

Showcase Zaanstad: HoogTij

Smart energy networks for industrial developments in Zaanstad

Energy produced by renewable sources has shown impressive growths, yet the biggest change has still to come. How can the development of new areas integrate energy matters from the start? The development of HoogTij has initiatives for different renewable energy sources, yet it was struggling with the business cases. It turned out that the smart grid was the missing link.

The municipality of Zaanstad has high ambitions to become energy neutral and produce all its energy needs from renewable sources. New development initiatives, such as the industrial area HoogTij, form a great breeding ground for smart energy networks. The site is being developed along the Nord Sea canal and forms a part of the harbour area of Amsterdam.

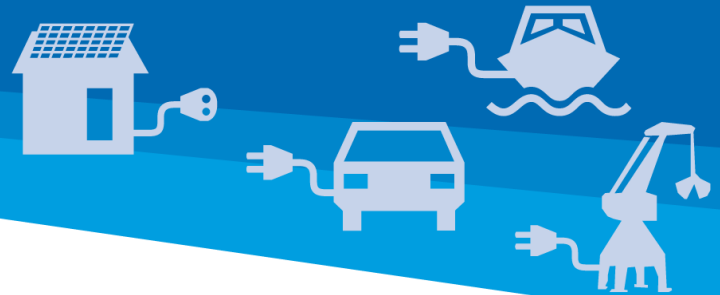
To provide clean energy for HoogTij, wind turbines are projected on the site. Moreover, a network for production of heat and cold is part of the energy infrastructure. Great intentions, yet the development of this heat network has uncertainties as well: Due to the economic recession, land issuing has a slow pace and the business case of the heat network remains weak.



A solution to overcome these problems is found to consolidate the development of wind turbines and the heat/cold network: The local smart grid increases the business case and makes such a development feasible. To investigate the added value of the smart grid, a simulation analysis is made. A heat pump is used to extract heat from the water of the nearby canal, which can be used to heat the buildings. The heat demand of buildings is investigated and the production of heat by an electric heat pump is analysed. Next, the flexibility of the system is used to match the production of the wind turbine, which supplies clean and affordable energy. The simulation proved that the energy costs were reduced significantly and the business case for the heat/cold network became feasible.

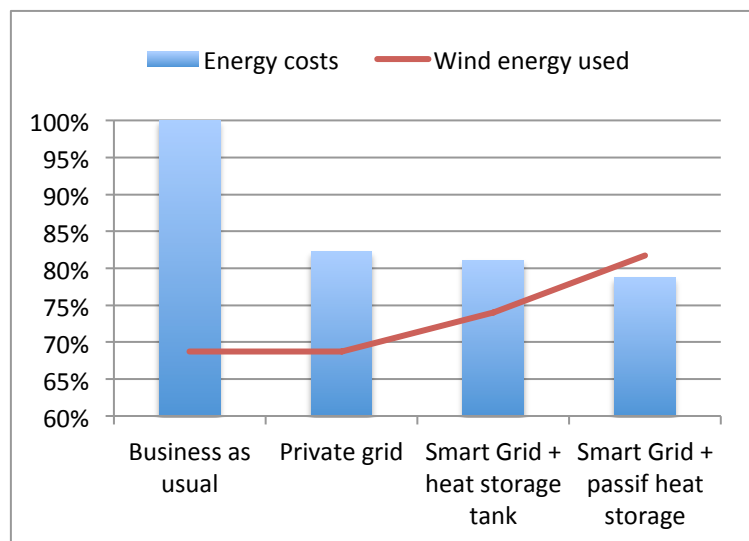


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Investigating the potential:

In the analysis that is made for the showcase HoogTij, different scenarios are simulated and compared on financial benefits. It turned out that a consolidation of the development of the wind turbine and the heat/cold network was very beneficial to reduce the energy costs. The produced energy from the wind turbine can be used locally to produce heat and cold for the buildings on HoogTij. When the flexibility that is present in the system is used, the energy costs can be reduced even more. The analysis made clear that the buildings itself could be used 'smart' and act as a giant heat storage: Without disturbing the users of the building, the production of heat is optimised to the available wind power. The results are illustrated in the graph; while energy costs are being reduced, the amount of wind energy that is used is maximised. In this way, the system is less depending on the electricity supplied by the grid and CO₂ emissions are reduced by 73%.



Showcase HoogTij enables settling companies to use renewable energy and subsequently, the integration of wind energy is improved by smart grid technologies.

The showcase has made clear what potential is available for HoogTij; now the challenge is to go from theory to practise. Which steps has to be taken to ensure a sustainable development of the area? And how can new coalitions be formed to make this happen?

The showcase HoogTij has been developed in cooperation whit expertise of the Eindhoven University of Technology, as part of a master thesis project.

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