



Scottish & Southern
Electricity Networks

TRANSMISSION

SSEN Transmission
Whole System Coordination Register
2023



www.ssen-transmission.co.uk

Whole System Coordination Register for 2022-23. Published May 2023

This register is published to demonstrate compliance by SSEN Transmission with the Whole System Electricity Licence condition. It reports on compliance for the period from 1st April 2022 to 1st April 2023.

Whole electricity system outcomes arise from actions taken between two or more parties, at least one of whom holds an electricity transmission or distribution licence, that result in both:

- An investment in the transmission and distribution electricity networks representing best value for money; and
- Improving or, at a minimum, maintaining the services and benefits received by Customers of the electricity network.

Part A The behaviour requirements (summarised)

Clause 1 The licensee must coordinate and cooperate with other Electricity Distributors and transmission licensees to identify actions and processes that advance the efficient and economical operation of the Total System.

Clause 2 The licensee must consider actions proposed by Distribution System Users/Transmission System Users which seek to advance the efficient and economical operation of its network.

Clause 3 The licensee must use all reasonable endeavours to implement actions and processes identified and proposed through coordination or user suggestions

Part B that: (a) will not negatively impact its network; and (b) are in the interest of the efficient and economical operation of the Total System.

Demonstrating compliance (summarised)

This register details completed and in progress work which demonstrates compliance with the Whole System Electricity Licence Condition.

The licensee must prepare and is required to publish on its website a coordination register demonstrating the steps it has taken to comply with Part A of this condition not later than 27 May 2023.

The licensee must keep up to date and is required to publish its coordination register (as updated) on its website at least once every 12 months from the date of initial publication.

Further information on the Whole Electricity System Licence Condition and its purpose can be found on Ofgem's website.

[Decision to implement the Whole Electricity System Licence Condition D17/7A for Transmission Owners and Electricity Distributors | Ofgem](#)

Relevant coordination and cooperation activities	Actions or Processes arising																				
Type	Supporting evidence shared with Whole System Manager	Unique ID	License	Collaborating licensees and other stakeholders	Year activity added	Description of the coordination/cooperation activity	Status	Latest stage/Update (Comments if any)	Coordination activity initiation date (mm/yyyy)	Whole system relevance of the activity	External links to reports on the activity (if available)	Description of data (who shared the data) (date shared/restricted sharing)	External links for data (if available)	Impact of the activity on the whole system	Impact of the activity on licensees	Recommended next stage of the activity	Justification for recommendation	Action or Process description	Action or process initiation date (mm/yyyy)	Status	Reference of the activity or user suggestion which resulted in this action/process
Coordination and cooperation activity	yes	SEN/01/S01	SEN Transmission	NGT	22/23	Project Aquila - Coordination activities with NGT on HVDC multi-vendor interoperability development and demonstration. Currently HVDC converters between different manufacturers cannot work with each other. This has been recognised by BEIS as a pathfinder project in July 2022. A new control model is being developed by the HVDC centre to work as an "adapter" to allow a control over converters by different manufacturers.	In progress	May-22	Sep-22	Through the engagement activities from GB Interoperability Working group with other network licensees, SEN Transmission, through HVDC Centre, is able to share its knowledge and experience in its approach to whole system and return to gain feedback it can use to make relevant changes to its design which will benefit the total system.	None	Models and project learning is continuously shared with NGT	None	Once multi-vendor interoperability is proven, this can be deployed to HVDC transmission projects in the future.	This would potentially reduce the number of HVDC converter stations required by connecting HVDC links to a multi-terminal switching stations.	SEN Transmission has submitted Project Aquila as a pathfinder project to demonstrate multi-vendor interoperability. This would be further tested in Project Aquila funded via Net Zero Resilience. The feasibility study of multi-vendor interoperability study is expected to be completed by mid 2024.	This project is important as it will enable interoperability development and benefit the delivery of the offshore transmission network by potentially reducing the connection to huge volumes of offshore wind require to meet net zero.				
Coordination and cooperation activity	yes	SEN/01/S04	SEN Transmission	NGSO, SPN, Vendors/manufacturers	22/23	Coordination activities with NGSO and SPN on system power quality issues following unusually high levels of harmonic distortion observed in the South West region. In particular, understanding the causes of the harmonic distortion and how to reduce them.	In progress	Apr-22	Apr-22	Through the coordination activities with other network licensees as well as the system operator, a holistic approach is being taken to resolve these power quality issues which will benefit the operability of the total electricity system.	None	Received harmonic data from SPN (restricted sharing)	None	This has a positive impact as the solutions to these power quality issues will ensure the operability of the total electricity system.	The knowledge sharing from these coordination activities has helped us to come up with the most efficient and economic solutions to resolve these emerging system power quality issues.	SEN Transmission has submitted a project to Ofgem which will mitigate the impact of these system power quality issues.	To maintain the operability of the electricity system	Coordinate with the HVDC centre on the design and simulation of a flexible controller.	Apr-23	New, Improving	SEN/01/S04
Coordination and cooperation activity	yes	SEN/01/S07	SEN Transmission	NGSO, SPN, Vendors/manufacturers	22/23	Preferred Solutions to perform for Lower levels of Fault Current on AC networks (PLS FCL) to simulate a future electrical network when the fault current is limited by a prolonged and evaluate how present PFC protection function and response. Based upon the findings it will determine if a Protection and Control (PAC) solution can be further developed to address the potential future network issues.	In progress	Dec-22	Jun-23	By understanding the protection and control requirements needed for the network to operate with the increase in renewable generation sources will reduce the potential for disruption to the electrical energy supply.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Data shared with University of Strathclyde and National HVDC Centre. All results of the project will be disseminated via ENA Operator Networks portal and CORE PAC documents and papers.	None	Positive impact Reducing the potential for protection and control issues to affect the electrical energy supply to the UK. This would impact from Generation, Transmission and Distribution as well as being an effect on Gas operation.	Positive impact on understanding the future protection & control needs for the network allows for better planning.	Real time field data collection to be replicated on the simulation network	Proof that the simulation can replicate the real time scenarios is necessary to provide confidence in the project outputs	Initiate project to resolve power quality issues in the south west of Scotland following approval from Ofgem	Jun-23	New	SEN/01/S07
Coordination and cooperation activity	yes	SEN/01/S08	SEN Transmission	NGSO	22/23	TOTEM Extension (Transmission Diver Tools for EMT (Electromagnetic Transient Modelling). Continuation of the 'NET_002 TOTEM' project to complete the development and associated validation of a full-scale model of the GB Transmission System in EMTP/PSCAD (Power System Computer Aided Design) simulation software.	In progress	Dec-22	May-20	Deliver tools for PSAD model manipulation for the whole GB network and analysis that will support the TOs in their use of the GB model.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Network models	None	Positive impact: To be able to actively model the current and future GB network. All TOs will be able to use the tools and Distribution Network Owner (DNO) will be able to use the results of the project and gain learning.	Positive impact: To be able to actively model the current and future SEN Transmission network	The end product will be a valuable modelling tool however it will need to be validated and improved through studying actual system disturbances.	Enable future proofing of the network.	Ensure the results of the project are moved into Baso operation	Apr-23	New	SEN/01/S08
Coordination and cooperation activity	yes	SEN/01/S09	SEN Transmission	SPN, NGT	22/23	A working group has been set up between the three GB TOs to develop a Master Carbon Asset (CA) Database which contains greenhouse gas intensity factors for specific assets to allow for more accurate reporting on embedded carbon emissions.	In progress	Nov-22	Jan-19	As a result of this work the three transmission network licensees will have a consistent methodology for calculating embedded carbon emissions in transmission projects. The CA database will be regularly updated with any new emission factors reported by the supply chain and these updates will be shared between all TOs.	None	Shared database between the three TOs.	None	This ensures a consistent methodology is applied across all TOs and the regular reporting will allow opportunities to share learning. This group helps improve carbon reporting across the transmission system. It also provides a consistent database for the supply chain to use when providing transmission related embedded carbon data.	This database has provided us with the necessary data to start reporting on project level embedded carbon. The continued shared learning will ensure we stay aligned with other TOs while improving the accuracy of our carbon reporting.	The key next step is to determine the governance of the CA Database i.e. when it will be stored, who will be responsible for updating etc. and consider how each TO will utilise the database.	These activities are necessary to allow a co-ordinated approach to embedded carbon emissions reporting.	Ensure the recommended next stage activity (model validation and improvement through study of actual system disturbances) is performed and the results distributed	Mar-23	New	SEN/01/S09
Coordination and cooperation activity	yes	SEN/01/S10	SEN Transmission	SPN, NGT	22/23	A working group has been set up between the three GB TOs to collaborate and standardise project wide reporting (where possible). The aim of the group is to promote data collection consistency and to reduce administrative efforts for our supply chain partners.	In progress	Nov-22	Jun-22	Through this working group, the GB TOs are applying a joint approach to methodology development by sharing knowledge on existing reporting requirements as well as discussing potential new requirements which could be explored further.	None	Knowledge sharing has occurred over MS Teams meetings, no data has been shared yet.	None	This will allow for more accurate reporting on operational emissions across the transmission system and will ensure a coordinated approach is applied amongst the three TOs.	Knowledge sharing from the working groups has given us a sense of the accuracy of our current methodology and has provided us with potential alternative methods which can be further explored.	These activities are necessary to allow a co-ordinated approach to substation energy consumption emissions reporting.	Share data into the master database	Dec-22	Improving	SEN/01/S10	
Coordination and cooperation activity	yes	SEN/02/S01	SEN Transmission	SPN, NGT	22/23	A working group has been set up between the three GB TOs to collaborate and standardise project wide reporting (where possible). The aim of the group is to promote data collection consistency and to reduce administrative efforts for our supply chain partners.	In progress	Nov-22	Oct-22	Through this working group, the GB TOs are sharing knowledge on existing reporting requirements as well as discussing potential new requirements which could be explored further.	None	Knowledge sharing has occurred over MS Teams meetings, no data has been shared yet.	None	This will ensure a coordinated approach is applied amongst the three TOs.	Positive impact - improved coordination and standardisation.	The next step is for all TOs to collaborate on a shared file in which we can review our reporting requirements.	These activities are necessary to allow a co-ordinated approach to waste reporting.	Exchange data and idea on methodologies with other stakeholders	Feb-23	Improving	SEN/02/S01
Coordination and cooperation activity	yes	SEN/02/S02	SEN Transmission	NGT, SPN, ENA Users	22/23	Co-ordination activities to further code modifications in GDS, STC, S2SS, S2SD Code that meet the code objectives of safe and reliable system and consumer benefits etc., and overarching goal of net zero	In progress	Dec-22	Apr-22	Enables co-ordinated whole system approach to code modifications, aligned positions, to fulfil the relevant code objectives and efficient code governance procedures.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	ENA Open Networks monthly publication of Steering Group Report - Annex of code modifications	None	Positive impact - enable fulfilment of the relevant code objectives and efficient code governance procedures.	Positive enables alignment and learning from TOs and users, and assessment of code modifications against the code objective and objectives of ENA Open Network project	Maintain activities and utilise learnings to inform SEN/02/1 - Energy Code Reform	Ensure learnings from current code governance and the opportunities and limitations inform advocacy position for Energy Code Reform				
Coordination and cooperation activity	yes	SEN/02/S03	SEN Transmission	NGT, SPN, ENA Users	22/23	Co-ordination activities and insight sharing on BEIS and Ofgem Energy Code Reform proposals in Energy Security Bill	In progress	Dec-22	Apr-22	Enables cross vector and cross fuel learning to ensure BEIS benefits are realised (Energy Assessment codes benefit £1.6m p/a efficiency saving for industry through reform)	None	None	None	Positive impact - seeks to take learnings from current code governance and to apply to reform and maximise whole system opportunity of reform.	Positive impact - seeks to take learnings from current code governance and to apply to reform and maximise whole system opportunity of reform.	Continuous SEN's Stakeholder Engagement Plan for CCA	Plan to date has brought value and insight through bilateral meetings.				
Coordination and cooperation activity	yes	SEN/02/S04	SEN Transmission	NGT, SPN, ENA Users	22/23	Co-ordination activities and insight sharing on BEIS and Ofgem Energy Code Reform proposals in Energy Security Bill	In progress	Dec-22	Nov-21	Our evidence based work on this area monitors and tracks the effect that changing market signals, for those connecting to our network can have on the operation of both distribution and transmission networks. A key part of this work is also considering the impact on consumers and ensure society reaches net zero efficiently at least cost.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	ENA Open Networks monthly publication of Steering Group Report - Annex of code modifications	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Our work in this area has led us to be trusted source of information that stakeholders rely on. We have responded to key government consultations such as BEIS NEMA consultation and Ofgem's Call for Input.	Positive impact on SEN Transmission in particular around enhancing our stakeholder engagement. Our engagement on market reform has ensured that our future network planning is considered by key organisation stakeholders such as BEIS and Ofgem.	Continue to contribute to key consultations that consider market arrangements and monitor their impact on transmission is considered for.	Grid changing, access and markets play a vital part of ensuring that we can deliver our business plan efficiently. It is important for us to continue to monitor change in this area and advocate where appropriate the requirements for our business, stakeholders and wider society.				
Coordination and cooperation activity	yes	SEN/02/S05	SEN Transmission	SPN, NGT, SEN Distribution, Users, Ofgem, NGSO, ENA, Trade bodies, NGT, SPN, Generators	22/23	Developing the markets and funding arrangements for the Electricity Restoration Standard directed by BEIS in 2021. Representing SEN Transmission in industry wide work group forums and code modifications to introduce the new standard effectively.	In progress	Dec-22	Jan-22	As part of the new standard, it is identifying new innovative ways to restore the system, this includes utilising distributed restart and DSO of restoration services. It is important that this coordinated across the whole system to ensure effective data sharing and operational practices in place and the market and funding mechanisms for such services to avoid any unintended consequences.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Many collaboration through work groups and delivery groups. The DSO shared their views, and industry including SEN Transmission provided input	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Will allow more efficient, coordinated restoration of the system, reintroducing new requirements that GB should be able to meet within 24 hours.	Positive impact as this ensures that the safety, reliability and economic operation of the transmission network is at the forefront of this work.	Work moved into Grid code modifications, continuing to monitor its progress. SAs also providing input and support where appropriate	Important to monitor and feed into any changes that may affect the safe, reliable and economic operation of the transmission network.				
Coordination and cooperation activity	yes	SEN/02/S06	SEN Transmission	All DNOs and TOs, NGSO, ENA	22/23	DSO implementation plan and interactive road map	Complete	Dec-22		As part of the ENA Open Network Project there was an objective to create an implementation plan and interactive roadmap for stakeholders showing the DNOs transitioning to DSOs. This was fed into and agreed by all DNOs, ESO and TOs with the ENA coordinating. This looked at all functions of the DSO including system operation, markets, coordination, planning, flexibility services etc. SEN Transmission fed into this by providing evidence on what we are doing to support the implementation of DSO and fed into the work to ensure that the appropriate data exchange and coordination practices are in place to avoid any unintended consequences.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Coordination with the ESO and DSO, system operation including restoration, network planning	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Our work in this area allowed coordination across the whole electricity system to ensure that the implementation of DSO functions were coordinated effectively and that any concerns or unintended consequences were avoided	Positive impact on stakeholder collaboration and ensuring the safe, reliable and economic operation of the transmission network as the use and operation of the whole system changes	Work within the ENA has now been completed. This work is being internally through coordinating regularly with SEN Distribution on their progress of implementing DSO functions and services	Important to monitor and feed into any changes that may affect the safe, reliable and economic operation of the transmission network.				
Coordination and cooperation activity	yes	SEN/02/S07	SEN Transmission	SEN Distribution, local Councils, communities and developers	22/23	Orkney Whole System Study - coordinating with SEN Distribution and developers to determine the optimal options of connecting renewable energy generation on Orkney.	Complete	Jan-23	Oct-22	Establishing working relationships with SEN Distribution, local Councils and communities to determine the optimal options of connecting renewable energy generation on Orkney.	None	Knowledge sharing through emails, Microsoft Teams and face to face meetings.	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Minimises social and environmental impact by building less across transmission and distribution. Enhances security of supply for consumers. Reduction in overall connection costs. Enables connection of renewable energy require to meet net zero in an efficient and economic manner	Positive impact - Cost savings for network licensees and developers	Recommend ongoing co-ordination with SEN Distribution and local councils to ensure that all parties involved.	Potential to provide costs savings to all parties involved.				
Coordination and cooperation activity	yes	SEN/02/S08	SEN Transmission	SEN Distribution, local Councils	22/23	Dumfries and Aberdeen City Network Development Strategies. Worked with SEN Distribution, local Councils, communities and developers to determine the optimal options of connecting renewable energy generation on Orkney.	In progress	Feb-23	Apr-23	A more holistic and cost effective approach to network investment was achieved by simultaneously considering local and non-load driven as well as the local plans for the cities, and to actively engaging the stakeholders.	None	Technical reports with identified load and non-load driven, along with a stakeholder engagement strategy (Restricted Sharing)	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Increased consideration of a higher number of factors influencing network investment, potentially increasing the ability to make investment decisions that will result in a reduced cost to customers and consumers	Positive impact - Cost savings for network licensees.	Recommend ongoing co-ordination with SEN Distribution and local councils to ensure that all parties involved.	Potential to provide costs savings to all parties involved.				
Coordination and cooperation activity	yes	SEN/02/S09	SEN Transmission	SEN Distribution, local Councils, communities and developers	22/23	Orkney Whole System Study - coordinating with SEN Distribution and developers to determine the optimal options of connecting renewable energy generation on Orkney.	In progress	May-23	Dec-22	Potential cost savings on infrastructure costs, minimises environmental and social impact	None	Terms of reference and work plans shared with SEN Distribution (Restricted Sharing)	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Minimises social and environmental impact by building less across transmission and distribution. Enhances security of supply for consumers. Reduction in overall connection costs. Enables connection of renewable energy require to meet net zero in an efficient and economic manner	Positive, cost savings across transmission and distribution	Recommend ongoing whole system development plans for Shetland, identifying funding mechanisms for the projects arising from this work, and engaging with Ofgem and stakeholders	Potential to provide costs savings to all parties involved.	Engage with stakeholders and provide justifications for the investments.	Dec-23	New	SEN/02/S09
Coordination and cooperation activity	yes	SEN/02/S10	SEN Transmission	SEN Distribution, local Councils, communities and developers	22/23	Orkney Whole System Study - coordinating with SEN Distribution and developers to determine the optimal options of connecting renewable energy generation on Orkney.	In progress	May-23	Dec-22	Potential cost savings on infrastructure costs, minimises environmental and social impact	None	Terms of reference and work plans shared with SEN Distribution (Restricted Sharing)	https://www.energy-nz.govt.nz/infrastructure/energy-research-and-development/energy-research-and-development-reports/	Minimises social and environmental impact by building less across transmission and distribution. Enhances security of supply for consumers. Reduction in overall connection costs. Enables connection of renewable energy require to meet net zero in an efficient and economic manner	Positive, cost savings across transmission and distribution	Recommend ongoing whole system development plans for Shetland, identifying funding mechanisms for the projects arising from this work, and engaging with Ofgem and stakeholders	Potential to provide costs savings to all parties involved.	Engage with stakeholders and provide justifications for the investments.	Dec-23	New	SEN/02/S10

Details of all proposals received during a relevant period from system users to advance the efficient and economical operation of Electricity Distributors' and/or transmission owners' networks. Details of any system user proposals that have been implemented (or are being implemented) as well as a concise and clear summary of proposals not deemed to be apt for implementation, including the reason(s) for that decision.

Unique identifier for each row of the sheet (starting with xxxx/U/001 where xxxx refers to the licensee)	Licensee who is publishing register	Licensees and other stakeholders with whom collaboration was/is being carried out.	domestic customer; customer commercial; Group of domestic customers; Group of commercial customers; local authority; combined authority; other infrastructure networks; generators; aggregators etc.	Date on which the user suggestion was received	Details of the suggestion. Only those suggestions that improve the economy and efficiency of the whole system is to be considered, suggestions benefitting just one user is not to be included.	Details of the relevance to whole system	Action taken based on the suggestion. Could even be decision to not take forward.	Justification of the action resulting from the user suggestion.
Unique id	Licensee	Collaborating licensees	User category	Suggestion submission date (mm/yyyy)	Description of the suggestion	Whole system relevance	Description of the action taken on the suggestion	Justification of the action
SSEN/029US	SSEN T	SSEN Distribution and ESO	Networks	Nov-22	SHEPD has provided a proposal that embedded generators in Shetland should be allowed to generate as long as the export threshold at the Gremister GSP is maintained .	Reasons given by SHEPD are that their proposed solution will be easier to implement and provide cost savings to customers	Work is underway to explore different options of the ANM scheme. A decision on the scheme design will be made considering safety of assets, security of supply to Shetland communities, network access priority, and costs to consumers.	

We encourage stakeholders to provide their proposals on the following link which is also available on our Whole System Hub.

<https://www.ssen-transmission.co.uk/information-centre/whole-system-hub/>

Alternatively, you can contact us using the following email address

wholesystemtransmission@sse.com