



## Cutting back on electricity costs without compromising on taste!



It is peak season in the kitchen, the stove and dishwasher are running non-stop – using efficient equipment means significantly cutting back on electricity costs. [Find out more](#)

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Wafts of cooking come from the oven while the refrigerator keeps the desserts cool. The dishwasher is used to clean the dirty plates. Winter is a time when many of these kitchen appliances are used all the more often. If the freezer and similar appliances were bought a while ago and have since become out-dated, the electricity bill can really add up fast. Now, before the Christmas rush begins, is a good chance to put your electric kitchen appliances to the test and to take a look at how you use them. This could lead to lower electricity costs and more money for delicious ingredients.

## Identifying energy-efficient appliances

New appliances use significantly less electricity than older models, which makes the investment pay off very quickly. Let's look at an example: a fridge-freezer with 270 litres of capacity that is used for twelve years uses 400 kilowatt hours (kWh) of electricity a year. The electricity costs add up to about €120 per year. A modern appliance of the same size only uses about 150 kWh over the same period. The annual electricity costs therefore drop significantly, falling by a sizable €75 to around €45.

By setting the temperature inside of the refrigerator to a maximum of 7 degrees and correctly sorting the food, electricity consumption can be reduced even further.

## Not just one, not two, but three electric appliances are in use while cooking and baking

While cooking and baking, a total of three electric kitchen appliances are used: the oven, stove and the extraction hood. If one of these needs to be replaced, you can consult the EU Energy Label (find out more [here](#)). The Label, however, is only a requirement for extraction hoods and electric or gas ovens. It is not required for stoves, for which this purchasing aid is really lacking. Gas stoves are the most energy efficient, followed by induction stoves. A few simple tips can help you cook energy efficiently regardless of what type of stove you are using. In general, about three times as much energy is consumed when the pot on the stove does not have a lid on it. You can save up to 30 per cent of the energy you use by making sure that the size of the pan base matches that of the stove.

## Paying attention to size and water consumption of a new dishwasher

Less electricity is needed for dishwashers that have a lower water consumption, as the electricity is used to heat the water. When buying a new dishwasher, it is important to pay attention to its size, as smaller households do not produce as many dirty dishes. If the machine is only half full, it uses more electricity and water than is actually necessary.

The considerable savings potential that can be unlocked through using energy-efficient appliances in the home not only applies to those used in the kitchen. Find out how the Top Runner Initiative is helping here in this [article](#).

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### FURTHER INFORMATION

- [\[→ Website of 'Germany makes it efficient' \(in German only\)](#)
  - [\[→ Information website of the National Top Runner Initiative](#)
  - [\[→ Energy efficiency](#)
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# Leading wind power in Europe

The energy transition has boosted the use of wind energy. Almost one third of the total EU wide capacity is installed in Germany. Spain and the United Kingdom are in second and third place.



Germany is clearly in the lead when it comes to the level of installed wind energy capacity in individual Member States of the European Union. Almost 45,000 megawatts (MW) of the EU-wide capacity of around 142,000 MW that was installed by the end of 2015 is located in Germany. This is a share of 32 per cent. Spain follows with around 23,000 MW (16 per cent) in second place, the United Kingdom in third with around 13,600 MW (10 per cent).

Germany was also leading in the growth of wind turbines in the EU last year. A total of 46 per cent of the 12,800 MW of newly installed wind power capacity came from new installations in Germany. This was followed by Poland, with just under 10 per cent, France, with just under 9 per cent, and the United Kingdom with just under 8 per cent.

## **Wind energy covers 11 per cent of electricity consumption in the EU**

Wind turbines in the EU generated a combined total of more than 300 terawatt hours of electricity in 2015 and therefore covered around 11 per cent of the total electricity consumption. Germany is clearly in the lead when it comes to the level of installed wind energy capacity in individual Member States of the European Union. Almost 45,000 megawatts (MW) of the EU-wide capacity of around 142,000 MW that was installed by the end of 2015 is located in Germany. This is a share of 32 per cent. Spain follows with around 23,000 MW (16 per cent) in second place, the United Kingdom in third with around 13,600 MW (10 per cent).

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FURTHER INFORMATION

[➔ Information portal on Renewable Energy](#)

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# Do we need to use expensive biomass as a flexible option in the electricity market of the future?

Managing Director of the German Biogas Association, Dr Claudius da Costa Gomez, and Executive Director of Agora Energiewende, Dr Patrick Graichen, give their answers to this question.

FOR: DR CLAUDIUS DA COSTA GOMEZ



Dr Claudius da Costa Gomez ©  
Fachverband Biogas e. V./Thomas  
Geiger

Every kilowatt hour of electricity generated by biogas plants will be more expensive than electricity from onshore wind power, photovoltaics and water power for as long as there are no real markets for electricity and carbon emissions. If these were to exist, coal-fired power plants would soon be shut down and flexible options for renewable energy would enter the market faster. This would finally drive forward a renewable heat market, and would mean another product from biogas plants would be on offer for a reasonable price. This would make electricity generated from biogas even cheaper.

In the future, a combination of biomethane facilities and power-to-gas systems will transform hydrogen and carbon dioxide into biomethane, which will be stored in the existing natural gas networks and transported to areas where it is needed. Biogas technology therefore offers solutions to two basic issues of the energy transition: we store renewable energy in such a way that there is enough electricity wherever and whenever it is needed.

Should there be no demand for biomethane on power markets, in spite of expectations, it can also be used for renewable mobility in ships and other heavy goods transport. Did you know that every other lorry in the USA is operated by gas? Investing in biogas plants is well worth it, regardless of what the requirements will look like in the future.

Furthermore, the use of biogas offers other positive knock-on effects in waste management, nutrient management and through preventing methane from leaking out of manure storage facilities. No one would talk about the flexibility option of biogas being expensive if these environmental services were financed through relevant markets and not through the kilowatt price for renewable electricity covered by the Renewable Energy Sources Act surcharge. The question is solely when those that speak of a cap on electricity prices and expensive renewable energy sources will understand this. And when they are ready to put this knowledge into practice in their political decisions.

**Dr Claudius da Costa Gomez is Managing Director of the German Biogas Association.**

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AGAINST: DR PATRICK GRAICHEN

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Dr Patrick Graichen © Agora  
Energiewende

Bioenergy has a big advantage over wind and solar power. We can use it to generate electricity irrespective of the weather conditions and we can control the amount of electricity produced. To the extent that the fields produce sufficient biomass, bioenergy also contributes to a high security of supply of our electricity system through providing zero-carbon flexibility and generating electricity in times of low wind and solar power generation.

**BUT:** This is quite expensive. The more flexible the plant is, the more gas generated in the fermenters is not used directly, but is instead placed in interim gas storage facilities. In addition, the gas engines and generators must be large enough to quickly process the stored gas. Both of these

factors make generating electricity from flexible biogas plants an expensive task.

To put this into perspective, a flexible biogas plant may generate 1 megawatt instead of 500 kilowatts, but only runs 3,000 instead of 6,000 hours a year. The larger gas engines, generators and gas storage facilities that make the system more flexible must be paid for. Electricity generated from bio energy, which, at 15 to 23 euro ct/kWh, is already today two to three times more expensive than electricity generated from solar and wind power (at 7 to 8 euro ct/kWh), will only go on to become more expensive through this increased flexibility. However, we want to make the energy transition as low-cost as possible.

So what does this mean for bioenergy? In the short term, it is important to continue providing a limited amount of funding for this energy source while also making it more flexible. The current corridor of 150 to 200 MW additional biomass plants per year is reasonable. In the mid to long-term, bioenergy must compete with other carbon-free flexibility options. En route towards a world that is fully powered by renewables, bioenergy would then compete with demand-side management, batteries and power-to-gas to replace our current dispatchable generation capacities based on fossil fuels. In the end, competition should decide which technology should provide the efficient backup to wind and solar energy.

**Dr Patrick Graichen is Executive Director of Agora Energiewende.**

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# What is ‘biomass’?

Lighting a fire in the fireplace in winter means using biomass to generate warmth. Read on to find out which materials, apart from wood, classify as biogenic energy sources and how they can be used to generate warmth, electricity or even fuel.



## Generating climate-friendly energy from organic waste and plant-based raw materials

Even Fred Flintstone knew how to light a fire, heat up food and keep himself warm. These skills are one of the first cultural achievements of human beings. Wood is the oldest fuel used by humans and, as a regenerative raw material, it is an important energy source even today.

Wood makes up by far the largest share of biomass usage for energy in Germany. In one and multi-family houses, logs of wood are burned in the fireplace, and wood pellets and wood chips fuel the heating system. However, heat generation is not limited to small and medium-sized systems. Local and district heating systems can be powered by larger wood-burning systems. These use residual wood from forests and industry in particular.

We now also use plant-based raw materials and organic waste to generate warmth, electricity or fuel. These include corn and wheat plants, straw, sugar beet, reed and other grasses, but also residual material such as manure, biowaste and sewage sludge. Biomass as a renewable energy source plays an important role in the energy transition in Germany. And it is also climate-friendly. The creation of biomass, specifically the growth of plants, causes the greenhouse gas carbon dioxide to be withdrawn from the atmosphere. Later, through the burning or rotting of biomass, the same amount of carbon dioxide is released back into the atmosphere. The climate footprint of biomass is therefore neutral, but only as long as the amount consumed does not exceed the amount that is regenerating. In other words, if more wood is burned than trees regrow, there is a certain level of climate damage.

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## Versatile use in heating, electricity and fuel

Not only heat can be generated from wood and other solid biogenic fuels, but also electricity. One method is to generate steam using the heat produced by the burning of wood. This steam is then used to power a turbine or an engine. The residual heat can then be used for heating buildings or in industrial drying processes. This is called combined heat and power generation, a method used in so-called cogeneration power plants.

Biomass can also be used as fuel for transport. Oily plants, such as rapeseed, can be pressed, processed and transformed into liquid fuel known as biodiesel. This biodiesel is an important 'green' fuel. Other climate-friendly energy sources for the transport sector are biomethane and bioethanol.

## Bacteria help generate energy

Not every type of biomass can be burned effectively. Corn and wheat plants, manure, sewage sludge or biowaste release energy when fermenting. During decomposition of organic material through specific methane bacteria, flammable biogas is created which can be used to generate electricity or as a fuel. Biogas plants are methane reactors specifically built for this purpose. They provide ideal conditions for the creation of energy-rich gas. These process environments are low in oxygen, and temperatures are set at a bacteria-friendly level between 30 and 37 degrees.

## Growth in electricity generation up to 2015

Around 50 million kilowatt hours of electricity were generated from biomass in solid, liquid and gas form in Germany last year. In 2004, it was only around 10 million kilowatt hours. The consumption of wood and wood pellets in private households has also increased in the past few years, which has led the share of biomass in renewable energy sources in the heating sector to retain its dominance, sitting at 87,8 per cent in 2015.

The highly efficient use of biomass for electricity generation will continue to be funded by the Renewable Energy Sources Act. In the future, the remuneration will be determined through auctions. The market incentive programme for renewable energy sources also supports biomass installations, especially in the heating sector. Further information can be found [here](#).

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### FURTHER INFORMATION

[\[→ Information portal on Renewable Energy\]](#)

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## Quote of the week



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“We are witnessing a transformation of global power markets led by renewables and, as is the case with other fields, the centre of gravity for renewable growth is moving to emerging markets.”

**Dr Fatih Birol, Managing Director of the International Energy Agency (IEA)**

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