# nationalgrid

How to connect to the National Electricity Transmission System (NETS)

2015



# Contents



### Foreword

We've created this publication to give our customers a clearer understanding of how we help them connect to NETS. We know it can seem like a complex process so we will help you along the way.

Our teams work hard to meet our customers' specific requirements, and the 'get it right first time' attitude is built into everything we do.

I hope this publication is useful, and I would like to take this opportunity to wish you the best for both your current and future projects.



#### New signature required

Nicola Medalova Head of Customer Service

#### This document explains how to connect to the National Electricity Transmission System (NETS) in Great Britain.

#### What's included?

- An explanation of NETS and who it applies to
- A detailed explanation of the processes involved in connecting to NETS
- An outline of most of the scenarios that our customers experience and an explanation of how we tailor each project to meet a customer's specific needs
- A description of the relevant industry codes and frameworks
- A summary of all the appendices and contractual agreements that are required to successfully connect a customer to NETS.

# 1.0 About National Grid

National Grid is one of the largest utility companies in the world. We play a vital role in delivering gas and electricity to millions of people across Great Britain and North-Eastern US.

National Grid is at the heart of energy in the UK, providing millions of homes and businesses with the vital power they need. Our energy network connects the nation and it is essential that we are continually improving it.

We work very closely with all of our stakeholders to promote the development of sustainable, innovative and affordable energy solutions. Ultimately, we are proud that our work and our people underpin the prosperity and wellbeing of our customers, communities and investors.

#### **1.2 National Grid Electricity** Transmission (NGET)

National Grid owns and operates the England and Wales electricity transmission network, and operates the Scottish transmission network.

NETS carries electricity from the generators to substations, where the voltage is lowered, ready for distribution to homes and businesses. Our network consists of overhead lines, underground cables and substations.

We are responsible for balancing the system and managing generation output to make sure it matches demand throughout the day, and that voltage and frequency are kept within acceptable limits. Generators, distribution network operators and suppliers pay us for the right to connect to our assets and to use our system to transport electricity on their behalf. We aim to transmit a safe, secure and dependable supply of electricity across the country.

The connections process is managed by our Transmission Network Service (TNS) team, which alongside Market Operations (MO) acts as the System Operator (SO), providing our customers with a valuable and transparent service.

As SO, we strive to deliver a great service to all of our customers, putting them at the heart of what we do. To help us do that, we've added customer-related elements to our ambition statement, focusing on understanding your needs in order to deliver for you.

We have access to a lot of data and publish many reports to the market every year. The market then uses this data to make commercial decisions and plans for the future of the industry in Great Britain.

For more information please visit www2.nationalgrid.com/uk/services/ electricity-connections/policies-and-guidance



### 2.0 Structure and Regulation

#### 2.1 The Electricity Industry

### The electricity power system is made up of four areas:

**Generators:** Generation is the production of electricity from coal, gas, oil, nuclear, wind and many other sources. Electricity can't be stored efficiently so it's generated as it's needed. We don't own or operate any of these electricity generation plants.

**Transmission:** The electricity that's been generated flows into the national electricity transmission system, which is owned by National Grid, and through to the regional distribution networks.

**Distributors:** They own and operate the distribution network of towers and cables that bring electricity from our national transmission network to homes and businesses. They don't sell electricity to consumers: this is done by the electricity suppliers.

**Suppliers:** They supply and sell electricity to consumers. They use the transmission and distribution networks to pass the electricity to homes and businesses.

For more information please visit www2.nationalgrid.com/uk/our-company/electricity

### The electricity industry is governed by three organisations:

**DECC (The Department of Energy & Climate Change)** is a ministerial department within the UK Government that puts policies in place to make sure the service that provides energy is secure, clean and affordable.

DECC is also responsible for energy security, setting energy policy and making sure that UK businesses and households have secure supplies of energy for light, power, heat and transport. For more information about DECC please visit www.gov.uk/government/ organisations/department-of-energy-climate-change

Ofgem (the Office of Gas and Electricity Markets) is an independent national regulatory authority, which has a duty to protect consumer interests. It's responsible for making sure that consumers receive value for money for the energy they use, and that their energy is delivered efficiently and reliably.

Ofgem supervises all market activity, regulates the energy networks and delivers government policy. It can take steps to make sure that energy is secure if the market does not deliver. For more information about Ofgem please visit www.ofgem.gov.uk

**Elexon** developed one of the largest energy industry codes, which is the balancing and settlement code. It also monitors the day-to-day operations of the UK's trading arrangements. For more information about Elexon please visit www.elexon.co.uk

# 2.0 Structure and Regulation (Continued)

### 2.2 UK Transmission Owners

In the UK there are three onshore transmission operators (TOs) and 12 offshore TOs (OFTOs). These operators can develop, operate and maintain the high-voltage system within their own geographical transmission areas, and own OFTO assets.

#### The three TOs are:

- 1. National Grid Electricity Transmission plc (NGET) for England and Wales
- 2. Scottish Power Transmission Limited (SPT) for Southern Scotland
- Scottish Hydro Electric Transmission plc (SHET) for Northern Scotland and Scottish Islands Groups.



#### 2.3 Electricity Market Reform (EMR)

EMR aims to deliver greener energy with more reliable supplies, while minimising costs for consumers in the long term. The goal is to transform the UK electricity sector to one in which low-carbon generation can compete with conventional, fossil-fuel generation. Ensuring we build a cleaner and more sustainable energy mix.

EMR has introduced two ways of providing incentives for the investment needed in our energy infrastructure.

**Contracts for Difference (CFD)** stabilises prices for low-carbon plants in the long term, allowing investments to come forward at a lower cost of capital and therefore a lower cost to consumers.

**Capacity Market (CM)** provides a regular retainer payment to encourage investment in generation and demand, to provide energy when required. It is open to both existing and potential customers.

For more information on EMR please visit: www2.nationalgrid.com/UK/Our-company/ Electricity/Electricity-market-reform/

#### National Grid's role with EMR

In our role as the system operator, we provide analysis and evidence to inform policy decisions made by DECC, such as those around capacity requirements.

And as the delivery body, our roles include administering the auction process and issuing capacity agreements to the participants.

This is a separate process to a general application to NETS, and there is a different application process for organisations that want to get involved with these mechanisms.

For more information please contact the EMR team at emr@nationalgrid.com

# 3.0 **The Customer Journey**

In order for you to be connected to the network, you must go through a range of processes. We will use our knowledge and experience to guide you from the start.

National Grid will only become formally involved with the project at the application stage. But we strongly recommend that you contact us as early as possible to discuss your thoughts and options. From this conversation, we can start to discuss likely connection timescales.

We will give you a dedicated customer account manager (CAM) for your project. They will take you through our 'customer journey' principles.



### O- Concept

Gathering the main attributes for a potential project required prior to application.

### O- Site

Being clear about the requirements and considerations for a project site, before the application begins.

### O— Application

Considering the processes involved when you're applying through National Grid and an outline of the various agreements you can be offered.

### O— Planning and Design

Outlining the stages you need to go through before a project gains consents and the validation of major commitments before we start construction at the project site.

### O— Construction and Compliance

Summarising the construction procedures and verifying the technical aspects of a project, before a transmission connection is made.

### O— Connection

Concluding the charges and requirements once you're successfully connected to NETS and describing the additional services on offer.

### O – Disconnection

Outlining the procedures and charges in place to successfully disconnect a project from the transmission network.



## 3.1 Concept

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Concept



Before a project site is determined and you make an application, you will begin to explore the points set out in this section.

#### **Customer category**

We have a wide range of customers with many different types of connection. However, most fall into one of two categories: '**transmission connected demand**' or '**transmission connected generation**'.

The transmission connected demand category includes customers who are applying to take power off NETS. Demand customers who require large power consumption can also connect directly to NETS: large industrial plants, steelworks or electrified railway projects, for instance. The transmission connected generation category includes customers applying to generate electricity and connect to NETS. For example wind, nuclear, solar, tidal, coal, biomass, Combined Cycle Gas Turbine (CCCT) and other projects across Great Britain. Generation projects are then classified as medium or large projects. See the definitions of medium and large projects below:

Large Power Station	NGET England and Wales	100MW+
	··· SPT Transmission Area	30MW+
		10MW+
Medium Power Station	····· NGET England and Wales	50-100MW
	NGET England and Wales	<50MW
Small Power Station	··· Scottish Hydro Electric (SHE T) <10MW	
	Scottish Power (SPT)	<30MW



# **Application**

# 3.1 Concept

Additional customers will fall into one of these three categories: **'embedded generation**', **'offshore generation**' and **'interconnectors'**.

#### Types of generation connection

If you're representing a generation project, you will need to decide between the following types of generation:

#### 1) Directly connected generation

- This is for a generator who wants to connect directly to NETS.
- This approach needs a bilateral connection agreement (BCA) and a construction agreement (CONSAG) with National Grid.

#### 2) Embedded generation

- This is for a generator who needs to go through a local distribution network operator (DNO).
- Those with a high MW output must work with National Grid.
- Projects close to grid supply points (GSPs) may also need to work with National Grid.
- This approach needs a bilateral embedded generation agreement (BEGA) or a bilateral embedded licence exemptible large power station agreement (BELLA).

There are several factors to take into account when deciding the type of generation connection. These include the size of your project, the voltage of the connection and the assets it is connecting to.

In England and Wales, if your connection voltage is 132kV or less then this is normally owned by the DNO. Whereas in Scotland 132kV is owned by the TO and anything below is distribution. Your CAM can discuss this with you.

#### Contracts

Who you have a contract with depends on the size and location of the project. It could be National Grid, a DNO or both.

All customers wishing to directly connect to the NETS will require a BCA contract with National Grid.

If you're thinking about an embedded generation connection, this is achieved through a 'use of system' agreement, either a BELLA or a BEGA, and an additional connection agreement with the DNO.

The technical and commercial arrangements surrounding the contract are determined by the peak MW output, and these arrangements are defined in the CUSC and the grid code. You can read more at www2.nationalgrid.com/uk/Industryinformation/Electricity-codes/Grid-code

You can find more information about connection types in the application stage or online at www2.nationalgrid.com/UK/Services/ Electricity-connections/New-connection

All the market participation arrangements are outlined in a separate contract with our Market Operations team. For more information please see the connection stage on page 37.

#### **Embedded generation**

If you're representing a small or medium-sized embedded project then you should contact the DNO first for a distribution connection. If the DNO thinks there may be an impact on NETS then the DNO contract may be subject to the completion of transmission works. The DNO will then work with the customer to see if there is an impact on NETS.

Both the DNO and National Grid will then follow the statement of works (SOW) process and assess whether a proposed small embedded generator will have an impact on the transmission network and if reinforcement works are needed. If you are planning on going through the SOW process then the DNO contacts us on your behalf and arranges the transmission agreement.

An embedded customer can ask us to take part in the balancing mechanism market. In order to do so, they must apply for a BEGA or BELLA contract.

A map of all the relevant distribution network companies is below.



#### Offshore and interconnector considerations

For offshore and interconnectors, the connection point is sometimes less obvious because of its distance from NETS. So we work with you to carry out a process called CION (connection and infrastructure options note), which helps us to identify the connection point with the lowest cost.

Please see the planning and design section on page 26 for more information about the CION process.

#### **Offshore transmission**

A project falls under the offshore transmission owner regime if the connection to shore is 132kV or above.

You will need to establish a six figure grid reference; from this we can find the transmission connection point by using the CION process.

For information about current offshore projects that The Crown Estate deals with please see: www.thecrownestate.co.uk/energy-and-infrastructure

#### Interconnector applications

There are two types of National Grid interconnector customer: a use of system party or a developer.

An interconnector developer will follow the same process as a transmission connected generation customer, filling in a CUSC Exhibit B application form and going through the CION process.

An interconnector user can trade in the UK market by filling in a CUSC Exhibit F application form. They deal directly with the individual interconnector in the relevant region. They must speak to both Elexon, which estimates BSUoS (balancing services use of system), and National Grid.

For more information on interconnectors please visit; www2.nationalgrid.com/About-us/ European-business-development/Interconnectors/



Site

#### Site requirements

Once the concept has been developed, you'll need to establish a project site and a six figure Ordnance Survey map reference.

You can then get consents for the transmission assets through the associated TO, which we will discuss throughout the application process.

This section sets out what you can expect in your initial meetings with National Grid.

#### **Project site checklist**

ion

**Space:** What's needed for necessary equipment, along with all the technical requirements for connection?

**Surveys/reports:** If you have a legal interest in surrounding areas, we will need to see the related reports.

**Project access:** You will need to make sure that we can access the site from a main road before construction can begin.

**Plan(s):** Of the proposed connection site including size and building/structure layout.

**Generation licence:** A generation licence can be obtained through DECC.

**Third-party permission:** A consent application will be sent to the relevant authorities.

**Substation routes:** We can install and operate electricity assets on land we don't own (this can be on, over or under third-party land), but of course we need permission from the owner or occupier.



### Planning and Design

#### Site considerations

**One-off works:** Sometimes a customer may ask for a design option that is more than what we would deem a compliant design. In these cases, where possible we will make the design amendment and charge the customer for that work. Each project's charge varies, depending on the route from the generator to the substation. If a project doesn't need any one-off work, then there won't be any charge.

**Technical data:** This data is explained in each section of the grid code and collated within the data registration code.

We need this technical data so we can thoroughly assess the likely impact of your connection. You can discuss this with your CAM before your application. For more information please see the compliance section on page 30.

#### **Connection timescales**

We work with you to set milestones and timescales, so everyone knows what's needed at each stage of the project.

When you ask for a connection date, the SO and TO will try to meet it but a range of factors – such as planning and consenting issues, or the impact of other connections in the area – may mean it isn't possible. We will keep you up to date throughout the offer process.

If there are any setbacks or changes to the design, timelines may need to change after you've accepted a connection offer. When this happens, it's normally at a customer's request. You would need to complete a modification application agreement, and there is a charge for this. Your CAM will keep you informed.

Each project timescale will be dependent on location and the number of other projects currently in that area. The map below indicates the likely connection dates. Please note that each application is unique, so your actual connection date could be later or earlier than shown.

The information on these pages gives you an idea of likely connection dates:

www2.nationalgrid.com/UK/Services/ Electricity-connections/Industry-products/ TEC-Register/

www2.nationalgrid.com/UK/Services/ Electricity-connections/Industry-products/ Embedded-Generation-Register/

www2.nationalgrid.com/UK/Industry-information/ Future-of-Energy/Electricity-Ten-Year-Statement/

www2.nationalgrid.com/UK/Services/Electricityconnections/Industry-products/Transmission-Networks-Connections-Updates

#### **SHE Transmission 2017 – 2020** Lots of embedded generation Often GSP reinforcements needed

**SP Transmission 2015 – 2020** Lots of embedded generation Often GSP reinforcements needed

#### North England

**2016 – 2020** Less connection applications than further north

**East England** Large projects later than 2020

#### West England & Wales 2016 – 2023 Mix of enabling and wider

reinforcement needed depending on issues

#### South England

Generation 2020 Onwards Interconnectors 2018 – 2028



### 3.3 Application

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Application



#### The application process

This section takes you from the formal application through to the planning and design stage. Each project is unique, and therefore each customer's experience will vary. But at the end of this stage, we will make you a formal offer.

#### Meet our team

Electricity Customer Services supports electricity customers connected to, or wishing to connect to, NETS.

We have specialist teams on hand to deliver expert advice and support our customers. Your CAM will be available to deal with any concerns you have and will keep you up to date with any changes. You may also deal with people from one or more of these National Grid teams:

- System Design can support you with any technical and engineering problems/options
- Market Operations deals with any issues around ancillary services, commercial intertrips and balance mechanism services
- Investment Delivery is responsible for managing investment and planning and delivering proposed projects, making sure the network is fit for purpose
- **Compliance** manages the projects' technical aspects, making sure they comply with the grid code before connection.



### Construction and Compliance

# 3.3 Application

#### Meetings Initial meeting

If you have any initial questions before your first meeting with us, please speak to your CAM.

We will organise an informal discussion, which can be in person if you wish. In this meeting we'll ask you about:

- the size of the development
- your choice of technology (wind, gas and so on)
- the location
- the transmission entry capacity (TEC) MW figure
- a proposed completion date.

A CAM and system design engineer will attend the meeting and will talk to you about your options, working through the processes involved and the ideas set out in the project. For Scotland projects there will also be a commercial TO rep.

We will then carry out a desktop assessment of the chosen area to check the viability of the project on the system network. Please see the optioneering stage on page 28 for further information.

#### **Pre-application meeting**

After the initial meeting, you will then have the chance to ask questions and check over any details before you complete your application.

Then, at a pre-application meeting, other members of our team will attend to provide their feedback. Who attends will depend on the location of the project.

For an **England/Wales project**, it will be your CAM, plus representatives of Investment Delivery and System Design.

For a **Scotland project**, it will be your CAM, plus representatives of TO Commercial and TO System Design.

SPT, SHET or NGET can carry out feasibility studies: these are normally done for interconnectors and demand connections. There is a cost for this.

#### **Application fees**

There are fees for all new applications or connection agreements. You can read more at www2. nationalgrid.com/UK/Industry-information/Systemcharges/Electricity-transmission/Transmission-Network-Use-of-System-Charges/Statement-of-Use-of-System-Charges/

Fees depend on the size, type and location of the scheme:

- onshore connections can be fixed or indicative application fees
- offshore connections will always be an indicative application fee.

These fees may change each year on 1 April, when we publish a new charging statement.

An indicative fee is an invoice from National Grid with an estimated amount. Reconciliation is then completed within 90 days of the offer acceptance, we will either refund you or submit a top-up invoice, depending on the final cost. All indicative application fees are capped at £400,000 + VAT.

With a fixed application fee, you know exactly what you are budgeting for. We review these fees each year, according to changes in zones A, B, C.

If we think your application might involve significantly more costs than is typical, we can choose not to give you a fixed price application fee. You will need to pay the fees immediately before we start the application process.



### Transmission entry capacity (TEC) and connection entry capacity (CEC)

To apply for a connection to NETS you must complete a CUSC Exhibit B application form. Please find at the link below: www2.nationalgrid.com/uk/industry-information/ electricity-codes/cusc/the-cusc/

For generation connections, directly connected customers must declare both their TEC and CEC when applying. For transmission connection demand customers, they must declare a million volt amperes (MVA) value.

Both TEC and CEC are defined within the CUSC and the registered TEC determines the size of the project.

The TEC is the amount that you want to put on to NETS from the generator. Once you're a connected customer, you must pay an annual fee to use the transmission system. This fee is based on TEC, so it's important to review this figure regularly, to accurately reflect the maximum output for each financial year.

The CEC is the maximum potential output onto the system, which can be higher than the TEC. In fact it is often set higher than TEC to allow for changes over the years, without needing a change to the infrastructure or system, which leads to higher costs. In order to complete the CUSC Exhibit B document you'll need to know the CEC, TEC, MVA and type of application fee. You can modify your TEC and CEC throughout your time as a generator, but it will mean we need to change your contract – and this will affect the costs.

#### Your connection charges

Your chosen connection point will have an impact on the TNUoS tariffs once you're connected, as this is based on the zones within Great Britain. Please see the connection stage on page 34 for information on charging.



# 3.3 Application

#### **Connection agreements**

Each agreement will be a tailored offer and you can find template forms for each agreement in the CUSC. Please find the CUSC at www2.nationalgrid.com/UK/Industry-information/ Electricity-codes/CUSC/The-CUSC/

The CUSC governs the rules for connecting to, and the use of, the transmission system through an accession agreement.

When you've completed the form, our design team will carry out a technical assessment of the project. This can take up to five days to declare technical competency.

Once we've confirmed that the project is competent and the application fee has been paid, the project can be 'clock started', meaning we will issue you an offer within three months. We will notify the customer when clock start is declared.

#### Types of connection agreements

#### **Bilateral agreements**

**Bilateral connection agreement (BCA)** This agreement states how generators will need to comply with the grid code, CUSC and balancing settlement code.

It sets out the arrangement for connection to NETS and the provisions for the balancing services. Generators with this agreement actively participate in the electricity balancing market. This contract stays in place for the life of the project.

### Bilateral embedded generation agreement (BEGA)

This agreement type is available to embedded generators that need access to the transmission network. A BEGA will provide a generator with TEC and allow them to operate in the energy balancing market.

As a result of these rights, a generator with a BEGA must follow the balancing and settlement code and pay TNUoS charges if generation is larger than 100MW.

### Bilateral embedded licence exemptible large power station agreement (BELLA)

This applies to generators that are classed as 'large' and are smaller than 100MW. For this reason, it generally applies only in Scotland because generators smaller than 100MW and larger than 50MW in England and Wales are classed as 'medium'.

A BELLA doesn't give a generator explicit access to the transmission network and they won't be able to get a generation licence, meaning they won't have to pay TNUoS charges.

Generators with a BELLA can take part in the balancing mechanism market if they wish to. They also need a contract with us and a corresponding connection agreement with the DNO.

Please contact us for a BELLA unless you want to enter an agreement with TEC; in which case, please refer back to the BEGA section.

#### **Construction agreement (CONSAG)**

If you want to build or modify a direct connection to NETS then you must have a CONSAG alongside the bilateral agreement. This covers any construction works needed as a result of that connection or modification.

It details the design, cost and programme for construction as well as other industry requirements associated with connection to NETS.

There may be an additional charge from us, especially if any delays on your side cause dates to be moved back. These charges are known as 'delay charges'.

#### **Contract appendices**

An offer consists of both a Bilateral Agreement and a CONSAG. Included within the offer is a range of appendices, all of which are tailored to the project's specific requirements. These are listed below.

#### **Bilateral connection agreement (BCA)**

From connection right through to disconnection, a directly connected project needs a BCA and will include the following appendices.

If your project is a staged agreement, your appendix will reflect this e.g. Stage 1, Stage 2.

- A: Transmission connection assets/ connection site – all the transmission plant and apparatus needed to connect the user's equipment to NETS are listed, along with their age at the time of connection.
- **B:** Connection charges/payment these are any user charges payable in line with the CUSC and relate to the assets set out in appendix A. If there are no assets, this will be blank.
- C: TEC and CEC these relate to the generating units and are only relevant for generation customers. Any modifications of CEC/TEC need a revised appendix C.
- D: One-off works charges
- F: Site-specific technical conditions for connection – includes grid code obligations specific to the project, categorised into five sections:
- F1: Ancillary services
- F2: Derogated plant
- F3: Special automatic facilities
- F4: Relay settings and protection
- F5: Other technical requirements.



# 3.3 Application

#### **Construction agreement**

This applies from the initial signed offer up until the connection is made.

The following sections apply to England, Wales and Scotland (both onshore and offshore):

B1: One-off works

- G: Transmission connection asset works
- H: Transmission reinforcement works a list of connect and manage derogation works is included in this appendix, outlining the work needed for connection and to enable wider works

#### I: User works

J: Construction programme – sets targets and milestones that both National Grid/the TO and the customer agree to meet

#### K: Liquidated damages

- L: Independent engineer an agreement to involve an independent third party if there's a dispute
- N: Third party works any additional involvement related to the connection
- O: User data a summary of the user's technical data
- **S: Scottish onshore assumptions** technical works assumptions made by National Grid.

#### These only apply to offshore:

- H1: Onshore transmission reinforcement works
- H2: Offshore transmission reinforcement works
- **OF: Technical appendices** information about the transmission interface point
- P: Offshore connection works technical assumptions made by National Grid.

Within the construction agreement, a securities statement is issued in January for April to September and in July for October to March. This includes the following appendices:

MM: Attributable works and key consents MM1: Cancellation charge statement MM2: Cancellation charge secured amount MM3: Notification attributable works.

For more information on this, please contact your CAM.

When you receive an offer, it will include further technical, commercial and contractual terms, along with costs and charges.

You then have three months to sign it, and for any post-offer negotiations to be made depending on the complexity of your scheme.

Once you've signed the offer, you will become a contracted customer.

At this point, your project will now be present on either the TEC, embedded or interconnector register which is publicly available on the National Grid website.



#### **Interactive offers**

When we receive an application, we assess it against any outstanding unsigned offers, in order of clock start dates, to the same substation.

If there's another unsigned offer related to that supply point, then we create an interactive queue, ordered by the earliest clock start date.

We then let all interested parties know that their offers are classed as 'interactive'. This explains the applicant's position in the interactive queue, and outlines the process that will follow.

Once we've issued a notice, the offer becomes interactive and affected parties can accept their offer, within a specific timeframe.

The customer first in the queue is given a period of five days to accept the offer, ending on the sixth day at 9am. If the first does not reply, the customer second in the queue will be given the option to accept. This continues until an offer is accepted.

This approach creates a race among parties, as the offer is open to both/all to accept. We will withdraw our offer to the losing party/parties and rework the current offer.

For more information about interactive offers, please see section 6.10.4 of the CUSC document on our website: www2.nationalgrid.com/uk/industryinformation/electricity-codes/cusc/the-cusc

#### **Industry framework**

As a customer connecting to NETS, you will need to comply with the relevant sections, as outlined here.

#### 1) Balance and settlement code (BSC)

This contains the governance arrangements for electricity balancing and settlement in Great Britain. This allows parties to ask us for the option to either buy or sell electricity into/out of the market.

### 2) NETS SQSS (security and quality of supply standard)

This determines the quality of supply, with a set of criteria which licensees have to follow. Transmission licensees use this in planning and operation, as they maintain the system with us. Ofgem has final approval.

#### 3) CUSC

This is an industry code governing the connection framework, which each customer has to agree too. There are further obligations in the data registration code (DRC), BCA, BEGA, BELLA and CONSAG.

#### 4) Grid code

This is an industry code that governs the technical framework, with all the technical requirements involved in a connection. It also highlights the site-specific requirements, which are found in the CONSAG and explained in appendix F.

# 3.3 Application

#### **Securities**

Securities are broken down into two sections: pre-commissioning (before connection), and postcommissioning (after connection).

TOs carry out construction works to make a connection possible, and if you stop or reduce this work once it has already begun, this can lead to stranded assets. That's why we ask for securities, which mean these costs are not passed on to consumers.

All contracted customers must provide security to NGET for any cancellation charges within the timescales set out in the CONSAG. Securities take place twice a year, in January and July. If you don't provide this, it leads to an 'event of default' and could result in NGET suspending construction works or terminating the agreements.

CUSC modification CMP192 was introduced which incentivises generation projects to provide timely notice of cancellations, closures and any reduction in capacity. There are two costs to be aware of:

- Attributable this is a specific liability that covers local generator-driven investment where the risk is completely on generation and not shared with demand.
- Wider this is a proportion of the non-attributable spend that is required to enforce the network to allow new connections.

There are four types of security you can provide:

- Cash (escrow)
- A letter of credit
- A performance bond from a qualified bank
- A performance bond from a qualified company.

For more information and documents on securities, please visit www2.nationalgrid.com/uk/services/ electricity-connections/policies-and-guidance/



#### **Liabilities**

Attributable liability is calculated twice a year and relates to the components making up the attributable works. Wider liability is a charge based on your zone and MW, these are published by us each year. Please read 2015-16 Wider Cancellation Charge Statement V.2.

A liability profile is created for a pre-commissioned generation project, right through to the closure or capacity reduction of a project.

The crucial date is the trigger date and is three financial years before the financial year of connection; this is detailed in the CONSAG.

Developers must secure a percentage of the liability, and this percentage changes at the trigger date.

Before the trigger date, the required held security is 100% of the total liability. After the trigger date, developers must secure 42% of the total liability. Once the key consents are in place, the secured amount then drops to 10% of the total liability.

The table below demonstrates full user commitment liability.

#### Termination, closure and reducing capacity Pre-commissioning

If you are on an actual attributable liability profile and the project is ended, we will invoice the cancellation charge stated on MM1. If you don't pay this invoice within 14 days we will use the held security and look to recover the remainder through other means.

If you have opted for a fixed attributable liability profile, we will ask you to pay the cancellation charge stated on MM1. If the capacity is reduced, we will invoice you for a proportion of the liability. If you don't pay this, we will again use the held security and look to recover the remainder through other means.

#### **Post-commissioning**

Liability for a post-commissioning generator depends on the notice you give for closure or reducing capacity. If you give us two years' notice, the liability will be 0% of the wider charge. If you give us less than two years' notice, we will invoice you for the percentage of the cancellation charge using the wider cancellation charge.

#### **Cancellation charge statements**

MM: Attributable works, the LARF (Local Asset Reuse Factor) and SIF (Strategic Investment Factor) for each attributable component and crucial consents.

MM1: Outlines how much a user is liable for if they decide to end the project.

MM2: Details the proportion of the cancellation charge that must be secured for the six-month security period.



#### Commissioning £

# 3.4 Planning and Design

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### Planning and Design



There is a planning and design phase in which we consider design options. In the application stage we assess the construction works, which typically include:

- Extending existing substations
- Building new substations
- Up-rating overhead lines
- Installing new overhead lines.

We will then draw up a detailed design, construction and procurement plan. Alongside this, we'll carry out studies to examine the site. Once the offer is signed, various processes take place to meet the connection date.



# ruction ompliance

# Connection

# 3.4 Planning and Design

#### **Network development process**

The purpose of this process is to manage decisions, optioneering, development, approval, delivery and closure for all NGET investments. Our goal is to deliver appropriate and fit-for-purpose projects with the lowest whole-life costs which meet your needs.

#### 1) Optioneering

We identify the scope, programme, forecast cost and risks associated with the proposed project and write a technical report that's shared with the relevant statutory consultees and stakeholders.

We'll then select a preferred option, which usually considers financial and whole-life value factors. We refine the design, identify efficiencies and address any outstanding risks and opportunities. This process is designed to take the option forward to sanction.

Once our Investment Management team is satisfied that it is appropriate to commit the resources needed to develop and approve the preferred option, the project will pass to the first sanction stage.

#### 2) Sanctioning

The purpose of this process is to confirm your commitment to the preferred option. We'll verify the financial elements of the project and check that all the necessary money is available. We'll also create a project plan, including details about procurement and delivery.

#### 3) Consents

Construction works and wider transmission reinforcement works need planning and other statutory consents. We'll work with the appropriate bodies at this stage because we need to be sure that we will have the necessary rights and permissions.

Example of activities that we need consents for include substation layouts, fault levels and up-rating overhead lines. The target is to achieve a NGET financial investment decision (FID), which then leads to a tender process and the building of the selected option.

### Connections and Infrastructure Options Note (CION)

Records the output of work between the developers and TOs and identifies the overall most economic, efficient and co-ordinated connection option.

It outlines the rationale for selecting the preferred connection option, including various technical, commercial, regulatory and environmental elements. It also evolves over time and requires input from several parties.

Please see the CION Process Guidance Note at http://www2.nationalgrid.com/uk/services/electricity-connections/policies-and-guidance/



# 3.5 Construction and Compliance



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### **Construction** and **Compliance**

#### Construction

Throughout the electricity connections process, your CAM will provide regular updates on progress. You also have the opportunity to discuss progress and any amendments to the programmes and their risk.

We monitor all the milestones and timeframes set out in appendix J of the CONSAG.

The length of the construction stage varies considerably, depending on the complexity of the scheme. Costs increase significantly at this stage because we're ordering the equipment needed to build and transport the assets. Within this phase, both parties follow the construction programme in the CONSAG. You can amend these dates via a modification application, but this does incur an additional fee.

MM3 gives you your attribute liability from the date of the statement through to completion, and the opportunity to fix your attributable liability.

For more information on securities, please read the CMP192 updated guidance document on our policies and guidance webpage.



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## **Disconnection**

# 3.5 Construction and Compliance

#### Compliance

All generators with a contractual agreement for connection to/use of NETS have to meet certain obligations before the project becomes operational. By following the compliance processes, you will receive a compliance certificate: without this you can't connect to or use NETS. This certificate is known as an operational notification.

The compliance process essentially provides an assurance to the customer's electricity connection, that it is compatible with the existing network system. It also gives you the opportunity to discuss the technical elements of your connection. We have a Compliance team that helps customers to make sure that they are complying with the grid code and other obligations (found in appendix F).

Each party must provide a self-certified compliance statement confirming compliance with their obligations in the grid code and bilateral agreements. Some obligations need additional evidence, such as manufacturer data or desktop studies.

We set out the milestones that you must comply with by the relevant date to ensure the operational notification is issued.

#### Operation notification process – the grid code

A new connection will follow the EON > ION > FON phases in sequence. Firstly, we issue an EON (energisation operational notification) once all the necessary pre-connection requirements have been completed. This allows a successful connection to take demand from the transmission system.

Secondly, before energy from a generator can be exported to the transmission system for the first time, an ION (interim operational notification) is needed.

A compliance engineer will carry out further tests, listed in the schedule of unresolved compliance issues attached to the ION. IONs are only valid for a particular time, but it is possible to get an extension if good progress is being made.

Once all the tests are complete and the project is fully compliant, we will issue a FON (final operation notification).

For more information please see the grid code compliance processes at www2.nationalgrid.com/UK/Industry-information/ Electricity-codes/Grid-code/The-Grid-code/



#### **Existing connections**

Once a connection to NETS is fully compliant, there is an ongoing obligation to continue to maintain compliance with the codes.

A connection may have technical issues or faults during its lifetime that are noticed by our control room. If we spot any issues, we will carry out an investigation. If the issue isn't fixed within three months, we will issue a limited operational notification (LON) – see GC CP.8.4 for more detail.

A LON includes a schedule of the unresolved compliance issues. Once these are resolved, we will issue a FON again to show that the connection is fully compliant.

For more information please visit www2.nationalgrid.com/UK/Services/ Electricity-connections/Compliance/



### 3.6 Connection

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Connection



#### Charges

There are three transmission costs you will need to pay:

#### 1) Connection charge

You pay a fee for using any existing connection assets. The cost depends on whether you've chosen capital contributions or securities during the development of the project.

It is calculated every January for each user, and is charged monthly. Important factors in the calculation are the gross asset value and the net asset value of the connection assets.

#### 2) Transmission network use of system (TNUoS)

TNUoS charges relate to the shared assets, that all customers benefit from using, and National Grid and/or the TO will pay for. As a result of this payment, a TNUoS tariff for the customer is implemented.

It is an annual payment that covers the cost of installation and the maintenance of NETS. Charges vary according to the project's location, size, and whether it involves generation or supply. You can read more in the grid code material at www2.nationalgrid.com/uk/Industry-information/ Electricity-codes/Grid-code/



# 3.6 Connection

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#### 3) Balancing services use of system (BSUoS)

This covers the day-to-day costs of the transmission system, which help maintain a secure system. We provide a forecast of BSUoS as part of the monthly balancing services summary report.

For more information on charging see section 14 of CUSC or visit www2.nationalgrid.com/UK/Industryinformation/System-charges/Electricity-transmission/ Transmission-network-use-of-system-charges/

#### **TEC or CEC amendments**

If a connected customer wants to change their registered TEC, we need notice of at least one year and five days. This allows us to adapt to the changes in TEC and help avoid any wider cancellation charges.

If you want to increase the project's CEC, you can submit a request by paying a modification application fee. If you want to reduce capacity once the project is built, you can submit a TEC reduction notice with no modification application fee.

When you request a change, we run tests to ensure the competency of the new modified TEC. All charges will still be within the same TNUoS tariff, but will apply to the new TEC for the time it is used.

If you need any changes before connection (such as during the construction phase), then a modification application fee applies to any requested increase or reduction in TEC. This can include transmission delay charges, as there are stranded assets costs when we have already built assets.

Zones are split into 14 areas and are highlighted in the map below. For more information on connection points, please see the power station map at www2.nationalgrid.com/UK/Industryinformation/Future-of-Energy/Electricity-Ten-Year-Statement/



#### **Ancillary services**

NETS will always experience short-term, temporary changes in overall capacity. We must be prepared to account for any power plant or transmission line that unexpectedly goes out of service, as well as any unforeseen increases or decreases in the demand for electricity.

This means we need additional balancing resources, to allow us to recover from a partial or total shutdown of NETS. Ancillary service products address these short-term imbalances by dispatching resources within seconds or minutes of an unacceptable imbalance.

During your project's development and construction phase, we encourage you to discuss ancillary services that you may be able to provide. Our Market Operations Contract Services team will deal with all issues in this area.

New connections greater than 50MW must provide ancillary services through the mandatory services agreement. Those below 50MW are not obliged to, but can still take part if they want to. Existing projects can apply but there is a cost for this and infrastructure modifications are needed too.

Work in this area is arranged by our Contracts and Settlements team and you will be allocated a different account manager to manage your ancillary services contracts. You can contact the team at commercial.operation@nationalgrid.com

For more information please visit www2.nationalgrid.com/uk/services/ balancing-services/settlements/

#### **Types of service**

Several services are available to adapt the amount of TEC.

#### 1) Short-term firm access service

This is for a period of less than seven weeks. TEC is updated online by us every quarter with information explaining whether the STTEC applications have been accepted or rejected.

You can find information about tariffs and fees for this service within the statement of use of system charges, or please see section 6.31 of the CUSC.

**2) Limited duration transmission entry capacity** This applies for customers wanting to generate at a higher output for more than seven weeks, but for

less than a year. There is a fixed application fee for each period applied for, and we don't process applications until we've received payment. For more information

please see section 6.32 of the CUSC.

# 3.7 Disconnection

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When a customer is ready to disconnect from the system, they contact us. They can request a full or partial disconnection. The bilateral agreement will be terminated once we've disconnected the site.

There are several contracts in place that allow a customer to disconnect from NETS. For more information please refer to the 'Guide to disconnection from the national electricity transmission system' document at www2.nationalgrid.com/uk/services/electricityconnections/policies-and-guidance/

#### **CUSC and BCA obligations**

#### **Disconnection notice**

CUSC states that you must give us formal written notice to disconnect your equipment, with at least six months' notice. This should be provided by the company party to the BCA.

We can also manage partial disconnections if they're needed, such as closing one station transformer. Once the six-month notice has passed, each party can disconnect its own equipment, which ends the BCA.

### TEC reduction and wider cancellation charge

It is sensible for the power station to reduce its TEC to 0MW before the power station ceases generation. To avoid any penalties, we recommend that notice of this is in line with the financial year and is one year and five days ahead.

A TEC reduction notice is a formal written request and should give at least five days' notice. There is a wider cancellation charge for a TEC reduction notice. This is a zonally based charge in £/MW and is published each January in the annual wider cancellation charge statement.

#### **Connection charges**

Where connection assets are in place, connection charges must be paid up until the end of the financial year in which the disconnection takes place.

A net asset value (NAV) is the calculation of the connection asset's value and takes into consideration the level of depreciation on the assets. Assets which have fully depreciated with no NAV will only incur a site-specific maintenance charge and other transmission running costs.

CUSC states that we can recover costs relating to termination. It refers to the remaining NAV, and costs from removing assets and recovering the connection site grounds.

### Certificate of disconnection and BMU de-registration

Elexon demands a certificate of disconnection from us, so that customers are de-registered from the balancing mechanism units once a disconnection date has been confirmed.

A form known as the BSCP15/4.2 needs to be completed: this is provided by Elexon and you should then send it to us at registration.BMU@nationalgrid.com

# 4.0 **Contract Appendices**

### **BCA Appendices**

For connection right through to decommission



BCA can be staged agreements



# 4.0 Contract Appendices

#### **CONSAG Appendices**

For signed offer to completion of works within the construction agreement, a securities statement is issued January and July of each year for (April to Sept) (Oct to March)





# 5.0 Acronyms

Acronym	Definition
BCA	Bilateral Connection Agreement
BEGA	Bilateral Embedded Generation Agreement
BELLA	Bilateral Embedded Licence Exemptible Large Power Station Agreement
BMU	Balancing Mechanism Unit
BSA	Balance Settlement Agreement
BSC	Balance and Settlement Code
BSUoS	Balancing Services Use of System
CAM	Customer Account Manager
CEC	Connection Entry Capacity
CFD	Contracts for Difference
CION	Construction Infrastructure Options Note
CONSAG	Construction Agreement
CUSC	Connection and Use of System Code
DECC	Department of Energy and Climate Change
DNO	Distribution Network Operator
DRC	Data Registration Code
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EMR	Electricity Market Reform
EON	Energisation Operation Notice
ETYS	Electricity Transmission 10-Year Statement
FES	Future Energy Scenario
FID	Financial Investment Decision
FON	Final Operation Notice
GSP	Grid Supply Point
ION	Interim Operation Notice
LON	Limited Operation Notice
NAV	Net Asset Value
NET SQSS	National Electricity Transmission System Security and Quality of Supply Standards
NETS	National Electricity Transmission System
NGET	National Grid Electricity Transmission
NPV	Net Present Value
RIIO	Revenue = Incentives + Innovation + Outputs
SHET	Scottish Hydro-Electric Transmission
SO	System Operator
SOW	Statement of Works
SPT	Scottish Power Transmission
SQSS	Security and Quality of Supply Standard
TEC	Transmission Entry Capacity
ТО	Transmission Owner
TNCU	Transmission Network Connections Update
TNUoS	Transmission Network Use of System

### 6.0 Useful Links

#### **Electricity Connections**

www2.nationalgrid.com/UK/Services/ Electricity-connections/

#### Electricity

www2.nationalgrid.com/uk/our-company/electricity/

#### DECC

www.gov.uk/government/organisations/ department-of-energy-climate-change

#### Ofgem

www.ofgem.gov.uk

Elexon www.elexon.co.uk/

#### EMR

www2.nationalgrid.com/UK/Our-company/ Electricity/Electricity-market-reform

#### Grid Code

www2.nationalgrid.com/uk/Industry-information/ Electricity-codes/Grid-code

#### The Crown Estate

www.thecrownestate.co.uk/energy-and-infrastructure

#### Interconnectors

www2.nationalgrid.com/About-us/ European-business-development/Interconnectors/

#### Registers

www2.nationalgrid.com/UK/Services/ Electricity-connections/Industry-products/ TEC-Register/

www2.nationalgrid.com/UK/Services/ Electricity-connections/Industry-products/ Embedded-Generation-Register/

#### **ETYS**

www2.nationalgrid.com/UK/Industry-information/ Future-of-Energy/Electricity-Ten-Year-Statement/

#### CUSC

www2.nationalgrid.com/uk/industry-information/ electricity-codes/cusc/the-cusc

#### Compliance

www2.nationalgrid.com/UK/Services/ Electricity-connections/Compliance

#### Transmission Network Use of System Charges

www2.nationalgrid.com/UK/Industry-information/ System-charges/Electricity-transmission/ Transmission-network-use-of-system-charges

#### **Electricity connections – policies and guidance** www2.nationalgrid.com/uk/services/ electricity-connections/policies-and-guidance

### Useful Information

If you have any questions about this document, or would like any more information, please speak to your CAM or email us at **transmissionconnections@nationalgrid.com** 

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The information used to compile this document is based on data and maps provided by National Grid Electricity Transmission plc and the two Scottish transmission licensees, Scottish Power Transmission Ltd (SPT) and Scottish Hydro-Electric Transmission plc (SHE), and data from users of the GB transmission system. The document should not be regarded as an indicator of the performance and prospects of National Grid or any other party.

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