GREEN HILL
SOLAR FARM

Green Hill Solar Farm
EN010170

Grid Connection Statement
Revision B

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Grid Connection Statement
Revision B

Prepared by
Name: Robin Prince
Job title: Head of Grid

Approved by
Name: Lesley Giles
Job title: Project Development Manager

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1 Introduction

1.1 Background

1.1.1 Green Hill Solar Farm Limited (the Applicant) has prepared this Grid Connection Statement (the Statement) as part of an application for a Development Consent Order (DCO) to construct, operate, maintain and decommission the Green Hill Solar Farm (the Scheme).

1.1.2 The Scheme comprises a number of land parcels (the 'Site' or 'Sites') described as Green Hill A, A.2, B, C, D, E, F, G, and BESS for the solar arrays, grid connection infrastructure and energy storage; and the Cable Route Corridor. The Scheme is located across land to the north, east and southeast of Northampton; and the west and south of Wellingborough. See the Location Plan **[REP3-004]** for the site locations.

1.1.3 The Scheme is described in full in Chapter 4 of the Environmental Statement (ES) (Scheme Description) **[REP1-031]**, which supports the application.

1.1.4 As the Scheme has a generating capacity that exceeds 50 megawatts (MW), it is defined under the Planning Act 2008 as a Nationally Significant Infrastructure Project (NSIP) and will therefore require a DCO from the Secretary of State. This Statement has been prepared by the Applicant to support the DCO application and should be read alongside all other documents submitted by the Applicant.

1.1.5 The Statement confirms who will be responsible for designing and building the grid connection infrastructure and cable routes for the connection to the electricity grid.

1.1.6 The Scheme will have an export and import connection to the National Electricity Transmission System (NETS). The Point of Connection (PoC) will be located at the existing Grendon 400 kV National Grid substation, currently owned and operated by National Grid Electricity Transmission.

1.1.7 The Scheme is being developed by the Applicant. The Applicant is part of Island Green Power Limited (IGP), who is a leading international developer of renewable energy projects, established in 2013.

1.2 Statement Purpose

1.2.1 This Statement is to accompany the suite of documents submitted by the Applicant pursuant to Section 55 of the Planning Act 2008 and Regulations 5 and 6 of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (APFP Regulations).

1.2.2 This statement has been prepared in accordance with Regulation 6(1)(a)(i) of the APFP Regulations, which requires an applicant for a DCO in respect of an onshore generation station to provide a statement of who will be responsible for designing and building the connection of the electricity grid.

1.2.3 Overarching National Policy Statement for Energy (NPS EN-1) paragraph 4.11.2 states that it is *"for the applicant to ensure that there will be necessary infrastructure and capacity within an existing or planned transmission or distribution network to accommodate the electricity generated"*. Paragraph 4.11.5 continues to advise that *"the applicant must liaise with National Grid who own*

and manage the/ transmission network in England and Wales or the relevant regional DNO or TSO to secure a grid connection".

1.2.4 Paragraph 4.11.7 states that:

"The Planning Act 2008 aims to create a holistic planning regime so that the cumulative effect of different elements of the same project can be considered together. Co-ordinated applications typically bring economic efficiencies and reduced environmental impact. The government therefore envisages that wherever reasonably possible, applications for new generating stations and related infrastructure should be contained in a single application to the Secretary of State or in separate applications submitted in tandem which have been prepared in an integrated way, as outlined in EN-5. This is particularly encouraged to ensure development of more co-ordinated transmission overall".

1.2.5 Paragraph 4.11.12 states that

"the Secretary of State should be satisfied that appropriate network connection arrangement are/will be in place for a given project regardless of whether one or multiple (linked) applications are submitted".

1.2.6 This Statement details the status of the grid connection offer and provides confirmation that the grid connection forms part of the Scheme and, as such, constitutes a single application to the Secretary of State.

1.3 Work Numbers

1.3.1 A 'Work No.' has been assigned to different elements of the Scheme for which consent is being sought, and defined in Schedule 1 of the Draft DCO **[REP5-008]**. The location of each Work No. is defined on the Works Plans **[EX6/GH2.4_G]** which should be consulted for further detail.

1.3.2 The Work Numbers relevant to this Statement are as follows:

- Work No.3 — work in connection with onsite substations (at each Site) including;
  - Work No. 3A — substations up to 400 kV;
  - Work No. 3B — substations up to 132 kV; and
  - Work No. 3C — substations up to 33 kV;
- Work No.4 — works to the National Grid substation to facilitate connection of the authorised development to the National Grid; and
- Work Nos. 5A and 5B — works to lay electrical cables, means of access, and temporary construction laydown areas for the electrical cables including high voltage electrical cables connecting between Work Nos. 3A, 3B and 3C and from Works No. 3A to Work No. 4.

2 Grid Connection Agreement

2.1.1 The Applicant submitted a grid application to National Energy System Operator (NESO) formally named National Grid Electricity System Operator Limited (NGESO), the system operator of NETS, in January 2021 to connect the Scheme to the NETS at Grendon 400 kV substation owned by National Grid Electricity Transmission (NGET).

2.1.2 NESO then worked with NGET to produce a connection offer which was received by the Applicant in May 2021 (NESO reference: A/IGPG/21/2501/1EN(0))

2.1.3 The connection offer was accepted in the form of a Bilateral Connection Agreement (BCA) between the Applicant and NESO, allowing for a Transmission Entry Capacity (TEC) of 500 MW (AC) export to and 500 MW (AC) import from the NETS. This was entered into in June 2021. The acceptance of the connection offer demonstrates that a connection at the Point of Connection is technically and financially viable.

2.1.4 As a requirement of the acceptance of the grid connection offer the Applicant must also agree to adhere to the Connection and Use of System Code (CUSC), the contractual framework in which the Applicant can connect and use the NETS. A CUSC Accession Agreement was also entered into in June 2021.

2.1.5 The Grid Connection Agreement allows the Applicant to export the electricity produced at Green Hill A, A.2, B, C, D, E, F, and G, not to exceed 500 MW (AC). It also allows for the import of up to 500 MW (AC) of electrical energy to be stored in an Energy Storage Facility (for the purposes of the Application, this is assumed to employ battery technology and therefore referred to as a 'Battery Energy Storage System' or 'BESS' throughout this Application), located at Green Hill BESS and/or Green Hill C, to be exported at a different time, back to the NETS.

3 Elements of the Grid Connection

3.1 Introduction

3.1.1 The Scheme will consist of eight Sites where the solar arrays will be constructed. There will also be Energy Storage Systems or BESS constructed on the Green Hill BESS site with option to also install BESS at Green Hill C. The electricity produced on each Site and stored within the BESS, will need to pass via one or both of the substations at Green Hill C and Green Hill BESS in order for the voltage to be transformed up to 400 kV to be exported to the NETS.

3.1.2 The following Works are needed for the grid connection of the Scheme:

- Work No.3 — work in connection with onsite substations (at each Site) including;
  - Work No. 3A — substations up to 400 kV;
  - Work No. 3B — substations up to 132 kV; and
  - Work No. 3C — substations up to 33 kV;
- Work No.4 — works to the National Grid substation to facilitate connection of the authorised development to the National Grid; and
- Work Nos. 5A and 5B — works to lay electrical cables, means of access, and temporary construction laydown areas for the electrical cables including high voltage electrical cables connecting between Work No.3A and 3B and from Works No. 3A to Work No. 4.

3.1.3 The Cable Route Corridors will accommodate circuits running from each of the Sites to the substations at Green Hill C and/or Green Hill BESS.

3.1.4 The total high voltage Cable Route Corridor distance from both the Green Hill A and Green Hill G substations to Grendon National Grid substation is approximately 31.4 km. Some of this route will contain single circuits, and some will have up to five circuits, dependent upon location.

3.1.5 A detailed description of the elements that make up the Cable Route Corridor and substations can be found within Chapter 4 of the Environmental Statement (ES), Scheme Description **[REP1-031]**.

3.2 Substations and Cable Routes up to 132 kilovolts

Green Hill A Substation (Work No. 3B)

3.2.1 The Green Hill A substation will transform all of the electricity produced at the Green Hill A Site from 33 kV up to 132 kV using high voltage transformers.

Green Hill A Cable Route (Work No. 5B)

3.2.2 The electricity generated at Green Hill A is collected by a substation on site and then exported to the Green Hill C substation via a 132 kV circuit of underground cables totalling approximately 8.1km.

Green Hill A.2 Substation (Work No. 3C)

3.2.3 The Green Hill A.2 33 kV substation, will combine all of the electricity produced at the Green Hill A.2 Site onto a single 33 kV circuit.

Green Hill A.2 Cable Route (Work No. 5B)

3.2.4 The electricity generated at Green Hill A.2 collected by a 33 kV substation on site and is then exported to the Green Hill A substation via a 33 kV circuit of underground cables totalling approximately 1.3km..

Green Hill B Substation (Work No. 3B)

3.2.5 The Green Hill B substation will transform all of the electricity produced at the Green Hill B Site from 33 kV up to 132 kV using high voltage transformers.

Green Hill B Cable Route (Work No. 5B)

3.2.6 The electricity generated at Green Hill B is collected by a substation on site and then exported to the Green Hill C substation via a 132 kV circuit of underground cables totalling approximately 5.5km.

Green Hill D Substation (Work No. 3C)

3.2.7 The Green Hill D 33 kV substation will combine all of the electricity produced at the Green Hill D Site onto a single 33 kV circuit.

Green Hill D Cable Route (Work No. 5B)

3.2.8 The electricity generated at Green Hill D collected by a substation on site is then exported to the Green Hill C substation via a 33 kV circuit of underground cables totalling approximately 0.9km.

Green Hill E Substation (Work No. 3B)

3.2.9 The Green Hill E substation will either transform all of the electricity produced at the Green Hill E Site from 33 kV up to 132 kV using high voltage transformers, or combine the electricity produced onto a maximum of five 33 kV circuits.

Green Hill E Cable Route (Work No. 5B)

3.2.10 The electricity generated at Green Hill E is collected by a substation on site and then exported to the Green Hill C substation via a single 132 kV circuit, or a maximum of five 33 kV circuits, of underground cables totalling approximately 1.7km.

Green Hill F Substation (Work No. 3B)

3.2.11 The Green Hill F substation will transform all of the electricity produced at the Green Hill F Site from 33 kV up to 132 kV using high voltage transformers.

Green Hill F Cable Route (Work No. 5B)

3.2.12 The electricity generated at Green Hill F is collected by a substation on site and then exported to either the Green Hill BESS substation or Green Hill G substation via a 132 kV circuit of underground cables totalling approximately 4.8km or 4.5km respectively.

3.3 Substations and Cable Routes at 400 kilovolts

Green Hill C Substation (Work No. 3A)

3.3.1 The Green Hill C 400 kV substation will collate all electricity produced from Green Hill A, A.2, B, D, and E which will enter the Green Hill C substation at either 33 kV or 132 kV, along with the electricity produced and stored at Green Hill C, which

is at a voltage of 33 kV. It will then be converted using high voltage transformers to a single 400 kV supply that can be exported to the Green Hill BESS substation.

Green Hill C Cable Route (Work No. 5A)

3.3.2 A single 400 kV circuit will run underground from the Green Hill C substation to the Green Hill BESS substation. This cable route will be approximately 10.7 km long. The circuit will run north then east of Mears Ashby, then east and south of Earls Barton. Horizonal Directional Drilling (HDD) techniques will be used to cross the River Nene, where the cable will turn east towards Green Hill BESS substation.

Green Hill BESS Substation (Work No. 3A)

3.3.3 The Green Hill BESS 400 kV substation will collate all electricity produced from Green Hill F and G which will either enter at 132 kV or 400 kV, along with the electricity transported from the substation at Green Hill C, which is at a voltage of 400 kV. It will then be converted using high voltage transformers to a single 400 kV supply that can be exported to the NETS. Green Hill BESS 400 kV substation will either contain Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS).

Green Hill BESS Cable Route (Work No. 5A)

3.3.4 A single 400 kV circuit will run underground from the Green Hill BESS substation to the adjacent Grendon 400 kV Air Insulated Switchgear (AIS) substation at Grendon National Grid Substation. This cable route will be approximately 314m long.

Green Hill G Substation (Work No. 3A)

3.3.5 The Green Hill G substation may optionally be 132 kV or 400 kV. It will either a) transform all of the electricity produced at the Green Hill G Site from 33 kV up to 132 kV or 400 kV, or b) transform all of the electricity produced at Green Hill G and Green Hill F from 33 kV and 132 kV, respectively, up to 400 kV using high voltage transformers. Green Hill G 400 kV substation will either contain Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS).

Green Hill G Cable Route (Work No. 5A)

3.3.6 The electricity generated at Green Hill G is collected by a substation on site and then exported to the Green Hill BESS Site via either a 132 kV or 400 kV circuit of underground cables totalling approximately 7.5 km.

3.4 Grendon National Grid Substation Works

3.4.1 Works will be required within the existing 400 kV AIS substation including the population of the bay onto the existing busbars:

- A 400 kV 3-phase 4000 A circuit breaker for control and protection of the outgoing circuit serving the Scheme;
- A 3-phase set of current transformers for protection of the new outgoing 400 kV feeder circuit and the overlap with the National Grid system;
- A 3-phase High Accuracy Metering Current and Voltage Transformer assembly for commercial metering of the connection;

- A 3-phase 400 kV Line disconnector/earth switch for isolation and earthing of the outgoing 400 kV feeder circuit;
- A 3-phase set of 400 kV high voltage cable sealing ends and cables connecting the National Grid site with the Scheme's site at Green Hill BESS; and
- A 3-phase Power Quality ready Capacitor Voltage transformer.

3.4.2 Also required is protection, control and ancillary apparatus for the circuit to be housed within a the existing National grid substation building and may also include the addition of a small local building sized approximately 6 m x 3 m, comprising duplicate feeder protection systems, commercial metering systems, National Grid owned protection and control equipment and User Remote Control and data acquisition apparatus.

4 Designing and Building of the Grid Connection

4.1 Responsibility of the Applicant

4.1.1 The Applicant has obtained expert advice from Omnia Projects to produce a bespoke electrical design for the Scheme. This has included electrical front end engineering design for each Site, and substation equipment and compound design. The Applicant also commissioned JSM Group to provide civil engineering input regarding the high voltage grid connection route.

4.1.2 The Applicant and its appointed contractors and consultants will be responsible for the design and construction of the following sections of the grid connection:

- On-site substations at Green Hill A, A.2, B, C, D, E, F, G, and BESS (Work No. 3);
- High voltage grid connection route (Work No. 5); and
- Installation of bay equipment at the POC (Work No. 4).

4.2 Responsibilities of National Grid Electricity Transmission

4.2.1 NGET will be responsible for the following sections of the grid connection, for design and construction, (which will be owned and operated by NGET):

4.2.2 Oversee the installation of the 400 kV AIS works to the NG Grendon substation spare bay (as described above).

5 Land Rights

5.1 Substations and Energy Storage Sites

5.1.1 The Applicant has entered into voluntary Option to Lease Agreements with the respective landowners of Green Hill A, A.2, B, C, D, E, F, G, and Green Hill BESS.

5.2 Cable Corridor Route

5.2.1 All freehold owners and tenants for the proposed cable route that will accommodate the various grid connection circuits, have been contacted and an indicative cable route discussed. Heads of Terms have been issued to each of these and the Applicant will continue to negotiate with each of the landowners.

5.2.2 The Applicant is pursuing voluntarily agreements with landowners along the cable corridor, but will also be seeking compulsory acquisition and temporary use powers through the DCO (see draft DCO **[REP5-008]**) to enable the Grid Connection to be delivered without impediment.

5.3 Green Hill National Grid Substation

5.3.1 It is understood that NGET already have the necessary land rights to undertake works to the new generation bay within their current land ownership.

6 Consenting of the Grid Connection Works

6.1.1 The Applicant is seeking to secure the consents for the Grid Connection Works via the DCO application through Works Nos. 3, 4 and 5 as set out in Schedule 1 of the draft DCO **[REP5-008]**. If the same terms relating to these Works Nos. are granted, development consent for the Grid Connection will have been secured.

7 Conclusion

7.1.1 The Applicant, Green Hill Solar Farm Limited is making an application for a DCO for the Scheme, of which the Grid Connection Works form part thereof. Therefore, this Statement has been submitted as per the requirement stated in Regulation 6(1)(a)(i) of the APFP Regulations, stating who will be responsible for designing and building the connection to the electricity grid.

7.1.2 This Statement confirms the above to the Secretary of State, namely:

- The Applicant has received a valid grid connection offer from NESO to connect the Scheme to the NETS at Grendon substation;
- The Applicant has accepted this grid offer by entering into a BCA with the NESO. This demonstrates that the connection is technically and financially viable;
- The Applicant has also undertaken electrical design for the Scheme including reviewing suitable cable routes, substation locations and required hazard avoidance to connect the sites Green Hill A, A.2, B, C, D, E, F and G to the main intake substation at Green Hill BESS 400 kV substation;
- A single 400 kV circuit will then run from Green Hill 400 kV BESS substation to Grendon NGET substation;
- A new 400 kV AIS bay will be created to allow the scheme to connect to the NETS;
- The Applicant will be responsible for designing and building all of the above elements of the grid connection. The Applicant will also operate and maintain these elements for the lifetime of the Scheme. The Applicant will be responsible, under NGET's supervision, for designing and carrying out the works required for the population of the new bay to allow for the Scheme's connection, and ongoing maintenance of the bay thereafter for the lifetime of the Scheme; and
- By the time construction starts the Applicant will have obtained all the necessary land rights for the Grid Connection, whether via the preferred method of voluntary agreement or by use of compulsory acquisition and temporary use powers in the DCO.

7.1.3 This statement is to be read alongside all other documents submitted by the Applicant relating to the DCO application. As set out in this statement and the draft DCO, the grid connection works form part of the Scheme for which development consent is being sought.