



Federal Ministry  
for Economic Affairs  
and Energy



Energiewende  
**direkt**

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## Cities of the future: these new neighbourhoods are all about protecting the climate



Buildings account for a very large share of greenhouse gas emissions. [Find out more](#)

# Cities of the future: these new neighbourhoods are all about protecting the climate

**Buildings account for a very large share of greenhouse gas emissions. But this does not mean that buildings cannot be energy-efficient. Six projects show how energy-efficient neighbourhoods are helping to move forward the energy transition.**



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More than a quarter of Germany's final energy is consumed in the homes, particularly for heating and taking showers. The problem is that many homes are poorly insulated or not insulated at all and that their heating systems are often outdated. As a result, the German building stock accounts for more than 30 per cent of the country's total carbon emissions. The Federal Government has set itself the goal of reducing carbon emissions by 80 per cent by 2050 compared with 2008 levels. In order for this goal to be achieved, German buildings and entire neighbourhoods need to become more energy-efficient and climate-friendly. This is a huge challenge, but – with the help of the Federal Government – it can be mastered.

## **Six flagship projects show what the city of the future could look like**

The Federal Ministry for Economic Affairs and Energy has a wide range of funding programmes that are tailored to the needs of homeowners. In addition to this, the Ministry works with the Federal Ministry of Education and Research to transform the use of heat in buildings and neighbourhoods. Under the 'solar construction/energy-efficient cities' programme, funding is available not only for the energy-optimised construction, renovation and operation of buildings and neighbourhoods, but also for connecting the sectors of electricity, heat and mobility in a smart manner. This includes using renewable energy for heating, cooling and for powering vehicles (for more information, please click [here](#)).

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Six flagship projects have been initiated to show ways in which this can be done in practice. They will receive a total of €100 million from the two Ministries for this. The goal of the projects is to develop and test a number of approaches under real-life conditions, making sure that these can be transferred to other neighbourhoods and cities across Germany.

## **From sewing machines to solar facades**

For more than 150 years, the premises of Pfaff AG, a company located in the city of Kaiserslautern, were used to produce sewing machines. Now, the industrial site is about to be turned into a climate-neutral neighbourhood for both residential and commercial use, where new technology will be developed, demonstrated and optimised. The idea is to develop and test coordinated solutions for energy supply, buildings, electric mobility and digital networking. The energy for the neighbourhood will be supplied via a smart grid in which all electricity generation facilities, electricity consumers and storage units will be connected with one another. This helps match supply and demand in the best possible manner. Rooftop solar panels and innovative solar facades are used to generate renewable energy directly where it is needed. The renewable energy can be used for charging electric cars. At the same time, these cars can serve as storage units, using the charging stations to feed back electricity from their batteries into the grid.

## **Using surplus electricity from wind farms**

At the end of February of this year, the city of Heide, located in Schleswig-Holstein, launched the QUARREE100 project. Under this project, the city's Rüdorfer Kamp neighbourhood – a patch of land of 20 hectares – is to be supplied with renewable energy that is generated directly in the neighbourhood and also with energy from wind farms located in the north of Germany. Most of Germany's wind power is generated in the north of the country, often more than can be fed into the grid, leading to wind turbines having to be switched off. This is to be avoided by using some of this electricity to power neighbourhoods. In addition to this, QUARREE100 seeks to optimise battery and gas storage units, so that any surplus electricity can be stored and used at a later point in time. When it comes to mobility, the project also provides a number of different options for powering vehicles, from hydrogen generated from renewable sources, to methane and electricity.

## **Connecting energy producers and consumers in the neighbourhood**

Another flagship project is being implemented on the former Fliegerhorst airbase in Oldenburg. Under this project, an energy-efficient neighbourhood featuring around 110 residential units will be built under the motto 'connecting energy producers and consumers in the neighbourhood'. The main goal is to generate the bulk of the neighbourhood's energy locally and prevent any energy from being wasted. Energy producers and energy consumers are to interact directly with one another. Any surplus energy will be converted into other forms of energy and stored (for more information about the energy-efficient neighbourhood, please click [here](#).)

## **Linking up smart homes to form a smart street**

In Zwickau, urban planners are working towards making housing climate-neutral by using connected and smart technology. The residents of a housing project entitled "Demonstrating the Energy Transition in Zwickau (ZED)" are to be supplied with heat and energy at exactly the times when they need it. Whilst the heat is supplied via heat pumps, the electricity is generated by solar installations.

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Any surplus electricity is stored. In the first stage of the project, regular homes are upgraded to smart homes that integrate heating systems and electricity consumers into a smart network. This means that every smart home can identify its energy needs and supply its residents accordingly. In the second stage of the project, the individual smart homes are then linked up in a way that allows the supply of heat and energy to be controlled along the entire street and in a smart manner. What is special about the Zwickau project is that it focuses on affordable housing: the idea is that everyone should be able to afford to live in an energy-efficient and climate-neutral home, irrespective of how much they earn (to find out more about the project, please click [here](#)).

## Connected across neighbourhood borders

The city of Esslingen is currently building its new 'Neue Weststadt' neighbourhood, which is to be entirely carbon-neutral. The neighbourhood, which is to provide around 500 residential units plus commercial areas, office space, a hotel, and several higher-education buildings, is to be completed by 2025. [Power-to-heat](#) (P2H) and [Power-to-gas](#) (P2G) are to ensure that the neighbourhood will be carbon-neutral. The hydrogen which forms during the P2G process can be used for heating, generating electricity, and powering vehicles. 'Neue Weststadt' is also to be connected in a smart manner, and not only within the neighbourhood itself; it is also to be linked up with adjacent neighbourhoods (for more details about the 'Neue Weststadt' in Esslingen, please click [here](#)).

## An interactive neighbourhood app

The sixth flagship project – 'Stadtquartier 2050' – is being carried out under the motto 'Working together to master challenges'. Two neighbourhoods, one located in Stuttgart and one in Überlingen am Bodensee, which together account for more than 960 housing units, are to demonstrate how innovative solutions can help make buildings carbon-neutral, whilst ensuring that housing remains affordable in an already tense housing market. This is being done, for example, by linking up renewable energy installations located in the neighbourhood with a district-heating network and heat and electricity storage facilities. In addition, buildings are fitted with high-quality thermal insulation. Furthermore, an interactive neighbourhood app has been developed, through which residents are to be rewarded for energy-efficient behaviour. The project is to be launched before the end of this year.

## Berlin Energy Days from 7 to 9 May

Presentations of the six lighthouse projects will be given on 8 May 2018 as part of the [Berlin Energy Days](#) (detailed information on the event in German only). The Energy Days are the annual showcase event for the German energy transition. Held for the first time in 1999, the event has developed into a key forum for promoting dialogue between policymakers, practitioners and researchers at the Federal level. The Energy Days feature more than 50 specialist sessions which are targeted at political decision-makers, regulators, associations, public institutions, energy experts, architects, engineers and advisors. Around 350 experts are expected to attend the event.

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### FURTHER INFORMATION

[↪ Research on energy-optimised buildings and neighbourhoods](#)

[↪ 2018 Berlin Energy Days website](#)

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# A fresh boost for the energy transition

29,844 – that’s the number of on and offshore wind-powered installations in Germany as of 2017. It’s 1,622 more than in the preceding year. Germany’s total wind power capacity now exceeds 50,000 megawatts onshore and 5,000 megawatts offshore.



Onshore wind power reigns supreme: it is by far the most important source of renewable energy in Germany, at a capacity of 50,000 megawatts (MW) at the end of 2017. This represents an impressive increase year-on-year. In 2017, the rate at which new capacity was being added (gross addition) soared up 15 per cent. That's an all-time high! There are now 28,675 onshore wind turbines in Germany, which is 1,405 more than at the end of 2016. Offshore, particularly in the North Sea, there are now 1,169 wind turbines generating electricity – an increase of 222 over the preceding year.

## **Onshore wind: Lower Saxony in the lead**

Lower Saxony defends its position as the German state with the most onshore capacity (currently 10,582 MW). That's more than a fifth of Germany's overall onshore wind power capacity. In second place is Schleswig-Holstein with 6,863 MW, closely followed by Brandenburg with 6,794 MW. Lower Saxony was again also the state that added the most new capacity year-on-year, accounting for almost 27% of all of the onshore capacity constructed in Germany last year. North Rhine-Westphalia also created a large amount of new capacity last year. It accounted for 16 per cent of Germany's new onshore capacity, putting it in second place. There are now 3,630 wind-powered installations operating in North-Rhine Westphalia, with a combined capacity of almost 5,500 MW. When it comes to total installed onshore capacity, North-Rhine Westphalia is now in fourth place, relegating Saxony-Anhalt into fifth.

## **Offshore wind: North Sea tops Baltic Sea by a wide margin**

There are 997 offshore wind-powered installations with a combined capacity of 4,695 MW in the North Sea, putting it a cut above the Baltic Sea, whose combined capacity from its 172 installations totals 692 MW. This means that 87 per cent of Germany's offshore installations are located in the North Sea, with the remaining 13 per cent in the Baltic Sea. The amount of new capacity created in the North Sea last year also clearly exceeds that of the Baltic Sea, with 897 MW compared to 354 MW.

## **Central Germany is Germany's onshore powerhouse**

Central Germany is the region boasting the largest share of onshore wind installations in Germany. Together, North-Rhine Westphalia, Thuringia, Saxony, Saxony-Anhalt, Brandenburg and Berlin account for 43.4 per cent of Germany's total capacity. This compares to a slightly smaller share of 41.4 per cent of Germany's total capacity in Germany's northern states (Lower Saxony, Schleswig-Holstein, Mecklenburg-Western Pomerania, Bremen and Hamburg).

## **The south is catching up**

Southern Germany uses a lot of solar power. The capacity of its wind-powered installations, however, is comparatively small, with Rhineland-Palatinate, Saarland, Baden-Württemberg and Bavaria accounting for a mere 15.3 per cent of Germany's total. This represents a slight increase of 0.6 percentage points, at the expense of the two other regions which each have lost 0.3 percentage points. The figures show just how necessary it is to build strong power lines connecting the north with the south, not least so that the wind power generated in the north can be distributed across the whole of Germany. In his policy statement, the new Federal Minister for Economic Affairs and Energy,

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Peter Altmaier, said: “The energy transition will succeed if we make progress on grid expansion. This is why I want to speed this up.”

## **Repowering – Replacing old wind-powered installations with better ones**

Every year, some onshore wind-powered installations are of course dismantled or decommissioned. In 2017, this happened exactly 387 times. There are various reasons why this may happen. Installations may have reached the end of their operating life or they may be subject to repowering. This is a process that involves existing installations being replaced with more modern ones that operate in the same location, but can generate much more electricity in a more efficient way. This can be seen from the average performance of old and new installations: the installations that have been dismantled had an average capacity of 1,200 kilowatts, compared to more than 3,000 for the new ones. In 2017, 315 repowered installations began their operating life.

These figures for 2017 were provided by German WindGuard GmbH, the company commissioned by Arbeitsgemeinschaft Offshore-Windenergie, the WindEnergie association, the Offshore Wind Energy Foundation, the WAB agency, and VDMA Power Systems to provide data on Germany’s on and offshore capacity every six months. Furthermore, the Onshore Wind Energy Agency used the register of facilities populated by the Bundesnetzagentur to find out about the number of wind turbines that were newly installed in 2017. Whilst the results of the two studies are close, the slightly different methods used have resulted in minor differences in the findings.

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### FURTHER INFORMATION

[\[→ Information about renewable energy\]](#)

[\[→ German WindGuard: Onshore and offshore wind energy statistics for 2017\]](#)

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# The energy transition going global

A growing number of countries in the world want to be part of the energy transition. Bilateral energy partnerships can help find suitable energy solutions. The Berlin Energy Transition Dialogue was also looking for possible ways to further improve this cooperation.



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As with wind power being used in Mexico, solar thermal installations in Morocco and hydrogen-powered buses in South Africa, it is obvious that the energy transition has turned into a global movement. Like Germany, many countries across the globe are seeking to fundamentally overhaul their energy systems, moving away from fossil fuels such as coal and gas to renewable energies that are compatible with the environment and our climate. Depending on where each country starts from and what its priorities are, there will be very different different ways to achieve this. Geography, natural resources and GDP all need to be factored in. There can be no perfect solution that would work everywhere. The energy transition is presenting Germany with major challenges, and the same is true of many other countries.

But despite the need for different strategies, it is often possible to take individual solutions and adapt them to a new context. Often it just takes a little tweak or two to adjust a strategy or technology that has proved successful in Germany to the needs of another country. This is why, for more than ten years now, Germany has been engaged in dedicated energy partnerships and dialogues with various individual countries.

## Join forces to speed up the energy transition and bring down its cost

Germany's energy partnerships and dialogues are designed to foster dialogue with partnering countries about the energy transition, and to allow for both sides to learn from one another. Items on the agenda include the expansion of renewables capacity, energy efficiency, grid and systems integration of renewables, and grid expansion. If both sides can find better solutions for these issues,



this is good news for their economies and for the global energy transition, which will proceed more quickly and – thanks to economies of scale – at a lower price. Across the globe, funding rates for renewables are decreasing where they are determined by way of auction, as is the case in Germany and other countries. In Mexico, for instance, average funding rates for solar and wind power have dropped to little more than two U.S. cents per kilowatt hour. The lowest rate for funding paid for a solar installation in Saudi Arabia is currently 2.2 U.S. cents per kilowatt hour. The United Arab Emirates has also posted a new record low of funding, in this case 7.3 U.S. cents per kilowatt hour for a solar thermal power plant. And Germany is no exception. In fact, funding rates have been halved compared to 2015 levels: the lowest rate for solar power is now 3.86 euro cents per kilowatt hour, the figure for onshore wind power is 3.8 cents, and three offshore wind installations are already able to manage completely without funding – with operators relying entirely on the prices paid on the power market.

## **Eleven energy partnerships, seven energy dialogues**

Germany is engaged in closer cooperation on the energy transition with almost 20 countries now, all trying to further speed up the process and reduce its cost. Among the countries Germany is working with are Brazil, China, India and Mexico, which which it has formed energy partnerships. The country is also engaged in energy dialogues with Japan, Russia, the USA and others. Last year in 2017, new dialogues were launched with the United Arab Emirates, Australia and Iran (for more information, please consult the 2017 Annual [Report](#)). The Federal Ministry for Economic Affairs and Energy is the lead ministry for the German side in the energy partnerships and dialogues. These instruments also help German companies working in the energy sector gain better access to foreign markets and investment opportunities. In this way, they work in concert with the Energy Export Initiative launched by the Federal Ministry for Economic Affairs and Energy and designed to support SMEs working in energy as they venture onto new markets ([click here to learn more about the Energy Export Initiative](#)).

## **A time to make friends: The Berlin Energy Transition Dialogue**

The annual Berlin Energy Transition Dialogue (BETD), which has been hosted by the German Federal Government on 17 and 18 April 2018 at the Federal Foreign Office, aimed to add fresh momentum to the global energy transition. It was the fourth consecutive gathering of ministers and other high-ranking policy-makers, business representatives, scientists and civil society activists. They were all coming together to discuss the latest trends, multilateral agreements and promising business models: In what ways and how fast are blockchain technology, virtual power plants and smart business ideas changing the world's energy markets? Does the future belong to electric mobility or to synthetic fuels? How can we meet the targets set out in the Paris Agreement? And what should be the energy sector's contribution to this?

## **Recent studies analysing the global energy transition**

The Federal Ministry for Economic Affairs and Energy, which co-hosted the conference together with the Federal Foreign Office in a lead capacity, has commissioned two studies to be published in time for the BETD. One will be presented by the International Energy Agency (IEA), which will be focusing on the role of energy efficiency in the global efforts to reach the Paris climate targets (available soon on the BETD website). The [second study](#), which has been conducted by the International Renewable Energy Agency (IRENA), looks at the role of renewables and their contributions to the global energy

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transition. Both texts will provide new insights that are relevant to decision-makers from the political sphere.

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#### FURTHER INFORMATION

[\[→ International energy policy\]](#)

[\[→ BETD website\]](#)

[\[→ 2017 Annual Report on the Energy Partnerships\]](#)

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## The EU Energy Label –or what you’ve always wanted to know about your household appliances

How much electricity does a new appliance need? What else can the energy label tell me? The label guide has all the answers. Please read on to learn more.



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**The EU energy label provides important information about the appliance’s electricity consumption and other characteristics that can help you make your purchasing decision.**

There is a good chance that the EU Energy Label can help you tell in advance whether you will be happy with a certain new household appliance. A growing number of people check out the label to find out about the device’s energy efficiency category. Green stands for high efficiency, red for low efficiency. But what is all the information in the lower half of the label about?

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## Energy efficiency and beyond

If you look at the label of a dishwasher, you will find that the first piece of information given below the colour-coded bar is the appliance's electricity consumption in kilowatt hours (kWh) for 280 cycles per year. An appliance in the A+++ efficiency category uses 230 kWh, compared to 290 kWh for an appliance classed in the A+ category. This difference of 60 kWh translates into savings of roughly €17 per year.

The tap icon located on the left-hand side below the information on electricity consumption shows how much water is used by the appliance for 280 cycles per year. Less than 10 litres per cycle counts as a good performance. For 280 cycles a year, this means up to 2,800 litres. If the device needs 12 litres per cycle, this adds up to an annual water consumption of 3,300 litres, or 500 litres more, costing an additional €2 per year.

The symbol located to the right-hand side of this information, representing a steaming plate, indicates how good the device's drying ability is. This performance is rated from A to G or best to worst. All of the standard dishwashers available fall into category A. It is only smaller (tabletop) devices that are sometimes classed as category B. Categories C to G are not used in practice.

The icon representing dishes allows consumers to see whether the device has the right capacity for their household. It shows how many covers (each consisting of a plate, soup plate, dessert bowl, cup, saucer, a glass, and five pieces of cutlery) fit into the dishwasher. A device that is 60 centimetres wide can usually hold up to 14 standard covers, which is ideal for mid-sized households of three to four people. A typical 45 centimetre appliance can only be used for up to 10 covers at a time. It may well make sense for small households or single people to opt for a 60 centimetre device, as these are often more efficient when it comes to power and water consumption.

The loudspeaker symbol located at the far right side of the label indicates the level of noise generated by the appliance (in decibel or dB). Devices are considered to be quiet if they generate a maximum of 40 dB, which is about the same as a fan. 30 dB is the amount of noise caused by whispering. Noises of 80 dB or more are perceived to be loud.

## The label guide is part of the National Top Runners initiative

As you can see, it makes good sense to look at the small print of the energy label – and not only of those attached to dishwashers. The Federal Ministry for Economic Affairs and Energy has developed a label guide as part of its national Top Runners initiative. The guide is designed to support consumers in their quest for energy efficient appliances. It is available for: washing machines, tumble dryers, refrigerators, dishwashers, TV sets and LED lamps. Step by step, the label guide navigates consumers towards the energy efficient appliances that best suit them, thus helping to save a great deal of money in energy costs. An average household can save up to €100 in electricity costs per year, simply by using a tumble dryer classed as A+++ , compared to a class B device.

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### FURTHER INFORMATION

[↪ Energy efficiency of products](#)

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# A debate on an equal footing

**Federal Minister for Economic Affairs Mr Altmaier regards swift grid expansion as a crucial priority for energy policy. Dr Peter Ahmels, who co-chairs the citizen's dialogue on the electricity grid, tells us what the public is asking about grid expansion.**



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**In 2015, the Federal Ministry for Economic Affairs and Energy engaged with members of the public directly affected by plans for the electricity grids and launched a dedicated public dialogue on grids. Many members of the public have used this tool to tell the government about their questions and concerns about grid expansion. Dr Ahmels, you are heading up the public dialogue on the electricity grid. What do you think is your most important task in this?**

Dr Peter Ahmels: We regard ourselves as brokers of dialogue and are trying to pave the way for constructive discussions between all stakeholders, especially the public. Whenever a new electricity line is being planned, there are many legitimate interests and often these are contradictory. The first step towards a facts-based and respectful dialogue is to give everyone the chance to be heard. This may sound trivial, but it is not.

**What are the challenges associated with this?**

First of all, creating a form of dialogue that all the stakeholders regard as constructive is anything but a trivial matter. Second, the issue itself is complex. We don't want a situation whereby dialogue proves impossible from the outset, simply due to different levels of knowledge. We want a dialogue of equals, which is why we try to provide information as early on as possible, answer questions and seek to explain the relevant issues and interdependencies in a way that is easy to understand. Most importantly, we want to explain to the public how they can become involved in the planning and approval proceedings.

**In Germany, members of the public can become involved in the process not only once the**

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**project has reached the planning stages, but already at the stage of the needs assessment, which is when scenarios are being developed and the network development plan defined. But does the public really make use of these opportunities?**

Not as much as they should. There are many technical terms that are not understandable for laypeople without additional explanations. It is true and good that we have these formal possibilities for the public to get involved, but they are often not enough. The problem is that many members of the public only start to become involved once they realise that they are personally affected, for instance by construction work. This is at a point when it is too late to make any substantial changes to the energy system.

This is why we try to make the public aware of any projects by which they may be affected and to explain to them how they can become involved in the formal procedure and also informally. More specifically, we are answering the following questions: What is being planned? Where can I find information? How can I become involved? What are the relevant dates and deadlines? In many cases, this is rather painstaking and laborious work, but it is the only way to get people involved.

**How can I find out if there are plans for a new electricity line in my municipality or region?**

You can use the [map on our website](#) to gain a good overview. The map provides information on all of the projects that have been confirmed by statute. It can be used to see whether a certain region may be affected. There is a brief data sheet for each project, complete with links to all of the relevant stakeholders such as project managers and regulatory authorities.

We also offer citizen's consultations and information events locally, bring our 'dialoguemobile' to town, and visit town halls and mayors. Of course, we also contact the local press of the regions affected by new projects and keep the news outlets informed.

**What can members of the public do if they discover that they may be affected and have questions?**

Our regional managers based in the ten citizens' bureaus will be happy to answer all your questions and queries. You can ask them in person, using our hotline or by email. You can also use our 'citizens' bureau online'.

Members of the public who want to play an active role in the planning procedure and the definition of the power line routes should definitely take note of the dates of the public application conferences. We would also encourage people to make use of the opportunities for public participation offered by the transmission line operators prior to the beginning of the statutory planning and approval procedures. Whilst these opportunities are of an informal nature and therefore non-binding, they help project managers gain information about local particularities.

**What are the questions the public finds the most important?**

There is a large variety of questions and issues, ranging from more general questions about the link between the energy transition and grid expansion to debates on whether certain power lines are really needed, questions about potential technical alternatives and concerns about the environmental impact, the landscape and electromagnetic fields. Which of these questions are considered to be the most pressing depends on the nature of the project and the stage of the planning.

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Thank you very much for talking to us.

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#### FURTHER INFORMATION

[\[→ Website of the citizens' dialogue of the electricity grid\]](#)

[\[→ An electricity grid for the energy transition\]](#)

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## Quote of the week



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“The energy transition will succeed if we make progress on grid expansion. This is why I want to speed this up.”

**Peter Altmaier, Federal Minister for Economic Affairs and Energy**

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