

# *Abstract*

Integration of European electricity market is one of the major challenges since the beginning of the 2000s. In 2010, market coupling, which optimizes power trading by allocating cross-border transmission capacity, was launched in Central West Europe (CWE). It was first implemented by using the Available Transmission Capacity (ATC) based capacity transmission. The ATC method was based on computation of Net Transfer Capacity on each border of the CWE zone by Transmission System Operators. On May 21<sup>st</sup> 2015, ATC method was replaced by the flow-based method. The flow-based method better takes into account the network specificities. It allocates transmission capacity based on branches rather than borders, as it was the case with ATC method.

Traders need to forecast the spot price in order to best choose their trading strategy. They have to forecast weather conditions, consumption, production and network maintenance. With the implementation of the flow-based method, now they also need to forecast the flow-based domain. Then, clustering on past data will help to fulfill this goal.

This thesis has been carried out in three main steps. First, ATC and flow-based methods have been compared each other in order to better understand what are the advantages with the flow-based method. Then, main achievements and features of the flow-based method have been highlighted based on data collected during the phase test. Finally, a procedure has been developed in order to cluster data which define the flow-based domain. The clustering procedure has been tested on data collected of January 2015. Different clustering methods and observation pre-processing have been compared and recommendations on the best choice have been made.

**Keywords: Flow-based, Interconnections, CWE zone, ATC, Clustering**