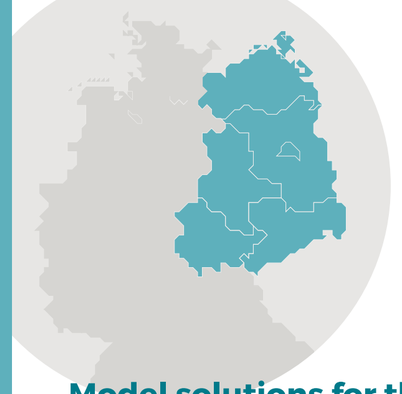
Project partners

Steering group



Model solutions for the energy transition

WindNODE is kindly supported by the Federal Ministry for Economic Affairs and Energy (BMWi) as a ‘Smart Energy Showcase’ (SINTEG) for the period 2017 – 2020. The objective is the system integration of large volumes of renewable energy while also keeping the power grids stable. Over 70 WindNODE partners work together on transferable model solutions, which can also move the energy transition forward outside of the WindNODE region.

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WINDNODE

WindNODE – Showcasing smart energy systems from northeastern Germany

www.windnode.de

Towards 100 % renewable energy

WindNODE is working towards a future in which our electricity requirements can be covered almost entirely by renewable sources. Today, one third of the electricity in Germany is already generated by renewable sources, mainly wind and solar power. This is much more than even optimists had hoped for a few years ago.

This one third is actually only an average value, as sun and wind are intermittent energy sources. On windless nights, for instance, there is almost no green power. During sunny, windy days, by contrast, wind and solar power stations may generate a lot more electricity than is required in certain regions. When this is the case, the power grids are in danger of being overloaded – sometimes to such an extent that the green power output has to be cut back. The greatest challenge for the further growth of renewable energy will be system integration. In other words, the question is how the generated electricity can be made available at the right place at the right time.

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Balance in the energy system

Even in a system with a high capacity of renewable generation, the balance between generation and consumption has to be guaranteed at all times. Grid expansion and upgrading play a key role in this regard. However, energy consumers can also make an important contribution. For instance, a factory can plan part of its production in a period when a powerful wind front is expected to pass over the country. A supermarket can cool its freezers 'in advance', as the products will remain sufficiently cold, even when the cooling units are deactivated temporarily during subsequent low wind periods. At WindNODE, we systematically search for flexibility in industry, commerce and residential areas. We are also engaged in the use of electricity to supply heating and cooling (Power-to-Heat, Power-to-Cold) and in transport (electromobility), as the so-called 'sector coupling' provides additional flexibility and at the same time helps replace fossil fuels (coal, oil, natural gas) with green power. Last but not least, we seek to answer the question of what needs to happen in order to actually exploit the identified flexibility potentials, both technically and economically.

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WindNODE project goals

More information can be found at: **www.windnode.de**

FLEXIBILITIES

We identify model users in industry, commerce and large residential areas who can flexibly adjust their energy demand to the fluctuating feed-in from wind and solar power stations. New flexibility options are offered by sector coupling applications (power, heat, cold, mobility) and in regional power plants, where producers and consumers are closely integrated. We test the use of these flexibilities in order to reduce grid congestion and to optimally exploit the available green power output.

SYSTEM INTEGRATION

The energy transition has entered the 'second stage', which focuses on smart and efficient system integration of green power: how can the balance between energy supply and demand be maintained despite the fluctuating generation of renewables? WindNODE shows solutions at three system levels: firstly with components for an efficient power grid infrastructure, secondly through information and communications technology connectivity, and thirdly with approaches for an 'energy market 2.0', developing new rules of play, market roles and business models.

VALUE CREATION

WindNODE seeks to guarantee a secure, affordable and comfortable electricity supply, even when the share of renewables is very high. A 'smart energy system' nevertheless offers more opportunities than merely fulfilling the supply task: energy innovations, which we successfully demonstrate in our showcase region and also introduce in the development of standards, are followed with interest on an international scale. They also strengthen our position on the technology map and secure jobs.

SHOWCASE

WindNODE is a showcase project to get involved with and participate, in which we seek to share our passion for 'energy and transition'. More than 20 'visitor sites' invite experts and the interested public to experience our smart energy system solutions. Additionally, we offer various opportunities to actively participate in our activities and help shape the energy transition.

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Showcases for energy and transition

WindNODE encompasses all eastern German states, including Berlin. Thinly populated areas with abundant wind power capacities are linked to urban load centres and about 11 million power grid connections. The large-scale model region showcases all players and components of the energy system and is highly innovative in the process: half of the local energy mix consists of renewables, a continuously upward trend, and as such already meets the Federal Government's energy transition targets for 2030. It is unique in that the green power for the most part originates from sources with fluctuating (volatile) generation, mainly wind power, while the users enjoy a quality of supply that is among the best in the world. At the same time, the energy transition once more relies on our region's ability to change: particular energy transition costs in the form of relatively high grid fees, time-consuming planning and participation procedures for wind farms and grid development, structural change in the Lusatia area – to name only a few. WindNODE offers a realistic outlook on the visions and challenges of the energy transition for the northeast of Germany and beyond, and is therefore particularly suited as a 'smart energy showcase'.

Associated partners

Subcontractors