

EnergyRegion.NRW

The EnergyEconomy Cluster and its Networks



Energy and the Economy in North Rhine-Westphalia

North Rhine-Westphalia is an energy region with a tradition. Since industrialisation the provision and exploitation of energy have exercised a major influence on economic and social development here. North Rhine-Westphalia converts and consumes most energy in Germany and emits the largest quantity of CO₂. Almost 30 per cent of Germany's electricity is generated in North Rhine-Westphalia. Germany's biggest energy supply utilities are also based here. Furthermore there are numerous research institutions in North Rhine-Westphalia concerned with the conversion and use of energy.

North Rhine-Westphalia offers excellent conditions for implementing a sustainable energy and climate policy: it is home to global players, small and medium-sized companies and excellent research institutions in the field of the energy economy. They provide the state with a unique concentration of competencies for forward-looking solutions outstanding economic potential. After all, the development of environmentally friendly technologies for an increase in final energy efficiency, for the use of renewable energies and for the modernisation of conventional energy generation systems is not only essential in terms of climate and energy policy, but also an intelligent strategy in terms of industrial policy.

The North Rhine-Westphalian state government has therefore developed an energy and climate protection strategy with which it plays a pacemaker role in Germany in energy and climate policy and promotes the domestic

energy economy. The aim is to achieve a sustainably high growth rate with a simultaneous reduction of CO₂ emissions. For this purpose the state government's intentions are:

- a reduction in energy consumption,
- an expansion of the share of the energy supply accounted for by renewable energies,
- an increase primarily in the efficiency of the conversion of fossil fuels to electricity,
- research, development and market launch of the necessary technologies,
- a boost in international energy technology transfer.

Climate protection is a positive economic factor for the state and it should be exploited. This can only be achieved by a close and harmonised joint effort on the part of policy-makers, companies, research institutions and all social groups in North Rhine-Westphalia.

Innovation through co-operation

The state government has established the EnergyEconomy Cluster "EnergyRegion.NRW" within the framework of its cluster policy in order to implement the goals of its energy and climate policy. This cluster provides an umbrella for all the state's activities in the energy economy domain.

EnergyRegion.NRW stands for innovative power, tradition, independence and openness to technology. Through the Cluster it is intended invigorate the efforts to initiate new projects in the energy economy and bring them up

to market readiness in order to exploit the worldwide economic potential in this domain. The activities of the Cluster EnergyRegion.NRW therefore concentrate on speeding up processes of innovation and optimising the introduction of innovative products into the market. The innovative potentials that exist can be realised primarily by a greater networking of those involved – small and medium-sized companies, large companies and global players, major research institutions and political decision-makers – in clusters all along value chains.

Research and Development

To develop practice-based and application-oriented solutions for tomorrow's energy and climate protection challenges, the search institutions have to network more closely with the energy economy companies in North Rhine-Westphalia. The EnergyRegion.NRW provides a platform to enable them to do this. In addition there is a close collaboration with the EnergyResearchCluster.NRW (CEF.NRW), for example in network technology.

Small and Medium-sized Companies

In Cluster EnergyRegion.NRW small and medium-sized companies can network reliably in a way that is open to technology and involves no single industrial interests. The EnergyRegion.NRW offers small and medium-sized companies in North Rhine-Westphalia, among other things, cross-company projects, the linking of partners, and neutral, first-hand information from a single source.

Large Companies

By making intensive use of the structures of the EnergyRegion.NRW and networking with partners in the North Rhine-Westphalian energy economy, large companies gain a major advantage over their international competitors. Large companies profit in the EnergyRegion.NRW from co-operating with network partners to identify small, innovative companies, to extend the range of what they are offering and to regionalise their own performance competency.

Political Decision-makers

With a transparent and up-to-date transmission of information from authorities and political decision-makers to industrial companies, the location of North Rhine-Westphalia profits to a particular degree. The cluster management and networks of EnergyRegion.NRW act as an interface between the energy economy and people in North Rhine-Westphalia. The ways local authorities profit from

the EnergyRegion.NRW include a structural strengthening of the region, reinforcement of the economic performers' ties with the region and therefore an upgrading of their location.

The Cluster's Management

The state government of North Rhine-Westphalia has delegated responsibility for managing the Cluster EnergyRegion.NRW to the EnergyAgency.NRW with its Director Dr. Frank-Michael Baumann. The Cluster management's principal task is to network those involved in the energy economy throughout the value chain and to improve the exchange of information. Within the Cluster EnergyRegion.NRW, 3,300 companies and institutions, 64 universities, 107 institutes and 94 associations work together. There are a total of 5,200 individuals actively involved in the Cluster's working groups and networks.

The Networks

The Cluster EnergyRegion.NRW encompasses eight important forward-looking subject areas, each covered by a Network. When it comes to selecting topics and network activities, prime consideration is given to the furtherance of climate-friendly energy technologies and solutions. The Cluster is therefore also a major factor in the implementation of the energy and climate protection strategy of the North Rhine-Westphalian state government.

The Networks cover the following fields:

- Biomass
- Fuel Cells and Hydrogen
- Energy-efficient and Solar Construction
- Geothermal Energy
- Fuels and Engines of the Future
- Power Plant Technologies
- Photovoltaics
- Wind Power

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Photovoltaics Network

In North Rhine-Westphalia major elements of the photovoltaics value chain are already located at focal points in and around Gelsenkirchen and in the Aachen/Jülich/Cologne region. The photovoltaics industry in North Rhine-Westphalia is a world leader and its technologies are in demand worldwide. The Photovoltaics Network has set itself the goal of developing North Rhine-Westphalia into a solar region and of intensifying the collaboration between the bodies involved all along the value chain.

At present the Photovoltaics Network can boast 300 members from over 80 companies, 22 research and development institutions, as well as chambers and associations.

Sample Activities

The Marketing Campaign Photovoltaics NRW

The marketing campaign "Photovoltaics NRW – Solar Power for North Rhine-Westphalia" supports photovoltaic companies from North Rhine-Westphalia, their suppliers

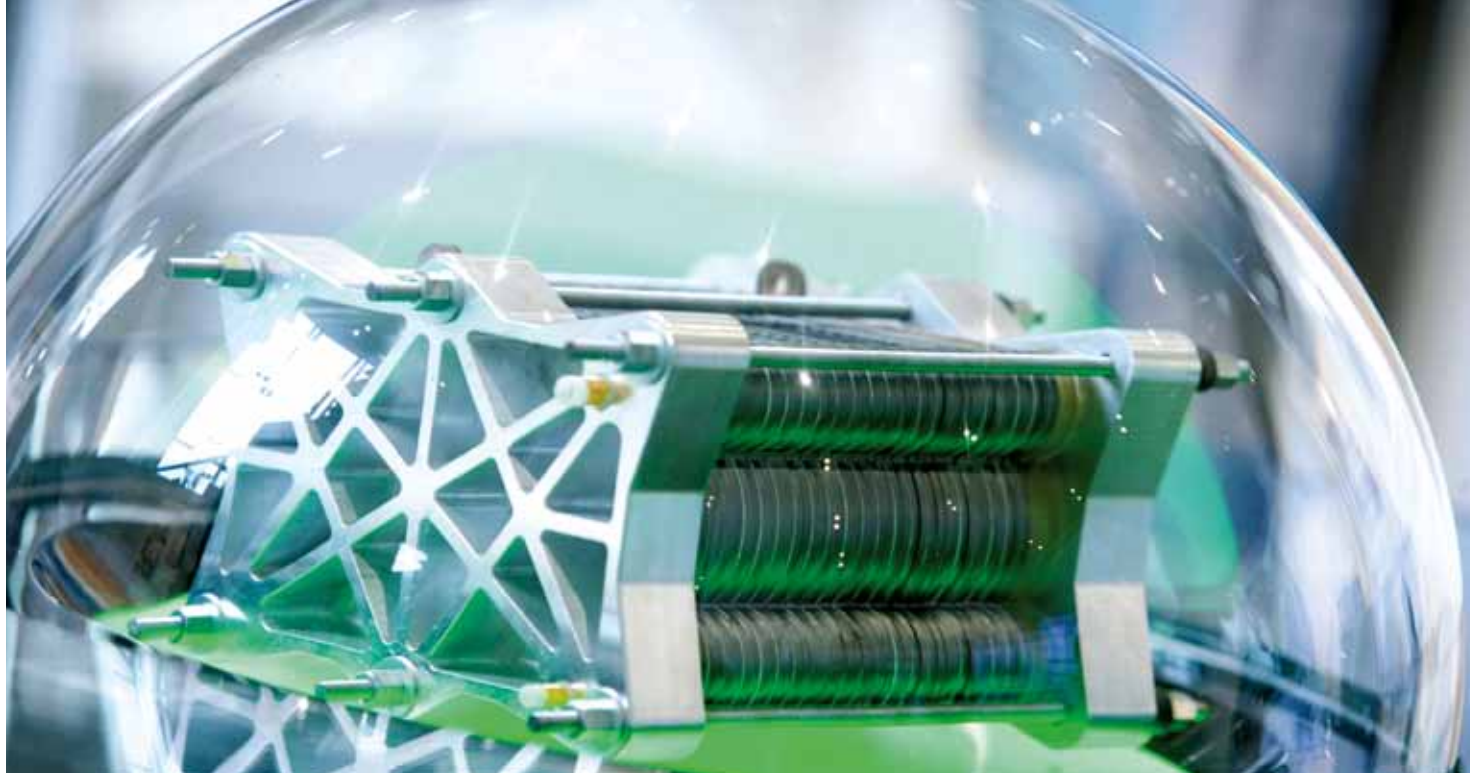
and scientific institutions by means of targeted marketing and PR activities. It provides information on photovoltaics as a climate-friendly power generation alternative and introduces the photovoltaics suppliers in your region to interested consumers. In this way the campaign intends to help secure and create future-oriented jobs in this field of innovation.

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Fuel Cell and Hydrogen Network

Hydrogen is seen as the fuel of the future. It is universally available, easy to transport, it can be stored and it's environmentally friendly. Fuel cells will play a major role as energy converter. They possess a high electrical efficiency, they can come in various forms according to the intended use and, apart from electricity, water and heat, they do not produce any emissions. Fuel cells can be used on a stationary or mobile basis. The aim of the Fuel Cell and Hydrogen Network is to develop fuel cells and system components suitable for fuel cells, and to advance them to the point where they can be introduced into the market. A further aim is to set up the H₂ infrastructure in North Rhine-Westphalia. Around 360 members from industry and science in North Rhine-Westphalia, and also from other federal states and abroad, belong to the Network. The Network is the largest of its kind in Europe and offers a series of services in the fields of project initiation, provision of information and communication, internationalisation, settlement and public relations.

Sample Activities

NRW Hydrogen HyWay

With the key project "NRW Hydrogen HyWay" the existing activities along the present 240 kilometre hydrogen pipeline and at other locations will be expanded and intensified between 2009 and 2011. Hydrogen as a by-product of industrial processes forms the starting point for initial applications and will be available in the medium term in sufficient quantities and under economically interesting conditions.

Articulated Bus with Fuel Cell Hybrid Engine

In a German-Dutch project an 18 metre long articulated bus with fuel cell engine is being developed. The 150 kilowatt fuel cell together with batteries and super capacitors will generate a drive power of 240 kilowatt, thus making possible a maximum speed of 70 km/h and range of 300 kilometres. The bus platform comes from the Netherlands, and the energy storage and management plus the hydrogen tanks come from North Rhine-Westphalia. The bus is to be put into service in the Cologne area and in Amsterdam.

HYCHAIN MINI-TRANS

The European joint project HYCHAIN MINI-TRANS, one of the key projects of the Directorate-General of Energy and Transport of the European Commission, includes a test of around 50 small and lightweight vehicles with fuel cell engines. It also includes setting up the hydrogen logistics in the four regions involved. More can be found at www.hychain.org

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Biomass Network

In the various value chains of solid, liquid and gaseous biomass numerous exciting and innovative projects are emerging in North Rhine-Westphalia. Their objective is the efficient generation of heat and power from natural resources.

In 2007 biomass was already contributing 40 per cent to the regeneratively generated power in North Rhine-Westphalia. In the field of regeneratively generated heat, the proportion of bioenergy was even 80 per cent. In view of the great significance of biomass in the regenerative energy mix, a new plan of action "Bioenergy.2020.NRW" was adopted in the summer of 2009. Under this plan the intention is for the generation of power and heat from biomass to achieve 17.8 billion kilowatt hours in 2020, more than double the present figure.

Sample Activities

Wood Pellets Campaign

Within the private-public partnership campaign, the Biomass Network works for the use of wood pellets in North Rhine-Westphalia. Thanks to a targeted programme of public information, the number of wood pellet heating systems installed in North Rhine-Westphalia has increased considerably over the past few years: the number of systems installed grew from 600 in 2003 to 10,000 at the beginning of 2009. Further details can be found at www.aktion-holzpellets.de

The future of Leppe :metabolon

:metabolon is a project within the Regionale 2010. The aim is to transform the previous waste disposal centre

Leppe to the east of Cologne into a learning and innovation location and a competence centre for material conversion (metabolims) and location-related environmental technology and techniques. Further details at www.bavweb.de

Decentralised utilisation of biogas in Steinfurt-Hollich

The "Kreishaus" (administrative centre) in Steinfurt has been supplied since spring 2006 with power and heat from a biogas-fuelled co-generation plant. The biogas from the biogas plant 3.5 kilometres away reaches the centrally located co-generation plant via an innovative biogas pipe. Further details at www.neue-energie-steinfurt.de

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Fuels and Engines of the Future Network

In the future mobility will require new fuels and new engine systems. North Rhine-Westphalia intends to exploit the existing resources in order to become an attractive and leading location for the development, manufacture, distribution and rational application of sustainable fuels and appropriate engines. This will also include the vigorous development of electric engines for motor vehicles. Alongside its energetic public relations work, the Network performs feasibility studies and initiates innovative projects. Furthermore the Network organises events and gives ongoing support as a co-operation partner. This has led to the forging of about 1,200 contacts to date with companies from the oil industry, the automobile industry, mechanical and plant engineering and biofuel agriculture.

Sample Activities

"NRW – Window on the World" for Sustainable Mobility Solutions in Conurbations

In the Rhine-Ruhr Region the Network will be used to present the advantages of synthetic fuels made from natural gas (GtL – Gas to Liquid). The high population density in the region means that it is an ideal location for the use of low-emission fuels and engines. The state of North Rhine-Westphalia supports the participating companies in researching the requisite technologies for clean bus fleets and taxis, for example.

UBA test vehicles – Project with the Institute for Motor Vehicles, Aachen (IKA)

The potential for increasing the efficiency of cars was examined in a study commissioned by the Federal Environment Department (UBA). In a volume model with

economical petrol engine and above-average mileages it was possible to cut CO₂ emissions by 24 per cent by such measures as a long transmission ratio, gear change indicator, automatic start/stop function, heat accumulator, mirror replacement system, light-running tyres, lightweight components and light-running oils.

REGIONOL – A Regional Bioethanol Project

In the Münsterland region a complete, regional value chain for bioethanol has been set up under the name REGIONOL, from production to marketing. The decentralised crude alcohol production links distilleries with biogas installations or straw heating systems and helps create an energy and greenhouse gas balance which is comparable with that of Brazilian ethanol.

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Energy-efficient and Solar Construction Network

In Germany 30 per cent of the final energy is needed for heating and the hot water supply of buildings. For North Rhine-Westphalia, the most densely populated state in Germany, the buildings domain is therefore of great importance. By applying innovative technologies and measures it is possible here to substantially increase energy efficiency. The Energy-efficient and Solar Construction Network fulfils an important cross-sectional function in that a wide range of renewable energies and state-of-the-art efficiency technologies are used in the area of innovative construction projects. Through the working groups and the numerous solar housing estate projects, more than 600 architects, engineers and representative of the housing industry, of local authorities and plant manufacturers from North Rhine-Westphalia are involved in the Network's activities.

Sample Projects

Commercial Buildings: "etrium"

Passive House Office Building

The "etrium" office building erected at the end of 2008 in Cologne has an annual heating energy requirement of only 11 kilowatt hours per square metre and thus needs only about one fifth of the heating energy of a conventional office building. This is made possible by excellent heat insulation and a ventilation system with heat recovery. The heat requirement is covered by a groundwater heat pump. On the roof a photovoltaic facility (32 kWp) and solar panels have been installed to supply hot water. Further details at www.etrium.de

Residential Building: New Construction

"Solar Estate Düsseldorf, MediaHarbour"

Rheinwohnungsbau has constructed a building with about 100 apartments, office space and two shops to the three-

litre standard, with ventilation systems and heat recovery. In the office and commercial buildings, a geothermal probe system supports the heating and, in summer, the cooling. About half the hot water required is supplied by a 260 square metre solar array.

Residential building: Remediation

"Solar Estate Gelsenkirchen-Lindenhof"

In Gelsenkirchen-Lindenhof, a residential estate from the 1950s has been remediated to create a solar estate with 220 dwellings. Through comprehensive insulation measures, the thermal heating requirement was reduced from 300 to 65 kilowatt hours per square metre. Solar panels cover 60 per cent of the hot water requirement and support the heating. It was possible to reduce CO₂ emissions by approx. 85 per cent by these measures.

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Geothermal Energy Network

Geothermal energy is an almost inexhaustible source for heating buildings and generating power. The technical possibilities for exploiting geothermal heat range from the supply of individual single-family houses by means of near-surface geothermal heat through to the use of temperatures substantially above 100° C from depths down to 5,000 metres to supply large energy customers with heat and power from deep geothermics. In North Rhine-Westphalia alone more than 70,000 heat pumps are currently in service to heat and cool buildings (as at the end of 2009). The number is due to rise to more than 200,000 heat pumps by 2020.

Some of the most important participants in the geothermics market are based in North Rhine-Westphalia and, in collaboration with the North Rhine-Westphalian universities and colleges, they set new standards in the manufacture and development of this innovative technology. The activities in this field are brought together by the Office for Geothermal Energy of the EnergyAgency.NRW in Bochum. The basis for future network activities is provided by the existing Geothermal Energy Working Group, which has about 520 members. The membership includes both companies and institutions from science and public administration in North Rhine-Westphalia.

Sample Activities

The Heat Pumps Market Place NRW

Marketing Campaign

The Heat Pumps Market Place NRW was established in Düsseldorf in 2001 with a view to the greater use of near-surface geothermal energy. Its task is to provide independent information to end customers and to raise the general awareness of heat pump technology. A number of brochures have already been published on the subject.

Up-to-date information and event notices can be found at www.waermepumpen-marktplatz-nrw.de

Geothermal Energy Value Chain

As an energy source, heat from the ground offers opportunities for economic growth and employment in North Rhine-Westphalia, and in particular the Ruhr Region – the leading location in Europe for energy and mining technologies. Within this study all the technologies, products and services were determined, described, linked in logical sequence and illustrated in graphic form in order to establish the structure of the geothermal energy value chain. Further information can be found at www.geothermie-zentrum.de

Potential Study on Geothermal Energy

To gain an accurate overview of the possibilities for the utilisation of near-surface and deep geothermics, the Geological Service of the state of North Rhine-Westphalia has prepared potential studies for North Rhine-Westphalia. Further information on the Internet at www.gd.nrw.de

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Power Plant Technology

Climate change, the continuing rise in energy demand and the need to replace older installations are major challenges for the power plant industry. With this in mind, more than 800 experts – in the Power Plant Technology Network – are working in two working groups and a number of working parties on advanced power plant technologies, such as the 700° C power plant and low-CO₂ power plant approaches, such as carbon capture storage (CCS) and solar thermal power plants. The aim is to optimise power plant technology further, to forge ahead with the construction and operation of high-efficiency and environmentally sound power plants, and to adjust them flexibly and efficiently to meet the requirements in the energy mix of the future.

Sample Activities

Analysis for the retrofitting of coal-fired power plants with CO₂ retention

Existing conventional power plants can reduce their CO₂ emissions through retrofitting with a CO₂ retention system. The aim of the project undertaken by ef.Ruhr Energieforschung is to show how CO₂ flue gas scrubbing can be integrated in an existing power plant process.

Development of fluidised bed drying with heat recovery for the drying of brown coal

A key technology for CO₂ reduction and efficiency improvement in brown-coal-fired power plants is fluidised bed drying with internal utilisation of waste heat. The technology developed by RWE appreciably increases the efficiency of brown-coal-fired power plants. This means a reduction of CO₂ emissions by 10 per cent.

NRWPP700 – CO₂ reduction by high-efficiency power plant technology

The internationally sponsored pre-engineering study NRWPP700, coordinated by VGB PowerTech, is directly based on the "Reference Power Plant NRW" and the world's largest component testing facility COMTES700 in Gelsenkirchen. NRWPP700 is the first stage for the construction of a highly efficient, low-emission 700° C power plant.

Potential Study on Power-Heat Co-generation in North Rhine-Westphalia

The declared goal of the North Rhine-Westphalian state government is to double the share of power generation accounted for by the co-generation of power and heat to 25 per cent. In a potential study, with accompanying support from the Network, the technological and economic potentials of co-generation in North Rhine-Westphalia are determined.

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Wind Power Network

By the end of 2008, there was an installed output in wind turbines of almost 23,900 MW in Germany. Among the federal states, North Rhine-Westphalia shares fourth place with Schleswig-Holstein, with an 11 per cent share of installed output. But the wind power industry does not only play an important role regionally; the export of technology is also a major topic. Worldwide one in two gear-boxes used in a wind turbine comes from North Rhine-Westphalia. For North Rhine-Westphalia the development and use of innovative wind power technologies are a major growth and economic factor – and a big step in the direction of climate protection and less energy dependence. The Wind Power Network is currently being built up. The aim is to include all important technological and sector-based fields in the development and use of state-of-the-art technologies. This includes in particular mechanical engineering, electrical engineering and materials. The "Wind" working group involves more than 300 component manufacturers, plant servicing companies, project developers and planners, engineers and representatives of plant manufacturers and licensing authorities from North Rhine-Westphalia in the Network's activities.

Sample Activities

Wind Round Table NRW

In order to network the wind power sector in NRW, Wind Round Tables are held twice a year. Those taking part share information and listen to a specialist address on new technologies, new participants in the sector or on changes and developments in legislation and politics. The Wind Round Table is organised by leading firms from the sector, the regional section of the Sector Association in the Rhineland and the Network.

Wind Power Technology Competence Centre

The Wind Power Technology Competence Centre is a pool of component suppliers, testing providers, wind park operators, universities and institutes. Its aim is to tackle the new challenges in the field of mechanical engineering and construction and of testing services in relation to offshore deployment. The Region West, with its focus in NRW and adjacent states, possesses the country's best structures and qualities for this purpose. With the expertise from the wind turbine test field for inland states in Grevenbroich and other large-scale testing facilities in the region, both the largest inland test field and all the know-how gained from testing are available.

WIND Supply Pool Office in Philadelphia

In a partnership with the US State of Pennsylvania, a Pool Office for small- and medium-scale industry is being developed to help firms from North Rhine-Westphalia and the rest of Germany to gain a foothold in one of the largest export markets. The project is organised by private industry.

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Exzellenz NRW

Excellence NRW stands for the cluster strategy at the industrial and innovative location of North Rhine-Westphalia. The state government intends to reinforce strengths and systematically expands the features of excellence in North Rhine-Westphalia. The aims of the cluster policy are to create a favourable environment for innovations which will boost the competitiveness of industry and stimulate growth and employment. You can learn more about the state's cluster strategy and the 16 clusters in North Rhine-Westphalia at www.exzellenz.nrw.de

Picture sources

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