

Introduction to Co-location

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This document does not seek to change or replace existing industry processes and codes. The intention is instead to simply and clearly demonstrate how existing connection, compliance and charging processes apply to transmission connected co-location in accordance with the current regulatory framework. In the event of any inconsistency between this document and industry processes and codes, the latter documents take precedence.

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Foreword

The UK energy system is undergoing fundamental change to deliver low carbon, smarter and more decentralised energy. The potential of electricity storage to function as a key enabler of flexibility and to play an increasing role in helping to manage supply and demand is increasingly viewed as a key component of this transforming system.

To date there has been an observable growth in electricity storage and an acceleration in the development of storage technology. This growth has led to a heightened interest in co-locating storage alongside renewable and other installations. We expect to see a gradual and steady increase in the number of applications for the co-location of a generation unit, in particular storage, alongside new and existing generation assets.

We are keen to help industry understand the process for co-location of storage and other forms of generation with existing generation that is either contracted or connected to the National Electricity Transmission System, within the current regulatory framework. This document provides guidance on some of the processes customers will need to be mindful of when considering co-location of generating units. It offers clear and transparent coverage of connection, charging and compliance that will assist customer thinking about projects and discussions with their Electricity Connection Contract Manager as part of the pre-application stages of the project.

This document does not change or replace existing Codes but rather seeks to clarify how transmission connected co-location sites are treated at present and in line with the regulatory framework. We believe this will deliver on consistency and transparency for the benefit of our customers first and foremost. It will also serve to complement similar guidance published by Ofgem and work being undertaken on the treatment of flexibility as part of the ENA Open Networks Project, which together should give customers and wider industry comprehensive coverage of storage across both distribution and transmission.

John Twomey

A handwritten signature in black ink, appearing to read 'J. Twomey', is written over a light grey rectangular background.

Markets Development Manager

Purpose

In July 2017 the Department for Business, Energy and Industrial Strategy (BEIS) and Ofgem published their Smart Systems and Flexibility Plan¹ (hereafter the Plan) to provide clarity on the action being taken by Government, Ofgem and industry, including National Grid Electricity System Operator (ESO), to deliver a smarter, more flexible energy system. The Plan identified 29 actions for Ofgem and industry to deliver, some of which focused on removing policy and regulatory framework barriers for storage, including the connections regime and co-locating electricity storage with generation assets. In October 2018 Ofgem published an update on progress against the actions in the Plan, including the publication of guidance for participants of the Renewables Obligation (RO) and Feed in Tariff (FIT) schemes who are considering co-locating electricity storage facilities with their accredited RO generating station or FIT installation.²

In parallel with the Government and Ofgem's work in this area, the ESO has been working with industry to better understand barriers to flexibility and storage, including the specific issue of co-located transmission connections. To address stakeholder feedback and to support Actions 1.4 and 1.6 of the Plan we are publishing this guidance to clarify how transmission co-located sites are treated under the existing regulatory framework across the areas of transmission connection, charging and compliance. This document is provided for guidance only and does not supplant the higher standing of industry Codes and the regulatory framework. The information contained herein offers clarity and transparency for co-located transmission connections in general and storage technology more specifically.

This guidance document will be kept under review and updated in response to any relevant future changes relating to the regulatory framework and connections regime for storage.

We hope this document provides clarity and transparency in respect of co-located transmission connections but in the event you have further questions please get in contact with your Electricity Connections Contract Manager and if you do not have one please contact transmissionconnections@nationalgrideso.com.

¹ https://www.ofgem.gov.uk/system/files/docs/2017/07/upgrading_our_energy_system_-_smart_systems_and_flexibility_plan.pdf

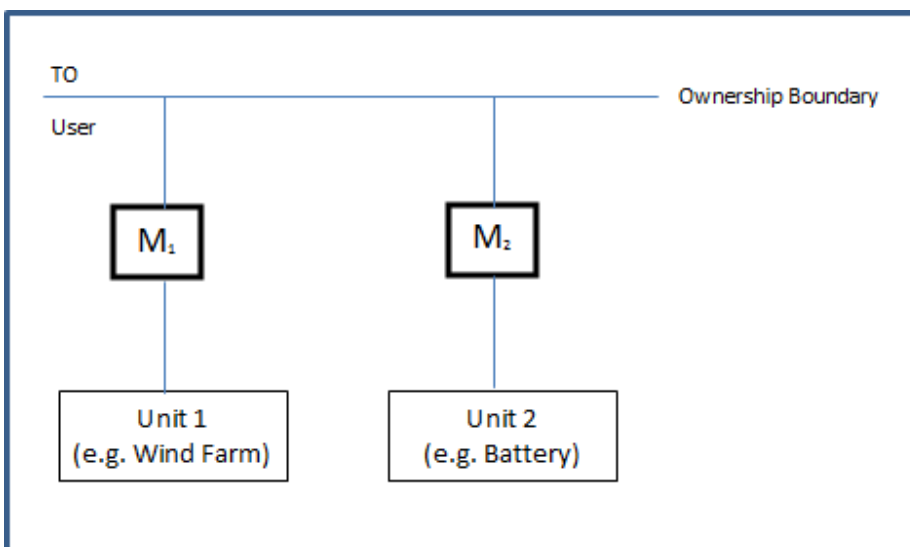
² https://www.ofgem.gov.uk/system/files/docs/2018/10/smart_systems_and_flexibility_plan_progress_update.pdf

Terminology

In this document a distinction is made between a 'parallel connection' and a 'consolidated connection'. To ensure that this terminology is correctly interpreted we have provided an explanation of each type of connection.

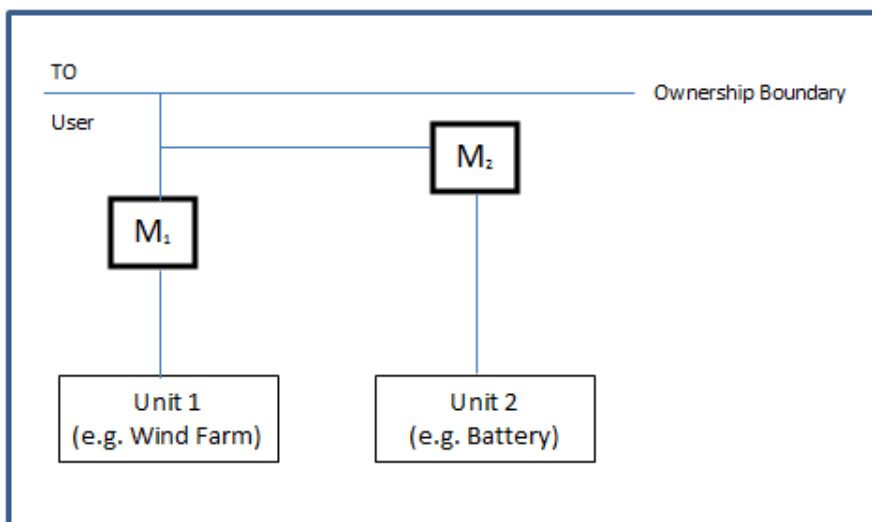
3.1 Parallel Connection

A parallel connection is one where the additional technology being co-located is connected directly to the transmission system at an existing or contracted connection site but with a new independent connection point and a representative example is depicted as follows.



3.2 Consolidated Connection

A consolidated connection in this context is one where the additional technology being co-located is connected to the transmission system behind an existing connection point at the existing (or contracted) connection site and a representative example is depicted as follows.



Co-location Guidance

This guidance section is subdivided into three areas:

- Connection
- Compliance
- Charging

Under each of the areas we have made any necessary distinction between parallel connection and consolidated connections as described in the previous section. Terms in bold are codified and their definitions can be found within the Connection and Use of System Code (CUSC) and/or the Grid Code.

Connection

Where a developer wishes to co-locate an additional unit, such as storage, at an existing connection site either a **Connection Application** or a **Modification Application** will be required. The type of application will depend on whether or not the new unit is intended to be part of the existing contracted or connected **Power Station**.

Regardless of whether a **Connection Application** or a **Modification Application** is submitted any application to increase **Transmission Entry Capacity** to accommodate a new unit will be assessed on a 'first come, first served' basis. However, please note our ongoing work with industry through the ENA Open Networks Project on the 'Transmission Queue', as this could possibly affect the approach taken in relation to the allocation and reallocation of capacity between contracted parties under certain circumstances.³

Parallel Connection

Where a developer intends to treat the new connecting unit as a new and separate **Power Station** (i.e. with a distinct **Connection Point** and **Bilateral Connection Agreement**) then, as a parallel connection, this will require a new **Connection Application**.

Consolidated Connection

Where a developer intends to treat the new connecting unit as a consolidated connection then the new **Generating Unit** or **Power Park Module** (likely also then being a separate **BM Unit**) will be grouped within the existing contracted or connected **Power Station**.

³http://www.energynetworks.org/assets/files/ON%20WS2%20P5%20Interactivity%20_%20Queue%20Management%20Consultation_v1.0.pdf

Therefore, a **Modification Application** will be required to review and potentially amend the existing **Bilateral Connection Agreement** prior to connection.

Where the new connecting unit is a different technology type, for example a **Power Park Module** consolidated with several **Generating Units**, there will likely be different site specific technical conditions and further works could be required prior to connection of the new unit. Where the new connecting unit is a technology type common to the existing unit(s) within the **Power Station**, it may be possible to maintain a single common set of site specific technical conditions. This can be discussed in more detail with your Electricity Connections Contract Manager during the **Modification Application** process.

In respect of the system assessments required within the **Modification** period then the new unit will be assessed at its appropriate place in the existing connection queue, similar to the circumstance where an existing contracted **Power Station** applies for a fuel type change or **TEC Increase Request**.

If a developer wishes the additional unit to be owned by a separate party to the registered **User** within the **Bilateral Connection Agreement** then whilst that may be possible this arrangement will likely need to be addressed between those two parties with the **Bilateral Connection Agreement** remaining between **The Company** and the contracted **User**. Alternatively, a brand new **Connection Application** can be submitted by the new **User** for a new and independent parallel connection.

Compliance

Please note that the approach to compliance will be directly informed by the contracted position.

Parallel Connection

If the connection of the new unit is to be a new **Power Station** with a separate **Bilateral Connection Agreement** then a normal compliance process will be followed. The provisions contained in **Grid Code** CP.5 to CP.7 detail the process to be followed for the **User's Plant** and **Apparatus** to become operational.⁴ This includes the issue of three Operational Notifications: **EON** (energisation), **ION** (interim synchronising) and **FON** (full compliance).

⁴ <https://www.nationalgrideso.com/codes/grid-code>

Consolidated Connection

If the new technology is being consolidated as a new unit within the **Power Station** under the existing **Bilateral Connection Agreement** then the compliance process pursuant to **Grid Code CP.8** will be followed. This will include the issue of a **Limited Operational Notification (LON)** for the **User's Plant** and **Apparatus** to become operational. The additional unit(s) will need to demonstrate compliance with the appropriate sections of **Grid Code** as well as maintaining the overall compliance of the **Power Station**. For example, a **Power Station** connected at a **Connection Point** could be made up of a **Power Park Module** and a newly connecting **Generating Unit**, which would need to be both individually and cumulatively compliant with the relevant sections of **Grid Code**. We would also ordinarily expect that the **Power Park Module** and **Generating Unit** would each be a separate **BM Unit** so they would need to be separately instructable and controllable. Please note that a new unit consolidated within an existing **Power Station** will be required to demonstrate compliance with several Grid Code requirements at the existing **Connection Point** (i.e. a new **Connection Point** will not be created as this would then be a parallel connection).

We also draw attention to ongoing work under Grid Code Consultation GC0096 to clarify the definitions and technical requirements for storage technologies as this could affect the classification of storage technology within the **Grid Code**, including the introduction of a new type of unit specific to storage, and consequently affect site specific technical conditions and compliance requirements.⁵ Also, in certain circumstances, and only in line with guidance published by Ofgem on derogation requests, a derogation will be considered where compliance cannot be properly demonstrated; this includes the process for derogation from European Network Codes.

Charging

In February 2017 the ESO published industry guidance on how storage technology is currently charged when connecting to the **National Electricity Transmission System**.⁶ However, the guidance did not reference co-location and as such we feel additional guidance specific to co-located sites connected to the **National Electricity Transmission System** is required.

⁵ The intention is to consult on the proposed definitions and technical requirements this year. Any consequential changes and definitions would then be expected to be applied to other industry codes as the need arises.

<https://www.nationalgrideso.com/codes/grid-code/modifications/gc0096-energy-storage>

⁶<https://www.nationalgrideso.com/sites/eso/files/documents/Guidance%20on%20how%20transmission%20connected%20storage%20is%20currently%20charged%20today.pdf>

Parallel Connection

For a parallel connection, the new technology connecting to the **National Electricity Transmission System** would be treated as a new and independent connection and would therefore be charged as such, in accordance with the published guidance referenced above.

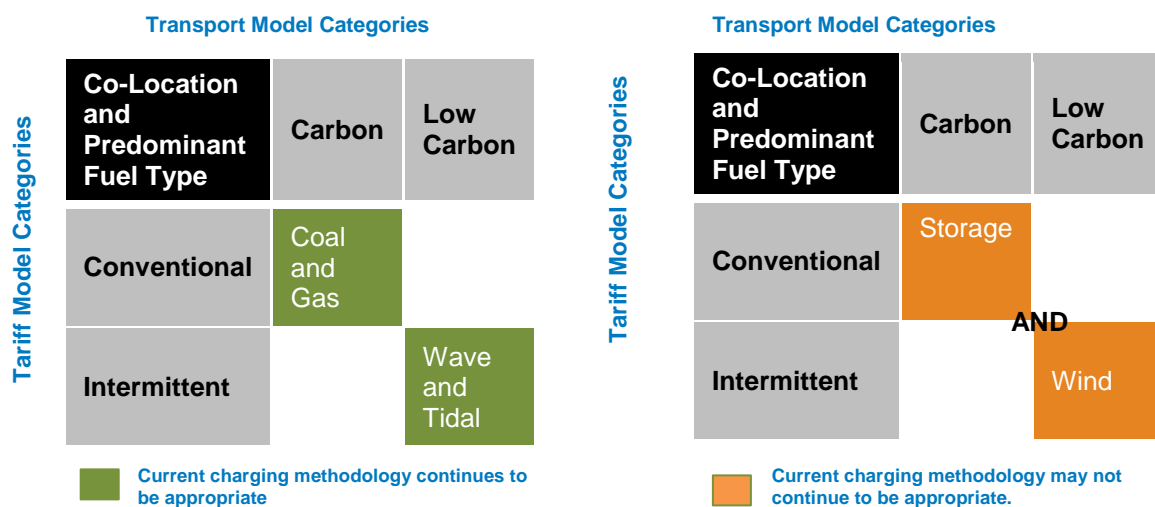
Consolidated Connection

For a consolidated connection with multiple fuel types and common charging characteristics (e.g. both fuel types are conventional carbon) then the ESO published guidance would again remain applicable.

For a consolidated connection with multiple fuel types but different charging characteristics (e.g. a combination of intermittent and conventional, or a combination of carbon and low carbon) then the current charging arrangements may not adequately cater for a single **Power Station** being connected to the **National Electricity Transmission System**. This is because under the current charging methodologies a **Power Station** with multiple fuel types would be charged according to its predominant fuel type.

While the current approach works for sites where the different fuel types have the same charging characteristics it may not remain appropriate for co-located sites with different fuel types and charging characteristics (refer to figure 1). To this end, the ESO held two industry engagement workshops in January 2019 to explore potential options for how TNUoS could be applied to co-located generation to ensure it is cost reflective. We will in due course provide an update to industry on how and when we plan to progress this work.⁷

Figure 1: Illustrative example of TNUoS charging methodology in relation to co-location



⁷ Should you wish to obtain further details or ask any questions related to the issue of TNUoS charging of co-located generation, please contact Grahame Neale, in the first instance: grahame.neale@nationalgrideso.com

Summary and Conclusion

For ease of reference we have provided a summary of the full guidance in the table below.

	Parallel Connection	Consolidated Connection
Connection	Connection Application New Bilateral Connection Agreement 'First Come, First Served' Existing Connection Site	Modification Application Modified Bilateral Connection Agreement 'First Come, First Served' Existing Connection Site
Compliance	New Connection Point New Power Station	Existing Connection Point Existing Power Station
Charging	Power Station TEC Fuel Type	Power Station TEC Predominant Fuel Type

In accordance with the guidance in this document, both parallel connections and consolidated connections will remain feasible options for new co-located transmission connections. However, given the clarity recently provided by Ofgem on the co-location of storage in relation to the RO, we expect that consolidated connections will be the more commonly preferred option for co-located transmission connections.⁸

We have also provided a list of FAQs in Appendix 1 which we hope will pre-empt some industry questions. Should you have any further questions on the above or on Transmission connected co-location please contact Sarah York: sarah.york@nationalgrideso.com.

⁸<https://www.ofgem.gov.uk/publications-and-updates/guidance-generators-co-location-electricity-storage-facilities-renewable-generation-supported-under-renewables-obligation-or-feed-tariff-schemes>

Appendix 1

FAQs

Q1. The guidance only refers to co-location of generation with generation – is it also possible to co-locate generation with directly connected demand?

A1. Yes but whilst similar principles would apply there will likely be some differences so if you wish to co-locate generation with directly connected demand then please contact your Electricity Connections Contract Manager in the first instance.

Q2. The guidance only refers to direct connections to the Transmission System – what about embedded generation?

A2. For a Large Power Station which is Embedded (i.e. a BEGA or a BELLA) then as the project is not directly connected to the Transmission System this guidance will not be directly applicable. However, the principles of this guidance remain unchanged in respect of 'Connection' and as such a Modification Application will be required by the DNO and/or Developer so we can reassess the possible effect of co-location on the Transmission System.

For a Relevant Embedded Small Power Station or a Relevant Embedded Medium Power Station this is being considered through the Open Networks Project and further information will be provided in due course.

Q3. I think my planned connection is a 'consolidated connection' but it will be a different design to that depicted in the diagram above?

A3. The depiction of a consolidated connection is representative and there will be other ways to configure a consolidated connection. If you would like to enquire whether your planned connection design is a consolidated connection and what this means then please contact your Electricity Connections Contract Manager in the first instance.

Q4. Is it possible to split my contracted Transmission Entry Capacity and then provide some of it to a third-party developer as either a parallel connection or a consolidated connection?

A4. Whilst there are arrangements in CUSC to transfer agreements to third parties if you would like to reallocate any Transmission Entry Capacity then this must be done via the ESO - Transmission Entry Capacity cannot simply be transferred to a parallel connection and any new connecting party must submit a new Connection Application. With regard to a consolidated connection, a share of the Transmission Entry Capacity contracted could be allocated to the new connecting 'unit' within the Power Station or alternatively additional Transmission Entry Capacity could be requested. In both cases a Modification Application would be required and the capacity would remain with the contracted User and it cannot be transferred to a third party, although it might be possible to make separate arrangements with a third party whilst remaining as 'lead party' under the Bilateral Connection Agreement.

If you are thinking about co-location and would like to further understand options, then please contact your Electricity Connections Contract Manager in the first instance.

Q5. Is there a limit to the number of 'units' which can be located behind a Connection Point as a consolidated connection?

A5. There should be a single Power Station at a Connection Point within a single Bilateral Connection Agreement, although where economic and efficient a single Power Station may have multiple Connection Points at a Connection Site. There is technically no limit on the number of 'units' which comprise a Power Station so long as it remains compliant with Grid Code.

Q6. If I want to co-locate as a consolidated connection do I need to increase my contracted Transmission Entry Capacity?

A6. No. It is possible to reconfigure your contracted Power Station and utilise your existing contracted Transmission Entry Capacity but due to changes to your Power Station, which may be material to the National Electricity Transmission System, a Modification Application will still be required. Even without an increase to Transmission Entry Capacity it remains possible that works or site specific technical conditions will be required prior to connection.

Q7. I do not understand how this is applicable to my project and I have further questions – what do I do now?

A7. Again, please contact your Electricity Connections Contract Manager in the first instance and they will be more than happy to discuss and answer any questions. If you do not have one please contact transmissionconnections@nationalgrid.com

Q8. If I want to understand the commercial opportunities that are available for co-location projects, who should I contact?

A8. For an insight into the commercial opportunities of co-locating generation assets with onsite battery storage (e.g. demand side response) and the potential revenue streams available, please contact Commercial.Operation@nationalgrideso.com

You may also wish to consult the MEUC Guide on DSR and Storage:
<http://powerresponsive.com/demand-side-response-dsr-guide/>

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Gallows Hill, Warwick, CV34 6DA

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