

### ***Application to the Nordic market***

Since the Nordic market settles into a virtual system price, and regional price differentials are calculated against this universal system price, the concept of transmission rights between the different price zones does not exist explicitly.

Instead, the CfD market allows market participants to buy and sell contracts for differences against the system price, so as to be hedged in their price area where they have consumption, sales or generation. However, the CfD market is not liquid and it is difficult for market participants to hedge out price area exposures on long term.

Nevertheless, the price differentials appear as a result of real physical network constraints. As such, the concepts described in this paper may easily be translated into the framework on which the Nordic market operates.

*For example:* we take two connected price areas in the Nordic system price - areas 1 and 2, with respective prices of  $P_1$  and  $P_2$ ; in this case, the difference in price between the two price areas,  $P_1 - P_2$ , is the result of the physical congestion of an interconnection. We will assume that this is a result of capacity limitations and that there is 1000MW available between these two price zones.

In this scenario, in Central Western Europe, the price of the 1000MW of physical rights between these two price zones would be  $P_1 - P_2$ , and the TSO would have sold such rights accordingly. These rights would then be treated as a Dual Purpose Transmission Right (DPTR) in the way as described in the main paper.

In the case of the Nordic market, however, one practical change would need to be done to accommodate the DPTR model: given that no physical rights to transmission are in place, the only option one would have as a holder of the DPTRs would be to use them financially and have the rights cashed out at the Nordic price area spreads.

Likewise, if there are more than two price areas, the TSO would be required to sell more DPTRs. As an example, the Swedish TSO would, together with the neighbouring TSOs, sell DPTRs between STO and NO1, NO2, FI, DK1 and DK2. There is an ongoing study on implementation of further price areas within Sweden and this would demand that the Swedish TSO is selling financial transmission rights, as there will not be any balance between production and consumption in each price area. This will mean that there will not be a balance between natural buyers and sellers in CfDs within each price area, but, in case the TSO sells FTRs, buyers and sellers from different price areas can meet.

We recommend the establishment of a Nordic auction office.