



Little Crow

Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT: TECHNICAL APPENDICES

APPENDIX 4.3

GRID NETWORK CONSTRAINTS REPORT

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GRID NETWORK CONSTRAINTS REPORT

ON BEHALF OF INRG SOLAR (LITTLE CROW) LTD

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1. INTRODUCTION

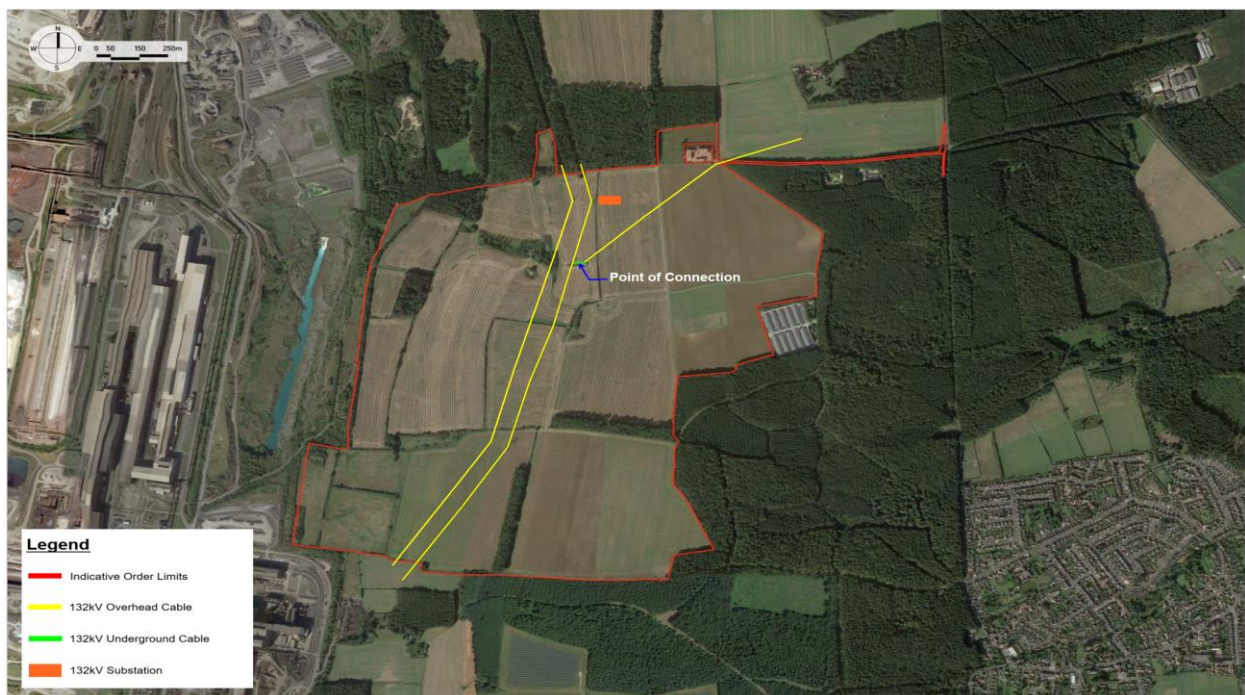
1.1 This Grid Network Constraints Report sets out the current status of the electricity network in the area surrounding Little Crow Solar Park, Scunthorpe DN20 0BG and the constraints future applications for grid connections are likely to experience. This document has been prepared by SMS Energy Services Ltd on behalf of INRG Solar (Little Crow) Ltd ('INRG').

2. Purpose of Document

2.1 This document details the constraints in the local electricity network.

3. Description of Works

3.1 The main element of the project is the construction, operation, maintenance and decommissioning of a ground mounted solar park and associated battery energy storage system with an intended design capacity of over 50MWp (megawatts peak). The project is connected to the electricity network via a single main connection at 132kV to the Northern Powergrid ('NPG') electricity network located within the Order Limits. The location of the Point of Connection ('PoC') to the NPG network is shown on Plan 1 below.



Plan 1

4. Connection Details

- 4.1 The proposed Little Crow Solar Farm will be connected to the electricity network via an electrical (grid) looped connection to the existing short section of underground 132kV cable located within the Order Limits. Typically, the PoC for a project of this size would be located outside the site boundary and in many instances would necessitate the laying of kilometres of underground cable at a substantial cost to connect to the electricity network potentially rendering projects unviable. In addition to the extra costs, connections outside the site boundary can also have an impact the local community due to the requirement for construction works which would typically take place in the highway necessitating road closures and traffic management systems to be in place.
- 4.2 The NPG network section is known as Keadby – Broughton – Teed – Scawby Brook overhead 132kV line circuit.
- 4.3 INRG has accepted the grid offer from NPG and secured the 99.9MW export capacity required for a project of this size. The grid offer accepted by INRG can only be used for the Little Crow Solar Farm and cannot under be transferred to any other site, as this would be deemed by the DNO as a significant alteration to the original application. The only viable connection voltage for a project of this size is at a voltage of 132kV and it requires the construction of a new 132kV sub-station on-site.

5. Local Network Constraints

- 5.1 The NPG Network Constraints Heat Map 'December 2019' indicates that there are no further suitable points of connection from the Grid supply 132kV network following INRGs acceptance of the grid offer for the Little Crow project.

2018 – Constraint

- 5.2 Constraints on the network in 2018 required that NPG submit a Modification Application ('Mod App') to National Grid Electricity Transmission ('NGET'). The Mod App was been completed by the NGET and NPG design teams in 2020.

5.3 The update from the Mod App has outlined that both the NGET and NPG 132kV switchgear and the NGET 132kV cabling must be replaced at Keadby substation. The budget cost for these works is c£22M.

5.4 This will have a direct impact on the connection costs and timelines for future projects that have not already secured grid connection offers and may render them unviable in terms of cost and timescales.

2019 – Constraint

5.5 There is a generation Active Network Management ('ANM') scheme which has been developed and deployed within the Driffield area. This is a standardised product that can be efficiently rolled out elsewhere as and when required.

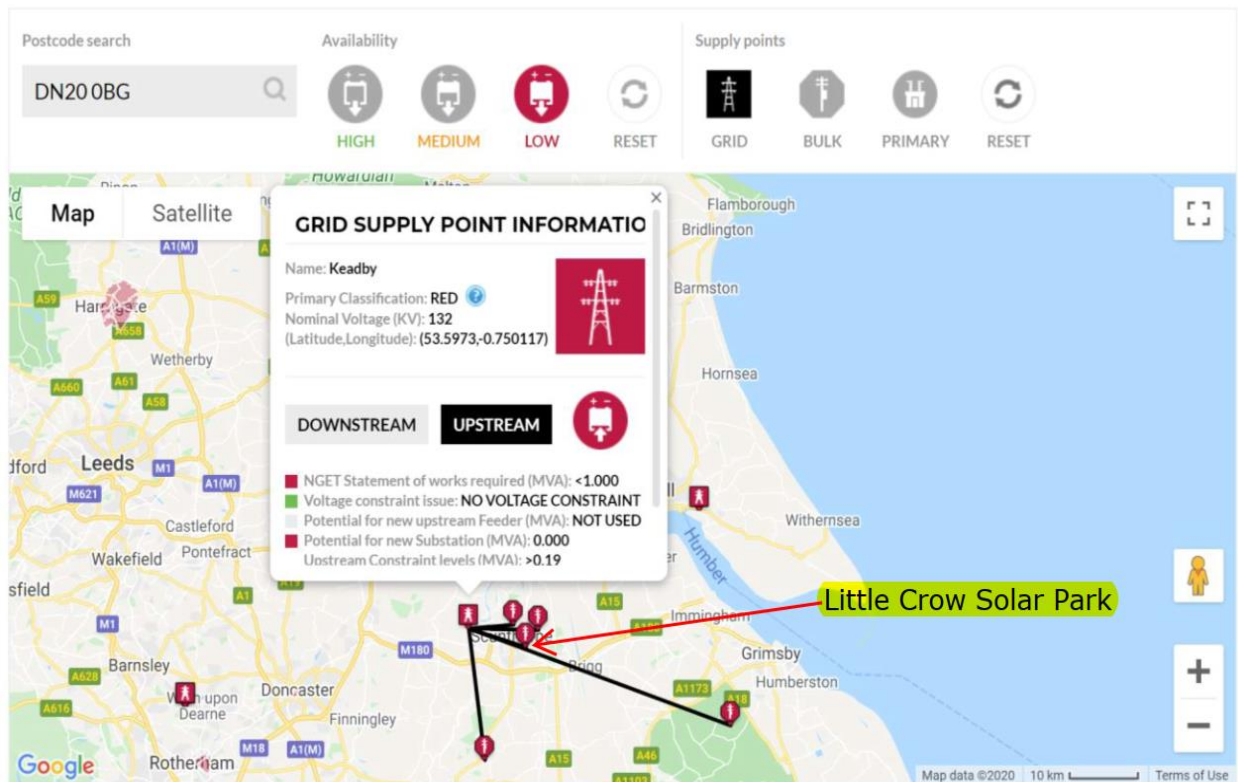
5.6 The Driffield ANM scheme manages the export from a number of generators to ensure that the power flows within the Driffield 66kV network and the local 132kV network remain within their design limits. NPG have identified the following areas as approaching their export capability limits:

- 5.7
- Keadby GSP (Scunthorpe and surrounding area).
 - Grimsby West GSP (Grimsby and Cleethorpes).
 - Creyke Beck GSP and Saltend North GSP (Hull and surrounding area).

5.8 These areas have been approved for the roll-out of ANM, which will enable NPG to continue to connect generation in the areas without triggering significant connection reinforcement costs. However, as curtailment times and frequency are an unknown, it would be difficult to calculate the reduction in power generated and exported to the grid on an annual basis.

5.9 NPG are now actively making ANM connection offers to generation customers wishing to connect to Keadby and will do likewise in the other areas as and when the trigger point for ANM is reached.

6. Keadby Substation detailed Technical Information



Substation Information

Name: Keadby

Downstream Nominal Voltage (kV): 132

Upstream Nominal Voltage (kV): NGET



Figure 1

The lower voltage busbars of the Keadby substation:

- ⊗ Downstream Overall Classification: RED – No Change from December 2018
- ⊗ Potential for new Sub-station (MVA): 0 - not previously recorded in December 2018
- ⊗ Fault Level (%): 100% - No Change from December 2018
- ⊗ Reverse Power Flow Capability: 100% | 240 (MVA) – No Change from December 2018
- ⊗ Voltage Constraint Issue: NO VOLTAGE CONSTRAINT – No Change from December 2018
- ⊗ Physical Constraints: No Physical Constraint – No Change from December 2018

The higher voltage circuits feeding the Keadby substation:

- ⊗ Upstream Overall Classification: RED – *No Change from December 2018*
- ⊗ Voltage constraint issue: NO VOLTAGE CONSTRAINT – *No Change from December 2018*
- ⊗ Potential for new upstream Feeder (MVA): – *Not Used*
- ⊗ NGET Statement of works required (MVA): <1 – *No Change from December 2018*
- ⊗ Upstream Constraints Levels (MVA): >0.19

Key

- ⊗ No Export Capacity
- ⊗ Export Capacity

7. Conclusion

- 7.1 The 99.9 MW capacity which has been secured by INRG, has taken the NPG electricity network to a 100% fault level. No further Distributed Generation connections can be connected on to NPG's existing electricity network, within the area in Figure 1 on Page 4, other than ANM schemes that may still be accepted by NPG. However, as curtailment times and frequency are an unknown, it would be difficult to calculate the reduction in power generated and exported to the grid on an annual basis.
- 7.2 The 99.9MW capacity has also taken the NGET electricity network very close to its network capability. The results of the recent Mod App have confirmed that upgrades to the 132kV switchgear and cabling at Keadby substation will be required possibly rendering any future projects unviable due to costs and timescales.

