“Adoption of Novel Solutions” for Decom North Sea

- Barriers and challenges to adoption of novel solutions in O&G offshore decommissioning
- Process for commercialisation
- Recommendations for overcoming barriers
Development Process for Innovation

TECHNICAL
- NEEDS
- RESEARCH
- CONCEPT
- DEVELOPMENT
- DESIGN FOR MANUFACTURING
- PRODUCTION

ARUP
Development Process for Innovation
Development Process for Innovation
Development Process for Innovation
Development Process for Innovation

**MARKET ANALYSIS**
- Source of ideas / partners / clients
- Size and shape of market
- Major players
- Competitor landscape
- Potential barriers
- Company strategy & future plans

**TECHNICAL**
- NEEDS
- RESEARCH
- CONCEPT
- DEVELOPMENT
- DESIGN FOR MANUFACTURING
- PRODUCTION

**COMMERCIAL**
- MARKET ANALYSIS
- ROADMAP
- EXECUTION
- LAUNCHING
- POST LAUNCH
Development Process for Innovation

PRODUCT ANALYSIS
Value of USP to stakeholders
Novelty (IP)

BRIEF

TECHNICAL
NEEDS
RESEARCH
CONCEPT
DEVELOPMENT
DESIGN FOR MANUFACTURING
PRODUCTION

COMMERCIAL
MARKET ANALYSIS
ROADMAP
EXECUTION
LAUNCHING
POST LAUNCH

MARKET FEEDBACK
Development Process for Innovation

**STRATEGY / ROADMAP**
Shape of team & collaborators, partner
Route to market and supply chain
Cost and revenue model
Research partners

**TECHNICAL**
- NEEDS
- RESEARCH
- CONCEPT
- DEVELOPMENT
- DESIGN FOR MANUFACTURING
- PRODUCTION

**COMMERCIAL**
- MARKET ANALYSIS
- ROADMAP
- EXECUTION
- LAUNCHING
- POST LAUNCH
Development Process for Innovation

EXECUTION
- Contract writing
- Global IPR shape patent claims & decide where to file
- Formalising partnerships or collaborations
- Cost & price point clarity

TECHNICAL
- NEEDS
- RESEARCH
- CONCEPT
- DEVELOPMENT
- DESIGN FOR MANUFACTURING
- PRODUCTION

COMMERCIAL
- MARKET ANALYSIS
- ROADMAP
- EXECUTION
- LAUNCHING
- POST LAUNCH

MARKET FEEDBACK
Development Process for Innovation

LAUNCHING
- Sales plan
- Connect with partners
- First project
- Product launch
- Key messages

BRIEF

MARKET FEEDBACK

TECHNICAL
- NEEDS
- RESEARCH
- CONCEPT
- DEVELOPMENT

PRODUCT FOR MANUFACTURING

PRODUCTION

COMMERCIAL
- MARKET ANALYSIS
- ROADMAP
- EXECUTION
- LAUNCHING
- POST LAUNCH
Mapping development against standard Technology Readiness Levels:

- Provides a useful framework for developers
- Informs funders and clients of status of technology development

**Technology Readiness Levels**

- **TRL 9**: Actual system “mission qualified”
- **TRL 8**: Actual system completed and “mission qualified”
- **TRL 7**: System prototyping demonstration in an operational environment
- **TRL 6**: System demonstration in a relevant end-to-end environment
- **TRL 5**: Subsystem validation in relevant environment
- **TRL 4**: Subsystem validation in laboratory
- **TRL 3**: Validation proof-of-concept
- **TRL 2**: Technology concept
- **TRL 1**: Basic principles observed
# Key Recommendations

<table>
<thead>
<tr>
<th>Regulators &amp; Industry Bodies</th>
<th>Purchasers</th>
<th>Innovators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Promote an innovation culture</td>
<td>• Better understand risks associated with innovation</td>
<td>• Undertake sufficient market analysis and development planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Harmonise requirements and standards with international counterparts</td>
<td>• Adopt culture of openness to innovation, particularly in procurement</td>
<td>• Early engagement with end-user operational teams</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Encourage funding agencies/innovation centres to make decommissioning a priority</td>
<td>• Early engagement with innovators, while respecting intellectual property</td>
<td>• Adopt a ‘structured’ approach to development to attract investors and end-users</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consider risk/cost sharing, JVs and partnerships</td>
<td>• Consider novel contracting approaches</td>
<td></td>
</tr>
</tbody>
</table>