

Title: Implementation of the Wood Review proposals for UK offshore oil and gas regulation IA No: DECC0170 Lead department or agency: Department of Energy and Climate Change (DECC) Other departments or agencies: None.	Impact Assessment (IA)
	Date: 05/09/2014
	Stage: Final
	Source of intervention: Domestic
	Type of measure: Primary legislation
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Summary: Intervention and Options	RPC: GREEN
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Cost of Preferred Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB in 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
n/a	n/a	n/a	Yes	Zero Net Cost

What is the problem under consideration? Why is government intervention necessary?

Current resourcing and regulatory powers are inadequate to ensure that private exploration and development will maximise the economic recovery of oil and gas from the UK Continental Shelf (UKCS). The independent 'Wood Review' which reported in 2014, made four recommendations to address the issues it identified, the majority of which will require a greater degree of intervention by an independent upstream oil and gas regulator. This will, for example, be to resolve disputes, promote greater collaboration among firms and align their private actions with social objectives for exploiting the nationally-owned resource. The primary legislation accompanying this Impact Assessment lays the necessary groundwork for the Wood Review to be fully implemented in due course.

What are the policy objectives and the intended effects?

The objective is to Maximise the Economic Recovery (MER) of oil and gas on the UKCS by increasing the effectiveness of sectoral regulation. The Wood Review (the Review) made four recommendations to achieve this objective. The regulatory functions should in due course be transferred to a body that is independent of Government and that can fund increased regulatory activity by charging for its services.

The Government intends to implement all of the Review's recommendations, but full implementation will require multiple stages of legislation and policy development in order to fully incorporate stakeholder views and avoid unintended consequences. A phased approach will therefore be adopted. Phase 1 requires primary legislation to establish the framework for MER UK Principles and to create the power for the Secretary of State to raise a levy to fund the activities of the new Regulator which cannot currently be charged for. Phase 2 will require primary and secondary legislation to establish wider powers, an enforcement regime, setting the level of the levy itself, developing a detailed strategy for how the MER UK Principles will be implemented, and the creation and establishment of an arm's length regulator.

This Impact Assessment accompanies the Phase 1 proposals – the powers to charge a levy and the establishment of the MER UK Principles in statute. Without further secondary legislation these will not have a direct impact on business. This IA does however provide an estimate of the potential costs and benefits associated with the implementation of all the Review's recommendations. The analysis will be refined with input from industry and the new Regulator during Phase 2 of policy development and primary and secondary legislation and presented in a further IA.

What policy options have been considered, including any alternatives to regulation?

Two options were considered for the establishment of MER UK principles:

Option 1: The do nothing option is a continuation of current arrangements, where industry is demonstrating some elements of MER UK on a field-by-field basis but not for the wider UKCS.

Option 2: The inclusion of MER UK Principles in primary legislation. This is the preferred option as it builds on existing practises and powers and is a necessary prerequisite of the UK Government’s intention to further develop these Principles.

Two options were considered for the funding model:

Option 1: The do nothing option is a continuation of current arrangements where some regulatory costs (c.20%) are recovered through the existing regime of fees and charges for services. All other costs are paid through general taxpayer contributions.

Option 2: The introduction of powers to raise a levy for the Regulator to recover costs for activities which they already undertake. This is the preferred option as the current fees and charging regime does not allow full recovery of costs, which is not in accordance with Her Majesty’s Treasury principles for Managing Public Money.¹⁹

Will the policy be reviewed? It will be reviewed. **Review date²⁰:** 2020

Does implementation go beyond minimum EU requirements?			N/A		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro: Yes	< 20: Yes	Small: Yes	Medium: Yes	Large: Yes
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)			Traded: n/a	Non-traded: n/a	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister:  Date: 20/10/14

¹⁹ HM Treasury (2013) Managing Public Money 2013 [web], available at: <https://www.gov.uk/government/publications/managing-public-money>.

²⁰ Refer to paragraphs 104-105 for further information on review requirements.

Summary: Analysis & Evidence

Policy Option 1

Description: Introduce new Model Clauses to enshrine MER UK Principles in statute and create a power to raise a levy for the Regulator to recover costs for activities from industry.

FULL ECONOMIC ASSESSMENT

Price Base Year 2014	PV Base Year 2014	Time Period Years 22	Net Benefit (Present Value (PV)) (£m)		
			Low: n/a	High: n/a	Best Estimate: n/a

COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	n/a	n/a	n/a	n/a
High	n/a		n/a	n/a
Best Estimate	n/a		n/a	n/a

Description and scale of key monetised costs by 'main affected groups'

There are no immediate monetised costs associated with the establishment of the MER UK principles and the creation of the powers for the Secretary of State to raise a levy to cover costs of regulation. In particular, the establishment of MER UK principles in legislation will not impact how the authority regulates the sector until it is supported by a strategy (with accompanying IA); and the levy will require secondary legislation to set a level. However, the monetised costs of £160m in NPV terms reflect; (a) current estimates of the additional running costs of a better resourced arm's length Regulator which should be fully recovered from industry following an initial contribution from Government in the first five years of it being established and, (b) the additional costs to industry from engaging with the new authority. There is uncertainty around these costs at this stage as they will depend largely on industry and regulatory activity and new finds in the UKCS) and the final cost recovery arrangements via the levy. The potential costs will be clarified with further policy development and legislation and addressed in a subsequent IA.

Other key non-monetised costs by 'main affected groups'

There will be a small amount of cost incurred by Government in developing the necessary secondary legislation and strategic documents following the primary legislation. This will be absorbed within existing resources and will not be passed through to business and therefore has not been monetised.

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	n/a	n/a	n/a	n/a
High	n/a		n/a	n/a
Best Estimate	n/a		n/a	n/a

Description and scale of key monetised benefits by 'main affected groups'

There are no immediate monetised costs or benefits with the establishment of the MER UK principles and the creation of the powers for the Secretary of State to raise a levy to cover costs of regulation. The estimated benefits set out in the Review from the implementation of all recommendations will require industry strategies and secondary legislation. However, the monetised benefits of £40.8bn (central estimate) comprise of the current estimates of (a) the net additional revenues of £32.8bn (central estimate of gross revenue from oil and gas production minus production costs) from an additional 3-4bn barrels of oil equivalent (boe) as set out in the Review over the period 2016-35 relative to the baseline production projection, and (b) net additional revenue of £8.0bn (central estimate) from a reduction in production costs for the projected baseline production over the period 2016-35 which would be expected to result from implementation of the Review's recommendations. There is uncertainty around these estimates at this stage due to the difficulty in forecasting revenue over a time horizon of twenty years, in particular due to uncertainty on; the volume of incremental production that will be realised in practise, oil and gas prices, and production costs.

Other key non-monetised benefits by 'main affected groups'

Full implementation of the Review's recommendations is expected to result in wider economic and financial benefits. These have not been monetised at this stage but include increased capacity, capability and skills in the oil and gas sector including the wider supply chain, increased innovation and enhanced security of supply.

Key assumptions/sensitivities/risks

3.5

A full list of assumptions underpinning the monetised costs and benefits, risks and sensitivity analysis is included in Section 5 of this IA.

Key assumptions: a 3.5% real discount rate, an exchange rate of £1/\$1.65, a NPV base year of 2014 and all values are expressed in 2014 real prices.

The Wood Review concluded that full implementation of its proposals would have the potential to deliver an addition 3-4 billion boe over the next 20 years. We have taken this to mean that incremental production 3-4 billion boe can be achieved over 20 years, from the point at which the Wood Review proposals are implemented. In line with our intended implementation plan (see paragraph 103 below), we expect it to be Summer 2016 by the time MER UK Principles are included in primary legislation and the independent Regulator – the Oil and Gas Authority (OGA) – is established. Therefore, incremental production of the 3-4 bn boe is assumed to take place over the period 2016-35. However, establishing and running the OGA is expected to incur costs from 2014 onwards, hence the 22 year appraisal period, from 2014-35, used in this IA.

Estimated incremental production over the period and assumed oil and gas prices are based on the analysis underpinning the gross benefit estimate included in the Review. Production costs associated with this incremental production are assumed to be equal to the average production costs for baseline production, evaluated over the period 2016-35. Production costs for baseline production are sourced from the OBR Fiscal Sustainability Report.

As there is uncertainty around the future level of full-cycle production costs and the likely distribution of these costs over the appraisal period, the NPV range presented in this IA reflects a range of full cycle production cost scenarios (see paragraphs 53 and 54 below).

Risks: if the regulator or industry changes its behaviour in advance of a further strategy, then this primary legislation will have a direct impact. We do not expect this to be the case as without further legislation, the regulator will not be given any additional powers (over and above what they currently have) to enforce behavioural changes on industry. Given existing industry expectations, we assume investor confidence is not affected by introduction of primary legislation.

BUSINESS ASSESSMENT (Option 1) (2009 Prices, 2010 NPV base year)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: £10.0m	Benefits: £2,023.0m	Net: £2,013.0m	Yes	Zero Net Cost

Evidence Base

1. Problem under consideration

1. In June 2013, the Secretary of State for Energy and Climate Change, tasked Sir Ian Wood to conduct an independently led review of offshore oil and gas recovery in the UK Continental Shelf (UKCS) and its regulation in order to maximise the recovery of indigenous oil and gas supplies and help maintain security of supply, in the context of a low-carbon future.
2. The Government's main objective in this area is to ensure the maximum economic recovery of the UK's hydrocarbon reserves taking into account the environmental impact of hydrocarbon development. This will benefit the UK economy by increasing socially cost-effective investment and by enhancing the security of supply of energy.
3. The model for the exploration, development and production of hydrocarbons in the UK is based on private sector activity under licences that grant exclusive rights to develop specific areas. As a result of companies being granted exclusive rights to development, greater regulation by government (than would be considered necessary in other sectors) is required to ensure that companies' private actions are economically efficient and therefore in the nation's interests. Companies apply their own investment criteria when considering whether and to what extent they will develop the hydrocarbon resources.
4. The Review was commissioned in recognition of the mature nature of the UKCS offshore basin and as a result the challenges facing both industry and the regulator in the years ahead. While some 42 billion barrels of oil equivalent (boe) have already been produced and resources are estimated to be between 12 to 24 billion boe,³ it is clear that over the long-term recoverable reserves are on a declining path as the basin matures, resources are exhausted and become increasingly difficult or uneconomic to extract. Production in recent years has followed a downward trend, falling by 38 per cent between 2010 and 2013, with the majority of the decline caused by a rapid fall in production efficiency. In addition, a sharp decline in exploration has led to less than 150 million boe being discovered in the past two years.
5. The '*UKCS Maximising Recovery Review*'⁴ reported on its findings in February 2014. It identified the key challenges facing the industry and the need for the current regulatory arrangements to evolve accordingly. The report stated that the current regulatory licensing model was not the problem, noting that it works successfully in most countries which are not monopolised by national oil companies. It instead stated that the light touch regulation applied in the early days of large fields and large operators must now evolve to take account for a basin with over 300 fields operated by an increasingly diverse mix of companies, much smaller new discoveries, many marginal fields and much greater interdependence in exploration, development and production. The following key issues were identified:
 - 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.

³ The Wood Review, UKCS Maximising Recovery Review, February 2014. <http://www.woodreview.co.uk/>

⁴ Ibid

- v. The need for far greater constructive collaboration between operators.
 - vi. The need for better implementation of industry strategies.
6. To address these issues the Review made the following principal recommendations and estimated that their full and rapid implementation could deliver 3-4 billion barrels of oil equivalent more than would otherwise be recovered over the next 20 years,⁵ estimated to be worth around £200 billion in additional revenues at today's prices (gross, undiscounted):
- **Recommendation 1:** Government and industry to develop and commit to a new strategy for Maximising Economic Recovery from the UKCS (MER UK).
 - **Recommendation 2:** Create a new arm's length regulatory body charged with effective stewardship and regulation of UKCS hydrocarbon recovery, and maximising collaboration, development and production across the industry.
 - **Recommendation 3:** The regulator should take additional powers to facilitate implementation of MER UK.
 - **Recommendation 4:** Develop and implement important sector strategies.
7. In July 2014, the Government published its response to the Review which set out a commitment to implement all of the recommendations therein⁶. In accepting Recommendation 2, the Government stated its intention to create a new body called the Oil and Gas Authority (OGA) with the proposal that its final form will be by means of a Government Company. The Government also agrees with the Review with respect to the need for the OGA to be significantly better resourced and that it is appropriate for the body to recover its costs from companies who will benefit from its services. This is in line with long-established Government practice across regulation and service delivery and will ensure the OGA is not restricted by any future Government funding constraints.
8. This Impact Assessment accompanies primary legislation which is a necessary pre-requisite for implementation of the recommendations made in the Review. At this stage, two primary powers are being sought via the Infrastructure Bill which is currently proceeding through Parliament:
- i. **Powers to enshrine the MER UK Principles in statute.** The measure will place a duty on the new Authority to apply MER UK in all its relevant statutory and non-statutory duties and, within 12 months following commencement of the Bill's measures, to set out a strategy for how it plans to implement the MER Principles. The measures proposed will place a corresponding duty on relevant license holders, upstream (petroleum) infrastructure owners and operators, to act in accordance with the MER UK Strategy.
 - ii. **Levy making powers in order to recover the costs of the OGA from industry.** The Government is proposing the levy-power included in the Bill is subject to a 3 year 'sunset clause' to ensure that an effective and efficient mechanism is developed in consultation with industry during this time. This approach recognises that setting the scale, apportioning the costs of the levy to industry and establishing the fees and charges for products and services under the existing charging power⁷, in an effective and administratively simple framework requires further consideration before being made through secondary regulations.

⁵ This IA examines the period 2014-35, as it is expected to be take two years to include MER principles in primary legislation and establish the OGA. Following this, it is assumed that the incremental production of 3-4 bn boe takes place over the 20 year period from 2016-35.

⁶ DECC, Government Response to Sir Ian Wood's UKCS: Maximising Economic Recovery Review, July 2014.

<https://www.gov.uk/government/publications/government-response-to-sir-ian-woods-review-of-the-uk-continental-shelf-ukcs>

⁷ The Gas and Petroleum (Consents) Charges Regulations 2013 allow broad powers for charging for the Secretary of State's consent.

9. As the primary legislation provides enabling powers there are no immediate monetised costs or benefits to business associated with this stage of the implementation. This Impact Assessment does however present preliminary estimates of the potential impacts associated with the implementation of all the Review's recommendations. The estimates will be refined in a further Impact Assessment at the secondary phase, which will benefit from input from the OGA and industry, in line with the proposed new tripartite approach. Consultation on the second phase will begin in autumn 2014.

2. Rationale for intervention

10. As outlined in the previous section, the UKCS is entering the next phase of its development. The landscape is markedly different to the early days of both large fields and operators which resulted in a light touch regulatory approach being adopted.
11. The current licensing regime is designed to address specific market failures. The Government now has a central role to play in ensuring the stewardship and regulation of the hydrocarbon resources and the industry evolves in order to meet the new challenges facing the sector.

Quasi-Public Good nature of exploration

12. Under the current regulatory regime, licenses grant firms exclusive rights to explore, drill for, and produce oil and gas within a specified area. Licensing is necessary because firms must be assured of this exclusive right before they make the necessary investments to develop oil and gas fields, to prevent other firms 'free-riding' on their discoveries. Without exclusive licensing, the geophysical information that they acquire by incurring the costs of exploration and oil and gas that can be produced would be available to other firms at zero cost. It would not be possible to exclude other firms from exploiting the oil or gas resource discovered, that is, they would be able to drill and extract the resource without having incurred the exploration costs. Licensing grants property rights, i.e. exclusive retention or exploration rights for specified areas, which address the non-excludability problem and thereby creates an incentive to incur exploration costs.
13. It is the Government's view that granting exclusive rights to exploit an important national resource warrants regulation to ensure that it is exploited efficiently and in the nation's interest, for example to prevent 'land banking'. Land banking is where a firm buys or rents land cheaply and does not utilise it effectively, instead holding it to prevent other firms utilising the resource, or in the hope of exploiting it at a future point in time where prices are higher for the resource.
14. While firms own the information that they acquire from exploration due to the granting of licenses (property rights) via the regulatory arrangements, information is also non-rivalrous (i.e. if one party consumes it that does not reduce the amount of information available for others' consumption). For example, publicly provided geoscience information available before competition for licences takes place is a public good which is non-rivalrous and non-excludable to some extent. This implies that maps and other technical data to support exploration will be under-provided if left to the market.

Information asymmetry

15. Situations within which one party has access to information that other parties do not have access to can lead to market inefficiencies⁸. Access to geoscience data plays a significant role in reducing risk for the industry, which assists companies to make informed decisions on exploration projects as well as supporting governments in maximising the future value of national resources on behalf of society. As the UKCS basin has matured the industry has become more fragmented with a large number of

⁸ There is a large academic literature on this topic. An early exposition of one type of information asymmetry is "The Market for "Lemons": Quality Uncertainty and the Market Mechanism", George Akerlof, The Quarterly Journal of Economics Vol. 84, No. 3 (Aug., 1970), pp. 488-500.

smaller firms becoming involved in different stages of the exploration and production process. As a result, these informational asymmetries are becoming more acute and causing significant coordination problems for the industry. Consequently a greater degree of government intervention is required to address these problems.

Natural Monopoly

16. Owners of pipelines and other infrastructure can have substantial market power, with the possibility that they will increase the prices charged to developers for accessing the pipeline, thereby adversely affecting the developer's profitability. That will generally not affect production levels as the infrastructure owners will simply be extracting a higher share of field developers' economic rent but in the longer term the expectation that tariffs will be set above cost-reflective levels will negatively impact on the incentive to explore. Therefore rules to govern third-party access are required to prevent their owners from exercising substantial market power with the consequence that output would fall below the socially desirable level.

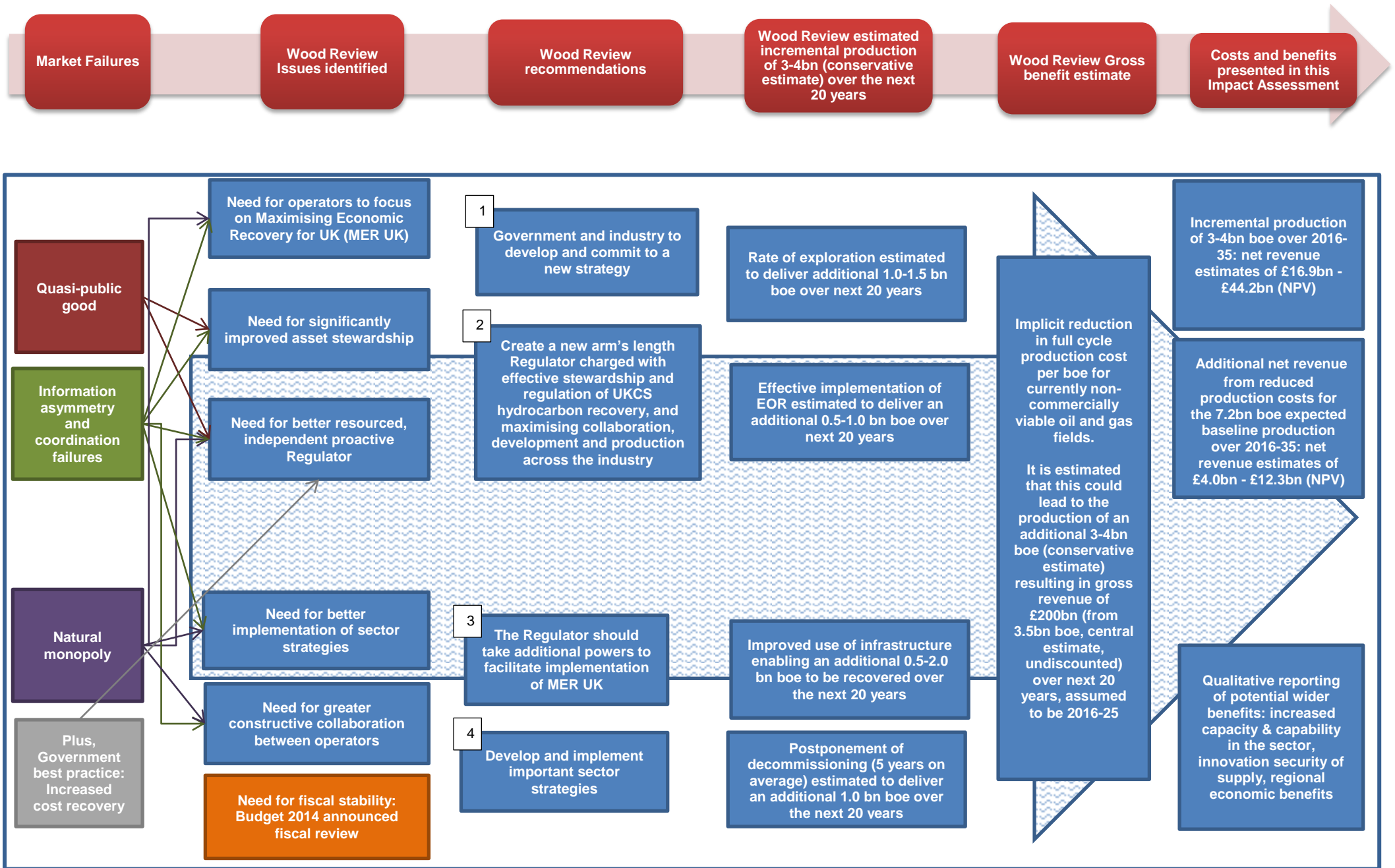
Development of these market failures over time in UKCS

17. These market failures underpin government regulation in this sector. The maturity of the basin necessitates a reappraisal of how well the existing regulatory regime is suited to addressing these market failures. As the industry has agreed in its responses to the Wood Review, more needs to be done to encourage further development.

18. 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. In the early days of the UKCS large fields were discovered and developed by a handful of major operators - investors now face new challenges. With the number of fields now increased to over 300 and new discoveries which are generally smaller and more expensive to exploit (which is less attractive to the larger operators), fields are operated by an increasingly diverse mix of companies who are far more interdependent than before and some of these operating assets are more than 30 years old – at or beyond the end of the originally intended design life.

19. A step-change in exploration strategy and activity is therefore required to identify and appraise investment opportunities and realise the full potential of the UKCS. Timing is also critical; in mature areas of the UKCS rapid exploration of the near field potential is required before existing infrastructure is decommissioned. Industry must therefore be required by the regulator to operate by the principles of MER UK which includes greater collaboration in key areas such as the development of regional hubs, sharing of infrastructure, appropriate sharing of geophysical information and the reduction of the complexity and delays in current legal and commercial processes.

Mapping of market failures in relation to the Wood Review's proposals and this Impact Assessment



Rationale for increased cost-recovery

20. As outlined in paragraph 7, the Government agrees with the assertion in the Review that the challenge of delivering MER UK requires the new regulator to be significantly better resourced than the current equivalent team in DECC. It also agrees that it is appropriate for the regulatory body to recover its costs from companies who will benefit from its services. This is in line with the long-established practice and Government policy - as set out in "Managing Public Money"⁹ - that Government recovers the costs of the services it provides, where this is possible. In particular it states that:

"This [cost recovery] can be a rational way to allocate resources because it signals to consumers that public services have real economic costs. Charging can thus help prevent waste through badly targeted consumption. It can also make comparisons with private sector services easier, promote competition, develop markets and generally promote financially sound behaviour in the public sector."

21. However, to demonstrate its commitment to the tripartite approach recommended in the Review, and help realise the other benefits outlined in the Review, Government will contribute £3 million per year for five years beginning in 2016/17 towards the running of the OGA.

22. While it is recognised that no cost increases are welcome for an industry that already faces significant challenges in the UKCS, the Government believes that the relatively modest investment that will be required will be paid back over time by improved performance, greater recovery and improved tax receipts across the basin. Such funding arrangements will also limit the risk of the work of the OGA being compromised by the challenging outlook for public finances.

23. Currently, around 20% of the costs of the Regulator in DECC are recovered from industry through fees under the Gas and Petroleum (Consents) Charges Regulation 2013 (SI 2013/1138). While the scope of the current charging power is broad, Government has concluded that an additional cost recovery mechanism will be required to be able to fully fund the body and that a levy would provide the fairest and simplest method of achieving this aim.

24. At least initially, it is envisaged that the levy will be calculated to recover costs including those associated with developing the MER UK strategy, and with respect to the majority of the Authority's non-statutory activities such as: supporting and encouraging supply chain efficiency and skills, research and development work (e.g. research into techniques for increasing the amount of oil that can be recovered from an oil field) and costs related to the collection, storage, analysis and dissemination of data (e.g. surveys in relation to geographical work).

25. However, setting the scale, apportioning the costs of the levy to industry and establishing the fees and charges for products and services under the existing charging power, in an effective and administratively simple framework will need further assessment and consultation with industry before being made via secondary legislation. The detailed work on the ultimate size and cost of the OGA will not be completed until its CEO is in place, although it is clear that it will be bigger than the existing Regulatory team in DECC, and therefore is likely to be more costly as detailed in Section 5 below.

⁹ HM Treasury (2013) Managing Public Money 2013 [web], available at: <https://www.gov.uk/government/publications/managing-public-money>.

3. Policy objectives

26. The policy objective is to maximise the economic recovery of oil and gas from the UKCS. Whilst this has always been our aim, we are looking to improve regulatory effectiveness to deliver an improved outcome. Central to this objective is a properly resourced independent regulator which fully utilises its existing powers and takes additional powers as necessary to enable it to ensure that in all areas of exploration, development and production, licence holders act in such a way that is consistent with MER UK. This is necessary to address the market failures discussed above and evolving challenges facing the industry.
27. Establishing MER UK principles in statute will lay the groundwork for giving the OGA sufficient flexibility to intervene in order to tackle the evolving market failures inherent in the market, for example to address informational asymmetries and coordination failures. Exactly how the Principles will be used to best address the market failures will be covered in a subsequent Impact Assessment which will accompany the Strategy.

4. Description of options considered

28. As set out in paragraph 8, this Impact Assessment accompanies the primary powers being sought through the Infrastructure Bill with respect to establishing MER UK Principles and powers to raise a levy to recover an increased level of costs from industry.
29. **MER UK Principles:** The Review recommended that Government, the regulator and industry adopt a cohesive tripartite approach to develop and commit to a new, shared strategy to maximise the economic and energy security opportunity that lies off the UK's shores. The 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 hydrocarbons from UK waters. In addition, license holders will be 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 what is recoverable under their own licences.
30. In taking forward the Review's recommendations in this respect, two options were considered:
- **Option 1:** The 'do nothing' option is a continuation of current arrangements, where industry is demonstrating some elements of MER UK, driven in part by the powers introduced in the Energy Act 2011, but where operators are encouraged to work collaboratively to develop UKCS resources solely on a field-by-field and not a UKCS-wide basis.
 - **Option 2:** The inclusion of MER UK Principles in the Infrastructure Bill. This will extend the existing regime to a UKCS-wide basis (rather than field-by-field). This is a precursor to subsequent work by the Regulator on what these principles will mean in practice and how they will be applied to best maximise economic recovery for the UK. This is the preferred option and the Principles will apply to activities at all stages of the oil and gas recovery lifecycle, starting from exploration, through appraisal, development and finally during decommissioning, driving collaboration where this can achieve outcomes greater than when licensees act alone.
31. **Cost Recovery:** The Review noted that many regulated bodies, including Ofgem, Ofcom and the Financial Conduct Authority, are fully funded by their respective industries and that this appeared to be an appropriate funding model for the proposed new regulator. This is in line with the Government's established approach to regulation and service delivery.

32. In taking forward the Review's recommendations in this respect, two options were considered:

- **Option 1:** The 'do nothing' option is a continuation of current arrangements where some costs (c.20%) are recovered through the existing regime of charges for services. All other costs are paid through general taxpayer contributions.
- **Option 2:** The introduction of powers to raise a levy within the Infrastructure Bill to recover all of the costs of regulation. This is the preferred option as the current charging model would not allow Government to recover 100% of the OGA's costs, and therefore requires the introduction of secondary legislation in order to specify the level and precise method of the charging.

5. Monetised and non-monetised costs and benefits of each option

33. While this Impact Assessment accompanies the primary powers being sought through the Infrastructure Bill, it provides estimates so far as possible at this stage of the potential costs and benefits associated with implementing all of the recommendations in the Review. The primary legislation provides enabling powers and therefore as detailed further below there are no immediate monetised costs or benefits to business associated with this stage of the implementation. The secondary stage of implementation, the full establishment of the OGA in its intended form as a Government Company, and the development of the UK MER Strategy will lead to the realisation of the full costs and benefits associated with the Review's recommendations. The estimated impacts presented here will be refined in a further Impact Assessment at the secondary phase, which will benefit from input from the OGA and industry, in line with the proposed new tripartite approach.

34. By definition, there are no impacts associated with the 'do nothing' (counterfactual) options on MER UK Principles or on levy charging.

Primary Power 1 - Enshrining MER UK principles in legislation (Option 2)

35. Industry already demonstrates MER UK principles in some of its activity – there are examples of nearby fields being jointly developed, and agreement to third party access terms. In addition, the current regulator has existing powers to resolve disputes over access to infrastructure, and has the ability to revise its guidance over how "maximising economic recovery" is defined. However, enshrining these Principles in statute will build on existing arrangements and make clear that in the long term across all areas of development and operation, all licence holders must act in such a way that is consistent with MER UK. This will set the expectation across the UKCS in areas such as maximising production efficiency, demonstrating effective utilisation of infrastructure, and collaborative behaviour for the development of regional clusters.

36. At this stage, there are not expected to be any costs or benefits to business resulting from introducing MER UK Principles. This is because the Principles are objectives for the regulator and will only impact business to the extent that the regulator acts on them. The regulator will not act on them until it has developed a strategy for implementation. This strategy has yet to be determined.

37. We do not expect a direct behavioural response from business in response to the introduction of primary legislation. DECC (as regulator) has for many years encouraged industry to invest to benefit the UK economy, and this messaging has not changed. Industry supports the Wood Review as a facilitator for further profitable investment in the UKCS and we would not expect businesses to act detrimentally to their own interests unless required legally to do so. As neither industry nor the regulator yet have a view on how the MER UK Principles will be articulated and implemented in the Strategy, it is difficult to envisage how the industry could alter its behaviour to reflect the Principles

enshrinement in legislation. Such behaviour change will only be possible on the publication of the strategy, when the regulator will be able to set out how MER UK will operate in practice.

Primary Power 2 - Introduction of legislation to facilitate levy charging (Option 2)

38. In consideration of the funding of a new Regulator, section 188 of the Energy Act 2004 gives the Secretary of State a broad power to recover, through charges, the costs of his 'relevant energy functions' under various Acts, including the Petroleum Act 1998. This regulation-making power enables charges for services or facilities provided by the Secretary of State in:
- carrying out the relevant energy functions,
 - the consideration or supervision for purposes connected with the relevant energy functions,
 - the issuance of a licence,
 - and anything else done by the Secretary of State in carrying out the relevant energy functions, or for purposes incidental or connected with carrying out the relevant energy functions.
39. Some of DECC's costs are already recovered. Work began in 2011 to introduce a mechanism to recover costs, which resulted in regulations, made under section 188 of the Energy Act 2004, coming into effect in June 2013.¹⁰ Since then, DECC has been charging industry a fee for consents issued under oil and gas licences, and for pipeline works authorisations. The charging regime was designed with a 'bottom-up' approach, as this avoids cross subsidies arising where a set rate or time estimate is used, but actual work differs from case to case.
40. The current charging regime is, therefore, restricted to activity around licensing. As such it recovers around 20% of total Government costs of around £1.0 million for FY13/14. DECC now also retains the income from licence application fees, which is set on a cost recovery basis at £2,100 each. In the 27th licensing round there were 224 applications, making £470k of income, but this cost is not annual as licensing rounds do not happen on yearly cycles¹¹. As explained further in the assumptions and risks sections below, both these licensing related costs which are recovered from industry are assumed to remain constant in the future and therefore no monetised impacts are included in this Impact Assessment over and above those assumed in the counterfactual.
41. The Section 188 charging power is sufficiently broad that it would be capable of recovering all of DECC's costs associated with regulation of upstream oil and gas activities, were it not for the constraint that a charge must relate to services or goods which provide a direct benefit to identifiable individuals. Because of this constraint, we would therefore only be able to recover a small proportion of the full costs of the new Regulator through this mechanism alone. We therefore propose, in accordance with the Government's principles for Managing Public Money, to give the Secretary of State a new power to enable him to collect the costs of the regulator from industry, via a levy.
42. The Review considered that the resources currently devoted to regulating the industry were inadequate. The UK has over 300 fields in production but the Regulator currently has 59 personnel working on more complex licensing and stewardship issues. In contrast the Review acknowledged that the Norwegian Petroleum Directorate has over 200 personnel and Energy Beheer Nederland has around 70 personnel, supplemented by consultancy resources. Based on the examples above and current plans we expect the new regulator to be larger, better resourced with stronger capability than at present and therefore more costly than current arrangements as detailed further below. The Review also noted that many regulatory bodies including Ofgem, Ofcom and the Financial Conduct Authority, are actually funded by their respective industries and concluded that this would appear to be an appropriate funding model for the new regulator.

¹⁰ Energy Act 2004 Impact Assessment: www.berr.gov.uk/files/file23849.pdf

¹¹ DECC internal financial records.

43. In broad terms, the levy would be calculated by taking the costs of the Regulator (not recoverable by charges and fees) and apportioning those costs to licence holders. Work still needs to be done to decide exactly how these costs should be shared by license holders but early considerations include a regime based on acreage, weighted by the reference to the sort of licenses they hold. As no levy is being set at this stage, there will be no immediate costs or benefits to business resulting from this proposal.
44. There will be a small cost to government/regulator resulting from this proposal. This relates to the development of secondary legislation, for example analytical work to determine the size of the levy. This will require a small additional resource in the form of a support team (which will cover the development of both the MER UK strategy and the secondary legislation) consisting of approximately 12 personnel, located within the Energy Delivery Unit in DECC which, in total comprises circa 200 people¹². The cost of the additional resource is expected to be met within existing resources and has not been monetised on the grounds of proportionality.

Monetised Benefits of implementing the Wood Review recommendations

Benefits from additional 3-4 billion boe (2016-2035)

45. The Review recommended the development and implementation of a number of sector strategies, 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. It considered that urgent and full implementation of its recommendations will have the potential to deliver, at the low end, an additional 3-4 billion barrels of oil equivalent (boe) in the next 20 years,¹³ worth approximately £200 billion gross (non-discounted) to the UK economy at today's prices, and at the high end will put the UK in a significantly stronger position to get closer to extraction of the estimated remaining reserves.¹⁴ In addition, it can reasonably be assumed that establishing an independent Regulator with additional resources and more specific expertise such as engineering and commercial will enable the regulatory function to have the necessary skills and resources to undertake further analysis of projects and intervene where appropriate to identify potential synergies and realise benefits.
46. Whilst the £200 billion figure does not include the costs of this additional production, we anticipate that the Principles will be implemented in such a way as to ensure that only activities which are economically beneficial to the UK will be encouraged. Whilst not all of these activities may meet the current standard investment metrics of individual companies all of the time, greater industry collaboration will increase the total reward, benefiting the sector in the long-term. As discussed above, the proposals are strongly supported by the industry.
47. The estimated £200 billion gross benefit in the Review was derived from the extra production asserted to come from the following areas which, collectively, increase the potential of the UKCS but are considered unlikely to be realised unless all of the recommendations within the report are

¹² DECC internal records

¹³ This IA examines the period 2014-35, as it is expected to take two years to include MER principles in primary legislation and establish the OGA. Following this, it is assumed that the incremental production of 3-4 bn boe takes place over the 20 year period from 2016-35.

¹⁴ Some 42 billion boe have already been extracted from the UKCS and it is estimated that a further 12 to 24 billion boe could be produced. 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 took the low case outcome as 12 billion boe and the high case expectation outcome as 24 billion boe.

implemented. The Review acknowledged that many of the elements that drive the potential increase in production overlap and therefore an estimate - considered as being conservative in the report - of 3-4 billion boe was presented as the range. Box 1 provides further information on the types of activity that are expected to increase production levels and the component estimates of the incremental production of 3-4 billion boe.

48. Based on DECC's understanding, the undiscounted £200 billion figure of additional value presented in the Review was derived from a central incremental production estimate of 3.5 billion boe over the next 20 years,¹⁵ an assumption that oil and gas prices remain stable at the prevailing levels at the time of publication (i.e. around \$110 (£67) per barrel of oil and 65p per therm of gas) and that oil and gas account for two-thirds and one-third of the total incremental production respectively. The implied price per boe was therefore \$94 (£57). The estimate did not take into account the associated extraction costs of these reserves.
49. For the purpose of this Impact Assessment, analysis has been undertaken within DECC to estimate the net (gross value minus production costs) discounted value associated with an increase of 3-4 billion boe over the next 20 years as assumed in the Review.¹⁶ An appraisal period of 22 years was used (2014-2035), with the first year of incremental extraction assumed to occur in 2016, the year in which it is expected that the new independent Regulator will be fully operational and capable of implementing the recommendations in the Review. It is reasonable to assume that extra incremental production comes on stream as early as 2016, as some projects, such as infill wells in existing fields, can come into production almost immediately. In this way, changes to behaviours and expectations could impact activity and thus production very quickly. However is reasonably expected to take time to build to significant levels if impact. For this reason, in our analysis the extra incremental production resulting from implementing the Review gradually increases over the period 2016-35. In our central scenario, it increases from around 0.03 billion boe per year in 2016 to around 0.23 billion boe per year in 2035. The NPV base year is assumed to be 2014, a 3.5% real discount rate is used and all values are presented in 2014 real prices. An exchange rate of £1/\$1.65 dollars is used which is consistent with the Review's analysis and the Office for Budget Responsibility's (OBR's), Fiscal Sustainability Report.
50. Underpinning the analysis is the logical assumption that the incremental 3-4 billion boe is not extracted under the DECC baseline production projection (around 7.2 billion boe over the period 2016-2035) as it is not considered commercially viable to do so given the associated full-cycle production costs. It is therefore assumed that as a result of implementing the Wood Review recommendations which are expected to drive increased exploration, effective EOR, improved use of infrastructure and delay decommissioning, the cost structure of these fields are reduced to the average cost of those currently considered commercially viable and included in the DECC baseline production projection over the period 2016-35.
51. To the extent that the recommended actions in the Review lead to the intended changes in behaviour (increased exploration, effective EOR, improved use of infrastructure and delayed decommissioning) by the Regulator private sector operators required to deliver the incremental output, there is likely to be a level of expenditure – potentially significant - attached to these activities. As data is not available on estimated full-cycle production costs of each field or the average full-cycle cost of the potential incremental 3-4 billion boe it is not possible to assess with accuracy either the average percentage cost reduction required to make these fields commercially viable or the overall investment required. However, for the purposes of this initial analysis a simplifying assumption has been made whereby the production costs of these currently non-viable fields reduce to the average

¹⁵ This IA examines the period 2014-35, as it is expected to be take two years to include MER principles in primary legislation and establish the OGA. Following this, it is assumed that the incremental production of 3-4 bn boe takes place over the 20 year period from 2016-35.

¹⁶ Ibid.

level in the baseline projection. It may be considered that incremental production resulting from the review will be on average higher cost than production in the baseline, due to the marginal nature of those fields. However, as set out in paragraph 57 below, it is expected that the average cost of the baseline production should fall as a result of implementation of the Review's recommendations. The Review did not focus on costs but nevertheless they have to be the principal driver for increased recovery and they bound to affect the cost of baseline production.

52. The net revenue / benefit figures presented in the analysis below therefore implicitly reflect the necessary level of investment. Box 1 below provides further information on the types of activity that are expected to increase production levels and the component estimated of the incremental production of 3-4 billion boe. As the policy proposals develop and the MER UK Strategy is prepared it will be necessary to undertake more detailed analysis on the potential capital and operational costs associated with investment in these activities. Such analysis will be undertaken in the next phase of this work programme in conjunction with industry and the Regulator and set out in the Impact Assessment which accompanies the secondary legislation.

Box 1. Indicative industry and regulatory activity that could deliver an additional 3-4 billion boe

The Wood Review stated that implementation of its recommendations in full could deliver an additional 3-4 billion boe from the UKCS when compared to current performance over the next 20 years.¹⁷ The estimated incremental output was underpinned by the range of sector strategies outlined in the report¹⁸. This additional output derives from increased exploration activity, better stewardship, more efficient production, improved recovery and delayed decommissioning. The key quantified benefits identified in the Review are as follows.¹⁹

- Increased rate of exploration estimated to deliver an additional 1.0-1.5 billion boe (Wood Review team analysis).
- Effective implementation of Enhanced Oil Recovery (EOR) estimated to deliver an additional 0.5-1 billion boe, ranging up to 6 billion boe in a best case scenario (DECC analysis);
- Improved use of infrastructure enabling an additional 0.5-2.0 billion boe to be recovered (Infrastructure Access Group report to PILOT May 2013); and
- Postponement of decommissioning (by five years on average), delivering an additional 1.0 billion boe (Wood Review team analysis).

Basis of the analysis

Despite the current surge in investment, the UKCS has exhibited some very disturbing trends in recent years:-

- Rapidly declining exploration with poor exploration success
- Sharply declining production, accentuated by a sharp drop in production efficiency
- Rapidly increasing costs, made the worse when considered on a unit of production basis
- Variable levels of asset stewardship
- Signs of rapid loss of infrastructure which could impair existing resource recovery and curtail future exploration potential
- Significant increases in decommissioning costs.

While the impact of implementing the recommendations in the Review is inherently difficult to quantify; the analysis has compared 'business as usual', where current performance dominates and shapes long term trends, against a more positive one of 'improved performance, delivering the MER-UK potential'. Rather than undertake analysis using deterministic modelling of individual fields, the Review instead mainly based its analysis on the output of the recent PILOT²⁰ work streams.

Improved exploration performance

In assessing the impact of the Review on exploration it was considered that the measures outlined in the report relating to exploration have the potential to deliver a step change in activity. Two forecasts, derived from recent periods of activity were compared, with a view that the improved outlook could be achieved if the right measures were in place:

- i. Business as usual exploration rate: based on exploration performance experienced over the four years of 2009-12 and considered the baseline for UKCS exploration unless there is external intervention.
- ii. Reasonably attainable increased exploration rate: based on the preceding four years of 2005-8 and considered the minimum level of performance improvement anticipated by the Review subject to the right measures being in place.

¹⁷ This IA examines the period 2014-35, as it is expected to take two years to include MER principles in primary legislation and establish the OGA. Following this, it is assumed that the incremental production of 3-4 bn boe takes place over the 20 year period from 2016-35.

¹⁸ The Wood Review, UKCS Maximising Recovery Review, February 2014, Page 7. <http://www.woodreview.co.uk/>

¹⁹ The individual ranges suggest that the Review has the potential to deliver an extra 3-5.5bn boe. However, many of these elements overlap. Therefore, for the purposes of this Impact Assessment and consistent with the Review, we have used a conservative estimate of 3-4 billion boe.

²⁰ PILOT is a joint programme involving the Government and the UK oil and gas industry which aims to secure the long-term future of the UK continental shelf (UKCS) and ensure full economic recovery of our hydrocarbon resources. It is chaired by the Secretary of State for Energy & Climate Change and comprises operators, major contractors, small and medium sized enterprises and trade unions.

Comparing the two forecasts, through to 2030, it was estimated that to 1.0-1.5 billion boe of recoverable reserves could additionally be discovered based on the higher rate of activity, with up to 475 exploration wells being drilled over the period compared to 300 in the lower case. The calculations assumed an average discovery size per well, per year with the total discovered being the product of the average discovery size times the numbers of wells. Two scenarios were considered, in one it was assumed that each well delivered 10 million boe per exploration well drilled, in the other it was assumed discoveries averaged 10 million boe per well until 2020 before gradually declining to 6 million boe per exploration well in 2030.

Effective implementation of Enhanced Oil Recovery (EOR)

The benefits of implementing widespread EOR technology have been considered by DECC. The Review considered that there would be little progress in implementing EOR without the intervention of a new regulator. DECC Screening Results show maximum recovery potential from the basin of circa 6 billion barrels of oil based on the application of the single best technology to each field, from which the Review assumed a more modest success of 0.5-1 billion barrels of oil recovered. To do so, DECC identified candidate assets and mapped locations to better understand synergies. Potential EOR volumes were then estimated for each technology as shown in the following table. It should be noted that volumes for individual EOR processes are not additive as different technologies target the same oil. However the 0.5-1 billion boe assumed in the Review is additive to its other recommendations.

EOR Process	Estimated Recovery (billion barrels of oil)
Miscible hydrocarbon flood	5.4
N2 & Flue gas	0.5
Miscible CO2*	5.7
Surfactant/Polymer*	4.8
Polymer	2.1
In-situ combustion	0.7
Steam drive	0.6
Brightwater	3.1
Low salinity*	2.0
Colloid Dispersal Gel (CDG)	3.1

*Technology partially considered viable on UKCS

Improved use of infrastructure

The Infrastructure Access Group (IAG) report presented to PILOT in May 2013 considered the impact of the ability to access infrastructure on overall recovery. The report identified that up to 6.3 billion boe, a quarter of the total estimated potential resources yet to be recovered, could be stranded because of the inability to access infrastructure, either because of commercial or technical barriers. Based on the range of scenarios considered in the report, the Review assumed that the improved use of infrastructure could allow add an additional 0.5 – 2 billion boe to be recovered over time.

Improved stewardship and delayed decommissioning

The Review considered the benefits that could be achieved by delaying decommissioning by five years across the UKCS. The five year period was intended to be indicative of the potential opportunity rather than calculated on a deterministic basis using individual reservoir models. The benefits arise from achieving additional recovery from existing assets whilst postponing of decommissioning expenditure, with further upside from the opportunity to explore for longer using existing infrastructure.

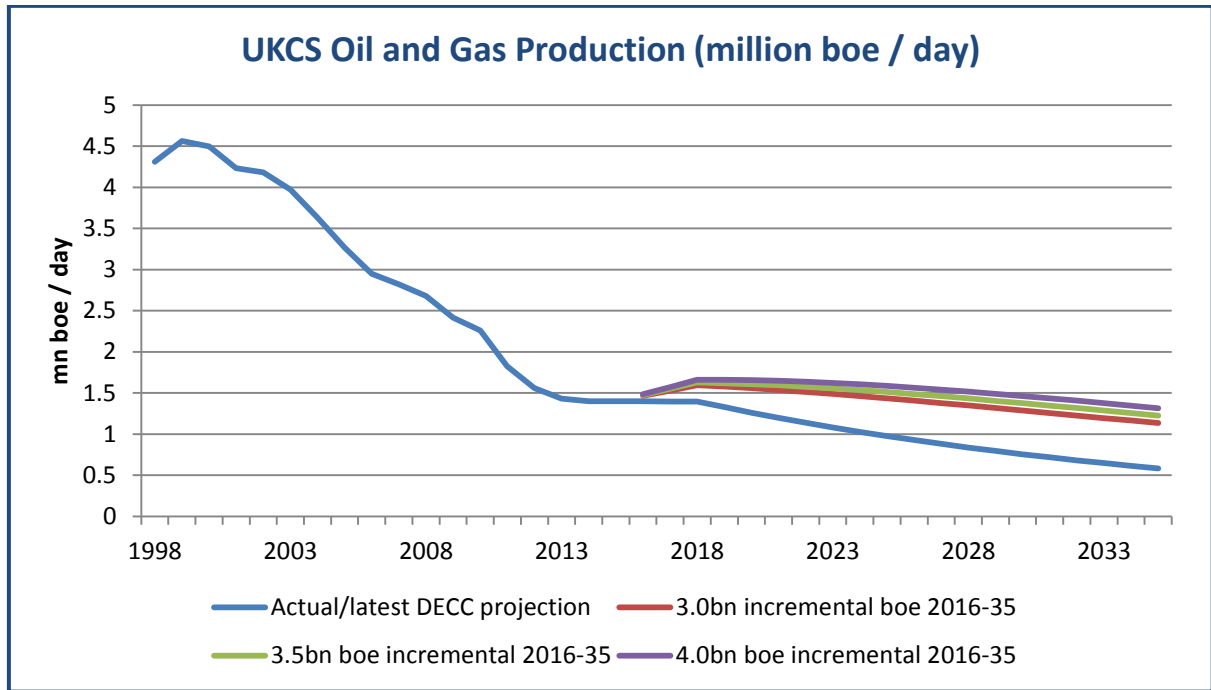
Extending the productive life of assets is expected to increase total recoverable reserves. A range of scenarios were considered to evaluate the total extra production capability. If every field currently sanctioned in the UKCS due to decommission post-2020 continued producing for another five years at the same overall rate as it did for its previous final five years, an additional 2.5 billion boe would be produced from the UKCS with the top 10 fields contributing 1 billion boe to this total. Even if a 50 per cent decline in production for the last five years were to be assumed, an additional 1.0-1.5 billion boe could be recovered. As a result, the Review made a prudent assessment that the benefits of postponing decommissioning by five years across the UKCS would enable an additional 1.0 billion boe to be recovered.

53. Projections of full-cycle production expenditure (£billion) (capital expenditure, operating expenditure, exploration and appraisal expenditure, and decommissioning expenditure) in the UKCS were sourced from the OBR's Fiscal Sustainability Report²¹ in order to calculate an average full cycle cost per boe for the period 2016-2035, which is then used in then analysis to estimate net revenue per boe extracted. The average full-cycle cost over the period to end 2035 is estimated at around \$69 (£42) per boe which results in average net revenue of around \$24 (£15) per boe given an implied price of around \$94 (£57) per boe. As there is uncertainty around the future level of full-cycle production costs and the likely distribution of these costs over the appraisal period, the NPV range presented in this IA reflects a range of full cycle production cost scenarios. The assumed production cost has a significant impact on the assessment of the net additional revenue that would accrue from incremental production of 3-4 billion boe over the period 2016-2035. However, in all scenarios the estimated NPV is still highly positive.
54. The specific assumptions on full cycle costs were drawn from the production cost series in the OBR Fiscal Sustainability Report, which shows annual production costs over the period 2016-35 reach a low of \$65 (£39) per boe and a high of around \$79 (£48) per boe. These costs compare to the average central cost assumption of \$69 (£42) per boe and therefore results in a non-symmetrical range from a reduction of around 8% at the low end to an increase of around 27% at the high end relative to the central cost estimate. Assumptions on oil and gas prices and therefore the implied price per boe is consistent with those used in the central case and are therefore held constant at \$94 (£57) per boe.
55. To undertake the analysis nine hypothetical profiles which were considered reasonable indicative pathways to deliver additional production of 3.0, 3.5 and 4.0 billion boe, each with low, medium or high full-cycle production costs, over the period to end 2035 were constructed. Figure 1 below illustrates the three production pathways. Relative to DECC's baseline production projection²² of around 7.2 billion boe in total over the period 2016-2035, the assumed incremental production of 3-4 billion boe is equivalent to an increase in total production of between 42-56%. The required total increase over the period was profiled in order that incremental production per annum increased steadily over time relative to the baseline. This reflects the likelihood that production would ramp up gradually following the successful implementation of the Review's recommendations and that there will be a necessary increase in investment in order to subsequently increase extraction levels relative to the baseline.

²¹ Office for Budget Responsibility, Fiscal Sustainability Report, July 2014, Supplementary tables.
<http://budgetresponsibility.org.uk/fiscal-sustainability-report-july-2014/>

²² <https://www.gov.uk/oil-and-gas-uk-field-data>

Figure 1: Incremental UKCS Production of 3.0-4.0 billion boe over 2016-35



56. The estimated gross and net benefits are reported in Tables 1-3 below. As outlined above, the estimate of £200 billion of additional gross value was based on the mid-point of an additional 3.5 billion boe. As oil and gas prices are assumed fixed over the period, the gross value of 3.0 and 4.0 billion boe is £170 billion and £230 billion respectively. Over the appraisal period of 22 years (2014-35), the NPV ranges from net revenue (gross revenues minus full-cycle production costs) of around £16.9 billion for incremental production of 3.0 billion boe with high production costs to around £44.2 billion for incremental production of 4.0 billion boe with low production costs, discounted at a real discount rate of 3.5%. The central estimate of an incremental 3.5 billion boe results in a NPV of around £33 billion.

Table 1: Analysis based on Wood Review methodology. Gross and net economic value from increased UKCS production, with central production costs, 2016-2035, 2014 prices.

	Low incremental production 3.0 bn boe	Central incremental production 3.5 bn boe	High incremental production 4.0 bn boe
Undiscounted gross revenue (£bn)	£170bn	£200bn	£230bn
Oil price / bbl (\$/£)	\$110 (£67)	\$110 (£67)	\$110 (£67)
Gas price / therm (p)	65p	65p	65p
Implied price / boe (\$/£)	\$94 (£57)	\$94 (£57)	\$94 (£57)
Average full cycle production cost per boe (\$/£)	\$69 (£42)	\$69 (£42)	\$69 (£42)
Net Revenue, NPV 2014-2035 (£bn)	£28.1bn	£32.8bn	£37.4bn

Table 2: Analysis based on Wood Review methodology. Gross and net economic value from increased UKCS production, with low production costs, 2016-2035, 2014 prices.

	Low incremental production 3.0 bn boe	Central incremental production 3.5 bn boe	High incremental production 4.0 bn boe
Undiscounted gross revenue (£bn)	£170bn	£200bn	£227bn
Oil price / bbl (\$/£)	\$110 (£67)	\$110 (£67)	\$110 (£67)
Gas price / therm (p)	65p	65p	65p
Implied price / boe (\$/£)	\$94 (£57)	\$94 (£57)	\$94 (£57)
Average full cycle production cost per boe (\$/£)	\$65 (£39)	\$65 (£39)	\$65 (£39)
Net Revenue, NPV 2014-2035 (£bn)	£33.2bn	£38.7bn	£44.2bn

Table 3: Analysis based on Wood Review methodology. Gross and net economic value from increased UKCS production, with high production costs, 2016-2035, 2014 prices.

	Low incremental production 3.0 bn boe	Central incremental production 3.5 bn boe	High incremental production 4.0 bn boe
Undiscounted gross revenue (£bn)	£170bn	£200bn	£227bn
Oil price / bbl (\$/£)	\$110 (£67)	\$110 (£67)	\$110 (£67)
Gas price / therm (p)	65p	65p	65p
Implied price / boe (\$/£)	\$94 (£57)	\$94 (£57)	\$94 (£57)
Average full cycle production cost per boe (\$/£)	\$79 (£48)	\$79 (£48)	\$79 (£48)
Net Revenue, NPV 2014-2035 (£bn)	£16.9bn	£19.7bn	£22.5bn

Benefits from reduced production costs for baseline production levels (2016-2035)

57. As outlined above, DECC's baseline production projection is 7.2 billion boe in total over the period 2016-2035. It is reasonable to assume that the necessary cost reductions expected to result from the implementation of the Review's recommendations in order to make the 3-4 billion additional boe commercially viable also have a positive (downward) impact on the full-cycle production costs associated with the baseline 7.2 billion boe. This baseline level of production will still require a great deal of expenditure, much of it capex as well as opex. And there will be associated decommissioning costs too. The strategies identified in the Wood Review that should result in cost reductions which will enable more exploration and development of otherwise uncommercial discoveries should also reduce the costs of the baseline level of production. For example, work to reduce the cost of EOR should benefit existing production where such techniques would have been employed anyway while greater collaboration should enable more efficient use of supply vessels in existing/new fields that would be developed anyway. And reductions in decommissioning costs should benefit such fields as well as those that would be developed only as a result of implementation of the Review's recommendations. While it is not possible to forecast with accuracy the potential level of cost reductions, indicative analysis has been undertaken to estimate the additional saving that would be realised from cumulative cost reductions of 5%, 10% and 15% relative to the projected average cost per boe (£42) over the period 2016-35. The cost reductions have been profiled so that they steadily increase over the period to reach these cumulative levels – as would be expected following increased investment – with annual reductions on the average cost per boe applied to the projected production in that year.

58. The results of the analysis are reported in table 4 below. Based on the assumed cumulative cost reductions of between 5-15% over the period 2016-2035, the NPV of the additional net revenue from baseline production of 7.2 billion boe is in the range £4.0 - £12.3 billion, with a central estimate of £8.0 billion. We recognise that these figures are uncertain, and will test them with industry and other stakeholders as part of our work for the secondary legislation.

Table 4: Additional revenue from reduction in production costs for baseline extraction over 2016-35, NPV (2014 prices).

	Low cumulative cost reduction (-5%)	Central cumulative cost reduction (-10%)	High cumulative cost reduction (-15%)
Baseline production projection, 2016-35 (bn boe)	7.2	7.2	7.2
Undiscounted net revenue (£bn)	6.4	12.7	19.5
Oil price / bbl (\$/£)	\$110 (£67)	\$110 (£67)	\$110 (£67)
Gas price / therm (p)	65p	65p	65p
Implied price / boe (\$/£)	\$94 (£57)	\$94 (£57)	\$94 (£57)
Production cost in 2035 per boe (£ per boe)	£40.0	£37.9	£35.7
Additional Net Revenue from production cost savings on baseline production, NPV (£bn)	£4.0bn	£8.0bn	£12.3bn

Total benefits to business from oil and gas production 2016-35

59. Table 5 below reports the combined NPV of the net additional revenue that could result from the successful implementation of the Review's recommendations. This is a combination of the value from the incremental production of 3-4 billion boe and the additional value from resulting from assumed reductions of between 5-15% in the baseline production costs. Taken together, the benefits are estimated to be in the range £20.9 - £56.5 billion, with a central estimate of £40.8 billion. The low estimate corresponds to the low incremental production, high production cost scenario show in Table 3 above. The high estimate corresponds to the high incremental production, low production cost scenario show in Table 2 above.

Table 5: Total benefits to business from the value of oil and gas production, 2016-35, £bn NPV, 2014 prices.

£bn	Low	Central	High
Revenue from 3-4bn boe incremental production (2016-35)	£16.9bn	£32.8bn	£44.2bn
Revenue from production cost savings on baseline production (2016-35)	£4.0bn	£8.0bn	£12.3bn
Total benefits to business	£20.9bn	£40.8bn	£56.5bn

60. The monetised benefits at societal level are equal to the benefits to business. As outlined in the wider impacts section below, the proposals are also likely to increase the security of energy supply which would also benefit society.

Monetised Costs of Implementing the Wood Review Recommendations

61. This section sets out the estimated monetised costs of implementing the Review's recommendations in full. The estimates are also subject also to uncertainty and will be refined in an Impact Assessment accompanying the secondary phase of legislation. The costs apply to the following groups:

- **Regulator:** estimated costs of establishing an independent regulator, increasing staff levels and salaries and associated increased resources.
- **Business:** estimated costs to oil and gas sector operators from increased engagement with the regulator. In addition, the costs of the regulator once established on an independent footing are expected to be recovered from industry.

Regulator Costs

Costs of the current LED regulatory functions

62. The current licensing and associated functions both onshore and offshore are governed by and derived from the same statutes and regulation and managed by the same Licensing, Exploration and Development (LED) team within DECC. The LED function is currently resource-constrained as identified in the Review. The annual costs of the current regulatory functions undertaken by 59 FTE employees are set out in Table 6 below based on the 2013 budget allocation and total around £4.5 million per annum (2014 prices). These are the baseline, status quo costs of regulating the industry and therefore do not form part of the estimated incremental costs associated with establishing and running the new regulator.

Table 6: Annual Costs of Current LED Regulatory Functions, £m, 2014 prices.

£m	Annual Costs
Salary costs	£3.6m
IT costs	£0.3m
Accommodation costs	£0.6m
Total current costs	£4.5m

Costs of a establishing and running the new Oil and Gas Authority (OGA)

63. The costs of establishing and operating a new independent regulator with increased capacity and capability have been estimated based on the costs of current LED operations within DECC, as set out in table 6 above. These baseline costs are then combined with the forecast increase in headcount and other resources considered necessary to achieve the improvements to regulation, oversight and coordination of activity in the sector envisaged in the Review.

64. **Staff costs:** It is estimated that the independent regulator would need a full staff complement of around 145 FTE employees and that staffing levels would increase steadily to this level over the period 2014-2019 from the current 59 FTE employees within LED. At an estimated average salary of around £79,000 (undiscounted, including superannuation and ENIC costs), total salary costs from 2020 onwards are therefore estimated at around £11.5 million (undiscounted) per annum. This staff cost includes an assessment of the salary uplift required to attract the grade and expertise of staff that the Review indicated would be required to effect the recommended changes to the regulatory regime. As a simplifying and prudent assumption, it is currently also assumed that the existing 59

FTE staff in LED transition onto the new increased salary scales from 2014 onwards and as a result in this assumption may overstate salary costs. The projected profile for the increase in staffing levels is reported in Table 7 below. In addition, provision has been made in the analysis for the costs associated with recruiting the additional members of staff to the new regulator, which is estimated at around £200,000 per annum over the period 2016-2019.

Table 7: Projected profile for increase in staffing levels

	2013	2014	2015	2016	2017	2018	2019	2020-35
Regulator Employees (FTE)	59	74	90	105	120	135	145	145

65. **Accommodation costs:** Estimated accommodation costs of £10,000 per FTE employee are based on the current LED budget in DECC. The accommodation costs are therefore profiled to increase in line with the increasing employment profile to 2020, which is based on the assumption that office space can be leased on a modular basis and expanded in line with employee numbers. From the start of 2019 onwards – the point at which the full complement of 145 staff is expected to be in place - the annual accommodation cost is therefore estimated to be around £1.5 million (undiscounted) per annum.

66. **IT Costs:** It is considered likely that the new Regulator’s computing needs will be able to be hosted on DECC’s IT system. The IT costs were estimated based on the current LED budget and then extrapolated in line with the profile of increasing employment levels over the period 2014-2019, before reaching a constant annual cost of £1.0 million (undiscounted) per annum from 2019 onwards. An IT capital allowance of £2,000 (undiscounted) for each staff member was all included in the year of their recruitment.

67. **Total Regulator Costs:** Table 6 below summarises the undiscounted cost estimates over the period to 2020, from which point on the annual costs for each component are assumed to be flat in real terms over the remainder of the appraisal period to end 2035. The total cost of running the regulator is therefore estimated at around £14 million per annum (undiscounted) from 2020 onwards. However, the current LED regulatory functions of £4.5 million (undiscounted) per annum as set out in Table 6 above need to be subtracted from the total costs of the new regulator to derive the incremental costs of the new regulator. On the assumption that these costs would continue to be incurred in the absence of a new independent regulator this results in a net additional cost of £9.5 million (undiscounted) from 2020 onwards.

Table 8: Total annual costs of the new independent regulator, undiscounted, £m, 2014 prices.

£m	2014	2015	2016	2017	2018	2019	2020-35
Salary costs	£5.8m	£7.1m	£8.3m	£9.5m	£10.7m	£11.5m	£11.5m
Accommodation costs	£0.7m	£0.9m	£1.1m	£1.2m	£1.4m	£1.5m	£1.5m
IT costs	£0.3m	£0.3m	£0.6m	£0.8m	£0.9m	£1.0m	£1.0m
Recruitment costs	£0.2m	£0.2m	£0.2m	£0.2m	£0.2m	£0.2m	£0.0m
Total Regulator costs	£7.1m	£8.5m	£10.1m	£11.7m	£13.1m	£14.1m	£14.0m
Minus LED Regulator costs	£4.5m	£4.5m	£4.5m	£4.5m	£4.5m	4.5m	£4.5m
Net (additional) Regulator costs	£2.6m	£4.0m	£5.6m	£7.1m	£8.6m	£9.6m	£9.4m

Note: totals may not sum due to rounding.

68. The Net Present Value (NPV) of the total estimated regulator costs is reported in Table 9 below. Over the 22 year appraisal period (2014-2035) the costs are estimated at around £201 million. However, as outlined above the current LED regulatory functions have a budget of £4.5 million per annum, based on the 2013 budget allocation. On the assumption that these costs would continue to be incurred in the absence of a new independent regulator it is necessary to subtract these annual costs from the new regulator's costs which results in a net NPV of around £130 million over the 22 year appraisal period.

Table 9: Net Costs of New Independent Regulator, £m NPV, 2014 prices.

NPV (£m)	
Salary costs	£164.6m
Accommodation costs	£20.8m
IT costs	£14.2m
Recruitment costs	£1.0m
Total regulator costs	£200.7m
Minus LED Regulator costs	£70.9m
Net (additional) Regulator costs	£129.8m

Costs to Business

Costs to the oil and gas sector - Industry engagement costs

69. In addition to the costs borne by the Regulator, market participants have suggested that they would be unlikely to incur significant additional costs from engagement with the regulator for three reasons:

- i. The additional resources available through the regulator would lead to more efficient interactions, too often in the current set-up DECC is unable to offer sufficient continuity or depth of resource to properly support an engagement.
- ii. Key transactions could be conducted more rapidly, as an example the turn-around of brownfield allowance approvals could be achieved in a timelier manner.
- iii. There will be savings within the operator community as certain work they currently undertake collectively or via Oil and Gas UK (the industry body) will instead be carried out by the new regulatory body.

70. On the above basis that the potential additional costs incurred by industry, over and above the direct costs of the new regulator, are expected to lie in the range of 0 to 25 per cent of the additional costs of regulation per annum (staff costs, accommodation costs and IT costs). A figure of 15 per cent was used as a prudent central estimate with the resulting costs reported in the table 10 below. As with the regulator costs, these costs are assumed to remain constant in real terms at 2020 levels over the remainder of the appraisal period to end 2035.

Table 10: Annual costs to the oil and gas sector from increased engagement with the regulator, undiscounted, 2014 prices, (£m).

£m	2014	2015	2016	2017	2018	2019	2020-35
Industry engagement costs	£1.1m	£1.3m	£1.5m	£1.7m	£2.0m	£2.1m	£2.1m

Cost Recovery of Regulator Costs

71. In addition to the above direct costs associated with the sector engaging more frequently or in greater depth with the new regulator, the Review recommended that the independent regulator should be self-funding with the aim of minimising the on-going financial contribution from DECC. If that objective is achieved, the majority of the budget impact for DECC should arise from any additional costs (set up costs and increased salary costs) up to the point when the new regulator takes up its function and the agreed charging regime is introduced. For the purposes of this Impact Assessment it is assumed that the date at which the new regulator will be fully operational as a Government Company will be from the start of 2016 and that it will be possible to recover 100% of the costs incurred through a combination of enhanced charging and via a levy on industry. However, it should be noted that Government has committed an additional £3.0 million per annum for five years from 2016 towards the costs of the new regulator which will not be recovered from industry²³.

72. The estimated costs (undiscounted) of the regulator's activities per annum over the period 2014-2020 which it assumed will be recovered from industry are reported in Table 11 below. The costs are assumed to remain constant in real terms at 2020 levels over the remainder of the appraisal period to end 2035. These costs are largely the same as the Regulator costs above with the exception that no costs associated with the regulatory functions listed in the table below are assumed to be recovered from industry in 2014 and 2015 (prior to the OGA being fully established), and that the £3 million

²³ DECC, Government Response to Sir Ian Wood's UKCS: Maximising Economic Recovery Review, July 2014. <https://www.gov.uk/government/publications/government-response-to-sir-ian-woods-review-of-the-uk-continental-shelf-ukcs>

contribution from Government in years 2016-20 is not recovered, but instead these are assumed to be funded by DECC as is the case currently with LED costs. As set out in paragraph 40²⁴, the estimates of the additional costs which will be recovered from industry exclude any potential increase or reduction in the licencing related costs which are currently recovered by DECC. These costs are assumed to be constant in real terms going forward, but will be explored further as the policy proposals are developed.

Table 11: Annual costs to the oil and gas sector recovering the costs of the regulator’s functions from 2016 onwards, undiscounted, £m, 2014 prices.

£m	2014	2015	2016	2017	2018	2019	2020	2021-35
Salary costs	£5.8m	£7.1m	£8.3m	£9.5m	£10.7m	£11.5m	£11.5m	£11.5m
Accommodation costs	£0.7m	£0.9m	£1.1m	£1.2m	£1.4m	£1.5m	£1.5m	£1.5m
IT costs	£0.3m	£0.3m	£0.6m	£0.8m	£0.9m	£1.0m	£1.0m	£1.0m
Recruitment costs	£0.2m	£0.2m	£0.2m	£0.2m	£0.2m	£0.2m	£0.0m	£0.0m
Total Regulator costs	£7.1m	£8.5m	£10.1m	£11.7m	£13.1m	£14.1m	£14.0m	£14.0m
Minus Government contribution	£7.1m	£8.5m	£3.0m	£3.0m	£3.0m	£3.0m	£3.0m	£0.0m
Total Regulator costs recovered from industry	£0.0m	£0.0m	£7.1m	£8.7m	£10.1m	£11.1m	£11.0m	£14.0m

Total Costs to Business

73. The NPV of the total cost to business is reported in Table 12 below. Over the 22 year appraisal period (2014-35) the costs are estimated at £202.4 million. This comprises the increased direct industry engagement costs and the regulator’s costs that are assumed to be recovered from industry from 2016 onwards.

Table 12: NPV of costs to the oil and gas sector, £m, 2014 prices.

PV (£m)	
Industry engagement costs	£30.1m
Regulator costs recovered from industry	£172.3m
Total costs to business	£202.4m

Total Societal Costs

74. At societal level, the total monetised costs of the policy comprise the net additional regulatory costs and the costs to industry from increased engagement with the new regulator. The difference between the PV of the total regulator costs recovered from industry (£172.3m) and the net additional regulator costs (£129.8m) of £42.5 million represents a transfer between Government and business and therefore is not included in the net societal cost of the policy. As reported in Table 13 below, over the 22 year appraisal period the NPV of costs to society is around £159.9 million.

²⁴ Refer also to the discussion in the Assumptions and Risks section.

Table 13: PV of Societal Level Costs, 2014 prices, £m.

NPV (£m)	
Industry engagement costs	£30.1m
Net (additional) regulator costs	£129.8m
Total Societal Cost	£159.9m

Net Cost / Benefit Estimates

75. Table 14 below summarises the estimated direct net monetised benefit to business in NPV terms. The low estimate corresponds to the low incremental production, high production cost scenario show in Table 3 above. The high estimate corresponds to the high incremental production, low production cost scenario show in Table 2 above. The estimated direct net benefit is in the range £20.7 - £56.3 billion over the appraisal period of 22 years, with a central estimate of £40.6 billion. As detailed further in Section 6 below, this results in a central estimate of the Equivalent Annual Net Cost to Business (EANCB) (benefit) of £2.25 billion (2014 prices, 2014 NPV base year) or for the purposes of the One-in-Two-Out (OITO) the value would be £2.01 billion (2009 prices, 2010 NPV base year). As detailed above and in the Review, these benefits to business are expected to result from the greater degree of intervention in the market by an independent regulator, for example, to resolve disputes, address information asymmetries and coordination failures (thereby promoting greater collaboration amongst firms and better aligning private actions with socially optimal objectives for exploring the nationally-owned resource. All of these costs and benefits will be incurred as a consequence of the second phase of implementation, and will be the subject of a further Impact Assessment in due course. None of these costs or benefits relate directly to the primary legislation associated with this Impact Assessment.

Table 14: Net Direct Cost/Benefit to Business, NPV 2014-2035, £bn, 2014 prices.

NPV (£bn)		Low	Central	High
Benefits	Revenue from 3-4 bn boe incremental production (2016-35)	£16.9bn	£32.8bn	£44.2bn
	Revenue from production cost savings on baseline production	£4.0bn	£8.0bn	£12.3bn
	Total benefits	£20.9bn	£40.8bn	£56.5bn
Costs	Industry engagement costs	£0.03bn	£0.03bn	£0.03bn
	Regulator costs recovered from industry	£0.17bn	£0.17bn	£0.17bn
	Total costs	£0.20bn	£0.20bn	£0.20bn
Total societal cost/benefit		£20.708bn	£40.596bn	£56.283bn

76. Table 15 below sets out the estimated net monetised benefit of the policy at societal level over the 22 year appraisal period in NPV terms. The low estimate corresponds to the low incremental production, high production cost scenario show in Table 3 above. The high estimate corresponds to the high incremental production, low production cost scenario show in Table 2 above. The estimated net benefit is broadly same as the net benefit to business in the range of £20.8 – £56.3 billion with a central estimate of £40.6 billion. The only difference is monetised net benefit at this stage between the business and societal level is the value of the transfer of £42.5 million (NPV, 2014 prices) from

industry to Government for the costs of funding the regulator, which serve to increase the net societal benefit by that amount relative to the cost to business.

Table 15: Net Societal Economic Cost/Benefit, NPV 2014-2035, £bn, 2014 prices.

NPV (£bn)		Low	Central	High
Benefits	Revenue from 3-4 bn boe incremental production (2016-35)	£16.9bn	£32.8bn	£44.2bn
	Revenue from production cost savings on baseline production	£4.0bn	£8.0bn	£12.3bn
	Total benefits	£20.9bn	£40.8bn	£56.5bn
Costs	Industry engagement costs	£0.03bn	£0.03bn	£0.03bn
	Net additional regulator costs	£0.13bn	£0.13bn	£0.13bn
	Total costs	£0.16bn	£0.16bn	£0.16bn
Total societal cost/benefit		£20.750bn	£40.639bn	£56.325bn

Assumptions

The following assumptions were used in the analysis:

- The Wood Review concluded that full implementation of its proposals would have the potential to deliver an addition 3-4 billion boe over the next 20 years. We have taken this to mean that incremental production 3-4 billion boe can be achieved over 20 years, from the point at which the Wood Review proposals are implemented. In line with our intended implementation plan (see paragraph 103 below), we expect it to be Summer 2016 by the time MER UK Principles are included in primary legislation and the independent Regulator – the Oil and Gas Authority (OGA) – is established. Therefore, incremental production of the 3-4 bn boe is assumed to take place over the period 2016-35. However, establishing and running the OGA is expected to incur costs from 2014 onwards, hence the 22 year appraisal period, from 2014-35, used in this IA.
- The NPV base year is 2014, a 3.5% real discount rate is used and all values are expressed in 2014 prices. An exchange rate of £1/\$1.65 dollars is used which is consistent with Review's analysis and the Office for Budget Responsibility's (OBR's) Fiscal Sustainability Report.
- Incremental production of oil and gas was assumed to be in the range 3-4 billion boe, with a central assumption of 3.5 billion boe, and that oil and gas account for two-thirds and one-third of the total incremental production respectively. These assumptions are consistent with the estimates presented in the Review.
- Oil and gas price assumptions are consistent with those underpinning the gross estimate of the benefits (£200bn) in the Review and therefore held constant in real terms over the period 2016-2035 at \$110 (£67) per barrel of oil and 65p per therm of gas. This results in an implied price per barrel of oil equivalent of \$94 (£57).
- Based on cost data from the OBR Fiscal Sustainability Report, the average full-cycle production cost over the period to end 2035 is assumed to be, for the central scenario, around \$69 (£42) per boe which results in average net revenue of around \$24 (£15) per boe given an average implied price of around \$94 (£57) per boe. For the low cost scenario, production cost are assumed to be around \$65 (£39) per boe which results in average net revenue of around \$29 (£17) per boe. For the high cost scenario, production cost are assumed to be around \$79 (£48) per boe which results in average net revenue of around \$15 (£9) per boe. The nominal costs in the OBR series

to real 2014 prices are deflated using the HMT GDP deflator series to 2018 and thereafter at the long-term GDP deflator inflation rate of 2.2 per cent per annum.

- The 'low' and 'high' production cost scenarios correspond to, respectively, the minimum and maximum full-cycle production costs from the OBR Fiscal Sustainability Report, evaluated over the period 2016-35.
- Assumptions underpinning the Regulator costs are based on internal DECC business and financial planning. These will be refined as part of the policy development process and updated in a subsequent Impact Assessment.
- As outlined in paragraphs 23 and 39-41, currently around 20% (~£1 million) of the annual costs of the Regulator in DECC are recovered from industry through charges. The cost recoverable aspects are restricted to Government activity around licensing. The additional costs that are expected to be recovered from industry in the future (see tables 12 and 14) are therefore the residual costs (staff, accommodation, IT and recruitment costs) which cannot currently be charged for under existing Regulations, and exclude the existing 20% licensing related costs. As outlined above, these new additional costs to be recovered from industry are expected to increase over the period 2014 to end 2020 before being held constant in real terms to the end of the appraisal period in 2035. As a simplifying assumption and in the absence of more detailed assessments from industry at this stage, the licensing related charges which are currently cost recoverable are assumed constant in real terms at around £1.0 million per annum over the appraisal period. As such, no associated cost or benefit to industry from an increase or decrease respectively in such licensing activity has been included within this Impact Assessment. In addition, as outlined in paragraph 40, DECC also retains income from license application fees, which in the most recent licensing round resulted in £470,000 of income, but such licensing rounds are not run on yearly cycles. This income recovered from industry is also assumed to be constant over the appraisal period in the absence of more detailed projections at this stage and therefore no additional cost or benefit to industry has been estimated from an increase or reduction in license applications going forward. This is identified as a risk in paragraph 82 below and will be assessed in more detail with industry and included in a subsequent Impact Assessment which will accompany secondary legislation.

Risks

77. It should be recognised that there is significant uncertainty around the estimates of gross and net value presented above, particularly as a result of undertaking analysis over a time horizon of 20 years and the number of variables including potential production levels, oil and gas prices and full-cycle production costs. As a result, it is possible that the overall long term benefits of implementing the Review's recommendations could be greater or less than is currently anticipated. However this risk has no bearing on the assessment in this Impact Assessment that the costs and benefits of the primary legislation to business are zero and the estimates will be refined at the secondary stage of legislation. In demonstrating a potential range of net revenues to business from implementation of the proposals, the sensitivity analysis contained in this Impact Assessment has expanded on the £200 billion gross revenue estimate presented in the Review. In doing so, the analysis focusses on the potential range of reduced production costs to estimate the net revenue that could accrue from 3-4 billion incremental boe. Such reductions in costs are considered necessary in order to make the incremental production commercially viable and the analysis is considered useful as the Review did not provide cost estimates or therefore net revenue estimates. The analysis also provides estimates of the additional revenue that could result from cost reductions that would be expected to pass-through to some extent to the expected baseline production over the appraisal period.
78. Changes in global oil prices are particularly difficult to forecast. This reflects the number and nature of the determinants of those prices, which include: activity in the global economy, global oil

production levels, the extent of inventories and spare capacity, geopolitical events and speculative demand – all of which are difficult to predict with any accuracy, even over very short time horizons. For example, DECC oil price projections (2013) are higher on average over the period 2016-2035 in real terms than those from the OBR in the central and high price scenarios by 38% and 50% respectively. In the low price scenario, DECC projections are around 2% lower than the OBR on average over the period. As set out in the preceding assumptions section, the oil and gas price assumptions underpinning the analysis in the Review are the basis for the analysis contained in this Impact Assessment. Sensitivity analysis has not been undertaken using alternative price projections, as the purpose of the analysis has been to demonstrate the estimated net benefits (revenue minus production costs) consistent with the £200 billion gross revenue estimate presented in the Review. While there is a strong medium-term correlation between oil and gas prices and production costs, higher or lower prices could be expected to result in commensurate changes in net revenues over the appraisal period.

79. Production from the UKCS is also difficult to forecast, but has followed a downward trend since 1999, by 7.8 per cent on average. The DECC baseline oil and gas production projections (which are also utilised by the OBR) are essentially flat in the short-term (2014-2018), reflecting the expected returns from very high levels of investment in recent years. Over the long-term, recoverable reserves are clearly on a declining path as the basin matures, resources are exhausted and become increasingly difficult or uneconomic to extract. DECC's baseline production projections are compiled using field-level data provided by the operators of each field. The estimates are then adjusted, based on DECC judgements on production levels, for example to take account of project slippage and historic optimism bias in industry forecasts. While DECC production forecasts are consistently lower than the industry predicts, they have tended to be over-optimistic. Given the difficulty in forecasting baseline production levels over the next 20 years, there is significant uncertainty in estimating the potential incremental production that could result from the implementation of the recommendations in the Review. This uncertainty was recognised in the Review and while a wide range of incremental production levels were identified, the narrower range of 3-4 billion boe which was considered to be conservative was presented as the central case.
80. In recent years unit and operating capital costs have increased on average at around half the rate of oil prices, with the sharp rise in oil prices in 2008 and 2011 associated with a steep rise in costs. Average full-cycle cost data for the baseline production forecast as published by the OBR is used in the analysis as there is a lack of robust data on the likely distribution of these costs over the appraisal period or the marginal cost of production. By definition, some of the fields included in the baseline projection will have full-cycle production costs above the average level (up to the marginal cost of production), while other fields will face lower costs. In the same way, the incremental 3-4 billion boe could have average costs above the average baseline level and some fields are likely to have costs below this level as a result of them being reduced by investment in EOR, sharing of infrastructure etc. However in the absence of data on the distribution of costs or marginal costs, the average full-cycle baseline production cost is used as a reasonable proxy in order to estimate the net revenue (per boe and per billion boe) associated with incremental production of 3-4 billion boe in the central scenario. However, in recognition of the uncertainty around production costs, the NPV range presented in this IA incorporates a range of low to high production costs (see tables 1-3).
81. To the extent that the recommended actions in the Review lead to the intended changes in behaviour (increased exploration, effective EOR, improved use of infrastructure and delayed decommissioning) by private sector operators required to deliver the incremental output, there is likely to be a level of expenditure – potentially significant - attached to these activities. As with the fields in the baseline production projection, data is not available on estimated full-cycle production costs of each field or the average full-cycle cost of the potential incremental 3-4 billion boe. As a consequence it is not possible to assess with any accuracy either the average percentage cost reduction required to make these fields commercially viable or the overall investment required. However, the cost of doing so is implicitly included in the assumption that the production costs of these currently non-viable fields

reduce to the average level in the baseline projection as the full cycle cost per boe will reflect the expenditure necessary (capex, opex, exploration and decommissioning) to bring costs down and consequently make these projects viable. The net revenue / benefit figures presented in the analysis above therefore implicitly reflect the necessary level of investment. Such analysis will be undertaken in the next phase of this work programme in conjunction with industry and the Regulator and set out in the Impact Assessment which accompanies the secondary legislation.

82. As outlined in the preceding assumptions section, as simplifying assumptions and in the absence of more detailed assessments from industry at this stage, the licensing related charges which are currently cost recoverable by DECC and the fees charged for DECC handling of license applications are assumed constant at current levels in real terms over the appraisal period. Consequently, no associated costs or benefits to industry from an increase or decrease respectively in these licensing related activities have been included within this Impact Assessment. To the extent that the proposals are successful and drive increased activity in the sector, licensing related costs - which are ultimately recovered from industry - may be expected to increase over time. These two aspects will be explored in more detail with industry and included in a subsequent Impact Assessment which will accompany secondary legislation.
83. If the regulator or industry changes its behaviour in advance of a strategy, then this primary legislation will have a direct impact. We do not expect this to be the case as without further legislation, the regulator will not be given any additional powers (over and above what they currently have) to enforce behavioural changes on industry.
84. The introduction of legislation concerning investment in UKCS could have negative or positive effects on investor confidence. Given that the industry has been supportively involved in the Wood Review for over a year and that the Government has clearly signalled its intent to regulate, we do not expect the introduction of legislation to impact on investor confidence.

6. Direct costs and benefits to business (OITO methodology)

85. The One-in, Two-out (OITO) rule ensures that any new regulatory measure that is expected to result in a direct net cost to business and civil society organisations must be offset by compensatory deregulatory measures providing savings to business of at least double that amount.
86. As set out in paragraphs 9 and 33, the introduction of primary powers will not result in any immediate costs or benefits to business compared to the counterfactual. This is because introducing MER UK Principles and powers to raise a levy into legislation will not directly alter regulatory activity.
87. However, this Impact Assessment provides indicative estimates at this stage of the potential full costs and benefits associated with implementing the Review's recommendations via further primary and secondary legislation. The benefits to business result from the estimated net revenue from incremental production of 3-4 billion boe over the period 2016-2035, which are estimated at £40.8 billion (central NPV estimate, 2014 prices). The costs to business comprise the estimated additional costs associated with engaging directly with the new regulator and due to the recovery of the regulator's running costs from industry, which are estimated at around £200 million (central NPV estimate, 2014 prices). While cost recovery mechanisms can be categorised as out-of-scope of the OITO rule under the 'Fees and Charges' exemption²⁵ where they relate to regulatory enforcement

²⁵ BIS, Better Regulation Framework Manual, July 2013, page 40.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf

and compliance, this proposal is not considered compliant with that exemption. This is because the change in the level of charges recovered from the oil and gas sector will result from an expansion in the scope of regulatory activity and under such circumstances the exemption does not apply.

88. Based on the central net benefit to business estimate of £40.60 billion (NPV, 2014 prices) the Equivalent Annual Net Cost to Business (EANCB) is estimated at £2.25 billion (benefit) in 2014 prices, or for the purposes of OITO accounting at £2.01 billion in 2009 prices and with a NPV base year of 2010. While the proposals are estimated to result in a net benefit to business, as they will result in new regulation, the policy is categorised as Zero Net Costs for the purposes of OITO. The EANCB estimate will be refined in line with the review of costs and benefits at the secondary stage of legislation.

7. Wider impacts

Economic and Financial Impacts

89. The estimated direct quantified impacts on business are covered in the monetised costs and benefits assessment in Section 5 above. In addition, the incremental production would be expected to increase the value of sales for supply chain companies in the UK. This could in turn be expected to increase capacity, capability and skills in the supply chain and may lead to an increase in the level of sectoral exports. It is likely that some business will benefit more than others if they are subject to a specific intervention following the implementation of the sector strategies. It is expected that many companies will benefit from greater collaboration and coordination of the activities. There is not expected to be any reduction in competition as a result of the proposals. However, as recognised in the Review, the new regulator will need to 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. In addition, the proposals should strengthen the competitiveness of the UKCS which increasingly faces significant competition for international investment and resources.

90. The UK oil and gas sector supports around 350,000 jobs²⁶ through direct, indirect and induced activity in the economy. The effect of implementing all of the Wood Review recommendations on the wider economy, such as the labour market, is indeterminate. For example, cost saving measures may reduce labour demand, while output increasing measures may increase it. Small and start-up businesses are also unlikely to be affected by the proposals although they may benefit from an increase in demand through the supply chain.

91. In addition, implementation of the Review's proposals is expected to promote innovation and lead to cost reduction within the oil and gas sector. In particular, it is considered likely that there will be a direct impact on enhanced oil recovery (EOR) technologies and beneficial synergies with work on-going to promote the adoption of carbon capture and storage technologies.

92. Consumers will not be directly affected by the proposals. The price of crude oil is set globally and consequently crude prices in the UK are determined by fluctuations in the global balance of supply and demand. Changes in the future level of production from the UKCS should not therefore have an impact on the price of oil or petroleum products.

93. Great Britain (GB) is well placed to manage oil and gas security of supply risks despite being a net importer of both primary fuels since 2005 and 2004 respectively. GB has the most liquid and one of the largest gas markets in Europe with extensive import infrastructure and a diverse range of gas supply sources. In 2012, around half of UK gas demand was supplied through UK production and

²⁶ Oil and Gas UK, Economic report 2013, <http://www.oilandgasuk.co.uk/publications/viewpub.cfm?frmPubID=753>

GB's import infrastructure has increased five-fold over the past decade, reflecting the predicted decline from domestic sources. Currently gas can be sourced from UKCS producers, pipelines from Europe and via shipments of Liquefied Natural Gas (LNG) from further afield or from gas storage. To further strengthen security of supply for gas, the Government is facilitating exploration activity for shale gas, and Ofgem is in the process of reforming the cash-out regime in an attempt to sharpen the incentives on gas market participants in order that they invest in measures to enhance security of supply. GB has also enjoyed extremely good security of oil supply in recent years with supplies coming from both the UKCS and from a diverse range of international sources. Oil from the UKCS could meet nearly two thirds of current refinery demand and the majority of GB's imports come from secure and stable markets. However GB's dependence on imports is expected to increase as oil demand globally continues to rise, and as global production becomes more complex. An increase in production of 3-4 billion boe over the next 20 years would therefore have a beneficial effect on security of supply in GB. Relative to DECC's baseline production projection of around 7.2 billion boe in total over the period 2016-2035, this level of incremental production of boe is equivalent to an increase in total production of between 42-56% and would therefore make a significant contribution towards meeting domestic demand for oil and gas.

94. There are not expected to be direct financial or resource impacts on Departments other than DECC. To demonstrate its commitment to the tripartite approach recommended in the Review, Government will contribute £3 million per year for five years beginning in 2016/17 towards the running costs of the OGA. In addition, in the Government has also announced in the 2014 Budget that it will conduct a review of the North Sea fiscal regime to ensure that it supports MER UK. HM Treasury will be working closely on this review with industry and the OGA as soon as it is established.

Social Impacts

95. It is considered likely that the proposals will lead to beneficial regional and local effects in areas such as Aberdeen, North East Scotland and other local areas that have a significant presence of companies and residents operating within the oil and gas supply chain. No other social impacts are expected.

Environmental Impacts

96. The other major area of regulation affecting the hydrocarbon sector is occupational health and safety (OHS) which seeks to safeguard the health, safety and welfare of workers and the general public to avoid and reduce personal and economic costs of work-related illnesses and fatalities. This regulatory function is undertaken by the Health and Safety Executive (HSE) and there will be no changes to it as a result of this proposal.
97. The environmental regulatory regime also falls under HSE's remit and entails examination of the industry's potential environmental impacts and putting controls and procedures in place to mitigate them. Much of the UK offshore environmental regulation regime is concerned with preventing or minimising any leakage of hydrocarbons during normal operations, and is strongly governed by EU regulations in this area. UK licensees are jointly and individually liable for any environmental and economic consequences of an offshore oil and gas leak.
98. The OGA will not be responsible for any Health and Safety or Environmental matters as existing bodies are full equipped to cover those. However, DECC and the OGA will need to consider their relationship and functions the respective bodies execute when dealing with environmental matters, as some will be in DECC's and OGA's interests.

8. Rationale and evidence that justifies the level of analysis

99. The analysis contained in this Impact Assessment is considered proportionate at this stage of policy development and to accompany primary legislation that is not expected to have any immediate direct costs or benefits on business. The analysis sets out preliminary estimates of the potential impacts associated with the implementation of all the Review's recommendations. The appraisal period of 22 years (2014-2035) is considered an appropriate time horizon for assessing potential costs and benefits and is consistent with that considered within the Review. The key analytical risks are uncertainties are identified and sensitivity analysis has been undertaken on the variables considered most likely to impact the net benefit estimates, namely the volume of incremental production over the period 2016-2035 and the associated full-cycle production costs. These estimates will be refined in a further Impact Assessment at the secondary phase, which will benefit from input from the OGA and industry, in line with the proposed new tripartite approach.

9. Small and Microbusiness Assessment (SMBA)

100. The exact number of small or microbusinesses (defined as having up to 49 FTE and 10 FTE employees respectively, as per BIS Better Regulation Framework Manual) in the exploration or production of the UKCS is unknown, however, both types of companies operate in this sector. The primary legislation as outlined in this IA will not impose any costs on business, however, there will be costs associated with the implementation of the subsequent secondary legislation as the preliminary estimates in this Impact Assessment demonstrate.

101. The Government believes that including businesses of all sizes in the policy will promote a higher level and more effective co-ordination by the new Regulator and will allow extracting the maximum benefit from the implementation of MER UK principles. Small and microbusinesses will benefit from access to the infrastructure and the synergies resulting from joint field exploration and development that would not be achieved by excluding them from the policy. The extent of involvement of small and microbusinesses and details of the charging regime will be determined through the secondary legislation; however, the intention is not to impose any disproportionate burden on companies of any size. A more detailed small and microbusiness assessment will be discussed in full in the Impact Assessment accompanying secondary legislation including a detailed assessment of the need for exemptions (full or partial) or actions to mitigate burdens on these businesses.

10. Summary and preferred option with description of implementation plan

102. In summary, the proposal is for two primary powers to be taken through the Infrastructure Bill in order to enshrine MER UK Principles in statute and to enable levy making to recover the costs of the new regulator from industry. As enabling powers, there are no immediate monetised costs or benefits to business associated with this stage of the implementation. The costs and benefits of implementing all of the Review's recommendations have been assessed so far as possible at this stage. This analysis suggested that the proposals should result in a net benefit to business and society as a whole of around £35.3 billion (NPV, 2014 prices). The secondary stage of implementation will lead to the realisation of the full costs and benefits associated with the Review's recommendations. The estimated impacts presented here will be refined in a further Impact Assessment at the secondary stage.

103. There is a desire across industry for the implementation of the proposals to take place as swiftly as possible. Government shares this view and intends so far as possible to proceed to the the following timetable:

- CEO Recruitment process commences. June 2014
- Shadow body in the form of an Executive Agency established. Q4 2014 – Q1 2015
- Building of additional capacity/capability in DECC team to deliver new areas of work prior to appointment of CEO. On-going
- Consideration with Industry on detailed underpinning and legal expression of powers for the Authority. Autumn 2014
- Appointment of the CEO designate. Autumn 2014
- Accelerated addition to capacity/capability in Executive Agency. Throughout 2015
- MER UK principles and levy-making powers established in statute, subject to the will of Parliament. By Summer 2015
- Levy in force through secondary regulations, subject to the will of Parliament. October 2015 – April 2016
- Government Company set up with new powers – subject to legislative programme for the next Parliament. By Summer 2016

104. The first strategy must be produced within 12 months of the clauses coming into force. Subject to Parliamentary Approval and the timing of Royal Assent, it is anticipated that the first Strategy must be produced between April 2016 and June 2016. Before publishing the strategy, the Secretary of State (SoS) must prepare a draft strategy, consult on the draft, consider representations made about the draft and lay the draft before Parliament for 40 sitting days. If neither House passes a negative resolution, the SoS may issue the strategy as laid before Parliament.

105. The strategy may be revised or updated whenever deemed appropriate by the SoS and later on by the OGA (once established). The SoS must review the strategy every four years as the strategy keeps pace with any significant technological, economic or wider regulatory developments. The strategy should take account of changing needs of the UKCS over time but not be constantly subject to revision.