

Hello, energy transition!



Federal Ministry
for Economic Affairs
and Energy

Energie  wende
Switch to the Future

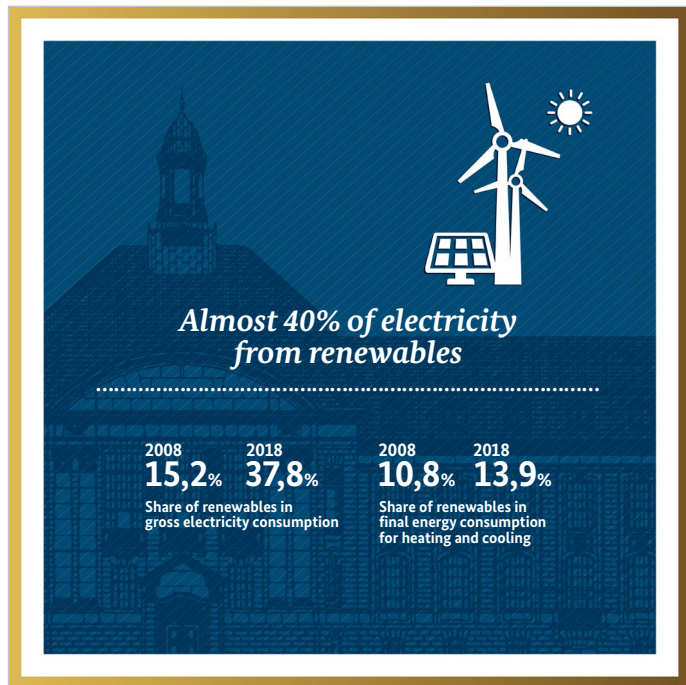
Energy of the future

Greater energy efficiency, lower consumption – based on a greater share of renewables and lower use of conventional sources. The energy transition is advancing at full speed. The aim is to create an energy supply that is secure, affordable and environmentally sustainable. A great deal has already been achieved, with citizens, companies and industry all playing their part.

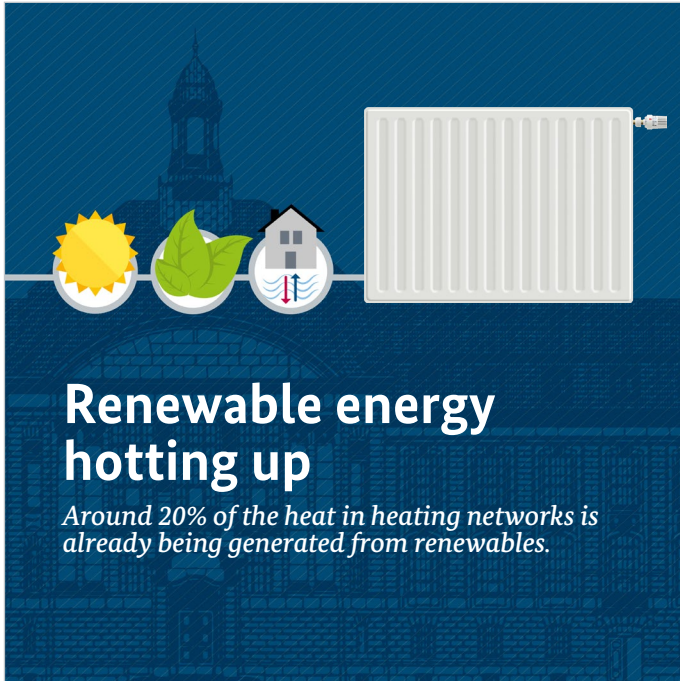
Did you know that renewable energy already accounts for almost 40% of our electricity consumption and that almost 320,000 people work in this area? Or that Germany comes in third in the world for wind energy? The energy transition is triggering investment and innovation in the German economy and in its industry. And the Federal Government is providing support to all those involved – whether for energy-efficiency retrofits in buildings, efficiency measures in industry, the purchase of electric vehicles or many other methods of action. This flyer provides a wealth of interesting facts about the energy transition.

We hope you enjoy reading it!

The energy transition – where are we currently at?



The share of renewables in total energy consumption just keeps rising. In 2018, sun, wind and other renewable sources already generated just under 40% of electricity consumption. We also want to match this feat in heating and cooling. This is why we are using our Market Incentive Programme (MAP) to support the installation of heating systems that use renewable energy. The programme's new funding line for 'Energy efficiency and renewable process heat in business' is fostering the transition to renewables in these areas as well.



The infographic features a dark blue background with a faint cityscape. A horizontal white line runs across the middle. On the left, three circular icons are placed on the line: a yellow sun, two green leaves, and a house with a chimney and a red double-headed arrow below it. To the right of these icons, a white radiator is connected to the line. The text 'Renewable energy hotting up' is written in large white font, with a subtitle below it in a smaller, italicized white font.

Renewable energy hotting up

Around 20% of the heat in heating networks is already being generated from renewables.

Renewable energy is used to provide not only electricity but heating as well. Over the last 10 years, the share of renewables in heating networks has risen greatly – climbing from 9.2% in 2006 to 19.8% in 2016. We want this development to continue and are therefore fostering the development of modern, climate-friendly heating networks today by providing support for model projects focusing on the ‘heating network systems 4.0’ (heating networks 4.0) of tomorrow.

Use of renewables increasing, coal, gas and oil decreasing.

Total consumption 13.523 PJ 2017 13.118 PJ 2018



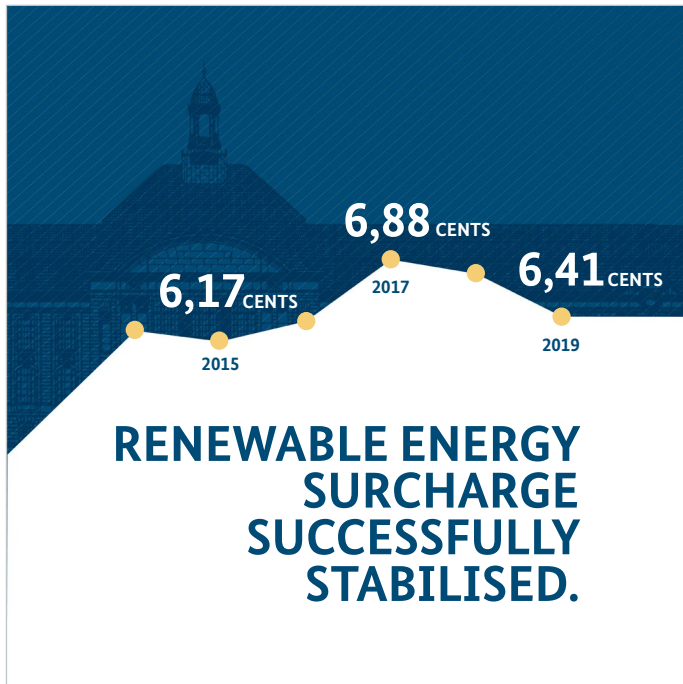
3,0% less primary energy



Renewables
+1,1%

- 4,9% Hard coal
- 4,7% Oil
- 2,1% Lignite
- 2,8% Gas
- 0,5% Nuclear

Our energy consumption is falling: from 2017 to 2018, it decreased by 3%. The use of fossil energy carriers such as coal, gas and mineral oil has dropped considerably, whilst renewable energy has continued to expand. Another positive development is that greater energy efficiency has also led to a decline in consumption.



We have stabilised the costs of the energy transition. The renewable energy surcharge has remained fairly stable at around 6.5 since 2014. It has recently fallen two times in a row. This is good news for the energy transition, because we are showing that the economic development and protecting the environment can go hand in hand.

500 million euros for the digitalisation of the energy transition

The SINTEG funding programme is testing out solutions within a limited area, with the aim for them to be implemented nationwide later on.



Scientists are working to ensure that our energy consumption remains sustainable, secure and affordable going forward. They are testing their solutions out in practice across five model regions in Germany. If successful, these solutions are to then be implemented across the whole of the country. The SINTEG programme brings together partners from a total of more than 300 companies, research institutes and municipalities, and is being supported by the Federal Ministry for Economic Affairs and Energy which is providing around 500 million euros of funding up to 2021.

GERMANY IS WORLD NUMBER 3 FOR WIND ENERGY

Considering its size, Germany has a huge amount of installed wind capacity.



At the end of 2018, Germany's installed wind power capacity exceeded 59 gigawatts – more than almost anywhere else in the world. In fact, only the USA and China had more. This is truly world-class!



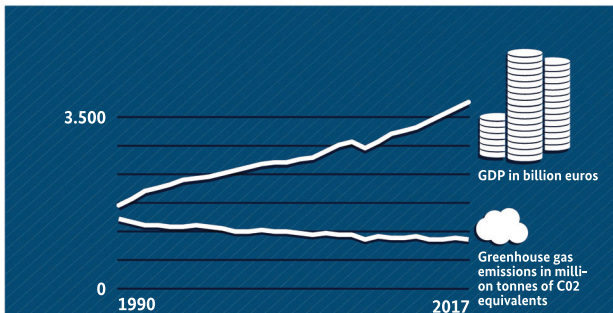
The energy transition is a European project. This is shown by the targets set by the 'Energy Union' for 2030: to reduce greenhouse gases by at least 40%, to cut energy consumption from coal, oil and other conventional sources by at least 32.5%, and to raise renewables in final energy consumption to at least 32% (compared to 1990 respectively). As we apply these targets, we all want to pull in the same direction so that we can do even more to mitigate climate change and ensure that our energy supply is cleaner.

Renewable energy as a driver of the economy

In 2017, 15.7 billion euros were invested in the construction of renewable energy installations in Germany.



The energy transition is driving the economy forward. In 2017, investment in the building of new renewable-energy installations was again higher than in the years before and totalled 15.7 billion euros. This secures jobs and brings Germany and the energy transition further along.



Carbon emissions are falling, economic growth is rising

.....
*Whilst GDP has more than doubled
since 1990, greenhouse gas emissions
have been continually decreasing.*

The German economy is growing while carbon emissions are sinking. From 1990 to 2018, greenhouse-gas emissions fell continuously, dropping by nearly a third. This shows that the economy and ecology are not a contradiction in terms. Indeed renewable energy and energy efficiency are making it possible for them to go hand in hand. Let's continue on this path!

A high number of jobs in renewables

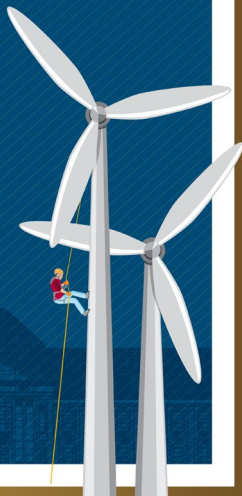
In 2017, 316,000 people were working either directly and on behalf of suppliers in the field of renewable energy.



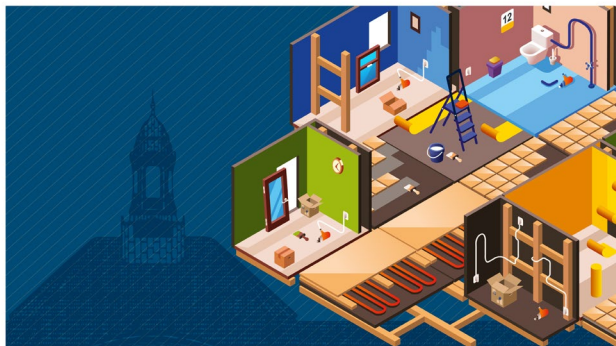
Renewable energy creates a great deal of jobs. Almost 320,000 people work in the production, installation and operation of renewable energy systems in Germany. The good thing about it is that the jobs are located not only where the systems themselves are set up and operated, but also in other areas, e.g. in the construction sector. This is good for both the energy transition and for the German economy.

13.9% OF WORLDWIDE JOBS IN THE WIND SECTOR ARE FOUND IN GERMANY

Germany accounts for 160,000 of the world's 1,148,000 jobs in wind, ranking second in an international comparison.



The energy transition creates jobs. This can especially be seen in wind energy: almost 14% of the world's jobs in this sector are located in Germany. This means that wind energy in Germany provides jobs for around 160,000 people – a new record! It also continues to put us in second place in a global comparison.



More energy efficiency, more jobs

Around 573,000 employees worked in the field of energy-efficiency retrofitting in 2017.

Energy efficiency is creating more and more jobs in Germany, not least in the goods-producing industry and in services. It is also generating jobs in energy-efficiency retrofits for buildings, a sector in which more than half a million people are employed. What's particularly good is that these jobs are located directly in the local regions.

Annual funding of 3.5 billion euros to improve energy efficiency



The best and cheapest way of combating climate change is to reduce the amount of energy that is needed in the first place. This is why implementing the energy transition also involves using energy more efficiently and reducing how much is consumed. The Federal Government promotes energy-efficiency retrofits in buildings, efficiency measures in industry and commerce, and energy consulting for companies, municipalities and private households, providing around 3.5 billion euros of funding every year!



Better informed to save more energy

.....

63,000 consumers have taken
advantage of Federal Government funding
for energy consulting.

*In 2017, 29,344 persons received expert advice;
in 2018, the figure was 33,464.*

Consulting is the key! In the past two years, 63,000 citizens, companies, municipalities and non-profit organisations have made use of government funding in Germany to help cover the costs of expert energy consulting. Consulting enables customers to find out how they can save energy and reduce costs. Through acting upon this advice, they make an important contribution to implementing the energy transition and mitigating climate change.

Efficiency measures for homes

*funded by the Federal Ministry for Economic Affairs and Energy
save 9.88 million tonnes of greenhouse gases from being released.*

Newbuilds:
-1,36 Mio. t
greenhouses gases

Energy-efficiency retrofits
-8,52 Mio. t
greenhouse gases




In the past 13 years, we have provided support for energy-efficiency retrofits and energy-efficient newbuilds to the owners of 5.4 million houses and flats. This enabled us to save 10 million tonnes of greenhouse gases from being released in 2018 alone.

RENEWABLE ENERGY IN 1ST PLACE IN HEATING FOR FIRST TIME

*Since 2018, most new residential buildings
are heated using renewable energy.*

**Newbuilds 2018:
total of 107,200**



66,6 %
of all new residential buildings use
renewable energy for heating (e.g. am-
bient, geothermal, solar thermal heat)

33,3 %
of all new residential buildings con-
tinue to be heated using conventional
energy (oil, gas, electricity)

Two thirds of all new resi-
dential buildings are installed
with heating systems that use
renewable energy. In 2018,
renewables therefore took
up first place for the very
first time. What's particularly
good is that renewables are
the main energy source for
heating in almost half of all
newbuilds. And using renew-
ables is doubly worthwhile:
Not only can you take advan-
tage of grants provided by the
Federal Ministry for Economic
Affairs and Energy, but you
also benefit from low heating
costs in the long term. And
you will help mitigate climate
change, too.

New information about old heating systems

Heating labels issued by chimney sweeps inform home-owners as to whether it's worthwhile for them to have their heating systems modernised.

2017: **675.000**
heating labels issued

2018: **1.010.000**
heating labels issued

Since 2017, it has been mandatory for chimney sweeps in the local districts to affix an energy label to older heating appliances and to explain to the consumer what the label means. In 2017, almost 700,000 appliances were covered; in 2018, it was more than a million. As a result of this action, more and more households are deciding to have their heating system modernised so that they consume less energy and reduce their heating costs.



Heating costs falling, comfort levels rising

The vast majority of home-owners who have had energy-efficiency retrofits undertaken on their houses or flats say that they are satisfied or very satisfied with them.



Energy-efficiency retrofits in houses and flats really pay off: not only do they reduce heating costs but they also raise comfort levels. This means that anyone who invests in energy-efficiency retrofits increases the value of their property, supports the transformation of energy system – and also benefits from state subsidies.

More than just hot air

Waste heat in companies can be used in many different areas.



Process heat: **30–90%** of waste heat can be used to pre-heat fresh air, for heating or to generate process heat.



Refrigeration/cooling systems: **35–95%** of waste heat can be used for heating or to generate process heat.



Compressed air: Up to **90%** of the electric drive power for air compressors can be used to heat water or service water.



Ventilation systems: **35–90%** of heat from discharged air can be recovered and re-used to pre-heat fresh air.

The energy transition in companies is moving forward. From 2020, the 'Using waste heat in commercial companies' programme will provide support for around 1,300 projects designed to help companies make better use of their waste heat and cut 1.4 million tonnes of carbon emissions each year. This is far more than was originally planned!

Energy efficiency as factor in competition

Innovative technologies reduce energy consumption



- ↓70% 1. Lighting
- ↓70% 2. IT systems
- ↓50% 3. Compressed air
- ↓30% 4. Heating
- ↓30% 5. Pump systems
- ↓30% 6. Refrigeration and cooling water systems
- ↓25% 7. Ventilation systems

Across Germany, the Federal Ministry for Economic Affairs and Energy supports around 220 energy efficiency networks in which companies can share information and save energy together. Businesses that produce their products using fewer resources and cut their emissions are able to operate at a lower cost than their rivals – and can therefore increase their competitiveness. Energy efficiency is a driver of new business models and innovative technologies and services that give German businesses an edge over their competitors from abroad.



*Clean solutions
for a clean industry*

.....
*Industrial processes now generate **28%**
less carbon emissions compared to 1990.*

German industry is becoming ever more environmentally friendly: Industrial processes are now generating around 28% less carbon emissions compared to 1990. Our consulting and funding programmes, especially those for industrial companies, have also contributed to this – for example the ‘Energy consulting in industry and commerce’ programme.

An isometric illustration of a port scene. In the foreground, a large white and blue ferry is docked at a pier. To its right, a yellow and blue cargo ship is being loaded or unloaded by a yellow crane. Further back, another cargo ship is docked. A lighthouse with red and white stripes stands on the left. In the background, a large building with a clock tower is visible. The scene is set against a dark blue background with a grid pattern.

87 MILLION EUROS FOR THE 'ENERGY TRANSITION IN TRANSPORT' INITIATIVE

From 2019 to 2021, the Federal Ministry for Economic Affairs and Energy is supporting the research and development of innovative solutions for synthetic fuels.

Electric cars are the cleaner alternative to petrol and diesel engines. But in shipping and aviation, using electricity is a lot more difficult. We are therefore promoting research on synthetic fuels so that large cargo barges and aircraft can also become much cleaner in the near future. This will enable us to make a decisive step forward in restructuring our energy system.



SAVING MONEY ON THE ROAD

*Electric cars can save drivers up to € 1,700
a year compared to a petrol-based engine.*

Electric cars not only play a part in implementing the energy transition, they also save a great deal of money – around 2,000 euros compared to a petrol-based engine. In order to raise the number of electric cars on our roads as quickly as possible, we are currently providing a purchasing premium of up to 4,000 euros, which is another reason to switch to an e-car soon.



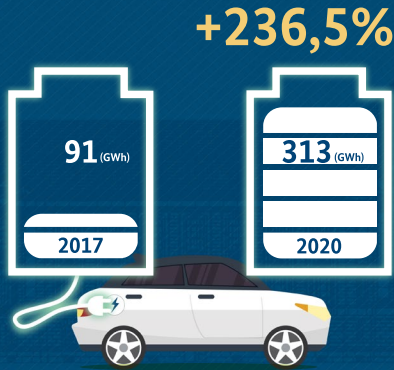
A clean alternative to petrol and diesel engines

At the start of 2019, there were more than 83,000 e-cars on Germany's roads – almost 30,000 more than in 2018. The Federal Ministry of Economic Affairs and Energy's purchasing premium is contributing to this development.

We have extended our purchasing premium scheme for e-cars. Anyone wanting to purchase a 100% electric car will continue to receive 4,000 euros from the state, and 3,000 euros for plug-in hybrids. The only condition is that the car must not cost more than 60,000 euros in its basic version. The extension of the scheme runs from 1 July 2019 to the end of 2020. Through this, the Federal Ministry for Economic Affairs and Energy is continuing to help raise the number of electric cars on the road – especially now that more and more models with larger ranges are coming onto the market.

GLOBAL BOOM FOR BATTERY-CELL PRODUCTION FOR E-CARS

The world will be able to manufacture battery cells with a total capacity of 313 gigawatt hours (GWh) in 2020.



German cars are among the best in the world. To make sure this also includes e-cars, Germany needs its own battery cell production. We have made a billion euros of funding available to assist with the development of battery cell production up to 2022.



An electricity grid for the energy transition

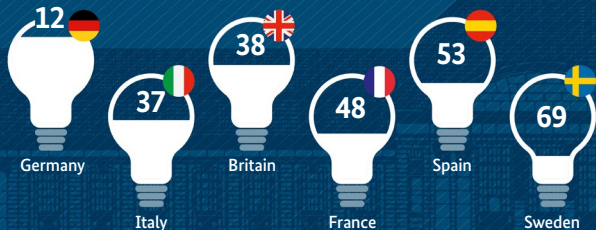
In order to make the energy transition a success, around 7,700 km of power lines need to be enhanced or built.

The building of new power lines for the energy transition is about to pick up speed. One reason for this is the revision of the Grid Expansion Acceleration Act (NABEG) which entered into force in May 2019. This speeds up and simplifies the approval process for erecting new lines as well as the optimisation of existing lines – without compromising civic participation and environmental protection.

A SECURE SUPPLY

*In a European comparison,
the German electricity grid is very reliable.*

Minutes without electricity per year (average):



The electricity supply in Germany is one of the most secure in Europe. Each citizen in the country has to go without power for an average of just 15 minutes a year – which is less than in any other comparable country in the EU. One of the factors that enables us to attain such a high degree of stability is crossborder electricity trading with our neighbouring countries, which is something we have been committed to for years.

SUPPORT FOR RESEARCH

Government funding of research and development in energy has almost doubled.

6th Energy Research Programme 2013-2017:

4,4 billion euros

+45%

7th Energy Research Programme 2018-2022:

6,4 billion euros



When it comes to restructuring our energy supply, we have already come a long way. At the same time, much remains to be done. Some of the solutions we will need in the future have not yet been developed. This is why the Federal Government is investing now even more in research and development in the energy sector than ever before. Its Energy Research Programme will provide around 6.4 billion euros for this task up to 2022. New areas of focus include transferring research results to practice more quickly, and using regulatory sandboxes. This will ensure that the energy transition continues to be successful going forward.

OUT WITH COAL, IN WITH INVESTMENT

*40 billion euros for the
structural transformation*



Coal is being phased out completely. So we now need to turn coal-mining areas into modern economies with attractive jobs. The key points paper on structural funding adopted by the Federal Government provides, for example, for the construction of new railway lines and the establishment of research institutions and federal authorities. The government is investing a total of 40 billion euros in the structural change. A further 240 million euros is available as immediate aid for the Länder concerned.

THE PHASE-OUT OF COAL HAS LONG SINCE BEGUN

Consumption of lignite and hard coal decreased in the first half of 2019 compared to figures for the first half of 2018.



2017



2018

The Coal Commission proposes that coal-fired power generation be terminated by 2038 at the latest. It is also identifying ways in which we can create structural change and indicating how Germany can achieve its climate targets in the energy sector. As this process takes place, it is crucial to ensure that the electricity supply remains secure and affordable and that the competitiveness of the German economy is maintained.

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