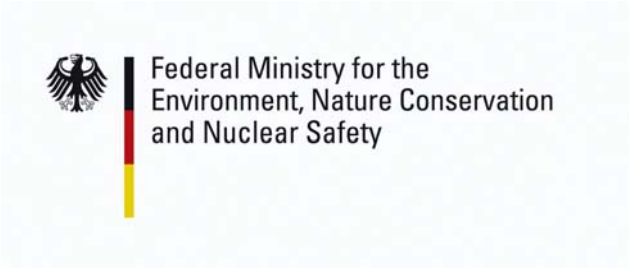

Renewable Energy Sources Act

Progress Report 2007

pursuant to Article 20 of the Act

- Draft –

**prepared by the Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety (BMU)**

Summary

5.7.2007

BMU draft of the Renewable Energy Sources Act / Progress Report 2007: Summary

1. *Legal mandate*

The Renewable Energy Sources Act (EEG) draws on more than **16 years of experience**: the feed-in of electricity from renewable energies to the grid was legally regulated for the first time in Germany with the adoption of legislation by the German Bundestag on the basis of consensus in 1990. The Electricity Feed Act (StrEG) entered into force on 1 January 1991. On 1 April 2000, it was replaced by the Renewable Energy Sources Act, which was amended on 21 July 2004. **The Renewable Energy Sources Act is the most important and successful instrument to promote the expansion of renewable energies in the electricity sector**. **As a result of the Act, the share of electricity produced from renewable energy sources has almost doubled from 6.3 % in 2000 to 12.0 % in 2006.** The Act also serves to implement the European Union's Directive on the promotion of electricity from renewable energy sources in the internal electricity market, which covers electricity from hydropower, biomass, landfill gas, sewage treatment plant gas and biogases, as well as wind, solar and geothermal power.

The coalition agreement of autumn 2005 envisages that the basic structure of the Renewable Energy Sources Act will be maintained, but with a review of its economic efficiency in 2007. The Act itself states that a progress report must be submitted to the German Bundestag by the end of 2007.

2. *International and European framework*

Two key developments worldwide have greatly increased the urgent need for an expansion of renewable energies: climate change, which is becoming increasingly evident, and rising energy consumption, especially in the ascendant Asian economies. The **European Council, chaired by Germany's Federal Chancellor**, reacted to these global developments on **9 March 2007**. Besides setting ambitious targets to reduce greenhouse gas emissions and increase energy efficiency, the European Council **agreed on a binding target of a 20 % share of renewable energies in overall EU energy consumption by 2020**, from a baseline of around 6.6 % in 2005.

3. *Raising the bar for Germany*

The expansion of renewable energies in Germany is advancing so successfully that the target set in the Renewable Energy Sources Act – to increase the share of renewable energies in electricity generation to at least 12.5 % by 2010 – will be exceeded as early as 2007; a 15 % share is likely to be achieved by 2010, with the minimum target of 20 % for 2020 being exceeded by a considerable margin. **The bar**

should therefore be raised for the future by setting new legal targets of at least 27 % for 2020 and at least 45 % for 2030. The feasibility of these targets is affirmed in the Pilot Study 2007 commissioned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

4. *Electricity covered by the Renewable Energy Sources Act: effective climate protection and a contribution to nature conservation*

In 2006, around 45 million tonnes of carbon dioxide (CO_2) emissions were saved because of the Renewable Energy Sources Act: 8 million tonnes more than in 2005. The use of all the various renewable energy sources prevented total emissions of more than 100 million tonnes of CO_2 in Germany in 2006: together with electricity not covered by the Act, power from renewable energies accounted for a CO_2 saving of 68 million tonnes, heat produced from renewable energies for a 21 million tonnes saving, and biofuels for a saving of 13 million tonnes.

By reducing the consequential damage resulting from the use of fossil fuels (e.g. species loss due to climate change and air pollution), renewable energies make an **important contribution to nature conservation**. The provisions of the Renewable Energy Sources Act and the relevant special laws aim to minimise any problematic impacts on nature conservation and the landscape arising from the use of renewables.

5. *Positive economic benefits: jobs, investments, exports*

In economic terms, the Renewable Energy Sources Act has had a number of positive outcomes: in the last 10 years, Germany has become the world market leader in the wind energy sector and is on track to assume this position in the photovoltaics and biomass power plant sectors as well. More than **€ 9 billion was invested in renewable energy installations** in Germany in 2006. In all, around **214,000 people were employed** in the renewables sector in 2006 – **some 50,000 more than in 2004.** Around **124,000 of these jobs were created as a result of the Renewable Energy Sources Act**. With a strong domestic market, companies have been able to steadily expand their **rate of exports**: more than 70 % of the wind power plants produced in Germany were exported. Thus as a result of the Act, Germany has taken on a **leading role** in plant and mechanical engineering **in this major future-oriented international market**.

6. *The benefits of the Renewable Energy Sources Act already far outweigh the costs*

In 2006, the costs to the electricity consumer resulting from the **differential costs of electricity covered by the Renewable Energy Sources Act amounted to € 3.2 billion and € 0.1 billion for the provision of energy balancing**; this must be compared with monetary benefits as follows:

- Through the merit-order effect alone (i.e. price reductions as a result of squeezing out more expensive electricity), **wholesale prices for electricity fell by about € 5 billion in 2006 due to the use of electricity covered by the Renewable Energy Sources Act.**
- The Renewable Energy Sources Act resulted in **savings of € 0.9 billion on fuel imports** in 2006. The consumption of irrecoverable fossil fuels was also reduced by at least the same extent.

- The consequential damage resulting from climate change and air pollution which was avoided in 2006 through the use of renewable energies for electricity generation in Germany would have cost around **€ 3.4 billion**.

The economic benefit of the Renewable Energy Sources Act therefore added up to approximately € 9.3 billion in 2006.

There is some imprecision associated with each of these figures, making direct cost-benefit accounting impossible. Nonetheless, the comparison shows **that the benefits of the Renewable Energy Sources Act already outweigh the costs.**

7. Better grid integration and system services

It is important to ensure that the strongly expanding share of electricity from renewable energy sources can continue to be fed reliably into the transmission grid. Besides **grid reinforcement and expansion and better grid management** by grid system operators, plant operators should make a contribution to grid stability in future: through the delivery of **system services** at wind energy plants and the use of **virtual power plants, load management and energy storage systems**. The progress report makes recommendations for a new approach to **feed-in management**.

8. A boost for hydropower

Hydropower expansion has stagnated, with hydropower accounting for 3.5 % of Germany's electricity supply (21.6 billion kWh in 2006). **In order to provide better incentives, the fees paid for electricity generated in small hydropower plants (with a capacity up to and including 5 MW) should be increased from 2009 and formal restrictions on the recognition of capacity increases at larger plants lifted**. In order to ensure the environmental compatibility of hydropower expansion, the fees paid under the Act for electricity generated from hydropower plants of all capacities will in future be conditional on environmental criteria.

9. Biomass: a booming industry with value added in rural regions

Electricity from biomass is showing dynamic growth, especially biogas: **electricity generation has increased sevenfold from 2.3 billion kWh in 2000 to 14.2 billion kWh in 2006**. However, due to the high level of demand, the costs of raw materials have also increased, so the **annual degression should be reduced slightly from 1.5 % to 1 % from 2009**. In order to improve efficiency, **the bonus for heat and power cogeneration (CHP) should be increased from 2 to 3 ct/kWh, with a decrease in the basic fee** of 0.5 ct/kWh for small and medium-sized plants and 2 ct/kWh for large plants. This is also intended to strengthen efficient, decentralised structures. Electricity from palm oil should only be remunerated in future if an effective certification scheme is in place to guarantee that the biomass used complies with sustainability criteria.

10. Wind energy: a showpiece technology onshore – breakthrough offshore yet to be achieved

In 2006, the use of wind energy already contributed 30.5 billion kWh, i.e. around 5 %, of our electricity supply. However, the replacement of first-generation wind turbines with new, more modern and more efficient systems has been slower than desired. It is therefore recommended that the **framework conditions for this repowering of onshore systems be improved**. Electricity generation costs have fallen by 60 % since 1991. Due to increases in the prices of raw materials, especially steel and copper, it is recommended that the **annual degression be reduced from 2 % to 1 %.**

Offshore wind energy deployment has advanced more slowly than anticipated. The costs of this completely new technology are higher than previously assumed. The **breakthrough in offshore wind energy deployment** in Germany should be achieved by increasing the **initial fees to a level comparable with that of other EU countries** (range: 11-14 ct/kWh, degression 5-7 % p.a.; precise figures to follow) **with a reduction in the rate of final fees**.

11. Solar power: a major international industry has developed in Germany

The photovoltaic sector has undergone a period of booming expansion over the past few years: solar electricity generation increased from 64 million kWh in 2000 to around 2 billion kWh in 2006 (0.3 % of the electricity supply). Billions of euros have been invested in new production capacity and **jobs created for skilled workers, primarily in Germany's new federal states**. Underpinned by research and development (R&D), unexpected **substantial advances have been made in the production of photovoltaic systems**. As a result of this positive trend, the production costs of photovoltaic systems have fallen substantially. A progressive **increase in the annual degression for new plants of 2 % from 2009 and a further 1 % from 2011** is therefore recommended. The fees paid for photovoltaic power will thus move far more quickly towards matching the "plug-in" price for conventional electricity.

12. Geothermal energy: further support required for market development

Geothermal energy offers major potential to generate both base load and regulating power**,** and anticipated environmental impacts are minimal. At present, however, only one geothermal power plant is in operation in Germany. A small number of other projects are currently being implemented. Overall, the potential of geothermal energy is not yet being harnessed to an adequate extent. With geothermal energy too, the material costs of the plants and especially the drilling costs have increased. Nonetheless, in order to inject momentum into this sector, **the fees paid under the Act should be increased from 2009**, and a **bonus should be introduced** in order to provide an incentive for **cogeneration of heat**. **Flanking measures** outside the scope of the Renewable Energy Sources Act are also important, such as the promotion of local district heating networks, the creation of a fund to provide security for the exploration risk**,** and more R&D funding.

13. Further prospects for electricity production from renewable energy sources

Further expansion of renewable energies for electricity generation by 2020 and 2030 will be based on the BMU's Lead Study 2007, which was also used for the German Energy Summit on 3 July 2007. The study assumes that the annual expansion rates which can be achieved in future are comparable to those witnessed over the last few years. **This would mean that electricity generated under the Renewable Energy Sources Act alone could reduce CO_2 emissions by 100 million tonnes annually by 2020.**

If the proposed recommendations for action are acted upon, the differential costs associated with electricity covered by the Renewable Energy Sources Act, amounting to € 3.2 billion in 2006, will increase to a maximum of around € 5-5.6 billion in 2015 and then fall to € 3.7 – 4.3 billion in 2020, decreasing steadily thereafter (the range reflects the possible contribution of offshore wind power). This does not take account of the positive macroeconomic effects; see No. 6). Estimation up to 2020: the aforementioned **recommendations for action** on solar power will save costs of around € 230 million in 2020. Together with the changes relating to onshore wind power/system services (+ € 50 million), biomass (+ € 20 million), hydropower (+ € 20 million) and geothermal energy (+ € 40 million), this will result in a cost reduction of around € 110 million for 2020. The recommendations for a breakthrough in offshore wind power (range) will result in an increase in differential costs of € 300-600 million in 2020. Altogether, then, the measures will result in an **increase** in differential costs of around € 200-500 million in 2020 compared with the present Renewable Energy Sources Act.

Key recommendations for action for the further development of the Renewable Energy Sources Act

	Provisions within the scope of the Renewable Energy Sources Act Overview (effective as of 1.1.2009)	Flanking measures
Aims	• New legal targets to be set in the Act for the share of renewable energies in electricity generation, i.e. an increase from 20 % to at least 27 % for 2020 and inclusion of a target of at least 45 % for 2030.	
Feed-in management	• Obligation on grid system operators to apply a system of feed-in management which guarantees maximum possible feed-in of electricity from renewable energy sources and existing CHP plants into the transmission grid. • Obligation on renewable and CHP plant operators to ensure that in the event of grid bottlenecks, their plants offer a feature for remote regulation and control by the grid system operator. • Feed-in management to be coupled to maximum utilisation of all feasible technical options for grid optimisation.	

Hydropower	• A single remuneration period of 20 years. • Amendment of fee categories; an increase in the fees paid for plants with a capacity up to and including 5 MW_{el}. • For systems with a capacity of over 5 MW: abolition of the cut-off date, the upper limit of 150 MW and the requirement for modernisation to result in an increase in the electrical energy of at least 15 %.	• Development of a strategy to introduce an inter-plant remuneration system for the ecological modernisation of several plants within a single river basis section.
Landfill gas, sewage treatment plant gas and mine gas	• Increase in the fees paid for landfill gas systems up to and including a capacity of 500 kW_{el}. • Reduction of 1 cent/kWh in the fees paid for electricity from mine gas plants with a capacity of 0.5-5 MW and of 2 cent/kWh for electricity from mine gas plants with a capacity of over 5 MW.	
Biomass	• Increase in the CHP bonus from 2 to 3 ct/kWh. • Basic fees to be reduced by 0.5 ct/kWh for small and medium-sized plants and by 2 ct/kWh for large plants. • Reduction in the degressive rate of remuneration for new plants from 1.5 % to 1 % p. a. • Elaboration of the provisions of the Renewable Energy Sources Act to avoid environmental negative impacts of biomass use, especially as regards the sustainability of renewable inputs, the problems associated with palm oil, etc.	• Review of regulations concerning good practice and other criteria of relevance to EU direct payments (cross-compliance) to avoid negative impacts of energy crop cultivation on nature and the environment.
Geothermal energy	• Reduction in the number of capacity categories from four to two, and increase in basic fees. • Introduction of a heat cogeneration bonus of 3 ct/kW_{el}.	• Provision of support for development of local district and district heating networks through other funding programmes.
Wind power and grid stability	• Reduction of the degressive rate of remuneration for new onshore wind power plants from 2 % to 1.0 % p.a. • Improvement of repowering incentive in Article 10 (2). • Improvement in fees paid to offshore wind energy plants from 10/2008 under Article 10 (3) by increasing initial fees from 8.74 to 11-14 ct/kWh, with a decrease in the lower rate of remuneration from 5.95 ct/kWh to 3.5 ct/kWh. • Increasing grid stability by improving the technical properties of onshore wind energy plants.	• Abolition of the deadline in Article 118 (7) of the Energy Industry Act, which currently provides for the assumption of the grid connection costs by the grid operator only for offshore facilities where construction commences before 31 December 2011.

Solar radiation	• Progressive increase in the degressive rates by 2 percentage points for 2009 and 2010 and a further 1 percentage point from 2011, i.e. from 5 % to 7 % and 8 % p. a. for roof systems, and from 6.5 % to 8.5 % and 9.5 % p. a. for open-space systems. • Introduction of a new category for roof systems with a capacity of over 1000 kW_p and a reduction in the remuneration rate.	