



Federal Ministry  
for Economic Affairs  
and Energy



Energiewende  
**direkt**

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## The energy system of the future and our citizens

The SINTEG research programme is developing blueprints for the energy system of the future and is getting citizens on board. **Find out more**



# Heat from renewable energy: 20 years of the Market Incentive Programme

The Market Incentive Programme 'Heat from renewable energies' (MAP) gives citizens, companies and municipalities the opportunity to secure large government grants. The programme has been running for two decades and is a massive success.



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On 1 September 1999, the Guidelines on the funding of measures for using heat from renewables entered into force. This was when the energy transition really started to gather pace for the first time. But even twenty years on, using renewables-based heat is still not out of fashion. Back then, the Federal Republic of Germany had just celebrated its 50th anniversary. In the same month, Boris Becker and Steffi Graf announced their retirement from tennis, and tickets for their last games were still paid for in Deutschmarks. Alongside the Renewable Energies Sources Act, passed one year later, the Market Incentive Programme 'Heat from renewables' is one of the pioneer achievements in energy policy. It has been in high demand ever since its launch, and continues to generate big successes.

## Modern, renewables-based heating systems very worthwhile

Old heating systems are often inefficient, very expensive to run, and harmful for the climate. Installing a new, MAP-funded modern system that uses renewables is therefore particularly worthwhile. The level of funding provided depends on the type, size and efficiency of the selected heating system. Funding is primarily provided for solar collectors, systems that burn solid biomass, and efficient heat pumps. Financial support is also available for especially innovative renewables-based technologies for heating and cooling, and the subsequent optimisation of systems that have already received funding. Where different technologies eligible for funding are combined, the amount

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of funding can be especially high. Now, twenty years after it was first launched, the Market Incentive Programme has a great deal of success to show.

## **23.7 billion euros invested in heat from renewables**

More than 1.8 million heating and cooling systems based on renewables have been funded since 1999. Funding is provided for small heating systems in detached and semi-detached houses as well as for large systems used by businesses or in municipal buildings. Since the programme first started, the Federal Government has paid out grants totalling more than 3.8 billion euros. This has stimulated investment of over 23.7 billion euros.

The government grants have also benefited the environment: in 2017, MAP-funded projects saved 394,794 tonnes of CO<sub>2</sub> equivalents from being released into the atmosphere. This is equivalent to the emissions released when 470,000 passengers travel from Düsseldorf to Mallorca. CO<sub>2</sub> equivalents are a unit of measurement for standardising the climate impact of the various greenhouse gases.

## **Around 35 per cent of final energy consumption in Germany is used for heating and hot water**

The heat market plays an important role in the energy transition. This is because around 35 per cent of Germany's final energy consumption is used for heating and hot water. The heating systems that were funded in 2018 alone will be able to save more than six million tonnes of CO<sub>2</sub> from being emitted over a service life of 20 years. This is almost equivalent to the volume of carbon emissions released by the city of Bremen in 2017. The Federal Government has set itself the target of raising the share of renewables in the heat market to 14 per cent by 2020. The funding provided under the MAP programme has been, and continues to be, an important component in this.

The State Secretary at the Federal Ministry for Economic Affairs with responsibility for energy policy, Mr Andreas Feicht, has already confirmed that this target has been met: 'The 2020 target for renewable energy in heat consumption was met in 2018. We now need to continue our efforts so that we remain on course to achieve the ambitious goals set for the long term.'

## **Heat pumps are the big hit under the MAP**

In the first half of 2019, demand for funding was highest for heat pumps, with a total of 14,289 funding applications being submitted. This is the figure reported by the Federal Office for Economic Affairs and Export Control (BAFA) which, together with KfW, is responsible for implementing the Market Incentive Programme on behalf of the Federal Ministry for Economic Affairs and Energy. In the same period, BAFA also received 12,500 applications for funding for biomass installations and 8,737 for solar collectors.

## **How to obtain funding**

Applications for the coveted MAP funding can be made by private persons, freelancers, charities, municipalities, municipal associations, companies and energy service providers (the contractors). With the help of energy advisers, applicants can select a suitable heating system that is eligible for funding in advance, and can submit their application online to either [BAFA](#) or [KfW](#). Those applying are notified as to whether their heating system can be funded before they purchase it.

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## FURTHER INFORMATION

[→ [BAFA brochure marking 20 years of the Market Incentive Programme 'Heat from Renewables'](#) (PDF download, 3MB, in German only)

[→ [Website providing information on renewable energies – the Market Incentive Programme](#) (in German only)

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## What exactly is a heat pump?

**Heat pumps harness natural heat from the ground, air or groundwater. They do this in a highly concentrated and climate-friendly way. Find out how this works and what heat pumps have in common with a refrigerator below.**



### **Heat pumps use free ambient heat to generate energy for heating or hot water.**

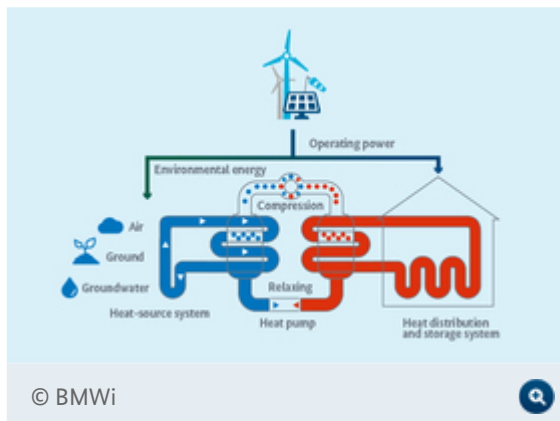
Depending on the season, we might sometimes walk across the garden lawn with thick boots on, and sometimes barefoot. All the while, the temperature just a few meters under our feet remains constant the whole year round. Ten metres below ground, it's about 15 degrees Celsius. This is a high enough temperature for heating and for heating water for taking a shower or a bath. All that's needed is a geothermal probe and a heat pump.

Heat pumps 'collect' the heat from the ground and concentrate it until heat is generated that can be transferred to a hot water storage tank, for example. In principle, they work like a refrigerator – only the other way round. How so? A refrigerator works by removing the heat from the food and releasing it externally. With a heat pump, the aim is to harness the heat from the environment to use it for heating or for making hot warmer.

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## Turning ambient heat into energy

The heat from the environment is used to heat a liquid coolant in the heat pump, causing it to evaporate. After this, a compressor is used to turn the heated, gaseous coolant into the required density and then to compress it. During this process, the coolant becomes even water. In the heat pump, the hot, gaseous coolant now transfers its heat to a heating system or hot water storage tank, after which it cools and becomes liquid again. The coolant is then further 'relaxed' and able to expand via what is known as an expansion or throttle valve, reducing the pressure of the coolant flowing through the system. As a result, it continues to cool down and can then absorb heat from its surroundings again. The heat pump cycle is then ready to start again.



## How the environment provides us with free energy

Modern heat pumps can work very economically. Depending on the model, only part of the usual amount of electricity is required to generate the heat needed for heating or for making hot water. The heat pump takes exponentially more energy from the ground, the groundwater or the air.

The resources are available for free and are inexhaustible. As a basic rule, the higher the initial temperature of the heat source, the less

electricity is required and the more efficient the heat pump is. The efficiency is increased even further if the target temperature is not too high. Heat pumps are therefore particularly suitable for installation in well-insulated houses that can be heated at relatively low temperatures. This is the case if, for example, underfloor heating is installed that runs on a low flow temperature.

## The heat pump is 100 percent climate-neutral

Sound good? A heat pump can be up to 100 percent climate-neutral if the electricity needed to operate it is also generated from renewable energy, for example if green electricity is used or the heat pump is combined with a photovoltaic system on the roof of the house. Anyone planning to purchase a heat pump should pay attention to a number of key points: selecting the right heat source (preferably soil), the optimum size, tolerable noise emissions and an environmentally friendly refrigerant.

The Federal Government provides funding for purchasing and installing efficient and environmentally friendly heat pumps in private homes. For a geothermal heat pump with a probe, minimum grants of €4,500 are available under the Market Incentive Programme for 'Heat from Renewables' (MAP), for example.

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### FURTHER INFORMATION

[\[→ The monitoring report on security of supply of the Federal Ministry for Economic Affairs and Energy \(in German only\)](#)

[\[→ Study: Definition and monitoring of security of supply on the European electricity markets](#)

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# Research project investigates energy system transformation in industry

Germany's manufacturing industry employs seven million people but is also responsible for one fifth of the country's harmful greenhouse gas emissions. Since 2018, a research project has therefore been examining how the energy transition can be successfully implemented in industry.



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The final report on Work Package 1 of the 'Energy Transition in Industry' research project has recently been published. The report looks at what industrial companies can do to reduce their greenhouse gas emissions. The impact that this will have on the energy sector is also examined. By 2021, there needs to be a clear idea about what contribution industry can make to making the economy almost greenhouse gas neutral whilst still safeguarding its successful position in international competition.

Within the framework of the Paris Climate Agreement, Germany has indeed committed itself to doing its part to help limit global warming. The Federal Republic of Germany is to be virtually greenhouse gas neutral by 2050. But this cannot be achieved without changes in industry.

## Certain sectors face particular challenges in mitigating climate change

Not all sectors generate the same level of greenhouse gas emissions. The report therefore looks at eight of the most energy-intensive sectors. A large volume of carbon emissions are created by metal production and processing (e.g. steel), the production of non-ferrous metals (e.g. aluminium, copper, zinc), basic chemicals, the glass, cement, lime and ceramics industries as well as the paper and food industries. A focus in the report is also placed on analysing the impact of horizontal technologies, such as those used in the automotive industry.

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## Outcomes of the first report

In order to make the transition to an almost greenhouse gas neutral economy, emissions in the industrial sector also need to be widely reduced. In order to achieve this, the report identifies a number of different solutions in which five key approaches have a role to play: the gradual improvement of energy and material efficiency, the use of biomass and synthetic fuels, [power-to-heat](#) technologies (heating with renewable electricity) and the underground storage of carbon dioxide (Carbon Capture and Storage, or CCS).

There are several ways of combining these options. Some scenarios are based on the assumption that emissions savings can be best achieved by increasing the use of synthetic fuels and power-to-heat. Others tend to rely more on biomass and carbon storage for reducing emissions. But there is agreement that if greenhouse gas emissions in industry are to be widely reduced, process-related emissions must also be significantly scaled back – either through the use of synthetic fuels or through carbon storage.

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### FURTHER INFORMATION

[\[→ Article published by the Federal Ministry for Economic Affairs and Energy entitled 'Energiewende in der Industrie' \(in German only\)](#)

[\[→ Energiewende in der Industrie \(project flyer\) \(in German only\)](#)

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## Quote of the week



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'Through SINTEG, we have created the opportunity to develop new technologies, processes and business models and to test them out in reality. This means that SINTEG is a regulatory sandbox for the smart energy system for the future. We need the innovative model solutions and blueprints developed under the programme in order to successfully implement the energy transition.'

**State Secretary Mr Andreas Feicht during the opening of the SINTEG Annual Conference in Kassel**

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