

## Response to:

# Scottish Affairs Committee: The future of the oil and gas industry inquiry

This is an **Institution of Chemical Engineers (IChemE)** response to the Scottish Affairs Committee call for evidence on the future of the oil and gas industry. This response was developed by the IChemE's Energy Centre, which brings together chemical engineers with expertise and insight across the energy sector.

IChemE is the global professional membership organisation for individuals with relevant experience or an interest in chemical and process engineering. Founded in 1922, IChemE has grown to its current status of over 40,000 members in around 100 countries.

We are the only organisation to award Chartered Chemical Engineer (CEng) status and Professional Process Safety Engineer. We are also licensed to award the titles Chartered Scientist (CSci) and Chartered Environmentalist (CEnv) to suitably qualified members.

Our Royal Charter and charitable status confer upon us an obligation to advance chemical engineering for the benefit of society as a whole and support the professional development of our membership, which spans a wide range of individuals from industry, regulators, academia and consultancies.

We can call upon our members' expertise in these fields without bias or favour, in order to reach objective advice based on sound science. This submission represents the views of a range of members across research and industry who are predominantly involved directly with the Scottish oil and gas sector. IChemE welcomes the opportunity to comment on this call for evidence.

For further information contact:

IChemE Energy Centre

[energycentre@icheme.org](mailto:energycentre@icheme.org)

+44 (0)1788 534459 / +44 (0)20 7927 8130

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## What challenges does Scotland's oil and gas industry face, and how can they be addressed?

### Economic challenges

- 1.1 The North Sea is a harsh environment for the oil and gas industry to operate in. The UK Continental Shelf is past peak oil production, new reserves tend to be smaller and more remotely located (therefore less economically attractive), some existing infrastructure is aging, and international competition is high. Production efficiency, though rising, is relatively low when compared to other regions,<sup>1</sup> and decommissioning costs are a present burden. As such, the region is in need of new investments.
- 1.2 Oil demand is set to continue to fall as electric vehicle usage increases. It is also possible that gas may follow a similar trend as electricity shifts towards renewable and nuclear energy. However, this should not be considered a threat to the sector, and there is support within the industry for embracing the energy transition in a way that sustains the centres of expertise and technical excellence in Scotland. There are many ways in which this could occur, which will be further explored below. One example is planned in the Netherlands, where electricity from offshore wind will be used to power the production of hydrogen gas fuel from water electrolysis. The processing and storage of the hydrogen gas fuel will utilise existing onshore and offshore gas infrastructure – a valuable synergy.

### Skills and personnel

- 1.3 There is a key shortage in higher level skills in key competence areas. One cause of this is the migration of high performance individuals to international projects. The 2014 downturn in the oil and gas industry led to reduction in recruitment at graduate level and significant job losses, over 84,000 in 2015.<sup>2</sup> The impact of this is that it is increasingly difficult to attract engineers into the industry, while several of the highly skilled staff have either moved to other industries or locations. Smaller companies in particular are not able or willing to take on graduates, creating risks for the future talent pool. One potential solution to this problem is to facilitate a program in which graduates are shared across a number of smaller operators for 3-4 years, similar to apprenticeship schemes. On a wider level, the government should support the development of skills relevant to the oil and gas industry and those which will be key in supporting the energy transition, through education and training opportunities. The government should also invest in retraining for high-skill staff in the renewable energy industry, as the other side of the knowledge sharing required for sustainable transition of the sectors.

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<sup>1</sup> Economic Report 2017. Oil and Gas UK, September 2017. (<http://bit.ly/2N9zQb7>)

<sup>2</sup> Economic Report 2016. Oil and Gas UK, September 2016. (<http://bit.ly/2KZz0QX>)

## Infrastructure

- 1.4 Decommissioning is a contentious issue. Cost definition remains a problem due to the immaturity of modelling and the different approaches taken by different operators. Operators may lack the relevant expertise and experience. Uncertainty in the timescales make it more difficult for the supply chains to meet demands. The individual strategies taken without optimal communication detract from the ability to create cost reductions from experience of past projects. Decommissioning scopes also present environmental and health & safety risks which would have to be properly addressed by Operators.
- 1.5 There is also debate on the value of decommissioning, with some arguing that its economic opportunities and potential for value creation are overstated. As such there have been calls for a comparative sustainability assessment of the current plans against one of well-plugging and leaving the infrastructure clean and inert in its place, though this approach is contentious.
- 1.6 It should further be considered that best value for taxpayers may come from the extension of the activity of some older assets beyond their original end-of-field life as defined by, with original owners maintaining their abandonment liability. This could be done under the control of a government body similar to the Nuclear Decommissioning Agency.

## How can the economic return from Scotland's oil and gas reserves be maximised?

- 2.1 Answers to this question depend on the nature of the economic return desired. Different scenarios may create different economic benefits; for the government through tax revenue, for the operating or service companies, for individual employees, or for local communities more broadly.
- 2.2 There is significant support for continuation of the Maximising Economic Recovery (MER) strategy laid out in the Wood Review.<sup>3</sup> However, there remain concerns that past poor extraction performance on exploited fields may limit economic returns. Poor uptime (the proportion of active days of an installation) is an additional cause for concern and may have root causes in skill deficits. Increasing this may drive up productivity. It is thought that on platforms designed for peak production, now with reduced loads as they reach their end of life, offshore activity and manning could be reduced and key operations such as compression moved onshore. Existing oil reserves may be exploited more efficiently through the utilisation of technologies such as enhanced oil recovery (EOR) using CO<sub>2</sub> obtained from carbon capture. It is considered, however, that the economic viability of this technology is dependent on carbon pricing and the sharing of risk in the design of CO<sub>2</sub> transport infrastructure.

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<sup>3</sup> UKCS Maximising Recovery Review: Final Report. Sir Ian Wood, February 2014. (<http://bit.ly/2NBzHOC>)

- 2.3 It would be productive to maximise collaboration between oil and gas companies, for example by expanding on their current sharing of resources such as supply ships and helicopters. There is also scope for companies working together to develop shared infrastructure at geographically concentrated but separately owned clusters of fields, which may not individually be economically attractive. One way this could be aided is through the anonymised publication of the data produced by the Oil and Gas Authority (OGA), allowing for more effective benchmarking between operators.
- 2.4 The number of operators in the same space who have divergent goals and capabilities is detrimental to maximising economic returns. If the government wishes to ensure maximum recovery from small reserves, it should consider facilitating this through the provision of infrastructure (e.g. midstream pipelines, plants, or host facilities) to allow operators to produce from marginal fields.
- 2.5 Furthermore, offshore windfarms adjacent to gas fields offer further synergies through, for example, the gas to wire concept in which gas power generation occurs offshore and the electricity is returned through the cables in place for the windfarm.
- 2.6 Decommissioning costs can be reduced as the supply chain gathers experience from repeated activities (e.g. plugging wells), and through increased co-ordination. It is important that UK participants within this supply chain are fully involved to maximise their cost reductions and economic participation. Other countries, such as the Netherlands, are already highly competitive in this sector.

### **What action is the UK Government taking to support the long-term future of the oil and gas industry in Scotland, and how effective has this been?**

- 3.1 Many of the actions of the government have been welcomed by the industry. Investment from organisations such as the Oil and Gas Technology Centre (OGTC) are having a beneficial effect, and the OGA has been effective increasing collaboration, adjudicating on disputes, improving commercial behaviour, encouraging research and technological/efficiency improvements. Efforts in these areas should be continued and expanded.
- 3.2 Tax incentives introduced since the 2014 downturn have also been welcomed. In particular, the Petroleum Revenue Tax (PRT) being zero-rated from 2016 is of advantage to older installations. However, the complexity of the tax structure creates an unnecessary extra expenditure of time and effort. The investment allowance and cluster allowance introduced in 2015 has gone some way to encourage investment in economically challenging or marginal fields, though as outlined previously there remain significant barriers.
- 3.3 These efforts by the government are encouraging, however the industry is still in a period of recovery and confidence has not fully returned. The overall effectiveness of measures aimed at oil and gas production may be limited. Many no longer considered the UK to be a leading oil and gas producer

anymore, as evident by the number of operators selling assets, downsizing of service and equipment companies who are also moving operations overseas, and the number of future projects being executed outside of the UK.

### **How well do the different stakeholders (UK Government, Scottish Government, companies) work together? Does the current devolution settlement enable all stakeholders to support the sector?**

- 4.1 Many operators and contractors operate across the UK, meaning that discrepancies between UK and Scottish legislation add to complexity and operating costs, as well as government costs. While organisations such as the OGA and OGTC have been valuable, the support landscape is otherwise confused, and organisations are not acting in a sufficiently coordinated manner.
- 4.2 There are also concerns with conflicts of interest between the UK and Scottish governments with regards to the way in which the sector is supported. Divergence of approach and the resulting instability can negatively impact the businesses involved. Examples of such issues arising from devolution conflict can be found in Canada with the very slow growth of the Newfoundland oil and gas sector as a result of the relationship between the government of Newfoundland & Labrador and the federal authorities.<sup>4</sup>
- 4.3 The oil and gas industry follow long term plans, which require clarity and consistency from governments. As such, Scottish and UK governments must jointly provide clarity on long term positions for the remainder of and following our withdrawal from the EU, despite the inherent uncertainties.

### **How can Scotland maximise its expertise, technology and infrastructure in oil and gas industry to secure the industry's future as reserves decline? What support is needed from Government to maximise these opportunities?**

- 5.1 As oil and gas reserves decline, there is a great opportunity in reshaping into a support and technology industry to service global producers. This requires the expansion of research and technology supply chains even while production falls. The government could further facilitate this through export assistance and focusing organisations such as the OGCT and Scottish Enterprise.
- 5.2 The government should actively support the development of business and facilities to not only support decommissioning industry within Scotland, but also position Scotland to serve as a base for global

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<sup>4</sup> A devolved Scottish oil & gas sector: regulatory lessons from the relationship between Newfoundland & Labrador and the federal government of Canada. Sanjoy Sen, March 2014. (<http://bit.ly/2uatoJR>)

support to decommissioning. This could include support towards the development or redevelopment of sea ports and dockyards, as well as attracting and retaining leading talent in this area.

5.3 The government should work with the energy industries to actively identify potential areas of crossover and integration with renewable energy technology sectors. This may come in the form of investigating ways to utilise existing technologies and infrastructures to reduce renewable costs, and ways to transfer skills present in the oil and gas industry to other businesses operating in the main production centres, such as subsea engineering and the design, construction and operation of offshore structures.

5.4 Greater investment in emerging and innovative technical innovation is also required. This includes wider support for the carbon capture and storage (CCS) and CO<sub>2</sub> EOR initiatives.

5.5 Lastly, consideration must be given to the wider investment in the region to ensure the attraction of talent to technical centres. Projects such as the City Deal for Aberdeen<sup>5</sup> are crucial to these goals but reports of skilled graduates being deterred by the prospect of relocation indicate a need for action.

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<sup>5</sup> Aberdeen City Regional Deal. Aberdeen City Council, December 2016. (<http://bit.ly/2JaaVBD>)