

SHAPING THE FUTURE OF THE INDUSTRIAL SECTOR:

The expansion of renewables at competitive
electricity prices as a key factor in climate neutrality

Position paper by IN4climate.NRW

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OUR CORE MESSAGES

Many of the key technologies needed for a climate-neutral industrial sector are based on substituting fossil sources of energy with the use of electricity from renewables. The total annual demand for electricity from renewables and for electricity-based synthetic energy carriers in Germany is set to rise sharply over the long term. If the transformation of the industrial sector is to be successful and the climate targets are to be achieved, three conditions are essential:

- **The high level of industrial demand for electricity from renewables must be met** by accelerating the expansion of generation in Germany and by importing electricity and electricity-based energy carriers.
- **Security of supply and system stability must be guaranteed** through grid expansion, storage technology and sector coupling as well as by improving the flexibility of electricity demand and removing barriers to flexibility.
- **Competitive electricity and energy prices must be ensured**, for example by retaining the relief for energy-intensive companies and on electricity generated and consumed on site.

THE ENERGY-INTENSIVE INDUSTRIAL SECTOR AS THE KEY TO ACHIEVING THE CLIMATE TARGETS

In percentage terms, the energy-intensive primary sector has already achieved much greater reductions to its greenhouse gas emissions in Germany than other sectors (BMU 2020). At around one-fifth of the country's current greenhouse gas emissions, it continues to play a central role in reaching the ambitious national and international climate protection goals. Many of the key technologies needed for a climate-neutral industrial sector are based on substituting fossil sources of energy with the (direct or indirect) use of electricity from renewable energy sources (renewables or RES) – from switching steel production over to hydrogen direct reduction and electric arc furnaces through to generating steam using electrode boilers and high-temperature heat pumps. The greenhouse gases produced in the electricity generation process are therefore decisive when it comes to determining how climate friendly the resulting products are. As a result, the transformation of the energy-intensive industrial sector and the achievement of the climate targets can only succeed if sufficient quantities of affordable, green electricity are reliably available.

Industrial activity already accounts for around half of Germany's electricity consumption of approximately 500 terawatt-hours. Electrifying energy-intensive processes will require a large additional amount of electricity from renewables. Alongside the partial conversion of industrial processes to electricity-based forms of technology, electricity consumption in Germany is also expected to rise in the next few years owing to the advancing electrification of the heating (e. g. electric heat pumps) and transport (electromobility) sectors. In scenarios showing how climate neutrality can be achieved in Germany, electricity and electricity-based fuels from renewable energy sources replace fossil fuels across all sectors. In the long term, this is likely to lead to a quadrupling of annual demand for renewable electricity in the economy as a whole, depending on certain assumptions. For example, the road map drawn up by the German Chemical Industry Association (VCI) towards achieving a largely greenhouse-gas-neutral chemical industry in Germany by 2050 forecasts a massive increase in annual demand for electricity. A significant proportion of this green electricity will be needed to produce hydrogen. Green hydrogen will be a critical factor in achieving the 2050 climate protection goals, especially when it comes to transforming the primary sector.

For the transformation to succeed against the background outlined above, the following three conditions are essential.

Condition 1: The high level of industrial demand for electricity from renewables must be met

In order to provide sufficient quantities of electricity to meet the needs of a climate-neutral industrial sector, the existing development corridor for renewable energies will need to be expanded and available land with potential for generating renewable electricity has to be opened up across all German federal states. However, the expansion of onshore wind power has contracted sharply in recent years. If this trend continues in the next few years, Germany will not only fail to meet its expansion target for 65 per cent of electricity generation to come from renewables by 2030, but the country will also fall far short of its climate protection goals. Further significant expansion of offshore wind power and photovoltaics will also be necessary. We welcome the fact that Germany's Federal Government has agreed to lift the 52-gigawatt cap on support for photovoltaic systems and has raised the expansion target for offshore wind turbines to 20 gigawatts by 2030.

In view of the enormous additional demand for renewable electricity and for products made using renewable electricity, such as green hydrogen, combined with Germany's limited potential, energy imports will continue to play a role in meeting the country's demand. High levels of potential in the wind and solar power sectors in many locations outside Europe – and also within Europe itself – mean that renewable electricity can be produced more cheaply and in larger quantities than in Germany. Electricity-based energy carriers can be imported in the form of climate-neutral hydrogen and synthetic fuels, thereby reducing the quantities of renewable electricity that need to be produced domestically.

Nevertheless, it is essential that renewables be developed at a more rapid pace in Germany itself, too. This will have the benefit of retaining added value in the country and of reducing the (geopolitical) risks and uncertainties associated with imports. With sufficient available renewables in Germany, it will be possible to gain experience in system integration and also move new industrial process and energy conversion technologies into trial stage and further development quickly – a major advantage, especially with regard to export potential in growing global climate protection markets.

We call for the following to meet the industrial sector's demand for renewables:

- To achieve the existing expansion targets in the face of a trend toward rising electricity demand and to tap into additional national potential for the expansion of renewables, Germany's Federal Government and its federal states must **relax rigid expansion limits** and **simplify repowering. Transparency, attractive participation formats and effective incentives** are important when it comes to increasing the acceptance of new installations by local residents.
- In order to harness the capabilities of the most efficient locations for renewable power generation outside Germany, the German Federal Government must push for the **expansion of European networks and regulatory integration**. This would also have the advantage of partially balancing the supply of electricity generated from renewables, which often fluctuates in opposite directions (particularly wind power in northern and southern Europe). Massive investments in energy transport infrastructure are needed as well, especially for electricity-based energy carriers. **Bilateral or multilateral energy partnerships** could also help to establish stable structures, such as supporting the construction of initial pilot plants and demonstration facilities.

Condition 2: Security of supply and system stability must be guaranteed

The low number of supply interruptions in Germany's electricity system has historically been – and continues to be – one of its biggest advantages as a location for industry. For the electricity supply to remain secure as a key factor for the globally competitive primary industry, this standard must be maintained while taking account of the rising proportion of renewables and the simultaneous phase-out of nuclear power and coal. The increasing necessity of interventions by transmission system operators, such as by activating so-called redispatching measures, already shows that greater efforts are needed to ensure that system stability is maintained in the long term as a result of the expansion in renewables.

As the proportion of renewables rises, the requirement for more flexibility in both conventional and renewable generation and demand will continue to increase. For their part, certain sectors of primary industry have the ability to improve the stability of an electricity system that is increasingly based on decentralised and fluctuating energy generation by adjusting the way they carry out electrified processes. Companies in other sectors, which do not have this option for technical reasons, must not be made to suffer any disadvantages as a result.

We call for the following to ensure security of supply and system stability:

- To guarantee security of supply, **grid extension in line with increased demand will be necessary as the top priority in addition to the expansion of storage capacity, sector coupling and greater flexibility in terms of electricity demand**. First and foremost, this will require an **acceleration of planning and approval procedures** and a corresponding regulatory framework in order to create sufficient incentives for market players to invest and innovate.
- For energy-intensive companies and other consumers of electricity to be able to contribute towards system stability, **barriers to flexibility must also be removed** and the existing **system of taxes and levies adapted in stages**. The way that network charges are structured must therefore neither have a counter-productive effect nor prevent opportunities for flexibility from being realised. For example, load peaks should not be subject to network charges where they occur as a result of targeted additional electricity consumption aimed at supporting the network at times when the volume of RES is high.

Condition 3: Competitive electricity and energy prices must be ensured

In addition to meeting the climate targets and ensuring security of supply and grid stability, it is vital in all of the measures associated with the ambitious expansion of renewables that competitive electricity prices be guaranteed at all times in order to avoid gradual offshoring of energy-intensive value chains. This will also ensure that the extensive investments in innovative climate protection technologies will be made at locations within Germany.

Electricity users pay the system costs of power generation via levies and charges. That is to say, in addition to the costs of promoting RES installations, they also contribute towards the costs of grid extension and feed-in management to eliminate bottlenecks as well as other expenses involved in guaranteeing security of supply, such as grid reserve costs and various capacity premiums. The renewable energy surcharge, network charges and electricity tax are the largest government-induced components of the electricity price, although power-hungry companies operating in competitive international markets and those consuming electricity generated on site have so far benefited from partial exemptions to and reliefs on the renewable energy surcharge and electricity tax.

We call for the following to ensure competitive pricing for electricity-based energy:

- **The availability of relief on electricity costs is a location factor.** Energy-intensive companies will only make investments in North Rhine-Westphalia in the future if they can be certain of competitive electricity prices.
- It is not realistic to expect electricity consumers to bear the full costs of transforming the electricity system by increasing the share of renewables as well as the costs of imported electricity-based fuels (power-to-X). Instead, Germany's federal budget will need to shoulder at least some of the financial burden. The **system of taxes and levies** must be **reviewed** and, where necessary, **adapted**. This must also entail finding solutions that are compatible with state aid rules. Using federal funds to subsidise new RES installations as an alternative to the renewable energy surcharge may present a suitable way forward. Electricity costs would decrease gradually, and planning security for the industrial sector would increase.
- For renewables to prevail in all sectors, the use of electricity and electricity-based energy (such as green hydrogen or synthetic fuels) **must be competitive with conventional energy sources**. This applies in particular to the energy-intensive industrial sector, which competes in a global market.

The **relief on electricity generated and consumed on site** has proved successful. It must be **maintained**. Decentralised generation facilities have a role to play in the energy transition and when it comes to stabilising the electricity system.

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