



AQUIND Limited

AQUIND INTERCONNECTOR

Applicant's Post Hearing Notes - Appendix 6 -
Technical Note - Consideration of Alternatives
(Connections)

The Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010, Rule 8(c)

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TECHNICAL NOTE

DATE:	27 February 2021	CONFIDENTIALITY:	Public
SUBJECT:	On-going discussions with South Downs National Park in relation to other sub-station options		
PROJECT:	62100616		
FOR THE ATTENTION OF:	AQUIND INTERCONNECTOR		

THE SOUTH-EAST

Connecting to a sub-station at any location along south-east coast would require additional reactive power compensation, which is required to maintain the voltage profile along the network within the mandatory limits. Otherwise, voltage could fall too low due to the higher power flows. Such compensation equipment already exists at some sub-stations considered (Mannington, Lovedean, Bolney) but more would be required at the other named sub-stations. This could be fixed compensation equipment (£3 – 5 million each) or dynamic compensation equipment (£10- 20 million each). Such projects would be expected to take between 2 and 3 years to complete.

BOLNEY SUB-STATION

Bolney sub-station lies on this “south-east ring” which is already severely constrained with existing and future proposed interconnectors and generation connections. This part of the network does not have capacity to accept new interconnectors and recent connections (i.e. 1GW Nemo Link) have involved upgrades at three substations to provide additional dynamic compensation and prevent voltage and network stability issues at a capital cost of at least £47 million. Accordingly, AQUIND Interconnector, due to its larger 2,000 MW capacity and the already congested situation, would require even higher costs on top of that. The connection of Rampion offshore wind farm also presented further constraints.

For these reasons, a connection to Bolney would have been deemed as not feasible and National Grid ruled that out as well as any other connection east of Lovedean.

FLEET SUB-STATION

Fleet substation was discarded because of no benefit comparing to Lovedean, which as well as Bramley, would have involved a cable route through SDNP.

OTHER SUB-STATIONS

Sub-stations at Mannington, Marchwood, Nursling, Fawley and Botley Wood had other challenges and restrictions:

- i. It is our understanding that there was no network capacity at **Fawley** sub-station since it was taken by a new gas fired power station. At the time of application to National Grid, the surrounding area was also in the process of being redeveloped for Fawley Waterside and not available to National Grid. In the Applicant’s opinion, a connection to Fawley would have been deemed not feasible for these reasons.
- ii. **Marchwood** sub-station is fed by a single overhead transmission circuit and serves a CCGT power station. In order to provide network capacity it would be necessary to construct an additional overhead transmission line with an additional connection equipment to enhance the connection of that sub-station to the transmission lines, which is not required at Lovedean. A desktop estimation identifies the additional equipment cost alone to be at least £27 million.

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The above estimate would be for the equipment cost only and the development, permitting, design, installation and commissioning costs are excluded. When factoring those in the cost is likely to rise towards £10 million per kilometre, with further costs increases if a 400kV underground connection were to be implemented. For example, the on-going Hinkley Point connection works (known as Hinckley Seabank) which consist of a new 48.5km overhead line, a new 8.5km underground cable and modifications to a further 67km of overhead line are expected to cost a total of £655 million¹. Typically, at this voltage, 1 km of an underground HVAC cable route can be up to 8-10 times more expensive than overhead lines. Depending on local conditions, such costs may further increase.

- iii. **Botley Wood** is a difficult substation configuration to upgrade because the substation is on the Botley Wood and Everett's and Mushes Copses SSSI. The IFA2 interconnector which recently connected 1000MW nearby undertook works to significantly upgrade Chilling Lane sub-station rather than connect into Botley Wood. The construction of a new 400kV substation to connect AQUIND Interconnector would be at a minimum cost of £75 million and would be expected to take more than 3 years, taking into account the sensitivity of the area. It is also not possible to connect that much interconnector capacity (3GW in total including IFA2 and AQUIND Interconnector) in such immediate proximity.
- iv. **Mannington** sub-station may not be suitable for extension at all due to the position of existing Static Var Compensation (SVC) within the substation and because there are residential properties in close proximity on three sides. It is also relevant that Navitus Bay offshore wind farm of nearly 1GW capacity was planned to connect there. In the Applicant's opinion, connecting to Mannington sub-station would have been deemed not feasible.
- v. **Nursling** sub-station has overhead lines which provide a constraint to the delivery of infrastructure beneath on three sides and therefore cannot easily be extended. In the Applicant's opinion, it would have been deemed not feasible. A connection to Nursling sub-station would also most likely require the construction of a new substation at the minimum cost of £75 million and associated new overhead or underground connections to the existing overhead transmission lines along with further reinforcements of affected lines with an expected timeframe for delivery in excess of 3 years.

CONCLUSION

Among all the sub-substations along the south coast, Lovedean provides the most direct and least constrained route to evacuate power from AQUIND Interconnector towards consumption centres in the south as well as to the north, including London, as well as to supply AQUIND Interconnector with power since most generation is further north.

The selection of the other sub-stations would have resulted in the need for more extensive additional works which would increase the cost of such works to both National Grid and the project and the time that it would take for the interconnector to become operational.

¹ (Source: https://www.ofgem.gov.uk/system/files/docs/2020/05/decision_on_our_project_assessment_for_the_hinkley-seabank_electricity_transmission_project_0.pdf).

