



## From utopia to beacon of hope

Once considered a utopia, today artificial intelligence offers great opportunities for the energy systems of the future - And it is already making its way into the energy transition. [Find out more](#)



## Impact of COVID-19 changes the energy mix in the first half of 2020

The coronavirus pandemic had a significant impact on Germany's primary energy mix in the first half of 2020. The sharp drop in energy consumption in these special circumstances has led to declines in all energy sources except renewables.

### Energy mix: Renewables grew significantly in the first half of 2020

Decline in consumption due to coronavirus pandemic changes primary energy mix



Shares of energy sources in primary energy consumption in Germany in % (period in previous year in brackets)

According to forecasts by Germany's Working Group on Energy Balances, energy consumption in Germany could fall by 7-12% by the end of 2020. This is based on calculations for the first half of 2020, according to which the impact of the coronavirus pandemic has caused energy consumption to shrink by 8.8% compared with the same period last year. At the end of the first six months of 2020, energy consumption was only 5,961 petajoules (PJ) or 203.5 million tonnes of coal equivalent.

## Effects of corona and mild weather reduce electricity consumption

According to the Working Group on Energy Balances, it is the effects of the coronavirus pandemic that are primarily responsible for the lower electricity consumption. The rather mild weather conditions seen compared to the previous year also contributed to this lower level of consumption. All major fossil fuels were affected by the decline in the first six months. Lignite and hard coal accounted for almost two thirds of the decline, which is why the Working Group also expects a significant reduction in energy-related carbon emissions for the first half of the year. According to projections, for the year 2020 as a whole, this decline could be between ten and 17%.

## Renewable energy accounts for higher share of energy consumption

Renewable energy accounted for a higher share of total energy consumption in the first half of 2020, with wind power and solar energy recording a 10% increase due to favourable weather conditions. Hydroelectric power stations supplied 1% more electricity, while the share of biomass actually decreased 1%.

Overall, renewables constituted 17.5% (up 2.1%) of primary energy consumption in the first six months, mineral oil 33.9% (up 0.7 %) and natural gas 27.7% (up 1.2 %). The share of nuclear energy fell by 0.3%. For coal, the decline was particularly marked: the contribution of lignite decreased by 2.7%, while the share of hard coal fell by 1.6%. In principle, however, the energy mix continues to be broad. **Primary energy** refers above all to the energy that is available in the very original form of energy or energy sources. These are fuels such as coal or natural gas, but also energy sources such as the sun, wind or nuclear fuels.

## Negative electricity exchange balance is significantly lower

Germany's neighbouring countries also consumed significantly less electricity in the first half of 2020, and the price of natural gas fell to a record low. The country's negative electricity exchange balance with its neighbours was therefore much lower in the first half of the year. This is based on the fact that the volume of electricity transported into Germany from abroad increased significantly, while electricity flows from Germany to neighbouring countries declined.

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### FURTHER INFORMATION

[➔ Press release of the Working Group on Energy Balances: 'Pandemic shrinks energy consumption' \(PDF download, 40 KB\) \(in German only\)](#)

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# A fresh onshore wind

The Federal Ministry for Economic Affairs and Energy presented its work plan for strengthening onshore wind energy in October 2019. Almost one year on, many of the main measures have already been rolled out. Time to take stock.



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In September 2019, Economic Affairs Minister Altmaier met with the wind energy sector, environmental associations, trade unions and representatives of civil society initiatives to discuss ways to increase public acceptance of wind energy and to speed up planning procedures. The Economic Affairs Ministry followed this up in October 2019 with its [work plan for strengthening onshore wind energy](#). It cites 18 specific measures and outlines where responsibilities lie at federal and Länder level. The measures will also help Germany to reach its target of renewables covering 65% of gross electricity consumption by 2030. An [overview of the status of the work plan](#) published at the end of August 2020 provides a progress report.

It says that, of the 18 measures in the work plan, 12 have been fully realised or are in the course of being realised. Six of these have been completed, and three are on the final straight. Three further measures can be realised in the revision of the Renewable Energy Sources Act, which is to be adopted before the end of 2020.

## Six measures for a fresh onshore wind already in place

The six measures which have already been implemented include new [distance rules for onshore wind energy installations](#); these were published in the exemption clause for the Länder in the Buildings Energy Act. This clarifies the scope available to the Länder in the stipulation of distances between wind energy installations and residential buildings. A new administrative provision for the “needs-oriented” night-lighting of wind turbines has been in force since 1 May 2020. It makes it possible for the flashing red lights on wind turbines to light up only when they are actually needed to warn air traffic. The Federation and the Länder also aim to cut the amount of red tape involved in the

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expansion of onshore wind: they agreed on 17 June 2020 on a swifter removal of impediments to planning approval. Also, authorisation procedures under immissions rules have been accelerated. To make sure that wind turbines can always be planned and constructed giving consideration to the natural environment, the cabinet has decided that a species protection website should be built up from 2021, providing information about flora and fauna in the relevant areas.

### **Three measures on the final straight**

Three further measures in the work plan are already on the final straight: In the Investment Acceleration Act, the number of courts involved in appeals against authorisations under immission protection rules has been cut. The Investment Acceleration Act also aims to restrict the suspensive effect of appeals against planning approval for wind turbines. Also, the digitisation strategy is being consistently implemented and further developed, both in terms of the regulatory framework and in terms of technical standards.

### **These measures will be introduced via the revision of the Renewable Energy Sources Act**

The revision of the Renewable Energy Sources Act is to roll out three further measures to strengthen onshore wind energy: the intention is that municipalities and citizens should enjoy greater financial participation. The building of new renewables facilities is to be steered at a regional level in order to avoid grid congestion. The coordinated revisions of the Renewable Energy Sources Act and the Federal Requirements Plan Act will also pave the way for a synchronised expansion of the grids and of renewable energy.

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#### FURTHER INFORMATION

[\[→ Federal Ministry for Economic Affairs and Energy press release: 'Status of implementation of the onshore wind energy work plan presented – 12 of 18 measures underway'\]](#)

[\[→ Status of implementation of the work plan to strengthen onshore wind energy \(PDF Download, 238 KB\)\]](#)

[\[→ Federal Ministry for Economic Affairs and Energy video: 'Press statement by Federal Minister Altmaier on the abolition of the PV cap and on minimum distances for onshore wind turbines'\]](#)

[\[→ Federal Ministry for Economic Affairs and Energy press release: 'Economic Affairs Ministry presents work plan to strengthen onshore wind energy'\]](#)

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# What do grid reserve, capacity reserve and security stand-by actually mean?

Our electricity supply has three guardian angels on the bench, ready to join in. In extreme situations, they safeguard the stability of the grid. Find out here which reserve is used when.



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**This is what it's all about: the grid reserve, the capacity reserve and the security stand-by have different roles but a common goal – to maintain the electricity supply.**

Germany has one of the world's most secure supplies of electricity. One reason is that there are three clever back-up mechanisms to keep the supply going. Like a triple safety net, they make sure that our energy system remains stable and continues to function even as the energy transition advances. However, the various back-ups are all different, and the grid reserve, the capacity reserve and the security stand-by all have their own story to tell.

## **The grid reserve safeguards the electricity grid when demand is high**

Our major transmission lines are at their busiest in winter. In the cold, windy months, the wind turbines in the north feed lots of electricity into the system, whilst the industrial heartlands in the south demand even more energy – especially when it's cold and gets dark early. To make sure that the powerlines don't have to shut down due to the sheer volume of electricity flowing through them, installations have to be curtailed in the north and ramped up in the south. These measures, known as 'redispatch', ensure that the grid can be operated safely. A grid reserve, also known as the 'winter reserve' or the 'cold reserve', is therefore formed each year, particularly for the colder six months of the year. It consists of power stations which are not currently operational or which have been notified for closure by the operators. They can step in quickly where needed. Their deployment is regulated by the [Energy Industry Act](#) and the [Grid Reserve Ordinance](#). The major German transmission system

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operators (TSOs), who are responsible for grid stability, identify the future need for a grid reserve each year. Their findings are reviewed and confirmed by the Federal Network Agency. The grid reserve for the winter of 2020/21 amounts to around 6.6 gigawatts (GW).

## **The capacity reserve: for extreme and unexpected situations**

When things get tight because something unexpected has happened, people are always happy to hear someone say: 'We've got some spare capacity we can use.' The same is true of the capacity reserve. It serves to guarantee security of supply even in extraordinary and unpredictable extreme situations. The capacity reserve is used when, despite free pricing, the supply of electricity on the wholesale market is not sufficient to cover the total demand for electricity. It is independent of the electricity market and thus delivers additional security for the consumers. The reserve consists of existing generating installations, storage facilities and demand outside the electricity market. The power plants in the capacity reserve are not allowed to operate actively on the electricity markets (ban on marketing), and are only permitted to increase their output in response to a demand from the TSOs. The TSOs can only make such a demand when there are no other alternatives available to offset imbalances between electricity take-off and feed-in. The capacity reserve is to provide a safety net consisting of another 2 gigawatts (GW) from the winter half-year of 2020/21. The capacity reserve is also regulated in the Energy Industry Act and the Capacity Reserve Ordinance. The TSOs concluded the first bidding round for the capacity reserve at the end of 2019. To this end, a total of 1,056 megawatts of generation capacity has been procured from the period from October 2020 until September 2022; a total of 2,000 megawatts was up for auction. This amount is to be reached in the next auction round. The current [monitoring report on security of supply](#) shows that electricity demand can be met at all times in the coming years. In order to ensure that the power supply remains stable as the energy transition progresses, the Federal Ministry for Economic Affairs and Energy currently monitors the security of the power supply; from next year, the Federal Network Agency will be responsible for this. The results are summarised in the monitoring report. It examines regularly (at least every two years) how the electricity market and the available power plants will develop in the coming years until 2030.

## **The security stand-by: if plans A and B are not enough**

A double safety net feels really good. And, to make sure it can really cope with every situation, the 'security stand-by' is available as a third safety net. Established by the Electricity Market Act of July 2016, it consists of power stations which have been scheduled for closure in the course of the phase-out of lignite-fired power generation. For four years, it will be possible to reactivate these shut-down power stations in extreme situations before they are finally decommissioned. They can only be called on if all other measures and even the grid reserve and the capacity reserve are insufficient. That has never happened so far. The power stations will have a period of ten or eleven days in which to be reactivated in response to a demand by the TSOs. Eight power plant blocks with a total capacity of 2.7 gigawatts are on security stand-by. They account for 13% of installed lignite-fired capacity. These provisionally decommissioned power stations have ceased to generate harmful carbon emissions. It is estimated that 12.5 million tonnes of carbon emissions will be saved from the time when the security stand-by system was launched in October 2016 until the end of 2020.

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### FURTHER INFORMATION

[\[➔ Federal Ministry for Economic Affairs and Energy article: 'Electricity Market of the Future'\]](#)

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[→ Report by the Federal Network Agency: 'Determining the need for a grid reserve in winter 2020/2021 and for the year 2024/2025' (in German only)

[→ Federal Ministry for Economic Affairs and Energy Brochure: 'Evaluation of the lignite security stand-by' (in German only)

[→ Federal Ministry for Economic Affairs and Energy article: 'What exactly is 'security of supply'?'

[→ Federal Ministry for Economic Affairs and Energy article: 'What exactly is 'redispatch'?'

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## Plenty of news from the future

**Wanting to be a researcher, to discover the world, to look into the future: it's part of everyone's DNA. Research into future energy worlds makes it possible and provides lots and lots of exciting news.**



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Fancy a journey into the world of energy of the future? The Economic Affairs Ministry's successful research programme 'Smart Energy Showcases – Digital Agenda for the Energy Transition' (SINTEG) is entering its final phase after almost four years, and is delivering plenty of exciting findings. Five model regions have been set up around Germany to test innovative solutions for the energy transition. The [WindNODE model region](#) in Germany's north-east presents ways for companies to make more flexible use of green electricity, thus also helping to reduce the burden on the grids. Experts have now produced a best-practice manual summarising the best ways for companies to coordinate their electricity consumption with the fluctuating supply from renewable sources. The brochure, entitled 'Flex Identifizieren!', focuses on individual possibilities to identify and use the available potential. This makes the manual a valuable aid for everyone interested in deploying flexibilities in practice. Anyone interested in learning more from the SINTEG showcases should note these dates: 28 and 29 October 2020. Experts from all five SINTEG model regions intend to present their findings at the final SINTEG conference. The conference can be followed online. For further information, please visit the [SINTEG website](#). The manual can be downloaded [here](#).

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## Two new regulatory sandboxes launched

Testing out new research findings in real life: this was the exciting opportunity for 20 winners of the Economic Affairs Ministry's '[regulatory sandboxes for the energy transition](#)' competition in July 2019. A number of innovative technologies and processes – such as the manufacture of hydrogen – are being tested in geographically defined experimentation spaces. The findings are to be transferable to the whole of Germany and should help new technologies to reach market maturity more quickly. Two new regulatory sandboxes launched in August 2020.

In Schleswig-Holstein, the partners in [Westküste100](#) are studying the best ways to generate hydrogen from renewable energy and store it. Federal Minister Peter Altmaier said: 'I am delighted that the Westküste100 regulatory sandbox is already implementing elements of the National Hydrogen Strategy.' The highly innovative pioneering project is helping to develop technology in the field of hydrogen.

The parties working on the [Integrierte WärmeWende Wilhelmsburg IW3](#) regulatory sandbox (Integrated HeatTransition Wilhelmsburg) in Hamburg are showing how a reliable and low-cost energy supply to urban areas can work with a high proportion of green electricity. 'With its integrated heat transition concept, IW3 will become a flagship for the energy and heat transition in urban areas,' said State Secretary Andreas Feicht. The two regulatory sandboxes form part of the Federal Government's [7th Energy Research programme](#).

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## Quote of the week



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'Combatting climate change is the central task of our generation. We have to make achieving climate and economic targets a priority and make the transformation towards a climate-neutral society by 2050 at the latest an irreversible process.'

**Economic Affairs Minister Peter Altmaier on his proposal for an alliance of society, business and government to promote climate neutrality and prosperity**

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## What the press say

This time in 'What the press say': They are enthroned on lofty balconies and bear names like Plug-and-Play-Solar or Guerilla-PV – mini power plants which allow consumers to generate their own solar electricity. Far below Berlin, researchers are busy working on the energy storage units of the future. Germany is one of the front-runners in the table of the leading producers of green energy.



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### **Der Tagesspiegel, 10 September 2020: 'Heat from beneath Berlin'**

Geologists are investigating a stratum of shell limestone 500 metres beneath Berlin to see whether it can be used to store energy and produce heat. They are focusing on two key processes for the energy transition, says Der Tagesspiegel: storing energy underground, and using geothermal heat (in German only).

### **tagesschau.de, 9 September 2020: 'Green electricity from the balcony'**

Want to save on electricity costs whilst helping the environment? Small-scale solar power plants which help to cover the user's electricity needs make this possible, according to tagesschau.de. They can be installed on balconies, for example, without any permits being required (in German only).

### **Capital, 25 August 2020: 'These countries are leading on renewable energy'**

Renewable forms of energy are continuing to make progress. They now account for 5% of the energy produced around the world. Capital has published a table ranking the countries currently producing the greenest energy (in German only).

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## **Altmaier presents proposal for climate change mitigation and a strong economy**

On 11 September 2020, Economic Affairs Minister Peter Altmaier presented a proposal for an alliance of society, business and government to foster climate neutrality and prosperity. The paper contains 20 specific proposals to boost climate action and economic strength. Altmaier stressed that the business sector, and especially small and medium-sized enterprises, would need support and a reliable basis on which to make plans as they embark on this necessary transition. He added that the path to climate neutrality can only be travelled successfully, and social cohesion maintained, if climate action and commercial activity are reconciled.

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## **IRENA report places energy transition at the heart of a sustainable economic recovery (in German only)**

Governments could bring the immediate need for economic incentives into line with the medium-term to long-term goals of decarbonisation and sustainable development by orienting policy measures and public spending to the energy transition – this is the message from a report by the International Renewable Energy Agency (IRENA). The paper provides practical insights and recommendations for governments to stimulate investment and policy action for economies post-COVID-19. The main findings: the report says that increasing public and private-sector energy spending to USD 4.5 trillion could boost the world economy by another 1.3% per year, creating 19 million new jobs in the field of the energy transition by 2030. The number of jobs in the field of renewable energy alone could thus triple to 30 million by 2030, says the report. This means that each million dollars invested in renewable energy would create three times as many jobs as investment in fossil fuel. The report concludes that strategic investments in the energy transition should be the immediate priority. The report is based on the Global Renewables Outlook 2020, which was published in the spring and which highlights the possibility for global energy transition in line with the Paris Agreement.

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## Fourth certificate awarded for smart meter gateway (in German only)

A fourth smart meter gateway has passed the Federal Office for Information Security's test. Smart meter gateways are the key technology for the digitisation of the energy transition. The smart metering system can do much more than a conventional electricity meter. A smart meter system consists of a digital meter and a central communications unit, the smart meter gateway. They provide each of the actors – from the grid operator, to the electricity supplier, right through to the consumer – with important information on generation and consumption. This will make it possible, for example, for the electricity grids to be controlled more smartly and used more efficiently in future.

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## SET Plan conference in Berlin on 23 and 24 November 2020

The Federal Ministry for Economic Affairs and Energy is hosting the 14th SET Plan conference in Berlin on 23 and 24 November 2020 together with the European Commission. It is already possible to register for the conference on the Strategic Energy Technology Plan (SET Plan). The SET Plan supports the energy transition at European level and identifies key areas of research and innovation needed for a climate-neutral energy supply. The conference gives all decision-makers, researchers and stakeholders an opportunity to join the discussions on the shape of the future energy supply. The main focuses of this year's conference include system integration, hydrogen, offshore wind energy and the Green Deal's renovation wave.

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