Decommissioning of Energy Assets

Webinar

21/04/2020 15:00 CEST

Davide Coppola, Giulia Manzetti (ESA)
Silvia Grandi (MISE - Italian Ministry of Economic Development)
Audrey Banner (UK Offshore Petroleum Regulator for Environment and Decommissioning)
Axel Laval (The Crown Estate)
WELCOME TO THE WEBINAR!

Before we start...

• Due to the number of attendees, please **keep your microphones muted** at all times and switch off the webcam function.

• You can use the **conversation function** anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar.
AGENDA

• ESA introduction

• “Decommissioning of Energy Assets” Invitation to Tender
  • Objectives
  • Examples of applications
  • Value of Space

• Challenges in the decommissioning sector - Guest Speakers:
  • Silvia Grandi - Italian Ministry of Economic Development
  • Audrey Banner - UK Offshore Petroleum Regulator for Environment and Decommissioning
  • Axel Laval - The Crown Estate

• How to apply: funding and tender information

• Open Questions & Answers session
THE EUROPEAN SPACE AGENCY

Purpose of ESA

To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.

Facts and figures

- Over 50 years of experience
- 22 Member States
- 8 sites across Europe and a spaceport in French Guiana
- Over 80 satellites designed, tested and operated in flight
space transportation

science

human spaceflight

earth observation
telecommunications and applications

navigation

exploration

operations

technology
Could you be leveraging Space technology and data for the benefit of life on Earth?
WHAT ESA OFFERS

Zero-Equity Funding (€60k-€3M+)
Tailored Project Management Support
Access to Our Network & Partners
Use of the ESA Brand for Credibility
Decommissioning of Energy Assets

Planned ESA's funded invitation to tender
Planned ESA-funded invitation to tender on decommissioning

ESA Space Solutions is planning on issuing an open competitive tender for a feasibility study to investigate the technical feasibility and economic viability of space-based applications for decommissioning of energy assets (wind, oil and gas, etc.), and define a roadmap for services implementation and demonstration.

Invitation to tender planned to be issued in May 2020

Funding up to € 200K per activity (100% ESA funded)

Duration 12 months
OBJECTIVES

• Assess technical feasibility and economic viability of space based services in support of decommissioning of offshore oil & gas plants and wind farms;

• Get anchor customers commitment towards services implementation and sustainable operation;

• Identify and assess the technical and non-technical risks associated with the implementation, commercialisation and operations of the services;

• Consolidate the business plan for supporting an informed decision for investment in further activities

• Define a roadmap for services implementation and demonstration (potentially through a follow-up ESA co-funded demonstration project).
EXAMPLES OF AREAS OF INTEREST

- Support to automation of decommissioning activities
e.g. underwater operations; high precision positioning for assets removal.

- Safety of workers off-shore and on-shore
e.g. augmented reality services and data analytics providing early warning of immediate risks to workers.

- Use of innovative space-enabled technology to support logistics and ensure safety of operations (onshore and offshore)
e.g. use of robots & autonomous vessels to improve logistics efficiency; use of other space enabled tech, like HAPs / RPAS for high resolution monitoring.
EXAMPLES OF AREAS OF INTEREST

• Monitoring of environmental impact
  e.g. residual hydrocarbons, oil spills, chemicals and harmful liquids that may accidentally be released during the decommissioning phase; environmental impact assessment of platform re-use.

• Logistics and end-to-end business support services
  e.g. processes optimisation through supply chain management and monitoring of external factors affecting operations efficiency (e.g. weather conditions and sea status), and information on infrastructure status; evaluation of safe and cost-effective options for reuse/recycling.
VALUE OF SPACE

**Satellite Navigation**
- Vessels positioning;
- Positioning of assets as input to logistic management services;
- Augmented Global Navigation Satellite System (GNSS) for automation of assets lifting and disposal.

**Satellite Communications**
- Communication between offshore and onshore, including M2M (for process automation and end-to-end business processes), voice and data (for both end-to-end business processes and safety of workers).

**Earth Observation**
- Environmental monitoring and detection of harmful liquid spills
- Provision of weather forecast for planning and optimisation of decommissioning activities
Silvia Grandi

Head of Division

Italian Ministry of Economic Development (MISE)

Directorate general for the infrastructures, safety, security of energy and mining systems
Decommissioning of Oil & Gas offshore infrastructures

The Italian experience and the state of art

Silvia Grandi

Webinar ESA, 21st April 2020
Space and Oil and Gas Offshore technology
... old Italian friends

Launch of a small satellite from the Santa Rita Platform offshore Kenya (Italian San Marco Research Programme) (1980s)
Drivers of offshore infrastructures decommissioning

TECHNICAL
Field Depletion

POLITICAL
De-carbonisation

[Source: Roca, 2017]
[Source: Greenpeace, 2014]
Lincences & Locations

Concessions:

• 113 onshore
• 66 offshore

Exploration and Research Permits:

• 39 onshore
• 26 offshore

are suspended

Ex Art. 11-ter L.12/2019 PiTESAI Plan
(includes Decommissioning plan 2021- on)
# Main Italian O&G offshore infrastructures

<table>
<thead>
<tr>
<th></th>
<th>GAS</th>
<th>OIL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopiles</td>
<td>22</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Bi-piles</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Clusters</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Steel Platforms</td>
<td>81</td>
<td>10</td>
<td>91</td>
</tr>
<tr>
<td>Subseas</td>
<td>12</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>126</td>
<td>13</td>
<td>138</td>
</tr>
</tbody>
</table>

[Source: Database MISE UNMIG, 2019]
The dimension of the phenomena

ITALY
138 Installations - 2 Licensed Operators
• 0% floating
• 10% subsea
• 83% small steel
• 7% large steel (4)

[Source: MISE DB-UNMIG, BUIG, 2019]

UK
470 Installations - 58 Licensed Operators
• 10% floating
• 30% subsea
• 50% small steel
• 10% large steel or concrete – potential derogations for abandonment

[Source: W. Kennedy, 2017]
From 1959 to 2000s

188 offshore infrastructures dedicated to oil & gas

- 49 decommissioned from the 1980s to 2010
- 1 decommissioned nel 2017
- 138 still offshore

✓ Topsides, treatment facilities, deck infrastructures: all dismantled and conveyed in onshore for the final recovery and/or disposal (Circular Economy ante litteram)

✓ Jacket steel infrastructures: 23 have been used as artificial reef (Paguro) + 26 have been removed and treated in dedicated onshore areas for final disposal

✓ Sealines

[Source: MiSE, UNMIG, 2020]
National Decommissioning Plan - 2017-2021

- Review and classification
- Safe and Sustainable Decommissioning Project
- Stakeholders participation
- Refresh Legal framework
- Integration with BLUE GROWTH, MSP
- Development of monitoring tools
- Dedicated communication
- R&D project promotion (CLYPEA, Blue MED, ESA, etc.)
- Intertwined with the PiTESAI Plan

[Source: MISE UNMIG GIS, 2017]
Main regulations

**International Conventions**
4. *IMO* (International Maritime Organization)

**Regional Convention**
1. *Oslo Convention* (mainly applicable for the North Sea)
4. *Barcellona Convention* (applicable for the Med. Sea)

**Italian regulatations**
1. **Mining Code**: plug and abandon of the gas/oil wells as well as the disposal of the treatment facilities and equipment of the platform
2. **Environmental Code**: EIA, emissions, waste, etc.
3. **EU/2013/30 Offshore directive** → D.Lgs. 145/2015
4. **DM. 15th February 2019**: decommissioning guidelines

→ Baseline: **Total removal** of the platforms & connected infrastructures
Partial Decommissioning and/or Multi-use (ri-functionalisation)

multi-use «areas» sharing sites, infrastructures and costs in diverse activities, such as transport, energy, aquaculture or leisure

[Fonte: Zanutigh, 2017]
Current List of Platforms in the official list for decommissioning

• Part a) – List of platforms to be removed (published on September 1\textsuperscript{st}, 2019)
  • ADA

• Part b) - List of platforms open to be requested for ri-functionalisation (published on September 1\textsuperscript{st}, 2019)
  • AZALEA A (open until 31/08/2020)
  • PC73 (open until 31/08/2020)

• To come (to be published on July 1\textsuperscript{st}, 2020)
  • REGINA 1
  • ARMIDA 1

THANK YOU FOR YOUR ATTENTION!
Audrey Banner

Head of Decommissioning Programme and Policy

UK Offshore Petroleum Regulator for Environment and Decommissioning
Technology in Decommissioning
Audrey Banner
OPRED

Photograph provided by CNR showing Murchison jacket sections at Vats disposal yard on a misty October morning.
Background – how much Decommissioning Activity is there in the UKCS

<table>
<thead>
<tr>
<th>Decommissioning Projects approved to date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complete Removal</strong></td>
</tr>
<tr>
<td>Platforms/Surface Installations</td>
</tr>
<tr>
<td>Subsea Installations</td>
</tr>
<tr>
<td><strong>Derogations</strong></td>
</tr>
<tr>
<td>Steel Jackets removed to top of footings</td>
</tr>
<tr>
<td>Concrete Gravity Base to be left in situ</td>
</tr>
<tr>
<td>Toppling</td>
</tr>
</tbody>
</table>
Decommissioning in action

Subsea infrastructure recovery

Photograph provided by Fairfield showing concrete mattresses from Dunlin, Merlin & Osprey fields recovered to deck.

Topsides removal and well P&A

Photograph provided by Total showing Frigg QP topsides lift.

Pipelines decommissioning

Photograph provided by Total showing Leadon flowline packed onto anchor winch drum.

Projects vary in complexity

Learning lessons as we go…
Background - Pipelines

• Currently 35,000 km of pipelines in the UKCS.

• Alongside complex related installations, mattresses and other pieces of kit.

• Pipelines are considered for removal or decommissioning in situ

• Removal technology has to considered as part of the assessment

• 151 pipelines have been left in situ as part of the decommissioning of the fields, with monitoring requirements

Photograph provided by Total, showing section of pipeline from Janice, James & Affleck fields being recovered to deck.
Pipeline – in situ

Types of pipelines

• infield pipelines
• Export pipelines, sometimes concrete coated and very large
• Pipeline Bundles, from around 30” up to 40” wide, with loose internals.
• Jumpers and umbilicals
• Cross border pipelines with Norway and the Netherlands

Removal

• We ask companies to decommission using remote technology where it is available, and encourage its development.
Example of Pipeline schematic

We require companies to provide evidence as part of the comparative assessment process.
OPRED - reasons for encouraging the development of new technology in Decommissioning and Environmental management

- Reducing the cost of decommissioning, thus reducing the cost to the taxpayer
- To develop safer methods for execution
- To increase efficiency
- To reduce emissions and energy usage
Gaps and main areas for improvement and development

- **Pipeline monitoring** – looking at the changes in the infrastructure from live usage through to decommissioning, at the stages of removal or long term monitoring of pipelines left in situ. Specifically the deterioration and degradation of the pipeline and interactions with other users of the sea (fishermen).

- **Infrastructure monitoring** – Monitoring the deterioration and degradation of infrastructure left in situ with detail of interactions with other users of the sea and any leaks from materials left in situ.

- **Emergency operations and oil spill considerations**

- **Environmental monitoring** – long term monitoring of environmental impacts of infrastructure left in situ. Technologies to analysis drill cutting piles, site monitoring and cell isolation have been identified and present collaboration opportunities
Assessment of decommissioning programmes
Where technology fits

- Safety
  - Risk to personnel – divers – remote working
  - Risk to other users of the sea
  - Risk to those on land

- Economic
  - Decommissioning cost estimate
  - Value of dismantlement and recycling

- Environmental
  - Remote Environmental monitoring
  - Marine impacts
  - Resource consumption
  - Emissions
  - Cumulative effects

- Societal
  - Fisheries impacts
  - Amenities
  - Communities

- Technical
  - What technology is available to undertake execution?
  - Presumption that technology will be developed to remove more infrastructure
  - Risk of major project failure
<table>
<thead>
<tr>
<th>Priority</th>
<th>Areas for development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process areas cleaning</td>
<td>Hydrocarbon free - Cleaning and Flushing of various topside equipment during preparation, execution and removal</td>
</tr>
<tr>
<td>Topside platform lift preparation</td>
<td></td>
</tr>
<tr>
<td>Separation of process equipment and flow lines</td>
<td>Complex cutting operations and retrofitting lifting hooks, during modular removal and lifting is an area where companies are looking for autonomous technology development, to enable safe operations.</td>
</tr>
<tr>
<td></td>
<td>Oil spill monitoring for both production and decommissioning.</td>
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</tbody>
</table>
**Priority Main tasks**

<table>
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<th>Task</th>
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<tbody>
<tr>
<td>a) Underwater surveys of seabed</td>
</tr>
<tr>
<td>b) Assessment of the jacket state</td>
</tr>
<tr>
<td>c) Marine growth removal</td>
</tr>
</tbody>
</table>

**Potential areas for development**

- Remote monitoring and surveying of pipelines and subsea equipment.
- Remote debris clearance and verification of clear seabed.
- Long term area wide remote monitoring post execution.
- Analysis and surveying of drill cutting piles.
- 3D mapping of the jacket and footings, as well as associated tanks to detail cutting points and provide evidence of size and long term deterioration.
- Mapping and characterisation of marine growth prior to execution.
**Technology: Topside platform removal** : Logistics, Safety

<table>
<thead>
<tr>
<th>Priority</th>
<th>Potential areas for development</th>
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| a) Topside platform lifting operations | • Dynamic positioning for Vessel usage  
<p>| b) Transportation vessel loading           | • Ongoing Monitoring during removal execution                                                   |</p>
<table>
<thead>
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<th>Priority</th>
<th>Potential areas for development</th>
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</thead>
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<tr>
<td>a) Pipeline flushing</td>
<td>• Remote environmental and physical monitoring for pre execution decommissioning</td>
</tr>
<tr>
<td>b) General subsea operations</td>
<td>• 3D imaging of pipelines to help inform comparative assessments for pipeline decommissioning</td>
</tr>
<tr>
<td>c) Jacket and piping removal</td>
<td>• Long term remote monitoring of deterioration of pipelines and snagging hazards.</td>
</tr>
<tr>
<td></td>
<td>• Long term remote monitoring of jacket footings left in marine environment</td>
</tr>
<tr>
<td></td>
<td>• Long term monitoring of Drill cuttings pile degradation</td>
</tr>
<tr>
<td></td>
<td>• Possible long term monitoring of in cell contents degradation.</td>
</tr>
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**Technology:** Onshore disposal, remediation and monitoring: Logistics, Safety

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<td>a) Vessel unloading and onshore disposal</td>
<td>• Dynamic positioning and mapping</td>
</tr>
<tr>
<td>b) Monitoring programme</td>
<td>• As in previous tables long term monitoring</td>
</tr>
</tbody>
</table>
Axel Laval

Assets Manager

The Crown Estate
Space-based applications for decommissioning offshore energy assets

The Crown Estate

Axel Laval - April 2020
Offshore Wind Energy

• The Crown Estate issues leases for Offshore Renewable Energy Installations.

• Consulted on decommissioning programmes

• Duty of stewardship:
  – Environment protection
  – Customers’ interests
  – Cost of energy
Key legislation

• The Crown Estate Act 1961
• The Energy Act 2004
• The Scotland Act 2016

also to note:

• UNCLOS 1982
• IMO standards 1989
• OSPAR Convention 1992
UK offshore wind assets

- Offshore Turbines: 2180 (30 September 2019)
- Offshore Substations: 31 (739)
- Export Cables: 73 (41)
- Offshore Masts: 16 (84)
- Wind Farms: 41 (17)

TOTAL Assets managed by The Crown Estate and Crown Estate Scotland
Capacity to decommission

Design life assumption of 22 years for offshore wind assets commissioned before 2012 and 25 years afterwards. Individual sites may vary.
Space-based applications

Environmental surveys:
- Pollution monitoring
- Long-term seabed mobility
- Weather and sea-state surveys to optimise operations
- Wildlife monitoring

Vessel localisation:
- High precision positioning for asset removal
- Areas where fishing activities may cause an increased risk of snagging (trawling)
- Optimum strategy where multiple assets are decommissioned simultaneously
The Crown Estate
How to apply:
Funding and Tender Information
Funded participation to ESA Space Solutions is open to any company and/or organisation, be it as group of users, public body or non-governmental organisation, residing in the following Member States:

Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom
HOW TO APPLY

1. **Register** (minimum ‘light registration’) by completing online questionnaire on ESA-STAR Registration ([esastar-emr.sso.esa.int](http://esastar-emr.sso.esa.int))

2. **Download** the official tender **documentation** (Invitation to Tender), which will be available as soon as the ITT is open (May 2020) via EMITS ([emits.esa.int](http://emits.esa.int))

3. Create ‘Bidder Restricted Area’ in ESA-STAR

4. **Write your Proposal** using the template provided in the Tender documentation and obtain **Letter of Authorization** from your National Delegation ([business.esa.int/national-delegations](http://business.esa.int/national-delegations))

5. **Submit** your proposal via ‘Bidder Restricted Area’ in ESA-STAR Tendering ([esastar.sso.esa.int](http://esastar.sso.esa.int))

More info can be found here:
[esa.int/About_Us/Business_with_ESA/How_to_do/esa-star_Registration_Process](http://esa.int/About_Us/Business_with_ESA/How_to_do/esa-star_Registration_Process)
OPEN QUESTIONS & ANSWERS SESSION
THANK YOU
FOR PARTICIPATING

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giulia.manzetti@esa.int