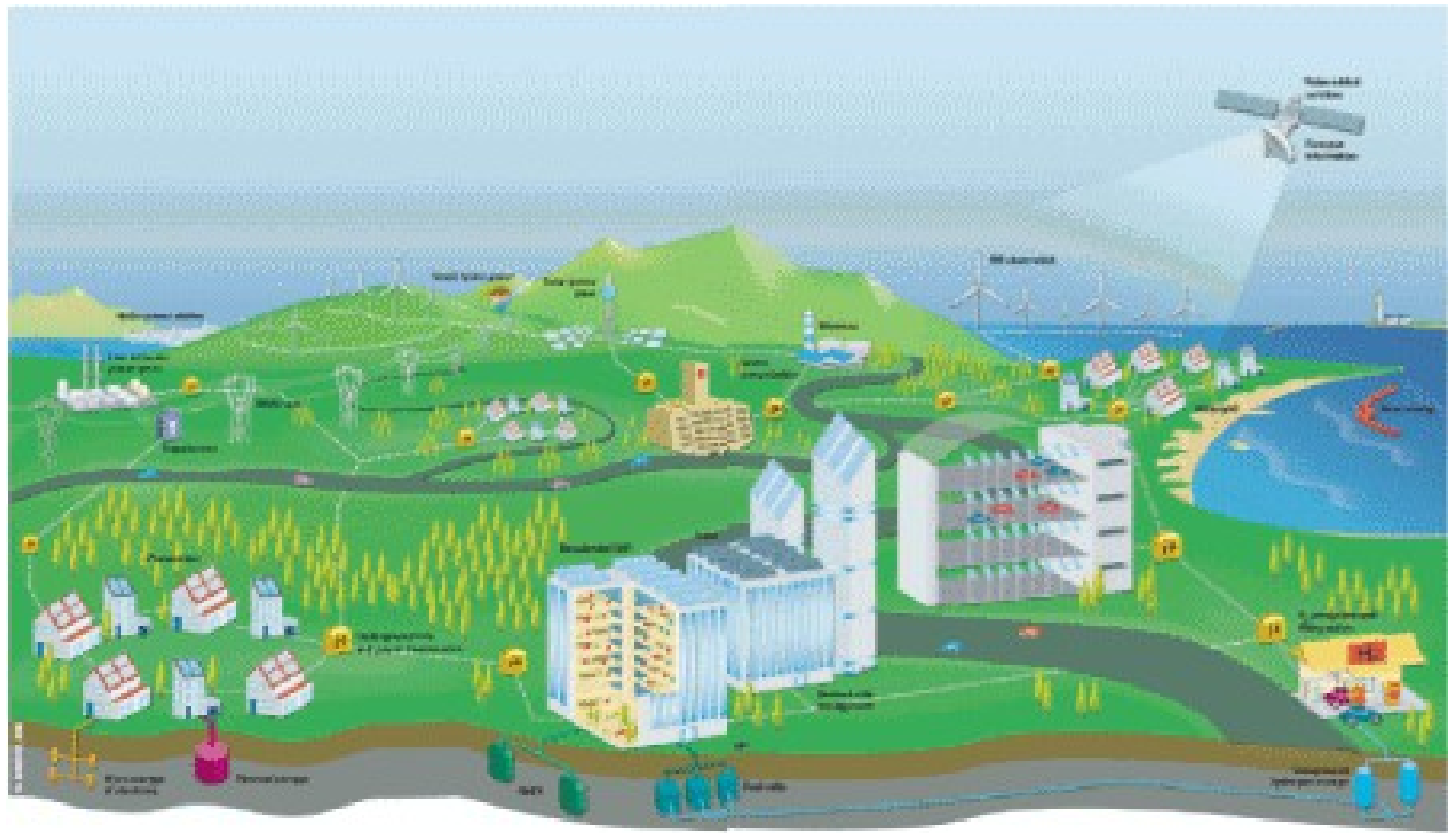


# Energy infrastructure



The three core activities described in the ProjectZero Masterplan 2029 and Roadmap 2015 are substantial energy efficiency measures, converting the energy supply to the areas own renewable sources and transforming the grid into a dynamic system, a so-called **Smart Grid**. This means that the infrastructure supplying and producing our energy must be replaced and new infrastructure built.

## Green District Heating

A mainstay in the ProjectZero Masterplan and the road to ZEROcarbon is green district heating. ProjectZero supports an expansion of existing district heating networks in the municipality and the conversion into green renewable sources.

[Read more about the world's best district heating here \(/energy-infrastructure/green-district-heating-2\)](/energy-infrastructure/green-district-heating-2)

## The answer is blowing in the wind

As fossil fuels become more and more scarce and energy prices are steadily increasing the energy system of the future will largely be based on electricity. Generating electricity for electrical cars, heat pumps, lighting, appliances, industrial processes and much more without using fossil fuels is a big challenge.

So far the cheapest and most effective way of producing CO<sub>2</sub>-neutral electricity is by using modern wind turbines. Turbines rated at 2,3 MW and above are now the standard and can supply more than 1.000 households with climate friendly power. The challenge lies in finding suitable places to install these massive structures.

In cooperation with the Danish Ministry of the Environment Sonderborg Municipality has screened the Sonderborg-area for possible new locations, a screening that has resulted in 7 new possible locations for new wind turbines.

Majority of windturbine-power is however expected to be produced coastal-near at the Lillegrund location, located north-east of the island of Als.

[Read more about ProjectZero's costal-near wind turbine activities here \(/energy-infrastructure/the-coastal-near-wind-turbine-park-2\)](/energy-infrastructure/the-coastal-near-wind-turbine-park-2).

## Biogas offers versatility from farming waste products

Biogas is a versatile energy source, having the potential to replace fossil fuels in transportation, district heating or industrial processes. ProjectZero works actively to establish two biogas facilities in the Sonderborg-area, processing more than 500.000 tons of substrate consisting of waste and manure from the farming community, organic industrial waste and much more. The biogas facility has the added advantage of providing a major reduction in the farming community's direct GHG emissions as well as providing better fertilizer and less dilution of unwanted components into the rivers, lakes and groundwater.

**A dynamical energy system – the Smart Grid**

The energy infrastructure requires a robust, yet flexible energy system that is able to incorporate and take full advantage of the many new renewable energy sources. Such a system is often called a Smart Grid and ProjectZero is working to establish a Smart Grid system in the Sonderborg-area. This requires new consumption habits, new technologies and new concepts and business models. It also means coming up with new ways of storing energy and new ways of generating energy at decentralized facilities. ProjectZero is a partner in the national CITIES research project focused on solutions and competencies for developing the future smart grid system. For more information click here: <http://www.sys.man.dtu.dk/Research/CCSD/Research-projects/CITIES> (<http://www.sys.man.dtu.dk/Research/CCSD/Research-projects/CITIES>)

**Storing energy in an underground balloon**

Two engineers from Sonderborg are developing an energy storage concept that can store excess energy from wind turbines and other RE sources. The concept is to pump water into a shallow water balloon, covering an area of 20 acres and putting 25 meters of sand on top providing counter pressure.

Instead of selling excess offshore wind energy cheaply abroad, the excess energy will be used to pump seawater into the balloon. When power consumption increases, the water balloon will be opened to reverse the process. The many tons of earth push the water through a turbine and generate electricity. An area of 20 acres will store 200 MWh with a capacity of 30 MW and be able to supply the entire island of Als with electricity for eight hours.

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