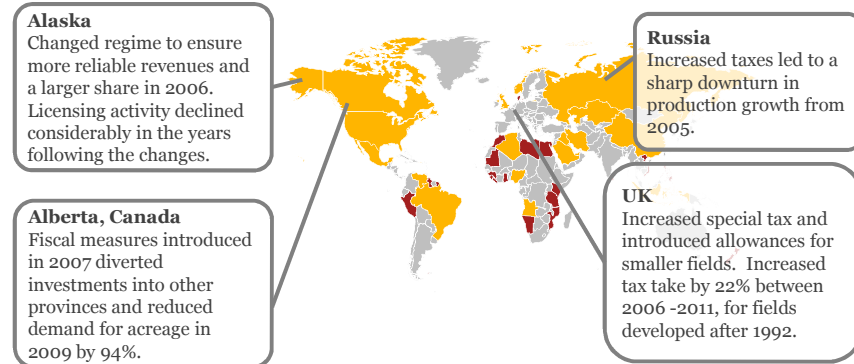
(Source: IHS CERA)

Generally, retrospective taxation is only introduced in countries with proven exploration and production success, with the UK, Alaska, Russia and Alberta (Canada) having imposed new tax terms on oil and gas companies after the exploration risk had been assumed (see Figure 28).

The introduction of retrospective taxation can clearly benefit the State in the form of higher tax revenues, but these benefits need to be balanced against associated credibility issues in the industry with negative implications for investment even in countries which are otherwise very attractive to investors.

5. Fiscal Certainty

Figure 28 – Spotlight on Retrospective Fiscal Changes



(Source: IHS CERA)

In the UK, after the 2011 tax increases were introduced, some operators put their developments on hold and the demand for licenses in 2012 decreased (albeit minimally). As mentioned earlier, the State subsequently introduced tax breaks to offset the negative impact of the retrospective taxation.

Reflecting this, most expert commentators advise against the imposition of retrospective taxation while acknowledging that the fiscal terms attaching to new licences can and should evolve in line with the overall attractiveness of the investment location. In Ireland, these include the Joint Committee on Communication, Natural Resources and Agriculture which recommended in a 2012 report that retrospective taxation should not be introduced.

While Ireland has not introduced retrospective taxation, the significant debate on the issue of the tax treatment of the industry has engendered a degree of industry nervousness on the matter which, in many respects, offsets the benefits of an otherwise attractive fiscal regime. If Ireland was to introduce retrospective tax changes for the oil and gas sector, this could also potentially have a negative impact on the perception of Ireland's stable regime for FDI (i.e. 12.5% standard corporation tax).

3.4 Explaining Ireland's Performance

Public policies which mitigate and/ or underwrite investment risk help to attract oil & gas exploration interests

6. Risk
Mitigation

Policymakers can help reduce the risk attaching to very significant exploration costs in primary ways, namely:

- provide detailed seismic data which allows for an informed assessment by the investor of the likelihood of a technical or commercial success; and
- subject to meeting licence terms and assuming no profit from production activity, the full or partial reimbursement by the State of exploration costs.

With regard to the former, Ireland offers relatively limited seismic data to would-be investors in exploration activity in Ireland waters although there are initiatives in train to partially address this issue (see Box 2). DCENR has attributed a lack of applications for deeper water areas in the 2011 licensing round in part to a paucity of data. However, based on consultations with industry, other issues seem to be more critical.

The lack of information is reflective, to some extent, of a relative low levels of drilling. All licencees that drill in the Irish offshore have to pass their technical data and exploration surveys onto DCENR/PAD. In turn DCENR/PAD makes certain technical information available to bona fide exploration companies as soon as the confidentiality period (generally four years to seven years) has expired with the licensees.

With regard to the latter, a feature of the Norwegian fiscal regime for the oil and gas industry is the fact that the State underwrites the exploration costs of unsuccessful oil and gas exploration companies to the tune of 78%. In Ireland, these costs can only be written off against tax if a subsequent commercial discovery results in profit. Reflecting this risk-sharing mechanism, only a small number of “big bet” licences are offered in Norway with the assessment of risk based on comprehensive seismic data held by the State.

Box 2 Seismic Research Initiatives

- In 2012, a team of leading researchers from academia, government, and industry from Ireland and Canada completed the first year of a two-year study to develop a New Kinematic Plate Reconstruction of the North Atlantic between Ireland and Canada.
- In 2013, a large seismic research study covering up to 18,000 kms is being carried out in the North Atlantic. This is a joint venture between ENI (Italian Oil and Gas Company) and DCENR, at a cost of over €15 million. It is expected all the raw data will be gathered by the end of 2013 and then made available to investors.

3.4 Explaining Ireland’s Performance

Reflecting comprehensive seismic data, higher success rates and risk-sharing mechanisms, Norway offers better return potential than Ireland in spite of higher taxation

Figure 29 – Example High-Level Comparator Model - Norway vs Ireland (colour coded from a private investors perspective)

	Norway	Ireland
Number of wells drilled	7	32
Commercial discoveries	1	1
Assumed average cost per exploration well	€40m	€60m
State investment (assumed 20% in Norway)	€56m	€0
Assumed private sector investment in exploration	€224m	€1,920m
Headline maximum tax rate	78%	40%
Private sector profit	€3,293	€10,422
Post tax profit: exploration investment	15:1	5:1
Investment Risk	Significantly reduced by virtue of State assuming a majority risk in exploration costs.	Investment risks are very high relative to Norway, reflecting full private sector assumption of risk, higher drilling costs and low rates of exploration success in absolute and relative terms.
Exploration & Development Cost Write-Off	130% for exploration and development costs, plus supplementary depreciation (uplift).	100% allowance for exploration & development expenditure if successful.

Key findings Norway:

- Success Rate in Norway of 1 in 7.
- State assumes high percentage of the risk of exploration e.g. the State invests up-front and underwrites the exploration costs of unsuccessful oil and gas exploration companies to the tune of 78%.
- Higher tax rate than Ireland.
- Taking success rate into account, Norway still provides a better return on exploration investment than Ireland.

Key findings Ireland:

- Success Rate in Ireland of 1 in 32.
- Private sector assumes full risks of exploration.
- Lower tax rate than Norway.
- Taking success rate into account, Ireland provides a poorer return on exploration investment than Norway.

(Source: PwC derived)

3.5 How Attractive is Ireland?

Notwithstanding attractive fiscal terms, Ireland is still considerably less attractive in the round than other European locations with very high rates of headline taxation for the oil and gas industry

Based on extensive consultation and research, figure 30 presents a summary assessment of the attractiveness of Ireland as a location for mobile exploration investment relative to those two jurisdictions which have relatively high headline rates of taxation, i.e. the Norway and the UK.

Figure 30 - Evaluation of the Relative Attractiveness of Ireland to the Oil & Gas Industry

Investment Criteria		<i>Ireland</i>	<i>Norway</i>	<i>UK</i>
1	What is the likelihood of making a commercial discovery?	●	●	●
2	Is the planning and regulatory regime conducive to doing business?	●	●	●
3	What are the likely exploration and development costs?	●	●	●
4	What annual tax rates will apply to profits?	●	●	●
5	How stable is the fiscal regime?	●	●	●
6	Will the State underwrite my risk in any way?	●	●	●

3.5 How Attractive is Ireland?

Benefits of our fiscal regime are being undermined by consistent speculation regarding radical change and by ongoing industry concerns about the regulatory challenges of doing business in Ireland

Ireland is assessed as a less attractive location for oil and gas industry investment than the Norway or UK, both of which have substantially higher headline rates of taxation. The factors underpinning this assessment are as follows:

- low success rates in absolute and relative terms;
- perception that Ireland presents significant planning and regulatory challenges;
- relative high exploration, development and production costs;
- uncertainty regarding the future fiscal regime; and
- limited risk mitigation strategy and no risk sharing.

Certain of Ireland's competitive constraints are within the gift of policy makers (e.g. planning and regulatory regime, stable fiscal regime), albeit with potentially significant associated costs, while others are simply a function of geology and the current state of development of the oil and gas industry.

Chapter 4

Potential National Economic Return from the Oil and Gas Industry

4.1 Introduction

This chapter examines the potential for a significant national economic return from the oil and gas industry in Ireland. It comprises four additional sections, the next of which describes the industry development cycle.

Section 4.3 profiles, at a high level, the potential economic return from the industry, while Section 4.4 presents tangible evidence of their existence at two case study locations. The potential economic return to Ireland, assuming a critical mass of production and development activity, is the subject of Section 4.5.

4.2 Oil and Gas Sector Development Cycle

A failure to attract significant levels of offshore exploration activity is constraining the typical industry development cycle

Assuming the existence of significant hydrocarbon reserves in Irish waters, more intense exploration activity will be required before the full potential of the industry can be realised. A piecemeal effort as exists at present means that, even in the event of a major discovery, many of the economic benefits will flow to specialist providers of product and services located outside the State (details of Ireland's current onshore support infrastructures are outlined in Appendix 9).

Evidence of low levels of exploration activity are found in the facts that in the ten year period from 2002 to 2011:

- an average of 1.7 wells were drilled in Ireland per year;
- an average of 35 wells were drilled per year in Norway; and
- an average of 69 wells were drilled per year in the UK.

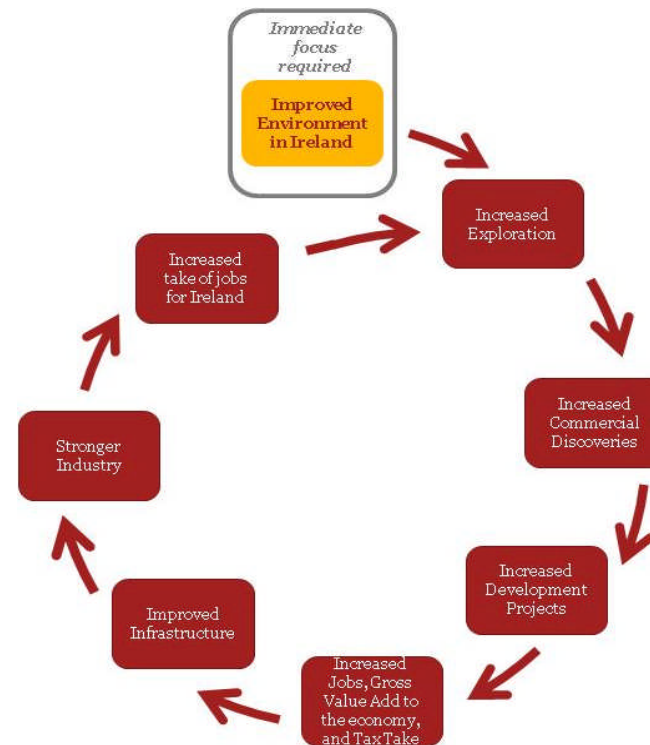
It is obvious, other things being equal, that the incidence of commercial discovery will rise with exploration activity, with the ratio between exploration and success rising in line with the quality of seismic data available to the industry. The oil and gas industry is highly specialised in terms of its supply needs and a minimum critical mass of activity is typically required before serious economic benefits (stemming from the establishment of a substantial indigenous industry) can start to flow. While success rates are low and temporally dispersed (we have had no commercial discovery in more than 15 years), economics dictate that the oil and gas industry source from specialist suppliers in neighbouring jurisdictions. The typical development cycle of the industry (see Figure 31) is being stalled in Ireland at the earliest stages.

“Ireland needs to see an increase in exploration activity and exploration drilling in particular, if the petroleum potential of our offshore is to be realised”

(Source: Pat Rabbitte, Minister for Communications, Energy and Natural Resources, Announcement of results of 2011 Atlantic Margin Licensing Round, October 2011)

Evidence of the economic potential of industry is provided in the remainder of this chapter. Key points of note are that serious economic benefits can flow even where there is no onshore refinement and policy initiatives required for industry development are more enabling in nature than interventionist.

Figure 31 - Industry Development Cycle

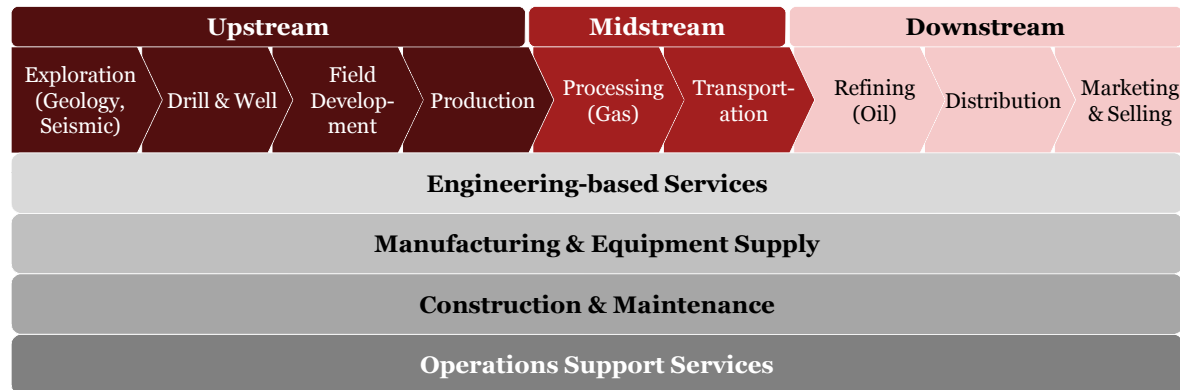


4.3 Profile of National & Local Economic Benefits

A commercial hydrocarbon discovery can generate major benefits for national and local economies

The discovery of oil and/or gas of a commercial scale can generate major benefits for local and national economies. The oil and gas industry value chain is divided into three phases (see Figure 32). Excluding any consideration of tax take, local economies can benefit from substantial additional local economy expenditures and jobs across all three phases.

Figure 32 – The Oil and Gas Industry Value Chain



A profile of the type and size of indigenous industries servicing the upstream end of the oil and gas industry value chain is shown in Figure 33.

Before these benefits can be realised, however, a critical mass of activity starting with exploration is needed. Thereafter, and in a relatively compressed time period, an indigenous supply base can develop and prosper.

Figure 33 – Upstream Sub Clusters in Norway (Companies and Employees)

Sub Cluster	Product Description	# Co.	# Employees
Operators	Hold production licence or have operating right for Oil and gas fields e.g. Statoil. Operators employ the suppliers listed below for products and services for Upstream activities.	223	22,000
Topside	Construction of offshore related vessels; surface installations and maintenance and modification of onshore and offshore production facilities	404	43,000
Operations Supplies	Engineering-based services – firms providing operational support and firms offering personnel for operations support	1,393	34,000
Drill & Well	Running drill & well operations, manufacturing of drill & well equipments, equipment supply, administration of rigs	235	20,000
Subsea	Technology for exploration, drilling and development of oil and gas fields in underwater locations	96	13,000
Geology/ Seismic	Computer-assisted modelling of reservoir data and acquisition and processing of seismic data	149	4,000
Total		2,500	136,000

(Source: Harvard Business School, Norway, Oil & Gas Cluster, May 2012)

4.3 Profile of National & Local Economic Benefits

No silver bullet in terms of policy approach, but a sustained commitment to industry development is a common feature of successful locations

Both Norway and UK had major commercial finds early on, in the early 1970s. Different approaches were taken to the development of the industries in these jurisdictions, but both have reaped major economic benefit. However, it took a considerable period of time for both countries to develop their respective industries to where they are today.

From the earliest days, the Norwegians saw oil as a national asset to be managed carefully. Norway's Government appreciated the importance of a national oil policy, and adopted principles around national supervision and control and state involvement. Security of supply was also important from the outset, petroleum discoveries were to be exploited in a way that made Norway as independent as possible for its supplies of crude oil, however, resources far exceeded Norway's own needs. The country accordingly became a major exporter of crude oil, and is now in the process of becoming an even bigger source of gas exports. Norway will be independent of oil imports for the foreseeable future (Source: Norwegian Petroleum Directorate, Dec 2010). In the early years of the industry the government also implemented protectionist procurement policies, which allowed the Ministry to ensure Norwegian suppliers were awarded contracts. It is important to note that since Norway joined the EU's internal market within the EEA (European Economic Area) in 1993, these policies are no longer allowed. However, Norwegian companies had already built up the technical knowledge of the industry. State involvement and high industry activity has also allowed the civil servants to gain extensive knowledge to productively steer the management of the oil and gas industry. Norwegians always point out the stability of the regime is important as is a deeply collaborative approach between the State and private sector interests in the quantification and management of investment risk.

By contrast, the UK policy approach was less interventionist. Rather, the focus has been on providing a positive enabling environment in pursuance of a policy of fast depletion. There is limited risk-sharing and/ or public investment, rather industry enablement has been the key to policy success. As with the EU, the British Government has a policy objective of security of energy supply. The UK's Continental Shelf (UKCS) satisfied 49% of the country's primary energy demand and the production of oil and gas boosted the balance of payments by approximately €47 billion in 2011 (Source: *Oil and Gas UK, Economic Report 2012*). However, production levels in the UK are decreasing and imports are increasing. In 2011, the UK imported more natural gas than it produced, this was the first time this had happened since 1967.

The scale accruing to Norway and the UK is evidenced below, with detailed local economy case studies (including two from Ireland – which show that some benefit is already been derived) provided in the next section.

Norway Oil & Gas Statistics

- **250,000** - direct, indirect and induced jobs in Norway
- **45,000** - people employed in Stavanger region
- **€61,700** - the average salary in Norway (€36,000 in Ireland - Source: CSO, 2012)
- **69,000** - recent job openings in Norway
- **23%** - industry contribution to Norway's GDP
- **2nd** - highest GDP per capita in the OECD

UK Oil & Gas Statistics

- **440,000** – 340,000 (direct, indirect and induced jobs) & 100,000 (exporting goods and services jobs) in the UK
- **137,300** – direct, indirect and induced jobs the Aberdeen Shire
- **15%** - higher (Aberdeen salaries) than the average earnings in the UK
- **15%** - industry contribution to the Scottish GVA
- **1,000** - companies in Aberdeen that operate wholly or predominately in the energy sector

(Source: Please refer to case studies overleaf)

4.4 Case Studies – Stavanger, Norway

Stavanger is home to Norway's official administrative centre; Statoil; the majority of international operators and 280 oil service companies

Background

Norway is the sixth largest oil producer in the world and the third largest oil exporter in the world. The total oil and gas resources is 13 billion boe of which 2.7 billion boe has been produced to date. In coming years, Norway will supply approximately 25 % of Europe's gas requirements Norway plans to become the primary UK gas supplier through new and existing pipelines.

The Norwegian State is directly involved in oil and gas production through its shareholding in Statoil (67% - Statoil was floated on the stock exchange in 2001). It was merged with the oil and gas part of Norsk Hydro in October 2007. The State also has direct investments in transport systems (including pipelines) and land-based plants.

Stavanger is the 4th largest city in Norway. The region has approximately 300,000 inhabitants. Stavanger is a so called “Oil Capital.” In 1969 the first oil field was discovered at Ekofisk, in the North Sea, and production began in 1971 which made the Stavanger Region a key player in the Norwegian economy.

Stavanger now is home to Statoil, the majority of major international oil and gas operators, approximately 280 oil service companies, all the main suppliers along with Norway's official administrative centre for the petroleum industry. Both the Norwegian Petroleum Directorate and the Petroleum Safety Authority Norway are located in Stavanger.

Stavanger nurtures a strong research and development environment anchored around the university and numerous research centres developing cutting edge technology in several fields, such as, remote operations, underwater operations and drilling.

Figure 34 – Stavanger Location



4.4 Case Studies – Stavanger, Norway

Norway's policy orientation from the start was focused on maintaining involvement in the oil sector, as opposed to simply maximizing revenue

Government Interventions

From the earliest days, the Norwegians saw oil as a national asset to be managed carefully. Norway's Government appreciated the importance of a national oil policy, and **adopted 10 basic principles** in 1972. The principles included: **national supervision and control**; that Norway be as **independent as possible** of others for its supplies of crude oil; **protection of nature and the environment**; petroleum must as a general rule be **landed in Norway** (with some exceptions); **State must become involved** at all appropriate levels and contribute to a coordination of Norwegian interests creation of an **integrated oil community** and a **state oil company** would be established. There have not been any significant changes to the basic law since it was set. The **stability of its regime is important**.

In 1972, **Statoil, a 100% owned national oil company** was established (today the Norwegian government owns 67%) and a **Norwegian Petroleum Directorate (NDP)**. The Directorate was charged with the management and control of Norway's oil and gas resources, building a Norwegian oil community and ensuring state participation. A decision was made to concentrate industry-related institutions e.g. Statoil and NDP in Stavanger.

In 1973, when Mobil discovered the Statfjord field, they were required to **bring Statoil in as a 50% partner** in the development of the field which secured Statoil's future for 20 years. As a part of the deal **Mobil had to train the Statoil employees** and this led to the development of an **indigenous expert oil industry**. The government also implemented **protectionist procurement policies** in the 1970s i.e. operators were legally required to inform the Ministry of Petroleum and Energy about suppliers bids, the Ministry could demand that specific Norwegian firms be included on the bidder list and also had the authority to change who was awarded the contract, allowing Norwegians to build up the technical know-how. **However, these policies were removed when Norway joined the EU's internal market with the EEA (European Economic Area) agreement in 1993.**

Local authorities **worked hard to prepare the infrastructure** necessary to attract foreign companies. Early on education and research capabilities were also established in Stavanger.

Since 1991, Statoil has operated a program to develop and support innovative supply companies, providing the opportunity for local companies to develop. Statoil played a major role in co-ordinating collaboration as a user, project sponsor and provider of information and expertise.

Civil servants gained knowledge of petroleum to regulate the sector through systematic efforts to build up their own independent competence, enabling them to productively steer the political discourse on petroleum management after the first commercial oil discovery was made.

Infrastructure

- Risavika Harbour is located near Stavanger, and is a regional, national and international logistical hub. It is the country's largest natural harbour area.
- Stavanger Airport Sola is Norway's **second largest airport** when it comes to international flights. The Airport had 4.4 million passengers in 2012 (Source: Norwegian, Avinor Airport Statistics).
- In 2008 the Ganddal Freight Terminal opened. It is the major logistics rail shipping link in the region.
- The University of Stavanger (UiS) was established in 1969, and saw its role in serving the educational needs of the local industry and developed key capabilities in relevant fields such as petroleum and engineering. Rogaland Research (RF) was established in 1973 by the regional authorities, originally as the research arm of the college, but soon developed into an independent research institute with the capacity to undertake applied research and testing in the oil and gas industry.

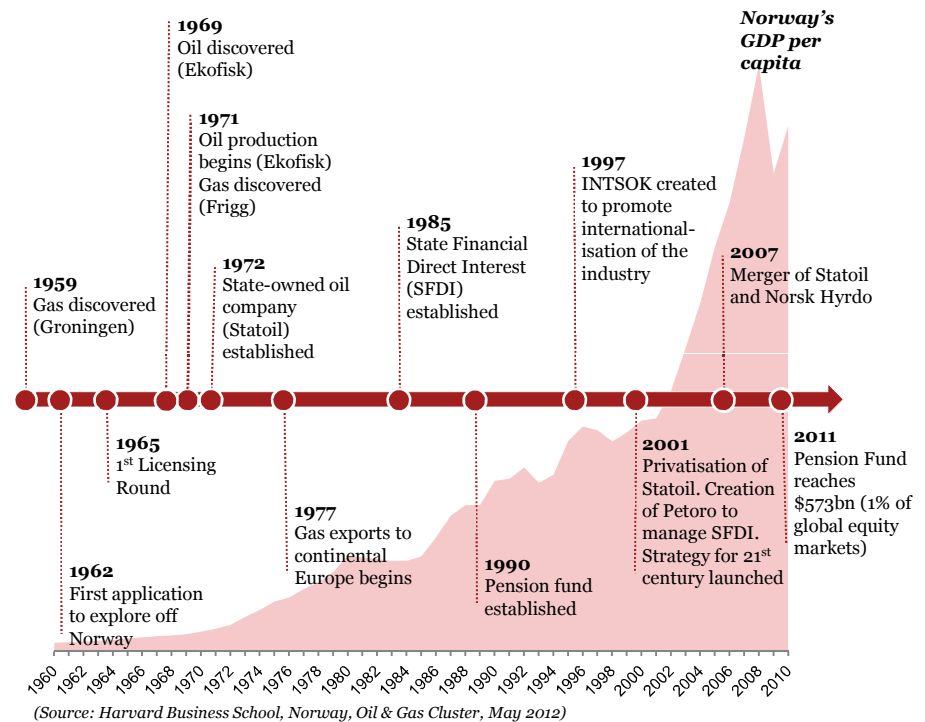
4.4 Case Studies – Stavanger, Norway

The oil and gas industry has dramatically transformed the Norwegian economy and, particularly, that of Stavanger

Economic Impacts

- The oil and gas sector in Norway employed approximately **49,000 people directly** in 2010 (Source: Norway Statistics).
- **More than 250,000 are employed in broad petroleum-related activities**, approximately 10% of the labour force (Source: Going Global, European Outlook 2012)
- Approximately **45,000 people (direct & indirect) in the Stavanger region** are employed in the petroleum sector (Source: Christine Sagen Helgo, Mayor City of Stavanger, World Energies Cities Partnership)
- The sector is Norway's **largest industry responsible for 23% of GDP** and 47% of total exports in 2010. (Source: Harvard Business School, Norway, Oil & Gas Cluster, May 2012)
- The **production value** of the oil and gas sector was approximately **€90 billion in 2010**, an increase of nearly 9% from 2009. This resulted in a value add of **€71 billion** for the economy (Source: Statistics Norway, 2013)
- In 2011, Norway's had the **second highest GDP per capita** (c.€46,500) **in the OECD** (Source: OECD 2013 & XE currency converter February 2013)
- Labour utilisation was 75.3% in the 15-64 age bracket, compared to and EU average of 64.2% (Source: Eurostat 2011)
- The **average salary** for all salaried Norwegians is **€61,700** (Source: Going Global, European Outlook 2012)
- The Norwegian Minister of Labour recently invited qualified applicants throughout Europe to apply for the more than 69,000 recent job openings. (Source: Going Global, European Outlook 2012)
- Oil and gas industry suppliers grew out of a history of shipping and ship building.
- The Government Pension Fund Global (often referred to as the Norwegian oil fund) is a government controlled fund owned by the people of Norway that is currently one of the **largest sovereign wealth funds in the world**. All government petroleum revenue is transferred to the Fund and the Fund is now larger than Norway's GNP. (Source: See speech by the Norwegian Minister of Foreign Affairs, Jonas Gahr Store, January 2012)

Figure 35 – Norwegian Oil And Gas Industry vs GDP per Capita



Social Impact

- Norway is regularly listed as the world's best country to live in and the Stavanger region has been voted as the best region in Norway to live in every year for the last decade. (Source: www.greaterstavanger.com)
- The unemployment rate in Stavanger (2%) has been consistently lower than the Norwegian average (3.2%), and significantly lower than the EU 27 (10.7%). (Source: Stavanger Kommune & Eurostat, 2012)

4.4 Case Studies – Aberdeen, Scotland

Aberdeen proactively engaged with the industry

Background

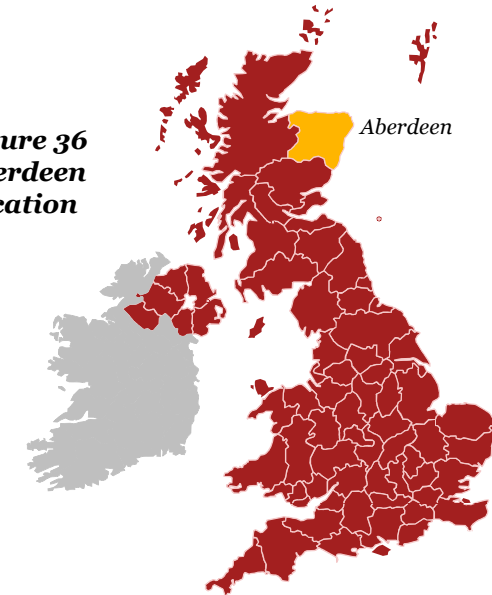
The impact of the oil and gas industry in Aberdeen has been well documented. Aberdeen is the main centre for UK Continental Shelf (UKCS) activities and is often referred to as the European oil capital. It is also a hub for many international operators.

In September 1969 the first oil strike was made in the northern sector of the UK Continental Shelf. Aberdeen was a natural base for oil companies as it was the closest large settlement to the main exploration activity. The city was also able to provide harbour space; industrial land; housing land; an airport and university-standard research facilities.

By the second half of the 1970s, a number of major fields had come on stream - Forties (1975), Brent (1976) and Ninian (1978) – and production was piped to new onshore terminals at Cruden Bay (oil) and St Fergus (gas). Throughout this period, offshore exploration for oil and gas continued unabated. In the 1980s, exploration activity was widened beyond the northern and central sectors of the UKCS, though Aberdeen remained the logical base for most offshore activity.

Since the first fields came on stream, around 38 billion barrels of oil equivalent (boe) have been produced from the UKCS with the prospect of a further 15-25 billion still to be extracted.

Figure 36
Aberdeen
Location



Government Interventions

There are two views in relation to Government interventions in Aberdeen. One view is that the industry in Aberdeen grew despite a lack of consistent support from the national and local authorities. (Source: *Industrial Performance Centre, MIT, A comparative case study of oil and gas industry development in Stavanger and Aberdeen, 2006*). However, Aberdeen City Council claim that Aberdeen prevailed over other competing centres through the initiatives taken by the local authorities and the local business community. Local Government created the conditions to allow the oil and gas sector to flourish. (Source: *Aberdeen City Council, The Importance of the Energy Sector to Aberdeen City and Shire*)

Through consultation it would appear there were no significant interventions, but that Aberdeen had good infrastructure e.g. a good harbour and airport and was considerably more responsive to the needs of the oil and gas industry than other locations.

In contrast to the Norwegian Government, the British Government moved quickly to adopt a fast depletion policy, prompting a larger number of foreign companies to move in. Efforts to promote local capability building in the UK came later when the national government pursued a 'Buy British' policy through the Offshore Suppliers Office (OFO) and also established a national company, the British National Oil Corporation (BNOC), which was dismantled shortly afterwards. The decision was taken to locate both BNOC and OCO in Glasgow, even though Aberdeen was already attracting oil related industry.

4.4 Case Studies – Aberdeen, Scotland (Cont'd)

The oil and gas sector employs 140,000 people (direct, indirect and induced) in Aberdeen and has had many social benefits.

Infrastructure

- The airport and harbour at Aberdeen have expanded to accommodate the oil and gas sector.
- The Harbour company is spending €75 million over the next few years enhancing the harbour and providing additional operational areas for cargo (source: www.aberdee-harbour.co.uk)
- The University of Aberdeen is recognised as a centre of excellence in petroleum energy research and training and offers a range of postgraduate courses in the energy sector.
- The Robert Gordon university has a dedicated 'Energy Centre' providing courses for the oil, gas and renewables sector.

Social Impact

- Over the last 30 years Aberdeen has had a lower incidence of unemployment than most other part on the UK
- There is also much lower incidence of long-term unemployment – one in five, compared to one in three in the rest of Scotland and the UK.
- One of the highest level of household disposable income in the UK.

Figure 37 Oil & Gas Employment in Aberdeen & Shire

Employment	Jobs in Aberdeen & Shire	% of total jobs in Aberdeen City & Shire	% of Total jobs in Scotland
Direct	23,500	10%	1%
Direct & Supply Chain	105,500	46%	4.3%
Direct, Supply Chain & Induced	137,300	60%	5.6%

(Source: Aberdeen City Council, The Importance of the Energy Sector to Aberdeen City and Shire, 2010)

Economic Impacts

- The industry supports approximately **440,000 jobs** (direct, indirect and induced and jobs in exporting goods and services) in the UK of which 200,000 are in Scotland. (Source: *Oil & Gas UK, 2012 Economic Report*)
- The oil and gas sector in Aberdeen City & Shire employs **23,500 directly** and over **137,000** when **supply chain and induced employment** is taken into account.
- Aberdeen Harbour handles over **9,000 vessels a year**, the majority of which are energy related.
- The oil and gas industry contributes **€17.7 billion to the Scottish GVA (approx 15% of total GVA)**. (Source: *Scottish Enterprise*). Aberdeen contributes a significant proportion of this.
- The sector contributed **€19.7 billions in taxes** to the UK Exchequer in 2011, again clearly Aberdeen contributed a large proportion of this. (Source: *Oil & Gas UK, 2012 Economic Report*)
- **Internationally derived sales** from the Scottish oil and gas industry for 2009-2010 were **€8.4 billion**. (Source: *Scottish Enterprise/Scottish Council for Development Industry, Survey of international activity in the oil and gas sector 2009-2010*)
- The **average earnings in Aberdeen are approximately 15% higher** than the UK average, due to the average earnings of people in the 'extraction of crude petroleum and natural gas'. (Source: *Annual Survey of Hours & Earnings*)
- It is estimated that there are in excess of **1,000 companies in Aberdeen** that operate wholly or predominately in the energy sector ranging from exploration and production multinationals to smaller, specialist enterprises that support the sector across a range of fields. (Source: *Aberdeen City Council, The Importance of the Energy Sector to Aberdeen City and Shire, 2012*)
- **Over 30% of the top 50 Scottish based companies** are located in Aberdeen City and Shire, almost all of these are in the energy Sector. (Source: *Business Insider Magazine*)
- The **retail, hotel and entertainment sectors are performing strongly** as they cater for the growing workforce. (Source: *Aberdeen City Council, The Importance of the Energy Sector to Aberdeen City and Shire, 2012*)
- In 1971, Aberdeen airport handled 140,000 passengers. In 2012 the airport handled 3.36 million passenger, with 525,000 of those being helicopter passengers making it one of the busiest commercial heliports in the world. (Source: www.aberdeensirport.com) **51% of the airport passengers work in the oil & gas industry**. (Source: *CAA 2010*)

4.4 Case Studies – Kinsale, Cork

Kinsale Energy spends €30 million in the local economy annually

Kinsale Energy

- **1971 & 1989** – commercial gas discoveries declared by Marathon Oil (now held by PSE Kinsale Energy part of Petronas Star Energy) in Kinsale and Ballycotton.
- **1975** - Bord Gáis Éireann was established as a limited company and signed a contract with Marathon Oil for the supply of natural gas from the Kinsale field at a bulk discounted rate for a 20 year term.
- **2003** – commercial gas discoveries declared by Ramco in Seven Heads (discovered by Esso in 1973).
- **100%** - of natural gas in the country provided by Kinsale Energy up until 1995, now providing approximately 5%.
- **€30 million** - annual spend in the local economy (payroll, contractors and sub-contractors).
- **€200 million** - royalty revenues paid to the State.
- **Other benefits to the area** – the Kinsale Head development has also had considerable downstream impacts in terms of jobs and value add to the regional economy, for example the development of the entire national grid; the notable cluster of chemical and pharmaceutical companies in Cork Harbour grew out of the availability of gas from the Kinsale field. The gas field was also a catalyst for companies such as the PM Group and Mainport to grow into global companies.

Mainport - Mainport was founded in 1954 as a ship agency company in Cork. In 1974, the company started to provide base support management services to licence-holders exploring in the Celtic Sea. In 1979, Mainport succeeded in winning a contract from Marathon Petroleum Ireland for the provision of a platform supply vessel and a safety standby vessel to service the Kinsale gas field. Mainport still hold this contract. More recently, Mainport have provided/ due to provide services to Providence and Exxon. Mainport currently employ approximately 35 people in the Cork region and spend approximately €2m in the local economy annually. Mainport is now an international integrated marine service company, providing a full range of services, with a fleet of 24 vessels, having operations in Ireland, the UK, Norway, South Africa, West Africa, Brazil and the Caspian Sea. New offices have recently been opened in Angola and Singapore. In recent years, the company has specialised in seismic survey support operations and is currently adding to its fleet three new-build seismic support vessels, which will operate worldwide.

PM Group - PM Group was founded in Ireland in 1973 and the company won its first major energy project with Marathon Petroleum in 1976 to provide project and construction management services on the Kinsale Head Gasfield Development. The Kinsale Head project is acknowledged by the company to have been a significant launching pad, and the experience gained was important in supporting the development of the Group. PM Group continues to work in the energy sector. They have provided significant services to Bord Gais over the last 30 years as well as further services to Kinsale Energy. They are currently working for Aramco, Saudi Arabia, and were also construction managers for the onshore gas terminal on the Shell Corrib project. The PM Group currently employs 1,850 people in over 30 countries in a wide range of sectors, primarily pharmaceutical, food processing and advanced manufacturing technology.

“The entire national gas grid, Aghada power plant, Poolbeg power plant and NET (Nitrogen Eireann Teoranta, a fertiliser plant that was built at Marino Point in Cork) were all constructed on foot of the Kinsale Head development.....Our local subcontractors include a standby boat contract, helicopter services, caterers, mechanical and electrical contractors. We source all our requirements locally except for specific specialist skills e.g. offshore compression specialists, divers etc.Kinsale Energy has been a significant help in developing local contractors for example Marathon Oil gave the PM Group its first major contract, Mainport has grown into an international business..... “

Fergal Murphy, Chief Executive Officer, Kinsale Energy

4.4 Case Studies – Killybegs, Donegal

The emergence of Killybegs as the main support area for offshore oil and gas industry off the west coast has helped generate local employment

Killybegs

Killybegs, Donegal has been acknowledged as Ireland's premier Fishing Harbour Centre for many years and is the main harbour for the landing of pelagic fish by the pelagic fleet. The harbour used to be the home of a considerable whitefish fleet as well, but this fleet has declined over the past 20 years due to the sale of tonnage/licences and decommissioning, brought about largely by declining whitefish and deepwater fishery quotas.

However, the emergence of Killybegs as the main support area for the offshore oil and gas exploration activity off the West Coast of Ireland has provided some relief to the unemployment in the area. with one particular operator, Sinbad Marine acting as the main transport contractor for the offshore development companies. There is a significant business in Killybegs in the management and support of visiting vessels e.g. in 2008 there were over 200 visiting offshore support vessels and in 2009 there were approximately 140. (Source: MRAG Consortium 'Assessment of the status, development and diversification of fisheries-dependent communities, Killybegs Case study', 2010).

The Corrib Gas Field project had a significant impact on some of the businesses in Killybegs e.g. supplying cranes and lift-trucks for loading and unloading supply vessels, base management and onshore logistics support.

Activity in the oil and gas sector is typically between April and October and key activity periods in the fishing sector (pelagic catching) is September/October and March/April. Therefore these two sectors complement each other and allow for a continuity in employment.

As part of the MRAG Consortium case study they carried out community consultations in order to quantify what proportion of the local business's turnover was fisheries specific, and what proportion relates to other port, oil and gas activities. Non-fisheries turnover which is almost exclusively in the port, oil and gas support sectors has been steadily on the increase since 2005.

Sinbad Marine was established in Killybegs in 1978 to service the international pelagic fishing fleets working off the west coast of Ireland. Given the company's agency and logistics experience, the company started servicing seismic/survey vessels and in 1999 established "Killybegs Supply Base."

The company now provides offshore services including base management and onshore logistics support to exploration companies, seismic and survey companies and other oil and gas service companies. Clients include Shell, ExxonMobil, Statoil, Providence Resources, Eni and Lansdowne Oil and Gas.

Many of Sinbad's subcontractors e.g. stevedoring, crane hire, waste, transport companies, etc. have also successfully expanded their scope to include supply to the offshore industry.

"50% of our business is from offshore services support..... The company usually employees 15 people, when we are busy with the gas and oil sector this increases to about 60 people. There is also a knock-on benefit in the town, hundreds of other jobs are created in the boat yards, fuel suppliers, taxis, in the hotels..... We need more oil and gas business , we need two, three wells operating to really have a sustainable business"

Jim Parkinson, Managing Director, Sinbad Marine

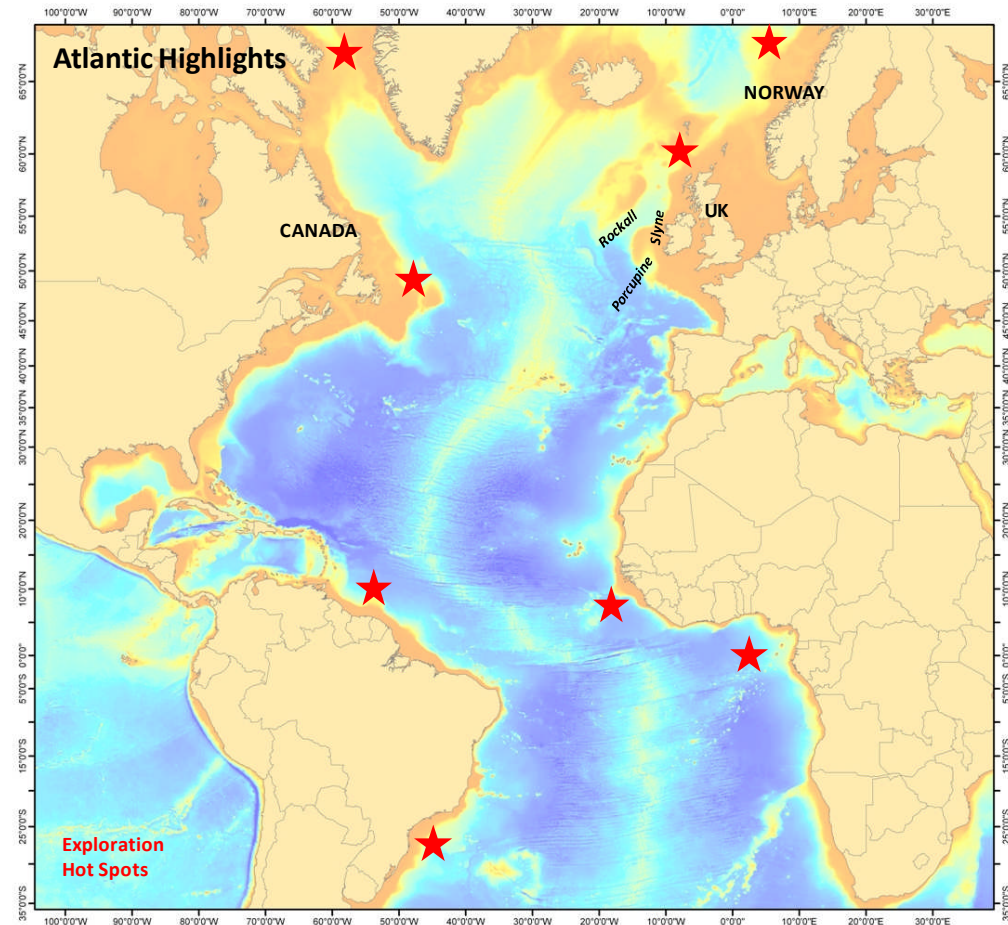
4.5 Potential Economic Benefits to Ireland

Ireland has a similar geological make up to successful oil producing countries such as Canada

As mentioned earlier, the probability of making a discovery in Ireland has improved over the past ten years (1 in 3), however none have been declared commercially viable to date. If, for example, current prospects such as Barryroe converted to commercial discoveries, this could have a significant impact for the attractiveness of Ireland as a destination for exploration.

Figure 38 shows that the west coast of Ireland is on the Atlantic Margin, similar to countries that have had success in commercial oil finds and are ranked among the top global producers, e.g. Canada, South America and Africa. This has given credence to suggestions there may be significant resources available to tap into. However, significant investment is required in order to find these resources.

Figure 38 – Exploration Activity in the Atlantic



(Source: DCENR/PAD)

4.5 Potential Economic Benefits to Ireland

A major commercial discovery such as Barryroe will deliver major economic benefits even at the current stage of industry development

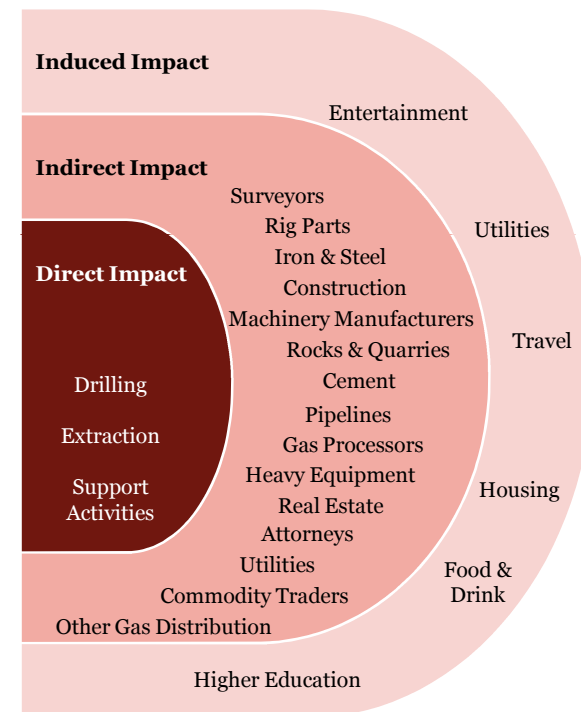
It is clear that major economic benefits can flow from the exploration, development and production activities of the oil and gas industry in small economies such as Ireland. To profile the scale of potential benefit, the PwC team worked with Providence Resources to profile additional Irish economy expenditures should its technical discovery at Barryroe prove to be commercial. Estimates were prepared for two scenarios, the first of which assumed the current state of development of the supply industry. The second assumed a more developed supply industry, on foot of a series of commercial discoveries in a short time period.

Economic benefits will derive from the development and production phases, the first of which will last an estimated 10 years and the second of which will last 25 years (see overleaf for details). The full project lifecycle is estimated at 31 years, There will be overlap in the development and production phase for a number of years. The size of the benefit is determined by: the value of additional national economy expenditures; and the sectoral composition of this spend.

The sectoral composition of demand is material to the extent that spend in sectors with a low import content (e.g. services) have a more substantial impact on the national economy than do expenditures in sectors with a high import content. The full-economy impacts of a € increase in expenditure in a defined sector are measured at three levels which describe the progression of the € spend through the economy, namely: direct; indirect and induced.

Explanations of these rounds or levels of economic benefit are described in Appendix 10, with an illustration provided in Figure 39.

Figure 39 – Example of Full Economy Impacts of the Oil and Gas Sector



4.5 Potential Economic Benefits to Ireland

Economic benefits will primarily derive from the production/operational phase, benefits from the development/construction phase will be less, reflecting the relatively undeveloped nature of the Irish oil and gas industry

PwC built a 31 year model with certain input assumptions provided by Providence Resources in relation to the Barryroe project. Based on this model, the following estimates were derived:

Development/Construction Phase (10 years).

It is estimated that the capital expenditure on the Barryroe project will be in the region of €4.5 billion this includes over €900 million for abandonment costs (i.e. decommissioning at the end of the useful life of the field). Reflecting the relatively undeveloped nature of the oil and gas industry in Ireland, the greatest share of expenditure during the construction phase (i.e. 95 %) will go to non-Irish suppliers. However, it is estimated that €190 million will accrue to the Irish supply base (excludes abandonment).

Production/Operational Phase (25 years).

It is estimated that production will start in year 7, once operational, it is estimated that over 50% of the expenditure will be kept in the Irish economy. The operating costs will fluctuate over the 25 year period, on average it is estimated that the annual operating costs will be in the region of €115 million and that approximately €58 million per annum will be spent in the Irish economy.

It is envisaged that:

- **operational personnel** - the majority of the estimated 110 FTE working on the rigs will be Irish;
- **inspection and maintenance** – a high percentage of expenditure will go to Irish suppliers e.g. electricians & maintenance contractors and the costs of renting vessels;

- **logistics and consumables** – vast majority of expenditure will be with Irish suppliers e.g. helicopter hire; vessel hire including the rescue boat and fuel;
- **well costs (maintaining wells)** - the greatest share of expenditure will go to non-Irish suppliers e.g. rig hire and crew;
- **insurance of operation** - the greatest share of expenditure will go to non-Irish suppliers e.g. underwriters in the UK;
- **field project costs** - the greatest share of expenditure will go to Irish suppliers e.g. onshore administration; supply base warehousing/rent and operation support (transport services).

Corporation Tax and PRRT

It is estimated that the total revenue will be in the region of €23 billion. The majority of which will be from oil, estimated at \$100 a barrel, based on the current average Brent Oil Price. Approximately 5% of revenue will be from gas.

Taking into account the 100% allowances for exploration expenditure and development expenditure of close to €4.8 billion (Barryroe development costs and prior exploration costs of Providence Resources and partners) and operational costs of over €2.8 billion, it is estimated that the corporate tax and PRRT return from a commercial discovery of the anticipated scale of Barryroe could be approximately €4.5 billion over its full project life. This is before any regard is had to other forms of taxation.

To place this in context, the annual corporate tax take in Ireland in 2011 was €4.5 billion

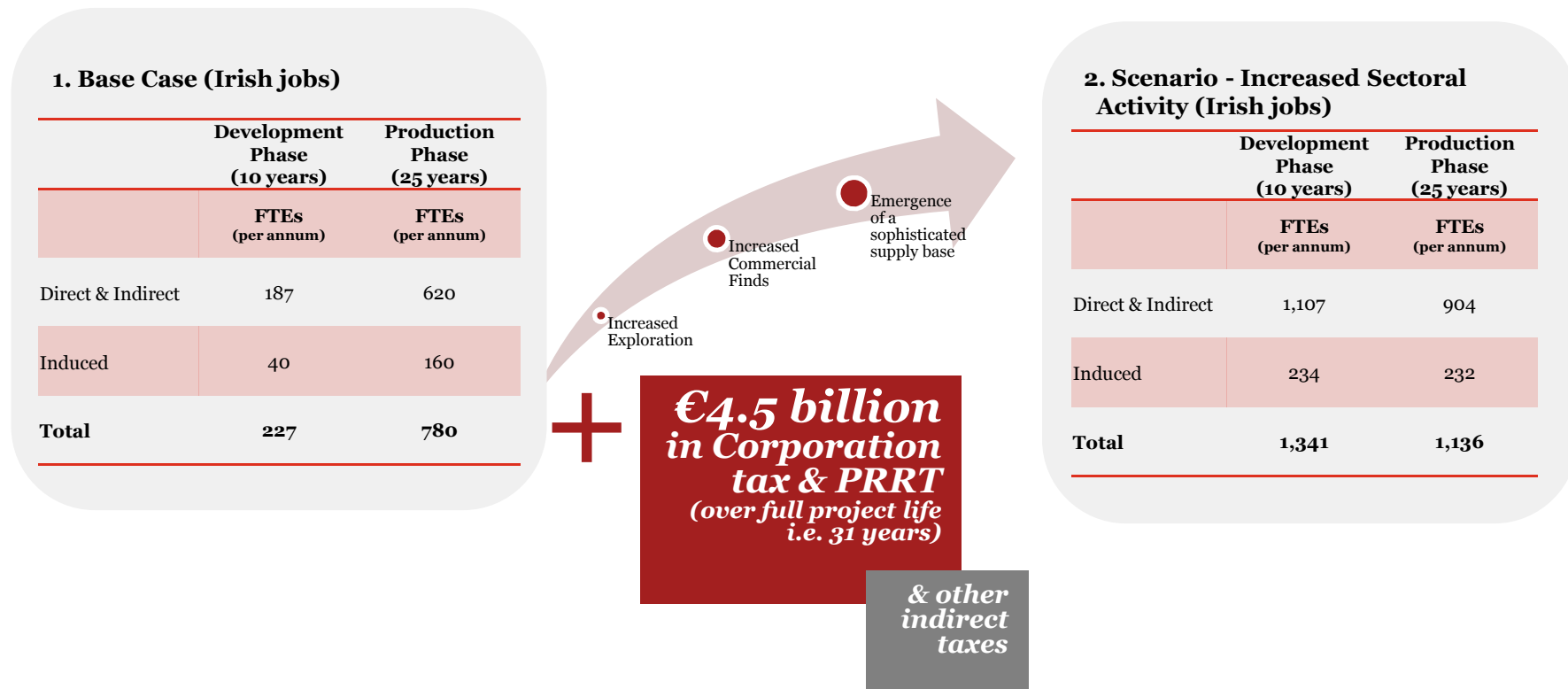
(Source: Revenue, Annual Report 2011).

4.5 Potential Economic Benefits to Ireland

The scale of the economic return from a single commercial discovery is constrained by a lack of critical mass in the Irish industry

Even within existing supply constraints, a major commercial discovery will deliver significant benefits to the Irish economy i.e. close to 800 jobs per annum in the production phase. The potential return is, however, much greater where there is an established supply base – particularly one which can cater to the needs of the industry in its development/construction phase.

Figure 40 - Potential Economic Benefits from Large Oil Commercial Discovery



4.5 Potential Economic Benefits to Ireland

Ten major commercial discoveries could generate close to 13,500 FTE jobs during the development phase and close to 11,500 FTE jobs during production.

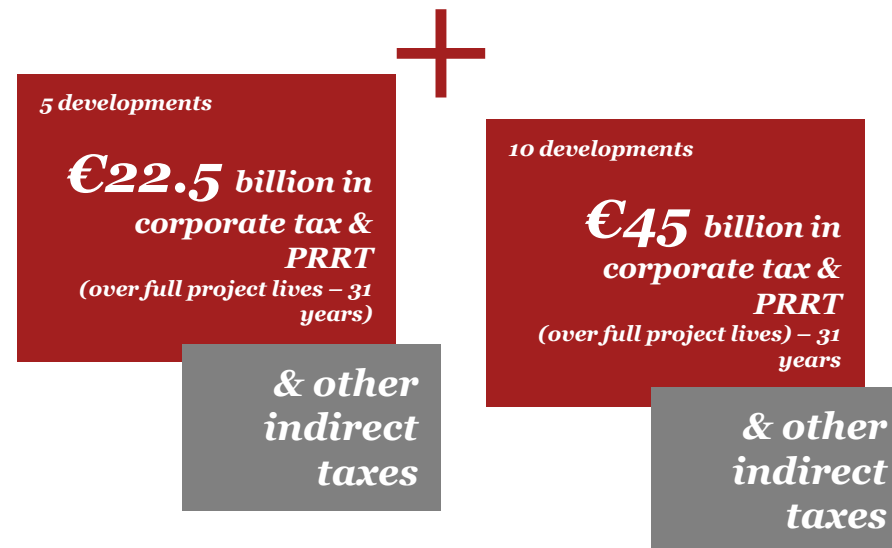
Norway currently has over 80 fields in production and 26 discoveries in the planning/development phase (Source: Facts 2012, The Norwegian Petroleum Sector).

If Ireland were to have ten commercial fields operating at any given time (based on the Barryroe model), there would be a potential to generate an average of 13,500 jobs a year during the development phase (10 years) and 11,500 jobs a year during production (25 years).

This appears reasonable, given the assumed number of commercial discoveries and the existence of a relatively sophisticated indigenous supply base to the industry.

Figure 41 - Jobs Potential of an Established Oil & Gas Industry

	FTEs per annum (direct, indirect and induced)
Development Phase	
5 projects	6,706
10 projects	13,413
Production Phase	
5 projects	5,680
10 projects	11,359



Chapter 5

Report Findings & Suggestions for Improvement

5.1 Introduction

This chapter presents key findings from the research undertaken, and considers means by which the potential economic contribution of the oil and gas industry to Ireland might be realised.

It comprises three additional sections, the next of which presents the key findings from our analysis.

Section 5.3 revisits the issues frequently raised in respect of the industry and evaluates them in the light of our research.

PwC's insights and views relating to the further development of the industry beyond its present fledgling state are presented in Section 5.4.

5.2 Key Findings

1. Ireland is underperforming relative to other European players in the attraction of exploration investment from the oil and gas industry.

2. This underperformance is partially attributable to factors beyond the control of policy makers, but there are important policy contributors.

3. The oil and gas industry has the potential to transform local and national economies, but a critical mass of activity is needed before a substantial indigenous supply base can develop.

4. This critical mass of activity does not currently exist in Ireland, nor will it exist until exploration demand is unlocked and success rates improve.

5. Notwithstanding this, Ireland is already deriving some economic advantage from the industry.

6. The policy experience of Scotland suggests that huge State investment is not always required, however an “enabling” environment is required to drive industry development.

5.3 Concerns in Regards to the Industry Revisited

Concerns raised in respect of the industry are not without factual basis, but have insufficient regard to relevant contextual factors

In Chapter 2 - Report Context, a number of concerns have been raised in respect of the industry, in recent years, in relation to the Irish oil and gas sector regime were listed. Based on findings in Chapter 3 - Ireland's Performance in Attracting Mobile Oil & Gas Exploration Investment and Chapter 4 - Potential national economic return from the oil and gas industry, these concerns have been revisited in the table below and overleaf.

Concerns	PwC Observation
Ireland's fiscal terms are too generous	<p>The maximum headline rate of tax in Ireland is low relative to other European countries with high rates of oil and gas exploration, development and production activity. Fiscal terms are, however, set at a level to attract exploration activity and normally rise in line with success in industry development, which coincides with an attractive operating environment - particularly high rates of commercial discovery. The Irish operating environment is not attractive in relative terms and this is reflected in very low levels of interest in exploration licences relative to the experience of other European countries e.g. Norway and the UK, in spite of what are generally considered favourable fiscal terms.</p> <p>The Irish headline rate of tax is in line with countries with similar circumstances e.g. France, Portugal and Morocco.</p> <p>Moreover, using headline rates of tax to gauge relative fiscal system generosity is, perhaps, overly simplistic. In the case of Norway, for example, high rates of tax co-exist with substantial production income and a commitment on the part of the State to underwrite the exploration risks of private sector interests to the tune of 78% as well as with a very significant State investment in the acquisition of seismic data which allows for informed assessments of discovery potential.</p>
Ireland will get no real economic advantage (tax take aside) from a major commercial discovery	<p>Until such time as a critical mass of activity exists in the sector (which will require the unlocking of an exploration demand), Ireland will be unable to fully exploit the economic potential to a level such as Scotland and Norway, which has an established indigenous supply base to the industry. This said, it is clear that Ireland is currently benefiting economically from the oil and gas industry (as evidenced in the case studies of Kinsale and Killybegs) and would derive significant benefit from the development and production of a single major commercial discovery. New jobs created in the sector would be incremental. The full economic potential, which it should be noted is not predicated on a refinement capability, will be less than is possible until such time as exploration activity increases.</p>
Ireland could impose landing and onshore refinement obligations, without negatively impacting exploration activity	<p>The imposition of landing and onshore refinement obligations is prohibited under EU legislation. Additional points of note are as follows:</p> <ul style="list-style-type: none"> • currently there is only one refinery in Ireland, Whitegate Refinery, Cork. The refinery is operated by Philip 66, who have guaranteed to operate it until 2016. There is uncertainty regarding the future of the refinery post 2016; • economies can derive major economic advantage even without onshore refinement; and • at this juncture, the issue is not whether current levels of exploration activity would be impacted, rather the question should be if levels of activity could be grown to the levels of key competitors.

5.3 Concerns in Regards to the Industry Revisited (Cont'd)

Concerns	PwC Observation
<p>Ireland could impose changes on the tax terms attaching to existing licences</p>	<p>As with any Sovereign State, Ireland could impose retrospective taxation on existing exploration licences and, in this manner, derive a greater tax return from their production activities. Retrospective tax measures have been introduced in a number of credible oil and gas industry locations, with varied impact on location attractiveness. Retrospective tax initiatives, and speculation around same which is almost as damaging, have the potential to seriously deter investor interest in a location, particularly in circumstances where that interest is tenuous at best – as is presently the situation in Ireland. All expert observers advise against retrospective taxation, but there is an acceptance that as the overall attractiveness of the operating environment improves, then the tax arrangements imposed on new licences can become more onerous.</p> <p>In summary, Ireland is simply not coming from a position of strength and the imposition of retrospective taxation would be ill-advised if the national policy objective of putting in place an attractive and stable policy environment for the industry is to be achieved. Moreover, a significant and ongoing speculation on this matter has the potential to have negative consequences for the Irish proposition in the industry.</p> <p>It should also be noted, a key feature of Ireland’s tax regime is the 12.5% standard corporation tax. The low corporate tax rate is one of the cornerstones of Ireland’s industrial policy and over the past number of years the Government have provided reassurance to both indigenous companies and multinationals operating in Ireland in relation to the continued 12.5% corporation tax rate. Retrospectives tax changes on the oil and gas sector could potentially alter the perception of Ireland’s stable corporate tax regime.</p>
<p>Oil companies are sitting on large areas of the Irish offshore where they know there are vast resources.</p>	<p>In common with the regimes of other countries, and reflecting the fact that exploration companies have to invest very significant sums in exploration activity, licences do facilitate industry players assessing the potential of a licences area for up to 15 years before declaring it commercially viable. However, exploration licences, carry significant exploration obligations which must be met if the licence is to be retained and/ or penalties are to be avoided. Licences must be surrendered if they are not active or if the licensed exploration programme is not being implemented and furthermore at the end of each phase a certain percentage of the acreage must be surrendered.</p> <p>Regarding the claim that companies are aware of vast resources in Irish waters, PwC are not in a position to comment on this matter, however it is noteworthy that DCENR receives a copy of all seismic and well data and has the same information as the companies. In more recent years, DCENR has real time access to drilling operations. If it were the case than companies are aware of vast resources, however, and it was widely known, one might expect higher levels of licence interest.</p> <p>While research funded by DCENR has estimated (yet-to-be-proven) reserves of 10 billion barrels of oil equivalent (bboe) in the Irish offshore, significant drilling activity would be required to test the accuracy of this estimate.</p>

5.4 Suggestions for Improvement

Unlocking the economic potential of the industry, assuming hydrocarbon reserves, will require certain enablers to be further strengthened

1 **Clearly developed and communicated strategy, targeted at key stakeholders and the general public**

A long term vision and strategy, addressing the development of the onshore and offshore industry over the next 10 to 15 years would give a clear indication to the Industry that Ireland is “open for business”. With strong Ministerial support, a clear action plan, the required resourcing, the potential benefits to the economy clearly communicated to the general public, and mechanisms for monitoring competitive performance and obtaining feedback from industry leaders on the attractiveness of the Irish proposition, Ireland may increase investment, leading to critical mass and a successful industry.

2 **A more transparent, streamlined and timely regulatory and planning process**

The whole planning and approval process would benefit from greater joint-up thinking from relevant Departments, a situation that might be improved by the establishment of an Inter-departmental Committee of Secretary Generals and senior officials from relevant departments. This could ensure that issues are addressed in a coherent way, and could allow for timely decision making. Furthermore, defined periodic licence rounds, would help facilitate exploration companies.

3 **A predictable and stable fiscal regime to end industry uncertainty**

Having explicit regard to the competitiveness of Ireland’s proposition, a decision on the optimal fiscal regime and, thereby, a move to end constant industry concern regarding short-term stability and retrospective taxation would provide some certainty to potential investors.

4 **Provision of relevant depth of seismic information/ data to enable investment decisions**

An enabler is the provision of baseline seismic and other geological data in order to bring potential investors to the table. We note significant investment is being undertaken in 2013, that should enhance Ireland’s position in having meaningful discussions with the industry in respect of the areas being surveyed.

5.4 Suggestions for Improvement

5

Proactive Cabinet support and endorsement for the development of the sector could have a real impact

Given the potential economic benefits to Ireland, and the assumption that many of the issues known at policy level are addressed, to give the next licensing round an increased chance of success, there are clear benefits of international roadshows with strong Government support. There is plenty of evidence of Ireland “punching above our weight” in sectors that have been prioritised based on economic benefits, and proactively targeted e.g. digital media and international financial services. While DCENR/PAD are the leading promotional body for attracting oil and gas exploration companies, consideration could be given to leveraging the expertise and insights of IDA in respect of attracting FDI investment to Ireland.

6

Industry engagement in developing and delivering upon the strategy for Ireland

The indigenous oil and gas exploration industry and their representative bodies have a role to play in the development of an integrated and cohesive plan for the exploration for oil and gas in Irish waters. In the event that significant reserves are found, both the Industry and the State serve to gain. The industry could do more to stitch itself into the whole industrial policy machinery i.e. research, education and training, industrial policy. The business economics of the industry are very complex and emotive, and misperceptions abound. To counter this, the industry needs to have a louder voice and engage more fully in the development of the strategy in a cohesive way.

Given the potential for the Irish economy of a major hydrocarbon find, there is a window of opportunity between now and the next licensing round to ensure that the issues and constraints identified, that are within the gift of policy makers, are addressed. This will enable in Ireland to fully pursue the investment opportunities available, and to ensure that Ireland is in an optimum position to unlock the economic potential of the oil and gas industry.

Appendices

Appendix 1 – Consultees

Organisation	Name and Title
Achilles	Jeanne Copeland, Operations Director
Amec	Robert Leonard, Business Development Director
Cork County Council	Martin O’Riordan, County Manager
Department of Energy and Climate Change (DECC)UK, Energy Development Unit,	Mike Hawkins, Head of Oil & Gas
Department of Communications, Energy and Natural Resources Department of Energy (DCENR)/ Petroleum Affairs Division (PAD)	Ciarán Ó hÓbáin, Principal Officer Jim Whelan, Licence Applications
Enterprise Ireland	Brendan Dollard, Energy Technologist
IMERC (Irish Maritime Energy & Resource Cluster), National Maritime College of Ireland, Cork	Judy Rea, Acting Director
Irish Offshore Operators Association	Fergus Cahill, Chairman
Joint Committee on Communication, Natural Resources and Agriculture, House of the Oireachteas	Andrew Doyle, Chairman
Kinsale Energy	Fergal Murphy, CEO
Lansdowne Oil & Gas	Stephen Boldy, CEO

Organisation	Name & Title
Mainport Holdings Ltd.	Dave Ronayne, Chief Executive
Own Our Oil	Eddie Hobbs
Petroceltic	Brian O’Cathain, CEO
PM Group	Michael Shelly, Executive Director
National Maritime College of Ireland	Cormac Gebruers Manager, Halpin Centre for Research & Innovation
San Leon	Alan Campbell, Commercial Manager
Sereca Energy	Mittch Flegg, Chief Operating Officer
Shell E&P Ireland Limited	Michael Crothers, Managing Director
Sinbad Marine	Jim Parkinson, CEO
SIPTU	Frank Connolly, Head of Communications
Statoil	Tony Drayton, Non-Operational Manager
UCC Department of Economics	Richard Moloney
Vayu	Colm Kennedy, Managing Director

Appendix 2 - Licensing Systems

There are three distinct structures for sharing of exploration risk between private and public sectors.

In both licensing and contractual systems, the private sector assumes all risks and costs associated with hydrocarbon exploration, development and production. The key difference is ownership of resources. In a licensing system, the private sector generally owns the resources, however this is not the case in Ireland (see note below) and in a contractual system, ownership is retained by the State.

A production sharing contract allows the oil/gas produced to be shared between public and private sector. For service contracts, the private sector is paid a cash fee for services provided.

Following Norway's lead, the State introduced a system of licensing in 1975. The licensing system is the oldest and most common type of agreement. Under the licensing model, private sector interests assume the financial risks attaching to exploration in anticipation of a financial return from a discovery.

The Government's main objective is to maximise the revenue form the production of oil and gas and use this revenue for public sector expenditure and investment, while at the same time ensuring that Ireland attracts the most efficient companies.

Figure 42 - Licensing Models for Hydrocarbon Exploration



*Note: Norway also takes an equity share in projects, plus earns stock dividends from their State-owned oil & gas company.

* It should be noted in Ireland, Article 10 of the Constitution asserts that the ownership of natural resources including all minerals etc. is vested in the State. Sections 4 and 5 of the Petroleum and Other Minerals Development Act 1960 (the 1960 Act) provides that petroleum in the State is vested in the ownership of the Minister [for Communications, Energy and Natural Resources] and his successors. Section 13 of the 1960 Act, which provides that the Minister, if satisfied that it is in the public interest, may demise this petroleum by way of lease. The lessee has the security of the terms of the lease (provision for terms are at Sn 13 (2)), but the ownership of the petroleum remains with the State.

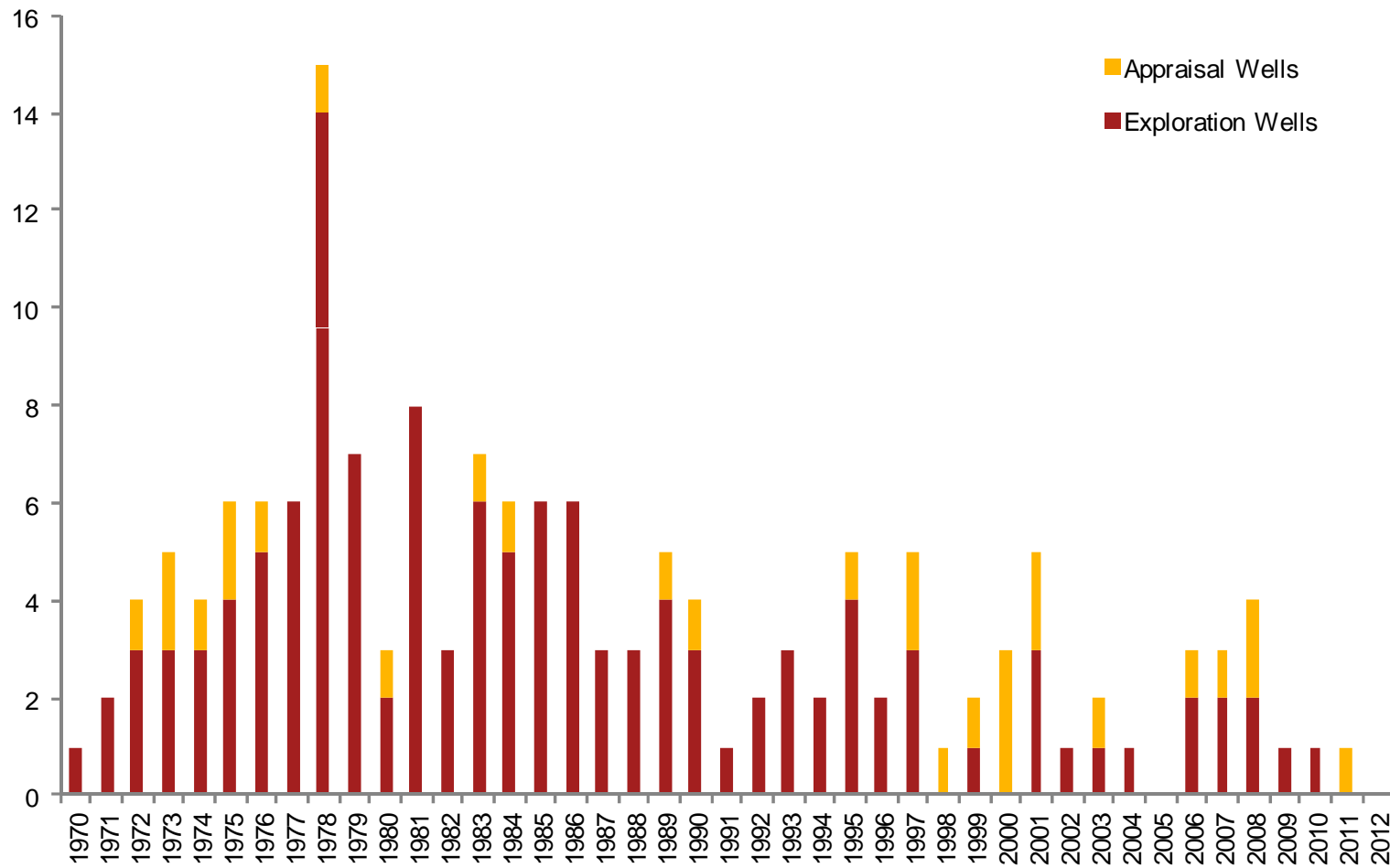
Appendix 3 - Licence Types in Ireland

Exploration Process	Licence Types		
Prospect, Lead or other exploration	Petroleum Prospecting Licence (max 3 years)	<ul style="list-style-type: none"> The (non-exclusive) right to search for petroleum in any part of the Irish Offshore which is not subject to another licence/ lease. 	
	Licensing Option (max 3 years)	<ul style="list-style-type: none"> Grants first rights to a future exploration licence in a specified area. Subject to completion of a work programme, but not as onerous as that required for an exploration licence. 	
Appraisal Phase	Exploration Licence (15 years)	<p>Grants the exclusive right to explore for petroleum in a specified area. Three types:</p> <ul style="list-style-type: none"> Standard Exploration licence - 6 years (2 phases), water depths of up to 200m. Deepwater Exploration Licence - 9 years (3 phases), water depths exceeding 200m (reduced from 12 in 2007). Frontier Exploration Licence - 12 years (4 phases maximum) (reduced from 16 in 2007 - can be extended), area posing significant logistical difficulties and declared a "Frontier Area" by the Minister. <p>Includes automatic relinquishment (25-50% area) for each phase of the licence.</p>	Reserved Area Licence – A leasee may, at any time, apply in respect of a specified area adjacent to or surrounding the leased area (only if not subjected to an authorisation, other than a petroleum prospecting licence).
Commercial Discovery – Development Phase		Petroleum Lease (30 years)	<ul style="list-style-type: none"> Grants exclusive rights to produce petroleum from the lease area, once a discovery is declared commercial. Discoveries that were deemed not commercially viable can be re-appraised years later with new data or reprocessing existing data, new technologies, rising prices. Production need not begin until 6 years after the expiration of an exploration licence. The Minister must grant the lease if commercially recoverable amounts of hydrocarbons are found, and the company produces a likely production profile, outline development, financial & marketing plans and statement of likely environment effects. Currently 3 in place: Kinsale/ Ballycotton; Corrib; and Seven Heads. Subject to the fiscal and non-fiscal conditions outlined in the specific licensing terms under which the initial authorisation i.e. licensing option or exploration licence was granted.
Commercial Discovery – Production Phase			

(Source: PwC derived based on information from DCENR/PAD)

Appendix 4 - Exploration and Appraisal Wells Drilled

Figure 43– Exploration and Appraisal Wells Drilled (1970 – 2012)



(Source: DCENR/PAD)

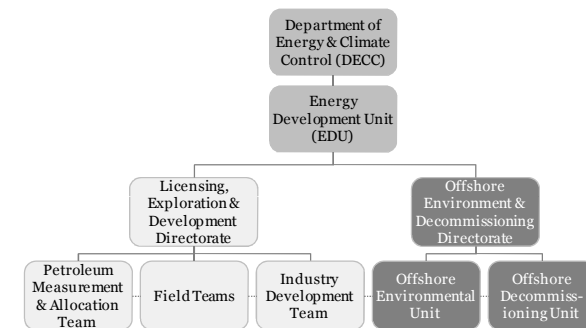
Appendix 5 – UK Regulatory and Planning System

The Energy Development Unit (EDU) of the Department of Energy and Climate Change (DECC) in the UK is the body responsible for ensuring maximum economic recovery of hydrocarbons from UK waters and is the regulator for oil and gas activities. The EDU employs approximately 150 people and comprises a number of distinct teams. Key responsibilities of the two main sections are as follows:

- **Licensing, Exploration & Development Unit** – consists of three teams and is responsible for the development of the regulatory framework and licensing (**Petroleum measurement and Allocation team**), maximising the value of fields and prospects (**Field Teams**), and working with the industry via an oil and gas taskforce (**Industry Development Team**).
- **Offshore Environment & Decommissioning Unit** – responsible for environmental regulation, enforcement, approvals and consent through the **Offshore Environmental Unit** and approval and monitoring of decommissioning programmes through the **Offshore Decommissioning Unit**.

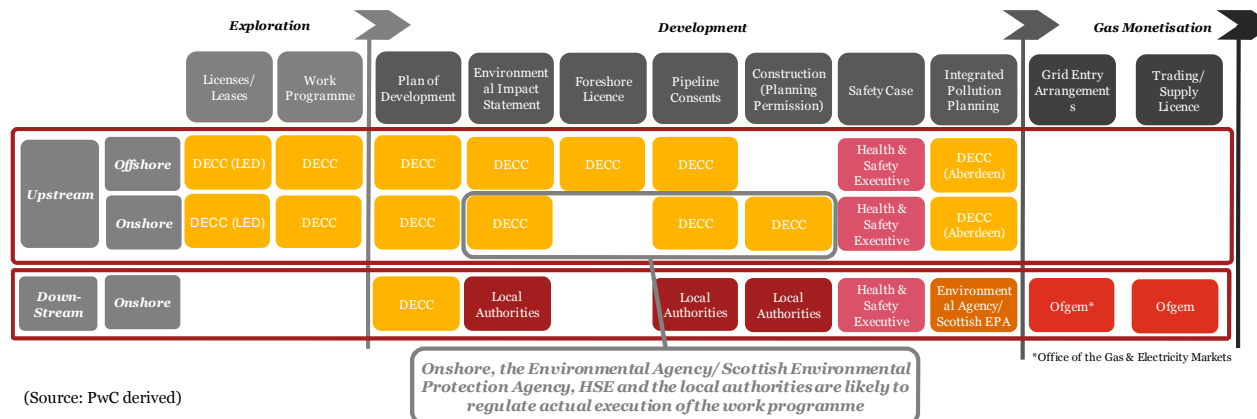
Key elements of the planning and regulatory framework are outlined in Figure 45. DECC acts across the entire upstream lifecycle from exploration through production to decommissioning.

Figure 44– DECC Organisation Structure



(Source: Department of Energy & Climate Change)

Figure 45 – Responsible Bodies for UK Planning



(Source: PwC derived)

Overseas Promotion
Overseas oil and gas promotion is undertaken by the UK Trade and Investment, Department for Business, Innovation and Skills (BIS) (has the function of attracting inward investment, similar to the IDA). An industrial strategy for oil and gas is currently being developed by BIS in collaboration with DECC and Oil & Gas UK (the UK offshore operators association).

Appendix 6 – Norway’s Regulatory and Planning System

The key state bodies responsible for the Norwegian regulatory framework are outlined in Figure 45.

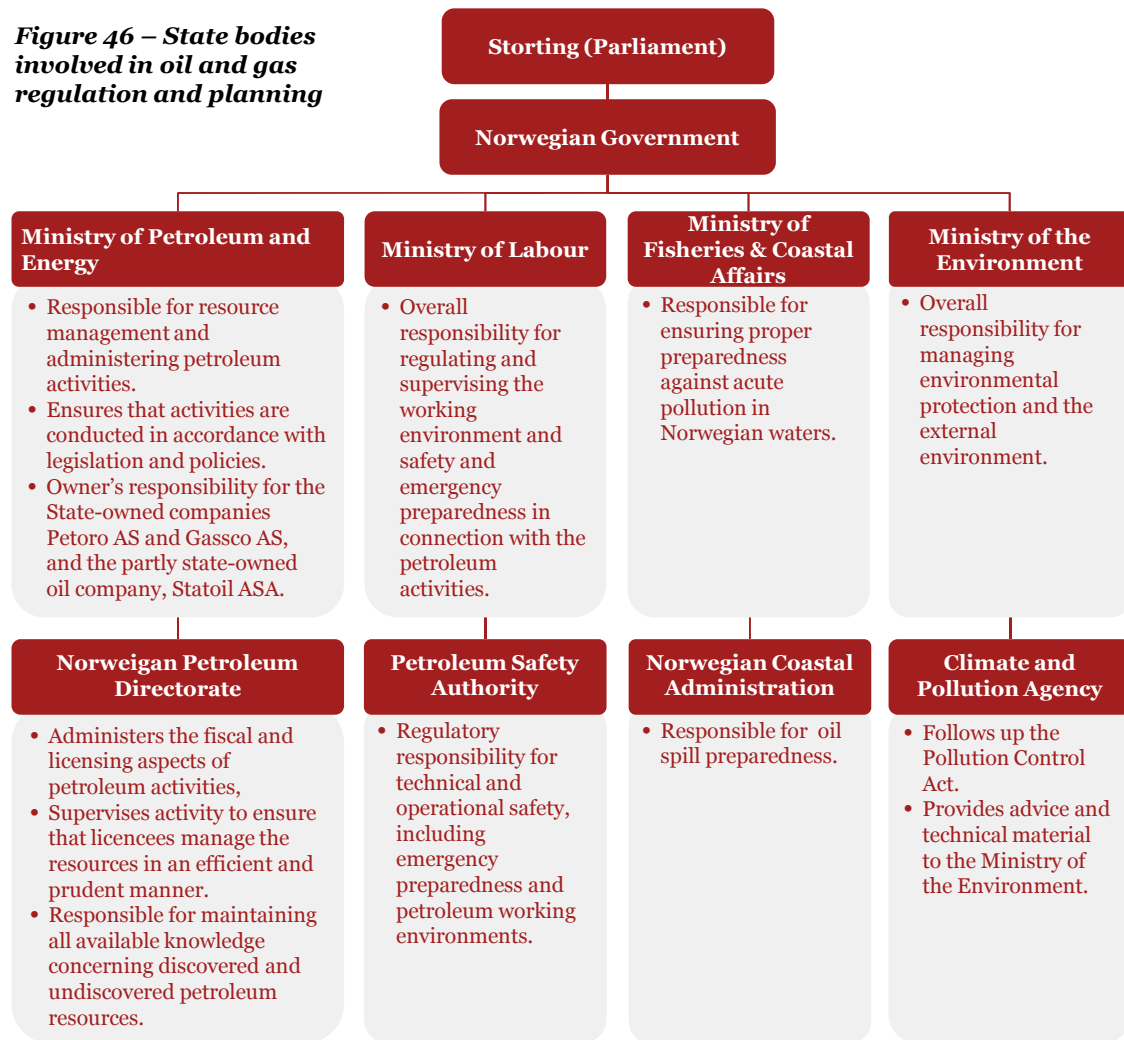
The NPD emphasises the importance of a predictable and transparent framework that considers the external environment, health, working environment and safety.

The framework provides the petroleum industry with incentives to meet the State’s objectives while also maximising their own profits.

Certain critical matters are determined by mutual agreement of private companies and the state through negotiation processes, for example the extent of state participation and the size of the exploration programme.

The regime also includes mechanisms that enhance transparency such as reporting on project incomes, and public information on tax payments.

Figure 46 – State bodies involved in oil and gas regulation and planning



(Source: PwC derived)

Appendix 7 - Fiscal Regime Options

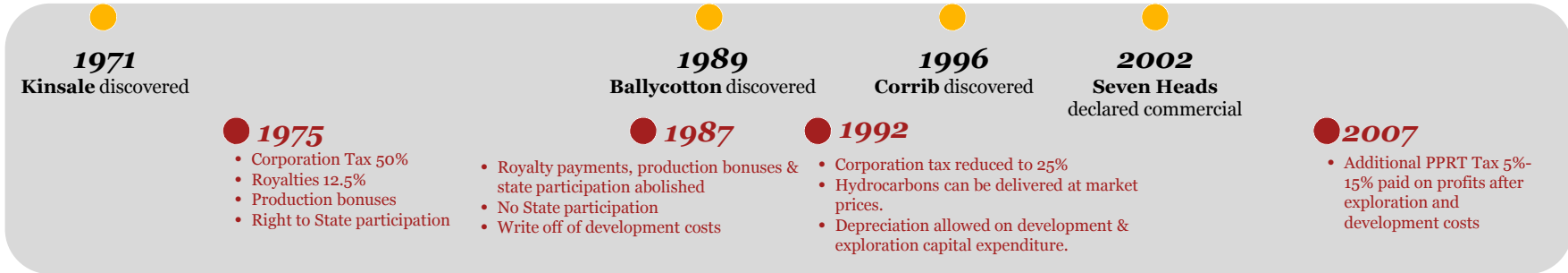
There are various factors that should be considered when designing a fiscal regime. The objective should be to maximise the revenue for the State over time, while achieving other development and socioeconomic objectives. The private sector's aim is to ensure that the return on investment is consistent with the risk associated with the project. Fiscal terms are typically set at the time of first granting of an exploration licence, and extend through to commercialisation. Were this not the case, private sector investors would have no certainty regarding the potential financial return from a major find. The table below explains some of the tax and non-tax components of fiscal regimes.

	How they work	Advantages to State	Disadvantages to State	Effect on Investment Decision
Royalties	<ul style="list-style-type: none"> Based on either the volume (unit) or the value (ad valorem) of production or export. Payable whether or not the project is profitable. 	<ul style="list-style-type: none"> Ensures an upfront revenue as soon as production starts. Easy to calculate, collect and monitor. 	<ul style="list-style-type: none"> Regressive form of taxation. To mitigate this, some countries apply sliding scales. 	<ul style="list-style-type: none"> Unit royalties may encourage future production over current production when future prices are expected to increase. Ad Valorem royalties may increase production in the present as the percentage remains constant.
Corporate Income Tax	<ul style="list-style-type: none"> Taxes are due when annual revenue exceeds some measure of costs and allowances. Key element is the definition of taxable income. Counties may adopt progressive income tax rates (add-ons) based on oil price, production or value. 	<ul style="list-style-type: none"> Assessment, collection and monitoring is easily accommodated in the existing tax system. Progressive income taxes allow the State to benefit when economic conditions are favourable. 	n/a	<ul style="list-style-type: none"> Parameters used to determine progressive rates of income tax are not necessarily correlated to investors return on investment, and therefore may not be neutral for investor decisions.
Resource Rent Tax (e.g. PRRT)	<ul style="list-style-type: none"> Ties taxation directly with project profitability. Taxes are deferred until all expenditure has been returned and the project has yielded a predefined return. May be a stepped tax schedule with incremental brackets. e.g. Ireland 0-15%. 	<ul style="list-style-type: none"> Resource rent tax is neutral in so far as it does not divert investments to or from that industry. 	<ul style="list-style-type: none"> Only provides income to the State when the target rate of return is reached. More difficult to assess and monitor. 	<ul style="list-style-type: none"> Relatively neutral to investment decisions.
Government Participation (e.g. PCS)	<ul style="list-style-type: none"> As a working interest (same terms as other joint venture partners), either from the outset of a project (rare) or as a reserved right to back into the project, (at field development or production). Usually as a carried interest where the State pays for its share from future earnings. Sometimes, the State may back in without repaying the investor for risks taken/ exploration expenses. May be direct, or through a state owned enterprise. 	<ul style="list-style-type: none"> Non-economic benefits- Increase sense of ownership Facilitates transfer of technology Increases control over field development decisions. 	<ul style="list-style-type: none"> May be a conflict of interest for the State as equity holder and regulator. The greater the participation, the lower the other fiscal terms. In some cases, due to the risks and cost of direct participation, the State would be better off solely taxing and regulating. 	<ul style="list-style-type: none"> Participation on concessional terms reduces the cash flow and increases the risk profile. If the State is paid out of production, the investor must raise the entire financing. Many investors view it as a deterrent.

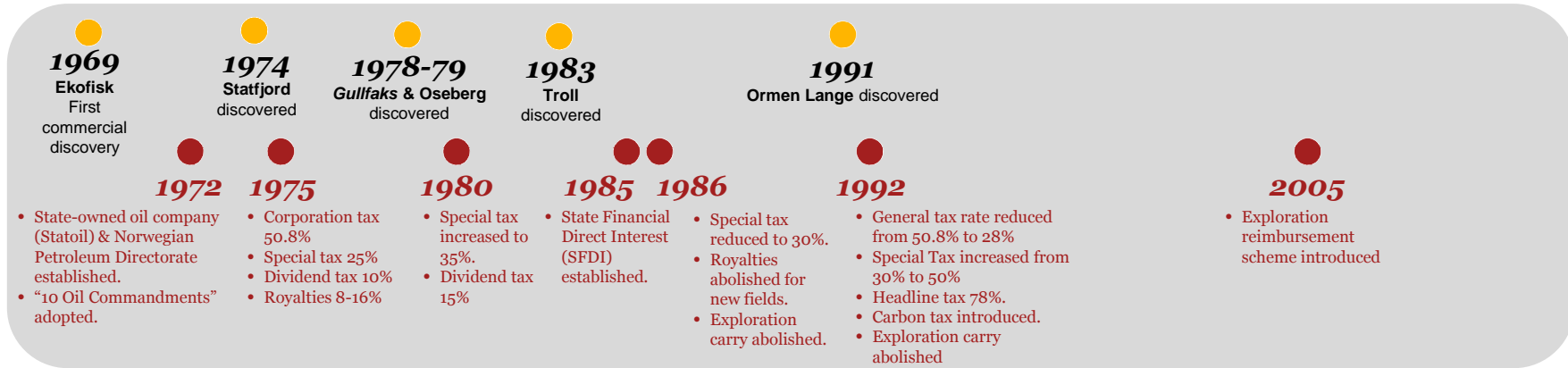
(Source: World Bank Hydrocarbon Fiscal Regimes)

Appendix 8 – Evolution of the Irish, UK and Norway Fiscal Regimes

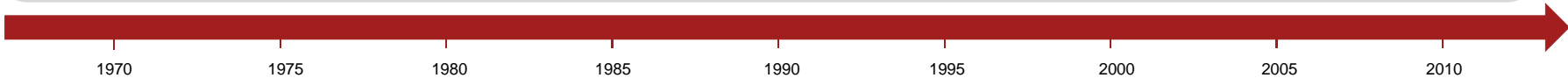
Ireland



Norway



UK



(Source: PwC derived)

● Major oil/ gas field discovery
● Fiscal system change

Appendix 9 – Onshore Infrastructure

Logistic Support Centres

Shore base & supply vessel operations

- Cork, Galway, Foynes and Killybegs have good facilities with warehousing and storage facilities for rent.
- From these locations, supply ships can reach offshore developments within approx 14 hours one-way.
- Ireland will be unable to develop an industry with full harbour support until a much higher level of offshore activity is achieved.
- It may be too early at this stage to identify a location to best serve Atlantic development.

Airports & Helicopter Operations

- Dublin, Cork, Shannon & Donegal Airports are suitable for helicopter support with the option of fixed wing charter flights.

Road Transport Links

- Irish road network is constantly improving and it is feasible to transport heavy trucks by road.

Landfall Reception Facilities

Whitegate Refinery,

- Oil Refinery in Cork Harbour.
- Established in 1957.
- Owned by ConocPhillips.

Whiddy Terminal

- Crude oil transshipment facility in Bantry Bay.
- Stores strategic and commercial stocks.

Corrib-Bellanaboy Bridge Terminal

- Gas processing facility in Mayo.
- Receives, separates and treats gas prior to export into the main gas network.

Inch Terminal

- Gas processing facility for Seven Heads.

Producers have the option to load extracted oil onto tankers and exporting. Gas needs to be cooled and processed as soon as possible following extraction, usually onshore closest to the field.

Skilled Labour

Personnel

- The industry relies on a flexible, mobile international workforce. There are many skilled Irish people working in the oil and gas industry abroad, but there is no indigenous industry here to sustain employment.

Training

- The National Maritime College of Ireland offers bespoke courses tailored to suit the particular training requirements of maritime petrochemical and oil companies.
- Customised training (including survival at sea courses) can be developed on state of the art marine simulators..
- Irish Maritime Energy and Research Cluster (IMERC) aims to promote Ireland as a world-renowned research and development location, that unlocks Ireland's maritime and energy potential.
- They have the ability to develop courses for the offshore oil and gas industry as and when required.

Research & Development

- The Coastal Marine Research Centre can carry out environmental surveys to ensure developments are in line with EU Directives.
- Ireland should aspire to developing niche knowledge-based specialties and capabilities to enhance it's attractiveness to multinationals for R&D.

Appendix 10 - Economic Multipliers Explained

Multipliers Explained

- **Direct impact** is measured as the jobs and value added generated by immediate beneficiaries of the additional Irish economy expenditure of the Barryroe Project e.g. the impact of the expenditure on the local helicopter company;
- **Indirect impact** is measured as the jobs and value added of suppliers to the direct beneficiaries of the additional spend; e.g. the impact of this additional spend on the helicopter company suppliers e.g. fuel supplier;
- **Induced impact** is measured as the jobs and value added resulting from the additional economy expenditure from expenditure of employees of Barryroe suppliers e.g. income received by retailers as a result of spending of the an employee in the fuel suppliers.

The most commonly applied form of multipliers are output and employment. The former measures the contribution of an additional € in expenditure to the national output, which is essentially a measure of the full value-added of the economy. The latter measures the impact on full-time equivalent (FTE) jobs

Multipliers are unique to individual economies, reflecting (among other factors) the fact that the import content of different sectors of activity will vary significantly depending on the resource base of the economy.

Potential Benefit to Ireland

The expenditure in throughout the construction and operation phase of the Barryroe project was analysed and split out between expenditure in Ireland and expenditure overseas.

The base case measures the number of FTEs that are estimated to be generated throughout the life of the Barryroe Project in Ireland.

Ireland presently lacks certain of the key supports and resources required to derive maximum economic advantage from a major oil or gas find. There is the risk that scale of economic return from a major offshore find will be less than experienced elsewhere.

However, if activity in the sector improves, local business will start to develop their service and products propositions to take advantage of the oil and gas industry. This in turn will have an impact on the number of jobs generated by the project in Ireland i.e. less jobs will go to overseas companies and suppliers.