Offshore Coordination
Early Opportunities Update

May 2022

nationalgridESO

Foreword

Welcome

Welcome to our Offshore Coordination Early Opportunities update. We wanted to share with you the progress we've made since the Early Opportunities workstream was launched in January 2021.

Background

In July 2020, in response to the UK government's ambition for 40GW of installed offshore wind capacity by 2030 (now 50GW) and net zero greenhouse gas emissions by 2050, the Department of Business, Energy and Industrial Strategy (BEIS) instigated the Offshore Transmission Network Review (OTNR). National Grid Electricity System Operator (ESO) was asked to take the lead on a number of areas, which we are taking forward in our Offshore Coordination Project.

Creation of an Early Opportunities workstream

Following an open letter from Ofgem in August 2020, which sought to increase the levels of offshore coordination, we recognised the need to capitalise on early opportunities for coordination through working with the industry to identify inflight projects that have the potential to coordinate with changes to, or existing flexibility within, the current regulatory framework. As a result the Early Opportunities workstream was created.

We've had a great response from our stakeholders who have taken up the challenge and proposed innovative solutions to achieve greater coordination.

In order to deliver the coordination proposals there will need to be changes to industry frameworks. In this document we set out the actions we will take forward to faciliate those changes.

We'd love to hear your feedback on any aspect of the Early Opportunities workstream, so if you'd like to get in touch please do so via the contact information shown at the end of this document.

Kind regards

Luke Wainwright

Early Opportunities Manager, Offshore Coordination Project

Executive summary

Purpose of this document

This document is intended to provide an overview of the work done to date under the Early Opportunities workstream of the Offshore Transmission Network Review (OTNR). It also provides a high level summary of our next steps.

Early Opportunities projects have opted-in

Following BEIS and Ofgem's open letter, "Increasing the level of coordination in offshore electricity infrastructure" of 24th August 2020, proposals were submitted for a number of projects. The associated developers are either; already pursuing some level of coordination or, have identified an opportunity to do so.

Agreed approach to development

Developers are expected to lead on their project proposals. We will revise our own internal and industry processes to enable coordination, lead on code modifications, and ensure that the relevant technical changes and requirements are considered and agreed.

Our commitment

We'll continue to look to clear a path for those projects covered by the Early Opportunities workstream so that wherever possible coordination can be facilitated. We will continue to work closely with BEIS, Ofgem, developers and other stakeholders to inform and shape our thinking and build upon the progress made so far.

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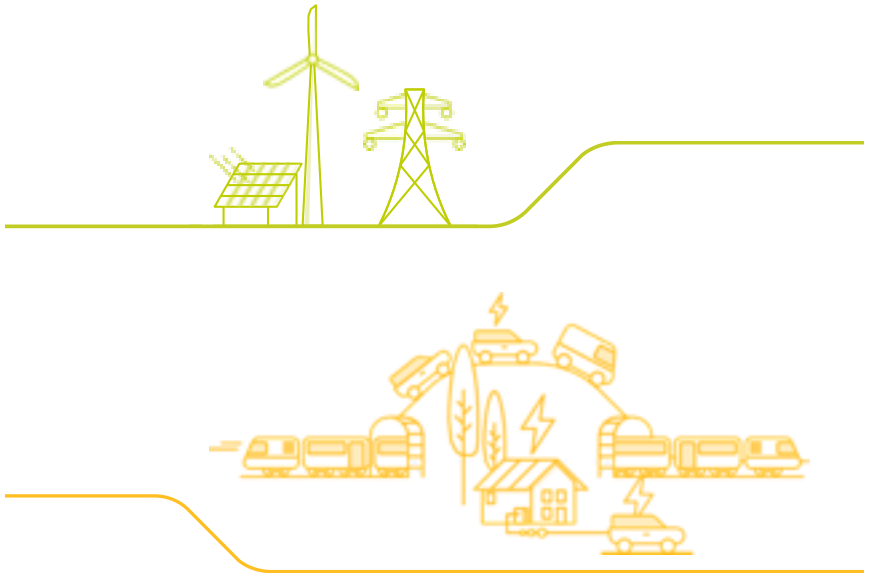


What do we mean by “Early Opportunities”?

The following objective has been set out by the Department for Business Energy and Industrial Strategy (BEIS) in relation to the Early Opportunities workstream of the OTNR:

- Identify and facilitate opportunities for increased coordination in the near term; focused on in-flight projects.

Offshore coordination designs for Early Opportunities are led and proposed by developers. Developers of relatively advanced offshore wind projects are encouraged to consider coordinated solutions by opting-in to the Early Opportunities workstream.

BEIS and Ofgem have defined the scope for projects with the opportunity for early coordination, with the view to mitigate disruption. These are classed as those projects that tend to meet the following criteria:

1. **Without fully approved planning permission**
   - Projects require planning permission, granted by the relevant authority, to undertake any major infrastructure development such as building and connecting an offshore wind farm.

2. **That have been assessed through the Connections and Infrastructure Options Note (CION) Process**
   - The ESO CION process (in conjunction with the relevant developer) provides the rationale for the selection of the most economic and efficient connection option from the assessment of technical, commercial, regulatory, environmental, planning and deliverability aspects.

These projects generally have a connection agreement with the ESO with a connection date on or before 2030.

What progress have we made so far?

- Projects have opted-in
- Five Early Opportunities models developed
- Initial assessment of the impact on industry codes and standards completed

Projects have opted-in to Early Opportunities by responding to BEIS and Ofgem's open letter – "Increasing the level of coordination in offshore electricity infrastructure" of 24th August 2020. These developers are either already pursuing some level of coordination or have identified an opportunity to do so. We have collaborated with these opt-in developers and have also engaged with other project developers who would be classed as in scope to ensure industry awareness of the OTNR and Early Opportunities objectives. Due to the confidential nature of the proposals specific details have not been included within this document.

Five Early Opportunities models identified

Following analysis of the projects that have opted-in we have identified five Early Opportunities models. These are based on the common themes and concepts drawn from those projects. Grouping has allowed us to assess the feasibility and impact of each model. Each model has unique risks and barriers to overcome, so we have also reviewed each project proposal individually.

Our models align with Ofgem's proposed concepts, as outlined in Ofgem's consultation of July 2021.

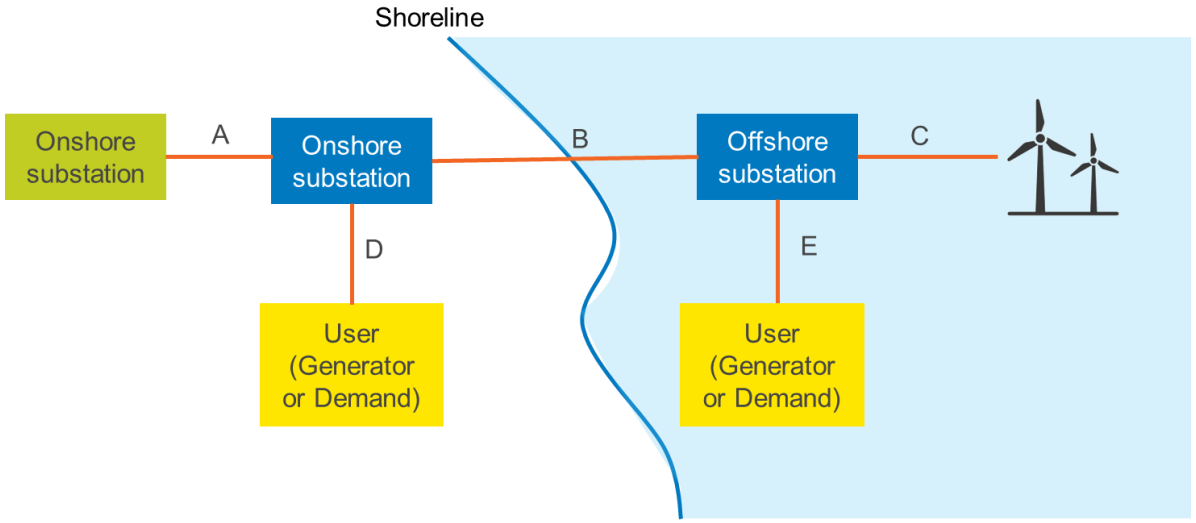
Industry codes and standards assessed

In analysing the viability of the five Early Opportunity models we have taken into consideration aspects such as; the regulatory framework, technical compliance and existing industry and ESO processes. The following pages set out the five Early Opportunities models along with an overview of the outcomes from our analysis of the industry codes and standards, and the work we are taking forward to facilitate the projects.

Early Opportunities Models

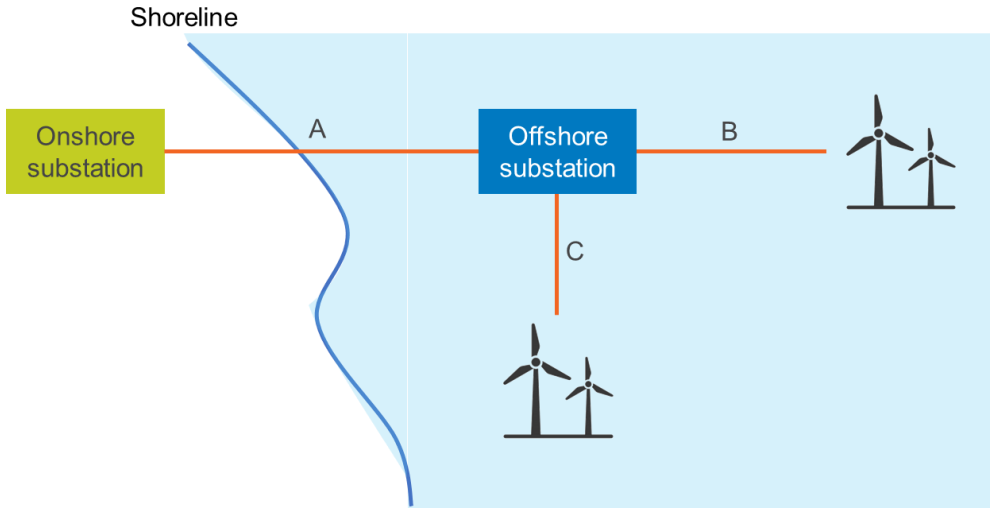
Five Early Opportunities models were identified based on the common themes and concepts of the projects that have opted-in so far. Ofgem's proposed concepts, as outlined in their consultation of July 2021, align with our Early Opportunities models.

Connection of electricity storage or a demand user to an offshore transmission system



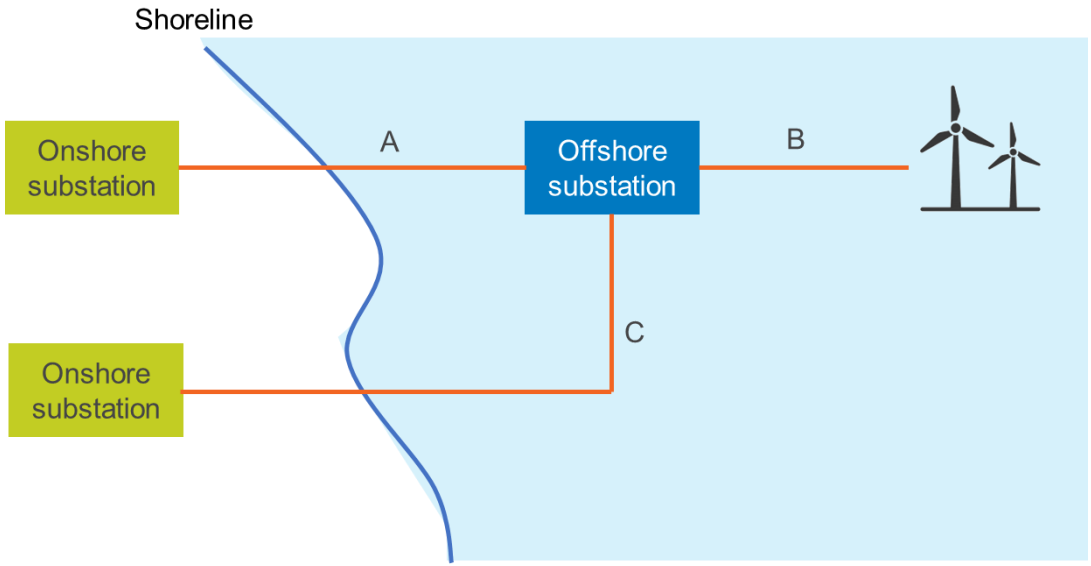
This concept may involve the connection of electricity storage or a demand customer to the onshore or offshore elements of an offshore transmission system. The principle could also allow for the electrification of oil and gas platforms. This arrangement would allow for coordination across energy vectors, not only of electricity transmission infrastructure.

Shared Offshore Transmission System



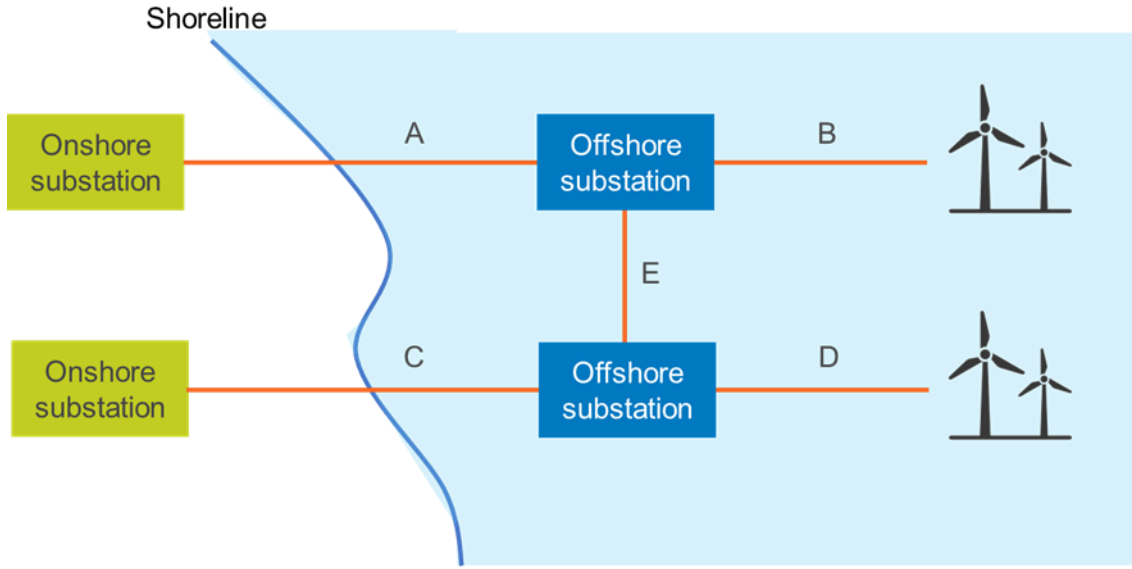
This concept involves multiple generators using a single offshore transmission system. This concept emphasises a reduction in landing points and the number of substations compared to the business-as-usual radial links.

Connection to a Transmission Owner (TO) owned bootstrap



This concept involves the connection of an offshore generator to a subsea electricity link between two points in the onshore transmission system, which is owned by a TO. These onshore-to-onshore links are known colloquially as “bootstraps”. This concept emphasises the reduction in landing points and infrastructure required to connect generation to shore.

Quasi Bootstrap



This concept involves the installation of a circuit between the respective offshore substations of two offshore generators, where the offshore substations are not connected to a single common onshore substation. This concept emphasises the potential to provide wider system benefits by reinforcing the onshore system in the form of a quasi-bootstrap. It would not reduce infrastructure or landing points but is an example of coordination.

Multi-Purpose Interconnector: Interconnector (IC)-led model and Offshore Transmission Owner (OFTO)-led model

Diagram 1 – One market

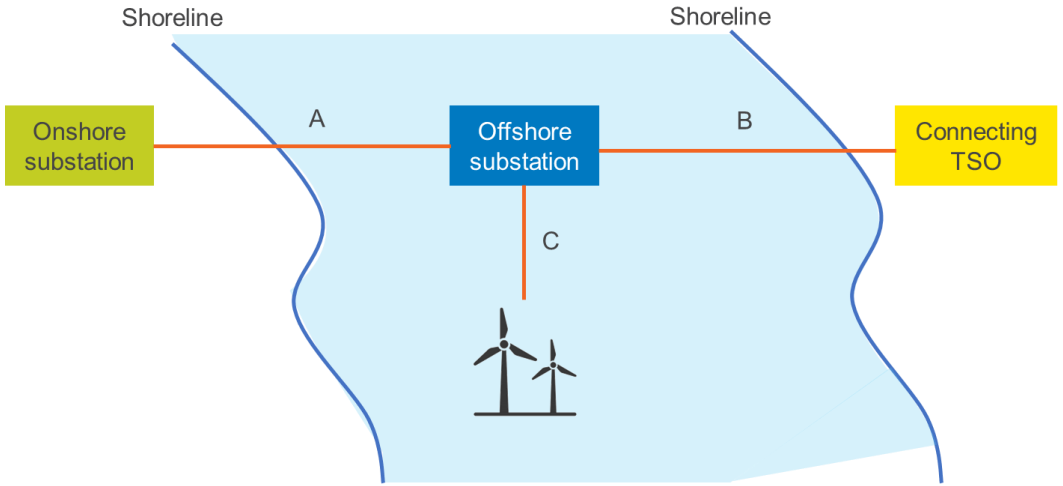
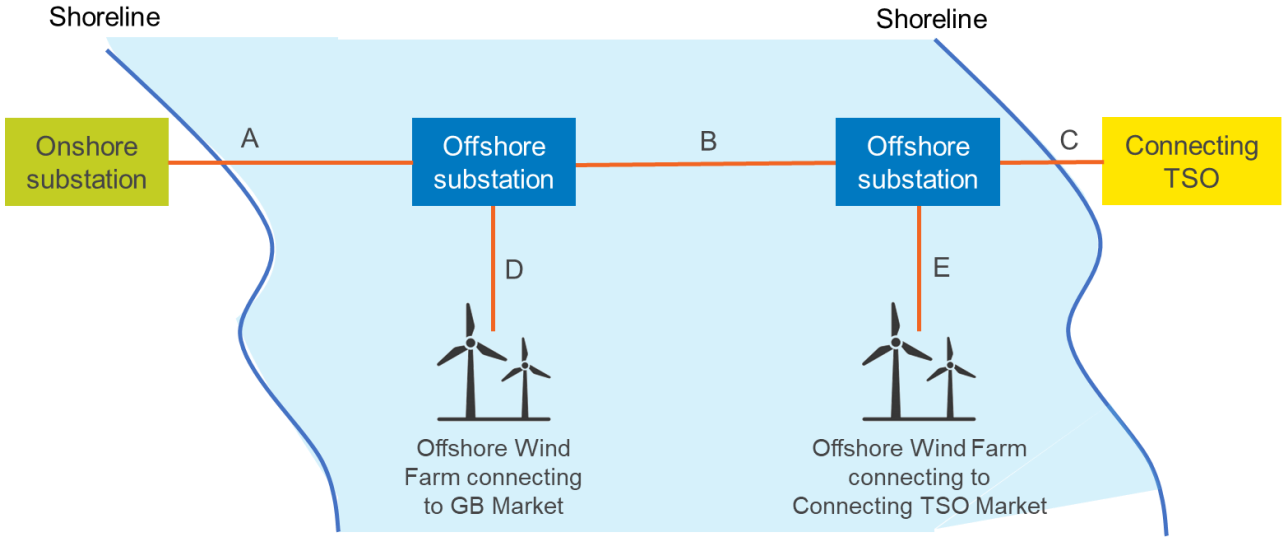


Diagram 2 – Two markets



This concept involves the connection of an offshore generator in the GB market to either;

i) Transmission infrastructure that is classified as an interconnector or;

ii) Transmission infrastructure comprised of distinct elements that are classified differently.

e.g. One element is classified as an interconnector, and the other is classified as an offshore transmission system.

This concept emphasises the reduction in landfall points required to connect a given amount of generation and interconnection to the wider system.

The description for these models (or concepts) is extracted from Chapter 2 of the Ofgem consultation on Early Opportunities, Pathway to 2030 and MPIs where you can also find the concepts described in more detail.

What does this mean for Industry Codes and Standards?

Participants in the GB energy market are required to comply with specific industry codes and standards.

Codes and standards	Outcomes and recommendations
System Operator Transmission Owner Code (STC)	The project proposals developed to date have not identified any change needed to the STC to enable the projects to progress.
Balancing and Settlement Code (BSC)	Currently, Elexon, the ESO and developers envisage there to be no, or minimal, change to the BSC for the majority of the Early Opportunities concepts.
Security and Quality of Supply Standard (SQSS)	We propose that a change is needed to increase the Normal/Infrequent Infeed Risk from 1320MW to 1800MW. This will be assessed in line with the Holistic Network Design (HND) under the Pathway to 2030 workstream of the OTNR along with the wider National Electricity Transmission System (NETS) SQSS review.
Grid Code (GC)	Our initial analysis has indicated that no change is required to the current GC. However, we will continue to engage with developers to understand if any changes to their proposals, or the approach taken by Ofgem and BEIS with regard to the Early Opportunities workstream, results in amendments being required.

What does this mean for Industry Codes and Standards?

Codes and standards	Outcomes and recommendations
Connection and Use of System Code (CUSC)	• The allocation of charges between two or more users when sharing the same offshore circuits and substation.
Three Code Modifications have been recommended to provide greater clarity to the Charging Methodology:	• Clarity of which wider tariff is applied, when a user is connecting to two Main Interconnected Transmission System (MITS) nodes that are in different zones (i.e. under a bootstrap concept).
(Additional CUSC code modifications may be identified following the outcome of the Ofgem Early Opportunities consultations)	• Whether the Charging Methodology needs to change for the situation when a user is building the OFTO assets for the connection of multiple users and these users are connecting at differing times.

To facilitate coordination the ESO is leading the CUSC related changes. We also hold a monthly codes and standards subgroup to share updates and seek feedback from our stakeholders.

Code Modifications required under Early Opportunities will be progressed in line with the industry agreed standard governance process as illustrated in this diagram.

What does this mean for Industry processes?

Industry process	Outcomes and recommendations
Contracts for Difference (CfDs) Administered by ESO Electricity Market Reform (EMR) and Low Carbon Contracts Company (LCCC)	There are no fundamental barriers that would preclude coordinated offshore projects participating in future Allocation Rounds. However, BEIS policy direction, in relation to eligibility criteria, sealed bids and assessment, will be required to accommodate offshore coordination in CfDs. Our EMR team, LCCC and BEIS are continuing collaboration to facilitate coordination in Allocation Round 5 (AR5).
Offshore Transmission Owners (OFTOs)	We have held several workshops with OFTOs and gathered their feedback on our proposals. This has highlighted a number of areas relating to the current OFTO framework which we are now seeking guidance from Ofgem on. Areas where clarification is sought include; funding arrangements, the incentives regime and licensing. Our discussions have also identified where OFTOs may need further support and training in order to transition to new contractual arrangements and increased applications for connection. We will continue to work with OFTOs to provide appropriate support as things develop.

What does this mean for ESO processes?

Broadly speaking, current ESO processes are on the basis of a radial connection to the NETS. Our analysis has looked at what changes may be required to facilitate coordinated connections.

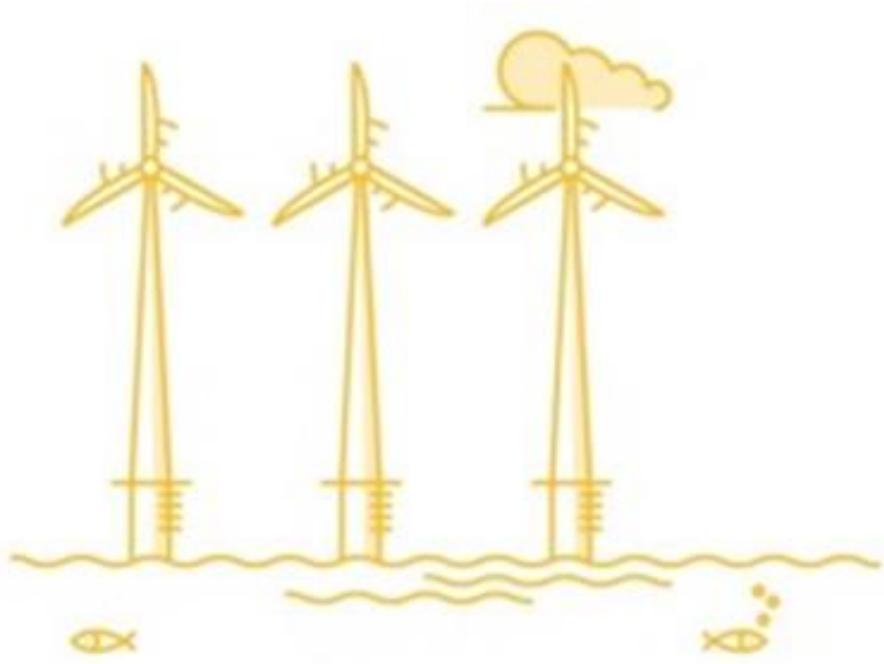
ESO process	Outcomes and recommendations
Applying for a connection	Changes are required to connections processes and systems in relation to applications for connection to an OFTO. In addition, new clauses may be required in connection agreements, but these would be on a project specific basis.
Economic assessment	Early Opportunities projects may need to be modelled in new ways. Further work is required in this area to enable a greater understanding of any impacts.
Demonstrating compliance with the Grid Code	There is the potential for new relationships between parties and new obligations that may require changes to how compliance is checked.
Operating the network	All innovative projects need to be operable, and as such all Early Opportunities projects will need to be reviewed by the ESO control room once more detailed designs are known. Business procedures will need to be updated to account for the new arrangements.

Multi-Purpose Interconnectors (MPIs)

Further information and clarity is needed to understand what constitutes an MPI (in the context of the Early Opportunities workstream).

A greater understanding regarding how an MPI would be operated and regulated is required in order to identify any changes to codes and standards, and to understand whether any gaps in internal processes exist.

We will continue to engage with stakeholders to understand in detail the MPI proposals and keep up to date with relevant industry consultations such as the Ofgem OTNR consultation, Ofgem Interconnector Policy Review and BEIS Enduring Regime.



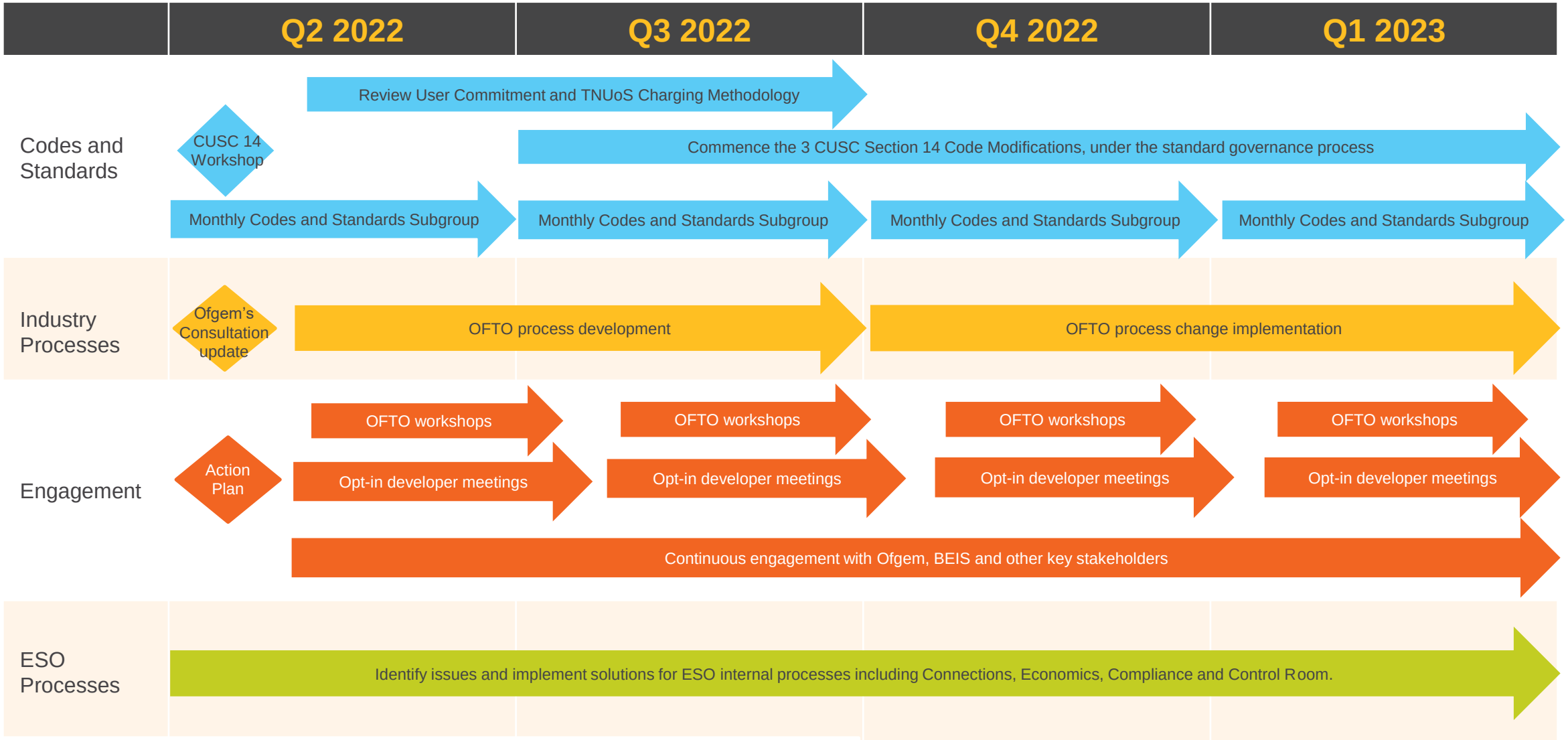
Our next steps

On the next page you'll find a high level overview showing the activities for the Early Opportunities workstream that are either:

- in flight, or;
- planned over the forthcoming months

Continuous engagement with the industry and the opt-in project developers remains really important to us. We've factored this into the next steps timeline and on the subsequent page we've included a diagram that shows the breadth of stakeholders we're engaging with.

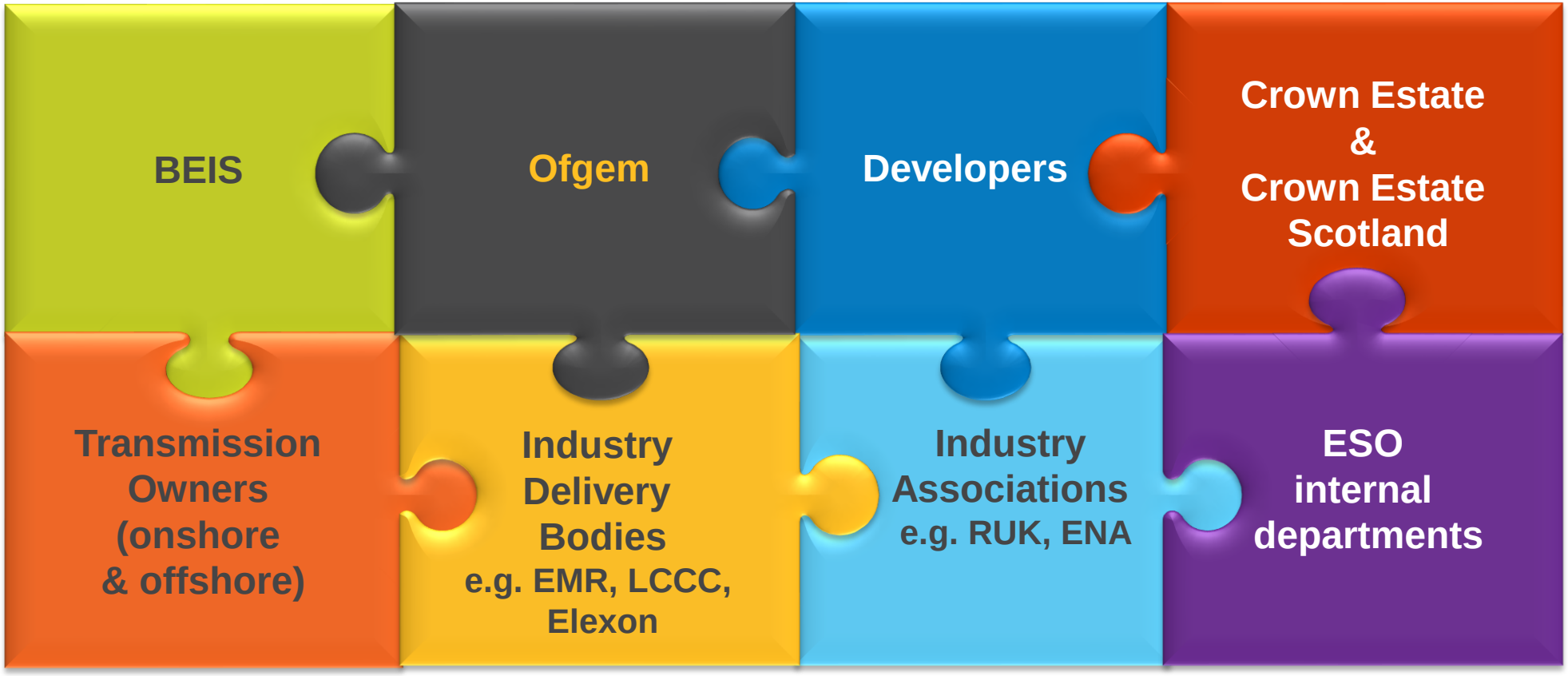
Next steps timeline



Please note that the timescales shown are for indication only and may be subject to change.

Stakeholder engagement

Our stakeholders are key to the success of the Early Opportunities workstream. We will continue to engage with them throughout the process via project specific meetings, workshops and any other appropriate means.



Glossary

Allocation Round	Contract for Difference (CfD) rounds in which developers compete to be awarded a contract.
Department for Business, Energy and Industrial Strategy (BEIS)	A UK Government department with responsibilities for business, industrial strategy, science, innovation, energy, and climate change.
Bootstrap	Subsea high voltage direct current (HVDC) link providing undersea connections between two points on the National Electricity Transmission System.
Balancing and Settlement Code (BSC)	The Balancing and Settlement Code is administered by ELEXON contains the rules and governance arrangements for electricity balancing and settlement in Great Britain.
Charging Methodology	CUSC Section 14 which sets out the charging calculations for parties to the CUSC.
Codes and Standards	Industry codes underpin the electricity and gas wholesale and retail markets. Market participants are required to comply with the industry codes in accordance with the conditions of their licence. At National Grid ESO, the Code Administrator team administers four of these codes. They are the CUSC, Grid Code, STC and SQSS.
Connection and Infrastructure Options Note (CION)	This is the document where the output of the CION optioneering process is recorded. It provides a joint record of the rationale for the selection of the overall preferred connection option from the assessment of technical, commercial, regulatory, environmental, planning and deliverability aspects.
Contract for Difference (CfD)	A contract between the Low Carbon Contracts Company (LCCC) and a low carbon electricity generator, designed to reduce its exposure to volatile wholesale prices.
Connection and Use of System Code (CUSC)	The Connection and Use of System Code is the contractual framework for connecting to and using the National Electricity Transmission System (NETS).
Electricity System Operator (ESO)	National Grid ESO is the electricity system operator for Great Britain. Our control room moves electricity around the country second by second to ensure that the right amount of electricity is where it's needed, when it's needed – always keeping supply and demand in perfect balance.

Glossary

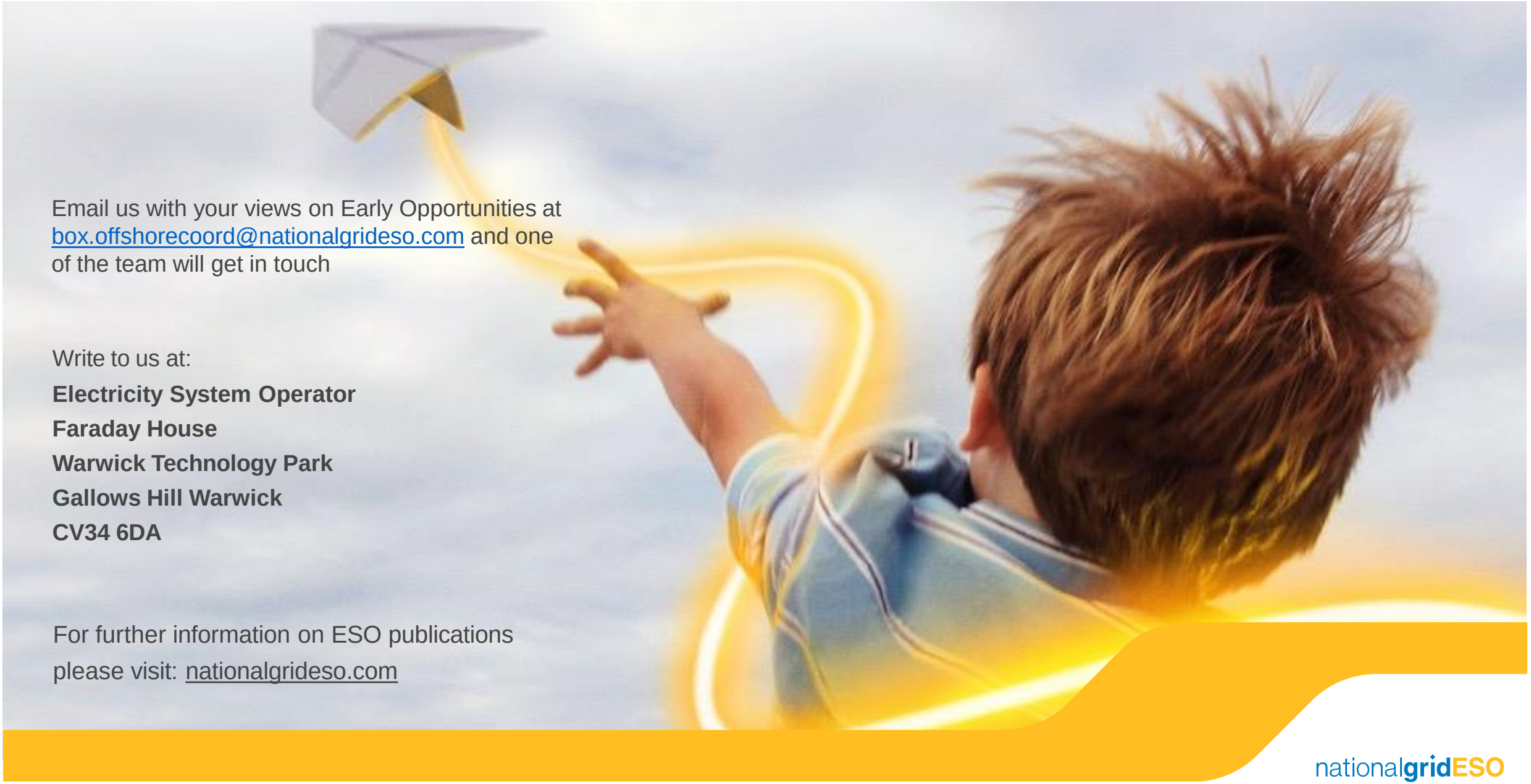
Elexon	Elexon are an external entity who are responsible for administering the Balancing and Settlement Code (BSC), which states the rules and governance around balancing electricity in Great Britain. They compare how much electricity generators and suppliers say they will produce and consume with actual volumes, helping to balance any differences.
Energy Networks Association (ENA)	The Energy Networks Association is the industry body representing energy network operators in the UK and Ireland.
Greenhouse Gas	A gas in the atmosphere that absorbs and emits radiation within the thermal infrared range.
Grid Code (GC)	Specifies the technical requirements for connection to, and use of, the National Electricity Transmission System.
High Voltage Direct Current (HVDC)	DC power transmission at voltages above 110 kilovolts (kV).
Holistic Network Design (HND)	The HND forms part of the OTNR. Its purpose is to provide a coordinated onshore and offshore design for a 2030 network to meet government objectives of connecting 50 GW of offshore wind in Great Britain by 2030. The HND aims to provide an economic, efficient, operable, sustainable, and coordinated National Electricity Transmission System (NETS) including the onshore and offshore assets required to connect offshore wind and considering international interconnectors.
Interconnector	Transmission assets that connect the GB market to Europe and allow suppliers to trade electricity or gas between markets.
Low Carbon Contracts Company (LCCC)	The Low Carbon Contracts Company (LCCC) is wholly owned by BEIS, created to deliver key elements of the Government's Electricity Market Reform (EMR) Programme. Which included managing Contracts for Difference (CfD) and carrying out the obligations of the Capacity Market Settlement Body to manage Capacity Market payment.
Main Interconnected Transmission System (MITS)	This comprises all the 400kV and 275kV elements of the onshore transmission system and, in Scotland, the 132kV elements of the onshore transmission system operated in parallel with the supergrid, and any elements of an offshore transmission system operated in parallel with the supergrid, but excludes generation circuits, transformer connections to lower voltage systems, external interconnections between the onshore transmission system and external systems, and any offshore transmission systems radially connected to the onshore transmission system via single interface points.

Glossary

National Electricity Transmission System (NETS)	The high voltage transmission system operated by National Grid System Operator (ESO).
National Grid Electricity System Operator (ESO)	National Grid Electricity System Operator (ESO) moves electricity to where it is needed on the transmission system, balancing supply and demand on a second by second basis in Great Britain. The ESO does not own any transmission assets. The electricity transmission system is owned by National Grid Electricity Transmission, Scottish Hydro Electricity Transmission and SP Transmission. Since April 2019 the ESO has been a legally separate company within the National Grid Group and has its own regulation, incentive scheme and company board.
Net Zero	When the total of all greenhouse gasses emitted in a year reaches zero, after all emissions and all carbon sequestration has been accounted for. This is the current UK target for 2050.
Offshore Transmission Network Review (OTNR)	A review, led by BEIS, into the way that the offshore transmission network is designed and delivered, consistent with the ambition to deliver net zero emissions by 2050. The ESO Offshore Coordination Project forms part of the OTNR.
Offshore Transmission Owner (OFTO)	A transmission owner who assumes responsibility for offshore transmission assets. An OFTO is competitively appointed by Ofgem through a tender process and is awarded an OFTO licence.
Pathway to 2030	Forms part of the OTNR and aims to deliver a Holistic Network Design for a coordinated onshore and offshore network to 2030, and assessing and progressing the required changes to relevant industry codes and standards.
Radial	Direct single connection of an offshore wind farm to the onshore transmission network without connection to other points.
RenewableUK (RUK)	RenewableUK is a not for profit renewable energy trade association in the UK.
System Operator-Transmission Owner Code (STC)	The System Operator Transmission Owner Code defines the relationship between the transmission system owners and the system operator.
Security and Quality of Supply Standard (SQSS)	A set of standards used in the planning and operation of GB's National Electricity Transmission System, including both onshore and offshore.

Glossary

Transmission Entry Capacity (TEC)	The amount of MW you have a right to put on to the NETS (averaged over a half hour period). If you hold TEC you must also pay an annual fee to use the transmission system (TNUoS).
Transmission Network Use of System (TNUoS)	TNUoS charges recover the cost of installing and maintaining the transmission system in England, Wales, Scotland and Offshore. Generators are charged according to TEC. Suppliers are charged based on actual demand. All tariffs are based on which geographical zone Users are connected to.
Transmission Owner (TO)	A collective term used to describe the three onshore electricity transmission asset owners within Great Britain, namely National Grid Electricity Transmission plc, Scottish Hydro Electric Transmission plc and SP Transmission plc.
Transmission System Operator (TSO)	TSOs are entities operating independently from the other electricity market players and are responsible for the bulk transmission of electric power on the main high voltage electric networks. TSOs provide grid access to the electricity market players (i.e. generating companies, traders, suppliers, distributors and directly connected customers) according to non-discriminatory and transparent rules. In order to ensure the security of supply, they also guarantee the safe operation and maintenance of the system. In many countries, TSOs are in charge of the development of the grid infrastructure too.
Trigger Date	The date under the securities methodology at which point wider liabilities and securities become applicable.
User	A term utilised in various sections of the industry codes to refer to the entities using the National Electricity Transmission System.
User Commitment	User commitment arrangements place liabilities on generators triggering broad system investment (Wider), and local generator-driven investment (Attributable) in order to financially secure the investment being undertaken on their behalf. This is formally set out in Section 15 of the CUSC. User commitment performs a vital function in ensuring adequate information is available to TOs to plan and develop the network in a manner that is economical and efficient and protects the interests of consumers and the wider industry.
Wider Tariff	Generic £/MW for all generators in a particular zone, each zone has a £/MW tariff. The Tariff is based on total annual TO asset spend and customers are only expected to secure against this once they have hit their trigger date. A Tariff Statement is published annually and contains the tariff for the coming year (effective from 1st April) and three years forecast.



Email us with your views on Early Opportunities at box.offshorecoord@nationalgrideso.com and one of the team will get in touch

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