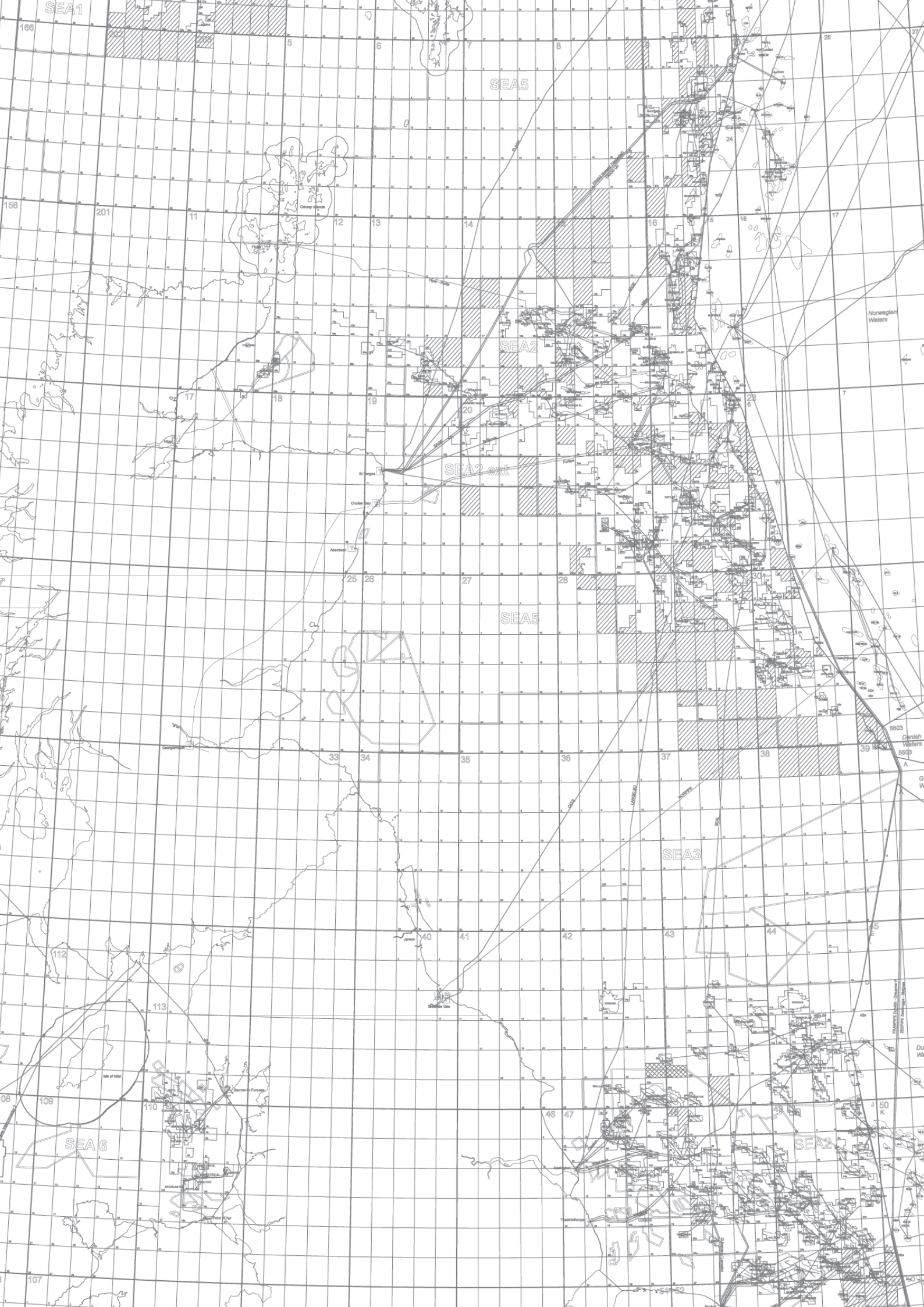

UKCS MAXIMISING RECOVERY REVIEW: FINAL REPORT

24 February 2014

Sir Ian Wood

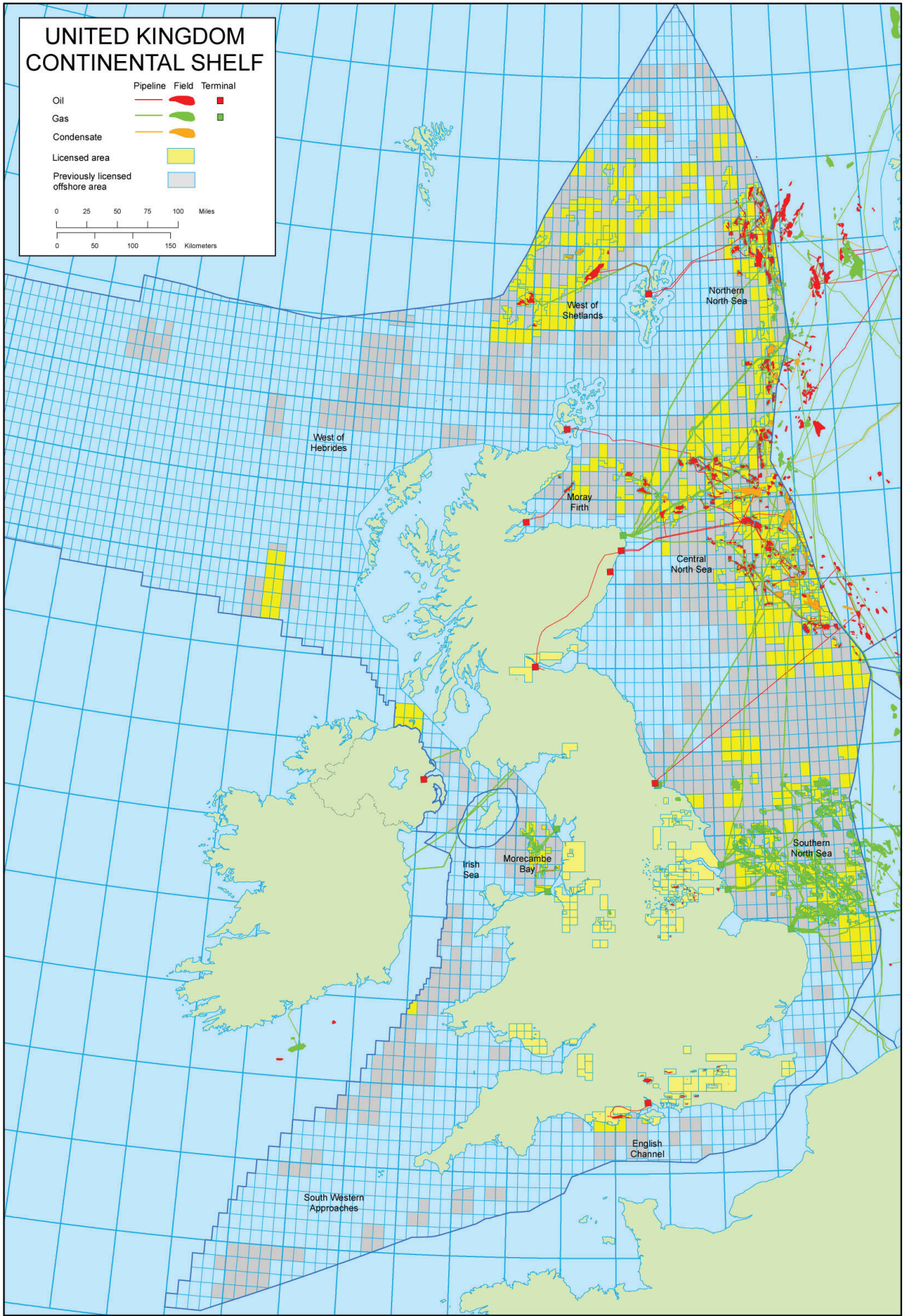
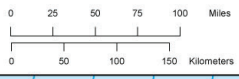


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UNITED KINGDOM CONTINENTAL SHELF

- | | Pipeline | Field | Terminal |
|-----------------------------------|----------|-------|----------|
| Oil | | | |
| Gas | | | |
| Condensate | | | |
| Licensed area | | | |
| Previously licensed offshore area | | | |



Foreword

I am pleased to present the Final Report of my UK Continental Shelf (UKCS) Maximising Recovery Review.

My Interim Report set out the Review's core recommendations which were issued for consultation:

- The urgent need for enhanced stewardship of UKCS resources;
- The importance of a new tripartite strategy for Maximising Economic Recovery from the UKCS (MER UK), involving HM Treasury, Industry, and a new independent Government Regulator with additional powers and resources; and
- The need for clear commitments from Industry to collaborate and work to the MER UK strategy.

These recommendations received overwhelming Industry support in written feedback and at various meetings. I have also been encouraged by the positive engagement from DECC, HM Treasury and senior Government Ministers.

In my Final Report, I have taken account of feedback, provided more information on how I see MER UK working and outlined six Sector Strategies, highlighting their role in MER UK, for the Regulator and Industry to take forward.

In this Foreword, I would like to briefly address some key themes from the feedback:

1. Firstly, I believe that the fundamental licensing model by which the UK monetises its offshore oil and gas resources is the right one. It is the model that works successfully in most countries which are not monopolised by national oil corporations.

In the early days with large fields to be found by major operators, the free market model worked well with a light touch Regulator. Some large fields were discovered and the UKCS was successfully launched into what was to become one of the UK's greatest industrial success stories. However, over time, the number of fields has increased, now to over 300, new discoveries are much smaller, many fields are marginal and very inter dependent, and there is competition for ageing infrastructure. Alongside this, the present Regulator has halved in size in the last 20 years and, as a result, is clearly struggling to perform a more demanding stewardship role. Additionally, the UKCS is facing stiff and growing competition from many international offshore regions and we need to step up our game to attract more investment.

The problems the Review has identified will be largely resolved by evolving the model to introduce a stronger Regulator with broader skills and capabilities able to significantly enhance the level of co-ordination and collaboration. Working closely with HM Treasury and Industry, the stronger Regulator will achieve the principles of MER UK whilst ensuring a fair return to companies to maintain and attract new investment to the basin.

2. I am also clear that the development of the UKCS must continue to be led by the operators, who provide the significant investment of funds, expertise and experience. The new Regulator's role will be licensing, supervision and stewardship. It must be low in bureaucracy, high in skills and experience, and strong and pragmatic. It will play a vital role in facilitating, co-ordinating, mediating, promoting and catalysing collaboration, removing barriers, and encouraging more efficient exploration, development and production.

To be effective, the new Regulator must be prepared to make greater use of its current powers, and will be helped by the proposed additional powers which are focused on maximising economic recovery by encouraging and facilitating collaboration and removing dispute barriers. The additional powers are not designed to force operators to invest but major investments will only be approved if they are consistent with the MER UK strategy whilst providing a fair return to licensees. The Regulator will influence and guide exploration, development and production investment decisions towards achieving the MER UK strategy. Recovering more oil and gas resources from the UKCS, and attracting more players and investment, will be to the benefit of all parties.

3. At present, the Regulator must compete for attention and resources within an extremely busy Department of Energy and Climate Change (DECC). The new Regulator must have a significant degree of independence and, with a strong CEO and enhanced autonomy, resources and capabilities, will be able to become far more involved and influential in the industry's challenges. With competitive remuneration levels, it should become an employer of choice attracting some of the best young graduates as an important first career step. It should also attract experienced personnel from operators and the supply chain who will welcome the opportunity to help meet a wider UKCS challenge and play a vital role in shaping the future of the industry. The success and reputation of the Regulator will be determined by the calibre of people it attracts and retains and I am encouraged by the quality of interest already expressed in feedback received.

4. The new Regulator will set its own priorities but from my Review I believe these should be:

- Establishing a strong relationship with HM Treasury who will benefit from access to counsel from a knowledgeable and informed Regulator and be better able to adjust the fiscal regime to meet the new challenges arising from maturity, and the opportunities for frontier areas and new plays;
- To work with HM Treasury and Industry to significantly enhance exploration programmes over the next two to three years;
- Working with Industry to significantly improve production performance and increase reservoir recovery;
- Encouraging and working with Industry to tackle the spiralling increases in exploration, development, production and decommissioning costs;
- Encouraging and facilitating both better deployment of current technology, and the development of new technology. There is an urgent need for Industry to focus in depth on the five or six most critical technology challenges.

5. Understandably, many of the feedback responses asked for more detail. Where appropriate, I have included this in the updated Report, Sector Strategies and a fuller explanation of MER UK. However, the Report is intentionally not over prescriptive. I have focused on making recommendations to set the general direction and key changes required. The details of how my recommendations should be implemented will be for the new Regulator and DECC, working closely with Industry and HM Treasury, to determine.

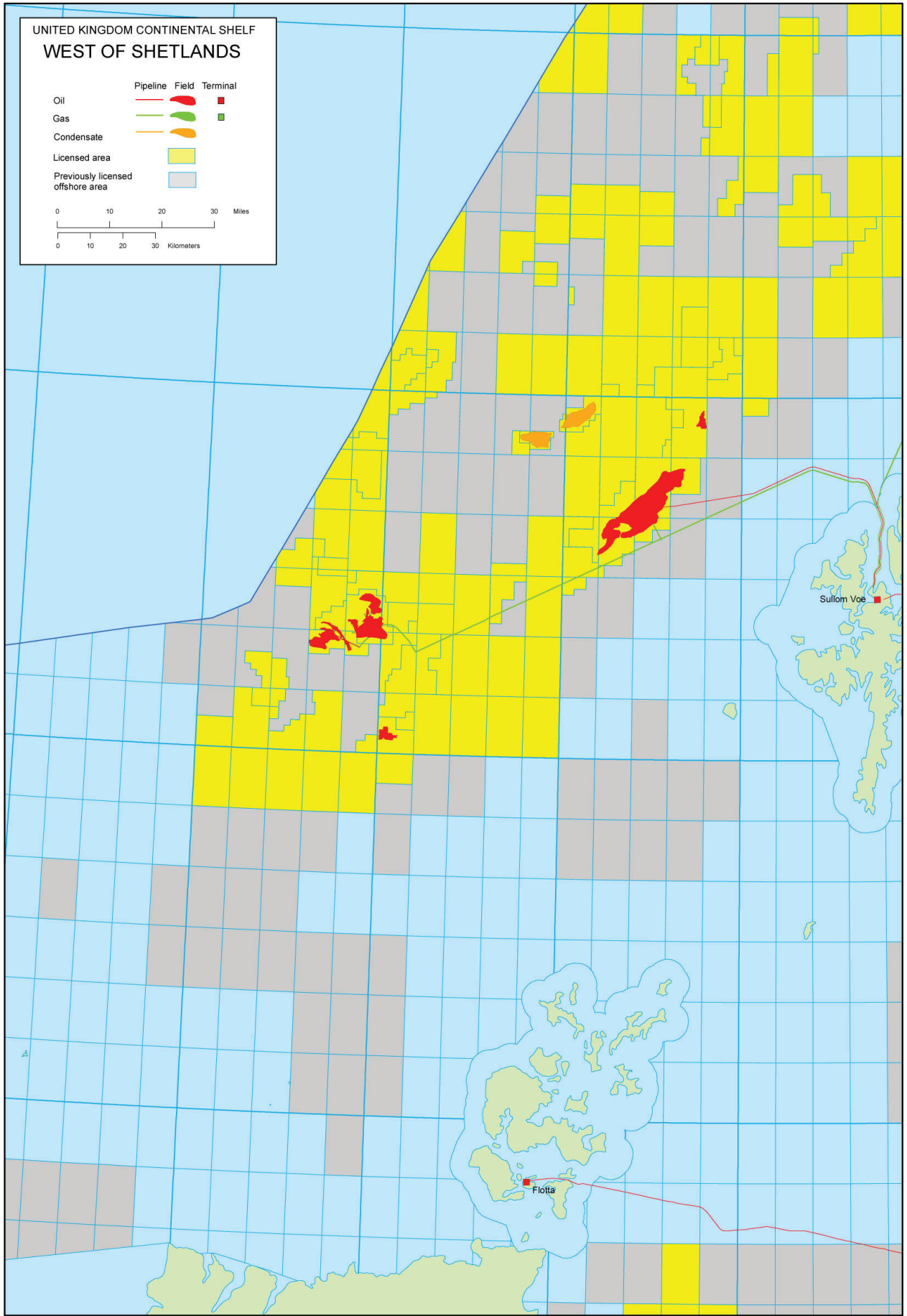
6. On the question of how the new Regulator might be financed, Industry understandably feels Government should pay at least some proportion of the costs. As I said in the Interim Report, I believe Industry will have to pay, but in return should be granted appropriate service level agreements laying out the quality of support and delivery that Industry should expect from the new Regulator.

7. One of the clearest messages from the feedback was the importance of moving ahead quickly to implement the recommendations. There is a huge prize at stake, and I believe Government must implement the key recommendations, including the creation of a new Regulator, as quickly as possible. The case for swift implementation is made all the more pressing by Industry's expectation of at least a 50 per cent reduction in new field investment in the latter half of this decade, unless further new commercial fields are identified. There is also clear consensus that exploration is at a critically low level and badly needs significant new initiatives.

UK offshore oil and gas is a great industry which has made an immeasurable and vastly underestimated contribution to the UK economy over the last five decades. This Review provides the opportunity for it to face its next 30 years and beyond supported by a better resourced, more capable and more involved Regulator that, working with greater industry collaboration, will help take us closer to the 24 billion boe prize potentially still to come.

I would like to thank both Industry and DECC for the frankness and honesty of their evidence, and their very helpful insight into the UKCS' challenges and opportunities. I would also like to thank my Review Team – Tom Wintle and Craig Watson from DECC and Michael Tholen from Oil & Gas UK - for the great work they have done in helping me pull the Review together in such a short period of time.

Finally, I must also thank the Secretary of State, Edward Davey, for giving me the opportunity to lead this Review and pull together the views expressed by many fine people from DECC, industry, other Government departments and from wider UKCS stakeholders. The success of the implementation of this Review is now in your hands.



Executive Summary

The UK's oil and gas industry makes a substantial contribution to the UK's energy security, economy and employment. Production from the UK Continental Shelf (UKCS) met 67 per cent of the UK's oil demand and 53 per cent of gas demand in 2012¹, supported the employment of 450,000 people across the UK, and in 2012-13 the industry paid £6.5 billion in corporate taxes on production².

Some 42 billion barrels of oil equivalent (boe) have already been produced from the UKCS³ and it is estimated that a further 12 to 24 billion boe could be produced⁴.

Whilst the UKCS is one of the most mature offshore basins in the world, it is not uniform and comprises a diverse mix including some frontier areas and new plays. Investors face new challenges as discoveries are generally smaller and more expensive to exploit⁵, fields are operated by an increasingly diverse mix of companies who are far more interdependent than before, and some operating assets are more than 30 years old – at or beyond the end of their originally intended design life.

Although UKCS investment reached a record high of over £14 billion in 2013⁶, Industry anticipates that this will at least halve in the second half of the decade unless new developments are matured. Additionally there are some serious underlying problems. Production has fallen by 38 per cent between 2010 and 2013, meaning the UKCS produced around 500

million boe less over the period. 360 million boe of this decline was caused by a rapid fall in production efficiency, costing HM Treasury £6 billion in lower tax receipts⁷. Further, a sharp decline in exploration has led to less than 150 million boe being discovered in the last two years.⁸

The problem is not our licensing model, which works successfully in most countries which are not monopolised by national oil corporations. The problem is that the light touch regulation applied in the early days of large fields and large operators, must now be evolved to take account of a basin with over 300 fields, much smaller new discoveries, many marginal fields and much greater inter dependence in exploration, development and production. The model must be evolved to address the following key issues:

- i. The need for operators to focus on maximising economic recovery for the UK as well as pursuing their individual commercial objectives.
- ii. The need for fiscal stability consistent with the challenges of maturity.
- iii. The need for a greater resourced and more proactive Regulator.
- iv. The need for significantly improved asset stewardship.
- v. The need for far greater constructive collaboration between operators.
- vi. The need for better implementation of industry strategies.

¹ Energy Trends Table I.3 June 2013 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208560/et_june_2013.PDF

² Oil & Gas UK Economic Report 2013 <https://publ.com/N6DITaa#6>

³ <https://www.gov.uk/oil-and-gas-uk-field-data#uk-oil-and-gas-reserves>

⁴ The range of reserves, resources and yet-to-find potential on the UKCS is reported by DECC www.gov.uk/oil-and-gas-uk-field-data. The sum of the separate low cases totals 12 billion boe, the mid-cases 22 billion boe and the high cases 35 billion boe. The Review has taken the low case outcome as 12 billion boe and the high case expectation outcome as 24 billion boe.

⁵ Wood Mackenzie submission, September 2013

⁶ Oil & Gas UK Economic Report 2013 <https://publ.com/N6DITaa#6>

⁷ Comparison of UKCS Tax Yield – Budget 2011 and 2013

⁸ Wood Mackenzie- Review of 2012 & 13 – UK upstream sector

To address these issues the report makes the following principal recommendations:

Recommendation 1: Government and Industry to develop and commit to a new strategy for Maximising Economic Recovery from the UKCS (MER UK)

Government (HM Treasury and the Regulator) and Industry must adopt a cohesive tripartite approach to develop and commit to a new, shared MER UK strategy to maximise the huge economic and energy security opportunity that still lies off the UK’s shores.

This Report details the key principles of MER UK, central to which will be the Regulator exercising its functions with a view to securing the maximum amount of economically recoverable petroleum from UK waters, and licence holders required to act in a manner best calculated to give rise to the recovery of the maximum amount of petroleum from UK waters as a whole, not just that recoverable under their own licences.

Recommendation 2: Create a new arm’s length regulatory body charged with effective stewardship and regulation of UKCS hydrocarbon recovery, and maximising collaboration in exploration, development and production across the Industry

The Department of Energy & Climate Change (DECC) should create a new independent Regulator, responsible for operational regulation of the UKCS, focused on supervising the licensing process and maximising economic recovery of the UK’s oil and gas reserves in the short, medium and long terms.

Recommendation 3: The Regulator should take additional powers to facilitate implementation of MER UK

To underpin delivery of the new MER UK strategy, Government should fully utilise its existing powers and take such additional powers as necessary to enable the new Regulator to:

- Ensure that in all areas of exploration, development and production, licence holders must act in such a way that is consistent with MER UK.
- Operate protocols and processes for dispute resolution, including the right for non-binding mediation and the use of expert assessors where appropriate.
- Operate a clear system of (private) informal and (public) formal warnings which could ultimately lead to the loss of operatorship and then licence.
- Attend Consortia Operating and Technical Management Committee meetings.
- Ensure greater access to the timely and transparent data necessary for a competitive market.

Recommendation 4: Develop and implement important Sector Strategies

The new Regulator should work with Industry to develop and implement the strategies outlined in this Review which build on the excellent work already conducted within PILOT and will underpin the MER UK strategy:

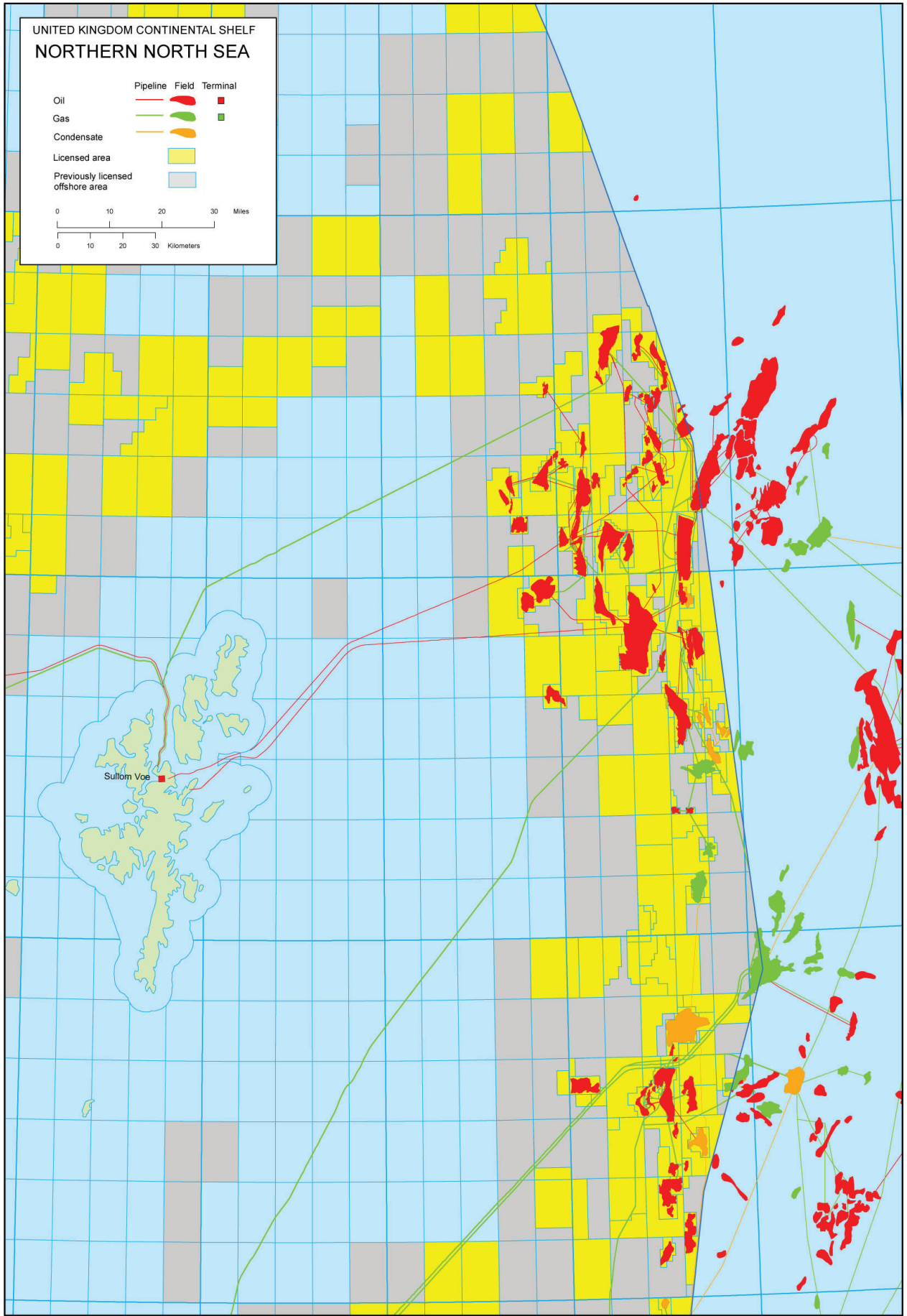
- Exploration (including access to data)
- Asset Stewardship (including Production Efficiency and Improved Oil Recovery)
- Regional Development (starting with the Southern North Sea)
- Infrastructure
- Technology (including Enhanced Oil Recovery and Carbon Capture and Storage)
- Decommissioning

Industry will be required to operate by the principles of the MER UK strategy, and this Report details a series of commitments Industry should be required to make as part of their participation in the tripartite strategy, including greater collaboration in key areas such as the development of regional hubs, sharing of infrastructure, appropriate sharing of geophysical information, and reducing the complexity and delays in current legal and commercial processes.

The Review believes that urgent and full implementation of the recommendations in this report will have the potential to deliver, at the low end, an additional 3-4 billion boe⁹ over the next 20 years, worth approximately £200 billion to the UK's economy at today's prices, and at the high end, will put the UK in a much stronger position to get closer to the 24 billion boe potential.

⁹ The benefits derive from the following opportunities, all of which contribute to a positive outlook for the UKCS and are unlikely to be achieved unless the recommendations within this report are implemented. Many of the elements overlap and a conservative estimate of 3-4 billion boe has been used. Key components:

- Increased rate of exploration estimated to deliver an additional 1 – 1.5 billion boe (Review team analysis),
- Effective implementation of Enhanced Oil Recovery (EOR) – 0.5 - 1 billion boe - ranging up to 6 billion boe in a best case scenario (DECC figures),
- Improved use of infrastructure allowing an additional 0.5 – 2 billion boe to be recovered (Infrastructure Access Group report to PILOT May 2013)
- Postponing of decommissioning (by five years on average) adding an additional 1 billion boe (Review team analysis).



2.

Introduction

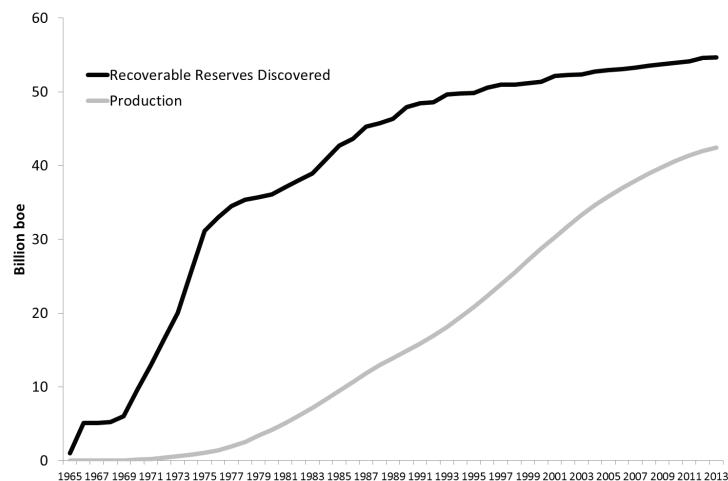
2.1 Overview

The first licences for the extraction of oil and gas from the UK Continental Shelf (UKCS) were issued in 1964, and over the last fifty years, the industry has spent more than £500 billion¹⁰ (in 2012 money) in exploration, development and production activities. To-date HM Treasury has received more than £310 billion¹¹ in production taxes and the UK has benefitted substantially from the employment, exports and huge impact on balance of payments provided by these oil and gas resources, and the emergence of a world class supply chain which has developed over the last five decades on the back of the UKCS.

The UK's oil and gas industry makes a substantial contribution to the UK's energy security, economy and employment. It supports the employment of 450,000 people, directly and indirectly¹², across the UK, and underpins the international export of related UK goods and services worth £7 billion¹³. In 2012-13 the industry paid £6.5 billion in corporate taxes on production¹⁴, over 15 per cent of all corporate taxes in the UK, and made a contribution of £39 billion to the UK balance of payments¹⁵.

“To-date the UKCS has produced more than 42 billion boe...”
Cumulative Reserves Discovered and Produced across the UKCS

Source: Wood Mackenzie



¹⁰ Oil & Gas UK Economic Report 2013 <https://publ.com/N6DITaa#6>

^{11, 12, 13} See reference 10

¹⁴ <https://www.gov.uk/oil-and-gas-taxation#government-revenues-from-uk-oil-and-gas-production>

¹⁵ See reference 10

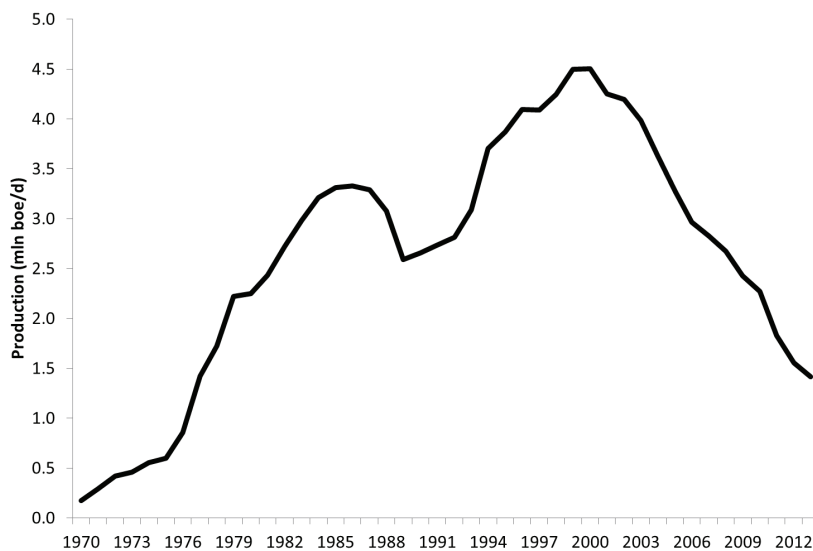
To-date the UK has produced more than 42 billion boe¹⁶. This is now a mature province, yet one with significant further potential including some new plays and frontier areas. It is estimated that a further 12 to 24 billion boe could be produced¹⁷ with ultimate recovery in a large part dependent on how well the UK manages the overall development of its remaining resources.

In addition to the economic importance, maximising recovery of the UK’s indigenous supplies of oil and gas will help maintain security of supply as the UK transitions to a low-carbon future, with DECC’s projections showing that in 2030 oil and gas will still be providing 70 per cent of the UK’s primary energy requirements¹⁸. In 2012, the UKCS produced 67 per cent of the UK’s oil demand and 53 per cent of gas demand¹⁹.

“Production from the UKCS peaked in 1999 at 4.6 million boepd...”

Annual production from the UKCS (oil and gas combined)

Source: DECC



¹⁶ <https://www.gov.uk/oil-and-gas-uk-field-data#uk-oil-and-gas-reserves>

¹⁷ See reference 4

¹⁸ DECC Updated Energy and Emission Projections to 2030
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239937/uep_2013.pdf

¹⁹ Energy Trends Table 1.3 June 2013
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208560/et_june_2013.PDF

2.2. Business Environment

The dynamics of the UKCS in the early days of production were very different than today. Throughout the 1970s and 1980s, a small number of very large fields dominated UKCS production, whereas today's production comes from more than 300 fields²⁰ operated by an increasingly diverse mix of companies who are far more interdependent than before. Most new fields are considerably smaller in size, the average UKCS discovery size over the past ten years has been 25 million boe and 90 per cent of current fields in production on the UKCS are producing less than 15,000 barrels of oil equivalent per day (boepd)²¹.

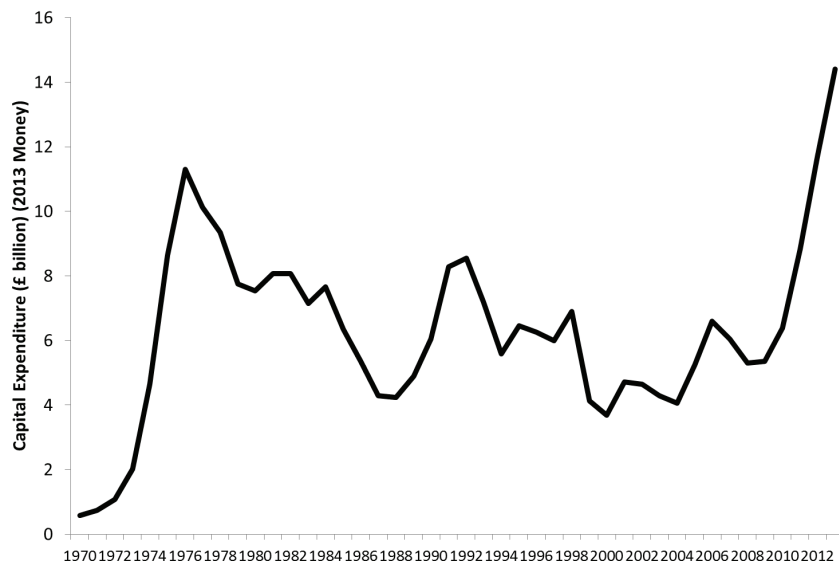
The UKCS is now one of the most mature offshore basins in the world but still has some interesting frontier areas, new exploration plays (such as the Carboniferous and Sub-basalt) and huge opportunities in maximising brownfield recovery. For example, the area West of Shetland is essentially a frontier region which provides the opportunity to use the lessons learnt from the more mature UKCS areas to achieve the optimal development.

Production from the UKCS peaked in 1999 at 4.6 million boepd²² and declined at around 7 per cent per annum to 2010 in a period of constrained investment. Exploration activity had picked up and averaged around 33 wells per annum over the period 2005-2008²³, discovering 1.4 billion boe²⁴.

“The fiscal allowances introduced by HM Treasury have resulted in a surge of new field developments with capital spend at £14 billion last year...”

Annual Capital Expenditure on the UKCS (2013 money)

Source: DECC, Oil & Gas UK



²⁰ Wood Mackenzie industry database

²¹ Wood Mackenzie submission, September 2013

²² <https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes>

²³ <https://www.gov.uk/oil-and-gas-wells#drilling-activity>

²⁴ Wood Mackenzie industry database

The last four years, however, have seen significant changes in business outlook:

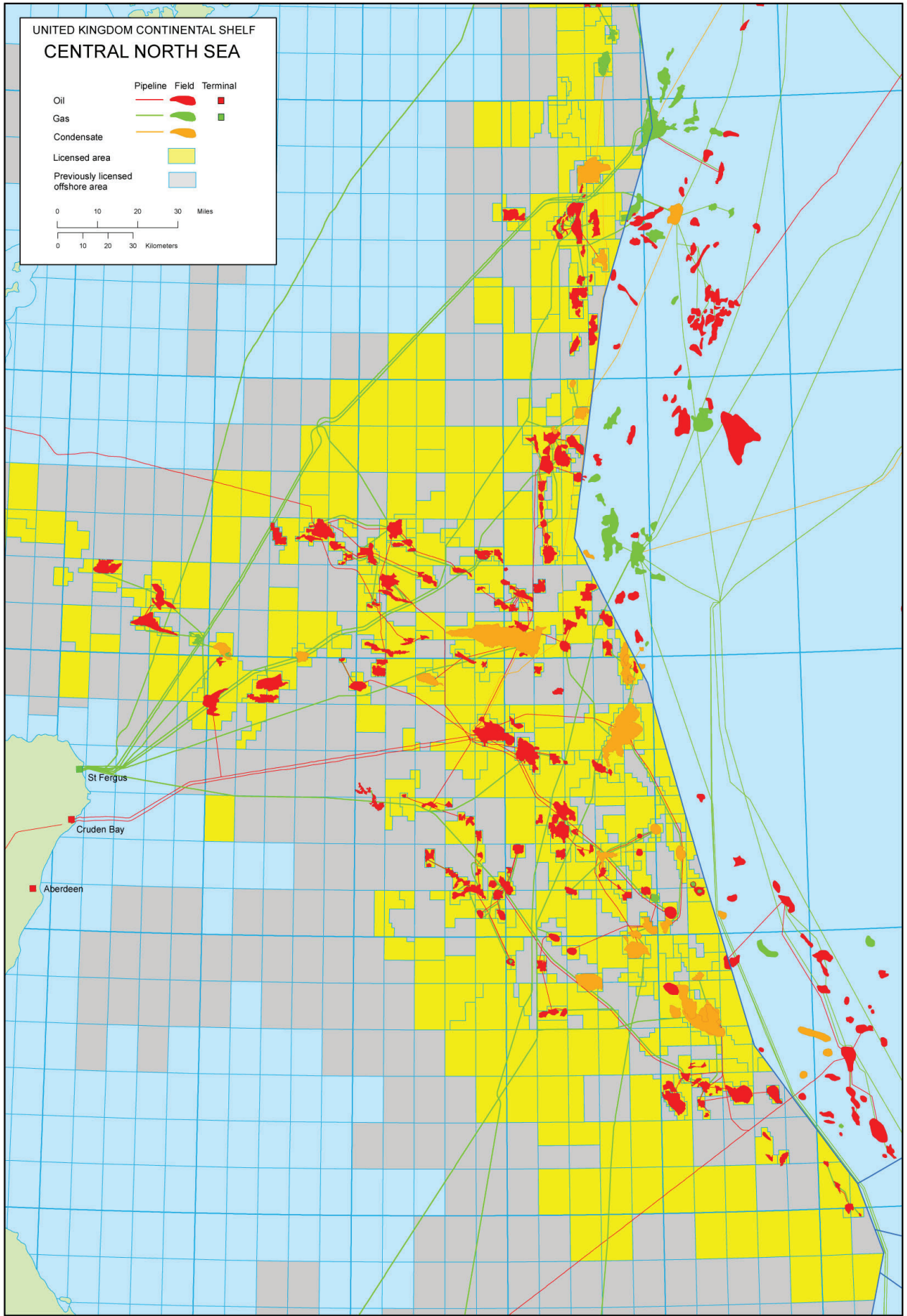
- i) The fiscal allowances introduced by HM Treasury have resulted in a surge of new field developments with capital spend at £14 billion last year. However, these fields will all be significantly developed by 2017/18 and as Oil & Gas UK indicated in their 2013 Activity Survey²⁵, capital expenditure will halve over this period unless new developments are matured.
- ii) Production has fallen by 38 per cent over the last 3 years producing around 500 million boe less over the period, 360 million of which is due to the rapid fall in production efficiency which has cost HM Treasury up to £6 billion in lower tax receipts. Production hit a low of 1.4 million boe last year, but a number of larger new fields are due to come on stream in the next two to three years and that could gradually take production back to the level of two to three years ago where it could be sustained for the remainder of this decade. However, many of the possible new smaller field developments will only be viable through collaboration to form hubs/ clusters to achieve the most economic and efficient development.
- iii) Production efficiency is critical to maximising recovery and has fallen from 80 per cent a decade ago to 70 per cent in 2010 and to an average of 60 per cent in 2012. There is an urgent need to recover this to at least 70 per cent as soon as possible and then back to 80 per cent over time.
- iv) Exploration is at an all-time low and is in urgent need of attention. In the last two years less than 150 million boe has been discovered and if this trend continues, the UK will fail to recover even a small portion of the exploration potential that still remains across the UKCS, which DECC estimate to range from 6 – 16 billion boe.
- v) Some operating assets are more than 30 years old – at or beyond the end of their intended design life. A key market and timing consideration is the need to maintain ageing infrastructure and encourage new infrastructure investment, as well as ensuring it is fully utilised through appropriate collaboration.
- vi) The UKCS has been criticised for not making full use of new technology. This will be key to enabling the exploitation of ever more complex discoveries, such as tight gas and oil and high pressure high temperature fields.
- vii) Cost pressures are also a significant challenge with the UKCS being one of the more expensive offshore basins in the world with development costs per barrel having risen five fold over the last decade. There must be concern at the recent postponement of two sizeable projects and steps must be taken to reduce the cost base.
- viii) Huge competition now exists for investment and resources coming from the international market. As each year goes by attracting international investment becomes more challenging and Government and Industry must proactively take steps to make the UKCS more commercially attractive.

²⁵ <http://www.oilandgasuk.co.uk/publications/viewpub.cfm?frmPubID=725>

2.3. Key Issues

The reasons behind the market trends are complex, but the Review believes the following issues are key:

- i) **Lack of focus on Maximising Economic Recovery for the UK** – under the current approach, operators have pursued individual commercial objectives in isolation, with limited shared commitment or obligation to maximise economic recovery across fields or within regions of the UKCS. New infrastructure is typically designed only for specific developments and without taking account of wider potential demand. Over the last three years, ten Floating Production Storage and Offloading vessels (FPSOs) have been selected for new fields. These have enabled the development of fields that would otherwise have been uneconomic, but generally have higher operating costs and poorer field recovery. Every effort must be made to use existing infrastructure where available.
- ii) **Fiscal Policy** – clear views were expressed that fiscal instability has been a significant factor in basin under-performance. However, changes such as the introduction of fiscal allowances for some new fields, for brown field developments, and certainty over decommissioning tax relief have been well received, and will help maximise long term economic recovery.
- iii) **Government stewardship** – Government’s present stewardship model, which was designed when the UKCS was a relatively young basin and is towards the “light touch” end of intervention, will not be adequate to manage the challenges the UKCS faces in the future. The Regulator (situated within the Department of Energy & Climate Change, DECC) is now significantly under resourced and far too thinly spread to respond effectively to many of the demands of managing an increasingly complex business and operating environment.
- iv) **Industry stewardship** – the rapid fall in production efficiency is an indication of poor asset stewardship which the Regulator has not been able to adequately confront due to the significant increase in their workload in recent years. The consequences of a past lack of investment are also becoming increasingly apparent. While ageing assets are a factor, there are strong signs that under-investment in assets and insufficient uptake of Improved Oil Recovery (IOR) and Enhanced Oil Recovery (EOR) techniques will have a significantly adverse effect on maximising economic recovery for the UK. It is acknowledged that some EOR schemes are costly and complex to operate, but Industry must be encouraged to invest more in these schemes to avoid leaving significant value behind.
- v) **Lack of collaboration and overzealous legal and commercial behaviour between operators** – a lack of cooperation and collaboration across industry has increased costs, caused delays, and led to poorer recovery. For example, the Review has found more than 20 instances in the last three years where the inability of operators to agree terms for access to processing and transport infrastructure has led to sub-optimal (more expensive / lower recovery) developments, significant delays or in some cases stranded assets.
- vi) **High quality strategic thinking by PILOT, but poor implementation** – on issues such as exploration, infrastructure and decommissioning, the UKCS now requires integrated planning and collaboration to ensure the most efficient approach is adopted across the UKCS. The Regulator and Industry must continue to work together through PILOT to implement the strategies already developed in a number of key areas.



3.

A new strategy for Maximising Economic Recovery from the UKCS (MER UK)

3.1. MER UK Strategy

Recommendation 1: Government and industry to develop and commit to a new strategy for Maximising Economic Recovery from the UKCS (MER UK)

The UKCS operating environment has changed very significantly in the last 20 years, growing to more than 300 fields, increasingly inter dependent for both production facilities and infrastructure, and in an environment of greater international competition to attract investment capital. Until now, successive governments have not taken a holistic approach in regulating exploration, development and production. The Review found strong consistent evidence of the need and desire for such an approach, with a more influential Regulator to facilitate and encourage collaboration on exploration, cluster field development and use of infrastructure to maximise the amount of oil and gas discovered and recovered. This holistic approach is the new MER UK Strategy.

Core to the strategy is:

- The evolution of the present Regulator to an independent, stronger, more experienced body with broader disciplines and powers. It must have the capability to facilitate and influence greater collaboration between operators on exploration, field developments and infrastructure to provide more revenue for the UK and better returns for the licensee.

- A cohesive tripartite approach between HM Treasury, the new Regulator and Industry to ensure UK Government's fiscal and regulatory policies take account of the late life challenges and opportunities of maturity, as well as encouraging the new frontier areas and new plays, to ensure we maximise the huge economic and energy security opportunity that still lies off the UK's shores.
- Industry's commitment to play its full role in the new tripartite approach, recognising that much better collaboration will increase the opportunities and value for all parties.

In addition to the formation of the new independent Regulator, the tripartite approach between HM Treasury, Regulator and Industry and Industry's commitment to much better collaboration, the Regulator must work with Industry to evolve six key sector strategies focused on achieving MER UK. These are summarised below and set out in further detail in Section 4 of this Report.

- **Exploration strategy** – to revitalise exploration, thereby ensuring that the totality of the economically recoverable oil and gas resources from the UKCS both in existing and new plays are fully explored, appraised and exploited in a timely manner consistent with existing and potential new infrastructure. This should be facilitated by efficient access to well and seismic data, an appropriately tailored licensing regime, and encouraging appropriate data sharing within the regional development plans. Measures should also be taken to promote UKCS exploration opportunities internationally.

- **Asset stewardship strategy** – to ensure operators are held to account for the proper stewardship of their assets and infrastructure consistent with their obligations to maximise economic recovery from the fields under their licences and with consideration to adjacent resources. In particular, operators should be expected to develop, maintain and operate their assets and infrastructure at all times in an efficient and effective manner and should share their asset stewardship strategy with the Regulator. The Regulator should set clear expectations on critical stewardship factors such as production efficiency²⁶ and recovery efficiency²⁷ and work with each joint venture partnership to ensure they are met.
- **Regional Development strategy** - to ensure the development of UKCS resources on a regional, rather than solely a field basis. Operators should be required, where appropriate, to co-operate with the Regulator and with other licence holders in the wider adjacent area on all aspects of field and cluster development, from exploration through to decommissioning, with the overarching aim of maximising economic recovery from clusters of fields as well as from individual fields. This offers opportunities to jointly enhance value to both HM Treasury and to licensees to deliver the best economic outcome. Consistent with this and the increasing need to tie back smaller and more marginal discoveries into existing – and often ageing - infrastructure, licence holders should make their infrastructure and process facilities available, subject to their own capacity requirements and technical compatibility, at fair and economic commercial terms and rates to potential third party users.
- **Infrastructure strategy** – to ensure that the life of the existing infrastructure is prolonged to facilitate the processing, transport and export of the UK’s offshore oil and gas resources, and investment in new key infrastructure is achieved. This strategy should be developed on a regional basis by the Regulator and Industry, to serve both MER UK as well as the commercial imperatives of individual licence holders.
- **Technology strategy** - to ensure existing technologies are deployed to their full effect and relevant new technologies developed to maximise recovery from the UKCS. There is an urgent need for Industry to focus in depth on the five or six most critical technology challenges. Doing so will encourage the UK to build further on its position as a global centre of expertise for offshore hydrocarbon basin exploitation.
- **Decommissioning strategy** – to achieve the maximum economic extension of field life and to ensure key assets are not decommissioned prematurely to the detriment of production hubs and infrastructure. To ensure that decommissioning is executed in a safe, environmentally sound and cost effective manner (consistent with the UK’s international legal obligations) with sufficient early planning and co-ordination, and that as decommissioning progresses, the UK gains a competitive industrial capability. (This strategy does not consider the environmental permitting aspects of decommissioning, which are outside the Terms of Reference of this Review).

²⁶ Actual production compared to the optimum achievable at any point in time

²⁷ Assessing recovery, focussing on progressing hydrocarbon resources through the maturation cycle through to reserves development and production

In implementing these strategies operators will avoid unnecessary costs, delays and technical, legal and commercial complexity in their dealings with one another and with the Regulator. The development and implementation of these sector strategies should be a collaborative process between Industry, the Regulator and where appropriate HM Treasury, with Industry making available suitably qualified and experienced senior personnel to contribute to the task.

Additional Powers for the Regulator

All licence holders will be bound to work within the requirements of MER UK and the following enhanced powers should be available to the Regulator to facilitate this. However, it is the Review's opinion that, with the facilitating presence and additional powers of the stronger Regulator, operators will increasingly collaborate within MER UK without the need to apply these powers.

- **Dispute resolution:** Disputes arising on matters relevant to the licence and/or the potential for collaboration will be brought to the Regulator for mediation within six months of the dispute arising between the parties. This will also apply to disputes within licence holding consortia. The Regulator will issue a nonbinding opinion on how the dispute should be resolved. Failure of any party to accept the nonbinding opinion, to the extent that it is inconsistent with MER UK or other licence terms, may result in appropriate sanctions being applied. This nonbinding dispute resolution process will not prejudice the normal legal rights of either party.

- **Attendance at meetings:** In order to assist its efforts in maintaining oversight of the strategy the Regulator will have the right (but not a duty) to attend, as an observer, meetings of the licence holders and in particular those at which matters relevant to the carrying out of their obligations under the licence, or an internal or external dispute, are being discussed.

- **Sanctions:** Where the Regulator takes the view that licence holders are not acting in accordance with the MER UK strategy, it should issue a notice requiring specific action by licence holders to carry out functions under or related to the licence in such a way as to give effect to the MER UK strategy. This should constitute a correction or improvement notice. If the necessary action is not forthcoming the Regulator should have the right to utilise the following sanctions:

- o Issuance of public formal warnings to licence holders;
- o Facilitation of a change in the operatorship;
- o Suspension of the licence;
- o Termination of the licence.

In all of the above, the Regulator should have the right to apply the sanctions to the whole consortium or to the appropriate members who are deemed to be failing to meet the MER UK requirements or other licence obligations.

More detailed information on the additional powers is outlined in Recommendation 3 of this Report.

Impact

Changes to the current regime must, of course, balance the desire to drive better performance and recovery with the risk of discouraging investment. The UK has significant opportunities still to be developed so we must ensure it remains an attractive destination for investment and take care not to impose any unnecessary additional bureaucracy. At the low end, the Review believes that, if implemented fully and quickly, the recommendations have the potential to deliver an additional 3-4 billion boe²⁸ over the next 20 years, worth approximately £200 billion to the UK's economy at today's prices, through an increase in Industry collaboration on cluster developments, reversing the fall in production efficiency, promoting exploration, delaying decommissioning, and preventing the stranding of assets through loss of key infrastructure. At the high end, HM Treasury, the Regulator and Industry fully committing to the new strategy will put the UK in a much stronger position to get closer to the 24 billion boe potential.

²⁸ See reference 9

The Review sees the key contributions from HM Treasury, the Regulator and Industry to deliver the new Maximising Economic Recovery from the UKCS (MER UK) strategy to be as follows:

3.2. HM Treasury

As stated earlier, fiscal policy is key to company behaviour and decision making. Since 2011, HM Treasury has demonstrated its desire to maximise economic recovery by introducing a brown field allowance for incremental projects in existing fields; a £3 billion allowance to support investment West of Shetland, a £500 million allowance for large shallow water gas fields, and extending the small field allowance²⁹. These measures have all been strongly welcomed by Industry, significantly contributing to the current record wave of investment. The recent decommissioning tax relief also gives the Industry much greater certainty on decommissioning liability and should facilitate a number of licence changes and release substantial funding held under guarantee. This should drive at least £13 billion of increased investment with additional 1.7 billion boe extracted³⁰.

The Review has the following observations for HM Treasury:

- The UKCS is not a uniform mature basin. There are frontier areas, new plays, new technically challenging areas, mature dry gas regions and mature oil regions. The MER UK strategy will require sufficient flexibility and capacity to encourage investment and maximise recovery in each of these plays. HMT will be able to work very closely with a greatly strengthened Regulator to better use their fiscal levers to incentivise MER UK.

- It is noted that HMT have chosen to use field allowances to successfully promote investment in more marginal fields. Interviewees warmly welcomed the allowances and believe they will make a significant contribution to maximising economic recovery. A significant number of interviewees also suggested that Government should consider further extension of field allowances to incentivise Enhanced Oil Recovery (EOR) as the business case emerges. This would promote new technologies, increase recovery and encourage major refurbishments of existing fields, thereby prolonging field life and postponing decommissioning. Interviewees also suggested looking at end-of-life fiscal plans to encourage business models which retain essential infrastructure, and combine late-life operations and decommissioning.
- Against the backdrop of a more complex fiscal regime, many interviewees expressed the view that bespoke allowances should be at a minimum within a simpler and stable fiscal regime within each area/play of the UKCS. This would enable better industry planning and significantly reduce the present level of work on bespoke applications.
- The Review found strong views on the need to stimulate exploration, particularly in less prospective areas. The recent discovery of the large 1.8 billion boe Johan Sverdrup field on the Norwegian Continental Shelf, close to the border with the UKCS, highlights the potential rewards of encouraging exploration³¹. Interviewees suggested the need to incentivise seismic and exploration wells for operators who currently lack production and also for less prospective areas. The rate of exploration drilling has halved over the last ten years³² and the UKCS must see a significant step up in exploration over the next five to ten years to achieve MER UK.

²⁹ <http://www.hmrc.gov.uk/budget2012/ootlar-main.pdf>

³⁰ Reference Budget 2012

³¹ http://www.lundin-petroleum.com/eng/Development_JohanSverdrup.php

³² www.gov.uk/oil-and-gas-wells#drilling-activity

3.3. Regulator (Licensing and Stewarding of Exploration, Development and Production)

A strong, informed and engaged Regulator is essential to ensure Industry maximises economic recovery of UKCS oil and gas for the UK. The Regulator is responsible for working with Industry to deliver the full productive potential of the UKCS through:

- Developing and delivering, in partnership with HMT and Industry, a coherent tripartite strategy for delivering MER UK over the next 30 years.
- Encouraging investment in the UKCS by creating a stable, competitive and predictable regulatory environment, and providing advice to HMT to inform fiscal decisions.
- Promoting active exploration for new oil and gas resources around the UKCS and facilitating timely and effective data sharing.
- Requiring licence holders to demonstrate sound stewardship of existing assets and infrastructure to achieve the maximum economic recovery of resources, and encouraging timely development of discoveries taking account of the broader need to maximise recovery across the UKCS.
- Encouraging existing technologies to be deployed to their full effect and new technologies developed to maximise recovery from the UKCS, and encouraging the UK to become a global centre of expertise for mature hydrocarbon basin exploitation.
- Encouraging and facilitating greater industry collaboration, ensuring disputes are resolved in line with MER UK and in a timely manner.
- Maximising the development and retention of key infrastructure to support the regional development of the UKCS, ensuring appropriate access to third parties and facilitating the development of new strategic infrastructure.

- Oversee planning for future decommissioning of the UKCS, ensuring it proceeds in a logical, sound and cost effective manner.

To achieve these objectives the Regulator must have the appropriate structure, resources and legal powers to operate effectively. The current structure, with the regulatory body situated within DECC, is, in the view of DECC, Industry and the Review, no longer adequate to meet the challenges of managing an increasingly complex basin.

Recommendation 2: Create a new arm's length regulatory body charged with effective stewardship and regulation of UKCS hydrocarbon recovery, and maximising collaboration in exploration, development and production across the Industry

The number of both administrative and specialist skilled posts in the Regulator has decreased over the last 20 years. In the early 1990s, the UKCS Regulator had around 90 personnel at a time when there were approximately 90 fields in production. The UK now has over 300 fields in production but the Regulator is down to approximately 50 personnel, working on more complex licensing and stewardship issues³³. In contrast, the Norwegian Petroleum Directorate (NPD) has over 200 personnel and Energie Beheer Nederland BV (EBN) in the Netherlands has around 70, supplemented by consultancy resources³⁴. The Review has heard consistent praise for the performance of the present DECC staff, but it was the overwhelming view from the evidence received that the Regulator is now significantly under-resourced and under-powered to effectively manage the increasingly complex UKCS. The Regulator is effectively limited to tackling the most immediate and pressing issues.

³³ Internal DECC data

³⁴ <http://www.npd.no/en/About-us/> <http://www.ebn.nl/en/OverEBN/Pages/The-organisation.aspx>

With the increasing interdependence between operators, and the number of disputes and disagreements over new field developments and access to infrastructure, Industry is clearly saying they want a stronger Regulator, able to become proactively involved, minimise disruption and delays, and facilitate and accelerate progress.

The new Regulator should be set up and operate on the following principles:

- i) The Regulator should be responsible for operational regulation of the UKCS (Licensing and Stewarding – Exploration, Development and Production activity), focusing on supervising the licensing process and maximising economic recovery of the UK's oil and gas resources. It should not cover the regulation of Health and Safety nor Environmental matters.
- ii) It should be responsible for ensuring that Government and Industry have a coherent strategy for delivering MER UK over the next 30 years.
- iii) It should be an arm's length body with the ability to attract top quality personnel, with appropriate industry experience, able to work closely with all parties to deliver the MER UK strategy. The rationale for an arm's length body is set out in Annex A.
- iv) It must be able to build up the necessary skills and experience to create a much stronger capability than at present. This should include additional leadership, commercial, legal, petroleum engineering, engineering, economic, geological and geophysical posts utilising appropriate IT systems and controls to enable efficient and effective performance.

v) It will require sufficient operational freedom, within an appropriate framework set by Ministers. As an arms-length body, it would need to be led by an individual with significant industry experience, who would work closely with the Energy Minister and policy officials in the relevant department (currently DECC).

vi) The new Regulator should publish its objectives and the success criteria by which its effectiveness will be judged, and against which it should report on an annual basis. A suggested set of objectives and success criteria are outlined at Annex B. However, these will ultimately be set by Government.

vii) It should identify areas in which Competition Law may prevent companies from working effectively to promote MER UK (for example, sharing of seismic data), and act as an independent external party to facilitate coordination and interpretation of data.

viii) The Review notes that many regulatory bodies, including Ofgem, Ofcom and the Financial Conduct Authority, are fully funded by their respective industries. This would appear to be an appropriate funding model for the proposed new Regulator, which must have the resources and delegated freedom to recruit high quality personnel in a competitive market.

Recommendation 3: The Regulator should take additional powers to facilitate implementation of MER UK

In other jurisdictions the Review has examined, a significant amount of a regulators' influence comes from their knowledge, capability and experience. These regulators are informed and involved, and, on occasion, prepared to press operators with an implicit, if not explicit, requirement to collaborate and alter plans in order to maximise recovery for the country concerned. A much better resourced UK Regulator should achieve this, but to ensure delivery of the new MER UK strategy, Government should take the necessary steps to secure the following additional powers:

i) Maximising Economic Recovery for the UK

- building on existing language, this will make clear that in all areas of development and operation, all licence holders must act in such a way that is consistent with MER UK. This would set the expectation in areas such as maximising production efficiency, demonstrating effective utilisation of infrastructure, and collaborative behaviour for development of regional clusters. This could be supported as necessary by the development of protocols and procedures as guidelines for achieving such collaboration.

ii) Dispute Resolution and complexity of the legal and commercial process

- the Review has found a significant number of disputes and disagreements on commercial and technical issues between and within licences, mainly on access to processing and transport infrastructure and new field cluster development, both of which have a significant impact on MER UK. The new Regulator should work with Industry to develop protocols and processes, based on past learning, for dispute resolution including the use of expert assessors where appropriate. Power should be given to the Regulator to resolve such disputes

and disagreements within an agreed timeline and structure, ending with the Regulator making a recommendation to the parties concerned. The parties will not be bound by the recommendation, but failure to accept the outcome may fall within the new MER UK clause, other clauses in the licence, or within the sanctions and incentives outlined below.

The Review is unwilling, and does not have the expertise, to be prescriptive to simplify the complexity of UKCS legal and commercial negotiations. Standard agreements do exist in a number of areas but are often not used. There is also a lot of learning from past disagreements in areas like transport, stabilisation, storage or handling of petroleum products in the infrastructure. The Review recommends that the operators should be given one year to come up with their solution to simplify the complexity and significantly reduce the time required in UKCS commercial and legal negotiations. If Industry cannot produce a satisfactory framework, the new Regulator should make its own recommendations which should then be included in the licence terms.

iii) Sanctions and Incentives - a number of sanctions already exist within the licence terms and regulations, ultimately including removal of the licence operatorship. Leading up to this, a clear system of (private) informal and (public) formal warnings should be developed for the Regulator to utilise, which could ultimately lead to the loss of operatorship and then licence. The new Regulator, with its greater involvement with operators, should be able to ensure many of the issues are resolved before or as they arise. With the urgent need to improve production efficiency, brownfield investment will be very important and the Regulator must be able to take steps to ensure assets are in the right hands to maximise brownfield recovery. Consideration of past performance regarding MER

UK and broader regulatory compliance should be used as a formal element of future company licence applications, and inform HMT thinking on whether further field allowances would be justified.

- iv) **Right to attend consortia meetings** - to effectively manage the UKCS, the Regulator must understand to the fullest extent possible the challenges faced by industry. As such, licences should include a provision allowing the Regulator to attend Operating and Technical Management Committee meetings. This is common practice in Norway and the Netherlands, where NPD and EBN frequently attends such meetings to ensure they are fully informed. It is not envisaged that the Regulator will routinely attend every meeting; this would not be the best use of the Regulator's resources particularly where an operator is performing effectively. The Review believes the Regulator should take a more targeted approach, attending meetings primarily where they have concerns or where areas relating to delivering MER UK or disputes are to be discussed.
- v) **Transparency and access to Data** - the ready access to timely data is a prerequisite for a competitive market and this is even more important in an industry which relies on good data to create value and support its safe operation. The new Regulator should give consideration as to how this should be achieved and include this in the licence terms accordingly. For example, to promote greater openness on asset performance, the Regulator should require production data to be provided within timings to be determined, typically within three weeks of the end of the month in question. The Regulator should also consider publishing key data on asset stewardship, which in time should include asset production efficiency and recovery efficiency (actual and projected) both to be reported annually, within six months of year end. Further powers to promote the reporting and

coordination of seismic and well data should also be given to the new Regulator.

Recommendation 4: Develop and implement important Sector Strategies

The new Regulator, with its expanded resources, should, as a priority, work with Industry to implement strategies in the areas below, (Section 4 of this Report outlines the strategies and actions for each of the following sectors taking account of views expressed in the Review and the excellent work done by the PILOT sub committees):

- Exploration (including access to data)
- Asset Stewardship (including Production Efficiency and Improved Oil Recovery)
- Regional Development (starting with the Southern North Sea)
- Infrastructure
- Technology (including Enhanced Oil Recovery and Carbon Capture and Storage)
- Decommissioning

The Interim Report signalled my original intention to include a strategy on access to finance, particularly for small operators. However, it is considered that this is adequately covered in the UK Oil and Gas Industrial Strategy published in 2013 which specifically addresses access to finance across the industry.

Additional considerations for the new Regulator:

- i) DECC, the parent Government department, must retain an oil and gas policy team as it has the ultimate responsibility for policy development. The new Regulator should provide technical support for that team, and also HMT, particularly on issues relating to encouraging MER UK.

- ii) Whilst the Review's remit is primarily offshore oil and gas, it is clear that there are many synergies with aspects of the regulation of onshore oil and gas activities (including shale gas) and there would be a strong rationale for a single regulator to manage all reserves, onshore and offshore. The Review believes that consideration should be given to the new Regulator taking on this function in due course to avoid duplication and ensure consistency (with appropriate resource adjustments).
- iii) The new Regulator has a key role to promote the UKCS, both within the UK and internationally. It should help to foster an attractive business environment able to attract the best operators and supply chain, and to access the finance, resources and skills needed to ensure the UK economy gains a long term benefit from the exploitation of these natural resources. The Department of Business, Innovation and Skills (BIS), in conjunction with DECC, has developed a UK Oil and Gas Industrial Strategy, launched in March 2013, which is intended to create the right conditions to maximise opportunity and investment to the benefit of the whole UK economy. The Scottish Government also published a Scottish industry led Oil and Gas strategy in May 2012. The Oil and Gas Industry Council has been set up to help support the implementation of the UK strategy and it will be beholden on the new Regulator to help support these initiatives whilst avoiding replicating any of the work being carried out by others.
- iv) There are a number of relationships and functions carried out by the current DECC team that Government will need to consider when setting up the new Regulator. For example, the current DECC team's role as Competent Authority for CO₂ sequestration, and the new body's relationship and interaction with the Environmental team in DECC and the British Geological Survey. It is not for Review to decide these factors; however it will be important for Government to ensure these considerations are taken into account when designing the new body.
- v) The Review believes that PILOT serves a very important and useful communication and relationship function between Industry and Government, and this should be continued. A fully resourced and more visible Regulator, playing a more active leadership role in PILOT, will significantly increase the likelihood of the PILOT policies and strategies being implemented.
- vi) It is noted that DECC has already undertaken work with The Crown Estate, the oil and gas industry, and the offshore renewables industry to ensure that potential conflicts of interest are identified and resolved at an early stage. This work should be developed further to ensure that the contribution of both sectors to the UK economy is maximised. With decades of experience of overcoming offshore challenges, the UK's oil and gas Industry has a wealth of transferable knowledge, skills and technology that the Review believes will benefit offshore renewables projects. Areas such as the subsea sector and safety will provide models for offshore renewables projects, as will Industry's experience of building a globally competitive supply chain. In addition to sharing knowledge and expertise, Industry should look for areas to work in collaboration with offshore renewables where mutually beneficial cost savings can be found, for example, the potential for offshore wind farms to provide power to oil and gas platforms.

3.4. Industry

The number of exploration and production companies operating across the UKCS has increased by more than 50 per cent over the last decade³⁵. The basin now has a number of small and medium sized companies, National Oil Companies, and major companies who have also retained a strong presence. The Review believes that to maximise economic recovery from the UKCS, including frontier areas, the UK needs all of these participants and should also actively market the UKCS to attract new entrants.

Industry clearly needs a business environment which is predictable and encourages long-term investment. A significant amount of future production will come from exploiting a large number of small, marginal fields, so the fiscal and regulatory environment must encourage such investment. However, this will also require Industry collaboration, use of economies of scale and a Regulator that will minimise bureaucracy, facilitate and support developments and help remove obstacles.

The Review has considered Industry performance and the challenges raised by the rapid production decline over recent years. Whilst there are some obvious exceptions, in many cases it appears that companies have constrained asset investment and expenditure in a drive to deliver short-term returns. Also, evidence given to the Review clearly indicates the frustration and concern expressed by companies of all sizes on the negative impact of commercial behaviours. Whilst it is acknowledged that there are genuine technical difficulties that can impact negotiations, the frequency of failure to agree between and within consortia on key issues, including access to infrastructure and development of field clusters, is very damaging.

The Review received evidence of a number of companies having a predisposition not to collaborate

- operators have brought many of the problems on themselves. Indeed disputes and disagreements are seen as a clear negative to further investment in the UKCS. As an example, West of Shetland is an extremely important frontier area where, despite a lot of discussion on co-ordinating the development of a number of fields, little collaboration has yet been achieved in terms of field and infrastructure development. Infrastructure, both managing ageing assets and securing the necessary investment in new assets, is perhaps the UKCS's most significant Achilles heel and the new Regulator must be empowered to achieve significantly better collaboration here.

The Review recommends the new Regulator should seek the following commitments from industry:

i) Commitment to the MER UK strategy

For MER UK to be achieved, Industry must play its full role in the cohesive tripartite approach. The prize here is improved production efficiency, better use of infrastructure, more active and, ideally, collaborative exploration programmes, many more small and medium fields developed economically and efficiently, and more cost effective development of regional clusters and infrastructure to achieve significantly increased reserves.

A large number of operators and other key stakeholders indicated significant frustration in working with a "light touch" Regulator. There is clear recognition that many of the current delays and failures to agree could be resolved with a considerably better resourced and so more involved and proactive Regulator. The introduction of the MER UK obligation will see significant mutual benefits to Industry with increased overall production from which everyone will benefit.

³⁵Oil & Gas UK data

Industry must also undertake to provide some of its best and most experienced people to work with the new Regulator on developing and implementing MER UK strategies in areas such as exploration, production, increased and enhanced oil recovery and decommissioning.

ii) Commit to work with the Regulator and adjacent licensees to develop efficient and effective cluster plans making the most economic use of production facilities and infrastructure

This will be a critical success factor for MER UK. The introduction of the MER UK obligation will mean that operators must be prepared to discuss cluster field development plans with each other and take account of the opportunities of co-ordinating production facilities and infrastructure support with the aim to maximising regional recovery including building in potential for further future regional developments.

iii) Commit to more efficient sharing of infrastructure (promoting third party access)

Both exploration and field development are being badly affected by a lack of anticipated infrastructure availability. Under MER UK, Industry will be expected to resolve such commercial disputes on infrastructure access issues in a timely manner. Industry must fully abide by the Infrastructure Code of Practice³⁶ which already exists and provides guidelines on third party access to infrastructure. In addition, the Regulator has sufficient legal powers to resolve issues which are contested and must actively use them under the new regime.

iv) Commit to work with the Regulator to develop new infrastructure business models

The new Regulator should have early discussions with the present infrastructure owners and possible new investors on how best to provide medium term infrastructure support in the UKCS. Unlike other comparable countries, infrastructure is largely owned by the present operators but there are signs that some modest infrastructure additions are appearing, financed by a number of the principal users. Measures should be taken to encourage a new infrastructure model focused on joint funding of infrastructure, and also the independent transporting and processing of third party production including onshore terminals. The ability to unbundle infrastructure from the existing production centric hubs should be evaluated and the revenue and decommissioning fiscal implications of such a development need to be considered.

v) Commit to deliver on its obligations regarding asset stewardship

Whilst there are some notable exceptions, the current situation where production efficiency has fallen to an average of 60 per cent in 2012³⁷ is unacceptable and illustrates the shortcomings of existing asset stewardship. It is first and foremost the responsibility of each company to demonstrate that it is an effective steward of the assets it is licenced to operate. The Review recommends that changes are made to the asset stewardship regime, with the new Regulator setting out clear expectations for asset performance and a timetable for their implementation. A fully resourced Regulator will be better able to assess performance and have more focused discussions with underperforming operators to agree and monitor a programme of continuous improvement. Where companies fall short of these expectations, the

³⁶ <http://www.oilandgasuk.co.uk/knowledgecentre/InfrastructureCodeofPractice.cfm>

³⁷ PILOT Production Taskforce presentation, 31 October 2013

Regulator should issue a private and then a public warning, and then, if appropriate, encourage the sale and transfer of assets to a company more committed to maximising economic recovery. In extremis, the Regulator's ultimate sanctions are to remove the operatorship and then the licence.

Poor project management, planning and execution efficiency, leading to high cost offshore operations has been raised on a number of occasions in the Review. Additionally the shortage and very high cost of offshore exploration rigs clearly impacts on MER UK. Skills shortages, particularly at high end technical levels are a problem and unit production costs have increased significantly as have the time taken to carry out major refurbishments and shutdowns. The Review observes that this is not helped by the very large number of self-employed contractors working within both the operators and the supply chain contractor organisations. These are challenges the Industry must work through and solve.

vi) **Commit to improve collaboration**

Effective collaboration will be fundamental to the successful future of the UKCS. The word collaboration is much used and abused in PILOT discussion. All the good work done by the PILOT sub committees will come to nothing unless meaningful implementation is achieved, and this will not happen without genuine Industry collaboration. It is the Review's belief that such collaboration should be robustly facilitated and co-ordinated by the Regulator, who must be able to call companies to account, within the licence terms, when they adopt an unreasonable position. The new Regulator, by acting as an independent third party receiving and coordinating data, will also help prevent Competition Law inadvertently hindering companies from working effectively together.

Industry has achieved very successful collaboration on health and safety issues and there is no reason why this cannot work just as well for areas such as production efficiency, rig sharing, more effective deployment of new technology, improved shutdown co-ordination, sharing access to key spares and a collaborative approach to decommissioning.

vii) **Commit to reduce the legal and commercial burden of working in the UKCS**

Evidence clearly indicates the UKCS is perceived as being one of the most difficult and adversarial legal and commercial basins in the world, disproportionately driven by risk aversion to the detriment of value creation, particularly when the transaction is not material to one party. Industry must challenge this culture and senior management must play a leading role in delivering change and, in particular, accept the challenge under Recommendation 3 ii to develop proposals to do so.

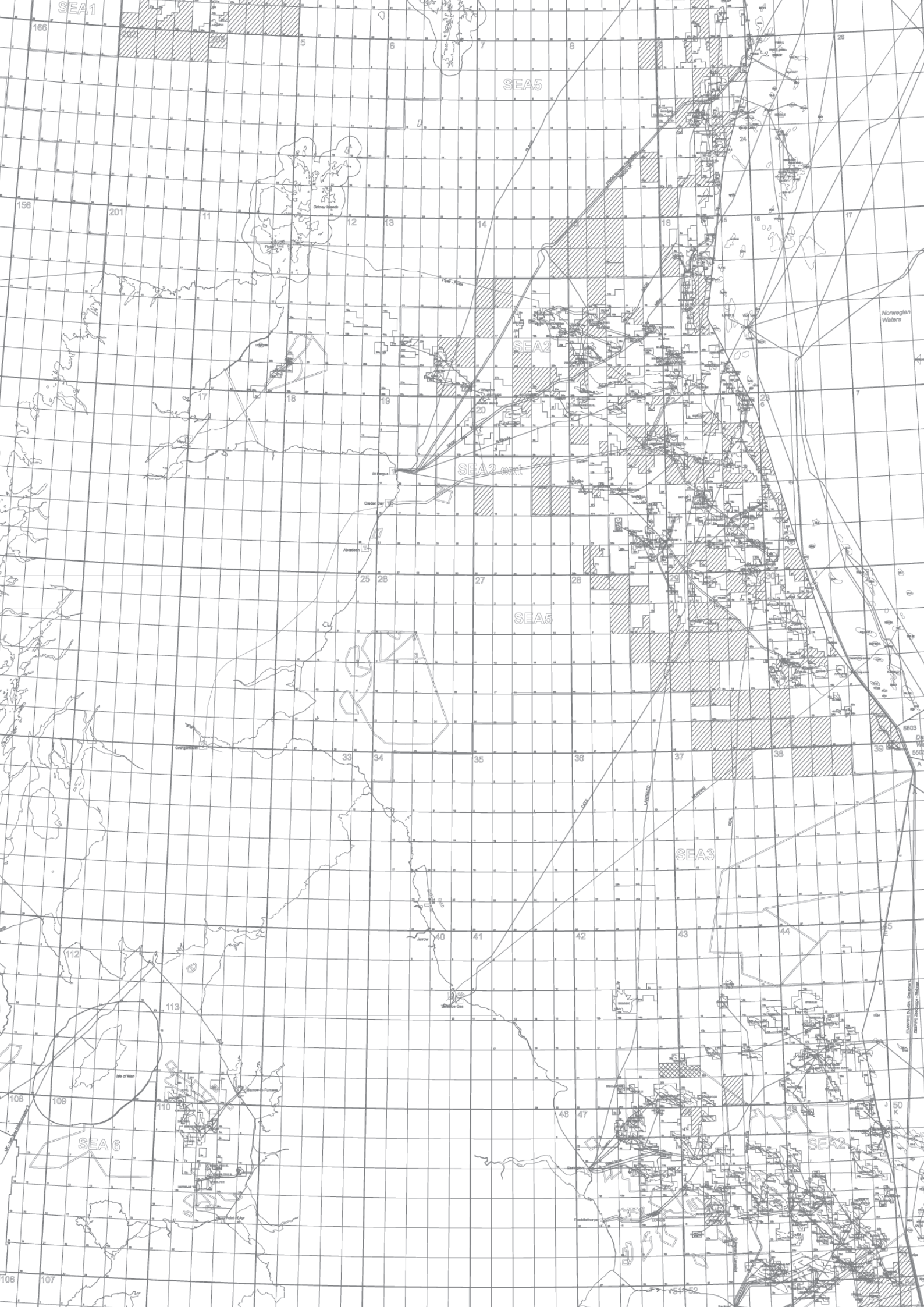
In the interim, Industry should commit to at least using agreed standardised agreements, processes and procedures, such as the: Joint Operating Agreement; Confidentiality Agreement; Proximity Agreement; Pipeline Crossing Agreement; and Decommissioning Security Agreement. Interestingly, a number of interviewees observed that operators took a much more constructive approach to risk in discussion with the supply chain than in discussion with each other.

Significant disagreements also emerge within Joint Ventures. The proposed new Regulator's right to attend Joint Venture meetings should improve the situation, as should the prospect of the Regulator exercising the dispute resolution process which, the Review believes, will result in many of the problems being resolved without recourse to the Regulator.

Partners within individual Joint Ventures must collaborate to ensure the operator can effectively fulfil their MER UK obligations, where necessary drawing on support resources from the other partners.

viii) Commit to working with Government to implement the UK Oil and Gas Industrial Strategy

In March 2013, the Government launched the UK Oil and Gas Industrial Strategy as one of several sector strategies that go together to make up the Government's wider industrial strategy. The strategy recognises the significant value of the supply chain which serves both the UKCS and the global oil and gas industry. Industry should ensure it prioritises its commitments and obligations within the UK Oil and Gas Industrial Strategy to ensure the continued health and growth of this valuable sector, both in the UK and internationally, to the benefit of the UK economy.



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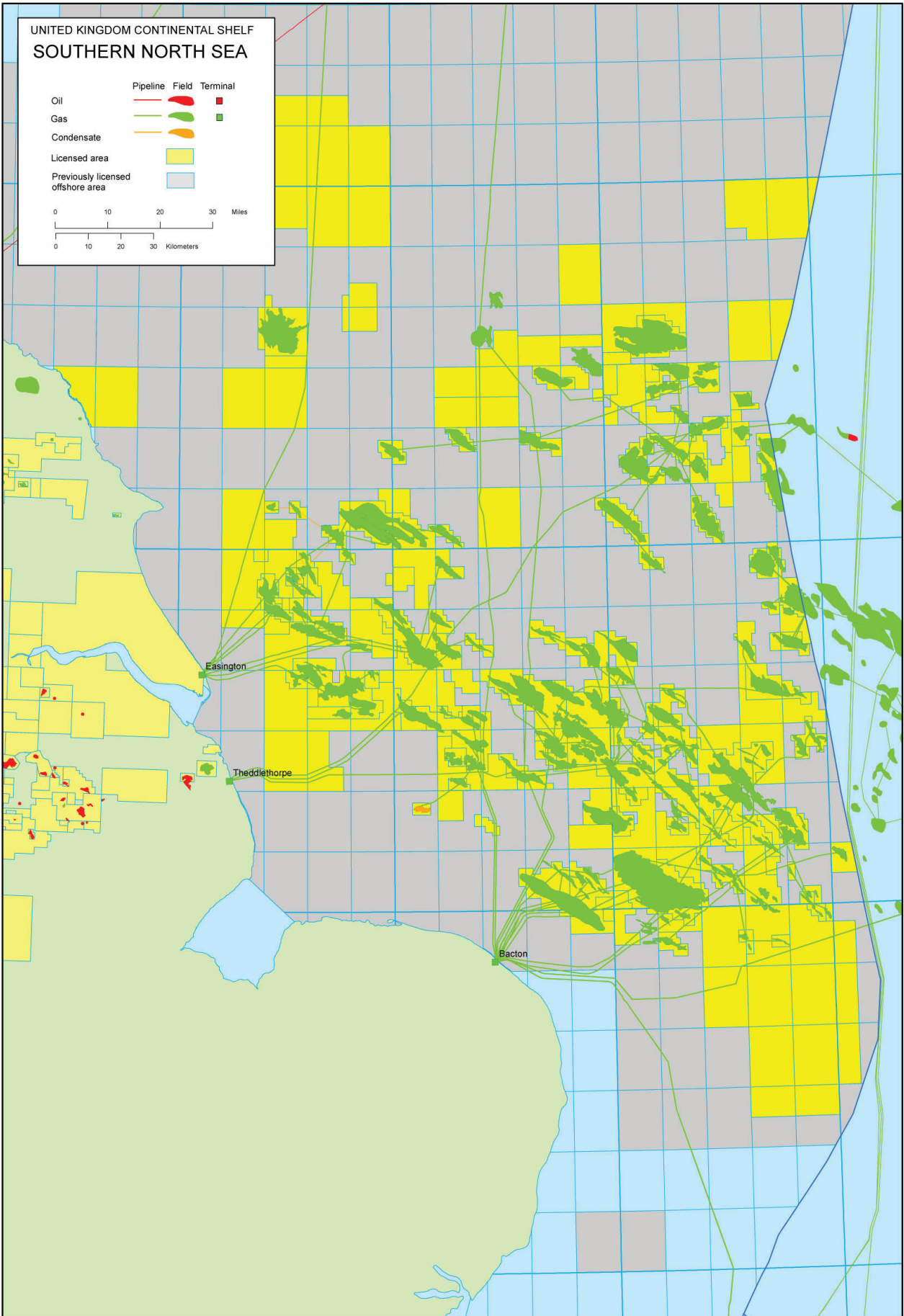
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4.

Sector Strategies for the new Regulator to develop and implement with Industry

In the Interim Report, it was indicated that the Final Report would include a number of strategies relevant to the initial work of the new Regulator. The individual sector strategies are outlined below, building on the detailed work conducted by PILOT over the last 18 months, and supplemented by input from the Review. The intention is that the new Regulator will discuss these with Industry as a priority, and firm up on implementation plans which should be aligned to deliver MER UK.

The UKCS is a complex business environment and is facing serious increasing cost pressures. These strategies address each of the main activities undertaken by Industry from exploration through to decommissioning and should help provide a competitive business environment with a clear investment framework promoting the attractiveness of the UKCS. They are intended to improve the effectiveness of the Industry and increase the size of the remaining prize in the UKCS both by accessing new opportunities from existing fields and by developing the new plays which have yet to be properly appraised. At all times, the intent is to create value and not to add to the regulatory burden.

4.1. Exploration Strategy

Strategy Objective

The objective of the exploration strategy should be to revitalise exploration, thereby ensuring that the totality of the economically recoverable oil and gas resources from the UKCS both in existing and new plays are fully explored, appraised and exploited in a timely manner consistent with existing and potential new infrastructure. This should be facilitated by efficient access to well and seismic data, an appropriately tailored licensing regime, and encouraging appropriate data sharing within the regional development plans. Measures should also be taken to promote UKCS exploration opportunities internationally.

Current situation / size of the prize

Since the turn of the millennium more than 360³⁸ wells have been drilled leading to the discovery of 4.1 billion boe³⁹. However, post 2008 exploration activity has fallen sharply reaching a low of 14 wells in 2011. Whilst exploration recovered slightly in 2012, only 22 wells were drilled discovering less than 50 million boe and exploration drilling remains low in 2013 with only 15 wells reported by year end⁴⁰.

There has not been a significant (multi-hundred million boe) discovery for five years⁴¹ and a step change in exploration strategy and knowledge are required to unlock new resources. Timing is also critical; in mature areas of the UKCS rapid exploration of near field potential is required before existing infrastructure is decommissioned. More exploration in frontier or under-explored regions is needed which itself requires more regional seismic.

³⁸ <https://www.gov.uk/oil-and-gas-wells#drilling-activity>

³⁹ Wood Mackenzie industry database

⁴⁰ See reference 38

⁴¹ See reference 39

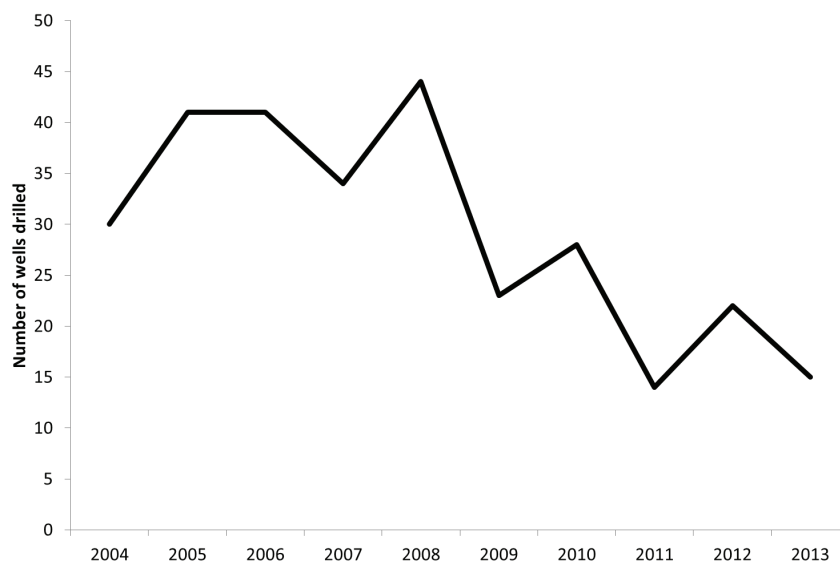
DECC estimates undiscovered resources of 6 to 9 billion boe as the low to medium cases which will be effected by a better understanding of the various plays and or better technology⁴². The current rate of exploration drilling is totally inadequate to exploit the undiscovered potential of the UKCS within the lifespan of existing infrastructure. The 2012 performance will fail to recover even a small amount of these resources. A focused exploration strategy will be essential to make real inroads in these opportunities. To highlight the size of the challenge, based on exploration performance seen over the last four to five years, the Review estimates that less than 3 billion boe will be discovered by 2030. Even increasing the rate of

exploration drilling back to that seen prior to 2008 will only lead to an additional 1 – 1.5 billion boe being discovered by 2030. A step change in approach is needed here.

“Exploration drilling remains low in 2013 with only 15 wells reported by year end...”

Recent Exploration Drilling Activity

Source: DECC



⁴² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/16094/Estimates_of_Undiscovered_Resources_24_July_2013_v2.pdf

PILOT has created an Exploration Task Force (ETF), bringing together DECC and Industry along with Oil & Gas UK which is currently concentrating on four areas:-

- i) New and neglected plays – seeking to improve the understanding and promote new plays and revisit old plays with new technology,
- ii) Seismic imaging, technology and data – to investigate the use of seismic, new technologies and more effective sharing of data, (including an update of the Millennium Atlas),
- iii) Collaboration with other PILOT initiatives – particularly the NNS and CNS rejuvenation projects to assess the exploration potential around mature hubs,
- iv) Comparative review – to look how the UK compares against other countries round the North Sea considering all the relevant factors.

Whilst the Review fully supports the objectives of the ETF, it is noted that there is a strong focus by the task force on technical factors impacting exploration as opposed to considering some of the broader factors including well costs, availability and access to rigs and finance, and equal consideration should be paid to these other factors.

Early priority actions for the new Regulator

A number of actions are recommended in regard to improving exploration activity on the UKCS, and additional comments are made on data management and the licensing regime:

Exploration – Actions

Action 1: Government should urgently assess the potential to stimulate exploration. The UK must regain its position as an attractive destination for exploration funds from large and small companies alike, and faces a real challenge to compete against international opportunities. The Review heard strong views that the fiscal regime failed to provide sufficient incentive to explore particularly in less prospective and more technically challenging areas.

The Review also heard that, whilst the promote licensing scheme has attracted many smaller companies, in many cases they face particular difficulties in accessing the necessary funding for exploration in the current market, not least where the company has no production income to offset exploration costs. The situation is exacerbated in the UK by the shortage of rigs, the likely need for smaller companies to provide full well funding up-front to the rig owner, and the need to demonstrate financial capacity to fund an additional relief well.

In such a competitive environment, the Review notes that the Netherlands and Norway have taken different approaches to facilitate exploration. In the Netherlands, the state owned non-operating company routinely takes a 40 per cent share in each exploration well and this sharing of risk has undoubtedly resulted in a boost in exploration activity. In Norway, companies without production automatically receive the tax relief in cash from exploration and this measure has been particularly helpful for smaller companies.

Action 2: The Regulator should facilitate the development of regional exploration plans to recover the full resource potential within each area of the UKCS. Exploration will be most efficiently carried out on a regional basis and is highly dependent on the existing infrastructure, collaboration on geological information where there are mutual benefits to the parties, and prospectivity within the region. The Regulator has the ability to influence the outcome and should manage licence rounds, working with Industry to deliver the best outcome.

Action 3: The Regulator should work closely with Industry and HM Treasury to evaluate New Plays⁴³ and help ensure they are explored and developed. It is apparent that there is reluctance by many explorers to pursue the new plays around the UKCS identified by the ETF, yet these hold much of the future exploration potential. This reflects a lack of good seismic data and geological information, insufficient sharing of existing data, and the inherent commercial risk of these highly uncertain opportunities. The size and shape of licence blocks within new plays and less prospective areas should also be considered to avoid fragmentation and offer coherent opportunities to the market.

The Regulator has a unique role to help facilitate new play opening activities such as West of Hebrides and should actively seek to create and encourage joint ventures to pursue such opportunities.

Action 4: The Regulator should establish why the high demand for acreage in recent exploration licensing rounds has not been being converted into more seismic and drilling activity, working closely with the ETF. Although recent exploration rounds have been very successful at licensing acreage, with the 27th offshore licensing round being the most successful to date, work needs to be done to assess why this demand is not being converted into more seismic and drilling activity. Barriers to be considered include the risk/reward balance, well costs, licence requirements, fiscal policy and the ability to access rigs and finance alongside the prospectivity of the basin. In support of this, a fuller review of the historical exploration well results is required in order to improve the understanding of the future basin potential.

⁴³ Current new plays identified by the ETF include:-

- i) West of Hebrides,
- ii) Carboniferous beneath the Central North Sea, East Irish Sea and Southern North Sea,
- iii) Western Graben margin,
- iv) Fractured basement,
- v) Sub-basalt and cretaceous sands,
- vi) High CO₂ Gas,
- vii) Triassic West of Shetlands,
- viii) English Channel and SW Approaches,
- ix) Permian in the East Irish Sea.

Action 5: The Regulator, in consultation with Industry, should investigate what measures can be taken to increase the rate of exploration drilling, specifically concentrating on drilling costs, improving the supply of rigs to the UKCS, and companies' ability to access rigs.

The current high well costs mean it is simply too expensive to drill many exploration targets or develop many of the smaller resource pools.

Action must be taken to review the cost drivers, looking at all the factors influencing the market including rig rates, rig count, competitiveness of the UK rig market, access to finance and the ability of smaller players to access rigs. Means must be found to reduce costs whilst ensuring the basin remains attractive for both rig owners and exploration and production activities. It is also noted that rig clubs, providing access to drilling resources for a collection of companies, are seen to work well in Norway yet are apparently much more difficult to set-up in the UK.

Action 6: The Regulator should facilitate Industry and the seismic companies to carry out speculative seismic, particularly targeting new plays which lack up-to-date seismic coverage, and, if justified, should support with Government funding.

The Review has received strong feedback that more high quality seismic coverage of new plays could be a game changer. Efforts should be made to incentivise Industry and encourage seismic companies to carry out more speculative seismic. Government should consider sponsoring seismic shoots in new plays and other prospective areas which lack suitable coverage; these should then be made available to Industry on an appropriate commercial basis. The Regulator can offer leadership, co-coordinating the resources of government and industry to secure the much needed seismic coverage. The Review has seen good examples in both Norway

and the Netherlands where the state has taken the initiative to shoot seismic in areas which lacked sufficient high quality coverage.

The Regulator should also encourage companies to use the best available seismic technology including broadband seismic, both for assessment within licensing rounds as well as part of routine production licence activity to maximise recovery.

Action 7: An up-to-date readily accessible digital perspective on the prospectivity and geology of the UKCS should be developed.

The ETF has identified the need to develop a successor to the Millennium Atlas which was compiled a decade ago, as a one-off publication, to provide a common insight into the geology and hydrocarbon plays of the North Sea.

The ETF is proposing to produce an on-line, updatable source of digital geological maps and related information for key areas of the UKCS, with the working title of "a 21st Century Exploration Roadmap", to promote a shared insight into the prospectivity of the UKCS. This is likely to be in the form of a series of digital publications rather than a single document and should be regularly updated. The full business case, work scope, resources, project management and funding model are currently being developed and is expected to require a measure of government support. It is already apparent that this will be a significant undertaking and will need to be expeditiously pursued if it is to have any near term benefit; as such results will need to be available within 18 months. The cost and timetable need to be urgently and critically assessed. However, the creation of a successor to the Millennium Atlas should not impede other initiatives also required to improve exploration outcomes.

Action 8: The case for specific measures to promote exploration around critical infrastructure should be properly evaluated.

“Rejuvenation” projects are currently being run under PILOT in the Central and Northern North Sea to extend the productive life of existing infrastructure and assess whether new infrastructure is required. These projects should transition to being led by the Regulator, who should encourage targeted exploration around key hubs which are otherwise likely to be decommissioned in the near term. A number of interviewees suggested that there may be a case for fiscal intervention to accelerate exploration around critical infrastructure, however this consideration is beyond the scope of this Review.

Action 9: The appropriate sharing of information within current portfolios, particularly around existing mature hubs should be facilitated by the Regulator.

It is also observed that the current approach to licensing of new acreage has led to increasingly fragmented “postage stamp” portfolios. Whilst a diversity of licensees may help open up new plays, the Regulator should facilitate the appropriate sharing of information within current portfolios, particularly around existing mature hubs. When awarding new licences in existing or new plays, the Regulator should seek to create coherent blocks and avoid further fragmentation to facilitate access to infrastructure.

Licences – Actions

Action 10: The terms for existing and new licences should be reviewed to reflect the requirements of MER UK and the prevailing business environment.

In line with the recommendations in this report, it would be appropriate for licences to have conditions related to maximising economic recovery for the UK, achieving acceptable production efficiency levels, and agreeing collaboration on cluster developments, to the extent such provisions are not already included.

In terms of the duration of licences, the Review concludes that the four years exploration and four years development terms in Traditional Seaward Production Licences should be appropriate for mature areas. However, they appear too short for the new frontier areas like West of Shetland, where the drilling season is severely restricted, and in plays like High Pressure High Temperature (HPHT) which have significant technology challenges. In such applications, six year exploration and six year development terms should be considered; these are already available in frontier areas which offer both six and even nine year frontier licence terms.

The Review also suggests that further flexibility should be considered on licence commitments. Whilst recognising that it is crucial to promote the active turnover of acreage, a degree of pragmatism should continue to be applied to ensure existing licenses should not require to be surrendered if the opportunity is clearly best pursued by the incumbent.

Care must also be taken that licensees are not compelled to drill commitment wells where new information suggests such wells would be unviable. This both wastes valuable drilling resources, and costs the operator and HMT dearly. In such circumstances, the operator should offer an alternative well or carry out significant seismic or equivalent material options either locally or elsewhere on the UKCS.

Data - Actions

Action 11: Licensees should meet their current obligations for retention and release of data. The requirement to release data on a more timely basis should also be considered by the Regulator and may necessitate amendment of licence model clauses. Successful exploration relies on ready access to good quality data and this is to be encouraged whilst respecting the commercial drivers of those who acquired the data in the first place.

Currently licensees are obliged to provide DECC with well and seismic data which DECC has the right to release after three or four years, depending on the Licence Round. It is noted that DECC has increasingly relied on operators to release the data to third parties rather than do so itself, in part because of a lack of resources. It is vital to release data once the period of confidentiality is completed and this is almost certainly best achieved by DECC receiving the information in a timely manner, and then releasing it independently. Whilst the Regulator chooses to delegate the process of data management to an agent, they will remain responsible to ensure licensees are in full compliance with their obligations.

The Review believes licensees are not always seen to meet their current obligations regarding data release on a timely basis, which must be addressed by the Regulator. To monitor this, the management of licence data needs to be improved and brought within the asset stewardship process. It may also be the case that licensees would benefit from clarification and simplification of the obligations and regulations to facilitate compliance. The Regulator should also ensure that when licences are relinquished, all relevant information is passed on to the appropriate data repository to the benefit of future licensees.

The Review also considers there is a case to consider substantially shortening the period prior to well and seismic data release on licences possibly to twelve months, depending on the type of data, to promote greater access to information. It is recommended the Regulator considers adopting this measure in consultation with Industry after proper evaluation of the broader consequences including the impact on proprietary seismic data acquisition, and also considering the ability to enforce compliance.

In regard to Seaward Exploration Licences where seismic contractors acquire “spec seismic data”, the protocol currently results in data being released after 10 years and the Regulator should consider whether this term should be reduced.

Action 12: The Regulator should promote a sustainable and unified approach to the management of petroleum-related geoscience information for the UK, making the best use of all the expertise available to it. The Review recognises that the extent to which the UK maximises recovery from the UKCS will be dictated by the availability of high quality subsurface data. Better use of available expertise such as the British Geological Survey (BGS) should be made to gain new insight and promote knowledge sharing.

The UK has a world-class geo-scientific resource in the BGS and there are indications that the competencies of the BGS are not being fully leveraged by either DECC or the offshore oil and gas industry. This may require changes to current confidentiality provisions within licences to facilitate controlled third party access to such information; new sources of funding may also need to be addressed to access these resources.

4.2. Asset Stewardship Strategy

Strategy Objective

The objective of the asset stewardship strategy should be to ensure that operators are held to account for the proper stewardship of their assets and infrastructure consistent with their obligations to maximise economic recovery from the fields under their licences and with consideration to adjacent resources. In particular, operators should be expected to develop, maintain and operate their assets and infrastructure at all times in an efficient and effective manner and should share their asset stewardship strategy with the Regulator.

The Regulator should set clear expectations on critical stewardship factors such as production efficiency and recovery efficiency and work with each joint venture partnership to ensure they are met.

Current situation / size of the prize

The quality of stewardship is a key determinant in realising the full economic potential of the UKCS; to quote DECC’s own guidance notes⁴⁴:

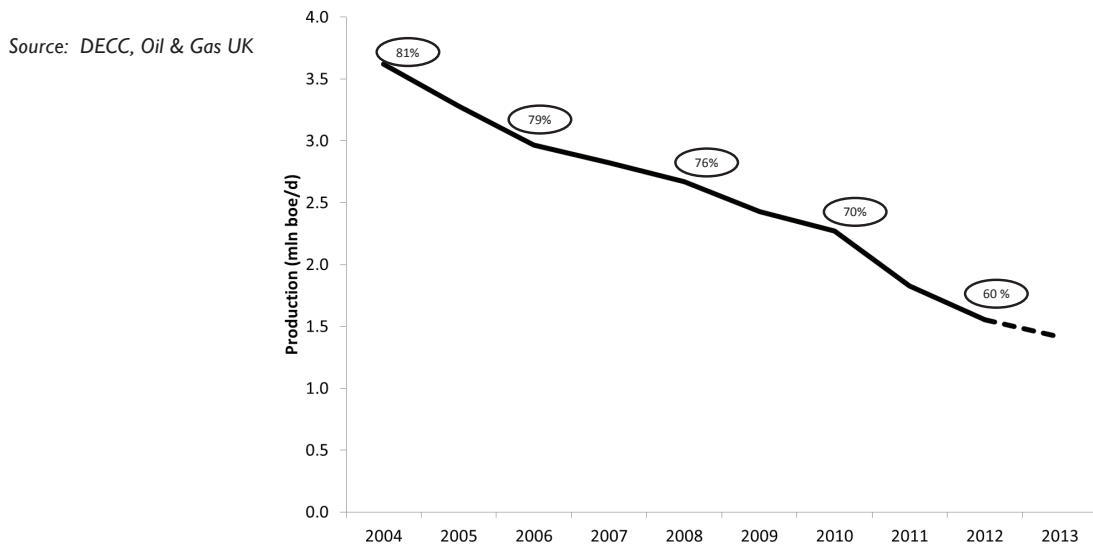
“Good stewardship comes down to two key factors:

- i) That asset owners consistently do the right things to identify and then exploit opportunities, and that
- ii) Assets are in the hands of those with the collective will, behaviours and resources to achieve this.”

Good asset stewardship makes good business sense. Over the last decade, DECC has conducted an annual stewardship review process for the fields managed by each Joint Venture. The stewardship review compares the field’s performance against the field development plan, assessing a range of critical indicators including safety performance and integrity management, expenditure, investment, reserves maturation, drilling, production decline and decommissioning plans.

“Over the last three years, the production efficiency of many fields has declined sharply and is now averaging 60 per cent across the UKCS...”

Recent Production from the UKCS (including production efficiency)



Ensuring asset integrity is a primary objective for the Industry and has important implications for asset stewardship and production efficiency. The Health and Safety Executive continues to work closely with Industry on the implementation of its “Ageing and Life Extension Inspection Programme” (KP4) with the objective to promote awareness and management of the risks associated with ageing plant in the offshore oil and gas Industry. The recent precipitous decline in production efficiency exemplifies the challenge facing both operators and Regulator in this mature basin. Over the last three years, the production efficiency of many fields has declined sharply and is now averaging 60 per cent across the UKCS⁴⁵. In response to the decline in production efficiency, operators have increasingly directed resources to improve asset integrity, which should deliver a long term uptime benefit. However, in the meantime, there are instances where production efficiency activities have lost out in terms of bed space to the essential integrity improvements. Whilst integrity catch up is now largely completed on some installations, others are still engaged in this activity.

Through PILOT, a Production Efficiency Task Force has been set up and considerable effort is now being devoted across the UKCS to improving performance with active leadership both by the industry and DECC. Detailed analysis has shown that in about half the cases, the primary cause of the outages are one off events, with 50 asset clusters accounting for 80 per cent of the production losses⁴⁶.

Largely as a result of the decline in production efficiency, UKCS production has fallen 38 per cent in the last three years⁴⁷ with DECC lacking the resources to significantly impact the fall in production efficiency.

⁴⁴ DECC Guidance on the content of offshore oil and gas field development plans, section 6.1: Stewardship
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265842/FDP_guidance_notes_November_2013_web.pdf

⁴⁵ PILOT presentation, 31 October 2013

⁴⁶ PILOT presentation, 31 October 2013

⁴⁷ <https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes>

Early priority actions for the new Regulator

Action 13: The Regulator should develop an enhanced asset stewardship strategy building on the existing stewardship process, setting clear performance expectations and reinforced by appropriate sanctions. The new asset stewardship strategy should build on the current DECC process, utilising the additional resources that will be available to significantly improve the quality of asset stewardship.

Each asset should be reviewed annually and the Regulator should set clear expectations on asset performance, focussing on key factors particularly (i) production efficiency and (ii) recovery efficiency as broader measures of stewardship. As part of the annual review, performance should be measured against the Field Development Plan and significant deviations from the original plan should require formal review with the Regulator. The asset operators should establish technical recovery limits and demonstrate that the field development plans are aligned to achieve them. They should also seek to apply new techniques to further extend recovery, applying the full range of EOR techniques as per the technology strategy; these plans should be reviewed annually by the Regulator. To support the process, the Regulator should use its powers (sanctions and incentives) to reinforce their expectations for performance.

A key issue will be to ensure that production licences are in the right hands i.e. with an operator who is prepared to invest money and quality management to maximise the recoverable reserves. Otherwise the Regulator should use its powers to facilitate an appropriate change in operatorship or ownership of the assets.

PILOT's production efficiency task force is doing good work to identify the various challenges and opportunities but the test of its success will be the extent to which this is translated into collaborative effective action.

Action 14: Operators should provide asset performance data on a timely basis. It is apparent that certain operators are unacceptably slow to provide key information on asset performance. As a particular example, monthly production returns are too frequently provided some months in arrears; timely information on production is essential and operators should provide such on a monthly basis, by the end of the subsequent month. To promote performance improvement, the Regulator should be empowered to publish such asset performance data as it determines as part of its annual reporting cycle.

It is also recognised that there is no shared Industry wide definition of key metrics and a shared knowledge and use of common terminology will be beneficial to ensure all parties are considering the same metric in stewardship discussions. Sharing of performance data, via the Regulator if needed to avoid any competition law conflicts, can help identify areas of operational excellence and encourage greater drive for performance improvement.

4.3. Regional Development Strategy

Strategy Objective

The objective of the Regional Development Strategy is to ensure the development of UKCS resources on a regional, rather than solely a field basis. Operators should be required, where appropriate, to co-operate with the Regulator and with other licence holders in the wider adjacent area on all aspects of field and cluster development, from exploration through to decommissioning, with the overarching aim of maximising economic recovery from clusters of fields as well as from individual fields. This offers opportunities to jointly enhance value to both HM Treasury and to licensees to deliver the best economic outcome. Consistent with this and the increasing need to tie back smaller and more marginal discoveries into existing – and often ageing - infrastructure, licence holders should make their infrastructure and process facilities available, subject to their own capacity requirements and technical compatibility, at fair and economic commercial terms and rates to potential third party users.

Current situation / size of the prize

The Review considers that under the new strategy of MER UK, which will seek to maximise the economic recovery across regions, the Regulator will be required to work closely with Industry to develop Regional Plans across the UKCS which co-ordinate and where appropriate integrate exploration, development, production and decommissioning plans.

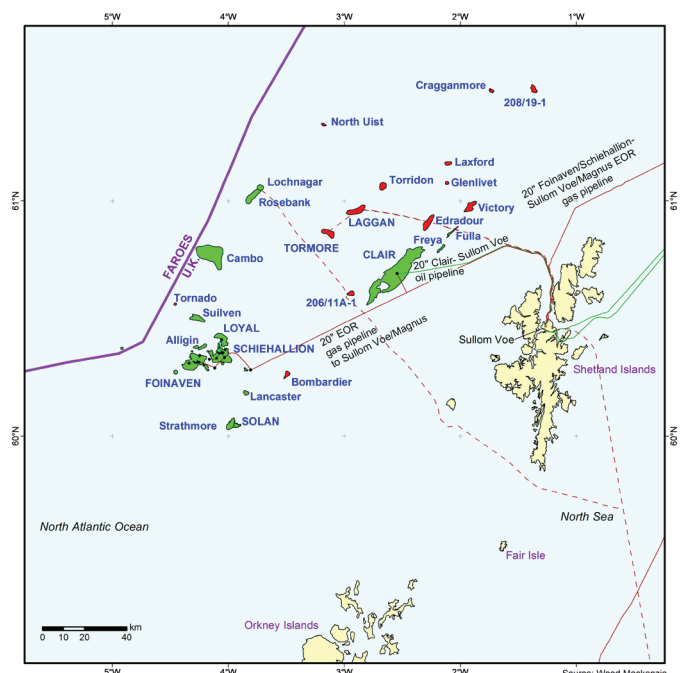
Industry, supported by DECC, is already making good progress to address this challenge in the Northern North Sea and the Central North Sea through the Rejuvenation projects. The Review sees this work being led by the new Regulator but working very closely with Industry. Greater transparency

and openness between operators will be essential to identify and collaborate on the opportunities. The Regulator will also be in a good position to collect and compile commercially confidential data without conflicting individual parties and can act as an intermediary to promote new opportunities e.g. around heavily depleted infrastructure, or to encourage cluster developments in a consortium of partners. This collaboration should increase the overall size and economic value of the opportunities thus creating more value for all.

“The objective of the Regional Development Strategy is to ensure the development of UKCS resources on a regional, rather than solely a field basis”

Overview of the West of Shetland region

Source: Wood Mackenzie



Early priority actions for the new Regulator

Action 15: The Regulator, working with Industry, should develop Regional Plans for each area and play across the UKCS.

The Review considers it necessary that, where appropriate, Regional Plans are developed in the UKCS. For example, plans could cover the mature Northern and Central North Sea, HPHT prospects, West of Shetland, the Southern North Sea and other areas identified by the Regulator consistent with the exploration new play themes. These Regional Plans should combine the broader perspective on prospectivity, exploration, development planning, asset and infrastructure utilisation and decommissioning. They should include resource maturation plans combining both the Regulator's and licensees' perspectives and be used as a basis for decision making in the stewardship discussions.

As an example, the Regulator should urgently develop a Southern North Sea plan building on the experience gained by the CNS and NNS "Rejuvenation" projects hosted under PILOT. The Southern North Sea is the most mature region of the UKCS, with first production from the West Sole Field in 1967⁴⁸. It is a gas producing region, now vulnerable to rapid decline, but still with some real potential from e.g. Cygnus (a current £1.4 billion⁴⁹ development) and Tolmount (a significant recent discovery). However, the Review considers the Southern North Sea is particularly vulnerable to premature contraction and decommissioning and there is a pressing need to prepare a regional plan to integrate all these issues.

Among the issues to be considered are:

- (a) Some significant parts of the SNS infrastructure are at risk and it is important to ensure the licences are in the hands of those prepared to invest. A number of assets require additional investment if their productive life is to be extended. There is a need to maximise access to existing infrastructure to open up stranded reserves and also for some investment in new infrastructure.
- (b) The level of maturity and the lower market value of gas (\$60 per barrel for gas v \$105 per barrel for oil) make it hard for the SNS to compete for new investment, both against oil opportunities on the UKCS as well as against the Netherlands. The SNS is also seen as a very expensive territory competing for resources with the rest of the North Sea where costs are primarily driven by oil price.
- (c) The almost exclusively gas producing Southern North Sea, now in danger of significant premature decommissioning, merits a differentiated fiscal regime reflecting the significantly lower market value of gas. This compares unfavourably to the Netherlands which is deemed to be 2.5 times more profitable on a post-tax basis (81 per cent tax rate versus 50 per cent in the Netherlands)⁵⁰. Whilst, HMT's introduction of small field allowances makes the UK more competitive for new investments, brownfield investments remain less attractive for the most part in the UK than in the Netherlands.

⁴⁸ DECC 'Full List of Offshore Fields in Production'

<https://www.gov.uk/oil-and-gas-uk-field-data#field-start-ups>

⁴⁹ <http://www.gdfsuezep.co.uk/news/news/2012/07-08-2012.aspx>

⁵⁰ http://www.ebn.nl/Actueel/Documents/ebn_focus_on_dutch_gas_2012.pdf

- (d) The Review was also informed by a number of parties who believe that special tax allowances would be required for discoveries high in impurities such as carbon dioxide and nitrogen, which are inherently more costly and less rewarding to develop. There is also real potential for exploitation of the carboniferous zone, and the significant number of small tight gas reservoirs which will require hydraulic fracturing and then costly additional treatment or blending facilities. Such activities are capital intensive and may require special fiscal consideration. However, this is beyond the scope of this Review.
- (e) With the large number of reservoirs in a comparatively small area, cluster developments must be achieved and this will clearly require significant industry collaboration.
- (f) Government must continue to carefully co-ordinate the allocation of wind farm licences and oil and gas licences.
- (g) The northern part of the Southern North Sea is not well explored and better collaboration on existing seismic and Government industry collaboration on shooting new seismic could produce some interesting new opportunities. EBN, the state owned company in the Netherlands, have just shot a significant amount of seismic in their northern region.
- (h) There is potentially valuable learning from the progress made by the Dutch offshore sector across the median line. From similar production rates in 2004, UK SNS gas production has fallen more rapidly particularly since 2006 and is now 16 bcm pa in 2012 compared with 19 bcm pa in the Netherlands, in spite of the UK sector having significantly higher (318 bcm)⁵¹ reserves and resources than the Netherlands (221 bcm)⁵². Further, Dutch exploration activity has held up much better than the UK sector. In the Netherlands, EBN has a very strong influence which is effectively focused on Maximising Economic Recovery of their natural gas resources. The Dutch Government is an active owner of the infrastructure and regulates the industry in a more active manner facilitating a degree of transparency, fairness and an enhanced information flow which makes resolving disputes easier and achieves a consistency across the region.
- (i) Third party access to infrastructure is not an issue in the Netherlands but it clearly is in the UK with some operators being exemplars but others apparently unwilling to accepting new tariff business at competitive rates.

⁵¹ <https://www.gov.uk/oil-and-gas-uk-field-data#uk-oil-and-gas-reserves>

⁵² www.nlog.nl

4.4. Infrastructure Strategy

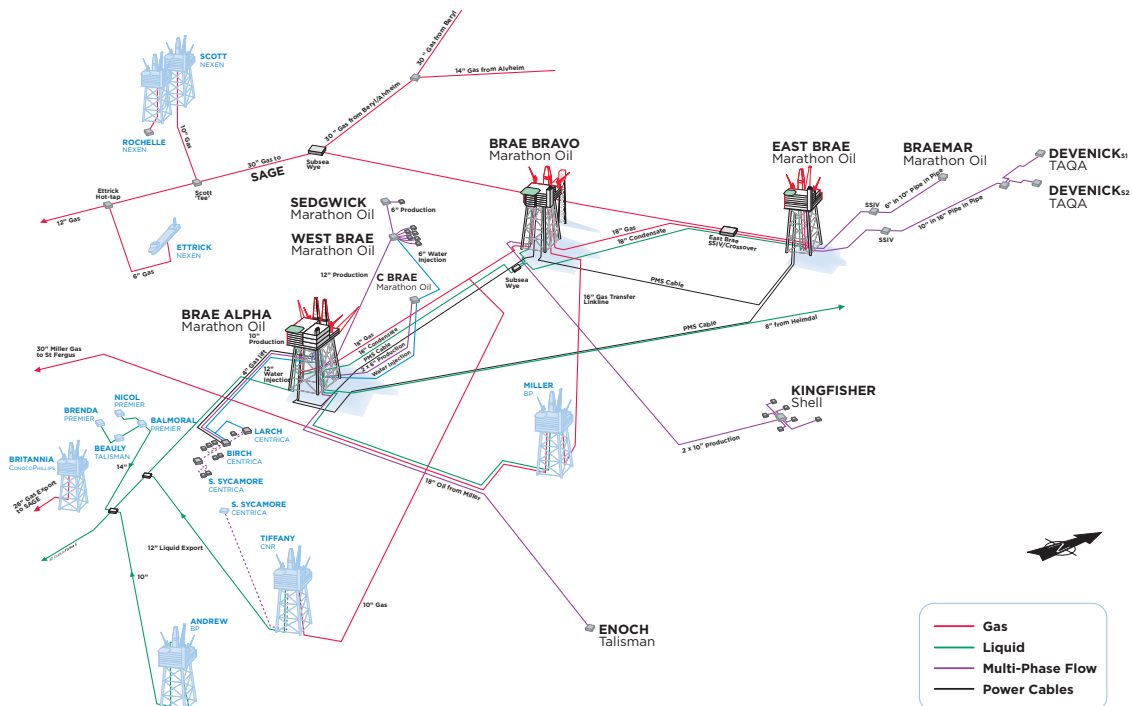
Strategy Objective

The objective of the infrastructure strategy should be to ensure that the life of the existing infrastructure is prolonged to facilitate the processing, transport and export of the UK’s offshore oil and gas resources, and that investment in new key infrastructure is achieved. This strategy should be developed on a regional basis by the regulator and industry, to serve both MER UK as well as the commercial imperatives of individual licence holders.

This will require the Regulator to identify critical infrastructure, monitor its capacity, track current throughput and potential volumes within its catchment area, and be cognisant of the commercial drivers needed to sustain such infrastructure. The Regulator must also look to facilitate investment in key new infrastructure consistent with regional development plans.

“Brae Area Schematic demonstrates the operational and commercial complexity of the UKCS...”

Source: Marathon



Current situation / size of the prize

Infrastructure retained and developed

The UKCS benefits from an extensive coverage of infrastructure (platforms, pipelines and onshore processing plants and terminals). This offers a competitive advantage, allowing new fields to be developed more cheaply via existing infrastructure, and enabling smaller fields to be developed which would otherwise be uneconomic if developed on a standalone basis. It is therefore essential that the UK manages the existing ageing infrastructure efficiently as part of the wider remit for MER UK and that all parties can gain access to infrastructure on an appropriate commercial basis.

Infrastructure in mature areas of the North Sea is under increasing commercial pressure as maintenance costs increase and throughput diminishes. Work carried out under PILOT estimates that between 0.5 – 2 billion boe are at risk from the early decommissioning of existing infrastructure⁵³.

Additionally, there is a clear need for the development of significant new infrastructure, particularly West of Shetland and in the Central North Sea which should be developed on a collaborative basis, either by existing incumbents or new players and may involve both upstream and mid-stream business models.

Access to Infrastructure

The pace of new developments is being constrained in part by the inability of third parties to negotiate appropriate technical and commercial terms to achieve access to existing infrastructure. As a result, developments are taking longer to implement and often end up being sub-optimal.

Fundamental to the problem is a misalignment of commercial and technical interests between the owner of the hub platform and infrastructure and the party seeking access to process and transport their well stream. The hub owner typically views the provision of processing and transportation to a third party as a low value opportunity, particularly when they have no equity interest. As a result there is little incentive for the hub owner to take on business which could add risks to their own operations and use up capacity in their facilities. In contrast, the small operator seeking access has little bargaining power and often suffers interminable delays in trying to counter the risk issues.

Early priority actions for the new Regulator

Action 16: The Regulator should work closely with Industry and HM Treasury to provide an economic environment which prolongs the life of existing infrastructure and promotes investment in key new infrastructure. The Regulator has a crucial role to play to facilitate the retention of existing, and the adding of new, critical infrastructure. As such the Regulator should develop, with industry, coherent plans for infrastructure founded on a sound knowledge of existing infrastructure throughput and emerging business opportunities.

⁵³ PILOT Presentation 2 May 2013

Action 17: Stewardship of infrastructure should be included within the existing asset stewardship process, and regional development plans should be used to promote collaborative infrastructure initiatives to provide additional capacity, prolong life and maximise recovery around key production hubs. The good stewardship of infrastructure is critical to the future of the UKCS. Without it, significant volumes will be lost and the productive life of the UKCS curtailed. The Regulator should identify critical hubs at risk of decommissioning well in advance, and work closely with industry to integrate infrastructure led exploration, development and production planning to maximise recovery and extend the life of existing infrastructure. The stewardship of infrastructure and onshore facilities is crucial to the longevity of the UKCS and as such should be given equal attention within the stewardship process.

Action 18: The new Regulator must make full use of the current legal powers to resolve disputes and facilitate access to infrastructure. This can be done through the Infrastructure Code of Practice (ICoP) or more active deployment of the Regulator's long established, but little used, powers to resolve access to infrastructure disputes. To try and minimise the level of legal work, standard protocols should be established by the industry in conjunction with the Regulator with set procedures, timetables and guidelines on issues such as co-mingling of liquids and other technical and commercial risks, with recourse to independent experts when appropriate. The protocol should take account of learning from past failures to agree.

Action 19: The new Regulator, in conjunction with HMT, should consider measures to encourage infrastructure owners to offer more competitive tariffs in order to improve marginal field economics and reduce tie-back costs. High costs drive up infrastructure tariffs for third party business, increasing development costs and shortening the commercial life of late-life fields. The Review believes that tariff business should not be treated as a high margin activity. It is noted that in other jurisdictions the tax rate for tariff income is substantially lower than that for production. In the UK, Petroleum Revenue Tax has been removed from tariff income, although it remains subject to the supplementary charge, as one means to encourage third party business. Were the Regulator and HMT to consider that further steps were required to promote new business, it would be important to ensure that any savings to infrastructure owners are passed on to the end client.

Action 20: The Regulator should take measures to facilitate the development of new infrastructure business models either from new entrants or existing players. There is a case to encourage specialist transport and processing companies. The Netherlands has a number of infrastructure companies such as NOGAT BV, whose business model is solely to operate offshore pipeline and onshore processing facilities, and therefore actively seek to attract new transport business and operate outside the ring fence. This business model should be considered for the UK, potentially for both new infrastructure and existing infrastructure where it could be unbundled from the existing production hubs. Under such a business model, the transporter would solely concentrate on the timely and efficient transportation of hydrocarbons, and no longer face conflicts of interest. It may be the case that changes to the fiscal regime could facilitate such developments, however this consideration is beyond the scope of this Review.

4.5. Technology Strategy

Strategy Objective

The objective of the Technology Strategy should be to ensure that existing technologies are deployed to their full effect and relevant new technologies developed to maximise recovery from the UKCS. There is an urgent need for Industry to focus in depth on the five or six most critical technology challenges. Doing so will encourage the UK to build further on its position as a global centre of expertise for offshore hydrocarbon basin exploitation.

Current situation / size of the prize

Technology has played an important part in the development of the UKCS e.g. the move to deeper waters, the ability to tie-back and remotely operate subsea fields over long distances, and the development of high pressure high temperature reservoirs. Over recent decades, the UK has developed a significant oil field services competency and this sector already exports in excess of £7 billion in oil field goods and services, reflecting the UK's technical expertise. The challenge will be to grow this capability further to access a global market worth more than \$0.9⁵⁴ trillion annually.

Industry and government must work together to identify the key technology requirements and ensure the resources are put in place to deliver them. As part of the annual stewardship review, operators should be challenged to demonstrate they are actively deploying the best and most cost effective technology across the UKCS to achieve MER UK, leveraging the capabilities of the UK's own oil and gas supply chain. More broadly, the UK's research and development funding bodies and research institutions have an

important role to play to help meet the technology needs of this industry.

Industry is currently looking to move ahead with a UKCS Technology Leadership Board and establishing technology theme delivery groups. From the evidence gathered, Industry progress has best been made when specific technology development requirements have been identified and those operators/supply chain companies with a particular interest in tackling these have worked together in a group. On this basis, the Regulator should focus on the technology theme delivery groups and work with industry in maximising the success of these. Principal opportunities are likely to be:

- **Improving exploration outcomes** – where new technologies, data and techniques are required to improve the imaging and evaluation of many exploration prospects to improve drilling outcomes. Early acquisition and access to high quality seismic over current and new plays is essential and should be supported by industry collaboration to enable analysis of regional plays.
- **Decommissioning cost reduction** – see reference to technology in the decommissioning section.
- **Production efficiency improvement** – half of all production losses are as a result of unplanned production outages. More could be done to prevent such events by improved equipment monitoring and better integrity management techniques; also looking at options such as regional subsea power grids co-operating closely with the renewables sector.
- **Improved Oil Recovery** – where the challenge is to deploy better reservoir management techniques, including 4d seismic, and the latest well technologies on a cost effective basis to improve recovery.

⁵⁴ Ernest Young Global oil and gas reserves study 2013

- **Enhanced recovery** – where deployment of Enhanced Oil Recovery (EOR) techniques could greatly improve recovery rates. The good progress made to-date by the PILOT EOR Work Group underlines the success of this approach.
- **Development of small fields** – new field discoveries tend to be of a diminishing size and require radically cheaper development and production solutions. A variety of potentially interesting technologies are approaching the market targeted at small fields all of which will require further appraisal. They include unmanned seabed, static surface and floating production systems. Standardised solutions will be key to developing cost effective solutions and the Central North Sea (CNS) and Northern North Sea (NNS) may gain from technology transfer from the UK and Dutch sectors of the Southern North Sea (SNS) where unmanned micro solutions are already being developed and deployed.
- **Extending the technological reach** – new technology has a key role to play to improve the frontier areas and new plays reaching further into deep water, achieving better processing and separation on the sea bed, and making more of the High Pressure High Temperature (HPHT) resource potential, reducing the costs of HPHT, and achieving more subsea developments.

Early priority actions for the new Regulator

Action 21: The technology challenges (outlined above) should be rapidly validated and technology sub groups set-up for each comprising the key companies with the prime interest in finding a solution, and the Regulator.

As an example, the PILOT EOR programme should be processed as a priority. This programme has seen a limited number of companies come together with strong leadership, working closely with DECC, to actively promote the use of EOR techniques across the UKCS. Their objective is to improve the recovery of incremental oil beyond what can be achieved using more conventional depletion and water recovery flood techniques. They have identified the three key techniques best suited to the UKCS – Low Salinity water-flooding, Chemical Flooding (polymer and surfactant), and Miscible Gas (hydrocarbon and CO₂) injection.

Their work programme for 2014/15 proposes DECC and industry jointly conduct a series of structured reviews promoting EOR on the most suitable fields (14 identified to date) – the expectation is that all these fields should actively be assessed for suitability to deploy EOR techniques. The reviews may be voluntary but if necessary could be mandated. Funding for the EOR reviews will need to be resolved between HMT, the Regulator and Industry. The workgroup also proposes a structured programme of collaboration on EOR to sustain the progress and deploy the technology on test sites offshore.

EOR offers a major new area of commercial opportunity for the UK's oil and gas supply chain and the research community. Already companies are considering building a polymer plant in the UK to service the North Sea and more can be done as experience of applying EOR techniques offshore improves.

End of field life oil recovery is currently projected at 46 per cent on average⁵⁵, yet with suitable technology interventions at least another 0.6 – 1.2 billion boe could be recovered with an ultimate prize of up to 6 billion boe⁵⁶.

Action 22: Operators should submit their plans to maximise the deployment of existing technology and develop new technology as part of the annual stewardship review cycle concentrating on the “top technology challenges” for the UKCS. Asset operators should establish technical recovery limits and demonstrate that the field development plans are aligned to achieve them. They should also seek to apply new technologies to further extend recovery including the full range of EOR techniques currently being promoted by the EOR working group.

Action 23: Companies should be encouraged to trial and deploy new technologies offshore, where necessary providing suitable incentives to do so. The main barriers to deployment of new technology are seen to be a risk aversion by operators combined with reluctance to pilot technologies on offshore field trials. When these are carried out, the results should be shared to help promote further use of the technology. More use should also be made of onshore installations as proving grounds prior to the deployment offshore.

Action 24: The Office of Carbon Capture and Storage should continue to work closely with the new Regulator and oil and gas licensees to examine the business case for the use of depleted reservoirs for carbon storage and possibly EOR. Carbon capture and storage offshore is an emerging opportunity that needs to develop a robust business case. It does however have the potential to be of huge benefit to the UKCS where depleted reservoirs and saline aquifers both offer the potential for CO₂ storage. Cheap sources of CO₂ may also have a role in EOR in future, albeit in competition with other EOR technologies. The Review would encourage further collaboration across industry, with DECC and with the research community, as the most appropriate means to promote the growth of this opportunity in the UK.

⁵⁵ DECC IEA presentation September 2013

⁵⁶ Oil & Gas UK 2013 Activity Survey

4.6. Decommissioning Strategy

Strategy Objective

The objectives of the decommissioning strategy should be to achieve the maximum economic extension of field life and to ensure key assets are not decommissioned prematurely to the detriment of production hubs and infrastructure. Also, to ensure that decommissioning is executed in a safe, environmentally sound and cost effective manner (consistent with the UK's international legal obligations) with sufficient early planning and co-ordination, and that as decommissioning progresses, the UK gains a competitive industrial capability. This strategy does not consider the environmental permitting aspects of decommissioning, which are outside the Terms of Reference of this Review.

Current situation / size of the prize

Decommissioning is an integral part of the life cycle of oil and gas assets. There is a need to manage the interrelationship between extending economic production, maintaining asset integrity, retaining facilities and utilities to optimise decommissioning, and preserving assets for future use where appropriate. The Regulator needs to work closely with Industry, HM Treasury, HSE and DECC's Environmental team to optimise these sometimes conflicting demands, not least to ensure that key hubs and supporting infrastructure are not decommissioned prematurely, which would render near field exploration and small field developments unviable.

On current estimates, decommissioning will cost more than £35 billion (2012 money), over the next 30 years⁵⁷. However, based on recent well abandonment performance, costs could escalate significantly and easily exceed £50 billion. Whilst the industry will carry out the decommissioning, more than half the cost (estimated at around 60 per cent) will ultimately be borne by the Government through tax relief. The two elements with the highest costs and, hence greatest potential for improvement, are well plugging and abandonment, and offshore facilities lifting and transportation to shore.

⁵⁷ Oil & Gas UK 2013 Activity Survey

Improvement to decommissioning performance presents a major opportunity; for example, a 25 per cent cost reduction would save the Exchequer around £5 billion (2013 money), with a similar penalty if costs continue to rise as seen in recent years⁵⁸. If decommissioning could be postponed by five years across the UKCS (for fields not yet entering decommissioning), it is estimated that the delay could allow an extra 1 billion boe to be recovered both from existing fields and through the development of new fields yet to be discovered⁵⁹. Likewise, if the UK can develop its expertise in this area, it will have a competitive advantage which can be exported to other oil provinces as they mature.

Through PILOT, Industry and Government have participated in several initiatives regarding decommissioning over the years. Most recently a Decommissioning Steering Group (DSG) has been formed, but this is an industry group, lacking regular DECC or HMT involvement, though DECC does attend on occasions.

Most attention to-date has been on developing decommissioning processes, methods of estimating the costs, and managing the build-up of current activity. There has been a lack of focus on macro-cost reduction or innovation, there is no strategic decommissioning plan looking at timing or infrastructure, and no focus on field life extension. It is apparent that there is a need for greater collaboration between operators and that the supply chain requires a better insight into the market opportunities.

Early priority actions for the new Regulator

Action 25: A new single decommissioning forum should be set up responsible for delivering significant decommissioning cost reduction, promoting innovation and greater cooperation, jointly led by the new Regulator and Industry. Under existing arrangements,

Government is not equipped to influence cost drivers. This forum should provide clear leadership on core issues. It should build on the action provided in the UK Government Oil and Gas Industrial Strategy to promote cost efficiencies but be significantly more ambitious on what it seeks to achieve.

The role of the new Regulator is key. It should set a target to radically reduce the cost of decommissioning over the next decade whilst respecting all current obligations. Industry should contribute their most experienced decommissioning management and expertise. Experience from recent decommissioning must be collated and new strategies, methodologies and techniques formulated building on existing experiences.

The new decommissioning forum should work very closely with the supply chain to look at how industry can best share risks and costs in areas like well plugging and abandonment, and topsides, jacket and subsea infrastructure removal. Expensive rigs and vessels could be shared and onshore yard capacity better scheduled.

⁵⁸ Internal analysis by Review

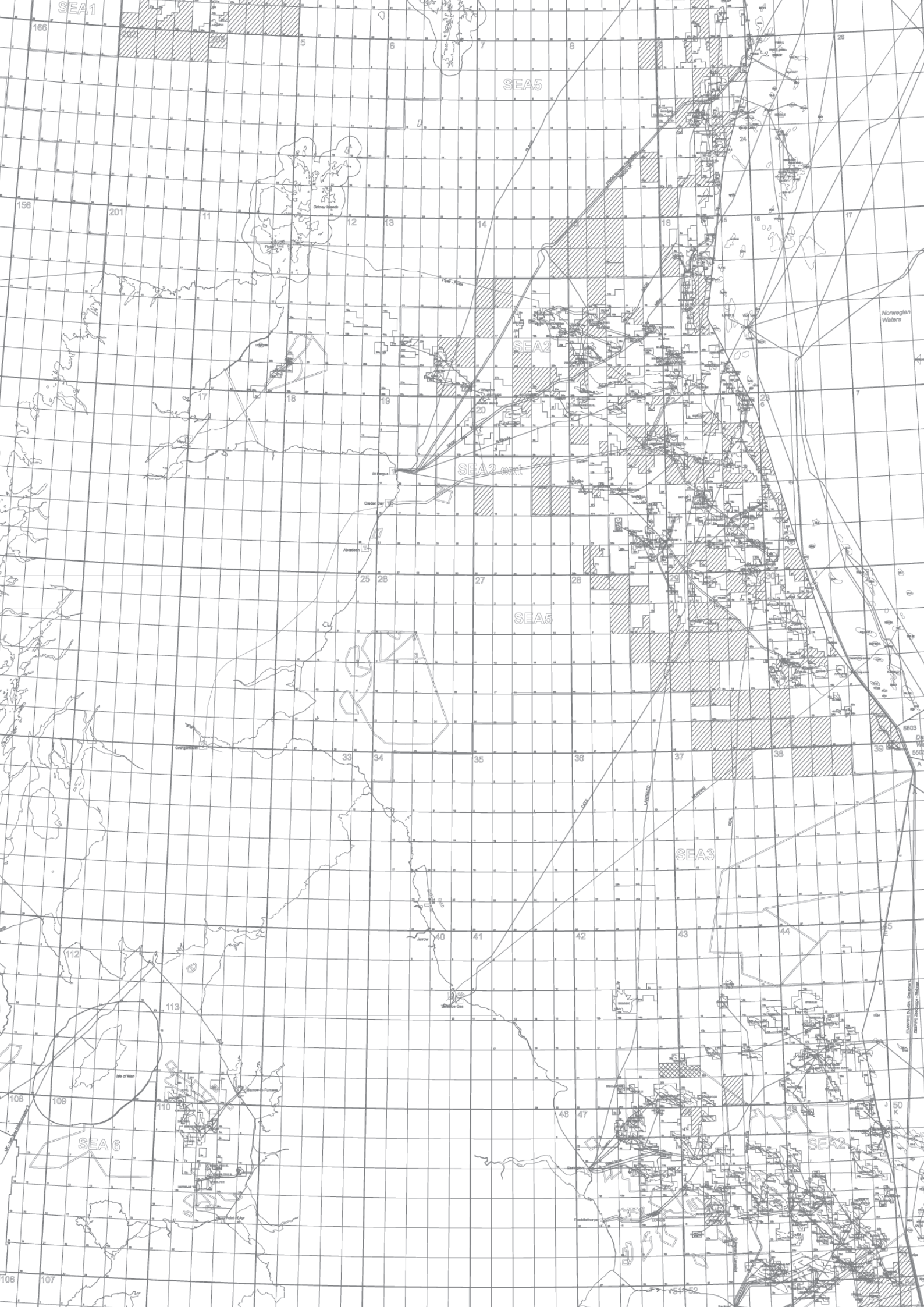
⁵⁹ Internal analysis by Review

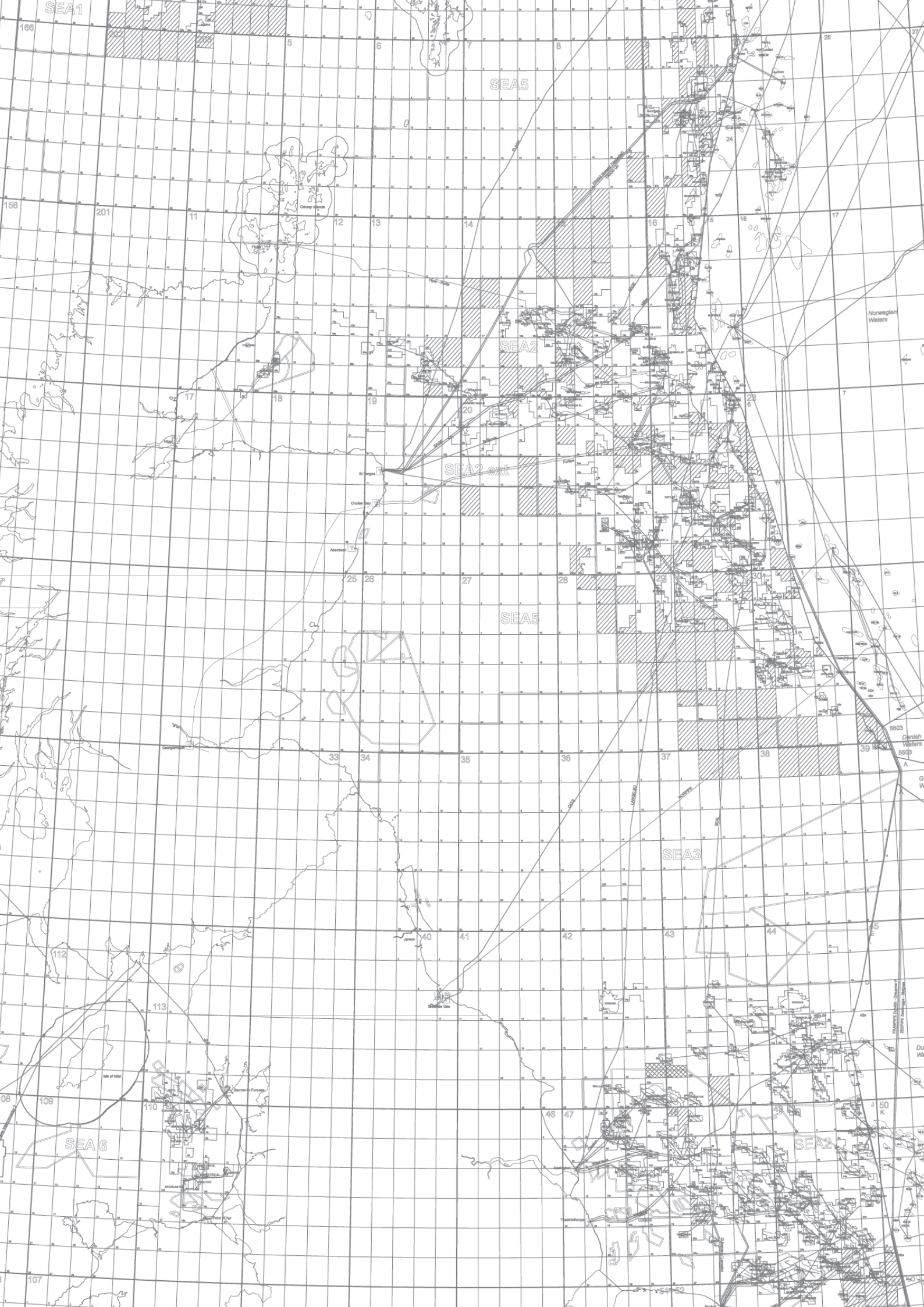
Action 26: The Industry Technology Strategy should include decommissioning cost reduction as one of its key objectives. Technology has a crucial role to play in controlling and reducing decommissioning costs. A programme should be developed to tackle the existing significant backlog of well abandonment using collaborative knowledge and efficiency, and developing best practice to progressively reduce the unit cost for operators and tax payer alike. There is also significant potential to reduce the cost of heavy lift resources and consider the deployment of novel approaches such as the piece-small technique amongst others as a means of innovative cost reduction. There should also be a focus on cutting techniques and the possibility of light well intervention vessels.

Action 27: The Regulator should ensure assets are not prematurely decommissioned, making the necessary linkage between decommissioning and access to infrastructure. When considering the permit for the cessation of production and decommissioning, the Regulator will take into account the impact on adjacent production and infrastructure, and exploration potential within the catchment area. It will facilitate the most efficient and cost effective means to retain critical infrastructure, taking account of the interests of the party seeking to decommission and the importance of maximising economic recovery from the adjacent fields. The Regulator should also address the timing of decommissioning to ensure efficient scheduling by all parties avoids placing excessive demand on the supply chain and further cost inflation.

Action 28: New late-life business models should be promoted combining the skills of the operator and decommissioning practitioner with a timely transition between the two. Decommissioning planning for each field should commence well before decommissioning (typically up to a decade or so prior to the end of field life). This should build on the action listed in the UK Government Oil and Gas Industrial Strategy to develop best practices when making an efficient transition from cessation of production to decommissioning. New late-life business models are still being developed to optimise the role of the operator and the decommissioning contractor, and the regulatory and fiscal system should support innovation here. Fiscal issues, particularly around the ability to access decommissioning relief, have been identified as one of the potential barriers to such late-life business models; these need to be explicitly addressed.

Action 29: The Regulator should work closely with the industry to investigate game changing decommissioning concepts which could radically change the value proposition. Decommissioning is still an emerging activity and is currently planned around existing concepts and technology frameworks. Industry should be proactive and receptive to considering decommissioning policies and initiatives in other countries and jurisdictions which achieve similar outcomes at less cost and/or less damage to the environment.





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SEA 5

SEA 2

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SEA 5

SEA 3

SEA 6

SEA 4

Norwegian Waters

Danish Waters

OSNEY MARSH

SIDE OF MEN

OSNEY MARSH

OSNEY MARSH

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OSNEY MARSH

OSNEY MARSH

Annex A.

Arguments for a new arm's length body

The Review believes that creating a new arm's length body, with a degree of independence from DECC, a clear focus on delivering MER UK, and appropriate resource to carry out its role effectively, is critical to the successful delivery of the new MER UK strategy.

Focus

- Creating a new body with the mandate to focus solely on MER UK will give a clear signal to Industry that Government is serious about implementing a step change in its management of the UKCS. The Review believes that simply increasing the resource of the team under the current structures within DECC is likely to be perceived as a re-badging exercise with little material change, which would risk losing the momentum the Review has created.

DECC is responsible for all energy and climate change policy, and as a result oil and gas must compete for attention within such a wide ranging and high profile portfolio. Although DECC has 1600 staff only approximately 50 are in the Licensing, Exploration and Development (LED) team responsible for the management of the UKCS, of which some also work on onshore issues unrelated to the UKCS.

- DECC's 2012 – 2013 priorities are wide ranging:
 - supporting investment in the UK's energy infrastructure – including through the Energy Bill, which will set in place the framework to bring forward the £110 billion needed in our electricity infrastructure over the next decade
 - supporting consumers and keeping energy bills down, including through implementation of the Green Deal

- promoting action in the EU and internationally to maintain energy security and mitigate dangerous climate change as we chart the way towards a global deal on climate change in 2015

- Creating a new body that will not have to compete internally with these other priorities, and with its own defined resources (including legal resource), will ensure a clear focus is retained on delivering MER UK.

Degree of independence

- Arm's length bodies operate with a degree of autonomy from ministers and their department and ministers do not concern themselves with the day to day running of the body.
- The new body will need a strong CEO who can influence Industry and HMT decisions to be successful. To attract a suitable calibre of leader, it is likely that they will expect the freedom to run the organisation as they see fit, within a framework set out by ministers. The leader of an expanded team within DECC would not have these same freedoms, potentially making this role less attractive to prospective candidates.

Identity and Culture

- The new regulator will be more involved and demanding of industry, proactively using its powers where necessary to achieve MER UK. This will be a shift in the culture of the current regulator, which has been restricted by both resource pressures and a historically risk averse culture whereby it has rarely used many of its more intrusive powers.

- For a step change in government stewardship of the UKCS to be fully achieved, the Review strongly believes that simply increasing the resource within DECC will not be enough. A new body, with a new identity and commercially adept culture focused on value creation is required as a signal to industry of the step change in approach of how government will manage the UKCS.

Resourcing the new regulator

- Fundamental to achieving the step change required in the management of the UKCS will be a strong, better resourced regulator. If the regulator is unable to attract sufficient numbers of high quality personnel with the required specialist skills to complement those already in post, its desired role in achieving the resolution of commercial disputes and avoiding competition law issues, as well as acting as a close advisor to HMT on industry fiscal policy, will be severely restricted.
- The success of the Regulator will fundamentally be determined by the quality of the people it attracts and retains, and the Review strongly believes creating a new, empowered body with the momentum of industry goodwill behind it, will be more attractive to potential candidates than a reorganisation within a government department.
- The new Regulator will have to be able to compete with Industry to attract high quality personnel. Although many arm's length bodies remain bound by government pay conditions they have more flexibility than if they remain part of DECC. As an arm's length body funded by industry, this should give a stronger position when negotiating remuneration and resource levels with HMT.

Non-typical Government Department/civil servant roles:

- To be credible and successful the Regulator will require increased capacity of specialist skills including geologists, engineers, and commercial personnel, all of which are not typical roles or skills found in government departments.

Satisfying the EU Offshore Safety Directive

- The Review understands that the creation of a new arm's length body may also go some way to satisfying the obligations under 8.2 and 8.3 of the recent EU Offshore Safety Directive.
 - 8.2. Member States shall at all times ensure the independence and objectivity of the competent authority in carrying out its regulatory functions ... Accordingly, conflicts of interest shall be prevented between, on the one hand, the regulatory functions of the competent authority and, on the other hand, the regulatory functions relating to the economic development of the offshore natural resources and licensing of offshore oil and gas operations within the Member State and the collection and management of revenues from those operations.
 - 8.3. In order to achieve the objectives set out in paragraph 2, Member States shall require the regulatory functions of the competent authority to be carried out within an authority that is independent of any of the functions of the Member State relating to the economic development of the offshore natural resources and licensing of offshore oil and gas operations within the Member State and the collection and management of revenues from those operations.

Annex B.

Draft objectives and success criteria for the new Regulator

Objectives and Success Criteria

It will be important to set clear and measurable success criteria against which Government and Industry can hold the new Regulator to account. Performance targets should be identified and regularly reviewed, with progress against them reported annually. It will be for DECC and HMT, in consultation with the new Regulator and Industry to set these. However, draft objectives and success criteria are set out below.

Objectives	Success Criteria
Develop and deliver, in partnership with DECC, HMT and Industry, a coherent tripartite strategy for delivering MER UK over the next 30 years	Government, working with Industry, has a robust maturation plan in place for MER UK Increased production, production efficiency and exploration, leading to an increased tax yield for government and improved returns for industry Demonstrable increase in collaboration
Encouraging investment in the UKCS by creating a stable, competitive and predictable regulatory environment, and providing advice to HMT to inform fiscal decisions	Achieving MER UK The UK is recognised internationally as having an attractive and competitive tax regime Increased investment and new entrants attracted
Promote active exploration for new oil and gas resources around the UKCS and facilitate timely and effective data sharing.	Successful licence rounds Increase in amount of seismic shot Increase in number of exploration wells drilled and discoveries
Require licence holders to demonstrate sound stewardship of existing assets and infrastructure to achieve the maximum economic recovery of resources, and encourage timely development of discoveries taking account of the broader needs to maximise recovery across the UKCS.	Increase in production Increase in production efficiency Decrease in unplanned shutdowns

continued

<p>Encourage Industry to deploy existing technologies to their full effect and to develop new technologies to maximise recovery from the UKCS, and encourage the UK to become a global centre of expertise for mature hydrocarbon basin exploitation</p>	<p>Increase in technology development and deployment Companies have effective technology plans for their fields Increased recovery factors Reduced decommissioning costs through technology</p>
<p>Encourage and facilitate greater industry collaboration, ensuring disputes are resolved in line with MER UK and in a timely manner</p>	<p>An increase in the amount of collaboration (e.g. clusters developed, infrastructure shared) A reduction in the time taken to reach commercial agreements, and a reduction in the complexity of these agreements</p>
<p>Maximise the development and retention of key infrastructure to support the regional development of the UKCS, ensuring appropriate access to third parties and facilitating the development of new strategic infrastructure</p>	<p>No economic fields stranded nor unable to be developed due to infrastructure issues, nor developed using a suboptimal infrastructure or processing route Key new infrastructure developed by consortia or third parties The ICOP process is used in a timely fashion to resolve infrastructure access disputes. Exploration is promoted around existing infrastructure to ensure resources are not stranded by premature decommissioning</p>
<p>Oversee planning for future decommissioning of the UKCS, ensuring it proceeds in a logical, sound and cost effective manner</p>	<p>Reduce the costs associated with decommissioning. Increase in collaboration on the challenges of decommissioning Industry technology development programme focused on decommissioning</p>

Annex C.

Evidence Base

Oral evidence received by the review

As part of the initial evidence gathering phase the Review team conducted more than 80 interviews with a wide variety of interested parties, including approximately:

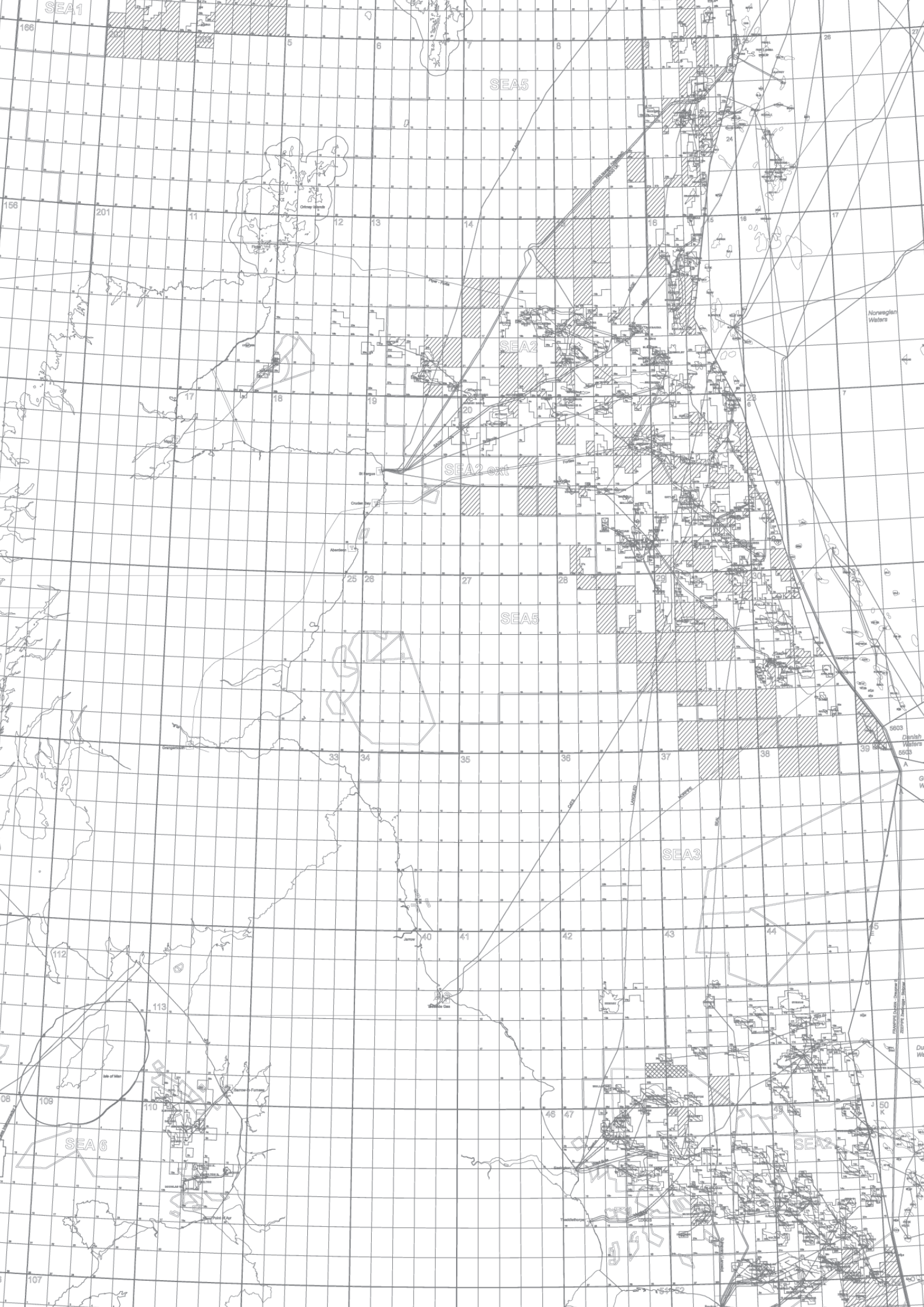
- 40 companies who have a licence interest in the UKCS; together these companies account for more than 95 per cent of UKCS production and investment
- 15 companies from the supply chain and other key stakeholders in UKCS activities
- 20 key Government figures in DECC, HM Treasury, BIS, Scotland Office and the Scottish Government; and
- 5 International regulators from the USA, Canada, Norway, the Netherlands and Australia

In addition to these interviews, the Review Team has received feedback on the Interim Report at a variety of stakeholder forums, including: PILOT, Oil & Gas UK's 2013 Annual General Meeting, a meeting of Oil and Gas Trade Associations, the Society of Petroleum Engineers, the British Offshore Oil and Gas Industry All Party Parliamentary Group and the Westminster Energy Forum.

Written evidence received by the review

The Review also requested written evidence to support its work. In August, the Review invited responses to key questions and received more than 25 submissions. Following the publication of the Interim Report on 11 November 2013 the Review team also invited feedback. Approximately 50 responses were received from: companies with a licence interest, the supply chain, trade associations, oil and gas consultants and interested individuals.

Throughout the course of the Review the team has also taken account of the numerous reports and strategies published on the UK's oil and gas industry, including but not restricted to: the UK Oil and Gas Industrial Strategy, the Oil & Gas UK Activity Survey 2013, the Oil & Gas UK Economic Report 2013, and the numerous papers and strategies produced by DECC, HMT, the PILOT subgroups, OGUK and external economic commentators.



Annex D.

Terms of Reference

The Government believes the time is right to take a fresh look at the current arrangements for maximising economic recovery of the UK's offshore oil and gas resources. The Secretary of State for Energy and Climate Change, Rt Hon Edward Davey MP has therefore invited Sir Ian Wood, recently-retired chairman of Wood Group to lead a Review.

Sir Ian's Review will examine key factors which affect UKCS performance and will develop recommendations designed to enhance economic recovery of oil and gas reserves in the future. The Review will recognise the unique partnership that is required between operators and Government to exploit the vital resource remaining in the mature UKCS and, taking account of the strategic challenges and opportunities that lie ahead, will examine:

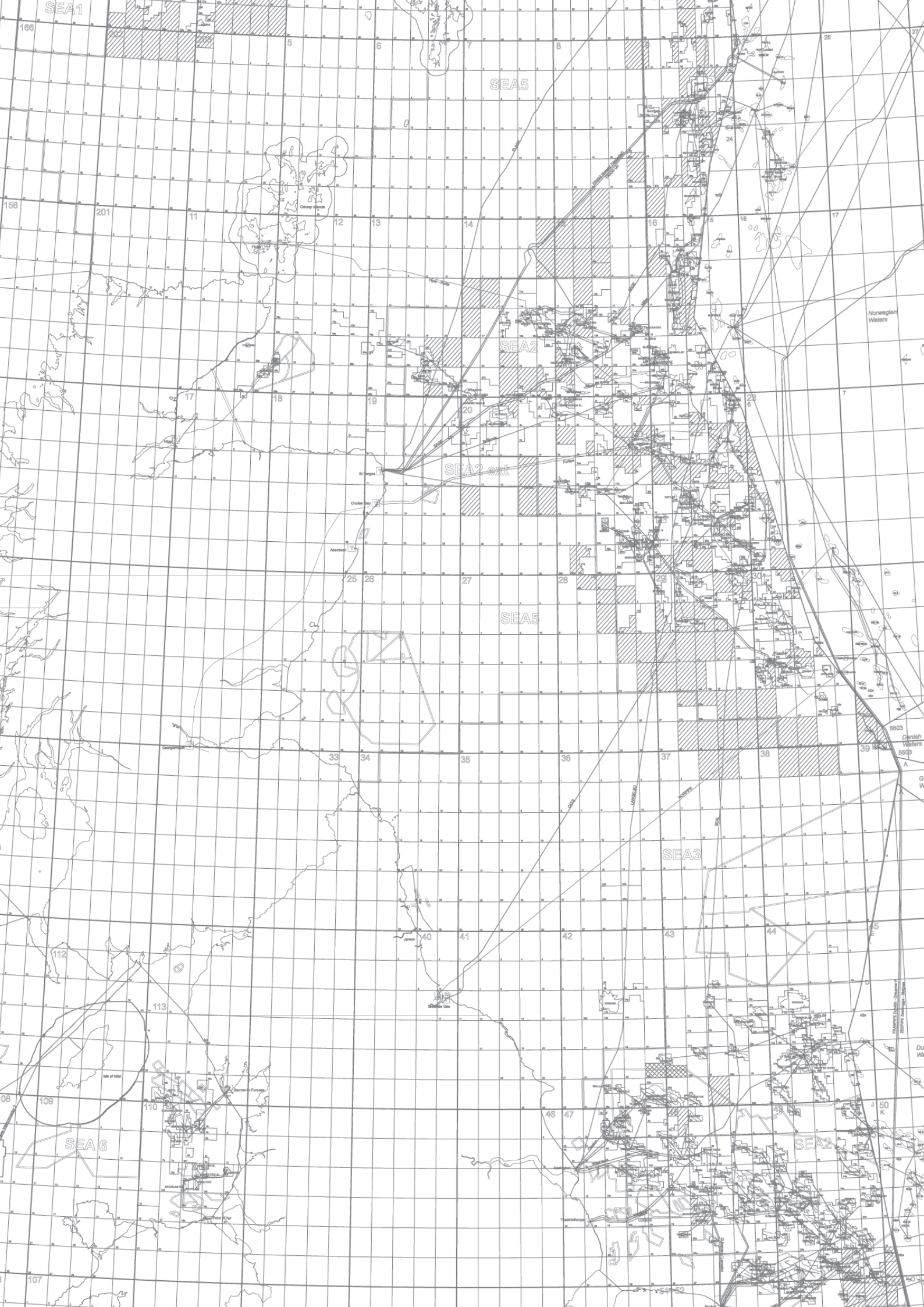
- Whether the incentives on operators to invest or divest are sufficiently strong to drive optimum investment and maximise economic recovery of current and future developments. This will include looking at the role and effectiveness of Petroleum Exploration and Development Licensing and associated regulatory and stewardship activity by Government as well as the investment hurdles, decision-making structures and resources available within and between licence holders;
- How the valuable work in the PILOT sub groups looking at production efficiency/Improved Oil Recovery, Enhanced Oil Recovery, exploration, access to infrastructure and technology, can best be driven through to early implementation. This will include looking at how to maximise investment in improving reservoir recovery rates across the basin;
- How to build on the partnership between operators and Government as well as significantly enhance inter operator collaboration across the basin to maximise economic recovery;

- The resources available to Government to carry out its oil and gas resource and Industry stewardship role effectively. In particular, the extent to which Government has the technical and commercial resources and capabilities, and how best these should be organised, to play a proactive and strategic role in partnership with Industry to maximise economic recovery of oil and gas.

While the Review will not make recommendations on taxation, its conclusions may nevertheless be drawn upon in future tax policy considerations by HM Treasury.

The Review will take account of the work of PILOT and the Oil and Gas Council and will draw upon expertise across Government, the oil and gas industry and elsewhere.

The aim of the Review will be to set the course for a prosperous and successful UKCS for the next decade and beyond, delivering growth, jobs and revenue to the UK economy and profitable opportunities for good operators.



Annex E.

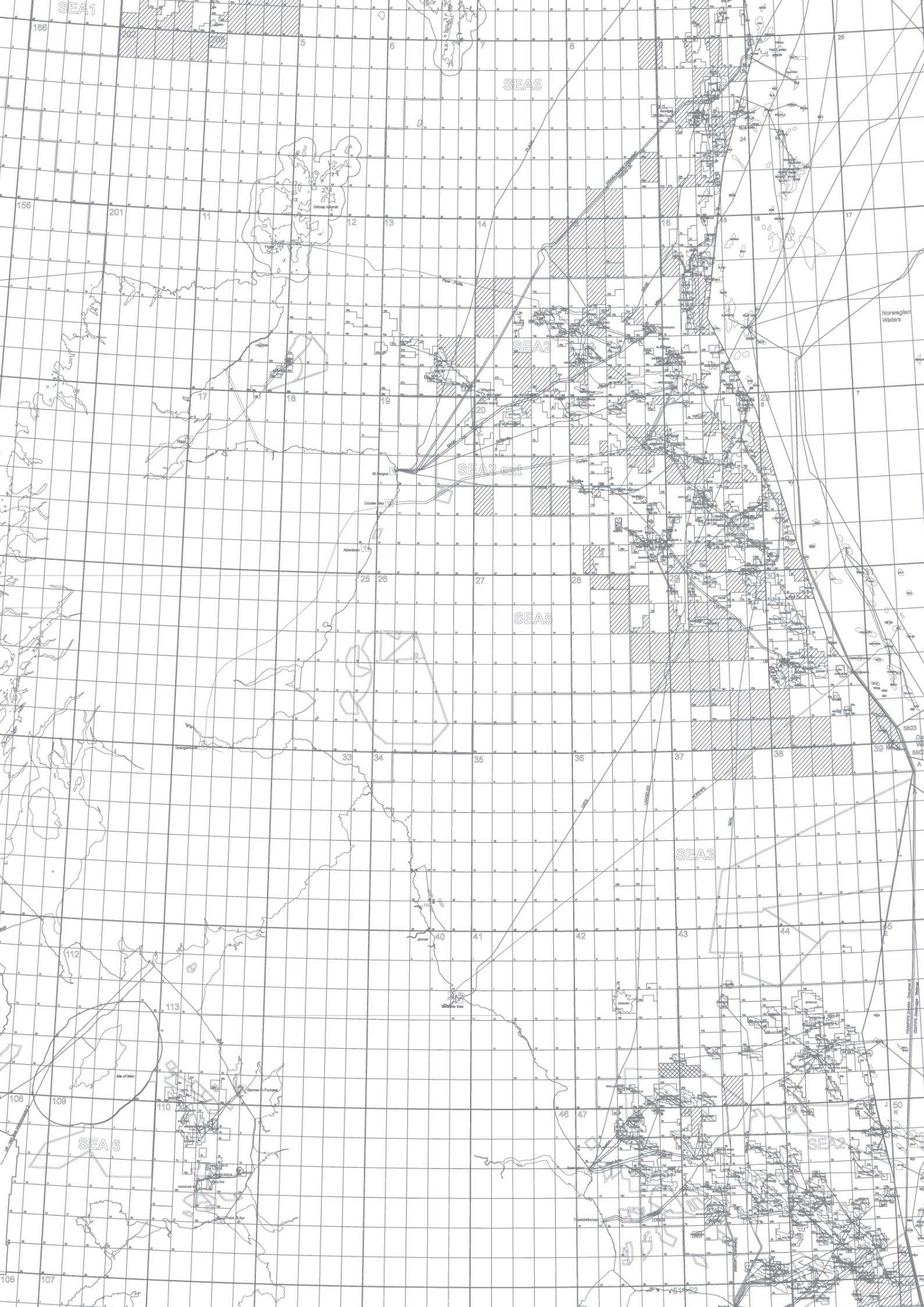
Areas not considered by the Review

The Review focusses on the primary issues impacting MER UK. The following issues will impact MER UK, but were outside the Review's Terms of Reference and therefore not directly considered in the Review:

- Fiscal Policy. One of the most significant issues, UK fiscal policy, has not been given full consideration, although it featured heavily in interviewees' comments.
- Issues fully covered in the UK Oil and Gas Industrial Strategy launched in March 2013
 - o The vital role supply chain contractors play, working with operators to enhance efficiency and performance, thereby speeding up developments and reducing costs
 - o The importance of continuing to develop the expertise of the UK supply chain to realise the huge long term potential of the international market
 - o The damaging impact of increasing supply chain costs. The UKCS is seen as one of the most expensive basins worldwide particularly in exploration and drilling costs. As an example, the proliferation of self-employed contractors both within the operators and in the supply chain rapidly moving between jobs leads to the highly negative impact of "leapfrog" remuneration rates
 - o Availability of skilled workforce, and the need for industry collaboration in an effort to even out the peaks and troughs of workload demand
 - o Access to finance: This is a critical issue in such a capital intensive industry and a number of workshops have been held over the last year to address the issue
- Safety regulation and performance, which is, and will always remain, a top priority for the industry is not within the scope of this Review. "Step Change" the pan-industry body and Oil & Gas UK continue to work closely with the Health and Safety Executive to address this priority.
- Similarly the industry is totally committed to protecting the Environment, and works closely with the relevant authority in DECC. This was not within the remit of the Review.

Glossary of Terms and Abbreviations

Bbl	barrel (of oil) (1 barrel = 0.16 m ³ and 7.55 barrels = 1 tonne)	FDP	Field Development Plan
Bcm	billion cubic metres (1 metre ³ = 35.3 cubic feet)	FPSO	floating production, storage and offloading (vessel)
Bcm/y	billion cubic metres per year (of gas)	HMT	Her Majesty's Treasury
BIS	Department for Business, Innovation and Skills	HPHT	high pressure, high temperature (of reservoirs)
Billion	one thousand million or 10 ⁹	ICoP	Infrastructure Code of Practice (for third party access to platforms, pipelines etc.)
Boe	barrel of oil equivalent: this includes oil, gas and other hydrocarbons and equates all of these with oil, in energy equivalent terms, so that a common measure can be made of any of them (one boe = 164 m ³ or 5.8 thousand cubic feet of gas)	IOR	increased oil recovery
Bpd	barrels per day	JOA	Joint Operating Agreement (between partners in a field)
Boepd	barrel of oil equivalent per day	NNS	northern North Sea
Brownfield	an oil or gas field already in production	PILOT	joint industry – government task force chaired by the Secretary of State of DECC
CCS	carbon capture and storage	PRT	Petroleum Revenue Tax
CNS	central North Sea	R&D	research and development
CO₂	carbon dioxide (one of the six 'greenhouse gases' under the Kyoto protocol)	RFCT	'Ring Fence' Corporation Tax (as applied to upstream oil and gas production)
DECC	Department of Energy and Climate Change	SC	Supplementary Charge (a corporate tax applied to upstream oil and gas production in addition to RFCT)
DRD	Decommissioning Relief Deed	SNS	southern North Sea (sometimes referred to as 'southern gas basin')
E&A	exploration and appraisal (drilling)	Trillion	one million million or 10 ¹²
EOR	enhanced oil recovery	UKCS	United Kingdom Continental Shelf
E&P	exploration and production (of oil and/or gas)	UKTI	UK Trade & Investment
EU	European Union (the 28 member states)	WoS	west of Shetland (sometimes referred to as 'Atlantic margin')



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Norwegian Waters

PROTECTED DATA - DESIGN OF
SPECIAL PROJECTS - SHIP

UKCS
MAXIMISING RECOVERY
REVIEW