

## It's all in the mix



**Saxony-Anhalt values a good mix: when it comes to renewable energy the federal state has become a shining example for green technology. The area between the Altmark region in the north and the Burgenland in the south is now home to an increasing number of photovoltaic systems, wind turbines and biomass energy plants. In the year 2011, renewable energies accounted for 44 per cent of all electrical power generation in the state, a leading figure when compared with Germany as a whole, with the federal average being just one fifth. This has also contributed to the states' total level of CO<sub>2</sub> emissions in 2011 decreasing to 25.1 million tonnes, thereby falling to the 1998 level.**

Saxony-Anhalt has now achieved the status of an electricity exporter. 45 per cent of the electrical energy that it produces is used by consumers either in other German states or abroad. Experts forecast that this value could increase to 86 per cent by 2030.

Brown coal is set to remain an important factor in the future energy mix. The base load during electrical power generation can only be guaranteed through this local raw material, which acts as form of insurance for security of supply and affordability. According to forecasts, electrical power generation using brown coal is set to remain constant until 2030, accounting for a quarter of all electricity production.

The effect of renewable energies on the environment cannot be underestimated. Of the 372,000 employees who earn their daily crust in this sector in Germany, 24,400 work in Saxony-Anhalt. One in every 40 jobs in the state is now directly or indirectly linked to 'renewables'.

In 2011, on behalf of the German Agency for Renewable Energies, polling institute TNS-Infratest completed a survey of citizens in Saxony-Anhalt. A clear majority said that they favoured the further development of renewable energies. In the federal state itself, 94 per cent of those surveyed said they favoured the conversion of energy systems over to renewable energies. The reception is also positive in the immediate vicinity. Around 57 per cent of Saxony-Anhalt find ecological power plants in their neighbourhood to be either 'very good' or 'good'. 72 per cent would welcome a solar park, and 42 per cent of those surveyed, a wind park in their nearby surroundings. The alternatives of natural gas, nuclear power and coal were viewed considerably more negatively, however.

### Well placed in the sun

The south of Saxony-Anhalt receives an especially intense level of sunlight. This is why wine has been grown in the Saale and Unstrut river valleys for over 1,000 years. Today, modern photovoltaic systems are finding a new home on former industrial sites and this technology accounts for roughly four per cent of local electrical power generation from renewable energies.

In early 2012 a 28 megawatt solar power plant operated by GERO Solarpark GmbH began operations in Amsdorf near Halle. The modern power plant, a 50 million Euro investment, was generating solar power just seven weeks after the building work began. The contractor is GERO Solarpark GmbH, whose partners GETEC green energy and ROMONTA planned and developed the project, implementing it together with Q-Cells as a system integrator. A large share of the investment sum has stayed in Saxony-Anhalt, and the new plant will be able to cover the annual electricity needs of roughly 9,000 households.

The density of industrial companies operating in the photovoltaics sector in this part of central Germany is unique. Highly qualified, highly motivated employees are a trademark of this region. The expertise here, which is combined with close-to-industry research and development, will help the sector to survive the current crisis. Saxony-Anhalt is working hard to help the affected companies in Solar Valley, giving them new perspectives at a time of competition with rock bottom prices. The strengthening of local research and development in the solar industry sector is playing a leading role in this context. This means the crisis should create new opportunities. The Fraunhofer Center for Silicon Photovoltaic CSP is playing a special role here. It was established in 2007 by the Fraunhofer Institute for Materials Mechanics (IWM) and the Fraunhofer Institute for Solar Energy Systems, ISE, to provide application-oriented research. In total 60 m. Euros are being set aside for this project, which will continue until 2013. The module technology centre is situated at the Schkopau location, with a technical facility for crystallisation and wafer processing currently under construction in Halle.

### Biomass is turned into energy

The efficient agricultural sector in Saxony-Anhalt not only supplies the foods industry. Farmers are also providing their raw materials to the power generation sector. And it is paying off. Accounting for more than 27 per cent of electrical power generation with renewable energy, biomass comes in at second after wind power, which accounts for 67 per cent.

Magdeburg is home to an example of an almost ideal link between regional resources and high performing industry. The PROKON Bio Ölwerk plant at Magdeburg commercial port converts rapeseed oil into biodiesel. In 2011 and 2012, more than 70 million Euros have been invested in the plant. Its proximity to suppliers of raw materials and its sound logistics links are the company success factors. More than 30 new permanent jobs have been created which means 130 employees are now on site, including 16 apprentices.

The plant's annual capacity is currently for the processing of 700,000 tonnes of rapeseed. This quantity is capable of yielding roughly 280,000 tonnes of vegetable oil, which in turn provides the basis for up to 255,000 tonnes of biodiesel. A good 400,000 tonnes of rape groats are made during production which is excellent for use as a base material for protein-rich animal feed. The high quality of the vegetable oil means it can also be used in the foods sector.

In Zörbig, near Halle, a modern biogas plant began operating in early 2012. According to the company data, the plant, that is operated by the firm VERBIO Vereinigte BioEnergie AG, is the first biogas plant in the world to process straw - with up to 20,000 tonnes per year. The apparent conflict between the plate and the fuel tank is a thing of the past at this plant! The future potential of this technology is uncontested. It means Saxony-Anhalt is a leader in the energy revolution. With the fuel that is produced in Zörbig, a carbon dioxide saving of up to 90 per cent is made when compared with fossil fuels.

When it comes to biomass, things are also innovative in other parts of Saxony-Anhalt. In 2016, the construction of a new bio-solar centre for the industrial production of micro algae is set to be completed in Köthen, a project involving a cooperation between Anhalt University of Applied Sciences and the firm Grossmann Ingenieur Consult GmbH (GICON). A test facility for a new type of algae reactor for creating biomass in order to prepare the new technologies is already in operation. It has what it takes to be an export hit 'Made in Saxony-Anhalt'. Algae are the fastest growing plants in the world. They develop their biomass by removing CO<sub>2</sub> from the air with the help of sunlight and emitting oxygen. At the same time, algae are far more effective than energy plants, for example.

The use of biomass is not currently without controversy, however. In 2012 the Deutsche Akademie der Naturforscher Leopoldina (German Academy of Natural Scientists) in Halle/Saale published an appraisal concerning the limits and possibilities of the use of bio energy. The scientists described the conditions under which the bio energy is of limited use. The report discusses the possible conversion of biomass into bio fuels such as bio ethanol and biodiesel that are both current and undergoing development. Approaches are also highlighted which aim at supporting the current research into creating solar energy from water in an environmentally friendly way and for creating hydrogen. The report says that in comparison with other sources of renewable energy such as photovoltaics, solar thermal energy and wind energy, bio energy requires more space and is often associated with higher greenhouse gas emissions and greater damage to the environment.

### The breeze is right

The greatest share of renewable energy to be produced in Saxony-Anhalt comes from wind turbines. At the end of 2011 there were 2,352 such turbines between Arendsee and Zeitz with an installed output of 3,642 megawatts. Wind power accounts for 73 per cent of the total electrical power generation from renewable energy in this federal state.

Companies such as ENERCON in the Magdeburg industrial area of Rothensee contribute to ensuring a German technological advantage in the development and production of the latest technology. In the capital of the state of Saxony-Anhalt, over 4,000 people are employed either directly or indirectly through ENERCON, with more at the company's locations in Aurich and Emden. The company claims that the E.126 wind energy system is one of the biggest in the world. In the ideal case scenario it can provide an annual yield of 14 million kilowatt hours, enough to provide 15,000 people with electricity.

Through the replacement of the old wind turbines over the years to come it will be possible to increase electrical power generation without the need for additional space.

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