CATAPULT Energy Systems

Digitalising Offshore Energy Systems

Offshore Energy Data Strategy Taskforce Report

Chaired by

North Sea Transition Authority

Delivery partner

CATAPULT Offshore Renewable Energy

Purpose, remit and acknowledgements

The Offshore Energy Data Strategy Taskforce brought together stakeholders from across the offshore energy sector to make a series of recommendations to accelerate the development and adoption of a coordinated digital and data strategy.

The Taskforce objectives were to:

- Align different industries across the sector to a common digital and data strategy, unifying the sector around key digitalisation initiatives.
- Identify challenges to data sharing between organisations and build on previous digitalisation successes.
- Define the policy changes required to implement a common data strategy.
- Identify the tools and digital infrastructure that needs be built to facilitate more efficient data transfer.
- Propose areas where collaborative or innovative projects could be formed to further develop and embed the principles outlined by the Taskforce.

The Taskforce was chaired by the North Sea Transition Authority (NSTA) alongside a steering group comprised of key organisations from across the offshore energy sector. Their expertise and guidance has been invaluable in the execution of the Taskforce, helping formulate recommendations and maximise the engagement from the wider sector, we are very grateful for all their time and support.

Steering Group

Nic Granger (chair), North Sea Transition Authority
Stephen Ashley, Net Zero Technology Centre
Chelsea Bradbury, The Crown Estate
Annie Breaden, Crown Estate Scotland
Daniel Brown, Offshore Energies UK
Ed Evans, The Open Data Institute
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John Seabourn, North Sea Transition Authority
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Furthermore, we would like to thank the stakeholders from across the industry who engaged with the Taskforce either through direct interviews or the public engagement events throughout. Their insight and enthusiasm have inspired the resulting recommendations.

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Foreword

We are living in a time when resolving the energy trilemma of sustainability, security and affordability is at the forefront of all our minds.

The climate emergency sees the UK upstream energy sector committed to emissions reductions through the North Sea Transition Deal as we transition away from fossil fuels to renewable energy sources to ensure the UK is environmentally sustainable.

With the war in Ukraine, and substantial increases in household energy bills and petrol prices piling pressure on families, maintaining security of energy supply continues to be important. Currently, oil and gas meet 75% of the UK's energy demand, and we will continue to need this source for decades to come as we transition, while aiming to cut gas demand by at least 40% by 2030.

As we seek to create value from the new technologies of carbon capture and storage, offshore wind and hydrogen we need better cohesive access to data and digital solutions. Spatial planning to identify the best places for co-location of these technologies needs data. We therefore must work together to unlock value from data and digital by sharing as openly as possible to enable the best analysis, benchmarking and monitoring for the offshore energy industry.

We've seen the opportunities data can offer us all with the introduction of smart electricity meters. Data has been recognised as a critical asset in the offshore energy sector for many years. This was emphasised in the Wood review in 2014 which recommended wider access to, and sharing of, industry data. Since then, all parts of the offshore energy industry have come a long way but we need to ensure we work together in collaboration.

Data can help us understand emissions better as we work towards the ambitious target of reaching net zero by 2050. With better access to data, and the digital solutions that help us to analyse it, we can add huge value to the energy transition.

The work undertaken here by the Catapult team in partnership with the North Sea Transition Authority, NZTC, OEUK and the Technology Leadership Board joined in a Taskforce from The Crown Estate, Crown Estate Scotland, RenewableUK and The ODI sets out the strategy for us to take the next step in unlocking value from data and digital and my thanks to those who have joined us in the many workshops and surveys to reach this stage.

Nic Granger
Director of Corporate
North Sea Transition Authority

Executive summary

The Offshore Energy Data Strategy (OEDS) Taskforce brought together stakeholders from across the offshore energy sector to make a series of recommendations that accelerate the development and adoption of a coordinated digital and data strategy.

The offshore energy sector plays a significant role in meeting the UK's energy needs and is therefore crucial in helping achieve Net Zero and evolving the UK energy system. The challenge is multi-faceted; established industries such as oil and gas must modernise their production techniques, offshore wind needs to accelerate growth to meet government targets, and new industries such as CCUS (Carbon Capture, Utilisation and Storage), hydrogen, and wave and tidal generation require further development to move towards long-term commercial viability.

Digital technologies and data are powerful tools for the offshore energy sector to address some of these issues, but they also present wider opportunities to integrate across traditional silos to identify new value and novel pathways to net zero. Regulators, licensing bodies, and industry bodies alike have identified value and led programmes of work in this area. As investment and activity increase across the sector, creating a collaborative and interconnected digital ecosystem will create further opportunities for all.

Data is non-rival, meaning that both the data owner and the sector can benefit from better utilisation simultaneously, this means that there is a sizeable opportunity in fostering data sharing and cross-sector digitalisation initiatives. The Taskforce is therefore aiming to align digital and data strategies across the sector with the mission of delivering a modern, digitalised, and integrated, offshore energy sector.

The offshore energy sector plays a significant role in meeting the UK's energy needs and is therefore crucial in helping achieve Net Zero and evolving the UK energy system.

Executive summary — continued

Taskforce recommendations

The Taskforce makes a series of recommendations that aim to create the conditions for better data sharing and therefore digitalisation. These have been grouped into 'strategic' and 'workstream' recommendations that tackle different aspects of the challenges. Taken together, these recommendations outline the key areas where a collaborative approach to investment and delivery can drive digitalisation across the offshore energy sector

The strategic recommendations address the areas of policy and regulation, tools and infrastructure, and digitalisation, including:

- **Recommendation 1: Unifying data principles**
  The offshore energy sector should establish a Digital Strategy Group and drive the adoption of a data management framework across the sector.
- **Recommendation 2: Delivering a common data toolkit**
  The offshore energy sector should establish a common data toolkit to facilitate controlled and automated data sharing across the sector.
- **Recommendation 3: Driving cross-sector digitalisation**
  The offshore energy sector should coordinate digitalisation efforts to enable efficient investment and capture cross-sector requirements.

Executive summary — continued

Achieving wide adoption for such endeavours is hard, there must be clear outcomes which the sector can work towards and senior stakeholders must commit to delivering shared objectives.

In addition to the strategic recommendations, the Taskforce has identified and outlined a series of workstream recommendations that represent high-level opportunities for areas of ongoing work that address some of the key issues that have been highlighted by stakeholders throughout the project. These recommendations contain proposals for projects or initiatives that can be established by the relevant groups to further progress in each workstream.

→ **Workstream A: Enabling whole system planning**
The offshore energy sector should create a whole system view of existing and planned infrastructure, aligning different data layers to provide a forward view of development requirements.

→ **Workstream B: Advancing data coordination**
Establish a Task Group to drive interoperability of data portals across the sector and promote the discoverability and reuse of existing data through the development of a data portal roadmap.

→ **Workstream C: Leveraging asset data**
The offshore energy sector should increase the utilisation of existing operational and asset data, using the Open Data Triage process, mitigation techniques, and standardised data sharing agreements to manage risks.

→ **Workstream D: Offshore emissions data for Net Zero**
Enable monitoring of Net Zero targets and advanced emissions tracking by leading on the provision of high-resolution and digitised emissions data monitoring and reporting.

Creating a more open data ecosystem is vital to realising the opportunities presented by digitalisation across the system, and in many cases, required to unlock the value of data across the different industries. The recommendations and workstreams outlined in the report make the case for a more pro-active approach to data sharing, but crucially, also provide the tools and processes that enable it to happen in a way that is compatible with commercial interests and behaviours.

Achieving wide adoption for such endeavours is hard, there must be clear outcomes which the sector can work towards and senior stakeholders must commit to delivering shared objectives.
By advocating and leading change within their organisations and industries, digital visionaries can accelerate the energy transition and make significant progress towards Net Zero objectives.

Introduction

The global energy system must drastically realign itself around renewable and carbon-neutral energy if we are to meet Net Zero targets and avoid the worst effects of climate change.

As a result of this, the UK energy sector is evolving, undergoing significant change across the whole energy lifecycle from production to consumption, demanding innovation and commitment from all energy organisations. This is especially true in the offshore energy sector, where sizeable challenges and opportunities present themselves in equal measure, all of which must be tackled in the pursuit of Net Zero.

Evolution of offshore energy

The offshore energy sector comprises a mix of both mature and developing industries, all of whom will play a key role in achieving UK Net Zero ambitions. Both, the oil and gas, and offshore wind sectors contribute significantly to the UK energy mix with diverse and independent operational activities. In addition, developing technologies, including hydrogen production and storage, wave and tidal generation, and CCUS, the UK Exclusive Economic Zone (UK EEZ) is awash with activity, investment, and opportunity.

Of course, there are other industries and organisations that operate in and manage the same waters that all have their own regulatory and commercial priorities. The fragmented nature of these entities and industries creates a challenging landscape for coordinating development and innovation. Despite the historical and operational differences, there are numerous shared challenges and opportunities that require a synchronised approach to data and digitalisation.

The future UK energy system will be more digital, requiring generators, operators, and networks to be in tune with each other's demands and capabilities to ensure energy requirements are met with minimum disruption. As the offshore energy sector evolves to meet these demands, it will also need to be more closely integrated with its onshore counterpart, with demand signals, energy vectors, and carbon flowing between them.

Introduction — continued

The offshore energy sector comprises a mix of both mature and developing industries, all of whom will play a key role in achieving UK Net Zero ambitions.

Data is fundamental to digitalisation, it underpins the information, systems, and process change required to realise the vision of a digitalised energy system. Regulators, licensing and industry bodies, and commercial entities across the sector recognise this and have proactively developed digitalisation plans that identify key challenges and pathways.

Digitalisation that is 'siloed' within single industries or domains will only realise a fraction of the possible benefits. The Offshore Energy Data Strategy (OEDS) Taskforce aims to maximise the opportunity and impact of digitalisation by outlining where and how different industries should coordinate their digital and data strategies with the mission of establishing a modern, digitalised, and integrated offshore energy sector.

Introduction — continued

Principles

Within the OEDS Taskforce, we have set out to establish the common ground across the sector and propose a coherent framework on which to base digital and data strategy development. This has been done by considering a wide range of input covering technical, policy, and operational topics relating to data and digitalisation more broadly. These findings have been guided by the following high-level principles:

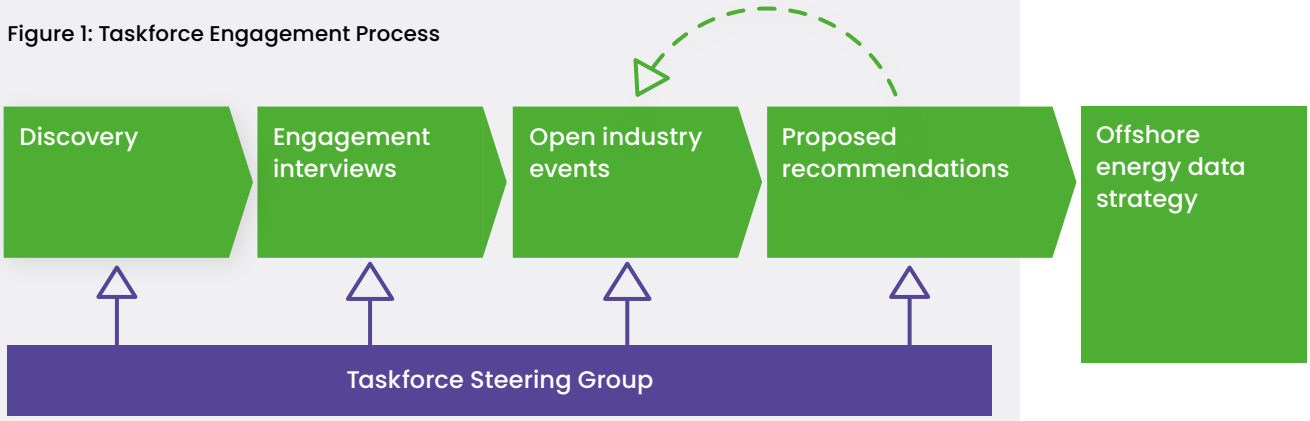
- **Address the whole offshore energy sector**
  Engage with and identify the shared challenges of industries from across the sector. To maximise the benefits and uptake of resulting recommendations, they should focus on the interaction between entities and promote cooperation.
- **Identify the barriers to data sharing**
  Creating a more open data ecosystem requires consideration of technological, regulatory, and commercial factors when formulating recommendations and initiatives.
- **Join existing initiatives**
  The most efficient way to drive digitalisation is to build on existing initiatives and work. Bringing these together will ensure that previous investments are maximised and create opportunities for expertise to be deployed in new areas.
- **Maximise the value of data**
  Data is a non-rival resource, if shared and utilised effectively it can deliver value for the data owner, sector, and wider economy simultaneously. This is vital to delivering long-term commercial benefits as well as meeting Net Zero targets.

The Taskforce is first and foremost an engagement activity, the input received from the extensive engagement work undertaken throughout the project is used to formulate proposals, which are then iteratively developed with the Taskforce Steering Group and within a series of open industry events, held throughout the project.

The resulting output is a series of recommendations aimed at policy makers, regulators, and industry bodies that outline the key component and requirements for implementing new digital and data policy. We have strived to propose the thinnest policy and regulatory recommendations that are required to drive data initiatives, whilst enabling innovation and commercial entities to thrive.

The Taskforce is first and foremost an engagement activity, the input received from the extensive engagement work undertaken throughout the project is used to formulate proposals.

Figure 1: Taskforce Engagement Process



High-level process diagram detailing the Taskforce engagement process. Over the course of the project, interviews were conducted with dozens of stakeholders in addition to three open industry events.

Introduction — continued

[1] Energy Data Taskforce — Energy Systems Catapult, es.catapult.org.uk, 2019

[2] Energy Digitalisation Taskforce — Energy Systems Catapult, es.catapult.org.uk, 2022

Finally, the Taskforce has sought to utilise and build on existing work across the sector. Primarily this includes the numerous digitalisation strategies and innovation initiatives already underway, led by industry, regulators, and licensing bodies alike, but also the outputs and experience from relevant projects in other sectors, energy related or otherwise.

Given the long-term strategic importance of establishing tighter interoperability with the onshore energy sector, particular care has been taken to ensure that outputs and recommendations utilise and are compatible with recommendations made by the Energy Data Taskforce[1] (EDTF) and the Energy Digitalisation Taskforce[2] (EDiT). These projects have informed digital and data strategy across in the onshore energy sector, creating consensus around key issues and providing a common framework for regulators and industry to align with.

Challenges and objectives

Given the vast differences in operational activities and maturity across the industry, it naturally follows that the range of goals is equally diverse. Despite this, it is still possible to identify common themes, opportunities, and solutions to the barriers of these targets.

At a high level, the challenges faced by each industry appear unique and only loosely related. For the offshore wind industry, accelerating expansion and harnessing the potential of automation and digitalisation will be key to scaling construction and operation. For oil and gas, efficiencies must be identified and realised across the asset lifecycle to achieve decarbonisation targets and large-scale coordination must be achieved to successfully electrify production activities. Finally, for the emerging markets and technologies of CCUS, wave, tidal, and hydrogen production, data will underpin the innovation that is required to demonstrate viability and transition towards sustainable business models.

Upon closer inspection however, the high-level challenges of achieving scalability, driving efficiency, and harnessing innovation are more widely applicable to the varied objectives and use cases across the sector. Understanding the range of objectives across the sector in its entirety creates more opportunities for collaboration, in turn driving efficiency and maximising the value of data.

Figure 2: Challenges and objectives illustration

Scalability	Efficiency	Innovation
→ Automated data gathering • Environmental • Inspections → Visibility of key infrastructure and asset data • Asset visibility • Maintenance • Operational → Cross-sector network and operational planning → Supply chain digitalisation • Digital asset data	→ Decommissioning economies of scale → Electrification of production → Increase cross-utilisation of resources • Vessels and equipment • People • Digital platforms → GHG monitoring and tracking • Carbon storage • Carbon intensity tracking • Emissions data resolution and availability	→ Technical feasibility assessment → Predictive maintenance and optimisation → Robotics, machine learning • Training data → Advanced modelling and control systems • Digitisation of asset data management

Introduction — continued

Benefits

Considering data in this way, taking a whole systems and cross-sectoral approach to data strategy, maximises the opportunities and utilisation of digital investments. The recommendations and workstreams described in the following report aim to enable progress in the following areas:

- **Targeted Innovation:** Reducing barriers to data access will attract innovators who can help solve some of the challenges associated with hardware, software, and logistics,
- **Develop New Products and Services:** A well-documented and open data ecosystem will enable organisations to identify new business models and opportunities,
- **Operational Excellence:** Utilising data expertise from all types of organisations should improve decision making at all levels across the system; and,
- **Accelerating the Transition:** Creating a more open data ecosystem creates the right conditions for digitalisation and energy transition success.

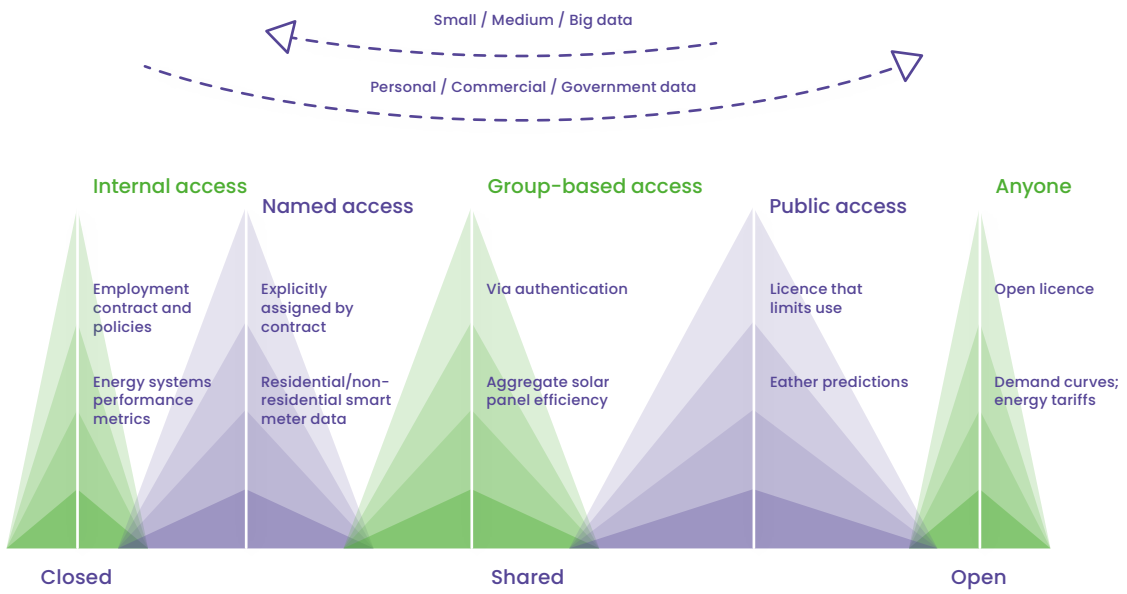
Shared data covers a wider range of data where there are legal, commercial, or regulatory restrictions as to how data can be processed or distributed.

Open and shared data

The key to defining a coordinated data strategy that addresses the challenges and objectives outlined above, is to clearly define the different levels of data openness and sharing requirements for each use case. The 'data spectrum' from The Open Data Institute (ODI) detailed in Figure 3, provides a framework that describes the different classifications of data openness and the respective mechanisms to facilitate their exchange, accordingly:

- **Open:** Can be used freely by anyone
- **Shared:** Can be used conditionally under licence
- **Closed:** Requires a bilateral contract for private use.

Figure 3: The data spectrum



The Data Spectrum classifies datasets on scale from freely available, non-restricted 'Open' data to limited use or availability 'Shared' or 'Closed' data. *The Data Spectrum: The ODI, theodi.org, https://theodi.org/about-the-odi/the-data-spectrum/ 2021 (CC-BY)*

Introduction — continued

[3] Open Banking, www.openbanking.org.uk

The case for open data is well made, commercial industries have been gradually incorporating and publishing open data as part of their digital operations and in doing so demonstrating the concept and benefits of open innovation.

Shared data covers a wider range of data where there are legal, commercial, or regulatory restrictions as to how data can be processed or distributed. Not all data is suited to open publication and creating the conditions where data can be shared more easily in a controlled environment is key to delivering many of the recommendations outlined in the following sections.

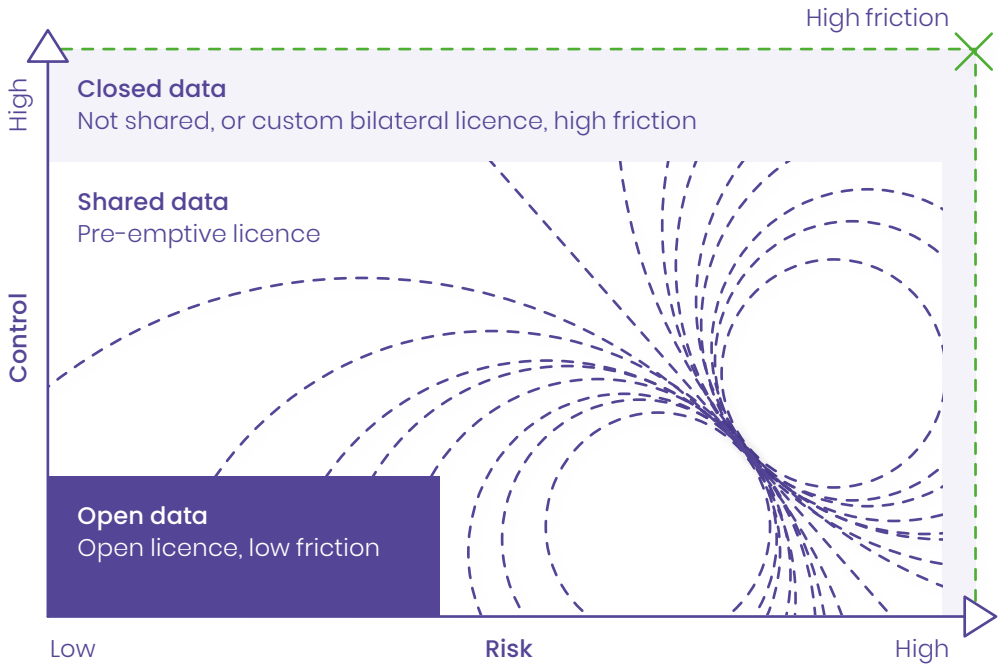
In more heavily regulated sectors, it would be feasible to make relatively small changes to industry codes and legislation that provide the legal basis for open data sharing. This is not the case in the offshore energy sector and a more commercially minded approach to data sharing must be established.

Shared data

The Open Banking[3] initiative has been a high profile, successful implementation of this approach. Through the deployment of open data APIs that facilitate secure, automated data exchange between authenticated parties and the classification of data licencing arrangements, it has defined a common infrastructure for the wider utilisation of financial data.

Strategic recommendations One and Two outline the requirements for building a similar data sharing ecosystem, where organisations can safely exchange different data types from across the data spectrum in a lower-friction environment to satisfy different use cases.

Figure 4: Open and shared data



The different levels of data openness and their respective control mechanisms.
icebreakerone.org, https://icebreakerone.org/open-shared-closed/, (CC-BY)

Introduction — continued

Data landscape

Also key to developing the Taskforce recommendations is an understanding of the scope and context of data use throughout the offshore energy sector. The Taskforce has focussed on the availability, provision, and utilisation of 'energy systems data' throughout its engagement, including asset data, operational data, maintenance data, and geotechnical data.

The (non-exhaustive) Figure 5 outlines the significant breadth of data used throughout the lifecycle in both the oil & gas and offshore renewables industries. Mapping the high-level view of this data to a common life cycle highlights the different areas where a coordinated data strategy could deliver value through closer integration between different industries and organisations.

In more heavily regulated sectors, it would be feasible to make relatively small changes to industry codes and legislation that provide the legal basis for open data sharing.

Introduction — continued

Figure 5: Data landscape map
Data types across the offshore energy sector, broken down by lifecycle stages.

	Application	Construction	Operation	Decommissioning
Renewables	• **Site leasing territory** • **Contract for difference** • **Terms** • **Farm specification** Sizing, distance from shore	• **Onshore electrical installation requirements** Substation, grid connections, voltage options • **Engineering works** Turbine and farm sizing, offshore plant	• **Wind forecasts** • **Load and output forecasts** • **Response and availability** • **SCADA** Turbine, balance of plant • **Alarm/Event logs** Outages, curtailment, remote control • **Seabed surveys**	
	• **Metocean assessment** Historical reference datasets, proposed site meteorology, oceanographic behavior, geotechnical • **Site specific modelling outputs** Operational and extreme weather, load/demand studies			
Common	• **Initial EIA** • **Regulatory boundaries** • **HSE requirements** • **Existing projects** Approved and rejected • **Ongoing activities** Fisheries, MOD, mining • **Adjacent facilities**	• **Onshore facilities** Vessel data, loading capacities • **Design** Anchoring, offshore support plant, CAD	• **Maintenance requirements** Onshore support, emergency response • **Condition monitoring**	• **Decommissioning works EIA** • **Onshore capabilities** Reuse or recycle, vessel data, loading capacities • **Adjacent facilities** • **HSE requirements** Hazardous materials • **Decommission legislation** • **Reusability assessment**
		• **Data interfacing** Operational, SCADA, digital twin. • **Hydrographic sensing** • **Meteorology** • **Nameplate Capacities**		
	• **Surveys** Benthic, grab samples, satellite, seismic, ecological, ornithological, subsurface, hydrographic, onshore, human impact, mitigations, metadata • **Models** Geology/stratigraphy, meteorology			
Oil & Gas	• **Nonintrusive Exploration** Seismic, gravity, magnetic • **Licensing options**	• **Plug and abandonment** • **Nearby pipelines** • **Intrusive exploration**	• **Subsurface reports** Well logs, drilling reports • **Output forecasts** • **SCADA** Flow rates, capacities, remote control • **Maintenance records**	• **Pipeline changes** • **Plug and abandonment**
	• **Historical subsurface reports** Well header, drilling reports • **Oil and Gas specific consents** Waste, safety zones, facility locations, contingency planning, gas storage			
	• **Models** Basin, fault line, reservoir, pressure, temperature			

Recommendations

Overview

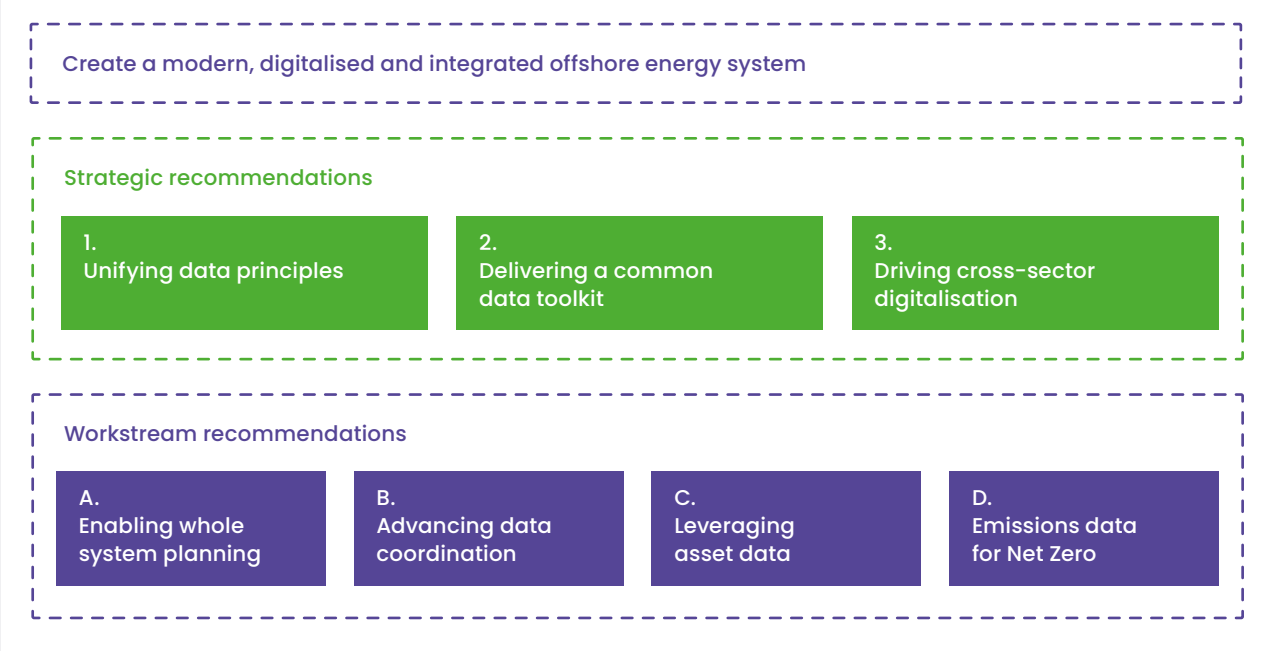
The OEDS Taskforce recommendations are grouped into two categories, strategic and workstream recommendations; taken together these recommendations describe the body of work the sector must undertake to deliver the potential of digitalisation.

Strategic recommendations (1–3) are high level interventions that are designed to create the right conditions to promote digitalisation and coordinate data strategy across the sector. Some of these recommendations and actions require Government or Regulator support to create the right environment for industry and others require industry to adopt new techniques or ways of working. The seek to develop strategy in the following areas:

- **Policy and regulation:** Setting out the key policy and guidance that Regulators, licensing bodies and industry bodies must adopt to map out the pathway for better digital and data policy.
- **Tools and infrastructure:** Building the digital infrastructure and data sharing protocols that facilitate modern, automated data sharing.
- **Digitalisation:** Identify requirements and align strategy across the sector.

Workstream recommendations (A–D) are designed to help the sector address specific issues or seize certain opportunities that have been identified by the Taskforce and sector stakeholders.

Figure 6: Recommendation structure



Recommnedations overview — continued

Implementation

Recommendations have been categorised as per the table below to provide an indication of resource and time requirements. These will be collated into a subsequent annex to inform enactment of recommendation actions.

Categorisation	Description
Quick wins	→ Least regret interventions that deliver near-term value → Small-scale projects with low risk → Deliverable within current policy and regulatory frameworks → Typically, 0–12 month delivery
Iterative improvements	→ Interventions that build on existing work to make an incremental step toward a Modern Decarbonised, Digital Energy System → Medium-scale projects with some complexity and likely have a need for extensive stakeholder engagement → Broadly deliverable within current policy and regulatory frameworks but may require some regulatory change to drive adoption → Typically, 12–24 month delivery
Strategic interventions	→ Interventions that require new approaches or solutions that set the foundation for the digitally enabled Net Zero energy system → Large-scale projects that may require funding → May require regulatory change or legislation to implement or drive adoption → Typically, 24–60 month delivery

Recommnedations overview — continued

The OEDS Taskforce recommendations are grouped into two categories, **strategic and workstream recommendations**; taken together these recommendations describe the body of work the sector must undertake to deliver the potential of digitalisation.

Create a modern, digitalised and integrated offshore energy system

Strategic recommendations

- Unifying data principles
- Delivering a common data toolkit
- Driving cross-sector digitalisation

Workstream recommendations

- Enabling whole system planning
- Advancing data coordination
- Leveraging asset data
- Emissions data for Net Zero

Strategic recommendations

Unifying data principles

The offshore energy sector should establish a Digital Strategy Group and drive the adoption of a data management framework across the offshore energy sector.

Actions

→ Create a cross-sector Digital Strategy Group
→ Implemenent Data Best Practice requirements within regulatory and licensing tools
→ Lead adoption of Data Best Practice Guidance
→ Deploy and advocate for a voluntary code for Data Best Practice

Delivering a common data toolkit

The offshore energy sector should establish a common data toolkit to facilitate controlled and automated data sharing across the sector.

Actions

→ Deliver a Offshore Energy Data Catalogue
→ Deliver the Data Sharing Fabric digitial infrastructure
→ Facilitate data interoperability initiatives

Driving cross-sector digitalisation

The offshore energy sector should coordinate digitalisation efforts to enable efficient investment and capture cross-sector requirements.

Actions

→ Gather and prioritise digitalisation requirements
→ Promote cyber security best practice and collaboration
→ Publish digital and data skills strategies
→ Support whole system digital infrastructure initiatives

Workstream recommendations

Enabling whole system planning

The offshore energy sector should create a whole system view of existing and planned infrastructure, aligning different data layers to provide a forward view of development requirements.

Actions

→ Publish an asset visibility strategy
→ Align transmission network planning requirements

Advancing data coordination

Establish a Task Group to drive interoperability of data portals across the sector and promote the discoverability and reuse of existing data through the development of a data portal roadmap.

Actions

→ Publish a high-level data portal roadmap
→ Improve data portal interoperability

Leveraging asset data

The offshore energy sector should increase the utilisation of existing operational and asset data, using the Open Data Triage process, mitigation techniques, and standardised data sharing agreements to manage risks.

Actions

→ Identify critical decomissioning data requirements
→ Facilitate wider use of legacy and operational data
→ Adopt a standardised, high-level data management process

Emissions data for Net Zero

Enable monitoring of Net Zero targets and advanced emissions tracking by leading on the provision of high-resolution and digitised emissions data monitoring and reporting.

Actions

→ Digitalise emissions data submission and provision tools
→ Align emissions data measurement and reporting requirements
→ Ensure alignment of CCUS, Hydrogen operational data reporting

Strategic recommendations

Recommendation 1: Unifying data principles

The offshore energy sector should establish a Digital Strategy Group and drive the adoption of a data management framework across the offshore energy sector.

Purpose and overview

Looking across the sector, it is evident that the importance of data and digitalisation is well understood, with regulators, licensing and industry bodies alike demonstrating a pro-active approach in identifying and setting out digitalisation strategies to achieve their respective objectives. Therefore, the overarching challenge across the sector is to ensure that these strategies are aligned, complementary, and make best use of existing resources and expertise.

This recommendation sets out the fundamental conditions required for a shared, sector wide approach to digital and data strategy. By outlining a set of unifying data principles, the constituent industries will be able to align strategies around sector specific initiatives, utilising common language, toolkits and processes that will create the conditions for a more integrated data ecosystem.

There is an abundance of data, data portals and repositories across the sector that provide operators, regulators, and the supply chain with critical operational data. However, these are ever evolving and will become more interdependent as the sector moves from independent production of fossil fuels and electricity to more dynamic systems that react to electricity demand, carbon sequestration requirements and hydrogen production.

The data requirements to enable these activities are vast and varied, including:

- geospatial asset data for planning and co-location of assets.
- imaging data for asset surveys and robotics.
- geological survey data for seabed surveys and subsurface analysis.
- electrification and transmission network requirements.
- operational data to coordinate logistics and supply chain activities.

Recommnedation 1: Unifying data principles — continued

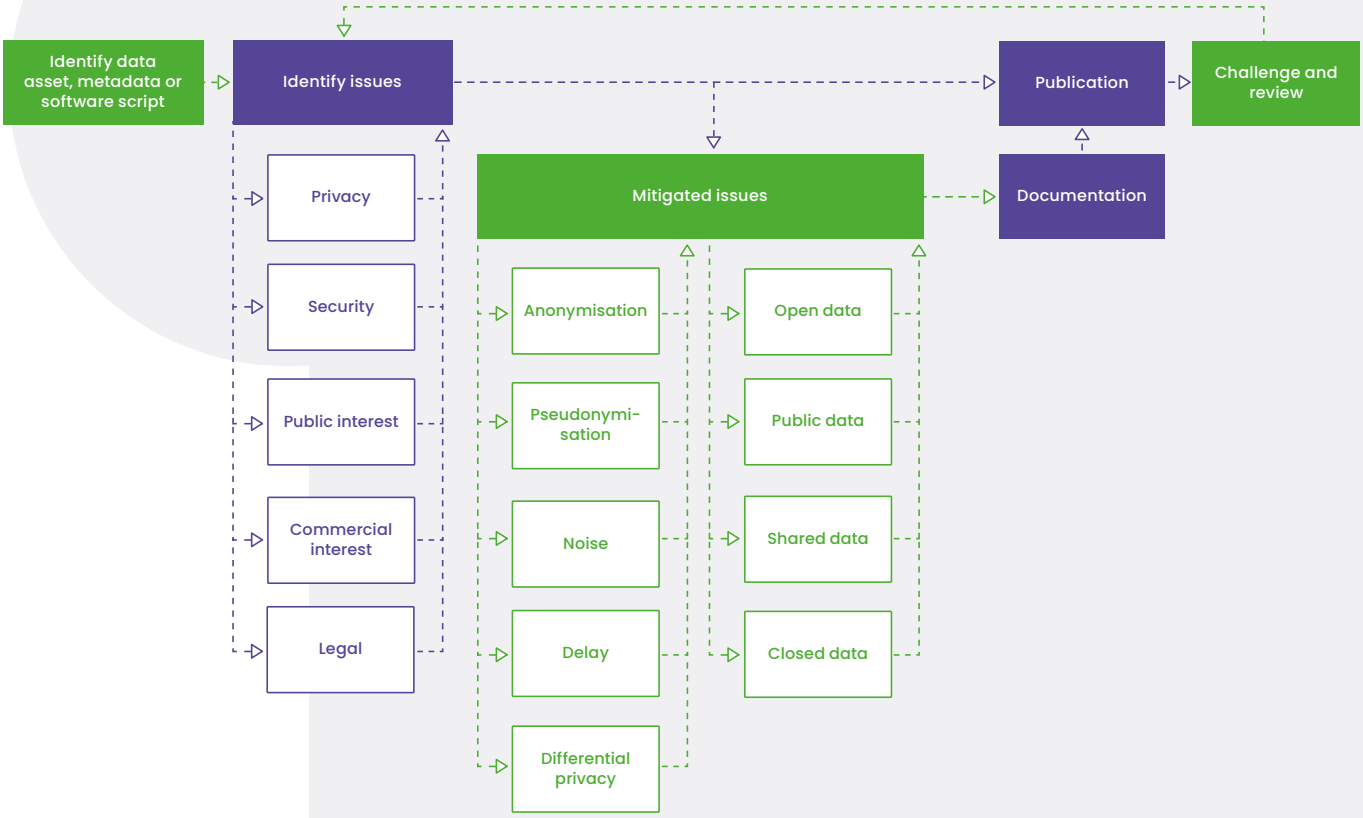
[4] Data Best Practice Guidance — Ofgem, www.ofgem.gov.uk, 2021

There are similarities and lessons to be taken from the onshore energy sector, which has sought to tackle similar challenges through the Energy Data Taskforce, Energy Digitalisation Taskforce, and numerous subsequent initiatives. Although there are differences and subtleties in the implementation approach employed in the onshore environment, there are also many elements that can be utilised or aligned with. Differences also arise from the recognition that in many ways, the offshore energy sector is ahead of its onshore counterpart in the data space, particularly regarding the collection and disclosure of survey and environmental data that is obtained or generated as part of operational activities. However, while starting from an advantageous position in terms of data availability, the coordination and strategic alignment in the offshore sector can utilise some of the outputs and learnings from onshore coordination activities.

Two key components that have driven digital strategy in the onshore sector, the creation of a strategic steering group and the creation of Ofgem's Data Best Practice Guidance[4] (DBP Guidance).

DBP Guidance sets out the high-level expectations regarding an organisation's approach to data management and improvement through the provision of eleven principles and subsequent implementation guidance. This is now a regulatory requirement of licenced network companies, with further expansion on the horizon. Given the widespread adoption of DBP Guidance and its forthcoming overlap into offshore licenced entities, it stands to reason that it should form the basis of data strategy for the offshore energy sector.

Figure 8: Open Data Triage process



High-level representation detailing the Open Data Triage Process. The process identifies data sharing issues and utilises an array of mitigation techniques, ensuring that data is published as open as possible. *ENA Data Triage Playbook, www.energynetworks.org, https://www.energynetworks.org/assets/images/ENA%20Data%20Triage%20Playbook.pdf, (CC-BY)*

Recommnedation 1: Unifying data principles — continued

The cornerstone of the DBP Guidance is the principle of 'Presumed Open'. This ambitious principle aims to change the culture of data sharing across the sector, embedding a more open approach to data management at the core of future digitalisation strategies. Crucially, however, not all data can be made truly Open, so the DBP guidance recognises this through provision of the Open Data Triage (ODT) process. This is a tool that enables data owners to assess their data, outlining and mitigating the risks specific to their data regarding legitimate data sharing concerns and documents this process in a transparent manner. The combination of these two components enables the DBP guidance to be adopted by a wide range of data types and organisations, from highly regulated, licenced entities to independent, commercial actors.

Adopting DBP Guidance, and consequently the Presumed Open principle and the Open Data Triage process, across the sector outlines a common framework for data management and facilitates greater integration both across the sector and with onshore counterparts. Adopting these core principles will help drive the cultural change and evolve the current data disclosure approach into a more open data ecosystem.

The offshore energy sector already demonstrates a high degree of maturity regarding data collection, management, and strategy. The North Sea Transition Authority already utilise data gathering powers, primarily through the Energy Act 2016, for the disclosure of key datasets, which are then made available through the National Data Repository and Open Data portal. Similarly, seabed leasing authorities The Crown Estate and Crown Estate Scotland stipulate strong data provision clauses as part of their licensing process. These data gathering requirements already implement some of the features outlined in the ODT process to mitigate data sharing risks as part of the data disclosure requirements, allowing delays in the release of certain data types to protect short-term commercial sensitivities.

By aligning around the core components and recommendations set out in this section, regulators, leasing authorities and commercial organisations will have a common way of assessing data and data sharing strategies, creating a more transparent and open ecosystem that enables behaviours to be both rationalised and challenged.

The offshore energy sector already demonstrates a high degree of maturity regarding data collection, management, and strategy.

Recommnedation 1: Unifying data principles — continued

Finally, to implement and advocate for these changes, the Taskforce recommends the creation of a Digital Strategy Group that is made up of relevant authorities. Given the varied concerns and fragmented nature of regulation across the offshore and marine sectors, no single entity is well placed to govern and steward these data principles alone and there is no single piece of legislation or regulation through which they can be enacted. Bringing together a collaborative group of regulatory and licensing organisations will maximise the adoption of the recommendations and provides the sector with focal point for formulating and implementing complementary digitalisation strategies.

Recommendation actions

Action 1.1: Digital strategy group

→ The offshore energy sector should formalise a cross-sector Digital Strategy Group to coordinate digital and data strategy across all regulatory and licensing bodies.

The OEDS Taskforce has demonstrated the ambition and ability of the sector to achieve a collaborative approach to digital and data strategy; the steering group comprises the key regulatory and licensing bodies required to implement the resulting recommendations. The NSTA, The Crown Estate, Crown Estate Scotland, BEIS, and Ofgem should be joined by relevant marine regulators, Marine Management Organisation (MMO) and Marine Scotland as the core membership. The group should be supported by industry representation from across the offshore energy sector, namely Offshore Energies UK and RenewableUK, Offshore Wind Innovation Hub (OWIH), and Net Zero Technology Centre (NZTC).

The group should initially deliver the proposed regulatory, policy, and guidance outlined in the strategic recommendations, based on the DBP Guidance recommendations outlined below. It should also formalise terms of reference for further activities, with the remit to:

→ Understand and represent the needs of data users
→ Bring forward challenges and opportunities to develop the digital and data landscape
→ Provide access to decision makers to enable fast deployment of solutions.

It should be noted that the formalisation of the Digital Strategy Group does not necessarily require the creation of a new forum or vehicle, so long as the principal responsibilities and membership outlined above is established.

Recommnedation 1: Unifying data principles — continued

Action 1.2: Regulatory and licensing implementation

→ Ofgem should expand the Data Best Practice Guidance licensing requirements into offshore Generator, Interconnector and Offshore Transmission Owner Licences.

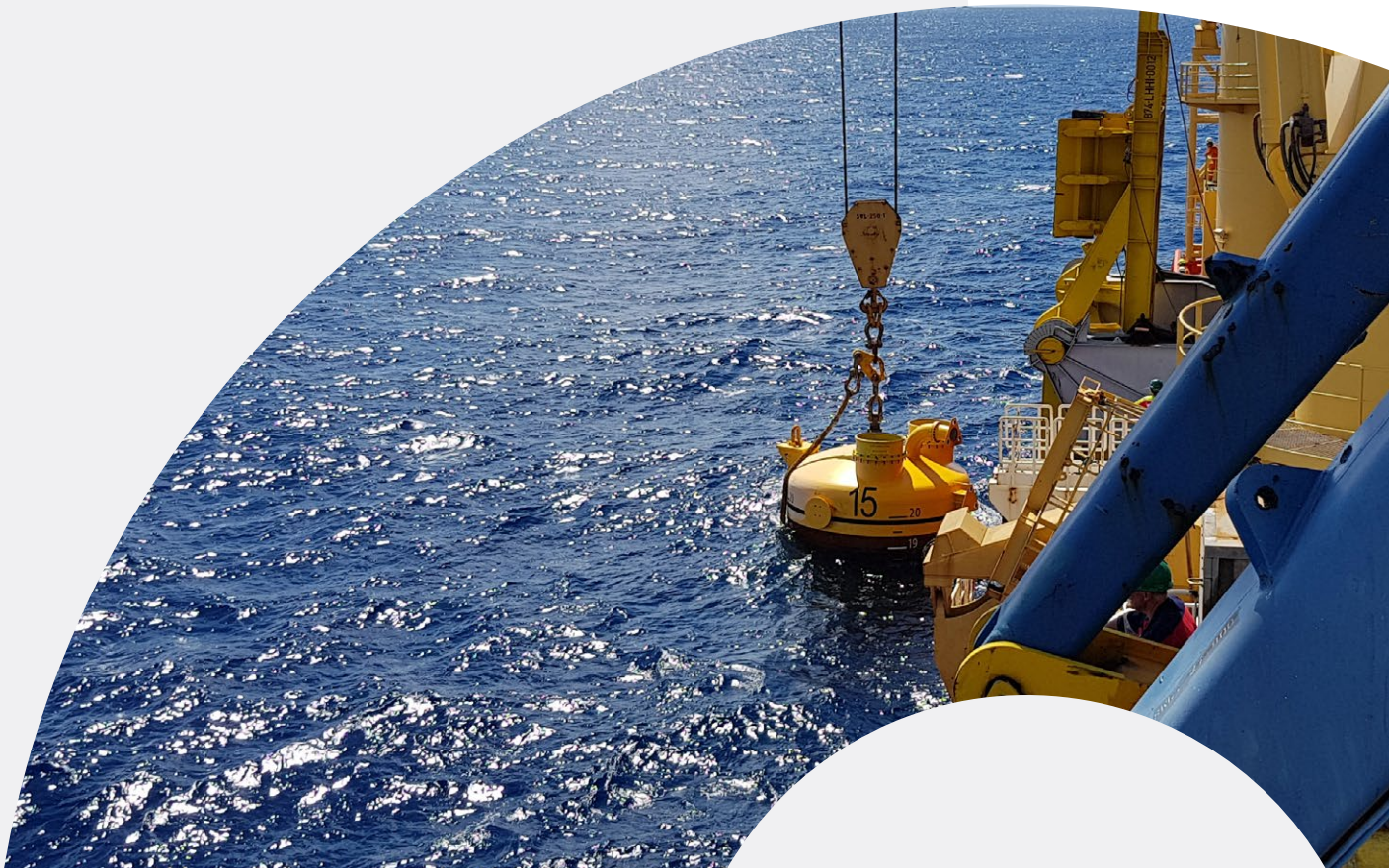
→ The Digital Strategy Group, regulatory bodies, and licensing bodies should incorporate Data Best Practice Guidance requirements into their respective regulatory instruments.

The adoption of a voluntary code, lead and advocated by industry bodies Offshore Energies UK and RenewableUK, will ensure the maximum adoption and proliferation of DBP Guidance across the sector.

Ofgem should extend the DBP Guidance licensing requirement to include Generator, Interconnector and Offshore Transmission Owner (OFTO) licences, doing so will bring offshore licenced activities in line with wider energy system reforms and promote greater alignment of data strategy.

The Digital Strategy Group should incorporate DBP Guidance requirements into their respective regulatory instruments and licensing conditions. This creates a set of mandatory data principles around which the sector can align and develop complementary data strategies. Embedding the Presumed Open principle and Open Data Triage process into core licence conditions will help drive the cultural change towards a more open data ecosystem.

Given that DBP Guidance utilises a principles-based approach and there is no single regulatory lever in which to implement this requirement, a multi-faceted approach is required. New licence and licence modification processes should be updated to incorporate the equivalent requirements. As historic licences cannot be updated mid-term, NSTA Stewardship Expectations should be utilised to drive the adoption across legacy licences. These changes will maximise the coverage of DBP Guidance, help align legacy data management, and build momentum amongst operators in changing their behaviour.



Recommnedation 1: Unifying data principles — continued

Action 1.3 — Adoption leadership

→ Offshore energy sector regulators and licensing bodies should adopt Data Best Practice Guidance within their own data management responsibilities.

Offshore energy sector regulators and licensing bodies should adopt DBP Guidance with respect to their own data management practices and responsibilities. Formalising the adoption of DBP Guidance will demonstrate leadership and help buy-in across the sector. Furthermore, it highlights good data management practice and the proactive approach taken thus far.

Leading on the implementation of Open Data Triage including publishing triage outputs and populating the *Offshore Energy Data Catalogue* (Recommendation 2) are all practical leadership steps.

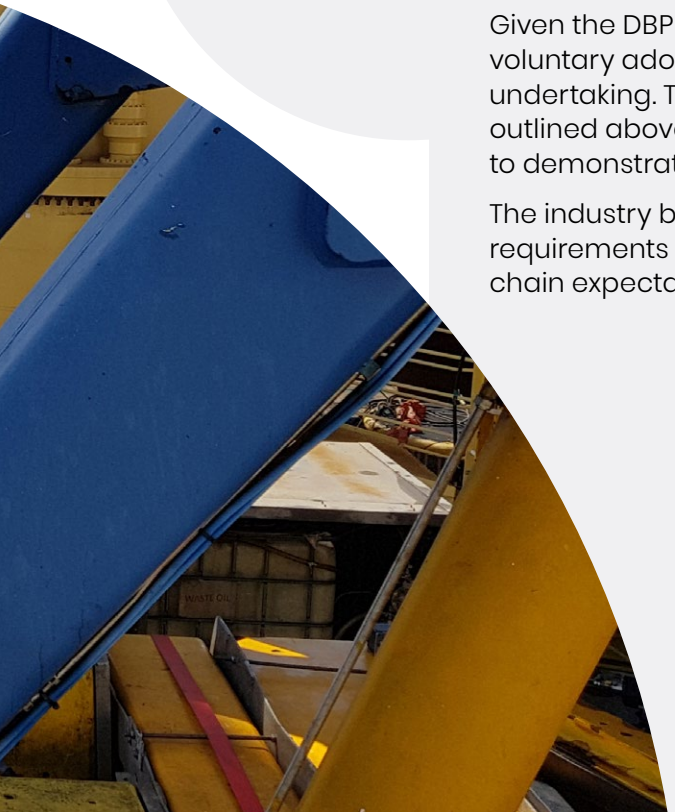
Action 1.4 — Voluntary Code

→ Industry bodies across the offshore energy sector should adopt Data Best Practice Guidance as a voluntary code, in line with Digital Strategy Group commitments.

The adoption of a voluntary code, lead and advocated by industry bodies Offshore Energies UK and RenewableUK, will ensure the maximum adoption and proliferation of DBP Guidance across the sector. This recognises that the offshore energy sector is inherently more commercial in its structure than more heavily regulated sectors and will therefore require a certain amount of voluntary adoption, of both the processes and spirit of the guidance, to drive the cultural change towards a more open data ecosystem.

Given the DBP Guidance invokes a principles-based approach, the voluntary adoption is not considered to be an overly burdensome undertaking. This addresses the areas outside of the measures outlined above and provides a clear opportunity for commercial entities to demonstrate leadership in the energy transition across the sector.

The industry bodies outlined above should incorporate DBP Guidance requirements into relevant membership requirements, such as supply chain expectations or codes of practice.



Recommnedation 1: Unifying data principles — continued

Summary

Recommended action	Detail	Lead organisations	Implementation
Digital strategy group	The offshore energy sector should formalise a cross-sector Digital Strategy Group to coordinate digital and data strategy across all regulatory and licensing bodies.	Regulatory and licensing bodies	Quick wins
Regulatory and licensing implementation	Ofgem should expand the Data Best Practice Guidance licensing requirements into offshore Generator, Interconnector and OFTO Licences.	Regulator	Strategic intervention
Regulatory and licensing implementation	The Digital Strategy Group, regulatory bodies, and licensing bodies should incorporate Data Best Practice Guidance requirements into their respective regulatory instruments.	Licensing bodies	Strategic intervention
Adoption leadership	Offshore energy sector regulators and licensing bodies should adopt Data Best Practice Guidance within their own data management responsibilities.	Regulatory and licensing bodies	Iterative improvements
Voluntary code	Industry bodies across the offshore energy sector should adopt Data Best Practice Guidance as a voluntary code, in line with Digital Strategy Group commitments.	Industry bodies	Quick wins

Recommnedation 1: Unifying data principles — continued

Offshore energy sector regulators and licensing bodies should adopt DBP Guidance with respect to their own data management practices and responsibilities.

Strategic recommendations

Recommendation 2: Delivering a common data toolkit

The offshore energy sector should establish a common data toolkit to facilitate controlled and automated data sharing across the sector.

Purpose and overview

To build an effective culture and ecosystem of connected data assets, some shared understanding of those data assets is needed. To generate that change in culture and expansion of the digital and data capabilities, an effective ecosystem of data interoperability, visibility and mobility should be targeted for improvement by all those in the offshore energy sector. If recommendation one is the strategic view, delivering the common data toolkit is the tactical action.

There are many opportunities for leveraging the wealth of data in the offshore energy sector, with some of these outlined as workstream initiatives in section 4. These all have common requirements regarding the identification and use of data from a relevant authoritative source, or the exchange of data between trusted parties through a commercial agreement. Data exists in many different standards and formats across the sector (where it is not collected for regulatory purposes) and by building a set of tools to foster collaboration and iterative improvement, the sector can incrementally improve access to both real-time and legacy data by gradually implementing the use cases flowing down from the strategy group.

To realise these opportunities, a common data toolkit should be created to provide the minimal data infrastructure that facilitates better data discovery and exchange. This includes the provision of a data catalogue to improve data visibility, data sharing infrastructure to facilitate more efficient exchange of Shared data, and interoperability initiatives to drive the alignment of licensing, glossaries, and metadata standards. Such an infrastructure will not emerge from independent efforts and must be initiated by a representative, cross-sector group to ensure maximum engagement across the offshore energy sector.

Together, the Unifying Data Principles and Common Data Toolkit recommendations outline the core components for an effective cross-sector data sharing ecosystem. Developing these as 'thin' services that perform a small number of functions well, is crucial to the success and uptake across the sector more widely. Each component must be clearly defined in terms of functionality and interfaces to maximise integration.

Recommnedation 2: Delivering a common data toolkit — continued

To build an effective culture and ecosystem of connected data assets, some shared understanding of those data assets is needed.

These elements are, to an extent, industry-agnostic and represent the fundamental tools and services required to build a more integrated data ecosystem. These have been identified through work that has been conducted off the back of the Energy Data Taskforce (2019) as well as looking at similar approaches in relevant industries.

The elements of any toolkit can be delivered through different routes. Innovation funding or competitions are a route used onshore and led to the development of the Data Sharing Fabric with the Data Catalogue being developed through government funding. These elements have combined to create a viable solution to increasing data visibility and mobility. Adopting, reusing or building upon these projects can enable an accelerated start to the offshore engagement with these products in the toolkit.

Whilst the Unifying Data Principles relates to data energy system data, this infrastructure can and should be used more widely to align data sharing practices across the sector.

Digital task groups

The Digital Strategy Group (DSG) outlined in the previous section, will have two primary functions. Firstly, the implementation of the regulation, policy, and guidance that is required to drive data strategy and digitalisation across the sector. Secondly, the group will instantiate a series of 'task groups', each with the objective of delivering a single component or project relating to the strategic and workstream objectives outlined in this report.

The range of tools and initiatives outlined in the following recommendations will require varied and tailored delivery mechanisms, ranging from innovation seed funding to government sponsorship, the balance and direction of which should be determined by the DSG. Ultimately the success of these projects will be determined by the buy-in and level of engagement from the commercial entities that they are intended to help, selecting the right delivery mechanism will be crucial to this.

This is one area where the offshore and onshore energy sectors can and should work more closely. The tools and services outlined in this section, specifically, the data catalogue and Data Sharing Fabric, share common aims and requirements. Indeed, these recommendations have utilised three years of learning and development from similar initiatives that arose from the EDTF and subsequent BEIS, Ofgem and Innovate UK funded Modernising Energy Data Programme (MED). Considering the increasing inter-dependence of offshore and onshore energy systems, the DSG should ensure that solutions arising from the following recommendations utilise existing resources or require interoperability with the wider energy data ecosystem as a minimum.

Recommnedation 2: Delivering a common data toolkit — continued

Recommendation actions

Action 2.1: Offshore energy data catalogue

→ The Digital Strategy Group should commission the development of the Offshore Energy Data Catalogue to improve data visibility and discoverability.

Visibility of data across the offshore energy sector is fragmented, with data being held across multiple portals and actors within each industry. Although there is good utilisation of data within industries, in particular environmental data is well shared and integrated, there is potential for a significant improvement in cross-sector utilisation. To enable this, it is first necessary to improve the discoverability of data across the sector.

The offshore energy sector should establish an Offshore Energy Data Catalogue to encourage cross-sectoral data use, improve data discoverability, and act as the foundation for a more advanced data sharing ecosystem.

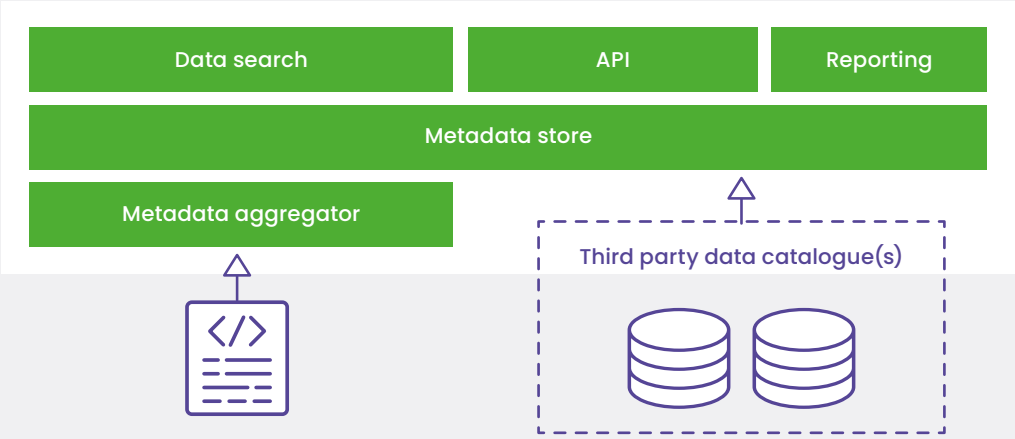
The Data Catalogue solution will collate the metadata of these disparate portals into a single, searchable location and enable organisations to easily find out what data exists and who holds it. Where data is open or publicly available downloads can be linked, and where permissions are needed an integration into either the relevant data portal, organisation, or a Data Sharing Fabric (see below) solution could enable access requirements.

The Data Catalogue creates visibility of all energy system datasets, whether held by public or private institutions. This does not mandate the sharing of data, but instead provides a standardised view of what is available across different industries and sets out the licensing and commercial terms that data is held under. This in turn stimulates engagement with datasets as parties are more easily able to identify organisations that they should negotiate data access with, in addition to providing a comprehensive view of the data landscape for regulators and licensing bodies to study and challenge as part of their ongoing data strategies. A Data Catalogue solution should use the learnings of the ONS Energy Data Visibility Discovery[5] to inform a programme of work to build a prototype Offshore Data Catalogue.

[5] ONS Energy Data Visibility Project Discovery Phase – Ofgem, www.ofgem.gov.uk/, 2021

Visibility of data across the offshore energy sector is fragmented, with data being held across multiple portals and actors within each industry.

Figure 9: Offshore energy data catalogue



High-level schematic of a data catalogue system. Metadata can be ingested through a centrally operated metadata aggregator that retrieves and updates metadata from relevant organisations. Organisations with more mature data management processes may wish to integrate more directly with the system and push their own updates to the data catalogue or synchronise compatible systems.

Recommnedations 2: Delivering a common data toolkit — continued

Action 2.2: Data sharing fabric

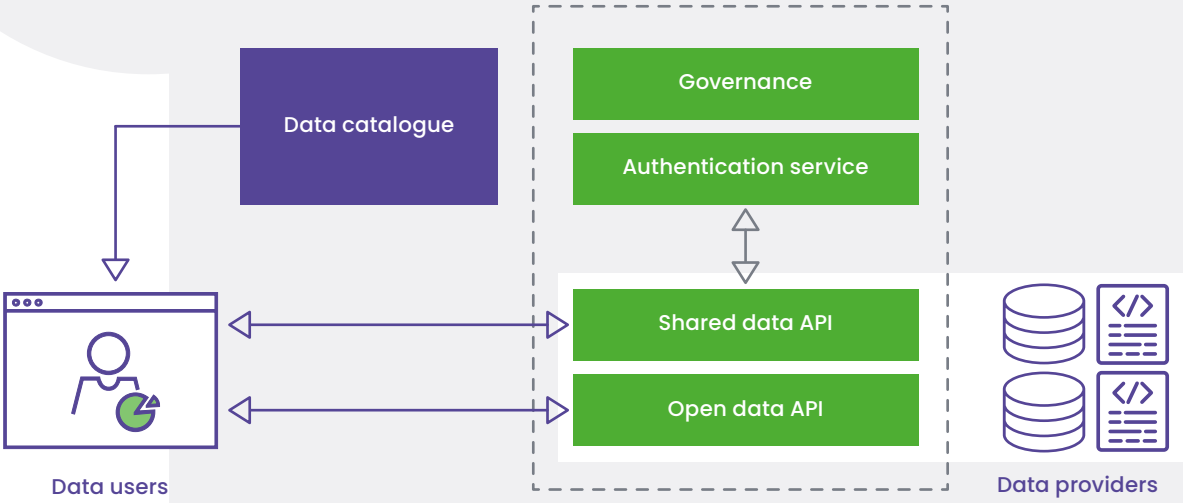
→ The Digital Strategy Group should commission the development of the Data Sharing Fabric, creating the digital components and protocols to facilitate autonomous data transfer.

To enable greater data mobility and promote the development of efficient, automated systems, it is necessary to transact data between organisations in a coordinated way through the 'Data Sharing Fabric'. The Data Sharing Fabric is a generalised term for the collection of authorisation and data transfer protocols that are required in a modern, digital ecosystem, where systems autonomously exchange data through standardised interfaces. This includes authentication services for shared data under licence, APIs to facilitate and standardised data sharing operations, indexing and search, and data request handling.

The DSG should establish Task Groups to deliver the relevant components that make up the Data Sharing Fabric, utilising existing open-source solutions that have been developed through similar initiatives, either integrating directly or ensuring interoperability of independent deployments.

The Data Sharing Fabric provides the digital infrastructure to facilitate better data transfer between trusted parties and is a requirement of several use cases that are outlined through workstream recommendations in the second part of this report. Due to the more commercial structure of the offshore energy sector, particularly compared to its onshore counterpart, the ability to transact data on a shared basis, under terms and limitations is crucial as there are fewer regulatory levers to create the basis for publication.

Figure 10: Data sharing fabric



A high-level schematic of the Data Sharing Fabric, detailing the use of an industry governed authentication service to facilitate the exchange of shared data on a limited basis to Data Users. It also shows how the Data Catalogue can be used in conjunction with the Data Sharing Fabric to facilitate authenticated data requests.

Recommnedation 2: Delivering a common data toolkit — continued

Action 2.3: Data interoperability

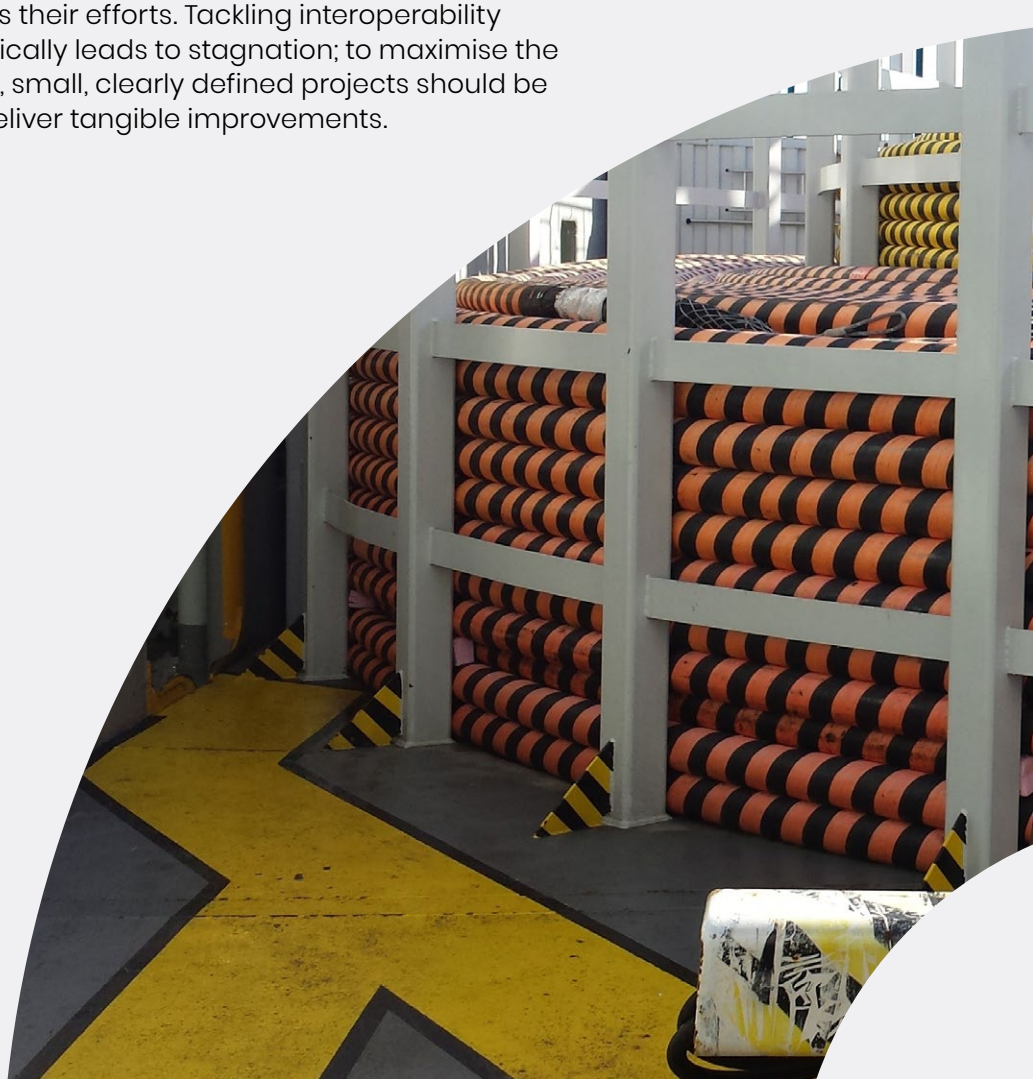
The Digital Strategy Group should establish a Data Interoperability Task Group that coordinates with workstream projects to drive development of data glossaries, aligned licence agreements, and metadata standards.

This action acts in conjunction with the others in this chapter and underpins the delivery of them. Prioritising interoperability can enable the effective and efficient transition to an environment of high visibility and mobility of Data Assets. Data licensing within the offshore energy sector is fragmented, this makes it difficult to navigate and understand how data can be used.

Aligning Metadata Standards and licence agreements helps ensure that, in addition to improving visibility and mobility of data, the Data Assets themselves also increase in utility. Strong Metadata Standards in conjunction with clean and well organised data assets reduce costs, provides greater clarity on the Data Asset, and reduces the risk of that data being used in error. Clear and consistent licensing arrangements will enable all seeking data to make more effective decisions at pace.

Identifying and commissioning projects that tackle a specific use case is key to driving the development and uptake of interoperability initiatives. The workstream recommendations that are outlined in the second part of this report identify some of the primary areas where the DSG and relevant Task Groups should focus their efforts. Tackling interoperability and standardisation head on typically leads to stagnation; to maximise the chance of success and adoption, small, clearly defined projects should be established that look to rapidly deliver tangible improvements.

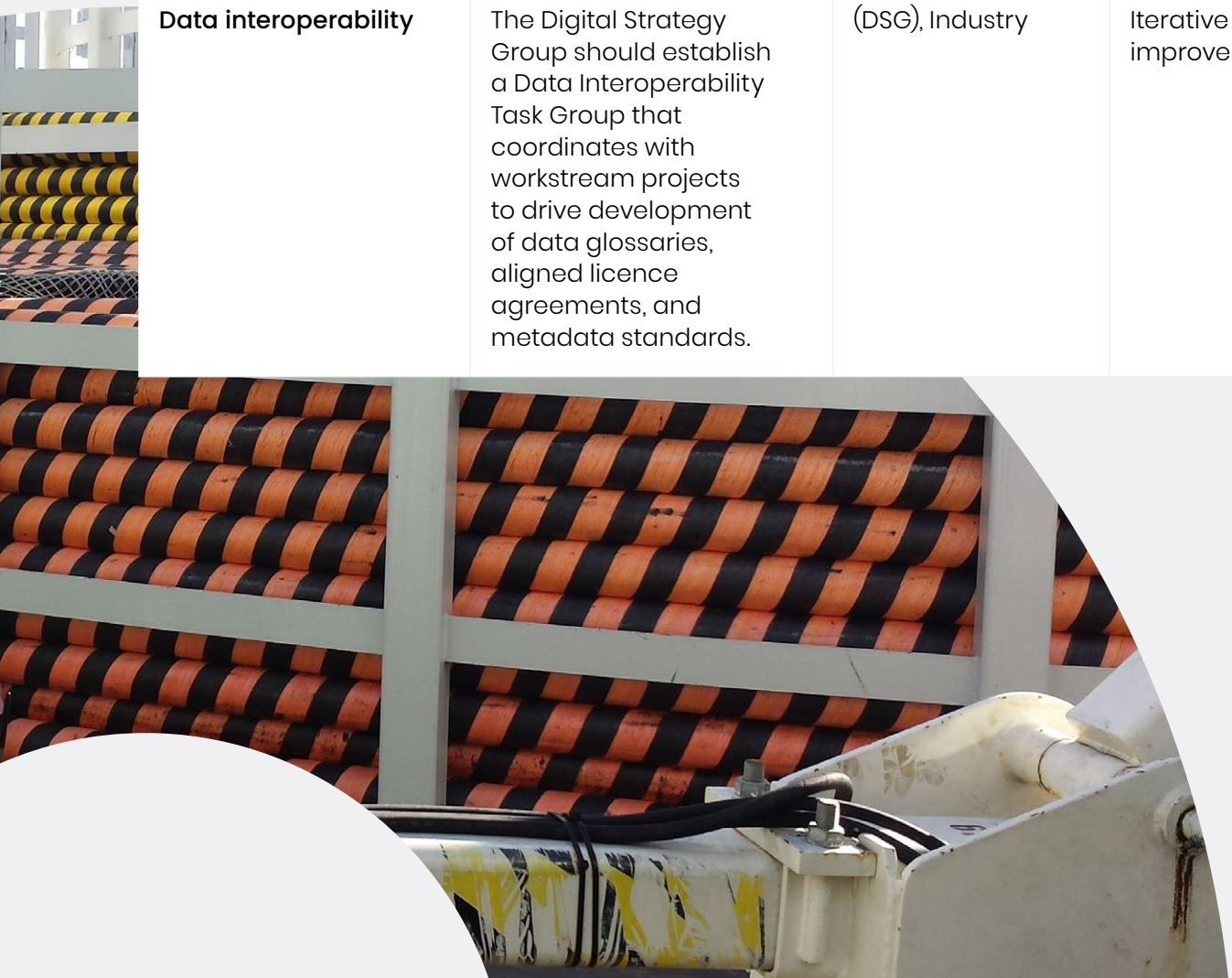
Identifying and commissioning projects that tackle a specific use case is key to driving the development and uptake of interoperability initiatives.



Recommnedation 2: Delivering a common data toolkit — continued

Summary

Recommended action	Detail	Lead organisations	Implementation
Offshore energy data catalogue	The Digital Strategy Group should commission the development of the Offshore Energy Data Catalogue to improve data visibility and discoverability.	(DSG), Industry	Iterative improvements
Data sharing fabric	The Digital Strategy Group should commission the development of the Data Sharing Fabric, creating the digital components and protocols to facilitate autonomous data transfer.	(DSG), Industry	Strategic intervention
Data interoperability	The Digital Strategy Group should establish a Data Interoperability Task Group that coordinates with workstream projects to drive development of data glossaries, aligned licence agreements, and metadata standards.	(DSG), Industry	Iterative improvements



Strategic recommendations

Recommendation 3: Driving cross-sector digitalisation

The offshore energy sector should coordinate digitalisation efforts to enable efficient investment and capture cross-sector requirements.

Purpose and overview

To build Digital technologies and data have the potential to revolutionise the offshore energy sector. Many organisations across the sector already utilise digital technologies and data solutions to optimise their operations and realise value for their business. However, the real value is unlocked by digitalisation: where digital technologies and digital ways of working are used to transform how the sector functions and the products and services that can be offered to customers.

Digitalisation of the offshore energy system will realise several benefits for business, the sector and whole country.

Digitalisation could enable the effective integration and optimisation of existing siloed operations which result in more efficient, lower cost solutions for customers. An example of this could be the integration of offshore asset management, utilising more dynamic asset monitoring technologies, proactive asset maintenance algorithms and digital workforce management solutions.

Digitalisation will also facilitate new business models and services to emerge which respond to customer needs and efficiently deliver Net Zero. This will be particularly important for developing technologies such as CCUS and emerging energy vectors such as hydrogen, which expected to play an integral role in the future energy system. These will both need to be closely integrated with existing offshore infrastructure and viable business models developed around them, digitalisation is likely to be key for both challenges.

Holistic digitalisation of the offshore energy sector is not something that organisations can achieve in isolation, nor can the full benefits be realised through purely incremental change. It will require visionaries across the sector to collaboratively identify and deliver fundamental technologies and a renewed digital culture that together, enable sector wide change. By using modern digital delivery techniques, large scale change can be broken down into manageable steps that collectively achieve the desired outcome.

Recommnedation 3: Driving cross-sector digitalisation — continued

Digitalising a sector will require a huge amount of collaboration and coordination. In many cases, digitalisation opportunities will require multiple organisations to deploy digital technologies to both monitor and control systems

The actions described below are designed to help the offshore energy sector to embrace digital technologies and data and utilise them to deliver a digitalised offshore energy sector as critical part of the UK's energy system.

Recommendation actions

Action 3.1: Cross-sector digitalisation requirements

→ The Digital Strategy Group should identify digitalisation requirements for stakeholders across the offshore energy sector to drive cross-sector digitalisation strategy through an appropriate cross-sector digital maturity survey.

Digitalising a sector will require a huge amount of collaboration and coordination. In many cases, digitalisation opportunities will require multiple organisations to deploy digital technologies to both monitor and control systems and act based on data or signals from other organisations. This is challenging for several reasons, not least because the costs and benefits are often imbalanced. This is further complicated when digitalisation opportunities span traditionally siloed energy vectors and established working relationships do not exist.

The telecommunication sector is a great example of digitalisation in practice and demonstrates that a coordinated approach has benefits for commercial entities. Commercial organisations regularly collaborate to create new digital standards and technologies that improve performance whilst retaining interoperability. In addition, the regulator actively encourages companies to share digital infrastructure and share the associated maintenance costs, this is particularly common in the mobile sector where mast sharing has become common place. These collaborative efforts have driven both technical innovation and driven down costs for customers.

It will be critical to have a way for digitalisation opportunities and requirements to be shared, discussed, and addressed. Enabling organisations to raise their digitalisation requirements will help to identify common needs of the sector, ensure that digitalisation investment is linked to tangible benefits and make sure costs are borne appropriately. Where the benefits are substantial and spread across organisations, the Digital Strategy Group may be able to justify collaborative funding bids or innovation projects which could further de-risk investment in novel digitalisation.

→

Recommnedation 3: Driving cross-sector digitalisation — continued

Action 3.2: Cyber security

→ The offshore energy sector should continue to prioritise cyber security, adhering to cyber security best practice and disseminate progress to the wider sector to help developing industries.

Digitalisation of the energy sector presents many opportunities and benefits, but it does not come without some risks that need to be mitigated. Digitalisation of previously analogue systems creates a larger attack vector that, if not managed correctly, could increase the risk of cyber-attacks causing system impacts. However, it is possible to manage and mitigate these risks through the application of cyber security best practice, a series of minimum requirements for creating secure digital operations.

There are many valuable resources that describe best practice and tangible actions that can maximise cyber security. The National Cyber Security Centre (NCSC),[6] Energy Digitalisation Taskforce,[7] academics[8] and many other offshore energy specific bodies[9] have all published extensively in this area.

Many organisations across the offshore energy sector and beyond have already demonstrated their competence in this domain but as digitalisation is accelerated, it will be key to ensure that all actors maintain the already high standards that have been set.

[6] National Cyber Security Centre, www.ncsc.gov.uk

[7] Energy Digitalisation Taskforce — Energy Systems Catapult, es.catapult.org.uk, 2022

[8] PETRAS, petras-iot.org

[9] Network Cyber Security — Ofgem, www.ofgem.gov.uk

Recommnedation 3: Driving cross-sector digitalisation — continued

As the sector transitions towards Net Zero, it will be essential to ensure that existing skills within declining areas are utilised in growth areas.

Action 3.3: Digital and data skills

→ Offshore energy organisations should develop, publish, and implement digital skills strategies. The Digital Strategy Group should utilise policy, regulation, and innovation funding to address potential skills gaps.

Digitalisation of the offshore energy sector will require a whole host of digital and data skills. Digital and data practitioners will be needed to design, deploy, and maintain new digital and data solutions, managers will be needed to oversee the delivery of successful digital and data transformation projects and leaders across the sector will be needed to identify opportunities and secure funding for digitalisation.

There are many individuals across the offshore energy sector who possess high level digital and data skills, however digitalisation of the sector will require many more specialists and for much of the workforce to have foundational digital and data skills. It will be critical to ensure that leaders and managers across the sector (not just in technical departments) are sufficiently digitally literate and able to support digitalisation.

As the sector transitions towards Net Zero, it will be essential to ensure that existing skills within declining areas are utilised in growth areas. In addition, digital skills and expertise developed during innovation projects should be harnessed.

The Taskforce recognises that there is a particularly strong information management culture in the oil and gas sector and these skills are in demand across renewables organisations. The offshore wind sector is currently deploying many new wind farms with state-of-the-art digital monitoring, these skills will be of great value to hydrogen producers.

By developing and publishing Digital Skills Strategies, organisations can identify their digital and data skill needs and describe how they expect to address this. Monitoring and reporting on implementation will allow the Digital Strategy Group to identify and manage skills short falls which can be addressed through policy, regulatory or funding interventions.

Recommnedation 3: Driving cross-sector digitalisation — continued

Action 3.4: Common digital infrastructure

The Digital Strategy Group should support industry to develop and adopt common digital infrastructure, such as a Digital Spine, to drive cross sector digitalisation and whole system optimisation.

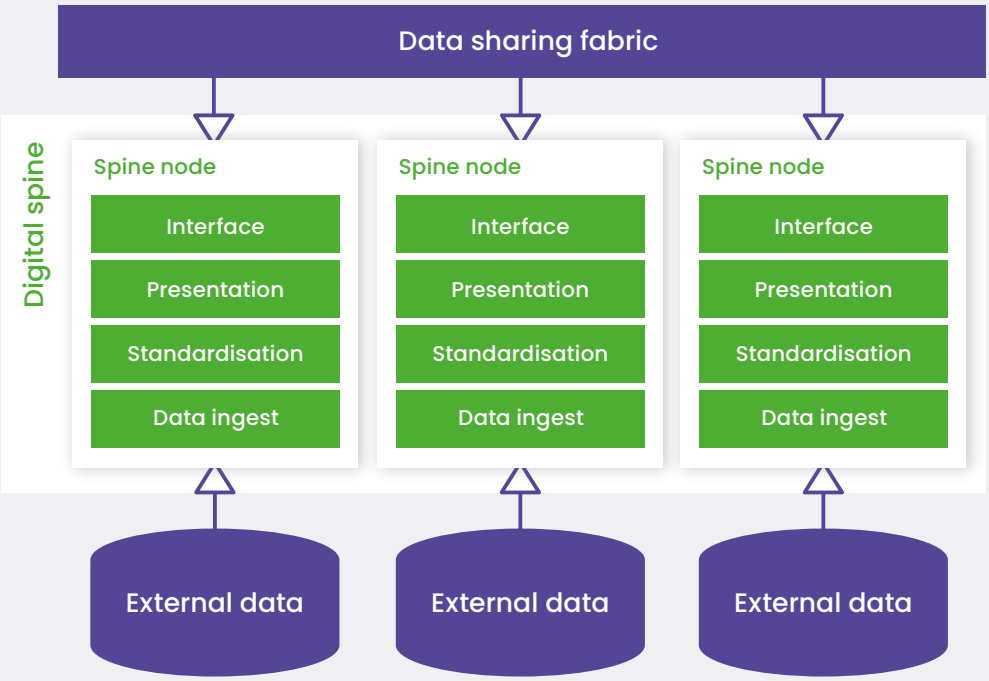
The offshore energy sector is part of the highly networked and interdependent UK energy system. Actions of one actor directly impact others.

The offshore energy sector is part of the highly networked and interdependent UK energy system. Actions of one actor directly impact others. In some cases, actions will impact other systems almost immediately, power networks, generators and demand need to be instantaneously balanced to ensure the system remains stable. In other cases, the rate of impact will be slower but still important, gas extraction and storage need to be closely managed to ensure that demand can be met both in the near term and across seasons.

Where these interdependencies exist, digitalisation can help to understand and manage the risks they create as well as embrace new opportunities that are created. One such example is the Digital Spine that was proposed by the Energy Digitalisation Taskforce. This decentralised digital system monitoring solution is designed to help actors across a distributed system to understand the behaviours of other parties and how this could or should impact their actions. The EDiT proposal describes the Digital Spine in the context of the power system which is directly relevant to offshore networks and power generators however the value of this approach also applies to gas and hydrogen operators that integrate into the wider UK energy system.

Another example of a common digital asset which has even wider applicability could be systems which enable carbon data sharing and supply chain tracking.

Figure 11: Digital Spine



High-level schematic detailing a possible architecture for a 'Digital Spine' system. The concept standardises the ingestion and presentation of data to facilitate automated data exchange through the Data Sharing Fabric.

Recommnedations 3: Driving cross-sector digitalisation — continued

Summary

Recommended action	Detail	Lead organisations	Implementation
Digitalisation requirements	The Digital Strategy Group should identify digitalisation requirements for stakeholders across the offshore energy sector to drive cross-sector digitalisation strategy through an appropriate cross-sector digital maturity survey.	Digital Strategy Group	Quick wins
Cyber security	The offshore energy sector should continue to prioritise cyber security, adhering to cyber security best practice and disseminate progress to the wider sector to help developing industries.	Offshore Energy Sector	Quick wins
Digital and data skills	Offshore energy organisations should develop, publish, and implement digital skills strategies. The Digital Strategy Group should utilise policy, regulation, and innovation funding to address potential skills gaps.	Offshore Energy Sector	Iterative improvements
Common digital infrastructure	The Digital Strategy Group should support industry to develop and adopt common digital infrastructure, such as a Digital Spine, to drive cross sector digitalisation and whole system optimisation.	Digital Strategy Group, Industry	Strategic intervention

Workstream Recommendations

The following recommendations are designed to address specific issues or seize certain opportunities that have been identified by the Taskforce and sector stakeholders.

Each recommendation has a high-level opportunity, which describes a theme of work that should be established and monitored by the DSG as an ongoing concern. Within each of these workstreams are a series of project or initiative recommendations that define a clear scope of work that can be undertaken to further the high-level opportunity.

The workstream recommendations reflect a collection of input and feedback the project has received from a variety of stakeholders, grouped into opportunities relating to whole system planning, data coordination, asset data, and emissions data. They have been curated and highlighted as projects that could deliver significant progress towards digitalisation objectives, providing a clear use case to drive adoption and cooperation.

It is expected that in addressing these workstream recommendations, the relevant 'lead organisation' will draw heavily on the outputs of the strategic recommendations outlined earlier in the report. The DSG should retain oversight of each workstream to ensure that both the strategic and workstream recommendations objectives remain compatible and complementary.

Within each of these workstreams are a series of project or initiative recommendations that define a clear scope of work that can be undertaken to further the high level opportunity.

Workstream recommendations

Workstream A:
Enabling whole system planning

The offshore energy sector should create a whole system view of existing and planned infrastructure, aligning different data layers to provide a forward view of development requirements.

Purpose and overview

To achieve the objectives set out by the North Sea Transition Deal and Offshore Wind Sector Deal, in addition to supporting growth in developing industries such as hydrogen and CCUS, it is essential to take a 'whole system' view of system planning and development. This requirement means that information regarding the planning, construction, and operation of offshore assets across the sector is available in both sufficient resolution and over appropriate timescales.

The evolution and transition of activities across the UK Exclusive Economic Zones (EEZ) will result in a significantly more crowded and diverse operational environment, it is therefore vital that there is a consistent approach to asset information, transmission network requirements and the exchange of critical data that underpins planning and operations.

In many cases, this data already exists, and the challenge is not collecting more data but coordinating between different entities to enable data to be shared in a consistent manner, with clear use cases and initiatives that focus on realising the benefits of broader data cooperation.

Data regarding the location, connectivity, and condition of assets across all operational sectors is a fundamental requirement that enables projects at all scales. Establishing a suitably open and authoritative source of key infrastructure and identifiers enables other data owners and users to reliably link information to known data points and form the framework for other services to be built upon. Data identifier 'key maps' that translate between related datasets can also be published, enabling data to be joined and integrated more accurately and efficiently.

Workstream A: Enabling whole system planning — continued

The evolution and transition of activities across the UK Exclusive Economic Zones (EEZ) will result in a significantly more crowded and diverse operational environment.

This recommendation recognises that there are justifiable sensitivities around the sharing and availability of certain data types, particularly where private entities retain the authoritative data. As with other recommendations in this report, the utilisation of the data principles and common data infrastructure set out in the strategic recommendations will be key to enabling the exchange of such data between trusted parties. Regulators and data owners that can make data available through legislation or licence conditions can ensure that fundamental datasets facilitate better data exchange by driving data standards and interoperability of core infrastructure data.

The National Energy System Map

The National Energy System Map (NESM) is a collaborative project that is seeking to bring together network data from Britain's electricity and gas network operators into a whole energy-system map.

The NESM project is working with Ordnance Survey and Spatial to create a single view of energy asset ownership and location data to improve investment decision making and facilitate the development of new markets.

Workstream A: Enabling whole system planning — continued

A—1: Asset visibility strategy

→ Establish an Asset Visibility Strategy, with remit to build a comprehensive and open picture of assets deployed across the UK EEZ.

The offshore energy sector should establish a cross-sector asset visibility strategy to provide a clear view of all assets and infrastructure across the UK EEZ to drive the alignment and interoperability of existing and proposed infrastructure information.

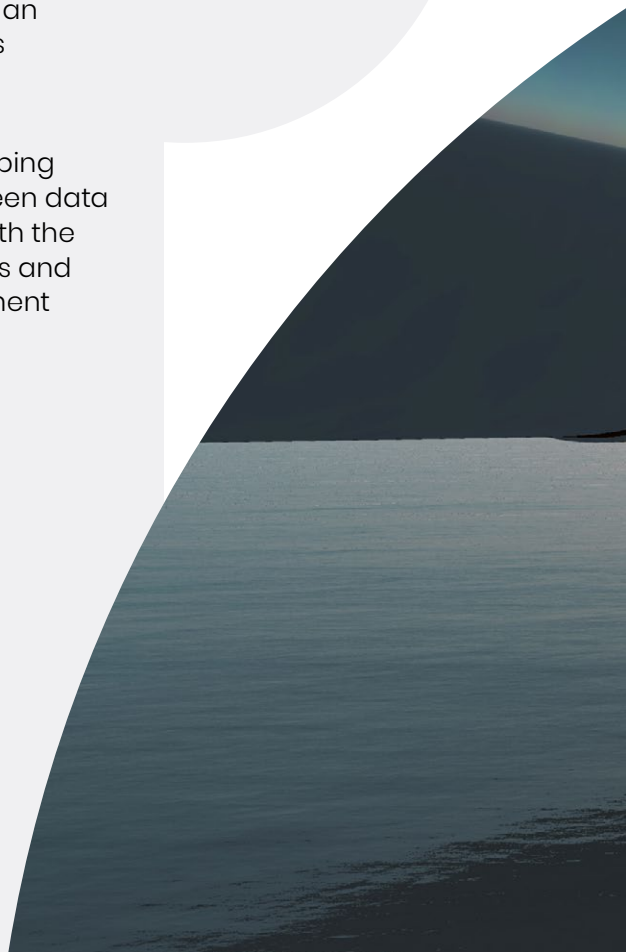
The strategy should cover all offshore energy assets that relate to the ongoing operation of an integrated offshore energy system, including pipelines, oil and gas operational infrastructure, renewable generation assets, and transmission and telecommunication cables. The strategy should identify the suitable custodians for each asset type, detailing the current maturity and accessibility of data that is held in either the public or private domain. This in turn will enable the identification of areas that require further data collection initiatives or data management improvements to achieve the desired level of visibility. To enable efficient use of asset data from across the sector, there needs to be alignment on the licensing, data formats and, where possible, interfaces across all asset data sources.

Given there are numerous custodians of asset data across the sector, it is not practical or desirable to consolidate asset data with a single entity. Instead, existing data owners should ensure that their datasets are interoperable with core datasets that facilitate better data exchange through interoperability and cross-referencing. The seabed data managed by the UK Hydrographic Office (UKHO) is an example of one such dataset as it provides common references and identifies for other asset data to be structured around.

The recently launched UKHO Centre for Seabed Mapping (CSM) initiative aims to coordinate between current government mapping initiatives, promoting standards and data interoperability between data managers across the UK EEZ. This approach bears similarities with the MEDIN project that has demonstrated how a range of data types and sources can be stewarded through a federated data management model and drive alignment across different data domains.[10]

[10] Value chains in public marine data — OECD, www.oecd.org, 2021

[11] Offshore Transmission Network Review, www.gov.uk



Workstream A: Enabling whole system planning — continued

The offshore energy sector should establish a cross-sector asset visibility strategy to provide a clear view of all assets and infrastructure across the UK EEZ.

Data owners who already provide visibility of asset information, such as pipeline installation and network topology data provided by the NSTA, new programmes of work such as the Offshore Transmission Network Review[11] (OTNR) for future offshore wind asset data, and existing offshore transmission infrastructure should all be included in the asset visibility strategy. Ensuring that low level datasets are interoperable and visible will create a backbone of asset infrastructure information that greatly improves the ability of offshore data users to integrate their data in a standardised way and facilitates better data exchange.

A primary use case for such an initiative to drive adoption and participation would be the creation of a national subsea asset register, utilising expertise and data from different industries to derive a common view of critical infrastructure. Similar projects are underway for onshore subsurface assets, such as the National Underground Asset Register, which brings together different utility and surveying experts to improve data availability, quality. and integration. Such a tool would provide benefit not only to the offshore energy sector industries, but also the wider offshore sector, providing visibility to defence, fishing, and aggregates industries on the makeup of offshore assets.

Workstream A: Enabling whole system planning — continued

A—2: Network planning visibility

→ Create a clear and comprehensive view of demand and generation requirements across the sector to provide visibility to transmission network planning authorities.

The DSG should align network planning visibility data, ensuring that electrification requirements from across the sector are made available to relevant transmission planning initiatives. Only by creating consistent visibility of generation and demand requirements across the sector, can efficient network planning be achieved.

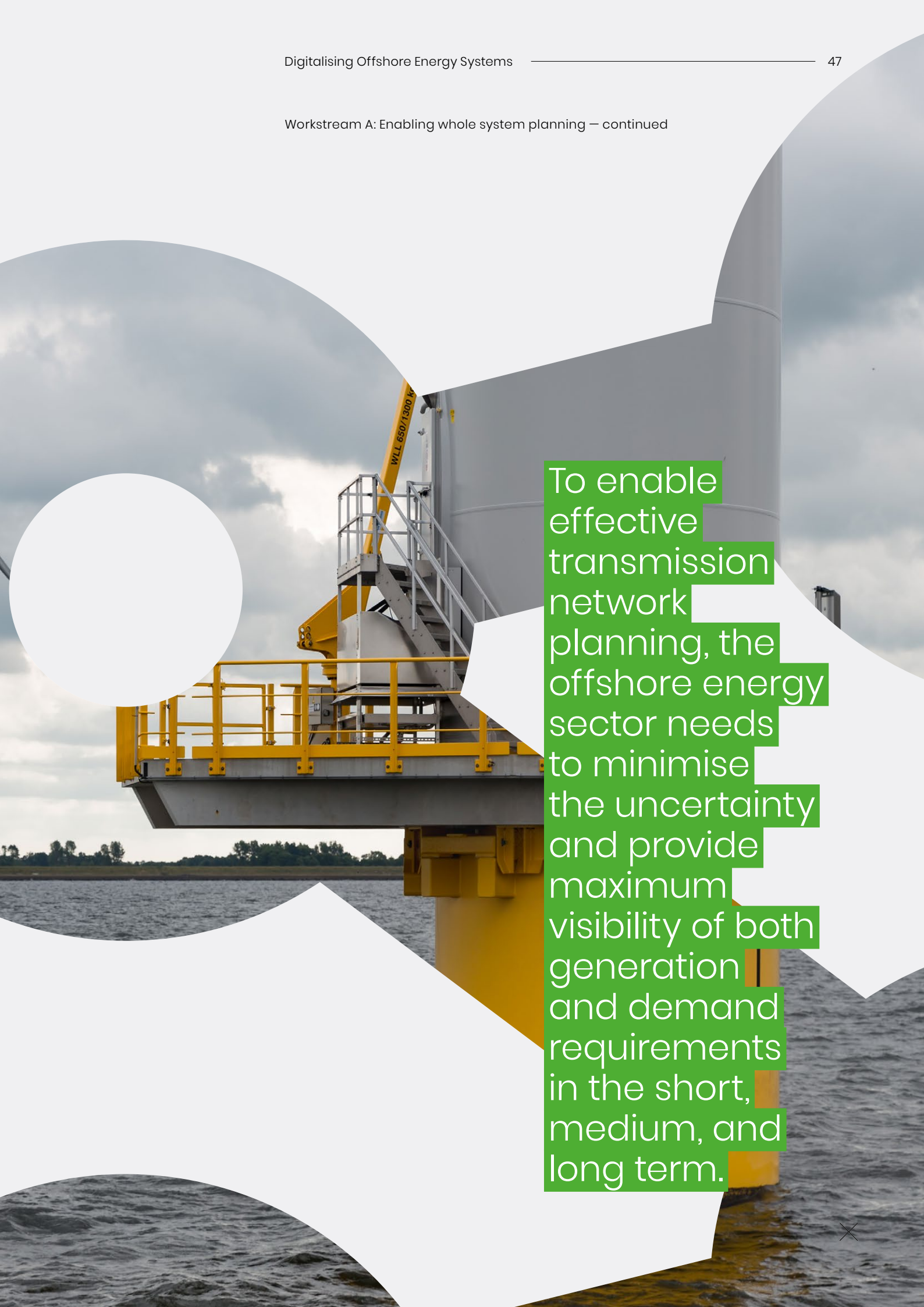
Historically, transmission network planning and construction has been undertaken iteratively as new projects and assets are confirmed, with network planning activities typically initiated once licensing rounds have been concluded. Transition plans across the UK EEZ will result in both an increase in demand as well as generation capacity as the oil and gas industry electrify their production operations to hit Net Zero targets. Combined with the longer-term prospect of increased demand for collocated hydrogen production acting as a secondary transport vector, a strategic and coordinated approach to transmission network planning is required.

To enable effective transmission network planning, the offshore energy sector needs to minimise the uncertainty and provide maximum visibility of both generation and demand requirements in the short, medium, and long term. By creating better visibility of deployment plans, transmission assets can be commissioned in anticipation of expected connections, which in turn will reduce the time taken for projects to move from planning to operation.

Ongoing strategic initiatives, such as the OTNR and Future Offshore Wind Scenarios are looking to establish longer-term certainty of generation capacities, across wind, floating wind, and other renewable sources. It is important that the ongoing transmission and infrastructure planning initiatives can derive expected demand and generation requirements across the whole sector. This includes the renewable developments mentioned above, but also oil and gas electrification requirements and hydrogen generation requirements. To enable a whole system view of offshore energy transmission requirements, the DSG should ensure that expected electrification and hydrogen demand information is made available in a similar and compatible format for all relevant industries.

In addition to improved forward visibility of generation and demand requirements, it is also necessary to ensure that leasing and connection application processes work in tandem to provide greater certainty as projects move through application, consenting and planning processes. The Digital Strategy Group should commission a review of existing processes alongside network planning initiatives to ensure that reporting requirements, modelling methodologies, and assumptions are aligned; establishing the common aims of these will help identify opportunities to further streamline the connections process.

Workstream A: Enabling whole system planning — continued



To enable effective transmission network planning, the offshore energy sector needs to minimise the uncertainty and provide maximum visibility of both generation and demand requirements in the short, medium, and long term.

Workstream recommendations

Workstream B: Advancing data coordination

Establish a Task Group to drive interoperability of data portals across the sector and promote the discoverability and reuse of existing data through the development of a data portal roadmap.

Purpose and overview

The success and speed of digitalisation more broadly across a sector is dependent on not only the provision of sufficiently detailed, accurate data, but also the ability for different organisations to efficiently exchange relevant data. Digitalisation, therefore, requires the availability of both high-quality data and the availability of suitable interfaces to transact this information.

There are significant resources of data openly available across the offshore sector, spanning licensing, operational, infrastructure and environmental data. These are made available in a variety of methods ranging from static data releases to fully fledged data portals that provide advanced querying and mapping functionality for users to interact with available datasets.

Regulators, licensing bodies, and environmental groups across the sector have demonstrated leadership in implementing a more open approach to data by developing portals and data management tools that make data available under open licences and have proactively identified areas where data collection powers can be invoked to improve availability.

The DBP Guidance (see *Unifying Data Principles*, Recommendation One) sets out the high-level principles that data owners should aim for when prioritising development areas and objectives for their respective data assets. Taken together, these principles provide a basis on which datasets can be developed into knowledge hubs, providing additional context and functionality users above the provision of data. Datasets that meet key user needs should be curated and supplied alongside supporting information regarding their gathering techniques, processing, and interpretation guidance.

The success and speed of digitalisation more broadly across a sector is dependent on not only the provision of sufficiently detailed, accurate data, but also the ability for different organisations to efficiently exchange relevant data.

Workstream B: Advancing data coordination — continued

To continue the development and encourage a more integrated data landscape, the offshore energy sector should establish a data portal Task Group that brings together the main data portal operators across the sector. The MEDIN project (National Oceanography Centre) is a primary example of a federated data management model that coordinates across multiple industries to ensure the ongoing identification, development, and adoption of good data management practices. A similar approach should be taken to offshore energy data. It is crucial to ensure that different portal development plans are aligned to coordinate product development priorities and identify key interactions and interoperability requirements.

through legislation or licence conditions can ensure that fundamental datasets facilitate better data exchange by driving data standards and interoperability of core infrastructure data.

The NSTA has worked with The Crown Estate and Crown Estate Scotland to create an Energy Map for the UKCS, which lists over 60 in-construction or active wind, wave, and tidal sites on the UKCS as well as recently awarded CCS licences and nearly 500 petroleum licences. It also includes infrastructure data collected under NSTA's Section 34 powers of the Energy Act 2016.

The Energy Map for the UKCS utilises NSTA's open data APIs, which currently support over 1.9m requests per week driving workflows in industry, government and academia as well providing transparent access to NSTA's open data for many communities.

Workstream B: Advancing data coordination — continued

B—1: Data portal roadmap

→ Establish a Task Group to oversee the coordination of data portals across the sector. Develop a roadmap to that outlines the current state and direction of travel for relevant data portals.

The DSG should establish a Task Group to develop a cross-sector, data portal roadmap to drive the alignment and coordination of data portals and resources across the offshore energy sector.

Data portals are a fundamental tool in providing greater access to industry data, enabling users to engage with organised information from a variety of sources. They can also play a pivotal role in driving standardisation and interoperability, acting as enforcers of data quality by setting the data formats and validation requirements. However, data portals in isolation only go so far in addressing user needs if there is little coordination between the different portals and direction of development. As the sector becomes interconnected in its operations and more closely integrated with onshore systems, a holistic view and plan for data resources across the sector is required to enable data portal operators to meet evolving user needs.

A data portal roadmap initiative should be informed by findings from the cross-sector digital maturity survey outlined in the Driving Cross-sector Digitalisation recommendation (section 0). This will define the scope and identify priority use cases regarding data portals and services across the offshore energy sector. Given the proliferation of existing data portals and services, a tiered approach would enable the iterative development of a comprehensive, cross-sector roadmap, initially looking at portals and data services provided by regulators, licensing bodies and public datasets that are of primary use to the sector.

A non-exhaustive list of such portals that should be included in this process are as follows: Open Data Portal (The Crown Estate), Marine Scotland Data Portal (Crown Estate Scotland), Open Data and National Data Repository (NSTA), Marine Data Exchange (The Crown Estate), Wave and Tidal Knowledge Network (ORE Catapult), Platform for Operational Data (ORE Catapult). The review process should also identify and include other key or primary data sources in this phase.

Secondly, expanding the review to include wider industry data portals and services that users may utilise in conjunction with primary data sources, such as: ADMIRALTY Marine Portal (UKHO), (British Geological Survey Data (National Geoscience Data Centre), LCCC Data Portal (LCCC) and data.gov.uk (UK Government). Finally, portals and service operated by commercial industry participants should be considered where they are considered to have a significant role in coordination of operations or data provision.

The roadmap initiative should act as a cross-sector engagement point to gather and align definitions of data users and their needs, allowing regulators and industry groups to integrate them into their own digitalisation strategies. Crucially, the roadmap will provide a coordination point between industry portal operators that enables a wider view of user service requirements, this will encourage a greater emphasis on linking existing services in an efficient manner. This should include identifying where datasets might be better archived or managed, utilising existing investments over new initiatives.

Workstream B: Advancing data coordination — continued

B–2: Data portal interoperability

→ The Data Portal Task Group should drive the alignment of standards, user experience, and data access patterns across key data portals to improve interoperability and efficiency in line with Data Portal Roadmap.

Building on the Data Portal Roadmap, the Data Portal Task Group should outline a programme of work to align user interactions across key data portals to improve interoperability and enable more automated, efficient use of data resources.

Developing digital infrastructure that is interoperable and provides shared services across a sector requires the ongoing coordination and collaboration between service providers. The Task Group should establish a core membership of data portal and data resource operators and set out clear guidelines and objectives to drive continued improvement in interoperability. Undertaking the creation of the data portal roadmap will initiate and guide this process, after which a more technical task group should be established to deliver key objectives regarding standardisation, user needs, and interconnectivity.

Building on the Data Portal Roadmap, the Data Portal Task Group should outline a programme of work to align user interactions across key data portals.

The outputs and work undertaken as part of the Common Data Toolkit recommendation will provide guidance on the utilisation of aligned industry terms, glossaries, and naming conventions to help drive the alignment of related data portals. Data owners should also focus on the implementation and alignment of existing standards identified in the data portal roadmap to further drive interoperability.

Identifying and enabling the linking of key datasets through common industry identifiers enables more accurate joining of datasets from across the sector, providing authoritative mappings between fields and values is one way to achieve this and utilises the outputs of the Enabling Whole System Planning (Workstream A) initiatives. Metadata and supporting information for key datasets should be maintained, ensuring that relevant datasets are visible in the Offshore Energy Data Catalogue and data catalogue vocabulary (DCAT) files provided to enable catalogue interoperability.

Where possible, user access patterns should be aligned to reduce the difficulty of accessing data from multiple portals and services, which should be analysed part of the data portal roadmap. The development of APIs, which provide automated, machine readable interfaces should be prioritised to enable dynamic data to be integrated into new services and tools.

Developing tools or products that look to integrate data from multiple sources and present processed information to users is another way to drive interoperability. The subsea asset register recommendation outlined in Asset Visibility Strategy (Workstream A-1) is a prime example where a collaborative initiative that focuses on the development of a tool that can be widely utilised across the industry. Typically, the value of such projects can only be realised once a critical mass of collaborating parties is achieved, requiring leadership and initial funding from a suitable authority or R&D focused organisation such as the NZTC.

Workstream recommendations

Workstream C: Leveraging asset data

The offshore energy sector should increase the utilisation of existing operational and asset data, using the Open Data Triage process, mitigation techniques, and standardised data sharing agreements to manage risks.

Purpose and overview

As activities across the UK EEZ transition, it will become more common for organisations to utilise and rely on information about assets held and operated by other entities. An example of this is for CCUS, where assets could be directly re-purposed for new functionality, less obvious though, is the need to increase visibility of asset data to stimulate and enable new markets, such as decommissioning. To unlock the value in these use cases, a pro-active approach to identifying, digitising, and increasing access to asset data is required. In this recommendation, we broadly define asset data as data relating to energy system infrastructure, maintenance, and operational data, both historic and current.

Asset owners and operators across the sector manage vast quantities of data relating to their assets, which vary significantly in how accessible and readily usable they are. Assets that were designed, built, and commenced operations prior to the widespread use of interconnected digital systems have significant quantities of 'analogue' data (not in a machine-readable format), such as technical design drawings and historic operational data.

At the other end of the scale, assets built more recently will have the interfaces and protocols available to stream or efficiently exchange data between parties, but there are also significant and justified concerns regarding the open publication of data, particularly where organisations are involved in highly competitive processes such as the offshore wind leasing regime.

However, despite the range of challenges associated with asset and operational data across the sector, there is clear and justifiable demand for a more open approach, where benefits can be realised beyond the individual organisation that owns or manages the data in question. Controlled and managed data sharing can accelerate the progress towards industry and economy wide objectives that are shared across the offshore energy sector.

Asset owners and operators across the sector manage vast quantities of data relating to their assets, which vary significantly in how accessible and readily usable they are.

Workstream C: Leveraging asset data — continued

The following proposals identify key areas where a considered approach to asset data sharing or management can unlock some of the wider system benefits to tackle sector objectives. Crucially, these initiatives are ways that the sector can employ a collaborative approach to delivery whilst utilising the digital tools outlined in the strategic recommendations to mitigate some of the perceived challenges to data sharing and utilisation.

Data Trusts (NZTC, TLB)

Innovative legal models that facilitate the exchange of commercially sensitive information such as 'data trusts' are being tested in different industries. One such example is the Data Trust proof of concept (NZTC, Technology Leadership Board) that is testing the model as a method of sharing decommissioning project data.

Such initiatives allow commercial entities to pool sensitive data, whilst managing and mitigating legal risk through the data trust model. This could create alternative options for facilitating data sharing in addition to the tools and policies outlined in the strategic recommendations.

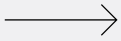
C–1: Data driven decommissioning

→ Establish a Data Driven Decommissioning Task Group to identify cost-critical decommissioning data and create wider access to non-digital information to help drive decommissioning digitalisation.

The DSG should establish a Data Driven Decommissioning Task Group that is responsible for identifying and prioritising decommissioning data requirements and opportunities across the offshore energy sector. This will initially focus on oil and gas decommissioning requirements, including the identification of cost-critical operational data, data digitisation initiatives, creation of minimum asset data requirements for decommissioning data packs, and defining and publishing performance benchmarks.

In terms of direct, measurable impact, there are few greater single opportunities for better data utilisation than the offshore decommissioning initiative. Over the coming decades it is estimated to cost £46bn, meaning any marginal gains in efficiency have the potential to provide substantial benefits to both private and public interests. This is just for the oil and gas industry, as wind farms and other renewables installations reach the end of their lifecycle, similar challenges will arise to ensure projects remain commercially competitive.

Digitalisation can play a significant role in realising efficiencies in decommissioning activities across the sector, but the availability and provision of data is critical to this and will have major impact on the final cost and effectiveness of the decommissioning market.



Workstream C: Leveraging asset data — continued

Operators possess the detailed information and data required to effectively plan their decommissioning requirements, this must be captured and made available to the supply chain to facilitate tighter integration in a way that is compatible with the commercial interests of operators.

Whilst offshore wind assets are generally in the earlier stages of their lifecycle, the question of decommissioning and extending operational lifetimes of ageing assets is approaching. This is a key area where processes and expertise can be shared across industries as fundamentally it is a question of managing industrial processes and logistics in the same operational environment.

Fully realised digital twins, where highly detailed and interactive models are used to represent and manage assets, are one way to drive the improvement and availability of asset data that will eventually feed into decommissioning processes. Whilst this approach is desirable and has significant benefits for establishing a truly digital sector, it is less feasible for ageing assets where the required investment will not generate sufficient returns.

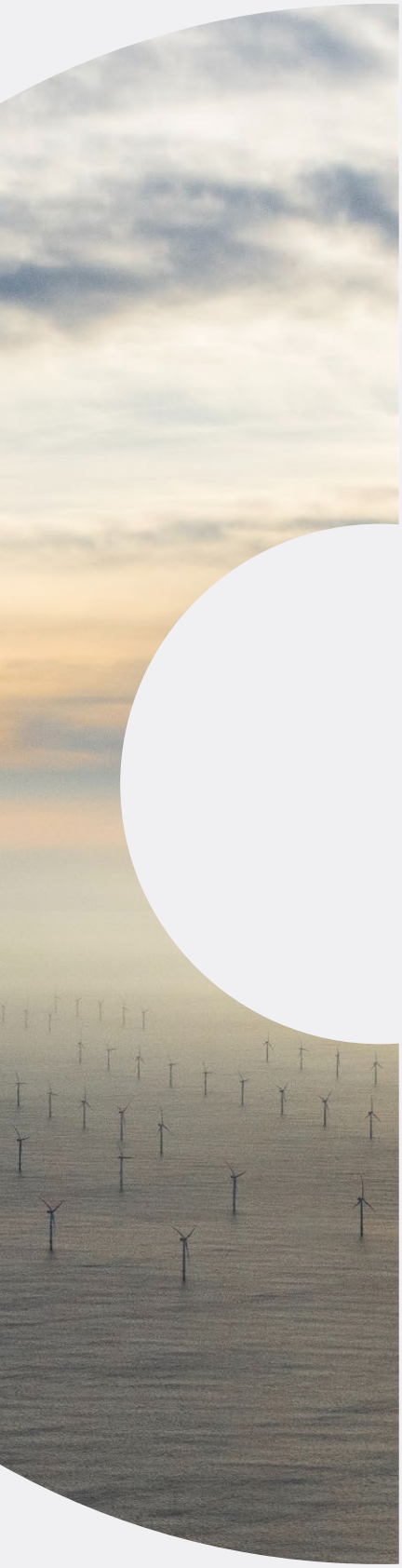
The NSTA and Decommissioning and Repurposing Taskforce is already assessing some of the challenges around data availability and decommissioning pipeline visibility, gathering information through its stewardship survey process and directly from operators. The following challenges map out distinct areas where data collection, visibility, and availability can be developed to facilitate Data Driven Decommissioning. Once these requirements are established, the Decommissioning Taskforce may wish to formalise them into a data specific focus area within the Taskforce remit.

High-value, historic operational data must be identified and preserved as assets change ownership through their lifecycle. This is the most time sensitive data issue as assets are more likely to change hands as they approach the end of their initial operating programmes. Operational data regarding well interventions provide critical insight when forecasting overall decommissioning costs, ensuring that this information is preserved through asset ownership changes could significantly reduce the uncertainty when planning plug and abandonment activities. Failing to protect this information will greatly increase overall decommissioning costs and should be gathered and processed in line with existing data collection powers.

The secondary challenge is then ensuring that data is digitised and available in a machine-readable format, this will drive efficiencies in the market by providing wider visibility of decommissioning requirements through platforms and allow service providers to automate tendering and planning processes. Such activities typically have a high up-front cost and are therefore suited to innovation support or targeted digitalisation initiatives by identifying novel techniques or establishing new markets to extract value from analogue data.

Whilst offshore wind assets are generally in the earlier stages of their lifecycle, the question of decommissioning and extending operational lifetimes of ageing assets is approaching.

Workstream C: Leveraging asset data — continued



A minimum specification of asset data, including technical drawings, models, and maintenance records, needs to be made available ahead of cessation of operations to enable the supply chain to invest and adapt to specific market requirements. Operators and supply chain organisations must define minimum information packs and standards to improve visibility and enable the market to harness economies of scale. Cessation of Production (CoP) dates are considered commercially sensitive and only made available to regulators on a limited basis. Whilst these concerns are valid, to fully mobilise and grow the decommissioning market, it is necessary to increase visibility of these dates to the supply chain. Regulators and Industry should utilise the Data Sharing Fabric to make this information available through authorised and managed interfaces, this will enable operators to share information to the supply chain in a controlled manner more readily.

Logistics data and metadata detailing planned operational activity across the sector should be made available to supply chain companies to enable greater optimisation of vessel and port capacities. Given the expansion of construction, maintenance, and decommissioning activities across all industries operating in the UK EEZ, a coordinated approach that spans the sector enables more optimal utilisation of limited resources. This could be achieved through the publication of standardised data or the adoption a service platform that interfaces between operational and supply chain organisations. Establishing a sector wide approach to logistical planning and cooperation will become more important as third-party service providers become more common-place as newer industries mature and expand beyond OEM-lead maintenance provision.

Finally, to establish transparency of both outcomes and performance, regulators should expand data requirements for benchmarking decommissioning activities and ensure that they are captured across the whole market. Decommissioning outcome and benchmarking data is limited in its availability, expanding the availability of this data will help drive competition across the sector and identify optimal decommissioning strategies, further minimising the overall cost of activities.

It should be recognised that some of the information and data sharing requirements outlined above will require the transaction of shared information between authorised parties and as such should utilise the Data Sharing Fabric that is outlined in Recommendation 2, *Delivering a Common Data Toolkit*.

The standardised approach and broader information management techniques implemented here can be utilised and transferred to other industries across the offshore energy sector. Establishing good practice in digitising asset data and considering end of life data requirements earlier in the asset lifecycle will help minimise full lifecycle costs of other all energy system activity in the offshore energy sector.

Workstream C: Leveraging asset data — continued

C—2: Utilising legacy and operational data

→ Establish a cross-sector Task Group to identify high priority use cases for legacy and operational data, commissioning data gathering and innovation initiatives to facilitate where necessary.

The offshore energy industry should establish a cross-sector Task Group to identify areas where innovation funding can be used to unlock value in existing asset, operational, and historic geological data. This initiative should focus on 'legacy data' that can provide additional value through re-analysis and high value operational data where novel techniques could be applied to facilitate wider data access.

When discussing operational data or information that may be considered Intellectual Property (IP), there is a justifiable reluctance to share information that could negatively impact competitive advantage. However, there is also a significant potential benefit to the wider sector if the data can be made available in such a way that it is non-rival and is presented in a way that mitigates the commercial risk.

Oil and Gas

The oil and gas industry has generated vast quantities of operational and survey data during exploration and extraction activities over several decades. Whilst significant quantities of data are collected and made available through regulatory obligations and portals, there are also untapped volumes of data that are not currently accessible and could be utilised in other parts of the sector. This is typically due to either commercial sensitivity concerns or where data uses have evolved since the original legislation developed.

The increase of CCUS operations across the sector presents opportunities for the further use of legacy data that has not been collected or is hard to access.

Seismic data that is utilised for assessing the viability and capacity of carbon storage projects is generally available, albeit at high cost. However, there is a clear demand and use cases for other operational data that, such as well pressure data or plug and abandonment data that will be held by operators. The Task Group should outline what the common data requirements are for such projects and ensure that CCUS initiatives can obtain data from existing data owners or be reported to the NSTA.

The Crown Estate's Offshore Wind and CCUS Co-location Forum is currently investigating the benefits of increased raw and processed, as well as shallow seismic data, when looking at reuse value for both CCUS activity and renewable projects. This will be particularly prevalent in the instance where licence areas overlap, and so presents an opportunity to re-use or reanalyse existing data and minimise additional survey activity.

Workstream C: Leveraging asset data — continued

[12] Offshore Wind and CCUS Co-location – The Crown Estate, www.thecrownestate.co.uk

The outputs from this Task Group, coupled with ongoing initiatives such as The Crown Estate's Offshore Wind and CCUS Co-location Forum[12], will help identify the priority datasets where there is a clear value to innovation and the ongoing growth of the CCUS sector, once these use cases have been identified, the underlying data availability issues can then be addressed. In cases where the data is not currently available in a digital format, innovation initiatives focussed on open data and advanced digitalisation techniques can be utilised to demonstrate the feasibility and develop new techniques. In other cases, Regulators should look to expand their current data collection requirements to ensure that data critical to achieving Net Zero objectives is gathered and made available in a sufficient manner. The existing powers exercised by NSTA and the National Data Repository provide a suitable pathway to facilitate such data provision.

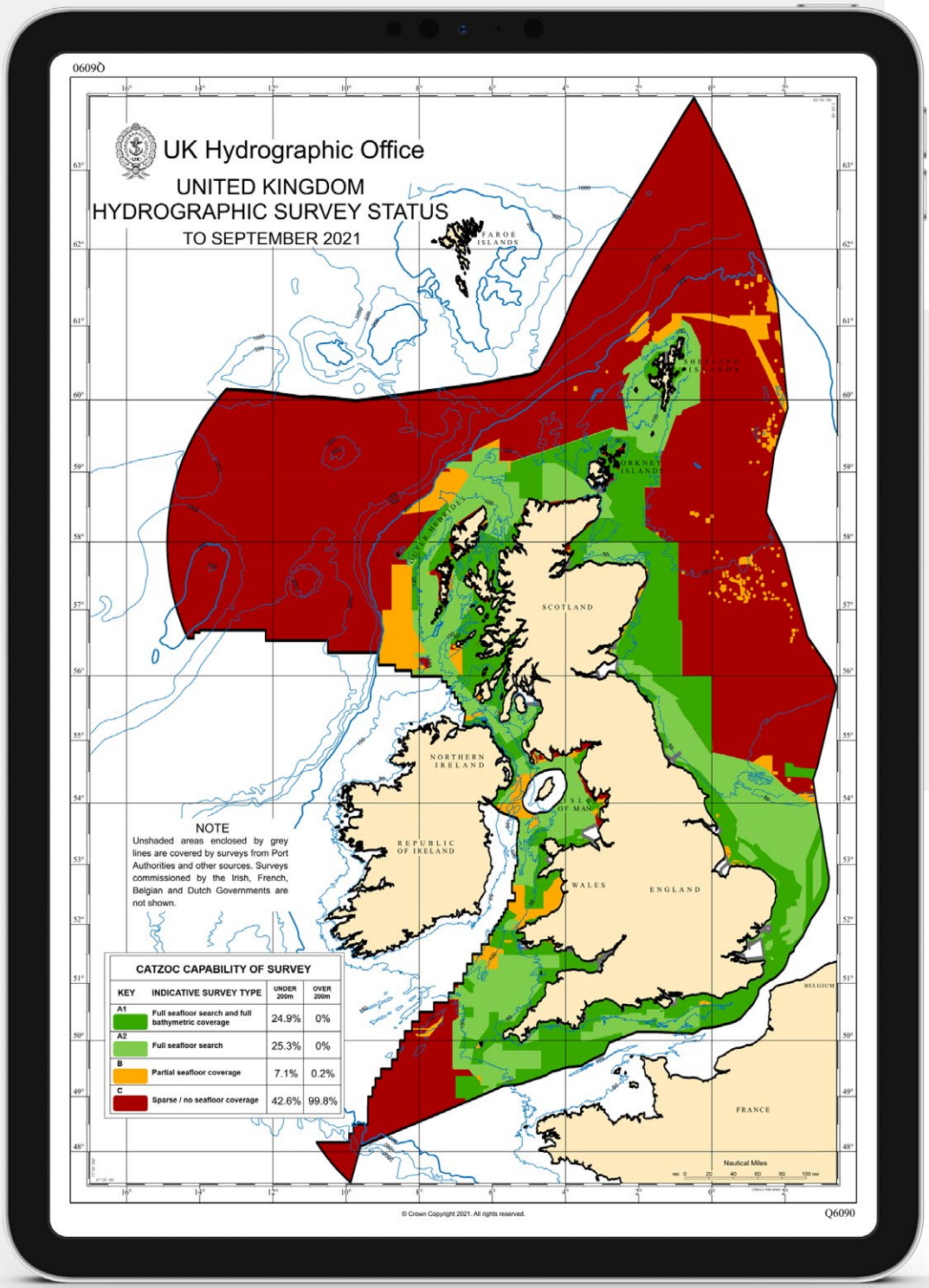
The oil and gas industry has generated vast quantities of operational and survey data during exploration and extraction activities over several decades.

Finally, existing shallow seismic and bathymetry data, held by operators across the sector, can be used to greatly increase the base level coverage of seabed mapping data that is managed and made available by the UKHO. Seismic first return data can be interpreted to provide basic coverage across wider areas without the need for additional survey time or environmental disturbance.

Reusing shallow seismic data in this way is a relatively straight forward way of extracting value from datasets that already exist and provides a direct benefit to the wider marine industry, providing a clear use case where the oil and gas sector can demonstrate leadership in advancing a more open data environment.

Workstream C: Leveraging asset data — continued

Figure 12: UK Bathymetric Survey Data



Map of UK hydrographic survey data held by the UKHO around UK waters. Shallow seismic and bathymetry data held by operators can use used to improve survey coverage and contribute to the wider marine data community.
UK Bathymetric Survey Coverage (Q6090)
© Crown Copyright 2022 — UK Hydrographic Office.

Workstream C: Leveraging asset data — continued

The offshore energy sector should adopt a holistic data management framework to ensure the standardisation of data captured and utilised across asset lifecycles.

Offshore Wind

In the offshore wind industry, the provision and wider use of operational data is a key area where benefits to the wider sector can be achieved through controlled information sharing. To minimise the variance in data provision from different turbine OEMs, offshore wind operators should seek alignment of data sharing contractual terms, creating minimum data provision requirements covering raw SCADA information, events, alarm data etc. This will help drive standardisation and improve the usability of data generated by generation assets, in turn enabling third party organisations, software providers, and academics to provide more relevant services and data analytics.

The sharing of operational and performance data is a contentious and difficult subject in any industry as competitive as offshore wind. However, gaining a more detailed understanding of operational outputs and other key information across the sector is vital in ensuring that the ongoing expansion of offshore wind is effective and efficient. Whilst there are successful data sharing initiatives, such as Offshore Renewable Energy Catapult's SPARTA programme and Defra's 'Better Data' workstream, there is clear demand from service providers and the wider data community to increase the availability and visibility of operational data relating to offshore wind generation.

Innovation funding should be used to identify projects and programmes of work that utilise more advanced architectures and data privacy mitigation techniques, such as homomorphic encryption and differential privacy, that could help unlock wider access to some of this information without compromising commercial interest.

As with other initiatives outlined as part of the Taskforce recommendations, not all data publication and sharing activities are suited to a fully open approach. The Open Data Triage process should be heavily utilised to enable data owners to assess and document the relevant datasets and represents a key tool in finding the balance between data sharing and commercial sensitivities. Once deployed, the Data Sharing Fabric will allow data owners to share data on limited basis with authenticated and authorised parties, creating a broader spectrum of options for data sharing under simplified licence terms.

SPARTA (System Performance, Availability and Reliability Trend Analysis — The Crown Estate and Offshore Renewable Energy Catapult) is an offshore wind farm performance benchmarking tool, run by the offshore wind industry.

The tool allows owner/operators of offshore wind farms to compare key performance indicators (KPIs) for their farms to aggregated and anonymised benchmarks. Owner/operators supply up to 159 monthly KPIs covering: Availability, production/lost production, reliability, and operation.

Workstream C: Leveraging asset data — continued

C—3: Data management framework

→ The offshore energy sector should adopt a data management framework to enable a standardised flow of asset data across the asset lifecycle.

The offshore energy sector should adopt a holistic data management framework to ensure the standardisation of data captured and utilised across asset lifecycles. This framework should promote a culture change within the sector, enabling increased data interoperability and a more collaborative landscape between differing organisation types; such as supply chain, construction and operation.

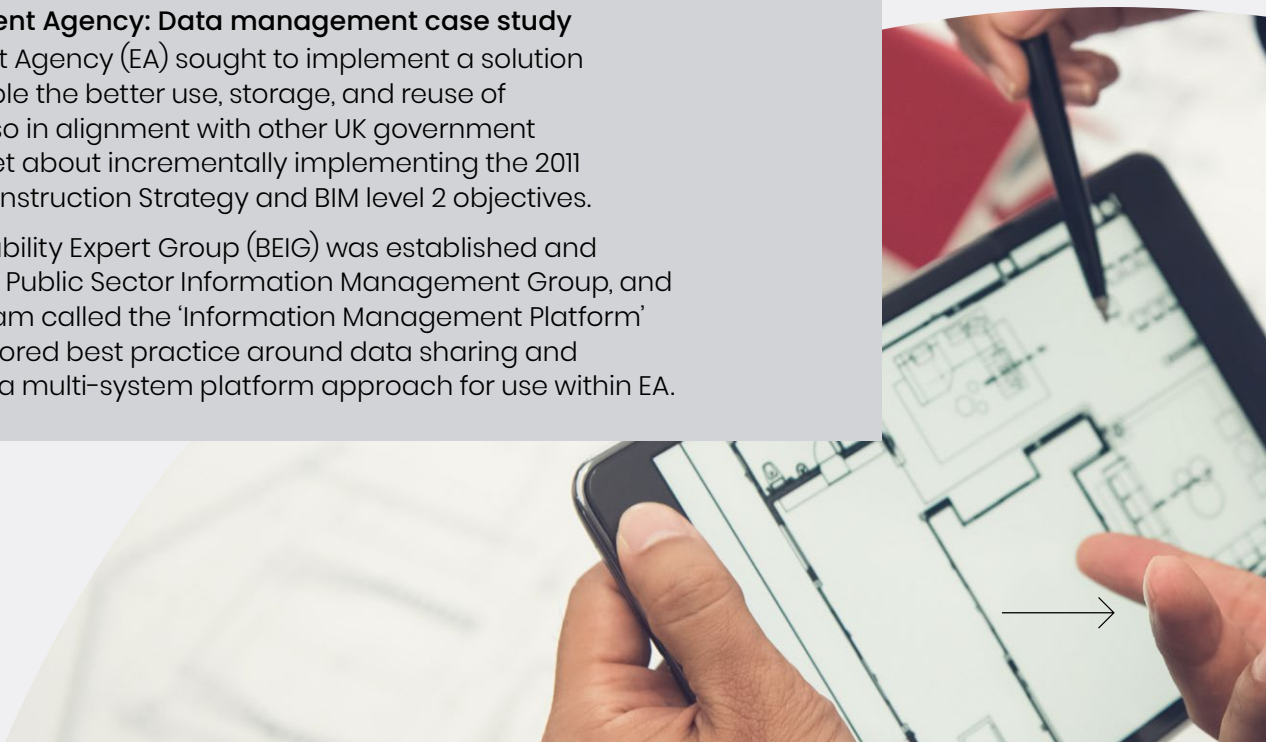
Historically, the oil and gas sector has grappled with the task of gaining whole visibility of lifecycle data for assets, and whilst fully fledged information management programmes have already been established, there remains issues with all stakeholder types having access to information. The scale and complexity of developing these initiatives is substantial, particularly given the less digitally mature environment in which they were created. However, there is still significant value in ensuring that the industry is moving towards a common standard for data exchange, as outlined in Data Driven Decommissioning (C–1). For the offshore wind sector, and other low carbon technologies, the opportunity to benefit from this learned experience is clear and the earlier the industry can align on an agreed approach to data management and exchange, the greater the rewards.

The sector should establish a Task Group that is able to advocate for the movement to a more standardised data management framework and promote collaboration amongst the differing organisations working within the offshore sector. This can enable the sharing of success stories to incentivise change, whilst also creating 'champions' who are exhibiting effective data sharing.

CPNI, Environment Agency: Data management case study

The Environment Agency (EA) sought to implement a solution that would enable the better use, storage, and reuse of their data, and so in alignment with other UK government departments, set about incrementally implementing the 2011 Government Construction Strategy and BIM level 2 objectives.

A BIM Interoperability Expert Group (BEIG) was established and overseen by the Public Sector Information Management Group, and lead a workstream called the 'Information Management Platform' (IMP), which explored best practice around data sharing and recommended a multi-system platform approach for use within EA.



Workstream C: Leveraging asset data — continued

[13] UK BIM Framework, www.ukbimframework.org

[14] ISO 19650-5:2020, www.iso.org

The UK BIM framework[13] is one such example where a common set of BIM (Building Information Modelling) standards (ISO 19650) are utilised within a Common Data Environment. Whilst the BIM frameworks initial intended use was to address digitalisation gaps within the onshore construction industry, parallels from the CPNI case study can be drawn into the offshore energy sector, providing a more standardised approach to data management.

It is recognised that duplicating such a framework within the offshore sector could prove difficult, due to sensitivities around data sharing and operating information. However, a similar initiative would ensure that the generation, management, storage and use of data is more efficient and standardised. Not only does the creation of a robust asset management framework allow for a more streamlined approach to utilising asset information, but it ensures the retaining of its value, throughout the asset lifecycle, negating the risks of outdated legacy information in the future.

The Data Management Framework Task Group should scope and trial a Common Data Environment, enabling the seamless transferral of data between project parties.

Such a framework requires buy-in and adoption across a critical mass of operators and supply chain companies to realise potential value. Industry should drive the adoption of the framework using the supply chain expectations and stewardship expectations, providing clear guidance to industry participants without requiring heavy handed regulation, contractual agreements, or licensing terms for roll out.

The Data Management Framework Task Group should scope and trial a Common Data Environment, enabling the seamless transferral of data between project parties, whilst also promoting a culture of openness and interoperability. Asset data should be digitised where possible, and aligned with a standard, such as the ISO 19650–5:2020,[14] which lays out the steps necessary to digitise civil engineering data.

Alongside this, Industry should seek to support the inclusion of such a framework into contractual agreements, allowing the alignment of differing project teams in the lifecycle of an asset. These arrangements should set out the data standards required throughout the project and identify the appropriate data owners for the lifecycle of the asset. Thus far, access to operational data has been one of the largest challenges faced to organisations working within the offshore sector, and so applying a framework like BIM earlier in the process should seek to combat this. There should be the inclusion of ongoing compliance with the evolving data management requirements also, to ensure ongoing cooperation.

Workstream recommendations

Workstream D:
Offshore emissions data for Net Zero

Enable monitoring of Net Zero targets and advanced emissions tracking by leading on the provision of high-resolution and digitised emissions data monitoring and reporting.

Purpose and overview

Decarbonisation is the primary concern of all Net Zero aspirations and the offshore energy sector is a key player in helping UK Government meet its legally binding reduction targets. The large-scale deployment of low carbon technologies and CCUS projects to offset unavoidable emissions and electrification of fossil fuel production are all fundamental to the success of decarbonisation strategies. Outside of the immediate practicalities of carbon reduction across the sector, the offshore energy sector can further enable and lead the progress toward emissions reduction targets through the provision of high-resolution, digitally mobile data. This will be required to inform, validate, and monitor government policies to create confidence that targets are accurate and achievable. Therefore, carbon and greenhouse gases (GHGs) will need to be monitored accurately to manage the transition effectively with relevant methodology and experience likely to be also relevant to the onshore energy sectors.

Differences in the quality of data collection and GHG calculation methodologies already present challenges within the wider carbon tracking landscape, not least because any meaningful comparisons are difficult. Assessing our progress to Net Zero can only be achieved if these problems start to be addressed and we should take the opportunity of not allowing these to be replicated going forwards for future applications such as hydrogen and CCUS. Emerging technologies could drive best practice and assist decarbonisation if we look to these as the benchmark. Environmental and Social Governance (ESG) reporting is becoming more important to investors looking to redirect their portfolios towards more sustainable investments and evidence how well they are performing against their goals. Across the industry this reporting is difficult to access and heterogeneous in presentation, making it difficult to compare like for like or against a baseline year.

Assessing our progress to Net Zero can only be achieved if these problems start to be addressed and we should take the opportunity of not allowing these to be replicated going forwards for future applications such as hydrogen and CCUS.

Workstream D: Emissions data for net zero — continued

[15] UKCS Flaring & Venting Report — NSTA, www.nstauthority.co.uk, 2020

[16] Programme Initiation Document — Energy Networks Association, www.energynetworks.org, 2022

The flow of emissions data must also increase in its level of digitalisation to achieve the granularity necessary to drive carbon policy and communicate progress for public interest. In the oil & gas sector, the NSTA already collects a large amount of robust information for regulatory purposes, and this will need to be expanded to cover the existing gaps . It will be necessary to do this without significantly increasing manual effort. In addition to this, future incentive schemes to stimulate hydrogen, CCUS and other technologies will require a much greater amount of data about their performance than is currently available.

Finally, there is a sizeable opportunity in the energy transition for the offshore sector to lead the development of digitally enabled solutions for the monitoring, reporting and verification (MRV) of GHG emissions. Offshore oil & gas operations are greenhouse gas intensive (scope 1 and 2 emissions) and the oil and gas products are responsible for significant additional emissions when used (scope 3). This is recognised through the North Sea Transition Deal where both Government and Industry set out ambitious plans to contribute to UK emissions reductions targets. We need higher resolution and more digital processes for emissions data to properly track O&G emission reduction commitments (scope 1 and 2). In addition, there is an opportunity to enable other sectors using fossil fuels to improve their own emissions inventories through the onward use of emissions intensity data associated with the energy sources they are using. A successful programme of emissions MRV would not only grow confidence in other sectors that success in their own sectors is achievable, but also enable greatly improved scope 1 and 2 emissions inventory tracking through the provision of more accurate, measured emissions data for onward use.

Supporting carbon regulation

The offshore energy sector should take the lead in supporting an economy-wide carbon monitoring, reporting, validation (MRV) accounting regulator, in improving standards, encouraging transparency, and lowering GHG emissions.

All the actions taken in this section will help to solve some of the problems with the measurement of carbon emissions in the offshore energy sector, but further work needs to be done across the whole economy as there are currently many different jurisdictions where carbon (and emissions more broadly) is managed. As a carbon-intensive sector, and with downstream products also inheriting embedded emissions across the economy, there is an opportunity for the offshore energy sector to take a leadership role in the economy-wide energy transition to achieve Net Zero rather than reacting to policy.

The carbon regulator has already been accepted in principle for greenhouse gas removals by BEIS. Carbon reporting of flexibility services is also being incorporated into Standard Licence Conditions for DNOs and they are working towards developing a consistent reporting methodology by 2023[16]. Supporting wider carbon regulation and leading on the provision of suitably granular and mobile emissions data will demonstrate a clear commitment to achieving Net Zero targets.

Workstream D: Emissions data for net zero — continued

D—1: Digitalise emissions data flows

→ Deploy digital and automated solutions for emissions data submission and develop suitable APIs to improve the mobility and availability of reported data.

The submission of data should be digitalised and automated to reduce the manual burden and to encourage greater consistency of data submitted. Furthermore, the distribution of data via open frameworks and APIs will help third parties access the data more efficiently and directly from source, for example investors aiming to analyse the carbon liability of their portfolio.

Manual processes still dominate the submission of data in the offshore energy sector with the regulatory authorities often chasing data submissions and bearing the burden of data cleansing and providing access to the data for external parties (if at all).

Successful decarbonisation, co-location of other technologies, re-purposing or decommissioning of assets can only be measured if a baseline is established to compare with. To facilitate this and learn as much as possible, the automated processes and digital pathways need to be forged sooner rather than later.

The submission of data should be digitalised and automated to reduce the manual burden and to encourage greater consistency of data submitted.

D—2: Improving emissions reporting

→ OPRED and the NSTA should strengthen data gathering obligations for GHG emissions reporting to maximise the submission of measured values.

→ Industry should improve the measurement of cold-flaring and venting activities through the deployment of sensing technology to increase the availability of measured values

To properly assess the embedded emissions of downstream consumption or track the carbon intensity of different energy vectors, more accurate data regarding the GHG implications of production is required.

Currently GHG emissions reporting for non-flaring emissions such as methane, are estimated via modelling techniques. This is an imperfect solution as the modelled value can vary wildly depending on the situation and circumstances, and furthermore prevents an accurate assessment of a baseline for reduction of GHGs. Another example is combustion efficiency (CE) related to both offshore flaring and power generation processes, which is the percentage conversion of hydrocarbons combusted and converted into CO_2 and H_2O, this should be measured instead of using assumed efficiencies.

Workstream D: Emissions data for net zero — continued

A consistent methane dataset should be developed with defined assessment standards and calculation methods covering all emission sources to benchmark individual facilities on their methane emissions. Facilities should move towards a more accurate and continuous cloud-based flare combustion monitoring using a combination of meters, sensors, and analysers appropriate for each facility coupled with common weather stations for windspeed measurements etc. This could be further supported by satellite detecting infrared radiance and provide a more comprehensive understanding of GHG emissions.

D—3: Data granularity

→ Ensure that hydrogen and CCUS operational reporting is aligned or interoperable with oil and gas production emissions data standards to ensure compatibility of data and transparent assessment of GHG intensity.

Although GHG emissions standards already exist it is difficult to access granular information about scope 1, 2 or 3 emissions on a closer basis other than yearly. To properly abate and optimise GHG emissions, data must be available on at least a daily basis or aligned with the relevant incentive scheme operational resolution. When measuring the carbon intensity of hydrogen production or the emissions avoided using CCUS, it will be necessary to align the data of the production of the source energy or fuels to ensure hydrogen and CCUS do not inherit the same problems with calculating embedded emissions and provenance as those that currently exist. Where carbon is captured, transported, used, or stored (short-term or long-term) this will need to be measured and validated for fiscal and financial purposes and to monitor for leakage. Other unintended emissions with potentially harmful effects may also need to be taken into consideration. Establishing consistent emission standards would also be beneficial when decommissioning offshore oil and gas assets.

Workstream D: Emissions data for net zero — continued

Workstream summary

Workstream	Workstream action	Detail	Lead organisations	Implementation
Enabling whole system planning	Asset visibility strategy	Establish an Asset Visibility Strategy, with remit to build a comprehensive and open picture of assets deployed across the UK EEZ.	Digital strategy group	Iterative improvements
	Network planning visibility	Create a clear and comprehensive view of demand and generation requirements across the sector to provide visibility to transmission network planning authorities.	(DSG), Industry	Iterative improvements
Advancing data coordination	Data portal roadmap	Establish a Task Group to oversee the coordination of data portals across the sector. Develop a roadmap to that outlines the current state and direction of travel for relevant data portals.	Task group	Quick wins
	Data portal interoperability	The Data Portal Task Group should drive the alignment of standards, user experience, and data access patterns across key data portals to improve interoperability and efficiency in line with Data Portal Roadmap.	Task group	Iterative improvements
Leveraging asset data	Data driven decommis-sioning	Establish a Data Driven Decommissioning Task Group to identify cost-critical decommissioning data and create wider access to non-digital information to help drive decommissioning digitalisation.	Task group	Iterative improvements
	Utilising legacy and operational data	Establish a cross-sector Task Group to identify high priority use cases for legacy and operational data, commissioning data gathering and innovation initiatives to facilitate where necessary.	Task group	Quick wins
	Data management framework	The offshore energy sector should adopt a data management framework to enable a standardised flow of asset data across the asset lifecycle.	Offshore energy sector	Iterative improvements

Workstream D: Emissions data for net zero — continued

Workstream summary

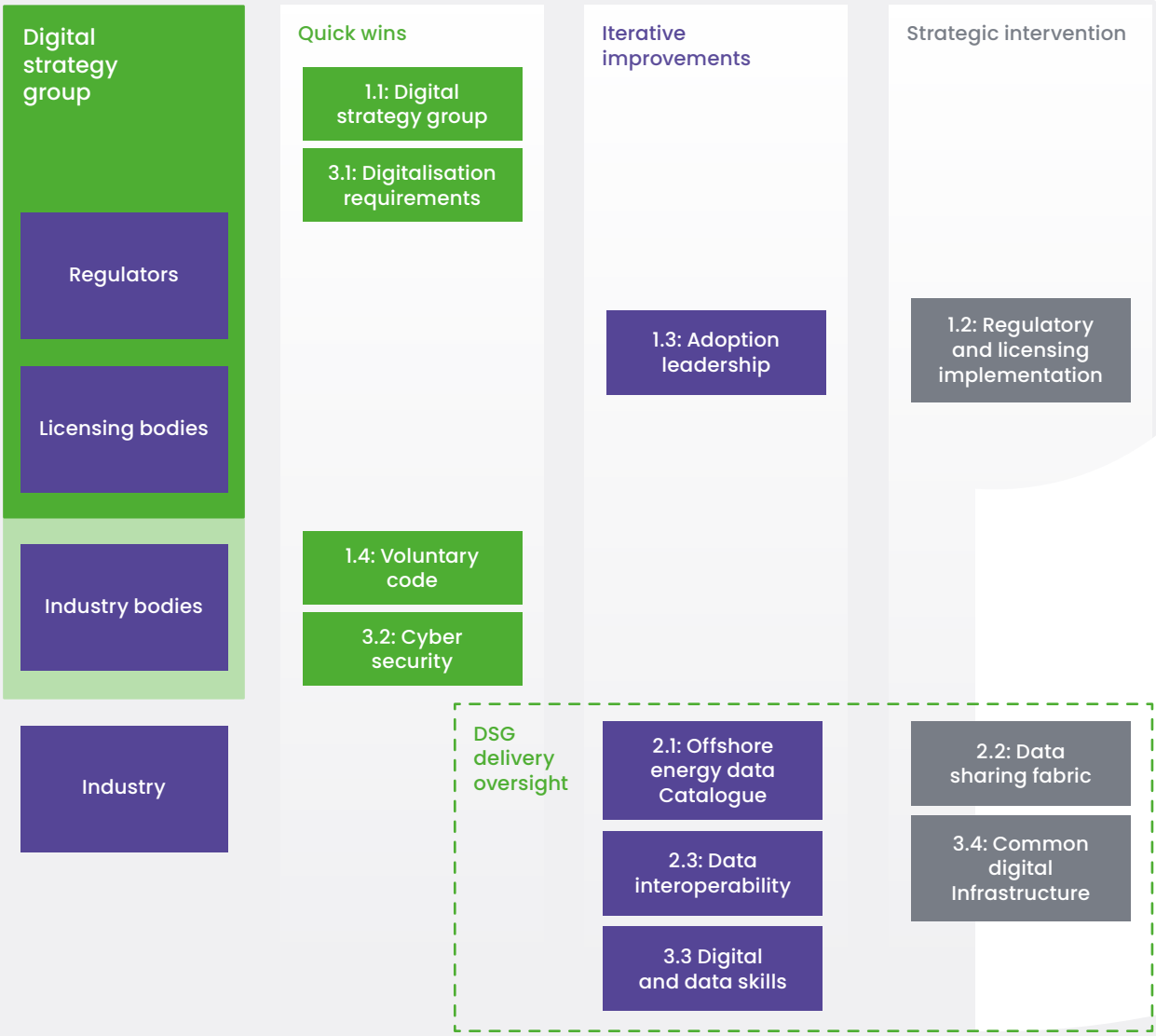
Workstream	Workstream action	Detail	Lead organisations	Implementation
Offshore emissions Data for Net Zero	Digitalise emissions data flows	Deploy digital and automated solutions for emissions data submission and develop suitable APIs to improve the mobility and availability of reported data.	Offshore energy sector	Quick wins
	Improve emissions reporting	The NSTA should strengthen data gathering obligations for GHG emissions reporting to maximise the submission of measured values.	Regulator	Iterative improvements
		Industry should improve the measurement of cold-flaring and venting activities through the deployment of sensing technology to increase the availability of measured values.	Industry	Iterative improvements
	Data granularity	Ensure that hydrogen and CCUS operational reporting is aligned or interoperable with oil and gas production emissions data standards to ensure compatibility of data and transparent assessment of GHG density.	Regulatory and licensing bodies	Strategic intervention

Delivery

The recommendations in this report have been formed to address specific sector needs.

These have been sub-categorised into higher-level, strategic recommendations that require the oversight from the DSG and workstream recommendations that outline projects or initiatives that can be undertaken by a range of organisations. A prioritised delivery roadmap with proposed project sponsors will be available as a separate annex, published alongside this report on the Taskforce launch page.

Figure 13: Delivery — strategic recommendations



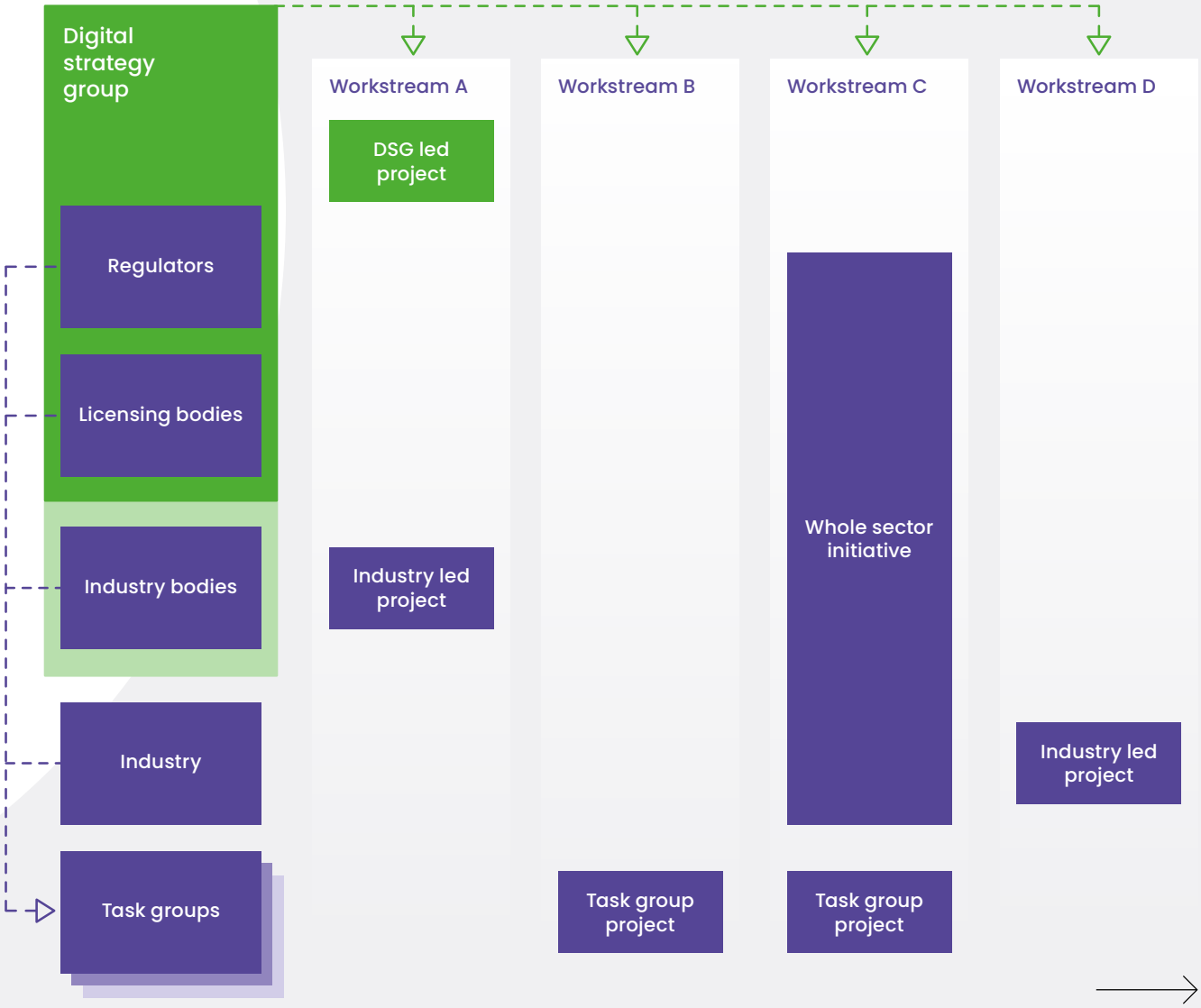
Delivery — continued

The Strategic recommendations are graded according to implementation difficulty to provide an indicative delivery prioritisation as per Figure 13.

Workstreams should be established as ongoing programmes of work in each of the areas defined in the previous section. Whilst the final governance structure of these workstreams will be refined by the DSG once formalised, it is expected that the DSG will retain oversight and responsibility for both the workstreams outlined in this project, and others that may arise as part of digitalisation requirement gathering exercises.

Task Groups should be formed to deliver the specific projects as described, comprising of a mixture of offshore energy sector actors as required. The makeup of these should be determined by the DSG, informed by industry engagement or a strategic directive. Figure 14 details the high-level relationship between these elements.

Figure 14: Delivery — workstream recommendations



Delivery — continued

Candidate delivery routes

There are numerous vehicles across sector that are well suited to leading and delivering some of the Taskforce recommendations. To avoid duplication of efforts, these should be considered as part of any recommendation delivery activities following the publication of this report.

For example, NZTC have secured funding through the Aberdeen City Region Deal, along with Technology Leadership Board (TLB) partners, for a proof-of-concept project to establish a 'data trust', an innovative form of data sharing that creates a legal entity to manage commercial data. In addition to this, the Offshore Energy Digital Architecture (NZTC) includes proposals for a data map and data catalogue that could be used to implement digital infrastructure components outlined in the Data Sharing Fabric.

The UKCS Data & Digital Maturity Survey,[17] commissioned by organisations across the sector, provided an invaluable view of the digital landscape in 2020, and laying the groundwork for the OEDS Taskforce. The survey will be repeated in 2022 with a larger group of sponsors and sector-wide scope. This is an obvious candidate to satisfy the cross-sector digitalisation requirements, outlined in *Driving Cross-sector Digitalisation* (Recommendation 3).

Such initiatives could be used as the delivery vehicle for Taskforce recommendation actions, providing they meet the overall strategic objectives of cross-sector representation and scope. Coordinating these through the DSG and expanding to include other industry groups such as the Offshore Wind Innovation Hub will help ensure that these are delivered in line with the mission of creating an integrated offshore energy sector.

[17] UKCS Data & Digital Maturity Survey — OEUK et al., www.deloitte.com, 2020

The Offshore Energy Digital Architecture (NZTC) includes proposals for a data map and data catalogue that could be used to implement digital infrastructure components outlined in the Data Sharing Fabric.

Conclusions

There is a consensus across the offshore energy sector that data sharing and utilisation is pivotal to the success of energy transition initiatives.

Regulators and licensing bodies have thus far demonstrated leadership and forward thinking in their approach to data collection in addition to developing digital strategies that build on this solid foundation.

The challenge now is to realise the opportunities and benefits that can be achieved through an aligned and collaborative approach to digitalisation across the sector; in doing so, the value derived from better data collection, provision, and utilisation will exceed the sum of its parts. By ensuring that data can be used more widely, either through open publication, limited licence, or controlled data sharing, organisations can extract the maximum utility from the available data.

Any programme of work that integrates a more open approach to data at its core will encounter scepticism and caution at the outset, particularly in a more commercially structured energy system, such as the offshore energy sector. This is understandable but should be viewed in the wider context of meeting Net Zero ambitions and the significant transition required of the offshore energy sector. The strategic recommendations set out the policy changes and tools that are required to create a more open data ecosystem whilst mitigating these risks, with the workstream recommendations seeking to highlight the potential use cases and benefits that can be unlocked along the way.

It is also important to draw on the experience of other sectors and digitalisation programmes, utilising best practice wherever possible and benefitting from past mistakes. In this regard, The Taskforce has taken particular care to build on similar bodies of work undertaken in the onshore energy sector. Whilst there are significant differences in terms of operation and structure, there is also a great alignment in some of the data and digital challenges that are faced by both sectors.

By aligning the overall approach to data management via the DBP Guidance and the Data Sharing Fabric, which outlines the tools and protocols required for a modern data sharing ecosystem, we are creating the conditions for tighter integration as activities become more interdependent. Whole systems thinking is a fundamental requirement to the success of the energy transition.

Conclusions — continued

The strategic recommendations seek to address these challenges and opportunities across three distinct areas: policy and regulation, tools and digital infrastructure, and digitalisation.

Recommendation 1: Unifying data principles

Formalising a Digital Strategy Group to advocate for cross-sectoral coordination will build on existing work and drive adoption of better data sharing practice across multiple industries.

Recommendation 2: Delivering a common data toolkit

Building the digital infrastructure and data sharing protocols that facilitate modern, automated data sharing. These should utilise or be interoperable with relevant systems across the UK energy sector.

Recommendation 3: Digitalisation

Utilising the DSG to monitor digitalisation progress, identify opportunities and requirements, and drive cross-sector digitalisation initiatives.

The offshore energy sector has set ambitious targets regarding growth and decarbonisation that will contribute significantly to the UK Net Zero commitments.

Workstream A: Enabling whole system planning

Creating better visibility of energy system infrastructure data through the creation of an asset visibility strategy and aligning network planning visibility requirements.

Workstream B: Advancing data coordination

Building on the success of existing data portals to create more seamless user experiences, driving interoperability and automation through better data portal coordination.

Workstream C: Leveraging asset data

Capturing and utilising asset data that is critical to the further development of industries or supply chain activities, focussing on decommissioning, operational, and geotechnical data use cases.

Workstream D: Offshore emissions data for Net Zero

Ensuring that high-resolution emissions data is automatically captured and made available through APIs to enable better emissions and carbon intensity tracking.

The workstream recommendations set out four areas where further projects and initiatives should be established to progress data utilisation.

The offshore energy sector has set ambitious targets regarding growth and decarbonisation that will contribute significantly to the UK Net Zero commitments. Whether or not the sector is successful in achieving these aims will, in part, come down to its ability to mobilise around these opportunities and embed a modern approach to data strategy at the heart of business operations.

The Taskforce is greatly appreciative for the insight, leadership, and support provided by the Taskforce Steering Group throughout the project.

We would also like to thank the numerous individuals and organisations who engaged with the Taskforce or participated in the industry events throughout the project, their experience and input has been invaluable:

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UK Research and Innovation, Scottish Enterprise, Scottish Government, Scottish Power Renewables, Scottish Renewables, ScottishPower Renewables, SCSS, Seaway 7 ASA, Sensia, Shell, Shetland Island Council, Siemens Gamesa, Simply Blue Energy, Smart Global Solutions, Sonardyne, Spark Assessment Services Limited, Spirit Energy, SSE, SSE Electricity Networks, SSE Renewables, SSE Transmission, Stena Drilling, Storega, Storelectric Limited, Subak, Subsea 7, SubTeraNDT Limited, Sword Group, Synaptec Ltd, Tallinn University of Technology, Talos Innovation, TDE Group, Tessella, TGS, The Crown Estate, The Energy Industries Council (EIC), The European Marine Energy Centre, The Institution of Engineering and Technology, The University of Edinburgh, TietoEVRY, Tin Ventures Limited, TNEI Services Ltd, TotalEnergies, TransformologyXR, Triangle Energy, Trilliant Networks Operations (UK) Ltd, TROVE Renewables, UCL Energy Institute, UK Hydrographic Office, UK Power Networks, Unasys, University of Aberdeen, University of Bangor, University of Birmingham, University of Bradford, University of Reading, University of Strathclyde, University of Sussex, University of Technology Sydney, Urban Tide, Urthian, Vattenfall, Vector, Vestas, Volantice, Welsh Government, Western Power Distribution, Wood PLC, Woodmac, Worley, Xodus, Xodus Group, Yokogawa Electric, Zapsa Ltd, Zero Emission Scotland Limited, Zilliant and Zühlke.

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