

## "renewables made in Germany" Newsletter April 2007

Dear Mr/Ms,

Thank you for your interest in German renewable energy technologies and welcome to the third "renewables made in Germany" newsletter from the Deutsche Energie-Agentur GmbH (dena) – the German Energy Agency. Today's issue features articles on the following topics:

- \* Current developments in renewable energy around the world
- \* Interesting projects and applications in renewable energy
- \* State-of-the-art German technologies and services for using renewable energy sources
- \* Opportunities and events that let you find out more and get in touch with German companies – maybe in your area soon.

We hope you enjoy reading this issue.  
The Renewable Energy Division of dena.

If you would like to recommend this newsletter to someone else please feel free to send him the following link: <http://www.renewables-made-in-germany.com/en/newsletter>.

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### 1. Study by the German Ministry for the Environment: Renewable energy technologies prevent damages running into billions

Last year, the generation of electricity from renewable energy sources has prevented damage worth at least 2.8 billion euros. A research group commissioned by the German Ministry for the Environment compared the external costs of producing electricity from renewable energy sources with those of electricity generated from fossil fuels. In economic theory, a negative external effect is defined as the impact of an activity on a third party that causes damage and is not appropriately compensated for. Examples of this are CO<sub>2</sub> emissions generated from electricity production that cause climate damage.

The research group quantified climate damage caused by the combustion of fossil raw materials (e.g. coal) for the generation of electricity as being between 6 and 8 euro cents per kilowatt/hour (kWh). External costs resulting from the generation of electricity from renewable energy sources are significantly below this level at less than 0.5 euro cents per kWh. Electricity generated from renewable energy sources in Germany has thus made a significant contribution towards reducing external costs. The 2.8 billion euros saved exceed by far the amount of subsidies for electricity from biomass, geothermal heating, photovoltaics, water and wind

stipulated by the German Renewable Energy Sources Act (EEG). In 2005, these subsidies amounted to 2.4 billion euros.

A brief summary of the study by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, DLR, Stuttgart) and the Fraunhofer Institute for Systems and Innovation Research (ISI, Karlsruhe) can be found in English at: <http://www.erneuerbare-energien.de/inhalt/37452/5466/>.

## 2. Worldwide boom of renewable energy technologies

In 2005, 38 billion US dollars were invested in renewable energy technologies throughout the world. This is a new record. "Renewables are capturing increased attention of businesses and policy-makers around the world," says Mohamed El-Ashry, Chairman of the Renewable Energy Policy Network.

The globally installed wind power capacity has increased by 24 percent to 59 gigawatts. More than half of the global expansion of the wind energy sector took place in the United States (2.4 gigawatts), Germany (1.8 gigawatts) and Spain (1.8 gigawatts). There has also been constant growth in other areas of renewable energy technologies. In several countries, energy generation from biomass has increased by between 50 and 100 percent, including Germany, Hungary, The Netherlands, Poland and Spain. The amount of grid-connected solar power systems rose by 55 percent. More than half of the global photovoltaics capacity has been installed in Germany, i.e. more than 200,000 photovoltaic systems. This technical expertise is highly in demand throughout the world. The photovoltaics industry has invested around six billion US dollars in new factories worldwide. The reason for this is that many countries have set up binding political framework conditions to promote alternative technologies. This does not only apply to the EU and the USA, but also to a great number of developing countries.

For detailed information on the global development of renewable energy technologies see the REN21 report at <http://www.ren21.net/globalstatusreport>.

## 3. Photovoltaics - A short introduction

Photovoltaic technology uses solar cells, which convert sunlight into electricity by making use of the "photovoltaic effect". Mostly monocrystalline or polycrystalline silicon cells are electrically connected to each other and encapsulated behind a glass cover to form a solar module. Depending on the particular application, modules are configured and wired up as complete installed systems with inverters, charge regulators, batteries and the like. Photovoltaic installations can be designed as standalone systems or grid-connected systems. In stand-alone systems, the energy yield is matched to energy requirements, if necessary by being stored in accumulators or supplemented with an additional energy source.

In grid-connected systems, the public electricity grid is effectively the energy storage medium. Hereby solar cells generate electrical energy directly from the sunlight shining on them. Power conversion is performed by the charge inverter, which also regulates the optimum operating mode according to radiation conditions and includes monitoring and protective devices. Energy utilisation – depending on the type of connection, generated electricity is either fed completely into the public grid or first used for domestic electricity supply and then only the surplus is supplied to the electricity grid operator. Compared to an off-grid installation, system costs are lower as energy storage is generally not required. This is a factor that also improves system efficiency and decreases environmental impact. The size of grid-connected solar power systems is more flexible than for other energy sources. Photovoltaic technology in general has the advantage of generating electricity without noise and emissions. It allows a large application scope, ranging from mini-applications such as solar-powered pocket calculators to generating electricity in private homes and large plants with an output of several megawatts.

In Germany, a new high-tech industry has grown in parallel with the rapid technical development of photovoltaic power generation. As part of dena's business trips, you will have the chance to mingle with decision-makers in that industry, for example on 11th December in Beijing (China) or in Algiers (Algeria) 11th December. Find more in section 10.

## 4. Greek photovoltaics sector focuses on German renewable energy sources act

This year in August, a Renewable Energy Sources Act was introduced in Greece. The Greek photovoltaics sector is now hoping for positive effects similar to those achieved in Germany as a result of the Renewable Energy Sources Act (EEG). The expansion of photovoltaics in Greece has been rather sluggish up to now. One reason for this was the lengthy and complicated authorization procedure. According to the new act, operators of installations from 20 kWp to 150 kWp will, in the future, be exempt from having to apply for

numerous exclusive licences.

The installation of photovoltaic systems has also been made more financially viable. Feed-in tariffs for electricity generated by PV systems up to and including 100 kWp have been increased for mainland locations by 45 euro cents and for the Greek Islands by 50 euro cents per kWh. The compensation rate for electricity generated by systems with outputs of over 100 kWp is now 40 euro cents on the mainland and 45 euro cents on the Islands. "The new feed-in tariff conditions are undoubtedly very attractive for large megawatt PV projects", says John Chadjivassiliadis, employee at the Institute of Energy for South-East Europe (IENE) in Athens.

Experts are assuming that, with the help of these feed-in tariffs, the Greek photovoltaics sector will soon step out of the shadow of today's relatively successful Greek solar thermal energy sector. Greece is hoping to realise other large innovative projects, such as the 'Olympic Sunroof'. This grid-connected solar power system was installed on the roof of the German School in Athens, near the Olympic Stadium, as part of dena's solar roof programme and has made an impressive case for electricity generation from 'renewables made in Germany'.

More information about the solar roof in Greece [here](#).

## 5. Self-sufficient energy supply through renewable energy technologies: best practices in Tanzania

The de-centralised use of renewable energy technologies also allows countries with less established electricity grids to supply their population with energy. In cooperation with Energiebau Solarstromsysteme GmbH, dena has launched a pilot project in Tanzania to demonstrate how this could successfully be put into practice.

To date, a large part of the population in Tanzania is not connected to the public grid. Consequently, electricity is frequently supplied by diesel generators. The high fuel costs, however, allow only very few people to benefit from permanent electricity. Yet, thanks to high levels of solar irradiance and large quantities of vegetable oil from the Jatropha plant, Tanzania disposes of two relevant renewable energy sources, which could ensure self-sufficient, sustainable and economic electricity supply: solar technology and bioenergy.

In order to make use of these sources, a photovoltaic vegetable oil hybrid system has been installed in Mbinga, Tanzania. The installation, commissioned in August 2006, uses both the high levels of solar irradiation and the locally produced Jatropha oil to generate electricity. A battery integrated into the system guarantees electricity supply round the clock. The installation is able to supply 140 people with electricity. Adapted to local conditions, the hybrid system will highlight the advantages of this kind of system in bringing electricity to rural regions to decision-makers in Tanzania, politicians in the whole East African region and organisations supporting German development cooperation.

More information on the solar roof in Tanzania [here](#). This Website will also be available in English soon.

Further information on Energiebau Solarstromsysteme GmbH [here](#).

## 6. renewables made in Germany - products and services

German renewable energy technologies have an excellent reputation both at home and abroad. Many years of experience and countless references around the world make "renewables made in Germany" a reliable source to meet your project needs. [www.renewables-made-in-germany.com](http://www.renewables-made-in-germany.com) provides information about German renewable energy industries, companies and products. In the following you will find an excerpt from the website with several representatives from the industry:

INDUSTRY: WINDENERGY

\* Provider: [Cube Engineering GmbH](#)

\* Profile: consultant, projects, services

Description: CUBE Engineering GmbH's services include wind measurement, wind analysis reports and yield forecasts, wind farm design and optimisation, turbulence studies, noise immission and shadowcast prognosis, visualisations and animations, as well as project development and due diligence and construction management.

INDUSTRY: PHOTOVOLTAICS

- \* Provider: [SOLON AG](#)
- \* Product: solar modules

Description: SOLON offers high-quality products and innovative solutions for solar technology.

INDUSTRY: SOLAR THERMAL

- \* Provider: [SOLAR-RIPP](#)
- \* Product: pool- heating-system

Description: The SOLAR-RIPP® company specialises in the manufacture of solar heating systems for swimming pools.

INDUSTRY: SOLAR THERMAL

- \* Provider: [Solar Millenium AG](#)
- \* Product: Solar Thermal Power Plants

Description: Solar Millennium AG plans and implements solar thermal power plants ranging from 50 to 200 MW based on parabolic trough and solar chimney technology, together with its affiliate companies and internationally renowned partners.

INDUSTRY: HYDROPOWER

- \* Provider: [Wasserkraft Volk AG \(WKV AG\)](#)
- \* Product: Hydropower Plants

Description: Wasserkraft Volk has comprehensive knowledge of the requirements of small and medium-sized hydropower plants. WKV designs and produces Francis spiral and open-flume turbines up to 15 MW, Pelton turbines up to 15 MW, Turgo turbines up to 5 MW and cross-flow turbines up to 2 MW, as well as generators, controllers and switchgears.

## 7. New solar roofs inaugurated

Within the scope of its solar roof programme, dena's further projects in Lisbon and Singapore in 2006 made again a huge contribution to the transfer of knowledge concerning application options, costs, technology and the advantages of solar energy technology.

In May 2006, the solar roof project Lisbon was inaugurated at the German School in Lisbon. The demonstration system was planned and installed in cooperation with IBC SOLAR AG. Further information about the project in Portugal can be found [here](#).

In cooperation with SUNSET Energietechnik GmbH, a 14.5 kWp solar roof system was put into operation at the German European School in Singapore in March. The system is the first grid-connected photovoltaic system in Singapore. More information about the solar project [here](#).

## 8. On the road with biodiesel

The Pan American Highway was crossed for the first time using alternative fuel sources in order to prove the everyday compatibility of environmentally friendly fuel sources. Supported by '[renewables made in Germany](#)', a total of nine drivers in three vehicles travelled the approx. 25,000 km from Alaska to Tierra del Fuego in 15 days. The fuel source for this journey on the longest and most spectacular road in the world was biodiesel. The project successfully set a global benchmark for the use of fuels from renewable raw materials. The project attracted a lot of media attention as well as the interest of many government representatives in all the countries they passed through. [Further information](#).  
<http://www.panamericana2006.com/>

## 9. International networking exchange for renewable energy technologies

Are you looking for information about German renewable energy technologies? In the [online forum](#) of "renewables made in Germany", German companies and institutions will answer all of your questions. In addition, you can make interesting contacts and find valuable partners for your project ideas. We look forward to you visiting us at [www.renewables-forum.com/](http://www.renewables-forum.com/)

## 10. Get in touch - "renewables made in Germany" business trips

Are you looking for contacts to experienced German companies in the renewable energy sector or more information about renewable energy technology from Germany?

If so, the German Chambers of Commerce Abroad (AHK) may be able to help you. As part of the "renewables made in Germany" programme, delegations of German business representatives from the renewable energy sector travel to all parts of the world to showcase their expertise and products and to explore possibilities for future cooperation.

Each event includes a one-day seminar where you receive information about current developments in renewable energy technology and the products of the Germany companies that are represented. If you want to get in touch with individual companies then the German Chamber of Commerce Abroad in your country can act as a liaison.

In 2006 three more events will take place in three different regions:

Target market	Location	Technology	Period	Seminar/Presentation	Contact
Central America	Santo Domingo (Domenican Republic)	all technologies	2006/12/04 – 2006/12/08	Thursday (12/05)	<a href="mailto:ahkregion@ahkzakk.com">ahkregion@ahkzakk.com</a>
Algeria	Algier	Solar thermal energy and photovoltaics	2006/12/11 – 2006/12/13	Monday (12/11)	<a href="mailto:m.ackermann@ahk-algerie.dz">m.ackermann@ahk-algerie.dz</a>
China	Beijing	Bioenergy	2006/12/11 – 2006/12/13	Monday (12/11)	<a href="mailto:badelt.georgia@bj.china.ahk.de">badelt.georgia@bj.china.ahk.de</a>

The following table shows all the dates and countries that are part of the trade mission scheduled for the first half of 2007. If you are interested in attending one of these events or require more information, please contact the relevant German Chamber of Commerce Abroad (e-mail: see table).

We look forward to hearing from you!

Target market	Location	Technology	Contact
Austria	Vienna	Bioenergy and photovoltaics	<a href="mailto:norbert.setzkorn@dhk.at">norbert.setzkorn@dhk.at</a>
Bolivia	La Paz	Photovoltaics	<a href="mailto:gerencia@ahkbol.com">gerencia@ahkbol.com</a>
Canada	Quebec	Wind energy	<a href="mailto:thomas.beck@germanchamber.ca">thomas.beck@germanchamber.ca</a>
Croatia	Zagreb	Bioenergy and solar thermal energy	<a href="mailto:info@ahk.hr">info@ahk.hr</a>
Czech Republic	Prague	Photovoltaics	<a href="mailto:schwan@dtihk.cz">schwan@dtihk.cz</a>
Egypt	Cairo	Wind and solar thermal energy	<a href="mailto:marionkussmann@ahk-mena.com">marionkussmann@ahk-mena.com</a>
Estonia (Baltic states)	Tallinn	Bioenergy	<a href="mailto:heiki.sirkel@ahk-balt.org">heiki.sirkel@ahk-balt.org</a>
Greece	Athens	Geothermal and solar thermal energy	<a href="mailto:anja.hack@b2brenenergy.com">anja.hack@b2brenenergy.com</a>

Hungary	Budapest	Bioenergy	<a href="mailto:szaboe@ahkungarn.hu">szaboe@ahkungarn.hu</a>
Italy	Bologna	Photovoltaics	<a href="mailto:juliane.hinsch@ahk-italien.it">juliane.hinsch@ahk-italien.it</a>
Japan	Hokkaido	Bioenergy and wind energy	<a href="mailto:uondracek@dihkj.or.jp">uondracek@dihkj.or.jp</a>
Norway	Oslo	Wind energy	<a href="mailto:rassmann@handelskammer.no">rassmann@handelskammer.no</a>
Poland	Warsaw	Bioenergy and wind energy	<a href="mailto:hgf@ihk.pl">hgf@ihk.pl</a>
Saudi Arabia	Riyadh	Bioenergy, wind energy and photovoltaics	<a href="mailto:potstada@ahk-arabia.com">potstada@ahk-arabia.com</a>
Singapore	Singapore	Photovoltaics	<a href="mailto:tim.philippi@sgc.org.sg">tim.philippi@sgc.org.sg</a>
South Korea	Seoul	Hydropower, geothermal and bioenergy	<a href="mailto:rwein@kgcci.com">rwein@kgcci.com</a>
Slovenia	Ljubljana	Bioenergy and photovoltaics	<a href="mailto:gertrud.rantzen@dihk.si">gertrud.rantzen@dihk.si</a>
Sweden	Stockholm	Wind energy	<a href="mailto:Micke.Bayart@handelskammer.se">Micke.Bayart@handelskammer.se</a>
Taiwan	Taipei	Photovoltaics	<a href="mailto:gursch@dwb-taipei.org.tw">gursch@dwb-taipei.org.tw</a>
The Netherlands	Den Haag	Geothermal energy	<a href="mailto:a.loehr@dnhk.org">a.loehr@dnhk.org</a>
Tunisia	Tunis	Photovoltaics	<a href="mailto:s.kraut@ahktunis.org">s.kraut@ahktunis.org</a>
Turkey	Istanbul	Wind energy	<a href="mailto:info@dtr-ihk.de">info@dtr-ihk.de</a>
USA, California	San Francisco	Photovoltaics	<a href="mailto:rgurka@gaccny.com">rgurka@gaccny.com</a>
USA, Kansas	Minneapolis	Bioenergy	<a href="mailto:Mark.tomkins@DEinternational.us">Mark.tomkins@DEinternational.us</a>
USA, New York	New York	Bioenergy and photovoltaics	<a href="mailto:ibentz@gaccny.com">ibentz@gaccny.com</a>

## 11. The German Ministry of Economics and Technology takes "renewable energy technologies" abroad

Another opportunity to make contact with German companies in the renewable energy technologies sector is to attend the trade fairs organised by the German Ministry of Economics and Technology. Come along to the German community stand and talk directly to German companies and receive information about the latest technologies. We look forward to your visit!

Date	Location	Fair
14th - 17th February 2007	Lyon / France	<a href="#">Salon des Energies Renouvelables</a>
28th February - 2nd March 2007	Madrid / Spain	<a href="#">Genera</a>
29th March - 1st April 2007	Thessaloniki / Greece	<a href="#">Energia (Infacoma)</a>
16th April - 20th April 2007	Hanover / Germany	<a href="#">Energy</a>

19th April - 21st April 2007	Verona / Italy	<a href="#">Solarexpo</a>
14th - 16th May 2007	Casablanca/ Morocco	<a href="#">Enviro Maroc</a>
16th - 18th May 2007	Daegu / South Korea	<a href="#">Green Energy Expo</a>
6th - 23rd June 2007	Freiburg / Germany	<a href="#">Intersolar</a>

## 12. Exhibition provides information about the potential of renewable energy technologies

The 'renewables made in Germany' technology exhibition provides information about application options and advantages of renewable energy sources.

With the help of 25 visual plates for each renewable energy sector, it provides concise information in three languages: English, French and Spanish. The exhibition has already been displayed at important conferences, events and trade fairs in many countries all over the world.

If you are interested in borrowing the exhibit please send an E-mail to [renewables@dena.de](mailto:renewables@dena.de).

## 13. Useful information

### New newsletter

The German Society for Technical Cooperation (GTZ) GmbH publishes a newsletter providing information about the energy sector and climate protection, and offers a survey of new projects, events and publications. The newsletter appears every two months. Information about the newsletter can be found [here](#).

### Hannover Trade Fair 2007

Again, energy will be the main topic of the HANNOVER TRADE FAIR 2007. The leading international trade fair of the energy sector will provide an overview of the complete market of technologies and services – from energy generation, supply, transfer and distribution to its application. Renewable energy sources will play a significant role on this international platform. Information on exhibitors and registration documents can be found [here](#).

## Service and editorial information

For more information about German technologies and manufacturers in the renewable energy industry, see our website [www.renewables-made-in-Germany.com](http://www.renewables-made-in-Germany.com).

### Editorial information

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