



Oil & Gas  
Authority

# Technology Strategy





# 1. Foreword

The Oil and Gas Authority (OGA) was established to regulate, influence and promote the UK oil and gas industry, in conjunction with other regulatory authorities, and has a range of powers to deliver this remit.

The development of a series of strategies and associated delivery programmes represents a key step in setting out how the OGA, government and industry should work together to Maximise Economic Recovery (MER) from the United Kingdom Continental Shelf (UKCS) – a core recommendation of the Wood Maximising Recovery review.

The MER UK Strategy underpins the OGA remit and became a legal obligation on licensees in March 2016. It describes how MER should operate in practice, setting out a legally binding obligation on licensees and others to take the steps necessary to secure the maximum value of economically recoverable hydrocarbons.

The MER UK Strategy also sets out a range of supporting obligations and safeguards, as well as the actions and behaviours required to achieve collaboration and cost reduction.

The purpose of these strategies and delivery programmes, developed in collaboration with industry and the MER UK Boards, is to promote a new way of working across the oil and gas lifecycle. The strategies set the key direction and the delivery programmes provide further direction and detail on the implementation of each strategy.

## 2. Executive summary

The UKCS is one of the world's most technologically advanced and diverse hydrocarbon provinces with a successful track record for pioneering new technologies throughout its long development and production history, spanning over 50 years.

Sustaining investments in the adoption, adaption and development of mature and new technology solutions has the potential to transform field development, production performance and cost effectiveness in the UKCS. Successful implementation of technology will enable the industry to extend the life of mature fields by several years and reduce their eventual decommissioning costs. In addition, it can improve the economics of many new, smaller or technically challenging fields, helping to unlock part of the 3.4 billion barrels of oil equivalent (boe) existing discoveries which are currently not under development<sup>1</sup>. Key additional benefits include the associated industry expertise which will strengthen the UK as a global leader in exporting oil and gas technology equipment and services, while reducing imports.

The aim of this Technology Strategy is to create the right set of conditions in the UKCS to:

- **Achieve MER UK objectives** by revitalising exploration, enabling the development of marginal discoveries and reducing costs of field developments, operations and decommissioning
- **Grow exports of the UK-based supply chain and reduce imports** by reinforcing the position of the UK as a global centre of excellence in oil and gas technology for equipment and services

The new Oil and Gas Technology Centre (OGTC), working alongside the industry and established research and development (R&D) institutions, will improve the effectiveness of technology R&D and will be critical to achieving swift and sustainable uptake and implementation of technology.

The OGA is already working with industry, governments and the research community to overcome current constraints to technology innovation and commercialisation. This Technology Strategy will be implemented by the OGA, MER UK Technology Leadership Board (TLB) and the OGTC working together with the industry to ensure commitment to the following themes.

- **Set priorities** – The TLB, including industry and the OGA, identifies technology priorities, defining scope and robust business cases and plans, which cover technology development and adoption through to deployment
- **Promote innovation** – Working with the TLB, the OGA and other established R&D institutions, the OGTC is responsible for delivering technology solutions, including unlocking supply chain potential, leveraging the wider network of UK technology and research organisations, and creating UK centres of excellence in technologies for mature oil and gas basins
- **Oversee industry efforts** – The OGA will regulate, influence and promote technology via the direct engagement of licence holders on Technology Plans, performance benchmarking, knowledge sharing and technology deployment campaigns, in line with the supporting obligations of the MER UK Strategy.

A Technology Delivery Programme will accompany this Strategy and provide detail on its implementation.

<sup>1</sup> OGA analysis

# 3. Current status, opportunities and risks

The UK is an established global leader in oil and gas technologies across several key sectors, such as geosciences, well and subsea engineering, offshore safety and operations.

## Case Study 1 UKCS as a global leader in subsea technology

The UK has been a world-leading provider of subsea technologies and solutions, holding circa 45% of global market share. A 2014 study found the subsea sector in the UK comprises circa 750 companies, supporting 66,000 jobs and accounting for a turnover of \$14.5 billion, of which \$7 billion is exported globally. UK companies have a presence throughout the supply chain (engineering, equipment and services) and have been instrumental in developing a number of key subsea technologies, such as remotely operated vehicles (ROVs) and autonomous underwater vehicles (AUVs), now used globally. The international demand for subsea expertise and technology is growing, as hydrocarbon developments move to deeper water and tackle more difficult reservoirs and fluid compositions<sup>2</sup>.

Considerable industry investment in field developments and rejuvenation, averaging £11 billion p.a. over 2010 to 2014<sup>3</sup>, has reversed UKCS production decline, growing production in 2015 for the first time in over a decade. However, benefits were partially offset by cost escalation, driven by the need to maintain ageing assets and to develop more marginal reserves, coupled with price inflation of equipment and services.

In recent years, UK oil and gas R&D spend has accounted for less than 0.5% of turnover, low in comparison with other leading producing countries (e.g. Norway at 4%), and with other technology-driven industries (such as automotive, aerospace and defence, with typically 2% to 4%)<sup>4</sup>. Furthermore, the government funding invested in oil and gas technology, between £10 million and £20 million p.a., has been lower than in other sectors<sup>5</sup>, relative to the contribution by the oil and gas industry to the UK economy.

<sup>2</sup> UKTI, A Guide to UK Subsea Capability for the Oil and Gas Industry, 2014, and Subsea UK

<sup>3</sup> Oil & Gas UK Economic Report, 2015

<sup>4</sup> UK Oil and Gas Industrial Strategy: Business and Government Action Plan, March 2013

<sup>5</sup> OGA analysis

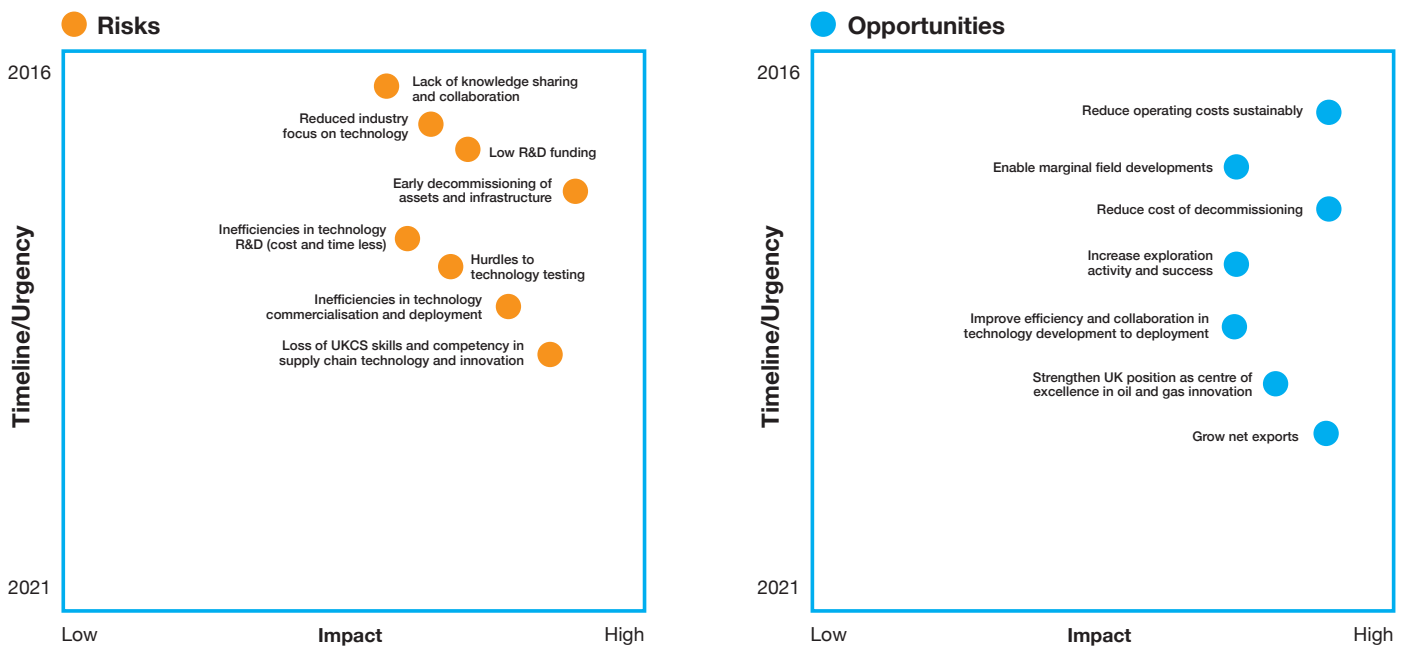
**Case study 2**  
**Transformation in the UK automotive sector**

In the 1990s and early 2000s, the UK automotive sector went through a sustained period of modest investment in innovation and capacity resulting in a decline of the UK share in global car manufacturing, with a significant contraction of the supply chain. This trend was reversed with the introduction of consistent policy, focus and collaboration on innovation. This resulted in an increase of industry revenues from £46 billion in 2003 to £64 billion in 2013, £30 billion of which was accounted for by exports. This success resulted in the commitment, between 2012 and 2013, of £6 billion of private investment. In addition, the UK car industry received £1 billion for technology research and skills as part of a 10-year scheme jointly funded by the government and manufacturers<sup>6</sup>.

This comparatively low technology focus and R&D funding in the oil and gas industry, combined with complex internal qualification and assurance processes, have resulted in long timelines to develop, demonstrate and deploy new technologies. The slow technology uptake by operators is also having an adverse impact on the highly capable and traditionally innovative service sector, which is finding it more difficult to introduce transformative, efficient technologies, with a risk of further loss of skills and capability. The main risks are summarised in the left-hand chart in Figure 1.

Conversely, deploying existing technologies and increasing the focus on innovation, through increased funding, greater efficiency and collaboration, the OGA, the TLB and the OGTC will help the oil and gas industry deliver significant benefits to the UK economy, both in terms of MER UK and growth of exports of technology equipment and services (refer to Figure 1, right-hand chart).

**Figure 1: Risk and opportunity matrix**



<sup>6</sup> PwC analysis

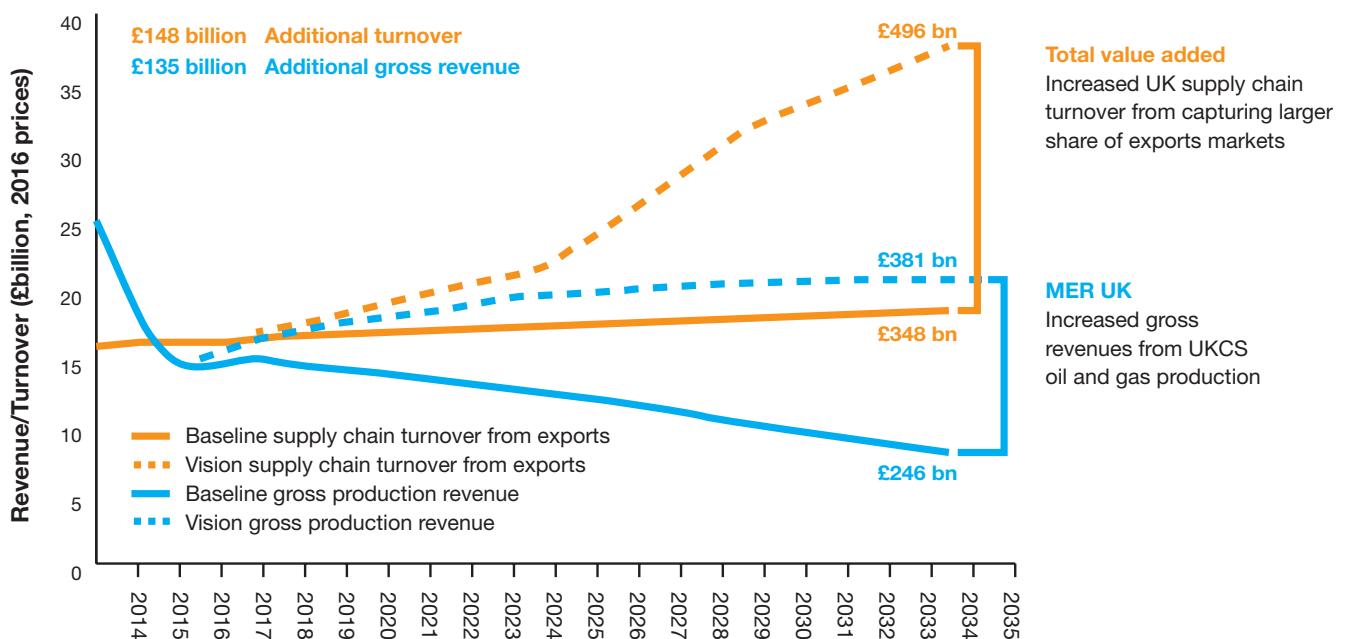
# 4. Strategic objectives

Technology solutions, combined with other investments and activities by the industry and government, will support efficiencies in field development and operating costs and the unlocking of additional value from hydrocarbon recovery and technology net exports. Therefore, the objectives of this Strategy are to ensure that existing and novel technologies are deployed to:

- **Achieve MER UK objectives** by revitalising exploration, enabling the development of marginal discoveries, and reducing costs of developments, operations and decommissioning
- **Grow exports of the UK-based supply chain and reduce imports** by enhancing the position of the UK as a global centre of excellence in oil and gas technology-driven equipment and services

The OGA has estimated the benefits to the UK economy in achieving these goals are significant as shown in Figure 2.

**Figure 2: UK-based oil and gas industry economic contribution – vision for MER UK and export upside**



This Technology Strategy is designed to support the above objectives with the OGA, the TLB, the OGTC and the industry working collaboratively to achieve the following:

#### In the near-term (1–3 years)

- Establish widespread adoption of best practices and technologies across companies and international basins to reduce operating costs and extend the life of the UKCS producing fields
- Introduce technologies and techniques to reduce field development costs, improve recovery, reduce the cost of decommissioning and unlock existing hydrocarbon discoveries which are not currently being pursued
- Stimulate R&D activity, to progress technology programmes more effectively and efficiently with industry's early commitment to deploy in field developments and operations

#### In the medium-term (3–5 years)

- Establish prototype testing and trials of new technologies
- Increase the number of field and/or area development plans which are successfully unlocked by technology, including asset life extensions relying on advancing technologies and techniques
- Identify and progress a pipeline of technology opportunities to further enhance, over time, the position of the UK as a global centre of excellence in oil and gas technologies

#### In the longer-term (5–10 years)

- Bring about full scale deployment of advanced technologies to operate offshore in a fundamentally more efficient way, while finding and recovering hydrocarbons currently considered uneconomic
- Working with the Department of Business, Energy and Industrial Strategy (BEIS), the Department for International Trade (DIT), the industry and trade associations, to reinforce the UK technology leadership in oil and gas equipment and services to grow net exports of technology equipment and services

Focusing on the near to medium-term opportunities (1–5 years), the OGA and the industry are already working towards delivering the targets as described in the OGA Corporate Plan 2016–2021, outlined in Figure 3.

**Figure 3: Technology targets from the OGA Corporate Plan 2016–2021**

KPI	Target	Timing	Who
Cost reduction from technology	30% to 50% cost reduction	Q1 2021	Industry with OGA support
Additional value and barrels from technology	Demonstrate progress towards securing the following longer term targets (2035): - additional 3bn boe recovered - at least double supply chain exports <sup>7</sup> - reduce imports by 15% <sup>7</sup>	Q1 2021	Industry with OGA support

<sup>7</sup> OGA Supply Chain Strategy, 2016



The following sections outline the ongoing efforts and opportunities for the near to medium-term.

#### 4.1 Cost reduction from technology

The sustainability of the UKCS depends on becoming once again globally competitive by reducing the prevailing high field development and operating costs and ensuring the cost-effective and safe life extension of ageing assets. To achieve this, the technology priorities include:

##### Well cost reduction

Efficient well technologies and practices will deliver significant savings in the drilling and construction of wells allowing additional marginal and mature field reserves to be developed. Efficient wells solutions include managed-pressure drilling, drilling while casing and standardised well designs. These can be complemented by securing economies of scale and other commercial efficiencies, e.g. through industry collaboration. Over 50% reduction in well construction costs is achievable and could unlock the drilling of 30 to 60 additional wells p.a., above current forecasts, unlocking further potential hydrocarbon recovery of 1 billion boe.

##### Case study 3

##### Well cost efficiencies for the UKCS

Recent work carried out by the TLB's Well Cost Reduction Workgroup has demonstrated that by combining existing (but not commonly used in the UKCS) technologies, a 30% reduction in well construction time (and hence costs) can be achieved. This combined technology method used conductor anchor nodes, casing while drilling and drilling liners. Further work has shown that increasing collaboration, sharing knowledge and using efficiency savings through deployment at scale can reduce the construction time by another 30%<sup>8</sup>.

##### Asset integrity

Technology can help the industry achieve efficiencies in maintenance and integrity costs and improve production uptime by over 10%. For example, it is possible to introduce more effective inspection and corrosion-monitoring technologies, at lower cost, by transferring best practices from other industries, such as the construction and the nuclear sectors. Technologies tested in the UKCS would attract significant interest from other international offshore basins, stimulating export prospects.

##### Digital technologies and data

Advanced methods to acquire, share, analyse and use operational data for improved diagnostic and decision-making in the field can deliver multi-billion pound savings in annual costs across logistics and materials management, asset integrity and maintenance. A similar major upside can be found in exploration and production operations, with the potential to add significant new reserves. Digital solutions and enhanced sensors can also significantly reduce operating and decommissioning costs by introducing more automation in operations and the use of autonomous systems in integrity inspection and maintenance.

<sup>8</sup> Analysis by the TLB Well Cost Reduction Workgroup

**Case study 4****Data analytics in exploration**

One major operator has already applied data analytics to its seismic data and identified 30 previously unknown new leads (with a net value of £300 million) from existing datasets much more efficiently than would have been possible through traditional geoscience techniques. Use of ‘big data analytics’ allows geoscientists to integrate and interpret information at a more advanced level, rather than the traditional data analysis, driving greater efficiency and accuracy in the turnaround of prospects. To apply this at a basin level, systems currently exist that are capable of retaining the anonymity of the original data, overcoming data release issues, a perceived key blocker in this area. This has worked well in other industries, such as the banking sector. It is estimated that if just five medium-sized fields were to be revealed in the UKCS, then value in the order of £0.5 billion to £1 billion could be achieved, vastly surpassing the initial investment in data techniques<sup>9</sup>.

**Decommissioning**

Current cost engineering estimates suggest that by 2050, approximately £47 billion<sup>10</sup> will be required to decommission UKCS fields and facilities. However, market-led estimates could be higher. Development and deployment of new technology will play a key role in achieving the MER UK target of delivering at least a 35% reduction in decommissioning costs, providing significant value to operators, the service sector and the UK government.

**Case study 5****Well Plugging and Abandonment (P&A) – cement logging through tubing**

A critical task prior to well abandonment is determining the quality of the annuli cement and its ability to provide a hydraulic seal. If this information can be obtained without the removal of the production tubing, the potential for significant cost savings could be realised by reducing rig times and adding to the suite of technologies required to allow rig-less abandonments. The ability to determine cement bond quality through multiple annuli is deemed an industry technology priority area globally<sup>11</sup>.

**Other areas**

Advances in the areas outlined above will have a significant positive impact on other applications which are also dependent on offshore infrastructure, such as Carbon Capture and Storage (CCS). These could be realised through better integrity management of pipelines and platforms, as well as the reduction in well construction costs and eventual decommissioning liabilities. In addition, technologies in power generation and transport, as well as offshore maintenance and operations, may lead to the transfer of lessons learned and operational synergies with the offshore renewable energy industry. The TLB is also exploring opportunities from the deployment of advanced materials and manufacturing technologies in UKCS applications, in order to define priorities in these areas.

<sup>9</sup> Analysis by TLB Digital Technology workgroup

<sup>10</sup> OGA Decommissioning Strategy, 2016

<sup>11</sup> Analysis by Industry Technology Facilitator (ITF)

## 4.2 Additional value and barrels recovered

### Seismic/exploration centre

The UK Government-funded seismic survey of the Rockall Basin and the Mid North Sea High areas provides an opportunity for technology developments to fully exploit the survey data obtained with gravity, magnetic and existing well data. This has the potential to further improve exploration across the basin, resulting in new discoveries, a reduction in dry holes and improved productivity and recovery. New 3D visualisation techniques are also enabling companies to identify exploration targets more effectively. Therefore, the OGA is co-investing in a new centre of excellence at Heriot-Watt University to ensure this technology is readily available to all operators.

### Small pools/marginal fields

A significant MER UK opportunity is the development of hydrocarbon accumulations which are currently considered too marginal to be sanctioned. There are over 300 oil and gas 'small pools', defined as discoveries of oil or gas accumulations under 50 million boe that are not currently being pursued by licence holders. Initial analysis has shown that reducing field development costs by 50% may unlock the development and recovery of over 1 billion boe<sup>12</sup>. Technology has a significant role to play with regards to small pools cost reduction, from reducing the cost of development wells to designing optimised subsea infrastructure and tie-backs to existing host facilities or efficient standalone concepts.

### Exports

Technology equipment and services (from seismic to asset integrity and decommissioning solutions) developed and deployed for the diverse conditions in the UKCS can also be applied to other basins worldwide, including those in late-life. Accounting for the export potential, in addition to the UKCS market, increases the attractiveness of UK investments in oil and gas technology developments. In addition, the UKCS represents an ideal 'test bed' for novel technologies given the scale of the industry, diversity of development concepts and operating conditions and the deep technical skills and experience available.

It is crucial that export opportunities are targeted and promoted with the service sector. This should be done jointly by the OGA with DIT, Scottish Development International (SDI), Oil & Gas UK, other trade associations and the Energy Industries Council (EIC) working together with the MER UK Supply Chain, Exports and Skills Board. The OGA will ensure that efforts in oil and gas technology development are aligned and optimally support the export agenda.

<sup>12</sup> Analysis by TLB Small Pool workgroup

# 5. Implementing the Strategy

Working together with key stakeholders, the OGA is continuing to:

- **Set priorities** – with the TLB and other MER UK Boards, define and agree priorities based on industry needs, robust business cases and plans for technology development through to deployment
- **Promote innovation** – support the OGTC in securing investment, harnessing development capabilities and delivering technology solutions
- **Oversee industry efforts** – the OGA will monitor and influence deployment of existing and new technologies by engaging operators on Technology Plans and applying regulatory powers

Executing this Technology Strategy will help stimulate a significant transformation in the UK oil and gas industry and the UKCS, including:

- Focusing technology efforts on what the UKCS needs, transforming performance and growing export capabilities of the supply chain
- Aligning technology priorities and plans across industry, governments and UK-based research institutions to collectively maximise UK-wide impact
- Establishing fully-funded, evidence-based business cases and plans, linking development to deployment
- Ensuring efficiency and timeliness in technology development by harnessing UK-wide capabilities and increasing collaboration within the oil and gas industry and with other technology-driven industries
- Co-ordinating plans across industry, including the service sector, to accelerate the safe deployment of technology through field tests, pilots and campaigns

## 5.1 Set priorities

There has been significant progress, through the work of the TLB, in consulting with the industry and agreeing the three initial UKCS priority themes (asset integrity, small pools and well cost reduction), for which rigorous business cases have been prepared to progress these themes in order to:

- **Adopt** existing technologies (those deployed by single operators and/or in other international basins, but not yet commonplace in the UKCS)
- **Adapt** technologies that are still immature or require optimisation to meet specific conditions (those that are in a pilot-phase and/or are used in other industries but need to be adapted to offshore applications)
- **Develop** novel technologies and business models for deployment, tackling fundamental areas of improved resource recovery and operational efficiencies

**Case study 6****Technology Leadership Board (TLB)**

The TLB has been instrumental in bringing focus to the UKCS technology debate. Achievements have included progress on the three critical technology themes of small pools, well cost and asset integrity. In September 2015, the OGA joined the TLB, co-chairing it with industry. The recent drop in oil price, impacting profitability of the UKCS, has further focused the TLB's work on utilising technology to reduce costs and reduce risks to support MER UK delivery. Much tighter investment budgets in companies (operators and service companies alike) has meant that the TLB needs to be more directly involved in helping crucial technologies move 'over the line', pioneering and piloting innovation, adopting an evidence-based business case approach and taking more direct responsibility for funding.

Both the OGA and the TLB are integral parts of the MER UK Forum and support the newly formed OGTC Board. They are best placed to identify and maintain a pipeline of future technology opportunities as well as promote industry needs, gain industry alignment and commitment on technology deployment. This has already led to two new TLB themes being developed:

- Decommissioning
- Digital technologies and data

Future themes may include manufacturing and materials, energy efficiency and low carbon solutions such as CCS and offshore renewables.

**5.2 Promote innovation**

Adequate funding and delivery capabilities are necessary for the development and deployment of technologies. Robust business cases and plans are pre-requisites and need to encompass a suitable level of contingency to ensure technologies are properly developed and tested through full commercialisation.

A significant change to the UKCS over the last decade is the increase in the number of smaller and independent operators, often with much smaller R&D budgets in comparison to the bigger companies. The UK and Scottish governments have responded to this situation by funding the OGTC and other technology institutes. Government funding will need to be matched by industry investment, including 'in-kind' support from operators and the service sector.

**Case study 7****The Oil and Gas Technology Centre (OGTC)**

The OGTC was established with £180 million funding from the 2016 Aberdeen City Region Deal and, when matched by industry funds and in-kind support, will unlock a £360 million total investment. The OGTC is an innovation enabling, technology delivery organisation and its clients and partners are the oil and gas industry, universities and research institutions. OGTC activities will be driven by industry needs and it will work in close co-ordination and collaboration with the TLB. The OGTC will be structured as a number of solution centres to deliver different themes of work, initially a continuation of the TLB priority themes. The OGTC will co-fund market-led technology programmes to develop technology for industry to bring to market. In addition, the OGTC will facilitate, stimulate and accelerate supply chain-led R&D into mature basin needs and support technology deployment to market. The OGTC will be a 'go to' hub for mature basin technology, providing intelligence and innovation, being highly networked into other UK and global centres of excellence and related disciplines.

In this context, the industry, the TLB and the OGA will play a pivotal role to support the ramp-up of the OGTC and promote further, complementary investments to ensure adequate funding for technical innovation is maintained from development to deployment. It is anticipated that the OGTC funding for the solution centres may need to be complemented by increased funding to unlock innovation in the broader service sector, small to medium enterprises and other technology institutes as well as to support decommissioning plans. This effort will be aligned with the OGTC plans to assess a range of investor opportunities in collaboration with the TLB and UK and Scottish government departments, including Scottish Enterprise and BEIS.

The OGA, the TLB and the OGTC will continue to work closely together, including putting appropriate programme management in place, and promoting the pooling of investment and collaboration across operators and with the service sector to accelerate commercialisation and deployment of technologies for the UKCS.

### 5.3 Oversee industry efforts

The MER UK Strategy makes clear that technologies, including new and emerging technologies, should be deployed to their optimum effect, and also makes clear requirements for industry collaboration.

This Technology Strategy places technology and innovation as a core enabler of MER UK and key to growing a sustainable export position for the UK supply chain in the longer term.

The OGA will introduce an enhanced asset stewardship process which will contain a set of specific actions and expectations on industry, some of which will relate to technology and innovation, including the development of Technology Plans.

### OGA's expectations of the industry

- The OGA will request individual operators to submit Technology Plans, covering development to deployment of new and existing technologies to address MER UK needs and the priorities of their assets and licences
- The OGA expects industry to support the OGTC in providing a platform for technology development and deployment
- The OGA will proactively engage in reviews and discussions with operators to enhance and accelerate their Technology Plans and pursue collaboration to develop and deploy technology, when beneficial

### Encouraging collaboration

- Through dialogue with the industry, the OGA will identify opportunities to deploy best practices and existing technologies to efficiently pursue MER UK objectives
- The TLB and the OGA will progressively develop and maintain a live 'landscape' of technology development, field trials, pilots, and deployments, facilitating the dialogue among operators and with service companies
- The OGA will investigate opportunities for industry partnerships and innovative business models to accelerate and lower risks in technology development, field-testing and deployment
- As part of the enhanced asset stewardship process, the OGA will monitor and track the development, testing and deployment of existing and novel technologies, using leading and lagging indicators, tracking technology adoption and its benefits

A Technology Delivery Programme will accompany this Strategy and provide detail on its implementation.

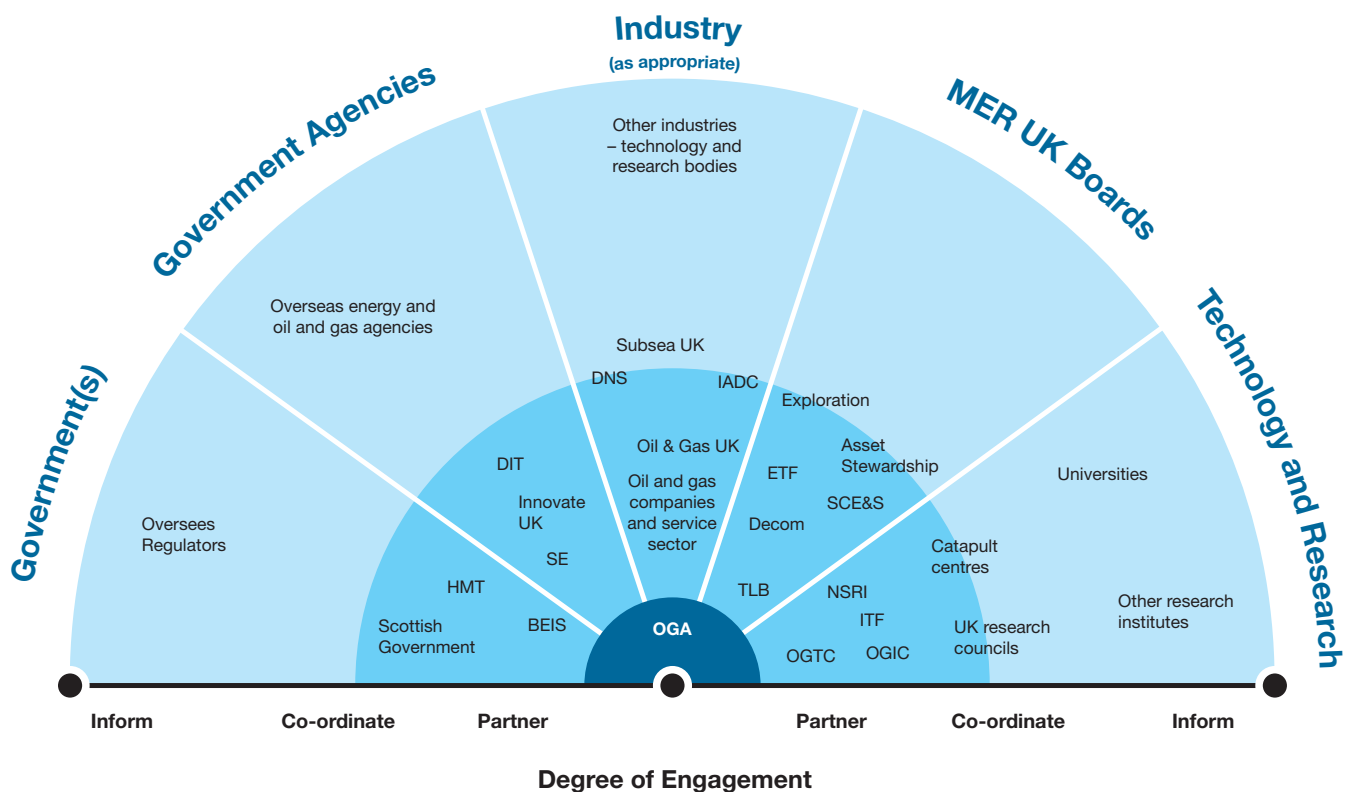
# 6. Stakeholder engagement

The OGA will actively engage and collaborate with stakeholders in governments, the oil and gas industry and research institutions.

The OGA will work together with these organisations to ensure technology objectives and plans are well aligned and funded, and that business cases are robust. A significant effort will be placed on ensuring industry traction and commitment to timely test and deploy technologies.

Key technology stakeholders and their expected degree of engagement by the OGA are illustrated in Figure 4 below.

**Figure 4: Technology stakeholder map**



BEIS	Department of Business, Energy and Industrial Strategy
DIT	Department for International Trade
DNS	Decom North Sea
ETF	Efficiency Task Force
HMT	Her Majesty's Treasury
IADC	International Association of Drilling Contractors
ITF	Industry Technology Facilitator
NSRI	National Subsea Research Initiative
OGIC	Oil and Gas Innovation Centre
OGTC	Oil and Gas Technology Centre
RDI	Regional Development and Infrastructure Board
SCE&S	Supply Chain Exports & Skills Board
SE	Scottish Enterprise
TLB	Technology Leadership Board

# 7. Monitoring and evaluation

Success of the implementation of this Technology Strategy (and accompanying Delivery Programme) will be measured in a number of ways.

As part of the new OGA enhanced asset stewardship process, the OGA will have the ability to track and measure the progress and impact of technology and innovation programmes.

Since technology programmes are relatively long term, the OGA will focus on both leading and lagging indicators of progress throughout deployment and realised benefits, including:

- R&D budgets, the number and scale of technology programmes funded, their progress and key milestones (technology readiness level, concept demonstration, field testing and commercialisation)
- Increase in (planned) offshore activity, for example the number of wells (to be) drilled
- Field Development Plans (FDPs) and/or area development plans which operators commence and the progress made, including FDP submissions to the OGA
- Reserves unlocked and new reserves booked by operators
- Efficient technologies adopted in asset operations, maintenance and integrity, and the ability to reduce opex in a demonstrable way
- Introduction of efficient technologies and techniques for decommissioning cost reduction in the decommissioning plans submitted to BEIS and the OGA
- Level of industry collaboration, knowledge sharing and campaigns to test and deploy technologies to the field

In addition, the OGA will monitor the health of the supply chain innovation pipeline, gathering and sharing success stories from companies which develop and patent technology and ones which are actively deploying technology.



# 8. Acknowledgements

The Technology Strategy has been compiled with the assistance, input and advice of many people and organisations. The OGA would like to acknowledge the following specific contributors.

## Technology Leadership Board

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- Amec Foster Wheeler
- Baker Hughes
- BIS (now BEIS)
- BP
- Centrica
- Chevron
- EnQuest
- GE (industry chair)
- Heriot-Watt University
- Imes Group
- ITF
- Innovate UK
- Magma Global
- NERC
- NSRI
- OGIC
- Oil & Gas UK
- Scottish Enterprise
- Scottish Government
- Shell
- TLB Theme Leads and Supporting Teams
- Total

## Other organisations

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- DECC (now BEIS)
- DIT (formerly UKTI)
- EY
- OGTC
- Other MER UK Boards
- PwC
- Robert Gordon University
- University of Aberdeen
- University of Strathclyde



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