

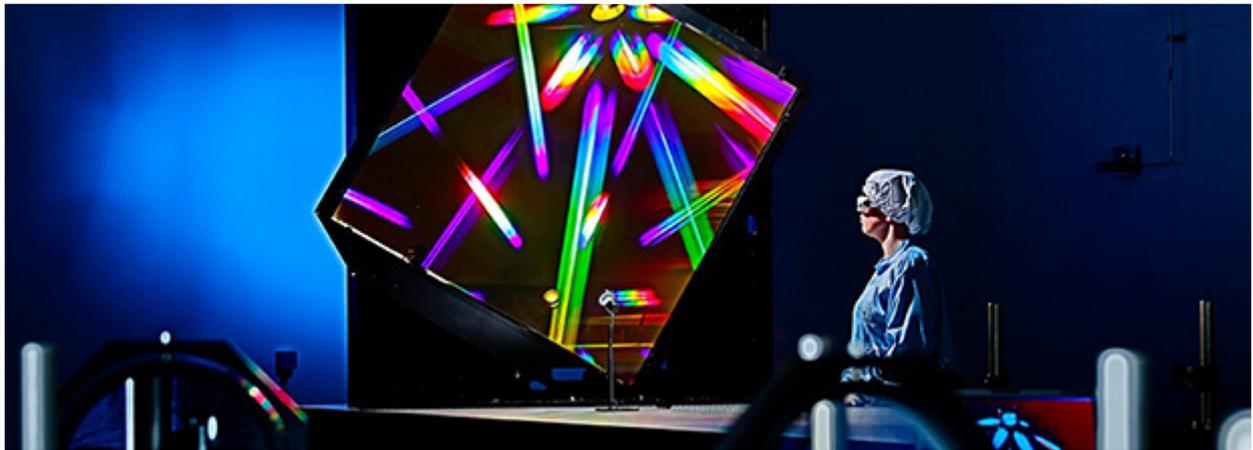


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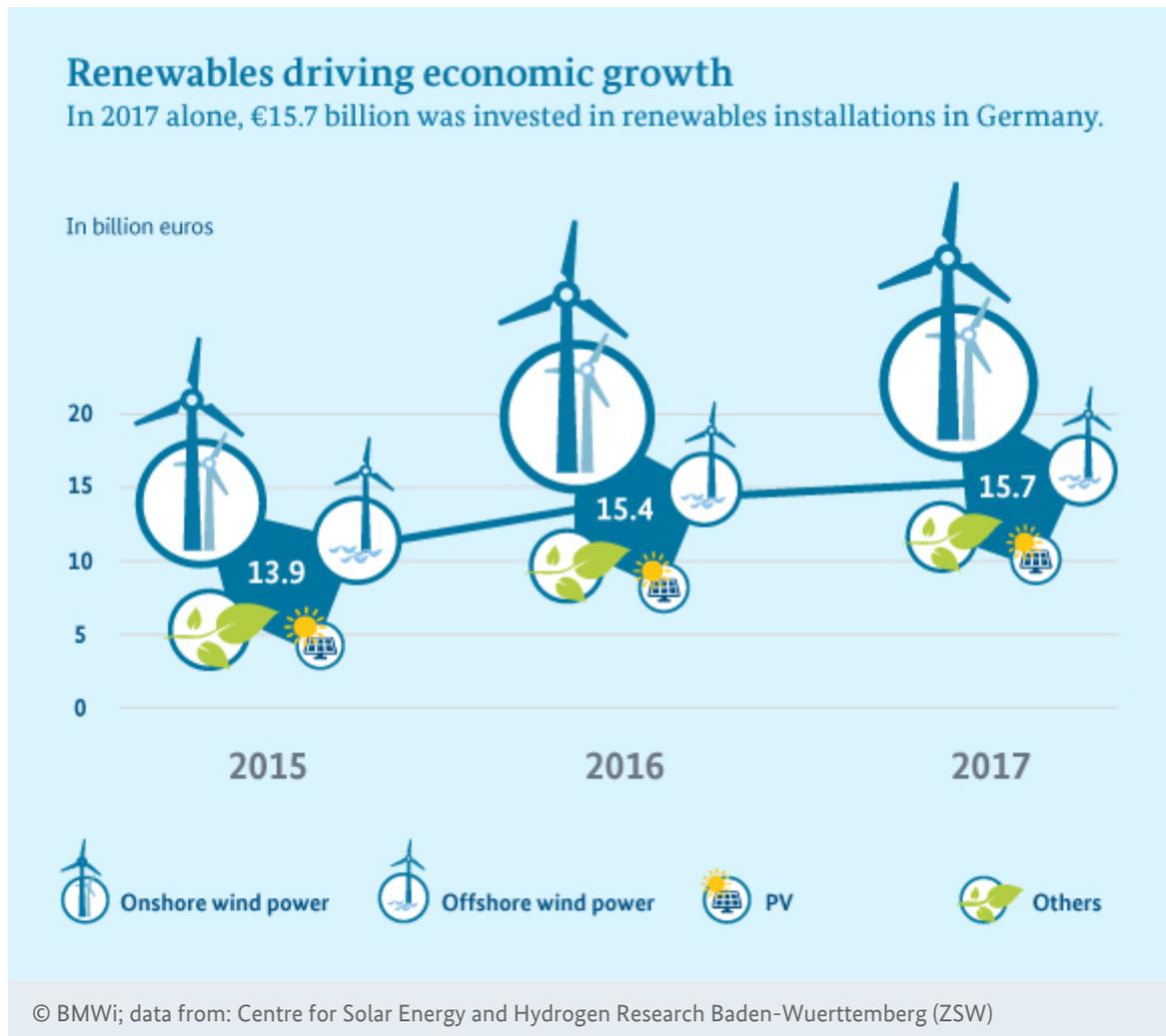
## Energy research 7.0: From the lab to real-life application



Germany's 7th Energy Research Programme comes with a number of new features, many of them designed to speed up the transfer of research outcomes into actual

# Investment in renewables up nationwide in 2017

Almost €16 billion was invested in new renewables installations in Germany last year. This means Germany continues to invest more in renewables, defying the international trend.



2017 was the second consecutive year which saw Germany's investment in renewables installations rise, in this case from €15.4 billion to €15.7 billion. This means that Germany continues to defy the global trend towards fewer investments (for more details, please refer to the September edition of this newsletter [here](#)).

## Renewables have become a driver of economic growth

Recent figures demonstrate that the energy transition has become a driver of economic growth in Germany. This is particularly so if you factor in not only the investments in new installations, but also the maintenance and operating work for existing ones, which add another €16.2 billion to the overall figure. And it is especially in this field that a large number of local companies have created a substantial number of jobs.

## Wind energy: strong. PV: weak, but stable

Investment in wind energy was particularly strong last year. Tallying €10.7 billion, these investments accounted for almost 68% of all investments in the renewables sector. In fact, wind energy has been able to further increase its dominance ever so slightly compared to the preceding year (almost 67%).

In terms of the overall development since 2010, however, investments fell from €28 billion in 2010 to just under €14 billion in 2015. The main culprit here is PV. The number of new installations being added has fallen considerably, with prices for individual modules also falling drastically. Considering this, it is all the more impressive to see that overall investment in renewables has been continuously rising again since 2015. Germany, which has a large stake in the value chain for planning, constructing and assembling installations, benefits a great deal from this investment.

Other renewables (electricity and heat from biomass, hydropower, solar, geothermal and ambient heat) accounted for a combined investment of €3.4 billion in 2017 (just over 21% of overall investments). Investment in solar thermal installations, hydropower and heat from biomass fell year-on-year, whereas investment in geothermal energy (including ambient heat) and electricity from biomass grew.

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### FURTHER INFORMATION

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

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# Reactive power. How to keep up the voltage in the electricity grid?

It is crucial for the voltage in the electricity grid to be kept extremely stable to prevent damage to electrical appliances. This stability is created by feeding reactive power into the grid. Want to learn more? Here is how it works.



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**Reactive power is used to ensure that the voltage is just right for electrical devices to work properly and without being damaged.**

The current of electricity that flows in our grids brings energy to our consumers. It is important for this energy to have a voltage of precisely 230 V when it arrives. This leaves very little margin for fluctuations. Electrical devices are designed to be operated at 230 volts. Use a higher or lower voltage and your device might stop working or even break.

## **Reactive power is there to keep the voltage stable**

Achieving a stable voltage level is hard work. After all, the transport of electricity also affects its voltage level.

But what exactly is reactive power? Scientifically speaking, it is the part of the current that does not transport energy. In any grid using alternate current (AC), as ours do, there is always reactive power. And there are many points in our grids where we need to feed in or take out the right amount of reactive power at the right time, so as to keep the voltage at the right level.

## **Like water for long-distance runners**

Let's make this a little easier to understand and think of the flow of current as a long-distance runner. Facing a long stretch of tarmac, the runner needs food that gives him the energy he's going to

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use. But that's not enough. To prevent his body from dehydrating, he also needs to drink something from time to time.

The water he drinks does not give him energy, it does not have a single calorie. Nevertheless, the runner needs to take a sip of water from time to time – or else he will collapse. His body needs the water as a kind of transport medium. In the same way, electric energy needs reactive power to be transported successfully.

## **Renewables are capable of producing reactive power**

Until now, the bulk of the reactive power in our grids has come from the major power plants. These can simply adjust how much reactive power they want to feed in or take off the grid. They provide this service as a kind of auxiliary task, given that their main purpose is to feed power into the grid. The network operators keep the power plant operators informed as to how much reactive power they need at each point and at any given time. This ensures that the voltage is kept stable.

Renewables installations, such as solar or wind installations, can also provide reactive power. This is highly important, given that they are increasingly replacing large power plants, many of which are either shut down completely or only used at peak demand. For this reason, operators of renewables installations are now obliged to feed in certain amounts of reactive power into the grid. This allows the network operators to rely on many individual installations to provide the reactive power they need.

## **Developing solutions together**

Whilst the work of a network operator has always included the task of keeping the voltage stable, there are still many questions that need answering: How should network operators choose which operator of an installation should provide what amount of reactive power? What is the process for requesting that reactive power? Are the operators of an installation providing reactive power entitled to payment for this service? If so, how should the amount be calculated and prices determined? These are just some of the questions that are currently being addressed by the Commission for the future provision of reactive power, a body established by the Federal Ministry for Economic Affairs and Energy. It brings together representatives of manufacturers and operators of power installations, network operators and consumers of electricity, who all seek to find answers to these questions.

The Commission held its first meeting on 17 September 2018 and plans to convene every three months. The next meeting is scheduled for 4 December. We will keep you informed.

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### FURTHER INFORMATION

[\[→ Grids and grid expansion\]](#)

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## Quote of the week



“The key to a successful energy transition is digitisation and sector coupling. New innovations will allow us to make progress not only in the power sector, but also in the crucial heat sector. This will help the climate. Climate-friendly energy technology ‘Made in Germany’ is in demand across the world – and we want to keep it that way.”

**Peter Altmaier, Federal Minister for Economic Affairs and Energy, speaking about the 7th Energy Research Programme launched by the Federal Government**

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## Renewables’ use expands across the globe

**The use of renewables is being expanded not only in Germany, but on a global scale. Last year, a total capacity of 178 GW of renewables was built across the globe, accounting for 70% of all new power capacity. These are the findings of the Renewables 2018 Global Status Report (GSR). According to the report, global investment in renewables installations was twice the amount of investments in power plants powered by fossil fuels or nuclear. The lion’s share (75%) of the investment was made in China, the U.S. and Europe. Whilst the energy transition is making good headway in the power sector, a lot remains to be done in the heating/cooling and transport sectors. Other challenges that remain are the growing demand for energy and carbon emissions from the energy sector, which both saw the first marked increase in four years.**

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# Call for abstracts for the ‘International Conference on Monitoring & Process Control of Anaerobic Digestion Plants’ open until 31 October

The fourth ‘International Conference on Monitoring & Process Control of Anaerobic Digestion Plants’ will be held in Leipzig on 26 and 27 March 2019. The focus of this conference will be on the latest developments and best practices in the field of biomass installations, and on networking. There will also be an exhibition. The deadline for abstracts is 31 October 2018. The conference is taking place of the ‘energetic uses of biomass’ programme funded by the Federal Ministry for Economic Affairs and Energy, a programme designed to promote the cost-effective and energy-efficient use of biomass in the electricity and heating markets.

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