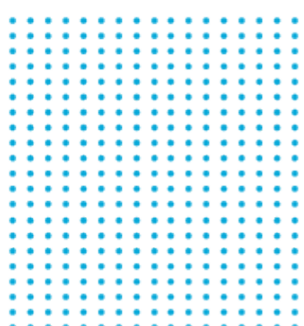




The
Oil & Gas
Technology
Centre

Your Innovation Partner

OGTC 18 Month Checkpoint Review



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Executive Summary

The Oil & Gas Technology Centre (OGTC) is an industry led, technology development and deployment organisation created with £180m of Aberdeen City Region Deal funding and officially opened in February 2017. Over the ten year funding period the Centre must be matched funded by industry (£180M). Each approved project is underpinned by the OGTC vision of maximising economic recovery from the UK section of the North Sea and anchoring the supply chain in the North East of Scotland. Each investment is also strategically reviewed to address MER UK and the work of the MER UK Task Forces. The Centre enables investment in the development of technology in partnership with industry, academia and the supply chain actively supported by the regulator and government. The Centre also strives to create a culture of Innovation in the North East of Scotland by actively sharing the results and case studies from those investments and sharing lessons and integrating expertise from other industries.

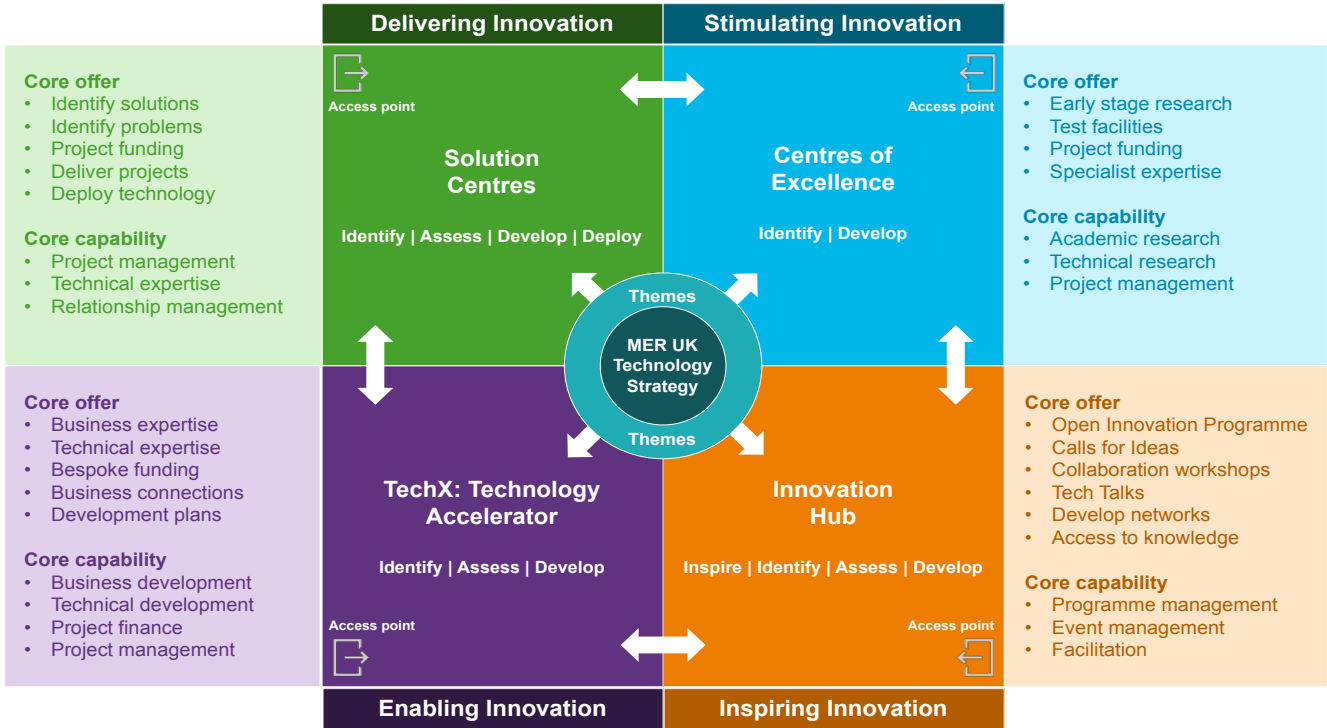
Working through **Solution Centres**, we encourage, lead and co-fund industry-initiated technology projects to develop and deploy solutions for the Oil & Gas Industry. We are focused on delivering innovation in five key areas: well construction, small pools, asset integrity, decommissioning and digital transformation.

Through **Centres of Excellence**, working closely with local universities, we stimulate innovation by supporting the development of high quality R&D capabilities in the University of Aberdeen, Robert Gordon University and within the oil and gas industry.

With TechX, our **Technology Accelerator**, we support smaller companies in the supply chain by funding accelerated development of their technology ideas in addition to exceptional mentoring and business support to enable them to become investment ready for product scale up.

And with our unique **Innovation Hub**, we are inspiring innovation by creating an inspirational place where companies, technology providers and schools come to collaborate on solutions and learn about the art of the possible.

Our objective is to establish a culture of innovation that will consolidate both Aberdeen's and the North-East of Scotland's position as the global hub for oil and gas technology and innovation.



18 Month Checkpoint

In the business case, the OGTC was set a number of targets to be achieved by the 18 month checkpoint scheduled for March 2018. As shown below, each one of these targets has been met or exceeded by the checkpoint date.

Milestone	Achieved Date	RAG Status
£8.5m co-investment match funding from the private sector (operators and supply chain)	July 2017	Green
A Centre of Excellence is in the process of being established in each of the 2 Local Universities focussed on research for oil and gas excellence	February 2018	Green
A Network Collaboration Zone established	September 2017	Green
Solution Centres: 8 projects in the areas of small pools, wells cost reduction, asset integrity, decommissioning identified & underway or completed	July 2017	Green
Solution Centres: Secure undertaking from industry partners to commit to at least 2 offshore technology deployment and test projects	July 2017	Green
Technology Accelerator Programme: Supply Chain R&D matched funding programme framework established (eligibility criteria, contracts, legal, IPR policy, payment terms etc.); 2 projects with funds secured and match funds released	December 2017	Green
Digital technologies / big data: Exemplar project well advanced	28 March 2018	Green
A technology knowledge database platform created and starting to populate	28 March 2018	Green

2017: A Year of Delivery

The Oil & Gas Technology Centre

Target: £8.5m co-investment matched funding from the private sector

Delivery: £22.0m to date

The OGTC has co-invested £37m with industry to develop and deploy new technology. Of the £37m, £22m has been invested by industry in matched funding and £15m has been invested by the OGTC. This is significantly higher than the original expectation of £8.5m matched funding in the first 18 months. The OGTC has a membership model of the solution centres and there is over 80 members in the first year spanning operators, supply chain and technology developers. The members drive the themes and investments ensuring focus on solving the key challenges in the Industry.

Target: A Network Collaboration Zone established

Delivery: The Innovation Hub opened in October 2017

The Innovation Hub was opened in early October 2017 and with over 5,000 visitors to the Centre, we have built strong connections across the UK innovation ecosystem, creating a culture of innovation.

Solution Centres

Target: 8 Projects over 4 Solution Centres in progress, underway or completed
Delivery: More than 80 projects underway over 5 Solution Centres

Five Solution Centres are now established covering Asset Integrity, Wells, Small Pools, Decommissioning and Digital Transformation. They operate a membership model and there are more than 80 memberships across the Solution Centres. They bring together oil and gas operators, supply chain companies and technology developers, as well as experts from other industries and academia to work on new and innovative solutions.

Over 400 technologies have already been screened by the Solution Centres from machine learning to robotics to virtual reality. This has resulted in more than 80 ongoing projects, well ahead of the original target of eight.

Each Solution Centre has also run at least one Call for Ideas, generating more than 180 technology ideas from within and outside the oil and gas industry. These Calls have led directly to project investment.

Well Construction

We are working with Spirit Energy to field-trial a well plugging and abandonment technology that could deliver up to £100 million cost-savings per year. Interwell's thermite solution, which is being deployed at Spirit Energy's onshore well at Caythorpe, melts materials in the wellbore, forming an impermeable barrier to seal the well. The results will be shared with a further nine North Sea companies collaborating on the project.

Asset Integrity

The results of three non-intrusive inspection (NII) trials, organised in partnership with Total E&P UK, demonstrated the potential to deliver significant cost, safety and efficiency benefit compared with traditional intrusive methods. We worked with Eddyfi, MISTRAS and Sonomatic to conduct the trials, who deployed a range of ultrasonic corrosion mapping and time of flight diffraction solutions. Our survey with ABB found that adopting NII technology could deliver increased production and lower maintenance costs worth up to £242 million per year on the UKCS.

We also worked alongside Eserve on a new technology to change how offshore surveys are conducted. In just three months, Eserve has grown from £0 to £650,000 in revenue and increased its team from three to 12 employees. This growth will help anchor Eserve in Aberdeen and strengthen the North-East supply chain.

A further project with Infinity Oilfield Services, is developing a safety solution which has the potential to deliver over £320m in potential savings to the industry. The Kevlar device contains corroded valve equipment to eliminate safety and operational risk and extend asset life. The first field trial has successfully completed with further installations planned for the remainder of 2018.

Small Pools

We have developed a concept for the Tie-back of the Future to help unlock the remaining stranded assets. Wood McKenzie has estimated that this has the potential to unlock 400 million barrels and generate £3bn of value for the UK. We are working with five organisations to transform the development of small pools. This has a significant export opportunity with 27 billion barrels in small pools globally.

Target: At Least 2 Offshore Field Trials
Delivery: More than 10 Trials have been completed

More than 10 field trials have already been completed between the Asset Integrity and Well Construction Solution Centres. These were focused on non-intrusive vessel inspections, corrosion under insulation, well plugging and abandonment, and more efficient delivery systems for drilling wells.

Target: Digital Technologies exemplar project well advanced
Delivery: Digital Call for Ideas completed and now progressing

The recent Digital Transformation 'Call for Ideas' generated 68 ideas on how to harness the power of big data and machine learning to unlock the remaining potential of the UK North Sea. Around c.£1 million will be invested in a portfolio of projects to assess more than 175,000 items of existing data, provided by the Oil & Gas Authority, Common Data Access and the Norwegian Petroleum Directorate, to identify oil and gas reserves in mature fields.

Centre of Excellence

Target: A Centre of Excellence is in the process of being established
Delivery: Two Centres of Excellence being progressed

Centres of Excellence (CoE) are now in the process of being established with both universities: Decommissioning with the University of Aberdeen and Subsea Engineering with Robert Gordon University. Both COE's will be operational by the end of 2018. Industry led, the Centres will build on the research and development capability of both universities, linking with other UK Innovation centres to tackle industry challenges.

TechX

Target: Technology Accelerator Program established
Delivery: TechX established and first 10 companies start the program in June 2018

We launched TechX – a unique technology accelerator and incubator focused on helping smaller, ambitious technology developers take their solutions into the oil and gas market – faster. Our three tailored programs – Pioneer, Market Entry and Ventures – TechX will accelerate the future of 100 start-ups and 200 SMEs.

With up to £100,000 funding available to Pioneer companies and up to £250,000 funding available for Market Entry participants with no equity or payback required, TechX provides unrivalled access to customers to help companies fast track a route to market. Our strategic partner, BP Ventures,

2018: The Year Ahead

Centres of Excellence

We're partnering with the University of Aberdeen to create a Decommissioning Centre of Excellence and Robert Gordon University to establish a Subsea Engineering Centre of Excellence. Industry led, the Centres will build on the research and development capability of both universities, linking with other UK innovation centres to tackle industry challenges.

Field Trials

Working with technology developers and operating companies to trial new solutions will continue to be priority in 2018. We already have almost 30 field trials planned for the year ahead and we expect to add more to the program. Proving new technologies in an operational environment is critical to their commercialisation and deployment.

TechX Pioneers

Our first TechX Pioneers Program attracted more than 125 applications from 24 countries. 10 technology start-ups have now been selected to take part in the intense 16-week program, which begins in June 2018.

Transformational Technology

Demand is growing for technologies to help transform the oil and gas industry for the low carbon economy. We are working with the industry on a Sector Deal proposal to government for funds to support further investment in this area to allow us to actively position the Oil & Gas industry for the Low Carbon Economy. This is an area of strong interest for the industry.

STEM Program

Encouraging more young people to get involved in science, technology, engineering and mathematics (STEM) is essential to create a culture of innovation in North-East Scotland. We are working with schools, colleges, universities and other partners to develop a STEM program using our Innovation Hub to host events and workshops to inspire the next generation.

Integrate ITF

In February 2018, we confirmed the merger with ITF (Industry Technology Facilitator) to focus and enhance technology and innovation support for the industry. The OGTC will continue to integrate ongoing ITF projects with the solution centre program.

OGTC Funding Position and Governance

Assessment of the benefit received in-kind

The majority of the matched funding the OGTC receives from the industry is in-kind i.e. the industry gets actively involved in the development and deployment of a technology through the provision of people, equipment, data and access to critical infrastructure and facilities to enable technology projects to be executed. The value of in-kind funding is derived from an agreed rate card and the auditable joint venture expenditure approval documentation used in the industry. The rate card has also been verified by the State Aid Team in the Scottish Government. (See Appendix).

If all matched funding was received in cash, the OGTC would not get the full engagement of the industry nor enable the rapid development and deployment of technology that the OGTC has been able to deliver to date.

Governance

The OGTC has a strict governance policy in place, covered by:

- Board Meeting every two months
 - The Board comprises representatives from the industry and academia.
 - The Board is also attended by two observers; one from Scottish Enterprise and one from the Aberdeen City Region Deal Committee. Both observers ensuring that learning can be shared across Scottish Enterprise, the OGTC and the ACRD.
- Audit Committee meeting every three months

Appendix – Rate Card

Type of Cost	Definition	Value Determination
Secondment	Employee is seconded to OGTC with Employer retaining full salary and related burden cost	Remuneration and other benefits paid by the Employer. Will be contracted under a Secondment Agreement between OGTC and Employer
Undergraduate	Person studying towards first degree	£50 per day
MSC Graduate	Person studying towards Masters Level	£100 per day
PHD Graduate	Person studying towards PHD Level	£150 per day
Operator and Tier 1 Project Engineering Support	Participation in delivering a Directed Project	£1,000 per day
SME Project Engineering Support	Delivering a Directed Project	Follows their loaded cost rate
Advisory Services / TechX Mentors / Workshop Panel Participation	OGTC Driven workshops in relation to Solution Centre Projects	£750 per day
Personnel Costs	Researchers, technicians and other supporting staff to the extent employed on the project	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets
Equipment, Instruments, Performing Trials, Access and Testing, Materials and Software	Costs of people, instruments, materials, equipment and access to the extent and for the period used for the project.	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets – also covers access to offshore facilities e.g. rig time
Premises	Office or Lab space provided as part of the project	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets
Technical Manuals	Cost of preparing manuals that would otherwise have to be paid by the OGTC	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets
Training	Training to enable staff to undertake specific tasks on the projects or training to familiarise staff with the technology	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets
Access to patents / know how / consultancy	Costs of contractual research, knowledge and patents bought or licensed from outside sources at arms' length conditions, as well as costs of consultancy and equivalent services used exclusively for the project	AFE Estimate from Industry as prepared in line with Joint Operating Agreements or Operator Budgets

Data Source	Core Value	Manipulation Cost
Seismic / Surveys (IRM's etc)	<p>The data is valued at 20% of the acquisition costs.</p> <p>(Valued at 20% due to lack of market available data also sole sourced. The only alternative would be to reshoot seismic)</p>	<p>Cost required to manipulate/prepare the data for use</p> <p>(Valued at £1,000 per man day - based on adhoc man day rate)</p>
Well Logs	<p>Data valued at 20% of the well logs acquisition costs. Examples would include LWD, MWD, DTS, DAS, Wireline Logs.</p> <p>(Valued at 20% due to lack of market available data also sole sourced. The only alternative would be to rerun well logs)</p>	<p>Cost required to manipulate/prepare the data for use - valued at £1,000 per man day</p> <p>(Valued at £1,000 per man day - based on adhoc man day rate)</p>
Real Time Operational Data	<p>Tag based data sourced from a Historian with a value of £1 per tag per day multiplied by the duration (in days) of the sample.</p> <p>e.g. 1,000 tags at £1 per tag for 365 days would equal an In-Kind contribution of £365,000</p> <p>Please note, the sample rate does not factor in this calculation.</p>	<p>Cost required to manipulate/prepare the data for use - valued at £1,000 per man day</p> <p>(Valued at £1,000 per man day - based on adhoc man day rate)</p>
Operational Drawings E.g. P&ID's	<p>Cost per drawing - £50</p>	<p>Cost required to manipulate/prepare the data for use - valued at £1,000 per man day</p> <p>(Valued at £1,000 per man day - based on adhoc man day rate)</p>
Inspection data (Operations)	<p>Cost of Reinspection in order to obtain the same data set</p> <p>(To follow Operator AFE to perform this reinspection)</p>	<p>Cost required to manipulate/prepare the data for use - valued at £1,000 per man day</p> <p>(Valued at £1,000 per man day - based on adhoc man day rate)</p>

Data Source	Core Value	Manipulation Cost
Master Data E.g. Inventory, Plant maintenance, etc	Cost per report - £1,000	Cost required to manipulate/prepare the data for use - valued at £1,000 per man day (Valued at £1,000 per man day - based on adhoc man day rate)
Daily Reports E.g. Drilling, Production, Logistics, etc	Cost per report - £10	Cost required to manipulate/prepare the data for use - valued at £1,000 per man day (Valued at £1,000 per man day - based on adhoc man day rate)
Personnel Data (Personnel record, Training, Competence etc.)	Cost per report - £150	Cost required to manipulate/prepare the data for use - valued at £1,000 per man day (Valued at £1,000 per man day - based on adhoc man day rate)
HSE Incident Report	Cost per report - £100	Cost required to manipulate/prepare the data for use - valued at £1,000 per man day (Valued at £1,000 per man day - based on adhoc man day rate)

Key Principles

- Data in the Public Domain attracts no value, unless it needs to be manipulated/prepared for use - in which case - valuation method as Manipulation Cost
- Valuation of data is the Core Value plus the Manipulation Cost