STATES & REGIONS

The **Energy Transition Platform** was launched by The Climate Group, alongside the initiative's lead government, North Rhine-Westphalia, and Stiftung Mercator in early 2016. The global initiative supports highly industrialized, carbon-intensive state and regional governments in developing and implementing innovative clean energy policies to accelerate the low carbon transition. The Energy Transition Platform is part of the States & Regions Policy Innovation program.

The Climate Group brings together state and regional government leaders from around the world to form the **States & Regions Alliance** – a powerful, high-profile network that shares expertise, demonstrates impact and influences the international climate dialogue. Our 35 members represent some of the most economically powerful regions in the world and include governments from across Europe, the Americas, South Asia, Australia and Africa, collectively accounting for over 354 million citizens and 12% of global GDP.

AN INDUSTRIAL REGION IN TRANSITION

ENERGY AND CLIMATE POLICY IN NORTH RHINE-WESTPHALIA

MAY 2016

Tackling climate change on a global scale requires economies to adopt low carbon energy systems – and to do so quickly. Some of the largest potential emissions cuts can only happen through policies developed and implemented by state and regional governments. Many states and regions are already implementing forward-thinking climate and energy policies that are shaping the world's future policy landscape. They play a crucial role in helping to deliver the greenhouse gas (GHG) reductions needed at the same time as responding to growing global demand for energy.

This briefing paper looks at energy transition policies and models in the German state of North Rhine-Westphalia. It forms part of a series of briefings on clean energy policies of state and regional governments. The briefing was written by the Wuppertal Insitute and summarizes the main findings of their research on the North Rhine-Westpalian energy transition experience. The full research report is available in German at TheClimateGroup.org.

North Rhine-Westphalia produces a third of Germany's energy and contributes over 30% of its GHG emissions. The state provides a good example of how the energy transition can work, as well as some common challenges that governments are facing. The Government of North Rhine-Westphalia is a member of The Climate Group States &

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Regions Alliance and is the lead government of the Energy Transition Platform, an initiative supporting highly industrialized, carbon intensive state and regional governments in developing and implementing innovative clean energy policies to accelerate the low carbon transition.

From May 2016 to December 2017, the partner regions of the Energy Transition Platform – Alberta, the Basque Country, California, Hauts-de-France, Lombardy, Minnesota, North Rhine-Westphalia, Silesia, South Australia, Upper Austria and Wales – will work together to speed up the energy transition through in-depth global peer learning on energy transition experiences around the world and overcoming barriers for adopting innovative clean energy models. Innovative clean energy policies and successful tools will be shared publicly throughout the project.

1. THE ENERGY AND CLIMATE POLICY CONTEXT IN NORTH RHINE-WESTPHALIA

The state of North Rhine-Westphalia is vital to the success of Germany's energy transition. It is responsible for a significant proportion of Germany's energy production, industrial productivity and energy consumption.

With around 17.5 million inhabitants, around a fifth of the German population lives in North Rhine-Westphalia – it has the largest population of the country's federal states. It is a diverse state with urban metropolitan areas such as Cologne, Düsseldorf and the Ruhr Area, as well as very rural areas such as Münsterland and Sauerland.

North Rhine-Westphalia is home to a range of energy-intensive industries, including metal production, basic chemicals, non-ferrous metals and paper. Its level of industrial production is above average compared with other German states. It is Germany's most important region for mining and its largest generator of electricity. Black coal deposits in the Ruhr Area, opencast lignite mines in the Rhine mining region and relatively cheap electricity supplies have contributed to a strong infrastructure for industry and manufacturing.

Changes in the energy sector and energy-intensive industries

The traditionally industrial regions of North Rhine-Westphalia are experiencing significant changes. Black coal extraction has been in decline for decades and the state's remaining black coal mines will close by 2018. The state government has decided that the opencast lignite mines in the Rhine region will stay open until at least 2030, but the possibility of abandoning coal mining for electricity generation is gaining public support at a national level.

The decline in black coal mining, along with increasing international competition, has led to a widespread decline in North Rhine-Westphalia's manufacturing sector and energy-intensive industries. In 1991, the state had around 3 million people employed in manufacturing. By 2013 the figure had dropped to around 2 million people. Over the same period, the number of people employed in the services sector rose from 1.8 million to around 6.8 million.[1]

This development has led to strong structural changes in the traditionally industrial parts of North Rhine-Westphalia. The region's industries have had to modernize to stay competitive, for example by developing energy efficient processes and innovative product lines.

Power generation and consumption

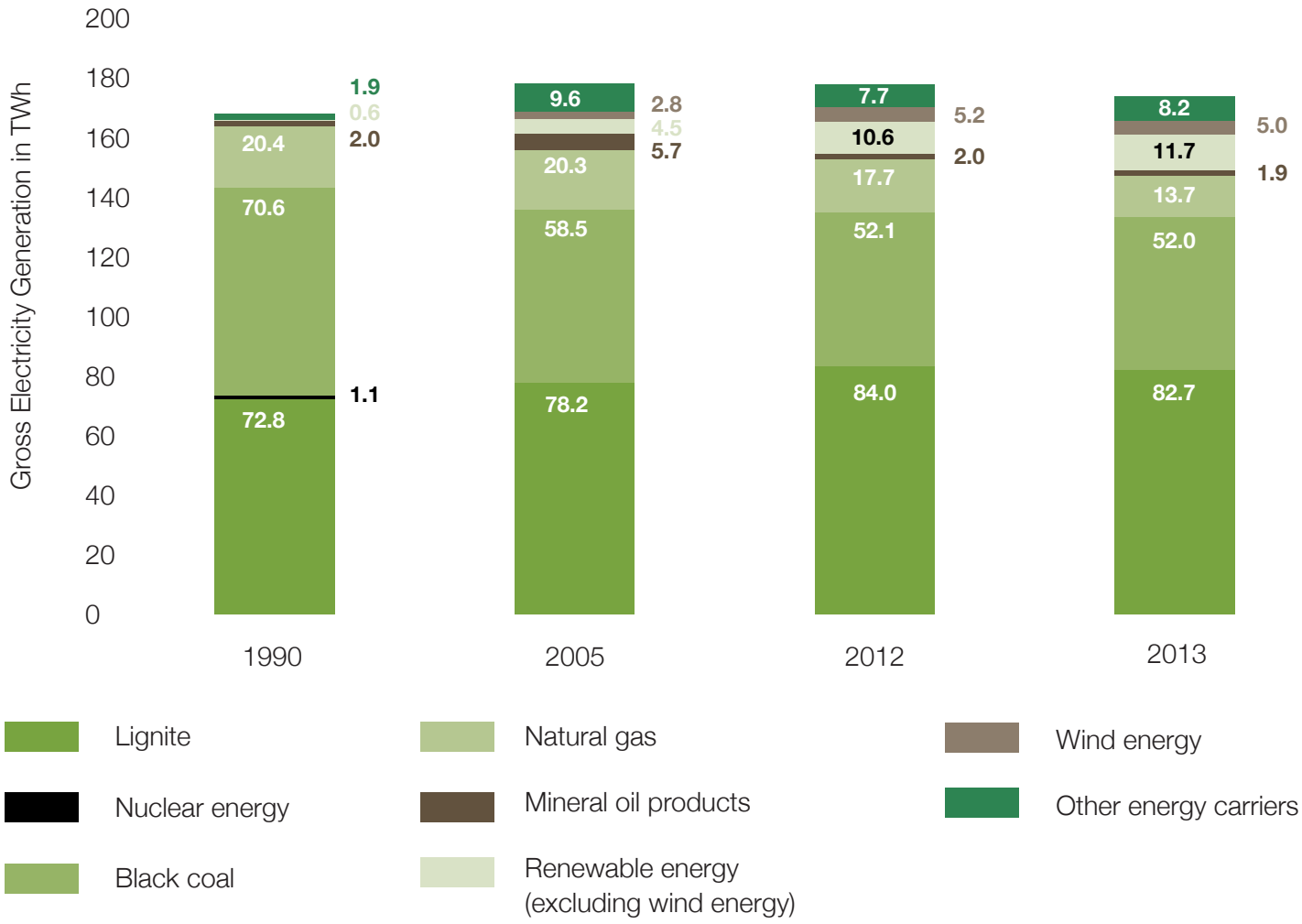
Since the liberalization of the German energy market in the late 1990s, consumers have been free to choose their electricity supplier. The market is dominated by four large power supply companies: E.On, RWE, EnBW and Vattenfall. There are a wide range of additional suppliers, including public utilities and specialist renewable energy providers that are independent of the large power companies. To avoid market distortions, there is a clear organizational separation between electricity generation and power grid operation. Grid access and grid fees are regulated by the Bundesnetzagentur (Federal Grid Agency).

With a high concentration of energy-intensive companies, North Rhine-Westphalia accounts for around 40% of Germany's power consumption. It is the most important location for major power plants. But since 2005, the state has successfully reduced the amount of energy used in the manufacturing sector, including energy-intensive industries, as well the energy used by households and small consumers. Over the same period, the transport sector has seen only a slight reduction in energy consumption.[2]

In 2013, around one-third of the electricity generated in Germany came from North Rhine-Westphalia. About 85% of this electricity came from fossil energy sources, with black coal and lignite making up 77%. The share of renewable energy was about 10%.[3]

1 Federal Statistical Office and the Statistical Offices of the States 2016.
2 IT.NRW 2013.
3 MKULNV and IWR 2016.

FIGURE 1: GROSS ELECTRICITY GENERATION IN NORTH RHINE-WESTPHALIA BY ENERGY SOURCE



Source: MKULNV and IWR 2016

Tackling greenhouse gas emissions

In 2013, North Rhine-Westphalia emitted around 300 million tonnes of greenhouse gas (GHG) emissions – 35% of Germany's total. This is around 60 million tonnes less than it produced in 1990 and around 36 million tonnes less than 2005. Most of the reductions were achieved before 2010 and can be attributed to the declining black coal mining industry. Fugitive emissions from the opening of mines and from the storage and transportation of energy sources have fallen sharply in the state since 1990.

Since 2010 and particularly since the end of the economic crisis in Germany, there has been no clear downward trend in overall emissions in North Rhine-Westphalia. But there have been changes in the proportion of emissions from different sources. Emissions from the energy conversion sector – power plants, coking plants and refineries – made up 45% of the total emissions in 1990, but over 50% in 2010. In the same period, GHG emissions from the industrial sector fell from 24% to 18%. In absolute terms, there was only a slight drop in GHG emissions from the energy conversion sector, while the industrial sector experienced a fall of over 20%. These unequal developments are explained by energy efficiency improvements in the industrial sector and the below-average performance of some energy-intensive industries, such as aluminum.

The electricity sector has increased energy efficiency and the use of renewable energy, and there has been a drop in the overall demand for electricity in the state. But at the same time, more lignite is being used for electricity generation, particularly at the expense of natural gas. The reasons for this include the surplus of emissions allowances in the EU Emissions Trading System, which make lignite a more cost-effective option than natural gas.

CO_2 emissions from electricity generation in North Rhine-Westphalia have fallen since 1995, but the absolute volume of emissions has gone down by just 5 million tonnes. Despite less domestic demand for electricity, electricity generation has decreased only slightly compared with 2010. The proportion of the state's electricity exports has risen sharply since 2009, reaching approximately 18% in 2012.[4]

Although North Rhine-Westphalia has significantly cut GHG emissions over the last 25 years, the pace of change has slowed in recent years. The state government has a target of reducing GHG emissions by at least 25% by 2020, taking the 1990 levels as a baseline. The government must speed up the pace of change if it is to reach this target. One way to do this is by working with other industrial regions, through initiatives like the Energy Transition Platform.

4 IT.NRW, various years.

2. NORTH RHINE-WESTPHALIA'S ENERGY AND CLIMATE POLICY TARGETS AND OPTIONS

Setting ambitious energy and climate policy targets

North Rhine-Westphalia's role in power generation and as an industrial region creates challenges for moving to a low carbon energy system, but the state government is working towards ambitious and legally binding climate protection targets. These targets are:

- reducing GHG emissions by at least 25% by 2020 and at least 80% by 2050, compared with 1990 levels;
- increasing the proportion of electricity generated by wind power to at least 15% by 2020; and
- increasing the proportion of electricity generated by combined heat and power generation (CHP, also known as cogeneration) to 25%, compared with 13% today.

INDUSTRY IS SEEN NOT AS PART OF THE PROBLEM, BUT AS PART OF THE SOLUTION.

The state government has developed a range of energy and climate policy tools and programs, as well as processes for consultation and discussion, to help it meet these targets. It wants climate protection to drive technological progress and help strengthen its international role in energy and industrial production, at the same time as speeding up ecological progress on a local and global level building on its traditional strengths. Industry is seen not as part of the problem, but as part of the solution.

FIGURE 2: CENTRAL ENERGY AND CLIMATE POLICY MEASURES OF THE NORTH RHINE-WESTPHALIA STATE GOVERNMENT SINCE 2010

2011

KlimaschutzStartProgramm (Climate Protection Start Program)

22 single measures for improving climate protection, including:

- Climate Package for Municipalities: consultation, capacity building and support programs
- Specialized Support Program: energy efficient construction and housing for existing and new buildings
- Energy-saving initiative for low-income households: energy-related advice and good practice projects
- Expansion of combined heat and power (CHP) as major bridging technology
- Support for improving energy and resource efficiency in companies

2011

Wind energy decree (part of KlimaschutzStartProgramm)

- New design of legal framework for wind energy
- Elimination of barriers for planning and approval
- Decree was amended in 2015 as increasing number of wind power plants have led to new legal and planning challenges

2012

Environmental Business Strategy NRW

- Since 2012 planning and implementation of several instruments and measures specifically supporting a strong and vivid environmental economy in NRW
- Objective: Strengthening competitiveness of companies and contributing to climate and environmental protection
- Core element: Environmental business report (first report published in August 2015 veröffentlicht)

2013

Climate Protection Act NRW

- First climate protection law of a large federal state in Germany
- Includes legally binding climate targets of NRW, especially for GHG mitigation of at least 25% by 2020 and at least 80% by 2050 compared to1990 levels

2014

Klima.Expo.NRW

- Duration: 2014 - 2022
- Hosting of events in NRW which present and explain successful climate protection projects to a broad audience
- Objective: Showcasing benefits of an ecologically-driven modernisation of NRW‘s economy for business, science and the public, mobilising further support for climate protection

2015

Climate Protection Plan NRW

- ‘Roadmap’ for achieving mitigation target‘s in NRW‘s Climate Protection Act
- Content: General strategies and specific measures for mitigation GHG emissions and adapting to the consequences of climate change

Source: Own research

The current state government has set up a series of measures for reducing GHG emissions since its inauguration in 2010. These measures include a Climate Protection Act – the first of its kind in Germany – and a Climate Protection Plan.

The role of state governments in the energy transition

The German federal states including North Rhine-Westphalia are (indirectly) subject to EU-wide regulations like the emissions trading system, as well as national regulations such as the German Renewable Energies Act and the German Cogeneration Act. Below state level, municipal administrations are responsible for areas such as land use planning, where state policy cannot interfere at all, or has only an indirect influence.

State governments have an important role in the implementation of European and national measures and can set some of their own priorities. They can guide and support municipal administrations and districts to develop and implement climate policy measures. As an important link between the German Government and the municipal administrations, they are in a position to influence the energy transition. State governments can be seen as the 'active forces' of German energy and climate policy. Without them, the energy transition cannot succeed.

The North Rhine-Westphalia Government is responsible for financial measures including subsidy programs for energy efficiency and renewable energy; information and advice services; and legal tools such as decrees and administrative regulations. Federal state governments have some flexibility about how they implement nationally-set laws. They can also influence national energy and climate policy strategies at the Bundesrat – the Federal Council of German state governments. An example of this is the setting of tax incentives for energy efficient refurbishment of buildings.

State governments can influence climate protection at the municipal level, for example through the use of decrees that make recommendations for municipal land use planning. In North Rhine-Westphalia, the Wind Energy Decree removed minimum distance regulations and other obstacles to the expansion of wind energy. The North Rhine-Westphalia Government also supports municipal administrations through financial subsidies for climate protection activities, plus information, advice and networking services.

The next section takes a more detailed look at energy and climate policy in North Rhine-Westphalia.

3. A PIONEERING APPROACH TO ENERGY AND CLIMATE POLICY

North Rhine-Westphalia's energy and climate policy can be seen as pioneering within Germany and more widely in Europe, particularly in the context of the challenges attributed to its role as a highly industrialized region.

Climate Protection Act: Legally-binding targets for climate protection

In February 2013, North Rhine-Westphalia became the first German federal state to pass a climate protection law. The Climate Protection Act sets legally binding climate targets which mean that by 2025, GHG emissions must be at least 25% lower than 1990 levels and at least 80% lower by 2050.

At a first glance, North Rhine-Westphalia's 2020 target seems to be less ambitious than the 40% one set by the German Government for the same time period, but 25% is seen as realistic and challenging enough given the state's economic structure. The Climate Protection Act also commits the North Rhine-Westphalia Government administration to becoming climate-neutral by 2030.

The Climate Protection Act does not dictate how climate targets will be achieved – the state government left this open to promote discussion and the adoption of innovative measures that would feed into a separate Climate Protection Plan.

Climate Protection Plan: Developing plans through a participatory process

The North Rhine-Westphalia Climate Protection Plan was approved by the Landtag (State Parliament) in December 2015. The Climate Protection Act specified that the Climate Protection Plan should be developed with the involvement of a wide range of stakeholders, and that it must include specific measures for climate mitigation and adaptation, as well as interim GHG emission reductions targets for each economic sector. The aim is to update the plan every 5 years.

The Climate Protection Plan contains 154 measures for climate mitigation and a further 66 for climate adaptation. Developing the plan took around 2 years and involved gathering ideas and proposals from 400 stakeholders from politics, business and civil society. Work on writing the plan did not start until the end of the participatory process, which meant that stakeholder groups were able to have a strong influence on its content.

The consultation process involved six working groups covering all sectors of the economy. Figure 3 shows the phases and the work structure used in the participation process for the Climate Protection Plan.

Each group discussed long-term climate strategies, including the use of different technologies and their contribution to the fight against climate change. Group members worked together to define GHG reduction scenarios that could form the basis of potential future developments. Each scenario model was supported with scientific research, to analyze the effect that each strategy would have on emissions. The working groups then went on to propose possible measures, such as subsidy programs, legislation initiatives and information services. Discussion and informal votes were used to determine the level of support and interest for each measure and identify any conflicts that could arise.

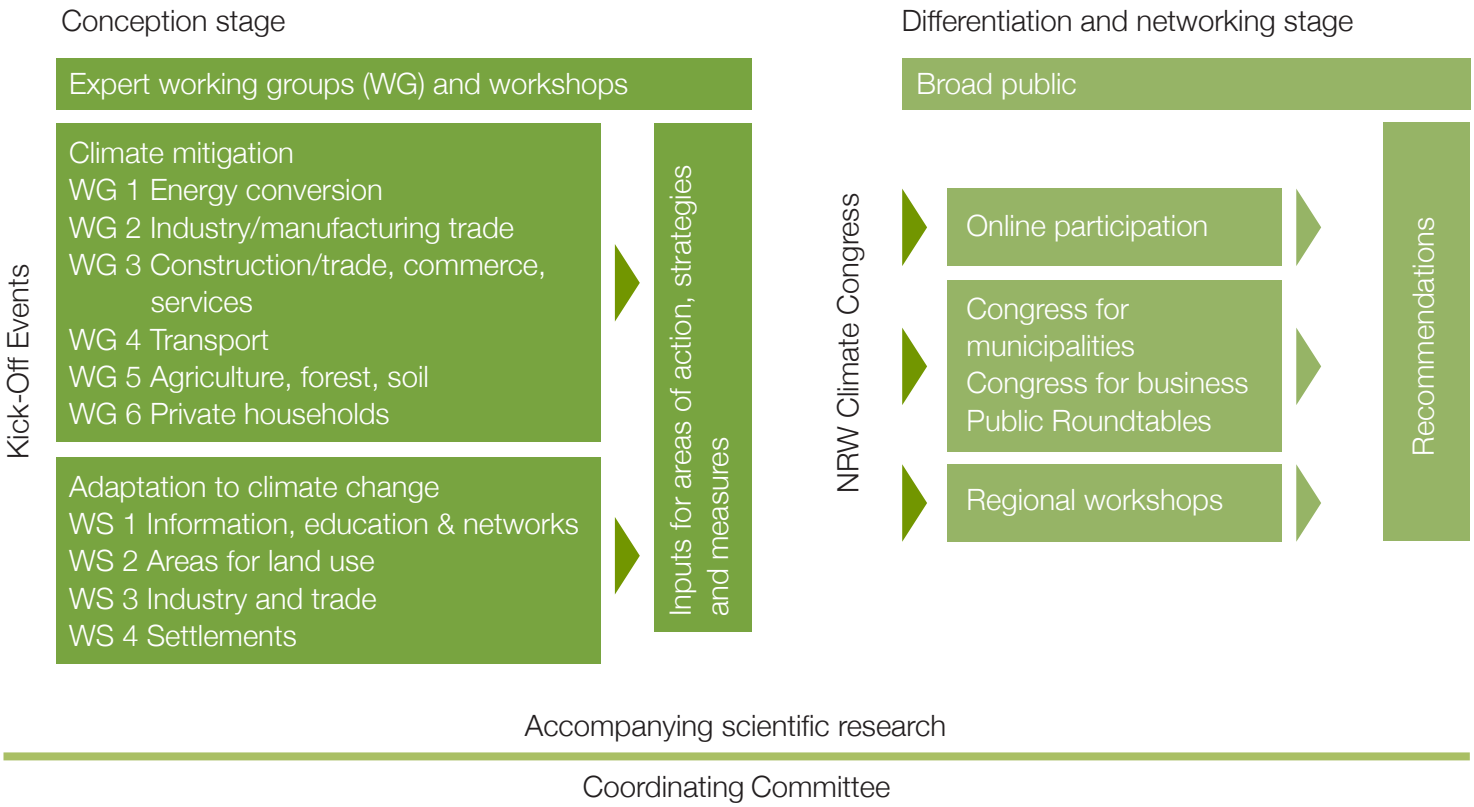
The process led to around 400 proposed actions, which the project team and state government went on to discuss at a series of workshops. They also used online tools to gather feedback from the general public.

A number of factors contributed to the success of the consultation process:

- using the shared framework of the legally-binding targets set in the Climate Protection Act as the starting point for the discussions
- allowing enough time and flexibility to examine the impact on individual industries and on different stakeholders
- jointly developed scenarios, which helped to keep discussions impartial
- working in a transparent way, with the full minutes of meetings and other important documents made available to the public as quickly as possible – this was important to stakeholders
- linking to the supporting scientific research throughout the consultation process
- coordinating and involving relevant state government departments, for example through inter-ministerial working groups, to support a consistent approach to working with stakeholders.

The effects of the participation process for the Climate Protection Plan were felt far beyond the borders of the state. The German Government and the federal states of Rhineland-Palatinate and Berlin all went on to establish climate protection concepts and plans with the support of participation processes. The experience of North Rhine-Westphalia helped to shape the approach to consultation used in Rhineland-Palatinate and at the national level in particular.

FIGURE 3: OVERVIEW OF THE PROCEDURE AND STRUCTURING OF THE PARTICIPATION PROCESS FOR THE CLIMATE PROTECTION PLAN



Source: MKULNV 2015

EnergieAgentur.NRW: connecting politics, business and society

The EnergieAgentur.NRW provides information and advice services to municipal administrations, businesses involved in energy generation and end consumers. It is organized as a private company and acts as a service provider on behalf of the North Rhine-Westphalia Government. It offers specialist expertise in areas including renewable energy, energy efficiency, power grids and storage and power plant technology. It creates a valuable link between the state, municipalities, energy companies and consumers.

The agency's services include support with projects such as designing and financing of renewable energy systems, and promoting collaboration between companies and scientists through expert networks.

The EnergieAgentur.NRW is regarded as an expert and reliable partner to work with on energy-related projects, with high levels of technical expertise and the ability to mediate between politicians, businesses and scientists. It has become a central point of contact for the key actors of North Rhine-Westphalia's energy and climate policy, particularly when it comes to implementing climate protection measures.

KlimaschutzStartProgramm: focusing on wind energy and combined heat and power generation

The North Rhine-Westphalia Government launched its KlimaschutzStartProgramm (Climate Protection Start Program) in 2011, with the aim of implementing a series of climate mitigation measures before the Climate Protection Act and Climate Protection Plan were in place.

The program contains a package of measures targeting private households, municipal administrations, businesses and other stakeholder groups. The measures cover 10 topics, including climate protection for municipal administrations; climate-friendly construction and homes; initiatives for wind energy and combined heat and power generation; and taking the first steps towards a climate-neutral state administration.

Promoting wind energy developments

The Wind Energy Decree is one of the main elements of the KlimaschutzStartProgramm. In 2011, the North Rhine-Westphalia Government used the Wind Energy Decree to overhaul the legal framework for the expansion of wind energy in the state. As a result, the capacity of wind turbines installed in North Rhine-Westphalia grew from around 150 MW in 2011 to around 300 MW in 2014, and around 422 MW in 2015.[5] These developments led to new planning and legal challenges, as well as an amendment to the Wind Energy Decree in November 2015.

The Wind Energy Decree and its amendment removed restrictive minimum distance regulations for wind turbines, making it easier for new facilities to be constructed. The amended decree also clarified details on the need for environmental assessments; the system for categorizing land according to how difficult it is to obtain development permission; and the methods used in public consultation processes. The decrees provide municipal administrations with valuable help with securing permits for wind turbines.

Expanding combined heat and power generation

The expansion of combined heat and power (CHP) is another important part of the KlimaschutzStartProgramm. The North Rhine-Westphalia Government sees CHP as central to its energy transition and climate protection goals. After commissioning a comprehensive study on the realistic economic potential for CHP in the state, the North Rhine-Westphalia Government set up a 'CHP impulse program' with funding of €250 million.

The CHP program offers advisory tools alongside subsidy and financing options for research and development projects, scientific studies and municipal activities. It aims to expand and consolidate the existing district heat network; promote service connections and outfeed stations for buildings; and subsidize decentralized CHP systems for low-income households and for trade and industry. The program is supplemented by incentives and support options for municipal administrations such as the development of a 'CHP control center' providing information and advice to municipalities.

5 LANUV 2014; MKULNV and MBWSV 2015.

The EnergieAgentur.NRW also offers information and advice on individual subsidy tools through a website focusing on CHP in North Rhine-Westphalia.[6] This website is part of the agency's information and networking campaign, under the heading 'CHP. NRW – Power meets heat'. The campaign aims to bring together stakeholders from businesses, science and civil society, to share and collaborate on CHP activities.

Energy transition in the building and construction sector

Around 40% of energy in Germany is used in the buildings sector. As a particularly densely populated state, this is significant for North Rhine-Westphalia in terms of energy transition and climate. Due to the political framework at EU and national level, the state government's work in the buildings sector focuses mostly on information, advice and fiscal tools. The Government is aiming at: increasing the rate and intensity of renovations, increasing the proportion of renewable energy in the buildings sector, and promoting integrated concepts for energy-plus homes and developments.

The 'Building and living to protect the climate' financial subsidy tool forms part of the KlimaschutzStartProgramm and is designed to increase the rate and intensity of energy efficient renovations. It provides reduced interest loans to low income households for the refurbishment of their homes, particularly in the rental and co-operative society sectors. To promote the new construction of low-energy houses ('Passivhaus') in this sector, the state government has permitted a moderate increase in social rents of 30 cents per square meter. The tool reaches an important target group – low-income households often lack capital for the refurbishment of buildings and apartments, which has led to a backlog of homes requiring refurbishment.

The 'Solar Building Check' forms another important part of the state's efforts to expand renewable energy in the buildings sector. The initiative is delivered by the EnergieAgentur.NRW and is partly funded by the North Rhine-Westphalia Government. Staff trained and certified by the EnergieAgentur.NRW provide on-site advisory services for existing buildings and new construction projects. They use a standardized checklist to record data about the suitability of buildings for solar energy, including information on roof areas, cable routing, integration and the placement of system components. After evaluating this information, they make recommendations to the building owner, as a first step towards constructing a solar energy system.

Identifying potential for energy transition in the industry sector

The energy-intensive industry of North Rhine-Westphalia is vital to the state's economy, but it faces tough international competition. Climate protection measures need to be developed in close co-operation with the industry and demonstrate a high degree of understanding of the challenges facing the sector. It is important to distinguish between measures that aim to create short-term gains in energy and resource efficiency, and measures that involve long-term and profound changes to industrial structures and processes.

6 www.kwk-fuer-nrw.de

Examples of long-term measures include a change of energy source, actions to reduce process-related emissions and moving towards a more climate-friendly product portfolio. As with the buildings sector, the industrial sector is subject to climate policy set above the state level – in this case mostly at the European level through the EU Emissions Trading System. The state policies in North Rhine-Westphalia play a supporting role.

The industry in North Rhine-Westphalia has been active and successful in the field of energy and resource efficiency over recent years. One tool for further improving energy efficiency is the efficiency loan from the NRW.Bank, which is part of the KlimaschutzStartProgramm. The bank provides low-interest loans of between €25,000 and €5 million to small, medium and large companies. The bank also provides loans to cover planning and consulting costs of up to 10% of the eligible investment.

Creating long-term potential for GHG reduction involves identifying opportunities within different industries and sectors and undertaking research and development projects to explore those opportunities. The aim is to make sure that appropriate technologies are ready to be used when they are needed. The 'Plattform Klimaschutz und Industrie NRW' (Platform Climate Protection and Industry North Rhine-Westphalia)[7] was set up to help the state work towards this goal, with researchers and other representatives from energy-intensive industries meeting to exchange knowledge and good practice within and between the industrial sectors.

INNOVATIONCITY RUHR | MODELLSTADT BOTTROP: A 'MODEL CITY' TRANSFORMATION PROJECT

InnovationCity Ruhr | Modellstadt Bottrop[8] was created through a competition which took place in 2010. The competition was developed by Initiativkreis Ruhr GmbH,[9] a partnership of around 70 businesses from the Ruhr area, with the aim of finding the 'climate city of the future' under the motto "Blue skies. Green city". The winning entry came from the city of Bottrop, which provided a comprehensive approach for climate-friendly urban redevelopment with a large number of project ideas. The application included the signatures of more than 20,000 citizens from the pilot area, showing widespread support for the project.

The model city district has an area of just under 2,500 hectares and a population of 68,000. It is working towards two targets: halving its CO_2 emissions by 2020 and improving the quality of life of Bottrop's residents by creating a sustainable and attractive urban environment. Its 'Masterplan for Climate-Friendly Urban Redevelopment' sets out 297 individual projects that aim to save energy, decentralize energy generation, promote electromobility, improve the residential environment and enable climate adaptation. A majority of them have already been initiated or are about to start.

The projects are intended to provide an example for the entire Ruhr Area, with the city becoming an 'urban laboratory'[10] actively shaped by its citizens. Alongside technical projects, the initiative also includes educational activities in schools and kindergartens on the theme of climate protection.

Initiativkreis Ruhr GmbH continues to support the public-private partnership project as the main shareholder of Innovation City Management GmbH, holding 61% of the shares. The Government of North Rhine-Westphalia provides financial backing to support energy-efficient refurbishment of existing buildings and housing developments, as well as the refurbishment of private residential buildings. The budget of the Innovation City Ruhr project is expected to reach just under €2.8 billion by 2020, with around 80% of the costs covered by private funding such as industry and property owners.[11]

7 http://wupperinst.org/en/p/wi/p/s/pd/497
8 www.icruhr.de
9 www.i-r.de
10 Best and Roose 2014.
11 Drescher 2011.

4. CHALLENGES AND SUCCESSES

The energy transition presents special challenges for North Rhine-Westphalia, which is Germany's most important industrial and energy state. In 2013, around 77% of the state's electricity was generated from coal, with a high proportion coming from lignite. The conversion of lignite into electricity has increased relative to 1990, with particular rises in 2012 and 2013.

The energy-intensive industry is important to North Rhine-Westphalia's economy, but in some cases it faces intensive international competition and severe cost pressures. The industry had no choice but to make significant efficiency gains, which has led to a decline in energy consumption and a fall in GHG emissions from industrial facilities since the mid-1990s. Under these conditions, it is challenging to implement low carbon policy measures that involve high capital investment costs repaying over long periods of time.

A number of overlapping effects can be seen to influence the implementation of energy and climate policy measures in North Rhine-Westphalia. Renewable energy use has expanded significantly in the last five years and electricity generation has become more efficient. But the resulting reduction in GHG emissions has been largely balanced out by the expansion of lignite-based electricity production. Electricity exports have more than compensated for the reduction in North Rhine-Westphalia's demand for electricity.

Using targeted policy measures

In the energy conversion sector, which covers refineries, coking plants as well as electricity generation, CO_2 emissions have remained virtually unchanged since 1990 and saw a slight increase from 2010 to 2013. But reductions in other sectors mean that overall, the state has reduced its GHG emissions by around 15% from 1990 to 2013, with relatively stable levels since 2010. This shows that further effort is needed from all stakeholders to meet the state government's target of a 25% cut in GHG emissions by 1990 – a realistic aim which can be achieved through targeted policy measures.

The increased uptake of wind energy in the years since the first amendment of the Wind Energy Decree in 2011 shows the effectiveness of targeted policy measures, while the work of the EnergieAgentur.NRW shows how information and advice services can support administrative regulations and subsidy programs. The EnergieAgentur.NRW helps various stakeholders move towards energy transition.

Policy innovation

North Rhine-Westphalia's complex energy policy framework makes it particularly important for the state government to take a systematic yet innovative policy approach to energy transition and climate protection. One important factor has been maintaining an intensive dialogue with energy and climate stakeholders, to strengthen the role of energy and industry in the state and use climate protection as a driving force for technical progress.

In recent years, the state government has used its freedom of action in the multi-level political system to create a comprehensive package of administrative measures, incentives, subsidy programs, dialogue and networking processes, as well as information and advice services. The main measures have been the Climate Protection Act and the Climate Protection Plan. North Rhine-Westphalia was the first German state to make its climate targets legally binding, which created a strong mandate for action at state government level as well as for economic and social stakeholders.

The Climate Protection Act's legally-binding targets helped to mobilize hundreds of stakeholders from a wide range of sectors during the participation process for the Climate Protection Plan. This participation process helped to break down distrust and promoted collaboration. Although the Climate Protection Plan has not resolved all conflicts and offers no guarantee that the energy transition will succeed and the climate protection targets will be met, the participation process represents important pioneering work by the North Rhine-Westphalia Government.

The KlimaschutzStartProgramm supports the Climate Protection Act and the Climate Protection Plan with a package of short-term measures. The main focus is on the expansion of renewable energy and CHP generation. Taking a systematic approach to developing legislative proposals and subsidy programs helped to create effective policy tools. The Wind Energy Decree and the 'CHP impulse program' were supported by extensive studies of the potential opportunities for renewable energy (including wind energy, photovoltaics and biomass) and CHP generation in the state.

The 'CHP impulse program' also demonstrates that close co-operation between the state government and municipal administrations of North Rhine-Westphalia is essential for a successful energy transition, as this is how economic, social and ecological constraints become apparent. It is important for the state government to directly support and address the municipal administrations, through activities such as the 'CHP Model Municipal Administration' competition and the 'CHP control center'.

A proactive, long-term approach

Overall, we can conclude that while North Rhine-Westphalia faces special challenges in the implementation of energy transition and an ambitious climate protection policy, it is making strong, systematic progress to transform the energy and industrial sectors with the help of effective policy tools. The proactive and long-term approach is enabling a positive, phased structural transition that is supported and shaped by stakeholders from politics, business and society.

Working with industrial regions in other countries will expose the North Rhine-Westphalia Government to new ideas and provide a valuable source of inspiration. The region's involvement in The Climate Group's Energy Transition Platform will help it to maintain momentum and support the development of new partnerships as it continues on its energy transition journey.

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