

SW T4202 Wind Dispatch Tool Constraint Group Update

Background

We use the Wind Dispatch Tool (WDT) in the TSOs' Control Centres to manage wind/solar constraints and curtailment in real time operation of the power system. Constraints are applied to individual windfarms or groups of windfarms associated with a particular constraint. The WDT allows the application of active power (MW) limits to the outputs of individual, controllable, wind/solar farms.

In 2019 a review of the constraint groups in the WDT was carried out on the basis of power flow studies and some groups were modified to reflect updated system topology and conditions. All windfarms that materially contribute to a constraint were included in a group used to manage that constraint. These groups facilitate the Control Centre selection of contributing units to resolve a particular constraint instead of manually selecting each individual windfarm. As a result of the changes to the groups, a number of windfarms were included in groups that they had not been part of historically.

The revised groups were implemented in December 2019. Earlier in 2020, an Information Note on Wind Dispatch Tool Constraints Groups, a document outlining the WDT constraint groups for an intact network, was published. We also outlined that we plan to review the Wind Dispatch Tool constraint groups on a regular basis and that we want to work in partnership with industry and welcome any feedback that you may have for consideration in future reviews.

One constraint group that was amended was the South West Constraint Group 1: Moneypoint 400/220 kV Transformer 2. This constraint group is used due to limitations on the Moneypoint 400/220 kV Transformer 2 (T4202) when exporting wind/solar from Kerry, north onto the 400 kV network.

[Update 14.10.2021]

With the return of Moneypoint 400/220 kV Transformer 1 (T4201) from long term forced outage the South West Constraint Group 1: Moneypoint 400/220 kV Transfer 2 will still be required. This is to protect against excessive N-1 loading on Moneypoint 400/220 kV Transformer T4202 above its emergency overload capability for the loss of Moneypoint 400/220 kV Transformer T4201 in normal operation

Analysis

The prevailing wind direction for the country is from the South West and wind fronts move from this direction typically causing wind output closer to coastal areas to increase first before moving further inland.

When a constraint is applied to the group there can be wide range between the Active Power Output of wind farms in areas closer to the coast and those further inland areas due to prevailing wind conditions.

The Wind Dispatch tool will reduce all windfarms in the group proportionally. The Wind Dispatch Tool calculation of the initial constraint setpoint for each windfarm is based on the current frequency adjusted output of the windfarm as well as the output of other windfarms in the same group. If the constraint is applied when there is a large range between areas, the reduction is applied to a high initial output in coastal areas and to a lower initial output inland.

As the wind front moved further inland and the Available Active Power (AAP) of the windfarms further inland increases, the difference between the Available Active Power and the constraint setpoint increases. However, as the WDT calculation does not currently account for changes in available active power output over time, successive constraint and curtailment setpoints will be based on the lower of the windfarms constraint setpoint or Available Active Power.

The result of having a constraint setpoint calculated when the units output is low is that the windfarms subsequent setpoints will also remain low until the constraint is lifted.

In order to “re-dispatch” the constraint the Control Centre would need to entirely remove the constraint, allow the wind farms in the group to increase output to AAP and then reapply it to the required level. This is not possible as it will breach system security standards, with significant impact in terms of equipment overloads, triggering Special Protection Schemes and on system frequency control.

Outcome

A further review of the Wind Dispatch Tool constraints groups is being carried out. However, this will take some time. In the short term, a number of windfarms that were added into the South West Constraint Group 1: Moneypoint 400/220 kV Transformer 2, will be temporarily excluded again based on their geographical location. A table of which nodes are to be excluded is provided in Appendix 1. This change has been implemented in the WDT as of 3 April 2020.

The impact of splitting large WDT constraint groups by geographical region will be studied in the review of the groups.

Changes to the Wind Dispatch Tool will be considered in the context of the wider range of changes required to achieve our RES-E targets.

Appendix 1

Revised SW T4202 Constraint group:

Station
Tralee
Dromada
Athea
Kilpaddoge
Trien
Reamore
Clahane
Cloghboola
Oughtragh
Knockearagh
Glanlee
Cordal
Garrow
Coomagearlaghy
Boggearagh
Moneypoint
Rathkeale
Macroom
Bandon
Dunmanway
Ballylickey
Ardnacrusha
Tullabrack
Booltiagh
Slieve Callan
Glenlara

110kV nodes to be excluded pending studies:

Station
Barrymore
Charleville
Dallow
Ikerrin
Thurles
Kill Hill
Lisheen
Cauteen