



Grid and Gas Connection Statement

Thurrock Flexible Generation Plant

Application document number A7.2

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Quality Management

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1 INTRODUCTION

1.1 Purpose of this Document

- 1.1.1 This Grid and Gas Connection Statement has been prepared as part of the application by Thurrock Power Ltd (the Applicant) for a Development Consent Order (a DCO), that has been submitted to the Secretary of State (the SoS) for Business, Energy and Industrial Strategy (BEIS), under section 37 of the Planning Act 2008 (as amended) (the PA 2008), in respect of the proposed development (the Application).
- 1.1.2 Thurrock Power proposes to develop a flexible generation plant on land north of Tilbury Substation in Thurrock. The flexible generation plant will provide up to 600 megawatts (MW) of electrical generation capacity on a fast response basis, together with up to 150 MW of battery storage capacity.
- 1.1.3 Schedule 1 of the draft DCO (application document A3.1) identifies the development for which development consent is being applied for and for which this Grid and Gas Statement has been prepared.
- 1.1.4 A DCO is required for the proposed development as it falls within the definition and thresholds for a Nationally Significant Infrastructure Project (an NSIP) under sections 14 and 15(2) of the PA 2008.
- 1.1.5 Regulation 6(1) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 states the following:
- (1) If the application is for the construction or extension of a generating station the application must be accompanied by –
- (a) If the application is for a generating station, that is not an offshore generating station –
 - (i) A statement of who will be responsible for designing and building the connection to the electricity grid; and
 - (ii) If a gas fuelled generating station, a statement of who will be responsible for designing and building the gas pipeline connection to the generating station.
- 1.1.6 This Statement forms the Grid and Gas Connection Statement for the proposed Thurrock Flexible Generation Plant as required by Regulation 6(1).

1.2 Thurrock Power Ltd

- 1.2.1 Thurrock Power is a subsidiary of Statera Energy Limited, a private British company that develops, builds and operates flexible electricity generating plant in the UK.
- 1.2.2 Statera Energy was established with the aim of delivering increased flexibility for the UK electricity system to assist in the transition to a low carbon economy in the expectation that renewable energy sources, such as solar and wind, will become the dominant form of generation of the future.

- 1.2.3 Thurrock Power will be a fully integrated developer, owner, and operator of the proposed Thurrock Flexible Generation Plant.

1.3 Site Description

- 1.3.1 The proposed development site is located on land south west of Station Road near Tilbury, Essex. The British National Grid coordinates are TQ662766 and the nearest existing postcode is RM18 8UL. It is within the administrative area of Thurrock Borough Council and lies in the Thurrock Green Belt.
- 1.3.2 The application boundary and location of the proposed development are shown in the Location and Order Limits Plans, application document A2.1.
- 1.3.3 The main development site for the generating plant and battery storage facility currently comprises open fields crossed by drainage ditches and three overhead power lines with steel lattice electricity pylons. Land for access routes (including causeway for barge deliveries during construction) and connections to the gas and electricity grid within the Order Limits comprises farm land, previously developed industrial sites, and the north bank of the River Thames.

1.4 The Proposed Development

- 1.4.1 In overview, the proposed development comprises the construction and operation of:
- reciprocating gas engines with rated electrical output totalling 600 MW;
 - batteries with rated electrical output of 150 MW and storage capacity of up to 600 MWh;
 - gas and electricity connections;
 - creation of temporary and permanent private access routes for construction haul and access in operation, including a causeway for barge deliveries; and
 - designation of exchange Common Land and habitat creation or enhancement for protected species translocation and biodiversity gain.

1.4.1 Electricity substations and grid connection

- 1.4.2 The proposed development will connect to the existing National Grid Tilbury 275 kV substation, which is immediately adjacent to the southern boundary of the main development site, via a short section of underground cable(s) lying within the boundary of the main development site and the existing National Grid substation site.
- 1.4.3 No changes are proposed to the existing high-voltage overhead lines crossing the main development site or other land within the application boundary. The indicative development layouts shown in the Illustrative Site Layout Plans (application document A2.7) take account of safe clearance zones around the existing electricity pylons and overhead wires on the main development site. The existing pylons will remain in place.
- 1.4.4 Within the main development site will be switchgear, step-up transformers, breakers, disconnectors, current and voltage transformers and relays (collectively

the switchgear) to connect the gas engines and batteries to the 275 kV underground export cable(s) that will in turn connect into the National Grid substation adjacent to the south. These will consist of:

- 33 kV switchgear houses, two 33 kV to 132 kV step-up transformers and associated switchgear, and two 132 kV to 275 kV step-up transformers and associated switchgear for batteries; and
- eight 11 kV to 132 kV step-up transformers and associated switchgear, and three 132 to 275 kV step-up transformers and associated switchgear for gas engines.

1.4.2 Gas Connection

- 1.4.5 A new gas pipeline connection to the existing high-pressure National Grid gas National Transmission System (NTS) at Feeder 18 will be required. Feeder 18 is approximately 2 km away from the main development site to the north east. The Order Limits include a corridor for routing the gas pipeline from the main development site through agricultural land as far as Station Road. The pipeline route will then skirt Low Street Pit local wildlife site to the south and will cross under public footpath 200.
- 1.4.6 The pipeline will then make two crossings of Station Road and will connect to Feeder 18 where it runs across an agricultural field east and south of Station Road. The connection itself will comprise of above and below ground steel pipework known as an Above Ground Installation (AGI, National Grid gas compound) for the junction point with instrumentation and control kiosks set in a compound no greater than 50 m square and with structures no more than 5 m in height. It would include a perimeter security fence, screening planting, and access track to the public highway.
- 1.4.7 The applicant requires flexibility in the DCO for the final location of the NTS connection point, as land along the route of Feeder 18 is subject to a third-party residential development option being agreed with the landowner and is also in proximity to the proposed Lower Thames Cross development. The Order Limits allow flexibility for the AGI location along the south-eastern side of the field in which it would be located.

2 CONTRACTUAL AGREEMENTS

2.1 Grid Connection

- 2.1.1 National Grid Electricity Transmission (NGET) owns and manages the National Electricity Transmission System (NETS) in England and Wales.
- 2.1.2 The Applicant has secured a connection agreement and construction agreement with NGET for a grid connection to the 275kV network at Tilbury (Ref: A/THUR/17/2608-EN(O)). This is referred to as the Transmission Entry Capacity Agreement. The Applicant subsequently increased the site's connection capacity from 600MW to 750MW through a modification application in November 2019.
- 2.1.3 NGET has conducted power system analysis and development and costing work examining a range of options in conjunction with the Applicant and has provided the most economic, coordinated and efficient design to connect the project at Tilbury 275 kV substation. There are a number of advantages to providing new flexible generation and rapid-response storage capacity to the London 275 kV transmission network, which have been set out in the Statement of Common Ground with NGET.
- 2.1.4 As part of the connection process the Applicant has entered into a suite of contracts with National Grid and acceded to the main industry governance documents. The two main contracts with National Grid are: The Bilateral Connection Agreement (BCA) and the Construction Agreement (ConsAg). The BCA details how the Applicant must comply with the Grid Code (i.e the operational and design requirements for operating a project connected to the transmission system), Connection and Use of System Charges (detailing the access rights for the connection to the transmission system, and the methodology for charging the connection and ongoing use of system), and the Balancing and Settlement Code (which details how parties can operate in the Balancing Mechanism, and the metering & settlement requirements). In addition, the Applicant has signed up to the Construction Agreement, which details the design, cost and programme associated with the connection to NGET.

2.2 Gas Connection

- 2.2.1 A Planning and Advanced Reservation of Capacity Agreement (PARCA) is a bilateral contract that allows entry and/or exit capacity to be reserved for the customer while they develop their own projects. In this instance, the Applicant has sought to reserve firm NTS capacity through two separate PARCA applications.
- 2.2.2 The first PARCA (ref TGC/10097-15) was submitted on 1st October 2017 with the reservation of 21,146,822 kWh/d of NTS Exit Capacity confirmed on 28th June 2018. This capacity will be exclusively held for the Applicant until the capacity is formally allocated at the end of Phase 2 or the PARCA is terminated. A second PARCA application (ref TGO/10545-33) was submitted, and deemed competent, on Friday 19th October 2019. This second application seeks to double the reservation by adding another 21,146,822 kWh/d of NTS Exit Capacity. The outcome of the second PARCA is ongoing.

- 2.2.3 The PARCA allows the Applicant to reserve capacity, but it does not provide a physical connection to the National Transmission System (NTS). The Applicant will make a separate A20 Application which will allow a new connection to the NTS. The A20 process can take up to three years from application to the construction of the physical connection. As the capacity process (PARCA) and the connection (A20) processes are separate, there is flexibility to initiate these two processes independently.
- 2.2.4 The A20 application process for a new 'green field' connection like the one proposed here can be broken down as follows; 1) an initial connection offer (ICO) will be made within two months, 2) a full connection offer (FCO) requiring a conceptual design study will be made within six months, and 3) a full connection offer (FCO) requiring a feasibility study will provide the feasibility study report within three months, and the offer six months following acceptance of the report by the customer.
- 2.2.5 The FCO is principally broken down into a Construction Agreement, Network Exit Agreement and Commissioning Agreement.

3 RESPONSABILITIES FOR DESIGNING AND BUILDING THE GRID AND GAS CONNECTION

3.1 Grid Connection

3.1.1 Background

- 3.1.1 The GB electricity network is operated by 14 Distribution Networks and three Transmission Networks. The Distribution Networks operate all networks 132kV and below, while the Transmission Network operates the 275kV and 400kV networks (Note: in Scotland 132kV falls under the transmission network ownership).
- 3.1.2 The Transmission system has three regions: Northern Scotland (operated by Scottish and Southern Electricity Networks); Southern Scotland (operated by Scottish Power Energy Networks); and England (operated by National Grid Electricity Transmission).

3.1.2 The Grid Connection

- 3.1.1 The Applicant will connect into the 275kV transmission network in England, meaning the connection arrangement will be with National Grid Electricity Transmission.
- 3.1.2 The Electrical Connection will be made to the existing National Grid Tilbury 275 kV substation, which is immediately adjacent to the southern boundary of the main development site, via a short section of underground cable(s) lying within the boundary of the main development site and the existing National Grid substation site. The total length of the grid connection is approximately 500m.

3.1.3 Design and Construction

- 3.1.1 Under the Construction Agreement with National Grid, NGET will be responsible for preparing a bay at the substation, including the removal of redundant high-voltage equipment within the bay and land preparation.
- 3.1.2 NGET will then complete works to facilitate the connection of 275kV generator bay.
- 3.1.3 The Applicant will be responsible for the design, installation and commissioning of the 275kV generator bay at the connection site, typically consisting of 275kV bars, breakers and disconnectors, and the grid connection to the Applicant's site.
- 3.1.4 NGET and the Applicant will agree all necessary safety rules and local safety instructions to apply during the construction and commissioning programme.
- 3.1.5 In addition, National Grid's Commissioning Engineer will witness generator circuit trip tests and confirm correct operation of feeder protection and/or intertripping as part of the general compliance testing of the generator.
- 3.1.6 Full details of the permanent and temporary rights required are contained in the Book of Reference (application document A4.3). The cable(s) route and generator bay location are shown on the Works Plans (application document A2.3).

3.2 Gas Connection

3.2.1 Background

- 3.2.1 The UK National Grid Gas system is split into two parts, the NTS and the LTS (Local Transmission System).
- 3.2.2 The NTS represents the infrastructure designed to transmit gas large distances around the country: this infrastructure principally consists of large diameter pipelines (> 24" or 600 mm) operating at high pressure (~70 barg). The NTS is the backbone of the UK gas infrastructure.
- 3.2.3 Feasibility studies identified that Feeder 18 on the NTS is the most appropriate connection option for the proposed development principally due to the high-pressure gas required by the engines. Several possible locations for connecting to Feeder 18 were reviewed and assessed based on industry best practice categories. This work entailed looking at a small number of routes to the nearest NTS infrastructure and culminated with a preferred minimum off-take connection (MOC) location and pipeline route. No suitable connection points onto the LTS were identified.
- 3.2.4 Further information on the gas connection, including the alternative route options considered between the Flexible Generation Plant and Feeder 18, is contained in Volume 2, Chapter 2 and 3 of the Environmental Statement (application document A6). An explanation of consultation feedback received on the gas connection and how it has been taken into account is contained in the Consultation Report (application document A5.1).

3.2.2 The Gas Connection

- 3.2.1 The gas connection route corridor is approximately 2 km in length and includes two public road crossings and one public footpath crossing.
- 3.2.2 The connection itself will comprise of above and below ground steel pipework known as an Above-Ground Installation (AGI, National Grid gas compound) for the junction point with instrumentation and control kiosks set in a compound no greater than 50 m square and with structures no more than 5 m in height.
- 3.2.3 On exiting the new National Grid AGI a private gas pipe will run to the Flexible Generation Plant site itself where a Pressure Reduction Compound will be positioned. In this compound, the gas pressure will be reduced to a pressure suitable for a medium speed combustion engine, typically in the region of 10bar.
- 3.2.4 Full details of the permanent and temporary rights required are contained in the Book of Reference (application document A4.3). The pipeline route and AGI location are shown on the Works Plans (application document A2.3).

3.2.3 Design

- 3.2.1 The Applicant will be responsible for the design of the pipeline between the Flexible Generation Plant and the AGI. If the AGI is not located directly above Feeder 18, National Grid Gas will be responsible for the design of the pipeline between the AGI and Feeder 18.

- 3.2.2 Details of the conceptual design for the pipeline between the Flexible Generation Plant and the AGI are provided in the Gas Connection Conceptual Design Report (application document A7.4).
- 3.2.3 It would be designed, constructed and tested to comply with the Institute of Gas Engineers' (IGE) Recommendations on Transmission and Distribution Practice – IGE/TD/1: Edition 5, 2009 – Steel Pipelines and Associated Installations for High Pressure Gas Transmission (IGE/TD/1).
- 3.2.4 The standard pipeline wall thickness would comply with the requirements of IGE/TD/1, which defines the minimum safe separation distance between a high pressure gas pipeline and normally inhabited buildings / major roads / major railways. This minimum safe separation distance is known as the Building Proximity Distance (BPD). If normally inhabited buildings / major roads / major railways are closer than 1 BPD (i.e. the gas pipeline is in an area where additional protection is required), thicker wall steel pipe (known as proximity pipe) would be used. The exact locations and lengths of where thicker wall steel pipe would be used would be confirmed in detailed design.
- 3.2.5 The pipeline would be buried to a depth of cover which is in accordance with recognised industry standards. For example, depths of cover would be:
- no less than 1.2 m in agricultural land;
 - no less than 2 m under road crossings; and
 - no less than 1.7 m under water crossings.
- 3.2.6 The AGI would comprise two parts, the Minimum Offtake Connection (MOC) facility and the PTF (Pipeline Inspection Gauge (PIG) Trap Facility).
- 3.2.7 The MOC would be designed, constructed, owned and operated by NGG.
- 3.2.8 The PTF would be designed, constructed, owned and operated by the Applicant.
- 3.2.9 The MOC would contain:
- Remotely Operable Valve (ROV);
 - Control and Instrumentation Kiosk; and
 - Electrical Supply Kiosk.
- 3.2.10 PTF would contain:
- PIG Launching Facility;
 - Emergency Control Valve;
 - Isolation Valve;
 - Control and Instrumentation Kiosk; and
 - Electrical Supply Kiosk.

3.2.4 Construction

- 3.2.1 The Applicant will responsible for the construction of the PTF and the pipeline as far as the PTF.
- 3.2.2 The MOC and pipeline to Feeder 18, if required will be constructed by NGG.

- 3.2.3 Construction of each pipeline would take place within a temporarily fenced strip of land called the 'working width'. The gas pipeline working width is required to facilitate safe construction and the protection of off-site receptors.
- 3.2.4 Due to the anticipated number and location of existing services which will necessitate crossing by the new pipeline, some temporary and permanent service protection work will be required to allow the necessary proposed construction works to be carried out. Appropriate Protective Provisions are included within the draft Development Consent Order (application document A3.1).
- 3.2.5 Commissioning**
 - 3.2.5 Commissioning of all new equipment will be carried out in accordance with an approved procedure. Purge rates for commissioning of the pipeline and plant will be agreed with NGG and will follow the requirements of IGE/SR/22 – 'Purging Operations for Fuel Gases in Transmission, Distribution and Storage'. All commissioning operations involving live gas will be under the control of NGG personnel using a non-routine operation procedure produced by NGG.
 - 3.2.6 Commissioning of all NGG equipment and metering is detailed within the FCO by the TR47 Commissioning document.

4 ACQUISITION OF LAND AND RIGHTS

- 4.1.1 The draft DCO includes powers to compulsorily acquire land and rights to allow Thurrock Power Ltd to construct, use and maintain the gas connection. These are fully described in the Book of Reference (application document A4.2).
- 4.1.2 These powers include acquisition of the freehold of the site of the AGI and new access track to the AGI from Station Road. In respect of the pipeline, these powers include the right to install, retain, use and maintain the pipeline and to access the pipeline for construction and maintenance.
- 4.1.3 The majority of the grid connection underground cable route will lie within the main development site for Thurrock Flexible Generation Plant which is land held under option by the applicant. Rights in Tilbury Substation are vested through the Transmission Entry Capacity Agreement.