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## **Geschäftsmöglichkeiten mit der Finanzierung erneuerbarer Energien in Deutschland**

Heinrich Degenhart, Thomas Schomerus  
Dezember 2008

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# Business Opportunities through the Financing of Renewable Energy Installations in Germany

Heinrich Degenhart\*, Thomas Schomerus\*\*

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## Zusammenfassung:

Der Beitrag basiert auf einem Forschungsprojekt zur Finanzierung Erneuerbarer-Energien-Anlagen im Auftrag der Wissenschaftsförderung des Deutschen Sparkassen und Giroverbands. Als Ergebnis wurde ein „Evidenzhandbuch“ mit ausgewählten Praxisbeispielen zur Finanzierung von Wind-, Biogas- und Solaranlagen erstellt. Nach den Beschlüssen der Europäischen Union soll bis 2020 der Anteil Erneuerbarer Energien am Primärenergieverbrauch auf 20% erhöht werden. Die Potenziale Erneuerbarer Energien reichen zur Erfüllung dieses Ziels aus. Die Bundesrepublik hat sich bzgl. der Förderung der Stromerzeugung aus Erneuerbaren Energien für ein Modell erhöhter Einspeisevergütungen entschieden, die von den Netzbetreibern zu zahlen sind. Wegen ihrer dezentralen Struktur und Bindung an die Regionen sind Sparkassen und Landesbanken für die Finanzierung Erneuerbarer-Energien-Anlagen besonders gut geeignet. Durch die auf 20 Jahre in gleich bleibender Höhe garantierten Einspeisevergütungen ist der Cash-Flow gesichert. Dadurch werden bereits ab einer Höhe von ca. 1 Mio. € Projektfinanzierungen durchgeführt, bei denen auf die sonst üblichen Sicherheiten verzichtet werden kann. Von großer Bedeutung für die Finanzierung ist das technische und betriebswirtschaftliche Know-How der Betreiber. Die untersuchten Finanzinstitute konnten aus der Finanzierung Erneuerbarer-Energien-Anlagen durch verbesserte Kundenbindung und Imagegewinne zusätzliche Vorteile ziehen.

**Schlüsselwörter:** Erneuerbare Energien, Sparkassen, Projektfinanzierung, Praxisbeispiele

## Abstract:

The article is based on a research project on the financing of renewable energy installations for the German Savings Banks association (Deutscher Sparkassen- und Giroverband). The result was an “evidence manual” containing selected examples of wind-, biogas- and solar-installation financing. According to the European Union decisions of January 2008, the percentage of primary energy consumption in renewable energies should be raised to 20% by 2020. Sufficient renewable energies are available for reaching these goals. Germany has chosen a so-called feed-in-system for these with raised tariffs which must be paid by grid owners. Owing to their decentralised structure and regional commitment, savings banks are well equipped for financing renewable energies. With the feed-in-tariffs fixed for 20 years, the Renewable Energies Act guarantees a secured cash-flow. This makes project financing, starting from 1 Mio €, interesting for financial institutes, whereby they abstain from demanding the usual securities. The plant operator’s technical and economical know-how forms a crucial basis for such decisions. By financing renewable energies installations, financial institutes gain further advantages through improved customer loyalty and obtaining a better image.

**Keywords:** Renewable Energies, Savings Banks, Project Finance, Case Studies

**JEL-classification:** G21, N70

## Correspondence:

Thomas Schomerus, Leuphana University of Lüneburg, Institute of Business and Law, Wilschenbrucher Weg 69, 21335 Lüneburg, Germany  
Fon +49 4131 677 7930, Fax +49 4131 677 7911, schomerus@uni.leuphana.de

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\* Institute of Business and Law, Banking and Finance, at Leuphana University of Lüneburg.

\*\* Professor of Public Law, in particular Environmental and Energy Law at Leuphana University of Lüneburg, and Institute of Business and Law at Leuphana University of Lüneburg.



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## Introduction

For several years, the business of electric power generation and to some extent heat generation from renewable energies has been growing. According to the German Ministry for the Environment, Nature Conservation and Nuclear Safety, in 2007 the inland turnover through construction and operation of such installations produced roughly 25 bn €, providing almost 250.000 jobs.<sup>1</sup> As opposed to fossil and nuclear energy generation, the renewable energies sector is predominantly decentralised in structure. Today, renewable-energy-installations or planning of such can be found in almost every German community.

Renewable energy financing is becoming increasingly a day-to-day business in the banking sector. Several questions arise, however, which have so far been dealt with and decided upon individually by the Sparkassen-Finanzgruppe (Savings-Banks-Group).<sup>2</sup>

An “Evidence Manual” for systemizing the financing procedure for renewable energies has been developed in a co-operation between a team of experts from Leuphana University of Lüneburg (Prof. Dr. Heinrich Degenhart, Prof. Dr. Thomas Schomerus), the market strategy department within the Deutsche Sparkassen- und Giroverband (DSGV), the German Savings Banks and Girogroup and the agency in charge of scientific promotion within the Sparkassen-Finanzgruppe e. V. It is the purpose of the manual to facilitate the handling of aforementioned typical questions and reduce the need for proffering specific information.<sup>3</sup>

## General Goals of Climate Protection and their Implementation

Should global warming be limited to a rise of 2 degrees C, according to the Intergovernmental Panel on Climate Change (IPCC) and other international and national institutions and organizations, on the basis of emissions in 1990, industrialized countries must reduce greenhouse gases by app. 30% by 2020 and by app. 80% by 2050.<sup>4</sup> At the G-8 Hokkaido-Toyako summit in Japan in 2008 the representatives agreed that “with respect to the goal of achieving at least 50% reduction of global emissions by 2050, the G8 leaders” should “seek to share and adopt it with all Parties to the United Nations Framework Convention on Climate

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<sup>1</sup> *Böhme/Dürschmidt* (ed.), Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Renewable Energy Sources in Figures, Status June 2008, p. 8 ([http://www.erneuerbare-energien.de/files/english/renewable\\_energy/downloads/application/pdf/broschuere\\_ee\\_zahlen\\_en.pdf](http://www.erneuerbare-energien.de/files/english/renewable_energy/downloads/application/pdf/broschuere_ee_zahlen_en.pdf)).

<sup>2</sup> See [http://www.sparkasse.de/s\\_finanzgruppe/index.html](http://www.sparkasse.de/s_finanzgruppe/index.html) (no English version available).

<sup>3</sup> *Degenhart/Schomerus*, Geschäftschancen durch Finanzierung Erneuerbarer-Energien-Anlagen, Wissenschaft für die Praxis H. 65 2008, 12.

<sup>4</sup> See in detail IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment, Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge, University Press, Cambridge, United Kingdom and New York, NY, USA.



Change”.<sup>5</sup> Besides these political climate targets, EU is, in accordance with the Kyoto-protocol, legally bound to reduce its CO<sub>2</sub> emissions by 8%<sup>6</sup> by the end of 2012, while Germany must reduce by 21%.<sup>7</sup>

In January 2008 the EU-Commission introduced their “20 and 20 by 2020”-paper<sup>8</sup> with its two main goals:

1. a 20% reduction of greenhouse gases by 2020 (should further industrialized countries – in particular the US – agree to comparable reductions, by even as much as 30%) and
2. an increase of 20% in the proportion of renewable energies involved in end-energy usage (not electricity consumption only!) within the EU-member states by 2020.

Compliance with the EU burden-sharing agreement means that Germany must, on the basis of showings from 2005, fulfill a new CO<sub>2</sub>-reduction target of 14% by 2020.<sup>9</sup> Furthermore, according to EU decisions from 2007, energy efficiency in general should by 2020, be improved by 20%.<sup>10</sup> Today, the 2006 EU-directive on energy end-use efficiency and energy services is still in force, requiring a reduction goal of 9% by 2016.<sup>11</sup>

In comparison, the national targets provided by the EU-renewable energies directive of 2001<sup>12</sup> lie much lower. According to these, Germany should reach a 12.5% proportion of renewables in electricity consumption by 2012 and 20% by 2020. The German Renewable Energy Act of 2004<sup>13</sup> has adopted these goals in its sec. 1. The 12.5%-target was already reached in the first half of 2007. In this year a 14.2% proportion of electricity consumption and 8.6% of general end-energy consumption has been achieved. This leads to a CO<sub>2</sub> avoidance of some 115 mio t.<sup>14</sup> With regard to this success, the federal German government announced a further CO<sub>2</sub> -reduction of up to 40% by 2020 and an increase of 25-30% in the proportion of renewables concerning electricity consumption.<sup>15</sup>

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<sup>5</sup> See the official summary of the Hokkaido Toyako summit of July 9, 2008 (<http://www.g8summit.go.jp/eng/news/summary.html>).

<sup>6</sup> See annex B of the Kyoto-Protocol to the United Nations Framework Convention on Climate Change of 1998 (<http://unfccc.int/resource/docs/convkp/kpeng.pdf>).

<sup>7</sup> See the so called burden-sharing agreement, Council Decision 2002/358/EC of 25 April 2002.

<sup>8</sup> 20 20 by 2020 - Europe's climate change opportunity, COM(2008) 30 final of 23 January 2008.

<sup>9</sup> Proposal for a decision of the European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, COM(2008) 17 of 23 January 2008, p. 15.

<sup>10</sup> Brussels European Council 8/9 March 2007, Presidency Conclusions, 7224/07, p. 20.

<sup>11</sup> Directive of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services COM 2006/32/EC).

<sup>12</sup> Directive on Electricity Production from Renewable Energy Sources (COM 2001/77/EC).

<sup>13</sup> Act on Granting Priority to Renewable Energy Sources, BGBl. 2004, p. 1918.

<sup>14</sup> *Gabriel*, Foreword to Böhme/Dürschmidt (Fn. 1), p. 4 f.

<sup>15</sup> See the Integrated Energy and Climate Programme of the German Government of August 2007 and the additional comprehensive package of 5 December 2007, English version available under <http://www.bmu.de/english/climate/downloads/doc/40589.php>.



## **Implementation by the Member States**

The national scope for measures aiming at reaching these short-, middle- and long-term targets is limited by EU competencies. In general, EC provides member states with directives which must, within a given margin, be transferred into their national law. For instance, the renewable-energies directive<sup>16</sup> does not specify which concrete measures member states should take. Thus, some member states have decided to employ a quota-system, whereas others, including Germany, have chosen the more successful model of increased feed-in tariffs.<sup>17</sup>

## **The System of the Renewable Energies Act**

According to the Renewable Energies Act<sup>18</sup> covering electricity generated by using renewable energies, this model guarantees an increased feed-in payment, varying with regard to energy sources and form and size of the installation. The set tariffs will be guaranteed for the next 20 years but on a diminishing scale, i.e. for following installations they will be reduced every year by a certain percentage with no provision for inflation compensation. The nearest grid owner is obliged to connect the installation to the grid, purchase the electricity generated and, having fulfilled certain requirements, to pay the raised electricity tariffs, as laid down in the act. The excess expenditure is counterbalanced by the transmission network owners who in their turn finally pass this surfeit on to the electricity consumers.

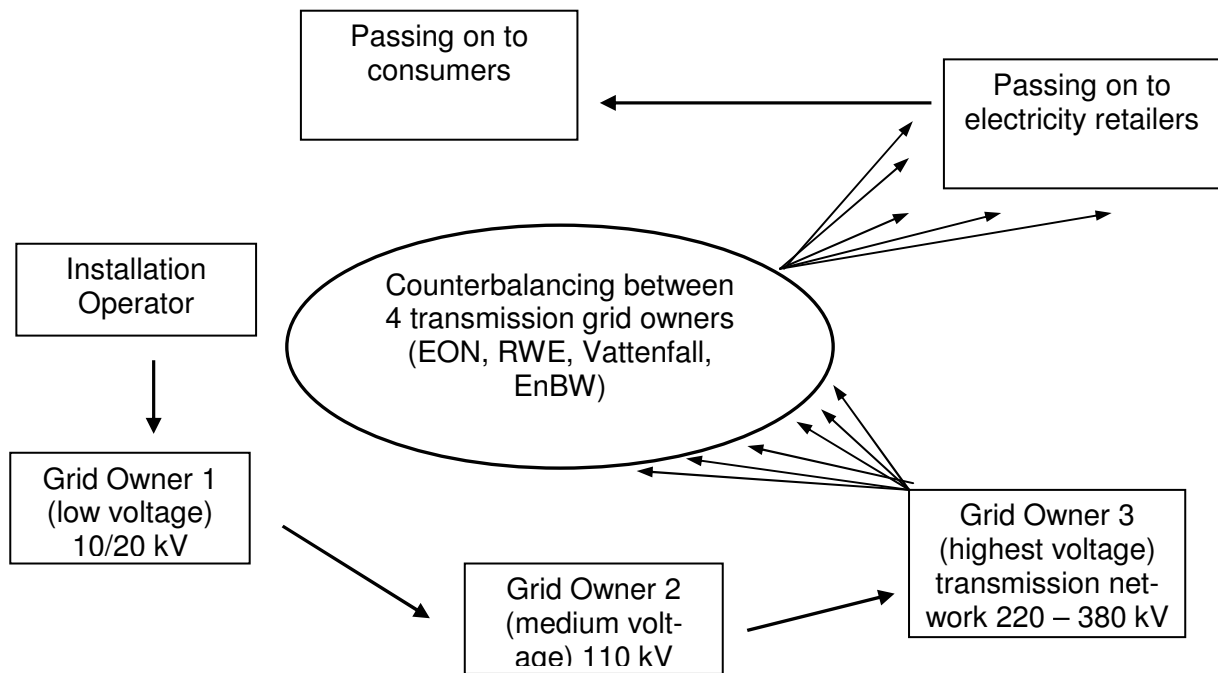
The Renewable Energies Act has made the decentralised energy generation in small independent units lucrative. Long-term binding feed-in tariffs allow for promising calculation of renewable energy plants. The tariffs provide a basis for regional financing approaches of such installations beyond those of traditional power-plant operators.

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<sup>16</sup> See above, fn. 12.

<sup>17</sup> See for instance EU-Commission, The support of electricity from renewable energy sources, COM(2005) 627 of 7 December 2005; in 2008, the German Federal Ministry of the Environment has opened up an internet data base on legal sources on renewable energy within the EU 25 (<http://www.res-legal.eu/en.html>).

<sup>18</sup> See above, fn. 13.



**Figure 1: Purchasing and payment chain acc. to Renewable Energies Act**

### Climate Package

Within the scope of their legal national options, the German federal government announced in October 2007 “key points for an integrated energy and climate programme” (Meseberg-package).<sup>19</sup> The expansion of renewable energies in the electricity sector takes second position out of altogether 29 selected measures. This includes an amendment of the Renewable Energies Act, improving the integration of renewables into the national grid, promoting repowering of wind energy installations and the expansion of offshore wind energy usage. The German parliament has passed this act in October 2008.<sup>20</sup>

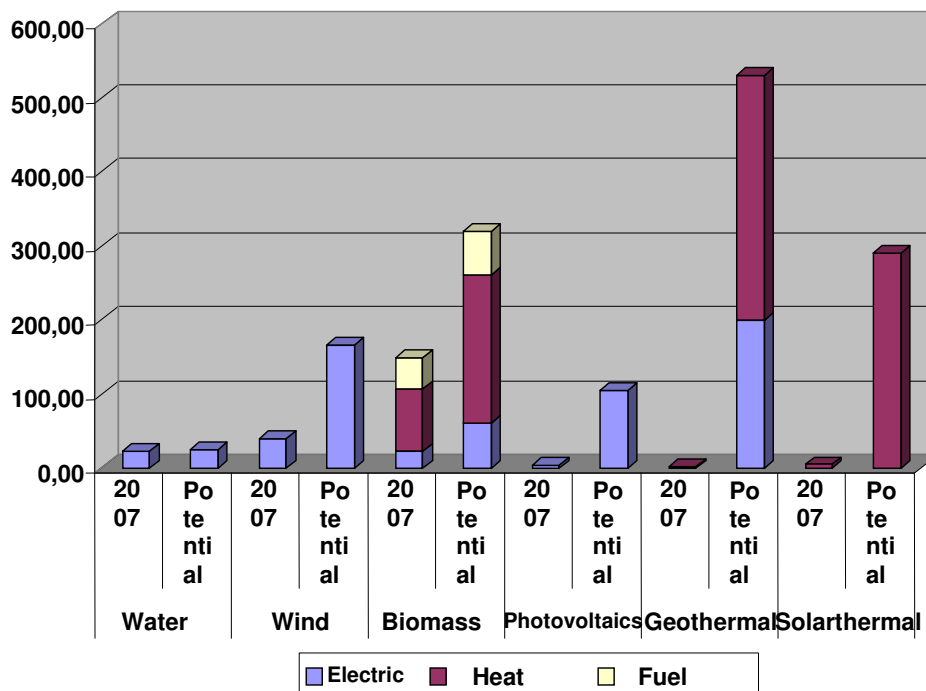
It is doubtful whether those measures will be sufficient for reaching the ambitious goals mentioned above. Further packages of measures will presumably follow, exploiting, for instance, the high efficiency potential in the renewable energies sector.

<sup>19</sup> See above, fn. 15.

<sup>20</sup> The so-called Renewable Energy Act 2009, coming into force on 1 January 2009 (BGBl. 2008, p. 2074).



### Potential of Renewable Energies (in TWh)



**Figure 2: Longterm potential of renewable energies in Germany and usage of renewable energies 2007 in comparison to total energy consumption 2007.<sup>21</sup>**

Figure 2 shows that, particularly in the fields of electricity and heat production, renewables have been utilized by only about one tenth of their potential. Partly, renewables are hardly used as can be seen in the example of geothermal energy. Substantial investments leading to extensive demand for financing such projects must be made in the near future.

### Model Cases from the Business World of Sparkassen and Landesbanken

Working on the manual, the team discovered that almost all Landesbanken (State Banks) and also several Sparkassen (Savings Banks) have had experience in financing renewable energies. The model cases focus on installations for generating electricity such as wind, sun or biomass. Heat generation was also covered particularly in connection with biomass. In one case solar thermal energy played a role.

<sup>21</sup> Sources: German Federal Ministry of Economics and Technology/ German Ministry for the Environment, Nature Conservation and Nuclear Safety, Energieversorgung für Deutschland, Statusbericht für den Energiegipfel am 3. April 2006, Status: February 2006, p. 5, see [www.bmu.de/files/download/application/pdf/statusbericht\\_0603.pdf](http://www.bmu.de/files/download/application/pdf/statusbericht_0603.pdf) and German Renewable Energy Federation (Bundesverband Erneuerbare Energien e.V.), Erneuerbare Energien: Rekordwerte trotz gebremstem Wachstum, Status 8.1.2008, see [www.bee-ev.de](http://www.bee-ev.de).





The size of the energy plants covered varied from 30 KW for a private solar installation to 6.8 MW for a wind farm with a financial volume from 5,000 € for a solar thermal installation up to nearly 10 Mio € for a solar park. Most of these projects made a financial demand of between 1 m € and 10 m €.

Overall budgets of over 1 Mio € had been financed, for the most part, as project financings through legally and economically independent units. Normal installation- and investment finance practices had been applied within the corporate clients area, for projects under 1m €. In the private clients sector, investment between 5,000 and 50,000 €, in some cases more, had been financed for private home owners or investors in energy generating plants.

### **Participants**

In the case of smaller investments, home owners or investors as beneficiaries, as well as Sparkassen and Landesbanken, were involved as financiers. Furthermore, regional energy suppliers or producers of energy installations were engaged in supporting or conciliating the financing process.

As far as larger investments with more than 1 m € were concerned, a number of initiators or sponsors were involved:

- regional energy suppliers,
- producers of energy installations,
- financial investors and leasing companies,
- single persons, particularly farmers.

All the various participants pursue their particular interests: regional energy suppliers have the intention of covering the field of renewable energies, producers want to promote their sales by placing financing offers. Financial investors, Saving Banks and State Banks aim at making profits by placing their own financing offers. Farmers want to generate a second income in addition to their agricultural activities, and single individuals either want to invest or to be involved in environmentally friendly energy generation and ease their conscience.

In most of the presented of project financing cases, the participants initiated proceedings by approaching the Sparkassen or Landesbanken. In almost half the cases, the financing process built on a long-standing business relationship with these initiators. In the case of consumer banking the initiators were mostly the financial institutions. For instance, the State Building Society Savings and Loan Association (Landesbaus-



parkasse – LBS)<sup>22</sup> attracted new clients for renewable energy projects with the help of its brokers. One of the Sparkassen placed a special financing scheme for renewable energy projects on the market.

### **Financing Procedures**

Procedures differ according to the particular financing scheme. Within the relatively small private clients business, credit programmes and controlling procedures are standardized. They are executed in the same way as regular construction loans for reconstruction activities. Important conditions are the credit-worthiness and the realty as securities. Feed-in payments and the assignments of claims are of secondary importance only.

Concerning larger investments of more than 1 m €, the situation is different. Of greater importance are legal and in particular, technical issues, as well as validity and securities. Several specialists were always employed in estimating the technical risks. Professional competence was of the greatest importance in their selection. Banks prefer to work with specialists whose work they already know, in addition to which, Landesbanken and also some Sparkassen have their own technical experts. In other Sparkassen, financial specialists gained such knowledge on their first projects. If necessary, State Banks offered competential support to Sparkassen.

Credit assessment, security evaluations and risk assessment were completed by the institutions themselves. To some extent, they were able to refer to self-developed cashflow-models.

### **Financing Structure**

All larger investments covered by this research were based on the project financing model. Only in one case was an installation regarded as part of a regular business financing procedure. Within the consumer banking business, predominantly modified construction financing models were employed. In all such project financing cases, the beneficiary was a limited partnership with a limited liability company as general partner (so-called GmbH & Co KG). Initiators (farmers, energy suppliers, plant producers) and owners were identical. To some extent the initiators also took over the function as chief executive officers (Geschäftsführer). In most cases, roughly 25% of equity capital was used, which for the most part consisted of limited liability capital (Kommanditkapital), but to some extent of subordinate shareholder's loans (nachrangige Gesellschafterdarlehen). In some cases, equity capital was raised by employing a fonds model with a large number of investors. In smaller investment projects, all equity capital came from one to three initiators. In a few cases, no or only very little equity capital was employed. In those cases where equity capital constituted a lower percentage, Sparkassen and Landesbanken obtained securities from shareholders' private means or

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<sup>22</sup> See <http://www.lbs.de/> (no English version available).



from limited personal liabilities. Other than that, the amount of equity capital demanded depended on the volume and validity of cashflow available for payment of interest. Cashflow may vary greatly and may in exceptional situations justify a very low private equity capital contingent.

As far as possible, in the financing procedure of the investments, the ERP-environment-protection and energy-saving programme was employed or secondary to that, the KfW-environmental-protection programme.<sup>23</sup>

As far as it was reasonable concerning the preferred redemption-structure, additional Sparkassen loans were offered. In some cases, additionally or alternatively, product leasing was employed. Some of these leasing businesses were refinanced by local Sparkassen. Within the arrangement by State Banks of ERP-/KfW-loans for larger projects, regional Sparkassen usually played a minor role.

Pre- or bridgeover-financings, in particular the pre-financing of expected VAT-refunds and state-aids, were regularly covered by the Landesbanken and Sparkassen involved in the financing process. Guarantees (avals) needed to fulfil official requirements were given by the Landesbanken and Sparkassen. Liquidity reserves used in such project financing procedures were also given by these.

In some cases, state aids or partial acquittals from KfW-credit programmes became part of the financing. In comparison to the overall budget, however, these amounts were low.

In smaller financings in the consumer banking business, relevant KfW-programmes such as the CO<sub>2</sub> building renovation programme were also employed. From the clients' perspective, however, these programmes were not always optimal. Therefore, Sparkassen special loan programmes were often employed together with Building Society loans.

### **Loan Securities**

It is an essential of project financings that they rely on the cash-flow from the financing object. Only as an exception, is recourse taken to the initiators or sponsors. As a consequence, securities are usually given by the financing object. Normally, not only the plant itself is transferred by way of security but also all claims important for the cash-flow are assigned as securities. This includes payments from the feed-in contracts and claims from lease contracts, personal easements concerning property, from insurance or maintenance contracts. This comprehensive covering has the purpose of securing further operations and the final disposal of the project in case of payment difficulties.

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<sup>23</sup> See [http://www.kfw-foerderbank.de/DE\\_Home/Umweltschutz/ERP-Umwelt93/index.jsp](http://www.kfw-foerderbank.de/DE_Home/Umweltschutz/ERP-Umwelt93/index.jsp) (no English version available).



In cases of smaller financings, new land-mortgages or the use of existing land-mortgages are usually employed, as well as the transfer of the plant as security. Sometimes concerning smaller sums, securities were not demanded at all.

### **Project Attendance**

All these project financings require an intensive attendance during the construction and the following operating stage. Attendance during construction does not differ essentially from other project financings. Insofar as technical expertise was needed, the financing Landesbanken and Sparkassen involved such specialists. In some cases, tax, legal and energy-technical expertise was employed. In the operating stage, all Landesbanken and Sparkassen required periodical reports, at least half-yearly but sometimes monthly or quarterly. On the basis of these reports, a target-performance comparison was carried out. Sometimes this data was made plausible by employing project data-banks and by a deviation-analysis. Normally, smaller private and business financings took place without such bank attendance.

### **Risk Analysis**

Within all project financing procedures displayed, risk analysis was of particular importance. In all Landesbanken and some Sparkassen, these risk analysis procedures are based on cash-flow models developed by these banks. Usually specialists are involved. Concerning financing of renewable energy installations, all banks prefer techniques provided by experienced constructors. The operator must also be experienced. In the case of biomass projects, the financing banks attach great importance to the farmers' know-how. Additionally, a guaranteed supply of resources including prices and volumes is very valuable. Short distances for biomass plants contribute to the success of the project. Of major importance are the required licenses for the construction and operation of the plant. Adequate knowledge of the place and a local network can also be vital.

### **Benefits for the Sparkassen**

Measurable benefits derive from marginal returns in the credit- and investment business. Within project financing, provisions are normally set up for the structuring of financing processes, in addition to which, commissions can be generated for the arrangement of insurances.

In the consumer banking business, commissions derive from building loan contracts and insurance policies, besides interest margins from the credit business.

Above all, the Sparkassen described cross-selling profits and image improvements. The initial financing of renewable energy projects had acclaimed model character. They demonstrate special expertise, and in a few



cases this generated follow-up projects. In addition to this, recognition of their financing renewable energy projects, lead to Sparkassen experiencing a raise in market shares of their regular business. From the perspective of the Sparkassen involved, the image profits gained by their position as financiers of environmentally friendly projects were crucial.

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