

# Summary of the “Energy Supply Strategy for NRW” (July 2019)

## Initial Situation

The goals of the Paris Climate Agreement require the world to pursue a largely climate neutral economy by the second half of the century. This requires a sustainable energy supply through renewable energy in the sectors electricity, heating and mobility. The German energy transition, the aspired decarbonisation, the reform of the EU Emission Trading Scheme and the EU Clean Energy Package contribute to shaping an energy system that is carbon neutral in the long term. These guidelines imply significant challenges for the energy-intensive and industrial State of North Rhine-Westphalia, that suggest to frame an “Energy Supply Strategy for NRW.”

North Rhine-Westphalia understands its particular responsibility with regard to the climate goals. The State Government recognizes the Paris Climate Agreement and will actively help to shape the transition process towards a **climate-friendly energy system** of the future.

The energy policy triade of a secure, economic and climate- and environmentally-friendly energy supply serves as a guideline for the “Energy Supply Strategy for NRW”: Security of supply, economic efficiency and climate and environmental protection shall stay balanced. The “Energy Supply Strategy for NRW” exploits the existing strengths and regional advantages of North Rhine-Westphalia:

- The central location in the European internal market
- The high population density along the river Rhine and the river Ruhr
- The large number of energy intensive companies
- The resilient state of the electricity, gas and heating grids
- The oil and gas storage infrastructure (storage tanks and caverns)
- The approved sites of conventional power plants
- The geographical proximity of energy producers and consumers and of industrial and urban districts
- The numerous well-trained experts as well as existing energy efficiency and industrial expertise
- The many renowned scientific institutions and universities

The central goal of the “Energy Supply Strategy for NRW” is to strengthen North Rhine-Westphalia as a key area for industry and energy supply. In addition, North Rhine-Westphalia pursues the following strategic aims through its “Energy Supply Strategy for NRW”:

- To maintain the high level of security of supply in the future
- To further develop its attractive industrial area (particularly for the energy-intensive industry and its value chain)
- To contribute significantly to climate goals
- To become an important hub for sector coupling, for renewable energy generation and utilization as well as for energy storage and energy efficiency
- To pioneer in developing climate-neutral industrial and urban energy solutions
- To contribute to leading international research in energy and climate protection

## Fields of Action

**A secure power supply** is indispensable for companies in North Rhine-Westphalia. Security and a high quality of supply are important location factors. Ensuring a secure power supply is challenging in the light of the agreed nuclear power phase-out and the coal energy phase-out aspired by the German Federal Government and with an increasingly volatile power supply from renewables. Therefore, sufficiently secure generation capacity in the form of flexible gas-fired power plants is required (Field of Action 1). These power plants could initially be powered by natural gas and, in due course, be converted to synthetic gas from renewable sources. Modern and highly efficient combined heat and power plants represent a central element for a secure power supply in North Rhine-Westphalia (Field of Action 2). The State Government intends to maintain and expand this element by modernizing the German Combined Heat and Power Generation Act [Kraft-Wärme-Kopplungsgesetz, KWKG]. A relevant share of these power plants could be built at existing coal plant sites in North Rhine-Westphalia. These sites already fulfill legal planning requirements and provide access to the necessary grid connections.

In addition to sufficient availability of production capacity, the supply quality of the transmission and distribution grids (particularly for the production industry and the information and communications technology industry) is also of high importance (Field of Action 3). Grid voltage or frequency fluctuations can significantly affect technical facilities of any kind. The secure operation of a grid which is faced with increasing amounts of decentralized and volatile electricity generation is more sophisticated than operating a grid designed to absorb electricity from large base-load power plants. Sufficient electrical and gas grid capacity is therefore necessary and makes the development of the existing infrastructure indispensable (Field of Action 4). The expansion of the energy infrastructure shall be accelerated in order to ensure constant supply, to reduce congestion and congestion management and to prevent a split of the German electricity bidding zone (Field of Action 5). The process of developing the energy infrastructure is time-sensitive and shall involve both the centralized generation and transportation infrastructure as well as the decentralized energy infrastructure. In particular, the development and expansion of energy storage, especially in the form of innovative storage systems, shall be driven by intelligent market design (Field of Action 6).

Intelligent demand side management is another important element in ensuring security of supply. Therefore, electricity consumption should be aligned with the availability of renewable electricity supply. One aim of the “Energy Supply Strategy for NRW” is therefore to further exploit the flexibility potential of consumers (Field of Action 7). A specific method to mobilize the flexibility of energy consumption in industry, in trade and service companies and in private households is provided by sector coupling. Sector coupling also bears the potential to improve the integration of electricity generated from volatile renewable energy sources into the system and to support the decarbonisation of the building and mobility sectors. These benefits call for improved framework conditions for sector coupling (Field of Action 8). Hydrogen and synthetic fuel supply structures will increase in importance in the long term (Field of Action 9). In an energy system with a high share of renewables, hydrogen does not only provide important long-term storage capacity but also helps to integrate fluctuating renewables and thereby contributes to decrease system costs.

**Competitive energy pricing** is a key aspect for the industrial hub of North Rhine-Westphalia to remain economically attractive. Energy costs are essential for siting decisions – particularly for energy intensive industries. Consequently, these costs shall be contained in a way that both the acceptance of the energy transition as a whole and the international competitiveness of companies are not threatened. While the levy for renewable energy is likely to either fall or remain stable in the coming years, CO<sub>2</sub> certification prices and grid fees will continue to rise noticeably and contribute to increasing electricity prices. The State Government of North Rhine-Westphalia will therefore promote specific relief for energy-intensive industries (by compensating electricity price increases induced by emissions trading) as well as a fairer allocation of the energy transition costs to all consumer groups - by transferring part of the costs associated with renewable energy and grid expansion to the federal budget (Field of Action 10). Furthermore, the competitiveness of energy-intensive industries can be supported by developing and introducing new and innovative methods, processes and technologies that significantly reduce energy consumption. The State Government therefore supports energy-intensive industries in achieving climate-friendly and competitive production processes (Fields of Action 10 and 17).

**Environmental sustainability in general and climate protection** in particular is associated with both challenges and opportunities for North Rhine-Westphalia as an industrial and business hub. Challenges, because the transition process towards a largely carbon neutral energy system in 2050 does already today entail far-reaching adjustments. Opportunities, because climate protection serves as a driver for the development and application of innovative technologies and services, and can contribute to modernizing the region of North Rhine-Westphalia. The increase in global demand for modern, energy-efficient technologies as well as for innovative products and services for effective climate protection could also evoke export opportunities for North Rhine-Westphalian companies. The international marketing and distribution of these goods can function as a multiplier for climate protection.

The high population density of North Rhine-Westphalia implies a strong focus on decentralized technology, such as photovoltaic, geothermal energy and biomass. The expansion of energy production from renewable sources - e.g. the expansion of wind energy – shall be managed in order to maintain an overall acceptance for the energy transition (Field of Action 11). Furthermore, energy efficiency bears an enormous potential to reduce energy consumption and emissions. Energy efficiency can reduce economic costs as well as expenses related to the energy transition since less fuel, fewer production facilities and energy grids will be necessary. Energy efficiency is therefore one of the pillars of the energy transition. North Rhine-Westphalia will hence further integrate energy efficiency into the energy transition by identifying and exploiting existing energy efficiency potentials (Field of Action 12). This applies particularly to energy efficiency in the building sector (Field of Action 13). Due to the high population density along the rivers Rhine and Ruhr, climate-friendly urban energy solutions are of special importance in North Rhine-Westphalia (Field of Action 14). The challenges of the energy transition in cities are concentrated in confined areas. The holistic optimization of urban districts will enable low-carbon, affordable and livable cities of the future.

A further goal of the “Energy Supply Strategy for NRW” is to establish a climate-friendly transition in the heating (Field of Action 15) and mobility (Field of Action 16) sector by supporting reviews of revenue-neutral CO<sub>2</sub> pricing methods based on the European Emissions Trading Scheme and by creating the necessary energy infrastructure.

A successful heating transition is aligned with local conditions and is based on 3 pillars: Efficient buildings, asset-related generation of renewable-based heating provision and a predominantly decarbonized, grid-bound heating supply. An increasing use of battery-powered electric vehicles and, in the future, hydrogen fuel cell-powered vehicles are important for the successful mobility transition.

A significant field of action of the “Energy Supply Strategy for NRW” focuses on fostering North Rhine-Westphalia as an energy and industrial hub through integrated research and innovation and on aspiring the lead in international energy and climate protection research (Field of Action 17). Innovation is indispensable for a successful energy transition to a carbon neutral energy system. The aim of the State Government is that such innovations are predominantly designed, developed, tested and applied in North Rhine-Westphalia.

### **Digitalization as a driver for the future Energy System**

In the long run, the current energy system will develop towards an international, intelligent and integrated system that links electricity, heating/cooling and mobility. This future cross-sector system will be characterized by renewable energy, energy efficiency and decentralized structures.

**Digitalization** will play an important role, particularly in ensuring short-term adjustments of supply and demand, and to advance sector coupling. At the same time, digitalization is necessary for urban energy solutions. Numerous new business opportunities will be created, such as power-to-x technologies and virtual power plants. In this way, innovative digital start-ups are expected to enter the market.

This will generally strengthen North Rhine-Westphalia as a technology, business and innovation hub. If all stakeholders comprehend the urge to change as an opportunity, North Rhine-Westphalia and its industrial base, its innovative companies and numerous research institutions will successfully master this transition. The “Energy Supply Strategy for NRW” outlines a feasible path towards an energy-secure, economically successful and climate-friendly future.

### **Overview of the Essential Fields of Action:**

1. Ensuring sufficient and secure generation capacity
2. Further developing and expanding cogeneration in North Rhine-Westphalia to maintain security of supply and sector coupling as a key technology
3. Ensuring high quality of electricity supply and power grids
4. Ensuring an adequate energy infrastructure expansion
5. Accelerating the energy infrastructure expansion
6. Advancing storage development as an important element of energy infrastructure and further developing innovative storage systems
7. Using the potentials for demand-sided flexibility
8. Improving framework conditions for sector coupling
9. Preparing a sustainable hydrogen and synthetic fuel supply structure
10. Ensuring industrial competitiveness and affordable electricity prices

11. Shaping the generation from and the expansion of renewable energy sources in a way that ensures acceptance, is open for different technologies and can be integrated into the market and the system
12. Promoting energy efficiency in the transition
13. Exploiting the potential of energy efficiency in the building sector
14. Implementing urban energy solutions for a successful energy transition and climate protection
15. Strategically developing a heating transition, modernizing and developing heating and cooling grids, utilizing waste-heat potential
16. Ensuring energy supply for a climate-friendly mobility
17. Fostering North Rhine-Westphalia as an energy and industrial hub through integrated research and innovation and becoming the leading international energy and climate protection research hub