

*European Power System 2040*

# Completing the map Summary

Final version after public consultation  
and ACER opinion - October 2019

# The TYNDP package is delivering the master plan for an electrically interconnected Europe

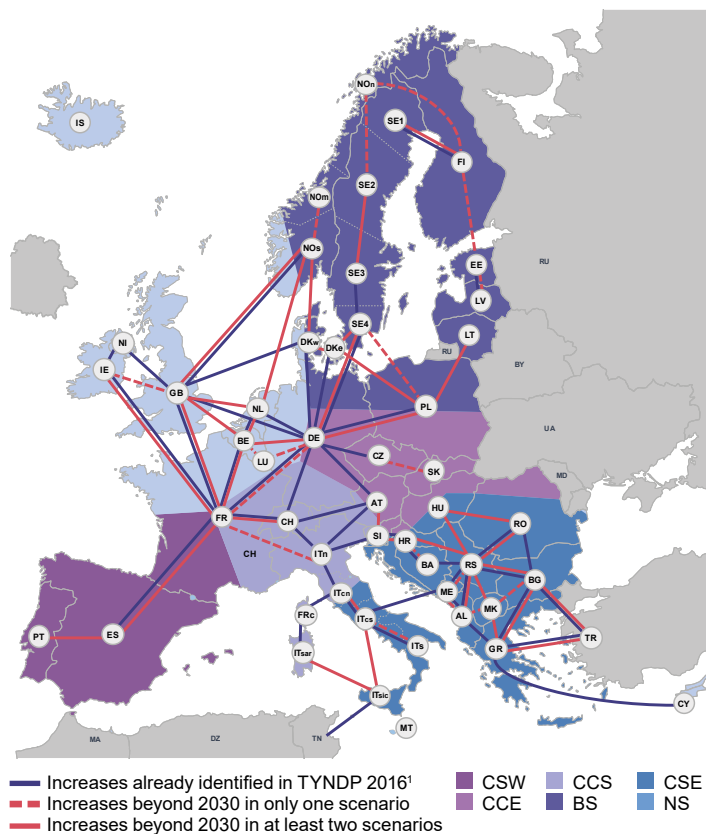
This has been achieved by revealing the challenges facing EU energy transition and proposing the next steps. An efficient transition requires efficient markets and efficient markets require sufficient infrastructure which will create value.

While the final TYNDP 2018 report identifies the most important projects for Europe, the System Needs Report shows future capacity needs for the three 2040 scenarios in the TYNDP 2018. It continues the evolution of the TYNDP and contains analyses of stability issues, SoS, CO<sub>2</sub> emissions, integration of renewables across the grid and integration of markets with each other – all done to several scenarios and climate years.

## 2040 Needs for system development

The map below shows the potential need for further increases in capacity in 2040 – beyond the 2020 grid.

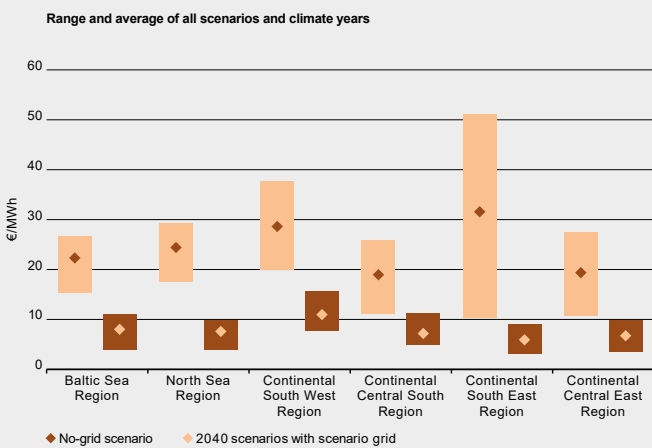
### Summary of capacity increases from 2020 to 2040



The chart below shows the average marginal costs of electricity production per regional group as summarised for all three 2040 scenarios and with the scenario grids implemented (**2040 scenarios with scenario grid**). The chart also shown (left) are needed for reasons such as increases were not implemented (**no-grid scenario**). While some of the needs for capacity increases shown (left) are needed for reasons such as increases in security of supply and integration of renewables, many also integrate the European electricity markets which can be seen in reduced average marginal cost differences for electricity production.

### All 2040 scenarios

European – Average hourly differences in marginal costs



More information can be found in the European System Needs Report 2018

- [https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP2018/energy\\_power\\_system\\_2040.pdf](https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP2018/energy_power_system_2040.pdf) in the Scenario Report
- [https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP2018/scenario\\_report.pdf](https://www.entsoe.eu/Documents/TYNDP%20documents/TYNDP2018/scenario_report.pdf) and in the Regional Investment Plans 2017 of the ENTSO-E regional groups
- Baltic Sea
- Continental Central East
- Continental Central South
- Continental South East
- Continental South West
- North Sea

<sup>1</sup> Reference capacities of TYNDP 2016 for 2030 which for some borders had been adjusted for the TYNDP 2018. Projects commissioned in 2020 are not included as capacity increases.

## Benefits

Increasing capacities at the borders, as shown on the map to the left, would have a significant impact on the ENTSO-E electrical system and society as a whole.



**3 to 14 €/MWh**  
reduction in marginal costs of electricity generation



**58 to 156 TWh**  
less curtailed renewable energy



**37 to 59 Mtonne**  
reduction in CO<sub>2</sub>



**24 to 471 GWh**  
reduction in energy not served