

Colocation and Transmission Network Use of System Insights Series

Part 2 Optimising Transmission Connected Colocation Projects and the impact of TNUoS

Summary

George Douthwaite, who leads our Regulatory and TNUoS service and an observer of the CMP316 “TNUoS Arrangements for Colocated Generation Sites” Working Group reflects on TNUoS in this five-part Thought Leadership Series along with Peter Lo on Portfolio Colocation Optimisation. We have amplified the visualisation to make it easier to digest for our clients and highlight potential impacts on return and risk in colocation versus standalone technology approaches.

- Part 1 – Introduction to TNUoS and ITPenergised unique modelling approach
- **Part 2 – Optimising Transmission Connected Colocation Projects and the impact of TNUoS**
- Part 3 – Optimising Transmission Connected Colocation Projects and TNUoS Connection and Use of System Code (CUSC) Modification Proposals (CMPs)
- Part 4 - Colocation TNUoS versus Standalone technology TNUoS – Scottish Site Example
- Part 5 - Colocation TNUoS versus Standalone technology TNUoS – 100MW Technology Units

In the remainder of this series George is joined by Peter Lo in co-writing the illustrative case studies with respect to the techno-economic optimisation of sizing of transmission connected colocated projects and the impact TNUoS has versus equivalent standalone schemes. Figures are illustrative.

This series builds on our original insights series on colocation which can be found [here](#).

For information relating to our global techno-economic-risk optimisation consultancy for colocation projects, and optimising global portfolio design, please contact Peter Lo at peter.lo@itpennergised.com. For information on our TNUoS prediction service based on a unique Digital Twin of the GB Power Network, NGET Future Energy Scenarios, Network Options Assessment, as well as a commercial layer, please contact George at george.douthwaite@itpennergised.com.



Part 2 – Optimising Transmission Connected Colocation projects and the impact of TNUoS

Context

There is increased investment appetite for battery storage in both standalone and in colocation configurations. In colocation battery storage can be included with one or more renewable generators – solar PV, wind or both and/ or thermal generators alongside other new energy frontier technologies such as green hydrogen, EV (Electric Vehicles) charging and industrial scale heat pumps to name a few.

The mainstream colocation configurations are **solar PV and battery storage** and **wind and battery storage** where the addition of the battery enables the potential to capture a more diverse revenue stream as an upside to the base case techno-economics of a solar PV or wind farm alone. It also acts as a downside mitigant and physical hedge against solar PV/ wind/ or both cannibalising the wholesale power price when there is a surplus of renewable energy compared to demand; giving an ability to time shift generation and therefore mitigate value erosion for colocation projects with merchant exposure and / or uncontracted revenue streams. Investors are becoming more comfortable with this form of merchant form of revenue stack as increasing intermittency from renewable generators drives an equivalent and exponentially increasing rise in the services that are then needed to balance our legacy power grid design that dates back to the late 1800s. The Balancing Mechanism, for example, was valued at c £1b in 2019 but this rose to c £4b in 2022. In the space of 4 years this is a 4X rise and rising.

Colocation benefits can include controlled release of energy onto the network to satisfy peak demands, power quality adjustments and more effective utilisation of available network capacity/delaying grid reinforcements.

Transmission Connected Colocated Projects

Transmission voltage connected colocation projects are on the rise. These mega-colocation projects may take advantage of incumbent grid connections previously used for large gas or coal fired power plant or look to solve for anticipated surges technically and commercially in intermittent renewable energy capacity such as ScotWind and other schemes that have a known timetable and jurisdiction. Larger scale at the project and portfolio level means more likely interest from EPC contractors. Economies of scale and scope may be unlocked. From a grid operator perspective, a larger project acts as a larger “silver bullet” to balance and stabilise the power grid regionally. Furthermore, in a world of limited transmission transportation capacity, colocation utilising storage allows a controlled release of energy onto the network that grid may be better able to cope with.

There is another advantage which is that the TNUoS charge may reduce and sometimes become an income stream for colocation projects compared to their equivalent projects on a standalone basis. However, when considering TNUoS, combining technologies at site is likely to increase the site level Annual Load Factor (ALF) since the connection can be utilised more of the time. An increase in ALF will increase the proportion of the Year-Round element applied to the site’s TNUoS tariff.

