# CONGESTION WITHIN THE GERMAN TRANSMISSION GRID – CAN POWER STORAGE BE A SUBSTITUTE FOR INFRASTRUCTURE INVESTMENTS?

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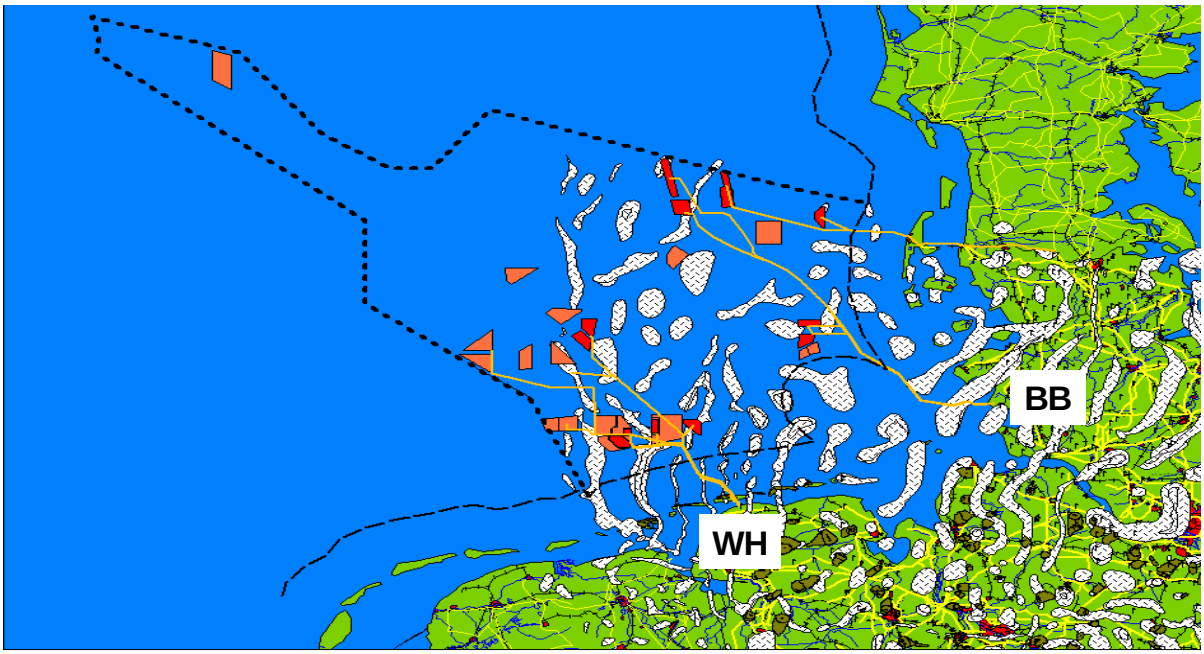
Changing framework conditions within the European and German Electricity Sector such as the liberalization of the electricity market, the strong increase of renewable energy in coastal areas in Northern Germany and the present high level of new power plant investments make a great demand on the existing power transmission grid. The concentrated wind power generation onshore in coastal areas at the North Sea and the Baltic Sea – and starting in 2007 - also offshore wind power make it more and more necessary to transport the electricity generated in the North to the centres of consumption in the Rhein Ruhr Area and the South of Germany (see Figure 1).

**Figure 1: Offshore Wind Power in the German North Sea and potential locations for CAES**




*Source:author*

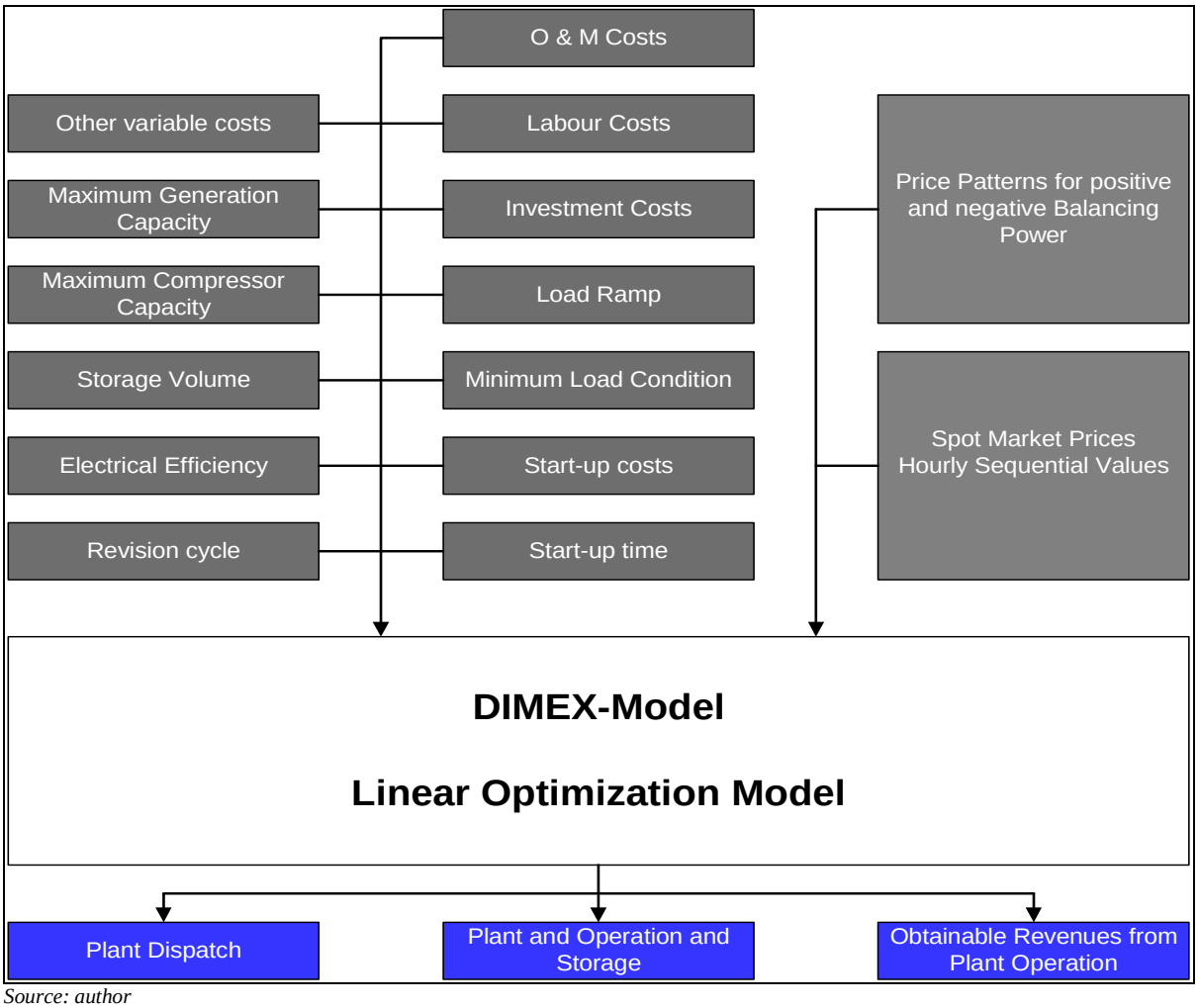
New infrastructure investments will be necessary to deal with the new situation and to enable further wind power investments.

In spite of the latest implementation of the “Infrastrukturbeschleunigungsgesetz” infrastructure extensions often are subject to delays due to the high number of affected parties and time consuming approval procedures so that the political targets for wind power installations will be endangered due to the upcoming infrastructure bottlenecks.

In ongoing scientific as well as in political discussions power storage is often claimed as the ultimate solution to deal with infrastructure bottlenecks. The probably mostly discussed storage technology will be Compressed Air Energy Storage (CAES). In CAES plants, power is stored by means of compressed air which is stored in a subsurface salt cavern.

The paper will therefore present a detailed analysis of the energy economic situation in Northern Germany today and for the next decades and includes an economic assessment of a CAES storage plant applied as a grid infeed management unit that allows for the substitution or deferral of otherwise necessary grid extensions. The analysis will be done by means of a model based approach by applying the DIMEX-TOP-GRID model.

**Figure 2: The DIMEX-TOP-GRID Model**




*Source: author*

The paper will include a short description of the applied methodology before the costs and benefits of a storage installation will be discussed examplarily for the grid connection point at Brunsbüttel and are compared to alternative infrastructure extension costs.

Finally, a recommendation for potential investors and political stakeholders will be given.