

The role of electrolyzers in the ecosystem around the offshore wind landing sites in the Rotterdam port area beyond 2030.

By 2030, 7.4 GW of offshore wind from the North Sea will land at Maasvlakte. In the following decades, this amount is expected to increase to more than 15 GW. Transporting all this power will require a massive effort from the TSO and will have a major impact on the planning and infrastructure of the port area. Meanwhile, industry in Rotterdam expects an increasing demand for green hydrogen to enable its transition to sustainable production. Electrolyzers on the scale required to provide such quantities of hydrogen are very energy intensive. This raises the question of the extent to which electrolyzers can alleviate grid congestion caused by offshore wind on the one hand, and produce significant amounts of green hydrogen on the other. Using a lot of electricity right where it arrives on shore seems like a logical solution, reducing the need for the procedurally complex and lengthy construction of high voltage transmission lines through congested industrial harbour areas.

This research will investigate the technical and economic feasibility of electrolyzers as a balancing mechanism. Is it feasible to ramp electrolyzers according to the power profile produced by the wind farms, thereby reducing the load on the grid?