

# Circular Economy Business Support

June 2018

**Oilfield Machinery Ltd. (Oil Mac)**

Confidential



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# Inspiring change for Scotland's resource economy

Find out more at [zerowastescotland.org.uk](http://zerowastescotland.org.uk)

## 1 Introduction

Zero Waste Scotland aims to stimulate innovation amongst Scottish businesses to help them adopt more circular business practices, which treat all resources as assets – keeping them in use for as long as possible to extract the maximum value from them.

The oil and gas sector is a large user of materials and a major economic force in Scotland<sup>1</sup>. To date, it has operated largely as a traditional, linear model, but it's a sector which offers significant opportunities to adopt more circular economic practices. In a general context, a circular economy assumes reuse of resources, minimisation of waste and efficient use of assets.

Much of the mature oil and gas producing infrastructure within the UK continental shelf (UKCS) basin is nearing the end of its economic life, many of these assets have been producing oil and gas for over 40 years and due to be decommissioned over the coming decades. Estimates of costs vary but latest figures from Oil & Gas UK forecast £17 billion will be spent on UKCS decommissioning between now and 2025<sup>2</sup>.

At present, the total infrastructure estimated to require decommissioning from the UKCS consists of over 260 installations, 300 production systems, over 3000 pipelines and around 5000 wells<sup>3</sup>. Currently, the majority of the materials and equipment from these platforms is recycled, with very little re-use or remanufacturing<sup>4</sup>. Here lies the opportunity; the potential benefits of adopting circular economy principles within the decommissioning sector are vast, environmental impacts would be reduced, cost savings could be achieved and new market opportunities would be created.

Making available European Regional Development Funds, Zero Waste Scotland (ZWS) is aiming to stimulate new business activity to identify, develop and bring to market new circular economy products and services. The support delivered and presented in this report falls under the energy infrastructure grant call and in particular the priority sector of oil & gas decommissioning.

## 2 Oil Mac

### 2.1 Background

Oilfield Machinery Limited (Oil Mac) is an SME based in the Port of Dundee in Scotland. They specialise in buying, selling and brokering surplus equipment from the oil and gas industry to maximise reuse and recovery value and therefore earning environmental credits for operators and contractors alongside maximising asset value recovery of equipment. Oil Mac was established in 2010 and is a well-established, profitable company with sizeable storage capacity and good links to key clients.

Oil Mac was established to address the following issues in the Oil and Gas (O&G) decommissioning industry:

- A substantial amount of valuable oilfield equipment is currently being destroyed before the end of its useable life. Oil Mac deem this to be unacceptable from an environmental and economic standpoint. There are great potential benefits to be gained from maximising equipment reuse, considering the need for operators to reduce capex and opex costs;

<sup>1</sup> Benton, D 2015 <http://www.green-alliance.org.uk/resources/Circular%20economy%20Scotland.pdf>

<sup>2</sup> Decommissioning Insight Report 2017 <https://oilandgasuk.co.uk/wp-content/uploads/2017/11/Decommissioning-Report-2017-27-Nov-final.pdf>

<sup>3</sup> Royal Academy of Engineering: <https://www.raeng.org.uk/publications/reports/decommissioning-in-the-north-sea>

<sup>4</sup> RSA 2015 <https://www.thersa.org/globalassets/pdfs/reports/rsa-great-recovery---north-sea-oil-and-gas-report.pdf>

- There was no such solution provider in place and proven approach to deal with resale and reuse issues. This is the gap in the market that Oil Mac intended to fill;
- There was little collaboration between buyers and sellers, resulting in different drivers across the market. Therefore, Oil Mac deemed that a tailored solution was required; and
- Oil Mac identified a changing market with increasing appetite for reuse as opposed to recycling (scrapping) and sought to provide a reliable, local, environmentally conscious, hassle-free disposal solution for processing redundant or surplus oil field equipment and machinery.

Oil Mac has the capability to service various types of equipment and aims to maximise the value for buyers and sellers as well as reuse opportunities. They have a broad personal contact list of over 10,000 contacts and utilise a bespoke customer relationship management system that drives targeted marketing. The company is run by engineers who make decisions based on the reusability of equipment rather than scrap value which leads to quick decision making.

## 2.2 Support

### 2.2.1 Initial Support Plan

The original agreed objectives of the project is to support Oil Mac to conduct a market assessment, identify opportunities and form a business model. The circular economy potential is for Oil Mac to profit from a business model that results in increased refurbishment of decommissioned equipment bought onshore from the O&G sector.

Development of Oil Mac's circular economy efforts may lead to synergies and opportunities for a number of businesses in the decommissioning supply chain around Dundee Port, and indeed other businesses currently receiving support under the Zero Waste Scotland Circular Economy Business Support Service.

The business support is needed on the market assessment aspect to define potential new markets for equipment re-use. This includes both the supply of equipment from local decommissioning and mapping of new markets in Scotland and internationally. The second aspect of business support lies in exploring the potential for new ways to encourage re-use, such as new financial tools or recertification of equipment. This involves identification of current barriers and identification of partner(s) for new approaches and business models. Development of a business model up to a proof of concept stage would advance this new business practice.

Three main opportunities were identified for the initial business support scheme:

- Reuse investigation to identify equipment that has opportunity for reuse and is verifiable;
- Engineered solutions to customise the equipment for redeployment for use to fit the buyer's specification; and
- New models of equipment ownership such as rental or leasing that transfers liability from the renter to the rentee.

It was identified that there are stocks of equipment both on and offshore that have great potential for reuse but there were barriers preventing this. The circular economy potential for Oil Mac was therefore identified as follows:

*Extending the operational life of O&G equipment by servicing and reselling equipment to buyers who have a use for it as opposed to scrapping it for parts. As much of the equipment is not near the end of its usable life, it is a waste from an economic and environmental perspective to break it up for scrap when it could be redeployed and provide better value for buyers and sellers.*

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*Provide a straightforward process for buyers and sellers to source and trade equipment they use to maximise reuse opportunities and reduce the manufacture of new equipment.*

### **Support required by Oil Mac**

#### **1. Stakeholder Engagement**

- Speak with operators and suppliers in structured format;
- Identification of barriers and challenges to re-use; and,
- Mapping of processes from decommissioning to equipment re-use for selected equipment.

#### **2. Market Assessment**

- Carry out research to identify the likely candidate equipment for re-use
- Identify the market within the O&G industry itself for reuse of equipment between operators; and
- Identify the potential for redeployment of O&G equipment in other industries unrelated to O&G.

#### **3. Business Model Development**

- Based on outputs of previous tasks, identify one or more novel business models for further development; and,
- Discussion of new business model with stakeholders, industry and other potential partners.

### **2.2.2 Evolution of scope**

The original discussions with stakeholders led to the identification of several barriers that were repeated across interviews held. Some barriers had potential existing solutions that required implementation from operators, for example, better documentation of the equipment during its life to allow for better knowledge of equipment condition when decommissioned and an opportunity to influence supply chain procurement models to incentivise reuse. However, the operator community were not present in the initial engagement sessions and this was noted as a gap in the support package. The idea that operators were a key partner to help overcome barriers inspired a new work stream developed to try and engage operators specifically and understand their attitudes and drivers to re-use.

On May 10, 2018 the business support team met with Oil Mac to provide an update on the research and stakeholder engagement work streams. At this meeting it was agreed that the remaining business support effort should be focussed on the new work stream focussed on operator engagement. This work stream would entail:

- Crafting and distributing a short survey (~10 questions) to predominantly tier 1 operators regarding re-use; and,
- Analysis of what the survey responses mean to the entire decommissioning sector and what opportunities exist for further engagement strategies to promote the circular economy. This would be written in a style to aim to benefit the whole sector, rather than acting solely in the interests of Oil Mac.

In addition, the team would aim to have some exploratory conversations with asset finance providers to gauge support for promoting the circular economy in the sector.

## **2.3 Objectives**

Following the evolution of the scope of the business support identified above, the objectives of the support were:

- Through stakeholder consultation gain an understanding why the process of reselling second hand equipment is not working as well as it could. There are plenty of buyers and sellers and plenty of suitable equipment;
-

- Identify and publish the disconnect between operators and the resale industry in a manner that the industry can adopt;
- Identify opportunities that arise from targeted consultation with tier 1 operators to promote the circular economy further across the oil and gas decommissioning sector.

### 3 Development

#### 3.1 Stakeholder Interviews

To maximise the circular economy potential of surplus O&G equipment, the industry would benefit from engagement with operators and decommissioning contractors to identify how equipment is being processed and how they are achieving their stated reuse and recycling rates, to identify barriers and opportunities. To that end, the following stakeholder discussions were had as part of this business support package

**Table 3.1: List of stakeholder conversations and description (supporting documents are presented in Appendix 4)**

<b>Name/Company</b>	<b>Description</b>	<b>Date</b>	<b>Notes</b>
<b>Scottish Enterprise</b>	Discussion about prior work done to promote re-use industry in Scotland	27/02/2018	See Appendix 4
<b>Decom North Sea</b>	Discussion about role of operators and industry bodies in encouraging re-use	13/03/2018	See Appendix 4
<b>Cron dall</b>	Discussion about umbilical and controls re-use	09/03/2018	See Appendix 4
<b>Scot Valves</b>	Discussion about valve re-use	19/03/2018	See Appendix 4
<b>Decommissioning workshop hosted at Xodus for Louisville Consultancy</b>	Half-day workshop with several attendees from relevant industries. Workshop was focussed on development of supply chain tool for re-use by Louisville consultancy, with many overlapping discussions relevant for this piece of business support.	06/02/2018	See Appendix 4

## 3.2 Market Assessment

### 3.2.1 Current Markets

The key market for decommissioned equipment is driven by scrap but the alternative markets for reuse within the O&G sector and for redeployment in other industries was explored for this report. The information in the tables are referenced and sources are listed. Additional information was also provided from the information received through the survey issued to tier 1 operators (covered in detail in Section 3.3).

**Table 3.2: Markets for equipment re-use**

Market	Detail	Sources
<b>Scrap / Recycling</b>	<p>The primary market for topsides is expected to be yards that specialise in recycling. The OSPAR Commission is the regulator for environmental protection in offshore operations in the North-East Atlantic. OSPAR Decision 98/3 'prohibits dumping and leaving wholly or partly in place, of disused offshore installations within the OSPAR maritime region.'</p> <p>Shell set a recycling target rate of 97% for the topsides on their Brent platforms. AbleUK was awarded the contract for decommissioning the four Brent platforms at facility in Seaton Port on the River Tees in Middlesbrough</p> <p>UK ports are positioning themselves to secure lucrative future decommissioning contracts. Lerwick Harbour in Shetland is one such example of a port undergoing major upgrades. Its geographic position in close proximity to the North Sea oil and gas fields, deep water harbour and large dockside storage area will allow it to handle the largest platform topsides.</p> <p>A joint venture of Veolia and Peterson in July 2017 accepted its first offshore installation to their purpose build decommissioning facility in Great Yarmouth. Over 80,000 tonnes of material was recovered from the Shell Leman BH platform with a target of achieving 97% reuse and recycling<sup>5</sup>.</p> <p>Price per tonne (from Shipbreaking Platform NGO)</p> <p>Europe: \$0/tonne +fees            Turkey: \$190/tonne            China: \$210/tonne            India/Bangladesh/Pakistan: \$280/tonne</p>	<p><a href="#">OSPAR</a></p> <p><a href="#">Shell</a></p> <p><a href="#">Veolia and Peterson</a></p> <p><a href="#">Guardian article with prices</a></p> <p><a href="#">Lerwick Port Authority</a></p> <p><a href="#">Veolia and Peterson</a></p>
<b>Oil and Gas Industry Re-use</b>	<p>There is a market for certain items to be re-used within the oil and gas sector. Reuse within oil and gas is particularly</p>	<p>Oil Mac</p>

<sup>5</sup> Shell indicates 97% reuse and recycling without providing further breakdown between the two activities

	<p>attractive for assets that have been acquired for standby or replacement parts and have remained unused.</p> <p>An important task early on the in the decommissioning process is to conduct a pre-landing audit to build an inventory of components and equipment that can be removed from the platform. The inventory will have detailed information on age and condition of equipment.</p> <p>Consideration at a component level is required as opposed to just considering high-value items such as entire platforms. The operator survey identified equipment that has good reuse potential. This includes pumps, gas turbines, accommodation blocks, umbilicals, flowlines, risers and valves. Comments were made that if equipment is not suitable for redeployment as is, that there is good potential for reuse as spare parts as opposed to scrap.</p>	RSA Report: <a href="#">The Great Recovery</a>
<b>Other Industry Re-use</b>	<p>Although there is an issue with standardised equipment when looking for reuse opportunities within the industry, there is significant scope for redeployment in other industries. For example, tubular steel from jackets has potential for redeployment for uses in construction as piling, scaffolding, pipelines and railway sleepers. On a larger scale, compartmental accommodation blocks have reuse potential as emergency shelter and temporary accommodation at events.</p>	Oil Mac RSA Report: <a href="#">The Great Recovery</a>
<b>Alternative financial approach for valve re-use</b>	<p>Valves could be a good reuse target, there are lots that will be decommissioned and new ones of similar spec and design are still being bought. About 10% to 15% of valves on a typical offshore installation are expensive enough (&gt;£100k) to be attractive as used items, as long as a good price advantage can be had and warranty / traceability is covered.</p>	Scot Gauld at <a href="#">Scot Valves</a>
<b>Incentivising of better umbilical decommissioning</b>	<p>With encouragement, industry might be able to improve. This will need both the owner and contractor to become more focussed on removing with a view to reuse rather than careless removal that causes damage as a consequence of lack of attention i.e. kinking of end by reeling end termination onto a reel too tight.</p> <p><b>Operator Company incentives</b></p> <ul style="list-style-type: none"> <li>• Build an across operator emergency stock pile of pipes for repair etc.</li> <li>• Include clauses in framework contracts that require contractors to stipulate how they intend on achieving recycling rates they state in bids.</li> <li>• CSR brownie points.</li> <li>• Financial payback.</li> </ul>	



	<ul style="list-style-type: none"> <li>• OGA stick.</li> </ul> <p><b>Contractor incentives</b></p> <ul style="list-style-type: none"> <li>• Make it easier. At the moment nobody thinks of reuse so pipelines are treated as scrap even though they have value.</li> <li>• Have reels available to make recovery easier.</li> <li>• Storage facilities available, make it easier / cheaper to recover to quayside. Blythe cranes cheaper than Aberdeen.</li> <li>• Recover from a DP supply boat, makes the boat cheaper and also easier to mobilise as it will be easier to rig up in Dundee, all deck kit modularised and ready to roll.</li> </ul> <p>Showcase positive examples of reuse to industry as a form of best-practice.</p>	
<p><b>Hire / Leasing model</b></p>	<ul style="list-style-type: none"> <li>• If operators aren't willing to buy 2nd hand assets, is there potential to introduce a hire / leasing model for operators?</li> </ul> <p>Consider the following questions:</p> <ul style="list-style-type: none"> <li>• A more positive agenda to re-use is required;</li> <li>• Highlight success stories of leasing examples in order to encourage the industry and ZWS to promote and "credit" the early adopters;</li> <li>• Development of a positive benchmarking approach for operators on re-use. Anonymised benchmarking to avoid companies being unwilling to share data. Positive publicity for operators performing well and supporters could act as a "pull" factor for other operators;</li> <li>• How a long-term hire / leasing model will affect warrant of products and who is liable for repair / maintenance costs;</li> <li>• Who hold the credit risk with equipment (What is covered; What conditions; Ownership; Existing credit capacity or underwrite arrangement.</li> </ul>	

### 3.2.2 Market Challenges

Based on discussions, several general barriers were identified, that apply to different types of equipment. These have been categorised as either supply-side or demand-side barriers, depending

on whether the barrier occurs at either the decommissioning or the re-use phase of the equipment life-cycle.

**Table 3.3: Summary of barriers on the supply-side**

<b>Barrier</b>	<b>Detail</b>	<b>Sources</b>
<b>Inventory and visibility of items</b>	<ul style="list-style-type: none"> <li>• Poor and incomplete inventories of equipment</li> <li>• Dockside storage space</li> <li>• Uncertainties over decommissioning forecasting and when / what equipment will be available</li> </ul>	Louisville Workshop  Scottish Enterprise  Oil Mac meeting (10/05/18)
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>• Operators do not prioritise maintenance near end of life and many assets will fall into disrepair.</li> </ul>	Louisville Workshop
<b>History / condition</b>	<ul style="list-style-type: none"> <li>• When the condition of an asset is in question, reliable documentation about the use and condition (service history) of the asset is hard to come by (particularly for older items).</li> <li>• Ageing equipment is reaching the end of its design life or is past it. Refurbishment is expensive and operators favour new equipment over expensive refurbishment.</li> <li>• One of the key themes from the operator survey indicated that incomplete audit trails of equipment was a key barrier to purchasing reused equipment.</li> <li>• Expired warranties on equipment lessen operator confidence.</li> </ul>	Louisville Workshop  Scottish Enterprise
<b>Recovery methodology (subsea)</b>	<ul style="list-style-type: none"> <li>• The technology to recover the largest platforms and subsea equipment does not currently exist to allow it to take place within acceptable levels of safety and technical risk.</li> </ul>	Louisville Workshop
<b>Liability</b>	<ul style="list-style-type: none"> <li>• Owners have a 'duty of care' and are at risk of being implicated if re-used assets cause damage or harm. Therefore, owners prefer not to send items for re-use.</li> <li>• "A further suggestion was that a well written contract between the operator and its contractor will ensure liability lies where both parties have agreed" (Scottish Enterprise).</li> </ul>	Louisville Workshop  Scottish Enterprise
<b>Operator Mentality</b>	<ul style="list-style-type: none"> <li>• Operators tend not to be concerned about re-use or the residual value of assets. Particularly when profits of re-use are not seen by them. Operators favour field optimisation as opposed to decommissioning through new well drilling, well works and third party collaboration.</li> </ul>	Scottish Enterprise

	<ul style="list-style-type: none"> <li>Cessation of production is very costly to reverse so operators work to ensure that all recoverable oil and gas is extracted.</li> </ul>	
<b>Timescales, storage and related cost</b>	<ul style="list-style-type: none"> <li>Once items come on-shore they must be dealt with very quickly, and often it is not feasible to line up sale of items in advance (see issues with inventory). In order to allow time to find a buyer the items must be stored somewhere, and this is costly. Removal of platforms depends on availability of specialist lift vessels and decommissioning crews.</li> </ul>	Scottish Enterprise

**Table 3.4: Summary of barriers on the demand-side**

<b>Barrier</b>	<b>Detail</b>	<b>Sources</b>
<b>Timing of asset delivery</b>	<ul style="list-style-type: none"> <li>Unclear decommissioning schedules create uncertainty over availability of equipment at specific time points.</li> </ul>	Louisville Workshop
<b>Liability / Reputation</b>	<ul style="list-style-type: none"> <li>Liability issues for re-use in the event that something fails, the cost and reputational risk is extremely high. There needs to be a clear ownership of liability and whether this falls with the broker or the buyer.</li> </ul>	Louisville Workshop Scottish Enterprise
<b>Price-Insensitivity</b>	<ul style="list-style-type: none"> <li>Operators are working on projects with extremely high capital and operating costs, such that a minor saving for re-use of equipment is not a large incentive.</li> </ul>	Louisville Workshop
<b>Recertification</b>	<ul style="list-style-type: none"> <li>Recertification is viewed as complex and too much hassle.</li> <li>One of the key themes from the operator survey indicated that incomplete audit trails of equipment was a key barrier to purchasing reused equipment</li> </ul>	Louisville Workshop Scottish Enterprise
<b>Contamination / Condition</b>	<ul style="list-style-type: none"> <li>Contamination from certain materials (hydrocarbons, chemicals) might make re-use with a different material unviable.</li> <li>Equipment has been exposed to harsh maritime environments for many decades in most cases and will require rigorous inspection and repair.</li> </ul>	Louisville Workshop
<b>Obsolescence</b>	<ul style="list-style-type: none"> <li>Operator Equipment Manufacturers (OEMs) main objective is to produce new equipment and not spare parts.</li> </ul>	Scottish Enterprise

<b>Operator Mentality</b>	<ul style="list-style-type: none"> <li>New equipment is generally seen as less complex and less costly than refurbished.</li> </ul>	Scottish Enterprise
<b>Bespoke demand</b>	<ul style="list-style-type: none"> <li>Particularly in the UK, operators and engineers define design criteria that require bespoke equipment so there is not a large amount of standardised equipment unlike in other industries such as aerospace.</li> </ul>	Scottish Enterprise
<b>Operator uncertainty</b>	<ul style="list-style-type: none"> <li>Operators are claiming that they are behind re-use in the industry but are rarely following through with this by actually procuring second hand assets. The mismatch is likely due to buying managers at the operators. Delays and uncertainty regarding medium / long term demand makes it difficult for suppliers to know what equipment to stock as priorities change.</li> </ul>	Oil Mac meeting (10/05/18)

### 3.2.3 Equipment specific worked examples

The number and variety of equipment being decommissioned does not allow for this report to go into detail about all possible equipment re-use opportunities. For the purpose of opportunity development, we have narrowed the search field to investigate barriers and opportunities for a subset of five equipment types, which were decided through discussions between the business support team, Oil Mac, and stakeholders. These are:

- Turbines;
- Valves;
- Production trees;
- Controls and control umbilicals, flowlines, and risers;
- Production equipment in its totality, pressure vessels, separators and everything else associated.

**Table 3.5: Re-use opportunities related to subset equipment types**

<b>Equipment</b>	<b>Detail</b>	<b>(Potential) Sources</b>
<b>Valves</b>	<ul style="list-style-type: none"> <li>After acquiring valves, it is possible to repair valves in a machine shop, can make new bits and pieces, refurbish and fix valves. However, business model is to repair rather than keep refurbished valves in stock for resale.</li> <li>Re-use of valves would require paperwork that demonstrates complete traceability to original forging and all maintenance. The people who re certify kit (DNV, Lloyds) will not do so for a valve without the original certification. The issue is mainly to do with the forging, the integrity of the pressure retaining lump of metal at the heart of the valve is the key item.</li> </ul>	Scot Gauld at <a href="#">Scot Valves</a>

<p><b>Controls and Control Umbilicals;</b></p> <p><b>Flowlines, risers</b></p>	<p><b>Market</b></p> <ul style="list-style-type: none"> <li>• Umbilicals could be useful if long enough (expensive). Controls are less likely to be attractive as they are not high cost and usually very bespoke equipment.</li> <li>• There is a market for used and unused but surplus flowlines, risers and umbilicals. Dynamic risers are the easiest to sell / most sought after, they are useful for early production systems, producing oil early to check reservoir characteristics etc. When reused they are cheaper, available 'off the shelf' so overcomes lead time, and can be used as insurance spares for emergency situations.</li> </ul> <p><b>Acquisition</b></p> <ul style="list-style-type: none"> <li>• Getting hold of inventory information is difficult, what will be made available and when? Once established, equipment resellers like Reflex Subsea receives occasional calls from pipe sellers.</li> </ul> <p><b>Storage</b></p> <ul style="list-style-type: none"> <li>• It is possible to speculatively buy pipe for future re-sale. Storage options on reels at Dundee, plus the same but on a carousel or potentially wet storage i.e. plugged at either end and laid on seabed for storage until needed (fishermen issues!). Already happens in Brazil</li> </ul> <p><b>Sale</b></p> <ul style="list-style-type: none"> <li>• Reflex Subsea are not big enough to offer a warranty but will do any test the client wants to close the deal.</li> </ul>	<p>Stephen Booth at <a href="#">Cron dall</a></p> <p>Alistair Neiuwenhuyse at <a href="#">Reflex Subsea</a></p>
<p><b>Production equipment in its totality, pressure vessels, separators and everything else associated</b></p>	<ul style="list-style-type: none"> <li>• The USA better at reuse of pressure vessels e.g. separators, than in the UK because the US Government retains certification information.</li> </ul>	<p>Alistair Neiuwenhuyse at <a href="#">Reflex Subsea</a></p>

Based on the above re-use opportunities, further barriers to these opportunities were identified through stakeholder engagement.

**Table 3.6: Barriers to re-use related to subset equipment**

<b>Opportunity/ Solution</b>	<b>Detail</b>	<b>(Potential) Sources</b>
<b>Valve repair</b>	Lack of traceability paperwork is the main issue / barrier.	Scot Gauld at <a href="#">Scot Valves</a>
<b>Umbilical re-use</b>	<p>Older umbilicals not so good as the IR (resistance to electric flow) builds over time and makes them not a viable option if electrical power needed which it always will be.</p> <p>Big companies (he mentioned Enquest in particular) are risk averse and will only consider new product.</p> <p>Pipelines are well documented in service so not the same issues of lack of paperwork as with valves. But once handed over to the EPIC decom contractor this paperwork chain is lost and then the pipeline gets treated badly during recovery and can become useless for reuse as a consequence, well maintained and documented for years then trashed at the final point because of lack of attention by decom contractor and lack of interest by owner.</p> <p>Summary:</p> <ul style="list-style-type: none"> <li>• Visibility of availability, access to data.</li> <li>• “WIFM” (What’s In It For Me?)</li> <li>• Damage to product by recovery contractor</li> <li>• Storage options</li> <li>• Reluctance to buy due to warranty</li> <li>• Recertification</li> <li>• End terminations</li> <li>• Cost of careful recovery</li> </ul>	<p>Stephen Booth at <a href="#">Crandall</a></p> <p>Alistair Neiuwenhuyse at <a href="#">Reflex Subsea</a></p>

### 3.2.4 OilMac Specific Takeaways

OilMac have experience dealing with trading the equipment listed in Tables 3.5 and 3.6 and the capabilities they have in terms of internal / external storage, heavy lift capacity and fabrication / maintenance partners positions them for dealing with these equipment types. OilMac have invested heavily in their inventory management tool and customer relationship management systems to ensure potential buyers are aware of what stock they have available. The main barrier is limited or no control over sourcing appropriate paperwork for subset equipment which can prevent OilMac secure recertification without original documentation.

### 3.3 Industry Consultation (Operator Survey)

As the business support progressed and the scope evolved through consultation with Oil Mac, there was a need identified to carry out focussed research into operator perceptions regarding barriers and enablers to greater reuse. It was decided that the most effective way to gather this information was through a short and targeted survey. The survey was distributed to decommissioning managers or specialists at 26 tier one operators. The operators were informed that the results of the survey would be published anonymously and respondents were given the opportunity to identify which company they were representing if they wished to do so.

The objective of the survey was to gather qualitative and quantitative data from decision-makers at tier 1 operators on their organisation's reuse practices and identify what was preventing circular economy advances in the oil and gas decommissioning industry. Another aim of the survey was to identify how engaged operators are in discussing and considering reuse in their decommissioning plans.

Of the 26 operators the survey was distributed to, over a 2-week period, five responses were received amounting to a response rate of 19%. While [available research](#) suggests that external survey results are typically in the range of 10-15% (although this can fluctuate significantly depending on the audience), by comparison our response rate is slightly above that range and could be considered positive. However, given the existing client/network relationship of individuals approached, we can consider this a disappointing response rate.

The survey questions and detailed responses are included in Appendices 1 and 2. Section 3.3.1 below summarises the key findings and analysis of the responses.

#### 3.3.1 Analysis

##### **Certification, Age and Obsolescence**

A common theme throughout the survey that was highlighted as a barrier to reuse was lack of paperwork and uncertainty over the asset's history. As shown on Figure 3.1, all five respondents assigned high importance to concern and risk (including asset liability) as a main barrier to reuse. All five also assigned high importance to difficulty in accessing original maintenance and usage paperwork history. Many components have potential for redeployment but due to the critical need for reliable equipment to prevent incidents on platforms, operators will not acquire stock that they do not have absolute faith in. The potential environmental and reputational damage that could stem from component failure is too great for operators to take risks. If there is uncertainty over future performance, the operator would be unlikely to purchase an item no matter how big the environmental or economic benefits are.

A potential solution to address operator uncertainty would be to establish a testing and certification process for recovered equipment. DNV GL is a global quality assurance and risk management consultancy who have identified the need for greater digitisation to address technical, organisational and cultural barriers across the supply chain and in data management. DNV GL offer independent certification and verification of equipment in line with international codes and standards to provide clear records which can be stored securely in their data libraries and be accessible upon request.<sup>6</sup> Having correct certification would then enable the asset broker to provide warranties which would give buyers confidence in the component. If the equipment was being deployed to an industry out with O&G in a less mission-critical role, testing and certification criteria could be suited for the buyer's requirements.

As much of the equipment has been in operation for many years, the certification and usage records will most likely be in paper form, making the sourcing of this paperwork to examine difficult. A solution to this could be to make it a legislative requirement for all such records to be stored digitally in a centralised database that is accessible at the point of need. This process is carried out in the USA and has increased audit trail visibility substantially.

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<sup>6</sup> <https://www.dnvgl.com/services/certification-and-verification-of-products-a-my-dnv-gl-service-85526>

One response said: 'Operators are generally prepared to support the reuse initiative, but most would not see development of this expertise internally as viable.' Therefore, if operators lack the capacity to develop this in house, this is where SMEs such as Oil Mac can fill that role, provided assurances are made that operators will actually purchase the equipment.

### **Equipment Visibility, Condition and Redeployment**

The survey results indicate that operators approach decommissioning at a system level, i.e. they consider large assets (whole platforms, production systems) as opposed to smaller individual pieces of equipment. One respondent answered 'Environmental benefits are clear, but the reality is that a good few assets that are currently being decommissioned are past their design life.' This may be the case for large assets; however, at the component level there are re-use opportunities that aren't being realised. The fact that operators aren't 'thinking small' enough about decommissioning limits the visibility of potential re-use markets.

Operators demand specific design requirements for components, creating bespoke demand. This results in low levels of component standardisation across the industry and makes it difficult for equipment to be transferred between operators. Retrofitting equipment to meet bespoke demand can therefore prove costly and operators would rather purchase new equipment to avoid unnecessary burden. There are however a number of standardised assets that have good reuse potential. Tubular steel from jackets, deck steel, pipelines and valves were identified as having great potential for reuse.

Due to the nature of the environment that platforms operate in, much of the material landed will have been at the mercy of the challenging maritime conditions, being exposed to salt water, wind, waves and hydrocarbons from the oil extraction process<sup>4</sup>. Under both pathways of reuse and recycling, equipment will require decontamination and refurbishment, which as highlighted earlier, operators are not willing to do internally. The broker selling the equipment would need to develop this capability to make equipment usable. Refurbishment costs will determine the viability for resale but this process involves cost uncertainty and additional risks for brokers procuring second hand assets for resale.

### **Discord Between Operator Intentions and Actions**

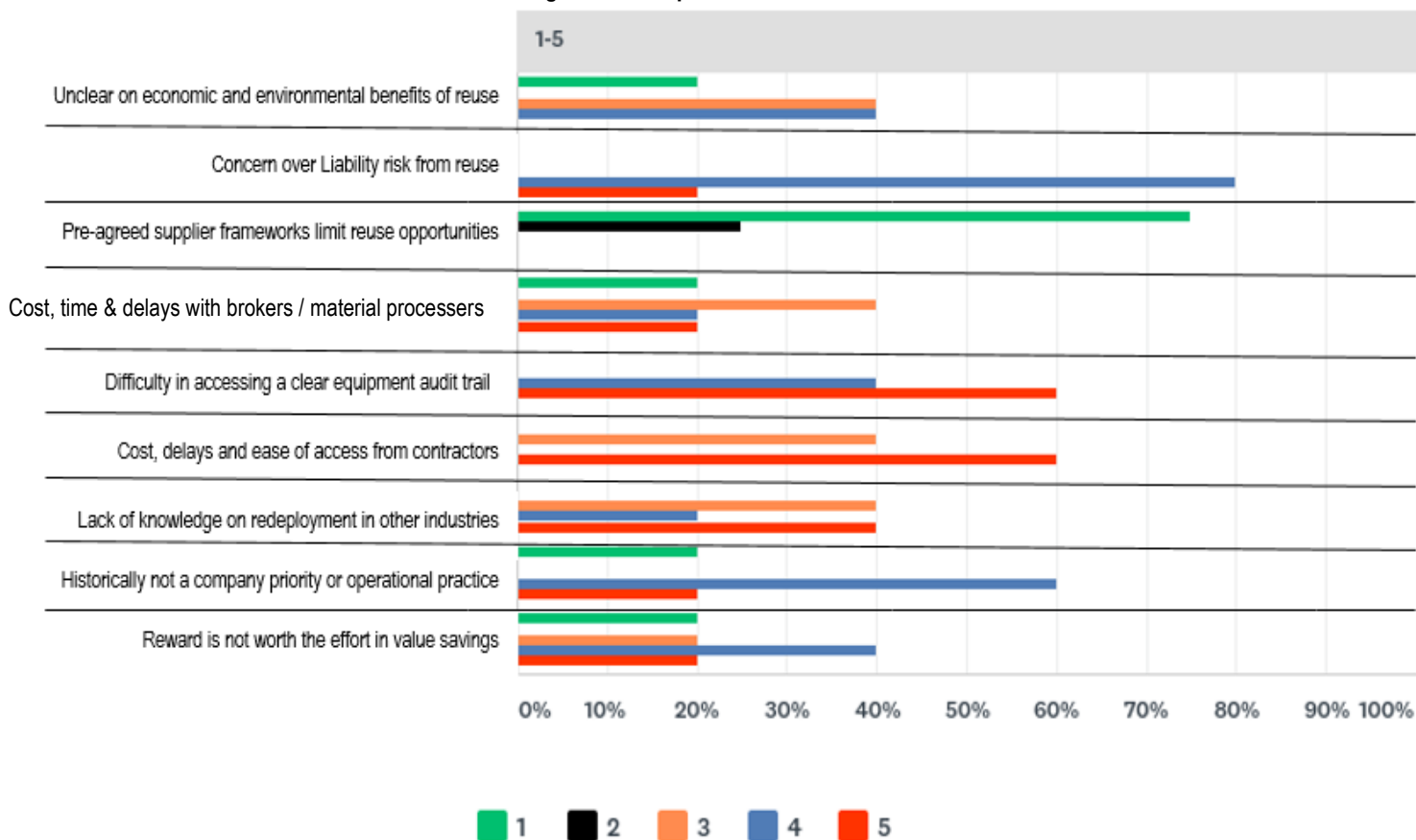
There would appear to be a disconnect between operator intentions and actions, as highlighted by Oil Mac from the outset. While there is positive dialogue from operators on actively promoting reuse, this is not translating into practice when it comes to procurement teams acquiring new equipment. There is no evidence of co-operation between the procurement and decommissioning teams in terms of identifying market opportunities.

Q2 asked 'Do you actively look for reuse opportunities as part of your decommissioning plans?' all five respondents answered 'yes' to this and 4/5 answered 'yes' to the Q3; 'Do you encourage / incentivise your decommissioning contractors to think about reuse opportunities. However, in Q10 as shown in Figure 3.1, 4/5 respondents assigned high significance when asked if 'historically, reuse is not a company priority or operational practice' is a barrier. This contradiction in answer responses is shown in Figures 3.2 and 3.3. Clearly in order to drive the circular economy throughout the sector, a cultural shift is required.

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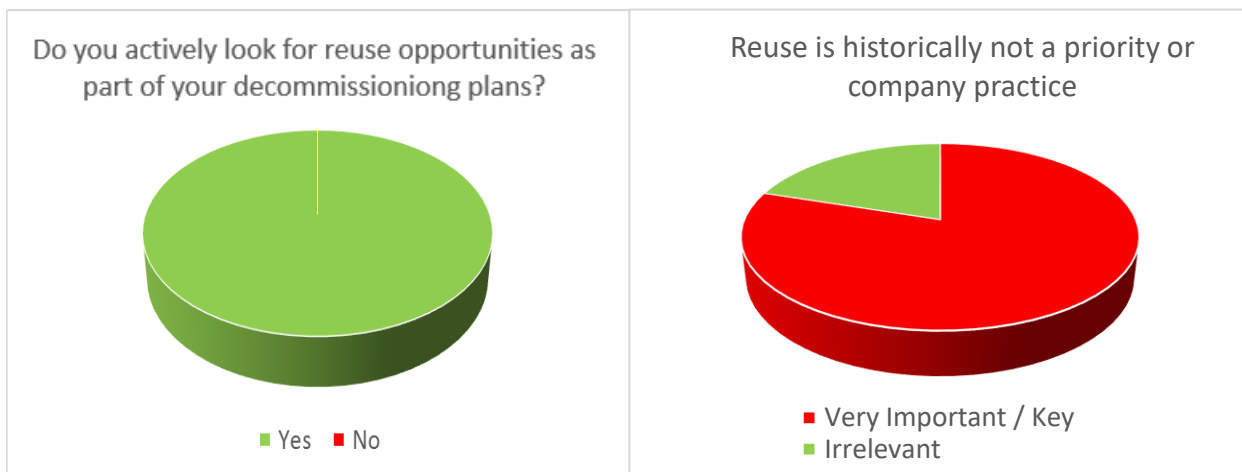


Figure 3.1: Respondents' answers to Question 10



An emerging message is that operators see decommissioning as largely the contractor’s responsibility and while one operator mentioned that ‘disposal contractor acceptability criteria includes waste/re-use pyramid considerations’ it clearly isn’t a high priority. One of the operators made the following statement several times in the survey responses; ‘The onshore waste management contractor is best placed to identify external re-use opportunities’. Further, three of the five operators indicated that they would *not* consider sharing contractor data about re-used equipment despite the fact that 4/5 said that contractors provide data / outputs on re-used or repurposed equipment back to the operators. This apparent unwillingness on the part of the operators is contradictory to the high recycling rates published by the industry.

Figures 3.2 and 3.3: Visual Representation of answers from Q.2 and Q. 10



### Market Uncertainty and Incentivisation

A respondent noted that whilst there are valuable items offshore with good reuse potential, their relative value to the whole decommissioning programme is low. 'The reward is not worth the effort due to the limited relative value saving' was rated as a significant barrier by three of the five respondents. Four of the five respondents also indicated that they were unclear on the economic/environmental benefits of re-use (see Figure 3.1). This is compounded by the fact that operators believe that by achieving good recycling rates (one responded noted 0% material sent to landfill) the recovery value is already being realised in the form of scrap material. However, it was noted by one respondent that 'the cumulative effect of re-use could save Operators money'. It is this observation that we must focus on as this is where the opportunity lies to further the circular economy in this sector.

This represents a significant opportunity to engage the sector in order to communicate the benefits. A focussed communication and awareness raising campaign could see multiple influential sector bodies coming together as a driving force for change. Key organisations to involve would typically involve:

- The Oil & Gas Technology Centre (OGTC) – representatives from the Small Pools, Decommissioning, and Digital Solution Centres;
- Oil & Gas UK (OGUK);
- Oil & Gas Authority (OGA);
- Decom North Sea (DNS);
- Department for Business, Energy & Industrial Strategy (BEIS) as the offshore regulator; and
- Scottish Environment Protection Agency (SEPA) as the onshore regulator responsible for developing Sector Plan for oil and gas decommissioning.

In order to encourage operators to capitalise on the financial benefits of re-use, ZWS could provide operators with information on profit sharing models and case studies of how such models have been implemented between operators and contractors perhaps by hosting a 'best practice' session.

It was apparent from responses that operators do not see pre-agreed supplier procurement frameworks with re-use limiting rules in place as a barrier. This presents a key opportunity to incentivise re-use at the procurement stage by making any potential savings and profits clear. If indeed the 'block' in the supply chain for re-use lies with the Tier 2 contractor or further down the supply chain, this could be used as leverage to require the Tier 1 operators to include incentivised re-use terms in the supplier frameworks. This would require the cooperation of procurement managers at the operating companies but with minimal additional work. Such a requirement would encourage contractors to seek a competitive advantage by successfully demonstrating re-use opportunities, placing them in a favourable position to secure long-term contracts. When issuing tenders to contractors, operators could also benefit from including a clause requiring contractors to consider how SMEs could be consulted further down the supply chain.

## 3.4 Leasing & Financing

As part of our wider company engagement support we followed this up with a "shallow-dive" survey with a small number [4] of specialised asset funders and providers known to have an interest or, offering in finance products to the O &G industry.

The key discussion themes included the following;

- Indicative level of interest in funding in CE scenarios in O&G decom;
  - Options that might be available for companies with a re-use offering in CE
  - Broad indication of the key / important criteria considerations (within commercially sensitive parameters)
-

The results are not in any way intended to provide or represent a depth analysis of finance options that may be available for the O&G CE opportunity but simply represent an initial temperature test around interest and applicability together with a broad sense for the key lender considerations for SME's considering this route as part of their business model for developing a CE offering.

### 3.4.1 Approach

All those surveyed indicated that they would be very welcoming of an opportunity to look at and consider financing options for any of the ZWS / Jacobs supported projects including the potential for using alternative financial instruments (products) to help. Contact details of each of the interviewees are provided at the end of this short paper/section.

Suppliers consulted included:

- Lombard Asset Finance (Part of RBS Group)
- Breadalbane Asset Finance (Asset Finance & Specialist Business Finance Brokers – Scotland)
- Bank of Scotland Asset Finance
- Rangewell Ltd (Asset Finance and Specialist Business Finance Brokers - London)
- BNP Paribas – did not respond.

Telephone conversation based around a simple interview guide sheet for qualitative feedback over the period 7 June – 28 June 2018.

Appendix 2 contains the interview guide sheet used, contact details of those consulted and detailed feedback from interviews held.

### 3.4.2 Key Points

In short, the message was consistent; virtually any asset or equipment (new or second hand) can be funded providing it has a re-sale value and that it has the potential to generate income through its lifetime.

Other considerations will include the financial standing of the applicant business however, the requirements for securing this type of support does not appear to be as onerous on the applicant business than say more traditional finance i.e. bank overdraft or business loan.

Perhaps not surprisingly and in addition to what are relatively “low bar” probity conditions, there will be some onus on the applicant to show projected cash flow and market demand.

Some subtle differences in the responses received from brokers verses mainstream funders were evident with each seeming to have slightly different advantages / disadvantages over the other. Brokers appear to have more flexibility on how an offer might be packaged though it seems logical to assume that the cost (their commission) will add to the price. Mainstream lenders would appear to be more competitively priced but appetite to risk will typically be lower.

Ultimately as with all lending considerations, the price paid (Interest/ fees) will be directly influenced by the overall risk to the underwriter of things not going to plan.

All the suppliers of asset finance we spoke too were very open and happy to look at all opportunities on a case by case basis.

Mainstream lenders are less favourable to fund scenarios where assets/equipment is destined outside of the UK (in one case not willing to fund outside the EU). The brokers spoken too were more relaxed that using their panel funder approach should allow this barrier to be navigated. One mainstream lender was keen to highlight that being part of a banking group means that in these instances they often work in tandem with the commercial bank part of their business to find other ways to finance the transaction.

The mainstream lenders appear for this scenario to be more focused on Hire Purchase type arrangements as opposed to leasing type deals.

For leasing deals the brokers on the face of it, appear to have more appetite however, this was also qualified in terms of asset re-saleability and the fact that based on the information we provided, they would still in the first instance have one of their specialist valuers assess any asset particularly for re-sale – ability at the end of the agreed period.

## 4 Conclusions and Recommendations

### 4.1 Recommendations for next steps

Based on the discussion and analysis presented above, the following represent recommendations for next steps that can be taken by Oil Mac specifically and/or the sector and Zero Waste Scotland to build on the business support covered in this report.

#### Oil Mac Recommendations

1. Follow up with all operators invited to comment on the survey to investigate the low rate of engagement;
2. Recommend that OilMac engage with DNV GL to determine how their services could aid their operations in terms of equipment certification and compliance. This could aid equipment record visibility and decrease uncertainty over future demand to enable strategic stocking of equipment; and
3. Approach Xodus to request facilitating introductions between operators and the re-use/re-sale market. For example, one operator specifically mentioned reuse of gas turbines, this is an equipment type that Oil Mac specialise in.

#### Industry Recommendations

4. Follow up with those companies who responded to discuss their responses – focussing on the challenges around driving a culture change and taking a more active lead on circular economy in the sector;
  5. Real focus and consideration should be given by Zero Waste Scotland and Oil Mac towards delivering a targeted sector wide engagement campaign on raising awareness of the environmental and economic benefits that the circular economy can bring. This must be a ‘top down’ sector wide approach by committee, involving representatives from key industry bodies;
  6. Focussed discussion with Repsol Sinopec/Veolia to discuss replication of profit share/incentivised decommissioning contractual model;
  7. Consider hosting/facilitating an industry ‘best practice’ session presenting positive case stories;
  8. Engage with sector bodies Oil & Gas UK and Oil & Gas Authority and selected operators in a ‘Focus Group’ setting to explore mechanisms for operators to influence procurement methods further down the decommissioning supply chains including Tier 2/3 contractors and SMEs;
  9. Engage the Digital Transformation solution centre at the Oil & Gas Technology Centre to explore the viability of a digital solution to keep clear and accurate audit trails for equipment to increase visibility and reduce uncertainty about equipment reliability and condition;
  10. Explore the viability of introducing specialised hire / leasing companies to the facilitate equipment reuse and encourage discussion between operators and SMEs specialising in equipment reuse; and
  11. Lending criteria for asset/equipment reuse financial transactions does not appear to be quite so onerous as is the case with more traditional main stream finance. This suggests that further conversations with the finance sector may be worthwhile to explore if indeed the financing of such assets is a potential barrier to increasing the volume of O&G decommissioning CE activity.
-

## 4.2 Conclusions

As recoverable oil and gas reserves are depleted, there is going to be a significant amount of decommissioning in the North Sea and globally in the coming decades. The UKCS alone contains 283 oil and gas platforms that will require decommissioning in the future. There will be a significant amount of infrastructure being landed onshore and choosing the most appropriate method of processing the material from an economic and environmental perspective will be crucial.

It is clear from existing reports and the findings from this report that operators speak positively with regard to equipment reuse but are not following this through with action and there is also a lack of engagement in giving the issue adequate consideration. These issues are making it very difficult for Oil Mac and similar SMEs to increase the circular economy potential of O&G equipment decommissioning in a financially viable manner.

Our conversations with a small sample of asset finance suppliers does suggest little exposure / case study examples in the CE sphere we are considering however, our conversations do demonstrate clear appetite as it relates to the opportunity to provide a quote or, in some cases, work with the small business to finance such transactions.

## 5 References

Benton, D 2015 <http://www.green-alliance.org.uk/resources/Circular%20economy%20Scotland.pdf>

Decommissioning Insight Report 2017 <https://oilandgasuk.co.uk/wp-content/uploads/2017/11/Decommissioning-Report-2017-27-Nov-final.pdf>

DNV GL, 2018 <https://www.dnvgl.com/services/certification-and-verification-of-subsea-equipment--3503>

Royal Academy of Engineering: <https://www.raeng.org.uk/publications/reports/decommissioning-in-the-north-sea>

RSA 2015 <https://www.thersa.org/globalassets/pdfs/reports/rsa-great-recovery---north-sea-oil-and-gas-report.pdf>

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## 6 Appendix 1: Survey Questions and Answers

### Q1 – Company Name (optional)

60% of respondents opted to provide their company name however for the purposes of this report shall remain anonymous.

### Q2 – Do you actively look for re-use opportunities as part of your decommissioning plans?

100% of respondents answered 'Yes' to this question, suggesting that operators are aware of the need to seek out opportunities for re-use, and crucially, are *actively* doing so.

### Q3 – Do you encourage / incentivise your decommissioning contractors to think about re-use opportunities?

80% of the operators responded 'Yes' to this question; however, some of comments indicate a willingness or intent as opposed to a demonstrable track record. For example, qualifying statements such as "sometimes...incentives may be built into the contract"; and "we do intend to do so when we can" were provided.

### Q4 – Within your existing decommissioning re-use plans, do your contractors provide any data / output on equipment re-used or re-purposed?

60% answered 'Yes' with one of the 'No' respondents indicating that "it is too soon to say as the company has not (yet) removed any assets suitable for redeployment or reuse". This indicates that contractors are participating in the re-sale market and that there is some form of communication / paper trail between operators and contractors at the decommissioning stage.

### Q5 – If you answered yes to Q4, would you consider sharing this for wider industry study sharing?

40% answered 'Yes' to this question. This could indicate a lack of engagement with other operators and the sector more broadly; however, it could also be explained by the lack of data / case studies available for sharing. This could also simply be down to reasons of confidentiality.

### Q6 – Are all your current decommissioning plans executed under pre-arranged procurement frameworks?

Only one of the five (20%) answered 'yes' to this question. This should be seen as a very positive finding, as it suggests that long-standing historic frameworks are not a barrier to implementing new approaches when appointing decommissioning contractors.

While operators themselves will likely not have control over where and how decommissioned equipment is reused, repurposed they are in a position to influence procurement models adopted by their own supply chain. We are aware of one example of incentivised procurement (profit share) in operation.

### Q7 – Can you list your primary and most relevant decommissioning contractors?

60% responded 'No'. This could be because the operators are not currently involved in any decommissioning work and/or an unwillingness to divulge this information for reasons of confidentiality. Of the responses provided, the extent of the supply chain varied greatly, ranging from a single supplier to five separate contractors. This indicates that Tier 1 operators are using a set pool of contractors.

### Q8 – Is there any particular equipment, or class of equipment that you are aware of that is being regularly re-used or repurposed? Please provide justification.

80% responded 'No' to this question, indicating either that the practice is not widespread and/or that operators are not interested in what happens to their assets once they have passed them to contractors.

One of the operators answered 'Gas Turbines' but did not provide further detail.

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**Q9 – Is there any particular equipment, or class of equipment that you are aware of that could perhaps be considered for re-use but currently is not? Please provide justification.**

80% responded 'No' to this question. One of the operators suggested 'platform considered jackets' as a potential opportunity but did not provide further detail.

**Q10 – Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the least and 5 being the most important.**

Figure 3.1 shows the operators' responses. Looking generally at the ratings, the lowest combined score (average 1.25) was assigned to 'pre-agreed supplier procurement framework rules limit re-use scope' illustrating that none of the operators view procurement as a major barrier. The highest score (average 4.6) was given to 'difficulty in accessing original equipment / maintenance and use paperwork history'. Other barriers which received high scores are:

- Concern and risk – including potential later liability issues from re-use (average score 4.2)
- Cost & time required to find viable buyers / brokers of equipment for re-use (average score 4.2)
- Lack of information about equipment and possible redeployment in other industries out with O&G (average score 4.0)

Interestingly, for the barrier 'The reward is not worth the effort in the grand scheme of things due to the limited relative value saving' one of the operators rated this a 5, while another rated it a 1, indicating that attitudes to re-use vary considerably across the sector.

One of the operators provided the following comment in relation to Q10:

"There are valuable equipment items offshore that can be re-used/sold, and whilst the cost benefit is minor compared to the wider decommissioning removal costs, the cumulative effect on re-use could save Operators and the tax [payer] money. However, I am not sure how the cost would compare for raw materials from equipment, being broken down for re-use compared to re-use (sale) cost. There are huge markets out with the UK that specialise in this type of re-use for Oil and Gas and other markets, and obtaining some data / metrics on re-sale / re-use vs recycling raw materials would be beneficial."

**Q11 – What is the single biggest factor that prevents you from procuring used equipment or surplus stock?**

The responses varied considerably as follows:

- "My understanding is that the company would pursue this option providing the equipment was available and the necessary documentation was in place, but I have not discussed this in detail with the procurement dept.";
- "certification, age, obsolescence";
- "unaware of what is available"; and
- "this question would need to be posed to the procurement team (not decommissioning)";
- "culture or company practice".

A common theme is that operators have not adopted this approach to procurement as it is not their company practice to do so, indicating a degree of momentum that would need to be overcome in order to incite real change. There is also a pattern of disconnect between the procurement and decommissioning teams / departments within the operating companies.

**Q12 – We believe flowlines, umbilicals, risers and valves demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment? Based on your knowledge and experience, can you suggest any other types of equipment that could be re-used in other sectors?**

100% responded 'No' to this question. Additional comments / suggests were made as follows:

- “It really depends on the age of the equipment, as a long-shot possibly pumps, compressors but primarily these would need to be passed back to the original vendor for refurbishment before any resale opportunities could arise. Reliability and associated liability issues would be the primary concern.”;
- “Diesel generators, gas turbines, accommodation blocks”; and
- “prime movers, pumps, parts for obsolete equipment”.

**Q13 – Do you have any other observations, suggestions or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning?**

Two additional comments were made as follows:

- “Need to make re-use and recycling more attractive options. We as a country need to invest. Need to then engage with disposal yards/contractors, to make them aware of what is available. Operators will ultimately look to them as the experts.”; and
- “Please note the substantial issues with intervening in offshore plant for identification and removal of low to medium value components. Aside from a few high value exceptions, such interventions should be made at the disposal yard by the waste management contractor after recovery of the asset to the shore.”

These comments emphasise themes that are present throughout the responses that operators largely see re-use and re-sale as a contractor issue, and that operators do not consider the benefits to justify the cost / effort involved.

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## 7 Appendix 2: Individual Survey Responses

### Oil & Gas Decommissioning & The Circular Economy

# #1

**COMPLETE**

Collector: Web Link 1 (Web Link)  
 Started: Wednesday, May 30, 2018 4:20:59 PM  
 Last Modified: Wednesday, May 30, 2018 4:41:42 PM  
 Time Spent: 00:20:42

Page 1: Oil & Gas Decommissioning & The Circular Economy

Q1 Company Name (Optional) Respondent skipped this question

Q2 Do you actively look for re-use opportunities as part Yes  
 of your decommissioning plans?

Q3 Do you encourage / incentivise your  
 decommissioning contractors to think about re-  
 use opportunities?

Yes,  
 If so, how?:  
 Sometimes. It depends on the Asset. Incentives may be  
 built into the contract. Reference Q4 it is too soon to say as  
 the company has not (yet) removed any assets suitable for  
 redeployment or reuse elsewhere, apart from wellheads.  
 Hence answers to Q4 and Q5 are No.

Q4 Within your existing decommissioning re-use plans, No  
 do your contractors provide any data / output on  
 equipment re-used or re-purposed?

Q5 If you answered yes to Q4, would you consider No  
 sharing this for wider industry case study sharing?

Q6 Are all your current decommissioning plans No  
 executed under pre-agreed procurement frameworks?

Q7 Can you list your primary and most relevant decommissioning contractors?

No.

Q8 Is there any particular equipment, or class of equipment that you are aware of that is being regularly re-  
 used or re-purposed? Please provide justification.

No.

Q9 Is there any particular equipment, or class of equipment that you are aware of that could perhaps  
 be considered for re-use but currently is not? Please provide justification.

No.

### Oil & Gas Decommissioning & The Circular Economy

**Q10** Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the least and 5 being the most important.

	1-5
Clarity - Unclear on the economic and environmental benefits of doing so	3
Concern and risk – Including potential later liability issues from re-use	4
Pre-agreed supplier procurement framework rules limit re-use scope	1
Cost, time & ease of access delays required with brokers / material handling companies	3
Difficulty in accessing original equipment / maintenance and use paperwork history	5
Cost & time required to find viable buyers / brokers of equipment for re-use	3
Lack of information about equipment and possible redeployment in other industries outwith O&G	3
Historically not a company priority and operational practice	1
The reward is not worth the effort in the grand scheme of things due to the limited relative value saving	4

Any additional comments regarding major barriers to re-use?:

Environmental benefits are clear, but the reality is that a good few assets that are currently being decommissioned are past their design life, and therefore the associated equipment have been operating beyond their design life. Some obsolete equipment may possibly be used as spares on similarly aged assets, but it is arguable whether there is a market for this. In our case we have 0% material sent to landfill, so the value benefits of pursuing reuse opportunities in the wider environmental context may be limited.

**Q11** What is the single biggest factor that prevents you from procuring used equipment or surplus stock?

My understanding is that the company would pursue this option providing the equipment was available and the necessary documentation was in place, but I have not discussed this in detail with the procurement dept.

**Q12** We believe flowlines, umbilicals, risers and valves demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment?

**No**

Based on your knowledge and experience, can you suggest any other types of equipment that could be reused in other sectors?

It really depends on the age of the equipment, as a long-shot possibly pumps, compressors but primarily these would need to be passed back to the original vendor for refurbishment before any resale opportunities could arise. Reliability and associated liability issues would be the primary concern.

**Q13** Do you have any other observations, suggestions or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning?

**No**

**Q14** Your feedback is important to the industry. Please confirm you are happy for us to share the anonymised results of this survey? **Yes**

## Oil &amp; Gas Decommissioning &amp; The Circular Economy

## #2

**COMPLETE**

Collector: Web Link 1 (Web Link)  
 Started: Wednesday, May 30, 2018 4:34:49 PM  
 Last Modified: Wednesday, May 30, 2018 4:52:05 PM  
 Time Spent: 00:17:15

Page 1: Oil &amp; Gas Decommissioning &amp; The Circular Economy

Q1 Company Name (Optional)



Q2 Do you actively look for re-use opportunities as part Yes  
 of your decommissioning plans?

Q3 Do you encourage / incentivise your  
 decommissioning contractors to think about re-  
 use opportunities?

**Yes,**

If so, how?:

We will, and will request contractors to make visible  
 the cost savings that can be realised as a result of re-  
 use opportunities. Not build in any direct incentive for  
 contractor to do this, however there will be an element  
 of profit to contractors associated to this.

Q4 Within your existing decommissioning re-use  
 plans, do your contractors provide any data / output  
 on equipment re-used or re-purposed?

**Yes,****No**

Q5 If you answered yes to Q4, would you consider  
 sharing this for wider industry case study sharing?

**Yes**

Q6 Are all your current decommissioning plans  
 executed under pre-agreed procurement frameworks?

**No**

Q7 Can you list your primary and most relevant decommissioning contractors?

Veolia

Q8 Is there any particular equipment, or class of  
 equipment that you are aware of that is being regularly  
 re-used or re-purposed? Please provide justification.

Respondent skipped this question

Q9 Is there any particular equipment, or class of  
 equipment that you are aware of that could perhaps be  
 considered for re-use but currently is not? Please  
 provide justification.

Respondent skipped this question

### Oil & Gas Decommissioning & The Circular Economy

**Q10** Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the least and 5 being the most important.

	1-5
Clarity - Unclear on the economic and environmental benefits of doing so	4
Concern and risk – Including potential later liability issues from re-use	4
Pre-agreed supplier procurement framework rules limit re-use scope	1
Cost, time & ease of access delays required with brokers / material handling companies	4
Difficulty in accessing original equipment / maintenance and use paperwork history	5
Cost & time required to find viable buyers / brokers of equipment for re-use	5
Lack of information about equipment and possible redeployment in other industries outwith O&G	3
Historically not a company priority and operational practice	5
The reward is not worth the effort in the grand scheme of things due to the limited relative value saving	3

Any additional comments regarding major barriers to re-use?:

There are valuable equipment items offshore that can be re-used / sold, and whilst the cost benefit is minor compared to the wider decommissioning removal costs, the cumulative effect on re-use could save Operators and the tax payer money. However, i am not sure how the cost would compare for raw materials from equipment, being broken down for re-use compared to a re-use (sale) cost. There are huge markets out with the UK that specialise in this type of re-use for Oil and Gas and other markets, and obtaining some data / metrics on re-sale / re-use vs recycling raw materials would be beneficial.

**Q11** What is the single biggest factor that prevents you from procuring used equipment or surplus

stock? certification, age, obsolescence.

**Q12** We believe flowlines, umbilicals, risers and valves **No** demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment?

**Q13** Do you have any other observations, suggestions Respondent skipped this question or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning?

**Q14** Your feedback is important to the industry. Please **Yes** confirm you are happy for us to share the anonymised results of this survey?

## Oil &amp; Gas Decommissioning &amp; The Circular Economy

## #3

**COMPLETE**

Collector: Web Link 1 (Web Link)  
 Started: Tuesday, June 05, 2018 2:52:06 PM  
 Last Modified: Tuesday, June 05, 2018 2:58:13 PM  
 Time Spent: 00:06:07

Page 1: Oil &amp; Gas Decommissioning &amp; The Circular Economy

Q1 Company Name (Optional) Respondent skipped this question

Q2 Do you actively look for re-use opportunities as part Yes  
 of your decommissioning plans?

Q3 Do you encourage / incentivise your decommissioning contractors to think about re-use opportunities? **No**

Q4 Within your existing decommissioning re-use plans, Yes  
 do your contractors provide any data / output on  
 equipment re-used or re-purposed?

Q5 If you answered yes to Q4, would you consider sharing this for wider industry case study sharing? **No**

Q6 Are all your current decommissioning plans executed under pre-agreed procurement frameworks? **Yes**

Q7 Can you list your primary and most relevant decommissioning contractors?

Not at this time.

Q8 Is there any particular equipment, or class of equipment that you are aware of that is being regularly re-used or re-purposed? Please provide justification.

Gas Turbines.

Q9 Is there any particular equipment, or class of equipment that you are aware of that could perhaps be considered for re-use but currently is not? Please provide justification.

Not at this time.

### Oil & Gas Decommissioning & The Circular Economy

**Q10** Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the the least and 5 being the most important.

	1-5
Clarity - Unclear on the economic and environmental benefits of doing so	4
Concern and risk – Including potential later liability issues from re-use	4
Pre-agreed supplier procurement framework rules limit re-use scope	
Cost, time & ease of access delays required with brokers / material handling companies	3
Difficulty in accessing original equipment / maintenance and use paperwork history	4
Cost & time required to find viable buyers / brokers of equipment for re-use	5
Lack of information about equipment and possible redeployment in other industries outwith O&G	5
Historically not a company priority and operational practice	4
The reward is not worth the effort in the grand scheme of things due to the limited relative value saving	5

**Q11** What is the single biggest factor that prevents you from procuring used equipment or surplus stock? Unaware of what is available.

**Q12** We believe flowlines, umbilicals, risers and valves demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment?

**No,**

Based on your knowledge and experience, can you suggest any other types of equipment that could be reused in other sectors?:

Diesel Generators, Gas Turbines, Accommodation Blocks

**Q13** Do you have any other observations, suggestions or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning?

Need to make re-use and recycling more attractive options. We as a country need to invest. Need to then engage with disposal yards/contractors, to make them aware of what is available. Operators will ultimately look to them as the experts.

**Q14** Your feedback is important to the industry. Please Yes confirm you are happy for us to share the anonymised results of this survey?

## Oil &amp; Gas Decommissioning &amp; The Circular Economy

## #4

**COMPLETE**

Collector: Web Link 1 (Web Link)  
 Started: Friday, June 08, 2018 10:35:10 AM  
 Last Modified: Friday, June 08, 2018 10:57:00 AM  
 Time Spent: 00:21:50

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Q1 Company Name (Optional)



Q2 Do you actively look for re-use opportunities as part Yes  
 of your decommissioning plans?

Q3 Do you encourage / incentivise your  
 decommissioning contractors to think about re-  
 use opportunities?

Yes,  
 If so, how?:  
 Disposal contractor acceptability criteria includes  
 waste/re-use pyramid considerations.

Q4 Within your existing decommissioning re-use plans, Yes  
 do your contractors provide any data / output on  
 equipment re-used or re-purposed?

Q5 If you answered yes to Q4, would you consider  
 sharing this for wider industry case study sharing?

Yes

Q6 Are all your current decommissioning plans  
 executed under pre-agreed procurement frameworks?

No

Q7 Can you list your primary and most relevant decommissioning contractors?

Recently / currently used:

Saipem UK  
 Heerema Marine Consultants  
 Technip  
 Subsea 7  
 Veolia

Q8 Is there any particular equipment, or class of equipment that you are aware of that is being regularly re-  
 used or re-purposed? Please provide justification.

The onshore waste management contractor is best placed to identify external re-use opportunities.

### Oil & Gas Decommissioning & The Circular Economy

**Q9** Is there any particular equipment, or class of equipment that you are aware of that could perhaps be considered for re-use but currently is not? Please provide justification.

The onshore waste management contractor is best placed to identify external re-use opportunities.

**Q10** Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the least and 5 being the most important.

	1-5
Clarity - Unclear on the economic and environmental benefits of doing so	1
Concern and risk – Including potential later liability issues from re-use	4
Pre-agreed supplier procurement framework rules limit re-use scope	1
Cost, time & ease of access delays required with brokers / material handling companies	5
Difficulty in accessing original equipment / maintenance and use paperwork history	4
Cost & time required to find viable buyers / brokers of equipment for re-use	5
Lack of information about equipment and possible redeployment in other industries outwith O&G	5
Historically not a company priority and operational practice	4
The reward is not worth the effort in the grand scheme of things due to the limited relative value saving	1

Any additional comments regarding major barriers to re-use?:

Operators are generally prepared to support the initiative, but most would not see development of this expertise internally as viable. The onshore waste management contractor is best placed to identify external re-use opportunities as they have the skills, contacts and it forms a core element of their business.

**Q11** What is the single biggest factor that prevents you from procuring used equipment or surplus stock? This question would need to be posed to the procurement team (not decommissioning).

**Q12** We believe flowlines, umbilicals, risers and valves demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment?

**No,**

Based on your knowledge and experience, can you suggest any other types of equipment that could be reused in other sectors?:

The onshore waste management contractor is best placed to identify external re-use opportunities.

**Q13** Do you have any other observations, suggestions or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning?

Please note the substantial issues with intervening in offshore plant for identification and removal of low to medium value components. Aside from a few high value exceptions, such interventions should be made at the disposal yard by the waste management contractor after recovery of the asset to shore.

**Q14** Your feedback is important to the industry. Please confirm you are happy for us to share the anonymised results of this survey? **Yes**



## Oil &amp; Gas Decommissioning &amp; The Circular Economy

## #5

**COMPLETE**

Collector: Web Link 1 (Web Link)  
 Started: Monday, June 11, 2018 1:53:03 PM  
 Last Modified: Monday, June 11, 2018 2:47:55 PM  
 Time Spent: 00:54:52

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Page 1: Oil & Gas Decommissioning & The Circular Economy

Q1 Company Name (Optional)




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Q2 Do you actively look for re-use opportunities as part Yes  
 of your decommissioning plans?

Q3 Do you encourage / incentivise your  
 decommissioning contractors to think about re-  
 use opportunities?

**Yes,**

if so, how?:

We haven't yet got to the stage of talking in such detail,  
 but do intend to do so when we can.

---

Q4 Within your existing decommissioning re-use plans, Yes  
 do your contractors provide any data / output on  
 equipment re-used or re-purposed?

---

Q5 If you answered yes to Q4, would you consider  
 sharing this for wider industry case study sharing?

**No**

---

Q6 Are all your current decommissioning plans  
 executed under pre-agreed procurement frameworks?

**No**

---

Q7 Can you list your primary and most relevant decommissioning contractors?

Not yet tendered

---

Q8 Is there any particular equipment, or class of equipment that you are aware of that is being regularly re-  
 used or re-purposed? Please provide justification.

**No**

---

Q9 Is there any particular equipment, or class of equipment that you are aware of that could perhaps  
 be considered for re-use but currently is not? Please provide justification.

Platform considered jackets

### Oil & Gas Decommissioning & The Circular Economy

**Q10** Think about the following barriers that we have identified and rate their importance 1-5 based on your perception, with 1 being the least and 5 being the most important.

	1-5
Clarity - Unclear on the economic and environmental benefits of doing so	3
Concern and risk – Including potential later liability issues from re-use	5
Pre-agreed supplier procurement framework rules limit re-use scope	2
Cost, time & ease of access delays required with brokers / material handling companies	1
Difficulty in accessing original equipment / maintenance and use paperwork history	5
Cost & time required to find viable buyers / brokers of equipment for re-use	3
Lack of information about equipment and possible redeployment in other industries outwith O&G	4
Historically not a company priority and operational practice	4
The reward is not worth the effort in the grand scheme of things due to the limited relative value saving	4

**Q11** What is the single biggest factor that prevents you from procuring used equipment or surplus stock? Culture or company practice

**Q12** We believe flowlines, umbilicals, risers and valves demonstrate good potential for re-use in other industries. Are you aware of any upcoming opportunities for re-use of this type of equipment?

**No,**

Based on your knowledge and experience, can you suggest any other types of equipment that could be reused in other sectors?:

Prime movers, pumps, parts for obsolete equipment

**Q13** Do you have any other observations, suggestions or comments that might be helpful in our efforts to increase the volume and quality of re-use from decommissioning? Respondent skipped this question

**Q14** Your feedback is important to the industry. Please confirm you are happy for us to share the anonymised results of this survey? **Yes**

## 8 Appendix 3: Leasing & Financing Interviews



Adobe Acrobat  
Document

Interview topic guide:

Contact details of companies consulted:

- [Lombard Asset Finance](#) (Part of RBS Group)
  - Brian Leitch; Relationship Director Lombard Asset Finance
- [Breadalbane Asset Finance](#) (Asset Finance & Specialist Business Finance Brokers – Scotland)
  - Duncan Wood Director;
- [Bank of Scotland Asset Finance](#)
  - Brian Bovell; Asset Manager Bank of Scotland;
- [Rangewell Ltd](#) (Asset Finance and Specialist Business Finance Brokers - London)
  - Mikhail Shah; Senior Credit Analyst;

Additional details and feedback from interviews:

- Other than the possible specialised nature of some of the assets being considered in the CE context, there was no major issue as it relates to the proposed re-purposing or re-use of any asset. i.e. it does not have to be new
  - Most likely product options appear to be around a finance lease (applicant typically pays the full cost of the asset and retains responsibility for maintaining it) and potentially – though perhaps less likely - Hire Purchase (Applicant probably does not pay the full cost of the asset and the lessor has responsibility for it)
  - The specialist nature of some of the assets being considered under this program would most likely affect potential re-sale value in a distressed sale situation – this means that valuers on a case by case basis would be used. One main stream lender and both brokers did cite the potential to look at the whole position of the applicant and perhaps “blend” financial products to make the transaction possible. One mainstream lender has specific experience of financing our short list equipment/assets albeit from new.
  - Financing options will require an assessment of the asset both in terms of its potential re-sale value and income generation potential to cover funding payments. One mainstream lender would “be unlikely to fund anything older than 7-years”
  - Funder conditions around Asset finance is typically a little less onerous than that of mainstream lending (e.g. overdraft or business term loan) for businesses
  - “Borrower” criteria assessment appears to vary slightly (and will be assessed on a case-by-case basis.) Important considerations for the borrower include;
    - Between 13 months and 2-years of annual accounts availability. (some still look at proposals from businesses with only 1-year trading history)
    - Applicants Balance sheet showing a positive Net Worth (in one instance the lender gave an indicative sense for this being up to 50% max of balance sheet. Net worth)
    - Company showing a positive earnings / profit before interest and tax.
    - All HMRC / Government taxes paid and up to date.
    - Costs in terms of payments include in one case a 10% + Vat payment up front.
    - Brokers sight of 6-months bank statements.
    - One broker advised that they will look at secured and unsecured lends
    - Broker – several on their lending panels (can be as many as 40 on this) have and use their own valuers of specific assets.
-

- Broker suggested decision time on applications can be around 7-10 days mainstream providers only a little longer.
  - Broker – suggested that even if the asset does go out of the country there are other options on how this may be financed, and they would be willing to consider this.
  - A schedule of specific assets would be helpful, and they would be very happy to “test” this by their specialist asset team and valuers if that were helpful.
-



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or call freephone **0808 100 2040**