Federal Ministry of Economy,
Family and Youth

AUSTRIA

Report for 2009

Based on Article 3(3) and

Article 5(5)

Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market

April 2010

Produced by Energie-Control GmbH, Rudolfsplatz 13a, 1010 Vienna and edited by the Federal Ministry for Economy, Family and Youth

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1 Introduction

European Union Directive 2001/77/EC, 27 September 2001, on the promotion of electricity from renewable energy sources (Directive 2001/77/EC) determines in Article 3(3) and Article 5(5) reporting requirements for Member States.

This report on the attainment of targets is based on the requirements in Article 3(3) and Article 5(5) of Directive 2001/77/EC.

Article 3(3) Directive 2001/77/EC provides as follows:

> *The Member States shall initially publish no later than on 27 October 2003, and subsequently every two years, a report analysing the extent to which the national indicative targets have been attained in particular consideration of climatic factors, which may hinder the fulfilment of these factors, and which indicates the extent to which the relevant measures comply with the national climate change commitments.*

In connection with the traceability system, Article 5(5) Directive 2001/77/EC stipulates the following:

> *The Member States or competent bodies create appropriate mechanisms in order to guarantee the accuracy and reliability of guarantees of origin, and describe in the report, in accordance with Article 3(3), the measures taken to guarantee the reliability of the traceability system.*

The Federal Ministry for Economy, Family and Youth has requested Energie-Control GmbH to work out the basic principles for this reporting. This report includes these basic preparation principles with an emphasis on describing the development of green electricity produced from 1997 to 2009 (and 2010 projection).

In order to evaluate the above-mentioned areas, the analyses are preceded by a detailed description of the existing legal conditions and current developments.

Detailed reports and assessments of the development of renewable energy in Austria can be found in the 2009 energy report from July. This can be downloaded from the website of Energie-Control GmbH at www.e-control.at.

2 Overview

Austria has the largest share of electricity produced from renewable energies out of all European Union countries. Already in 1997, compared to the total gross electrical consumption of 56,083 GWh, a share of 66 % with 37,002 GWh (excluding electricity produced from pumped water) was produced from renewable energy sources.

Since then, the electricity produced from renewable energy sources in Austria has increased steadily. From 1997 to 2004 the electricity produced from hydropower in particular was further developed, by approximately 1,700 GWh, to which a new Danube power station (Freudenau) contributed approximately 900 GWh. This means, compared to the gross electrical consumption, an additional production of electricity from renewable energy sources of approximately 1.6 %.

Electricity produced from 'new' renewable energy sources (wind power, biomass, biogas, photovoltaic) was supported until 2002 through various regulations in different Länder. This led to a supported production of electricity from these energy sources of approximately 400 GWh in 2002 (+ 0.7 %).

Since 2003, the electricity produced from 'new' renewable energy sources (wind power, biomass, biogas, photovoltaic) has been supported through uniform regulations across Austria (Green Electricity Act 2002). This led to a sharp increase in electricity produced from these energy sources. In 2009, 4,503 GWh of supported energy was produced from these energy sources.

This means, compared to the gross electricity consumption of 1997, an additional production of electricity from renewable energy sources of 8.0 % and, compared to the gross electricity consumption of 2009 (69,628 GWh, preliminary value), an additional production of electricity from renewable energy sources of 6.5 %.

In addition, the Green Electricity Act also provides for the support of hydropower up to a capacity of 20 MW. As these measures, in addition to new buildings, often also include the modernisation of existing facilities, revitalisation projects and also a large number of very small facilities, there are currently only incomplete statistics available on the additional electricity thereby produced. Evaluations of the total capacity of newly built small-scale hydropower plants and revitalised small-scale hydropower plants allow an additional electricity production of approximately 700 GWh to be deduced since the 2002 Green Electricity Act came into force (approximately + 1.2 % compared to gross electricity consumption).

In addition, the energy produced from renewable energy sources in Austria not supported under the Green Electricity Act has risen significantly since 1997, for instance through the forest-based industry's autogeneration stations. This increase amounts to approximately 600 GWh (approximately 1 % of gross domestic electricity consumption).

In this way, corresponding to Directive 2001/77/EC of the European Union of 27 September 2001, numerous investments took place in Austria and funding programmes were implemented, through which the electricity produced from renewable energy sources based on an already very high base value in 1997 once again increased very sharply. Overall, taking into account the 46,978 GWh of green electricity not fed into the public grid in 2009, 9,976 GWh more electricity was produced than in 1997 (37,002 GWh).

This 9,976 GWh increase means that the additional electricity produced from renewable energy sources corresponds to a share of 17.6 % of gross domestic electricity consumption in 1997, and a share of 14.1 % of gross domestic electricity consumption in 2009.

Substantial subsidies have been agreed on for this development, particularly for energy produced from 'new' renewable energy sources, as feed-in tariffs are granted which often amount to a multiple of the 'normal' electricity market value. Approximately 250 million euros to 320 million euros (varied depending on the electricity market price and thus the difference between the feed-in tariff and the electricity market price) is spent per year for this support which must be granted based on the feed-in tariff guarantee period.

The effect of climate protection through the electricity produced from renewable energy sources is determined by comparing it with the electricity production which would have to cover the demand for electricity without this electricity production. If one takes as the comparison electricity produced from combined cycle gas and steam generating stations, then in this type of facility an average of approximately 0.44 tonnes of CO_2 is emitted per MWh electricity produced.

The electricity produced from renewable energy sources of 46,978 GWh thus avoids 20.7 million tonnes of CO_2 emissions which otherwise would be emitted when producing the same amount of electricity with combined cycle gas and steam generating stations.

Even if only the amount of electricity which has been additionally produced from renewable energy sources since 1997 in Austria is evaluated, there is a substantial avoidance of CO_2 emissions. The additional electricity produced from renewable energy sources of 9,976 GWh after 1997 avoids 4.4 million tonnes of CO_2 emissions

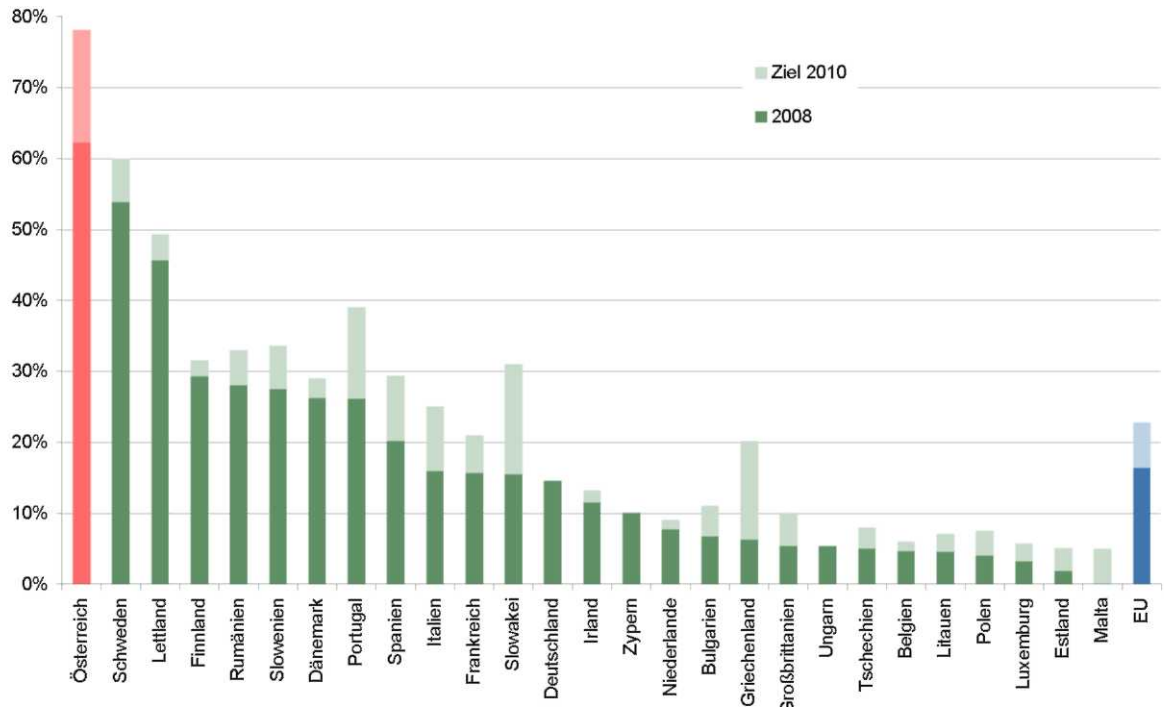
which otherwise would be emitted when producing the same amount of energy with combined cycle gas and steam generating stations.

The above-mentioned amounts of CO_2 avoidance through electricity produced from renewable energy sources in Austria represent a substantial share of total CO_2 emissions in Austria (88 million tonnes CO_2 equivalent or 74 million tonnes CO_2 in 2007).

The degree of support is relatively low for electricity produced from hydropower with under 20 euros per tonne for the most part; for electricity produced from wind power it is approximately 50 euros per tonne of CO_2 reduced. For electricity produced from biomass/biogas (on average, approximately 180 euros per tonne of CO_2 reduced) and photovoltaics (support granted in 2009 for asset investment was approximately 1,300 euros per tonne of CO_2 reduced) it is considerably higher, however, and thus a multitude of the current CO_2 price in the Emissions Trading System (approximately 13 euros per tonne of CO_2 reduction, Status April 2010).

3 Electricity production in Austria

Electricity production in Austria is characterised by a high share of renewable energy sources, particularly hydropower. By European standards, Austria has by far the largest share of electricity produced from renewable energy sources.



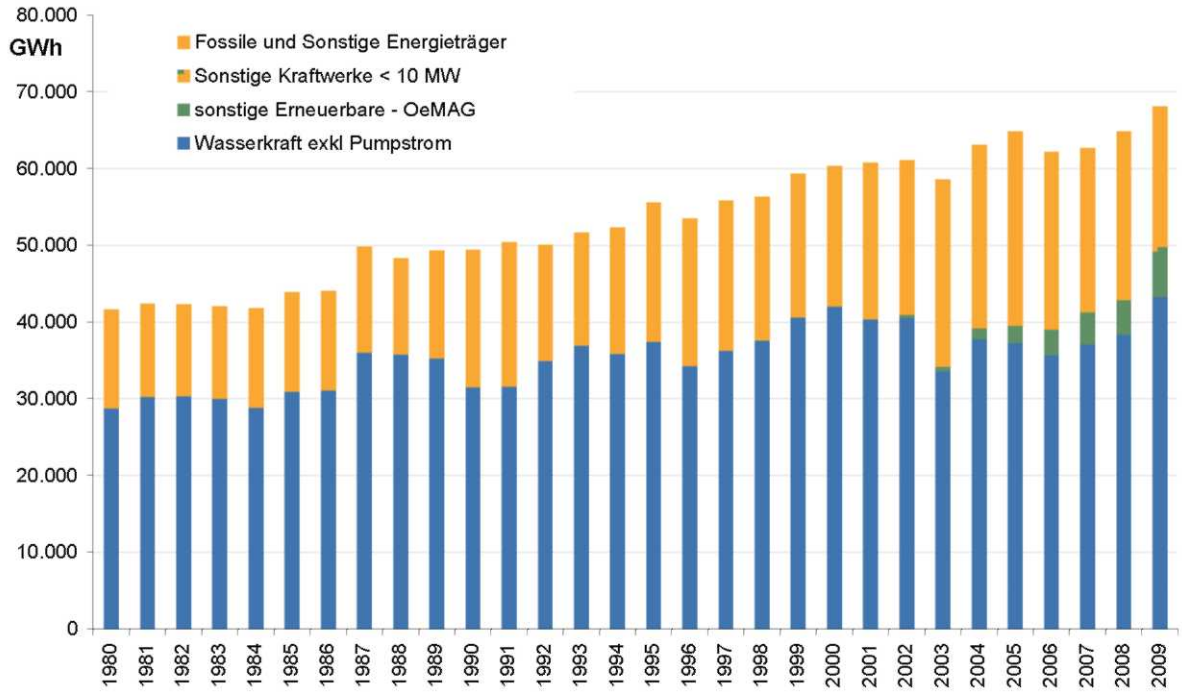
Sources: Energie-Control GmbH, EU-RL 2001/77, EurObserv'ER; 2008: estimated values]

German	English
Ziel 2010	2010 objective
Östereich	Austria
Schweden	Sweden
Lettland	Latvia
Finnland	Finland
Rumänien	Romania
Slowenien	Slovenia
Dänemark	Denmark
Portugal	Portugal
Spanien	Spain
Italien	Italy
Frankreich	France
Slowakei	Slovakia
Deutschland	Germany
Irland	Ireland
Zypern	Cyprus
Neiderlande	Netherlands
Bulgarien	Bulgaria
Griechenland	Greece
Gro• brittanien	Great Britain
Ungarn	Hungary
Tschechien	Czech Republic
Belgien	Belgium

Litauen Polen Luxemburg Estland Malta	Lithuania Poland Luxembourg Estonia Malta

Figure 1: Share of renewable energies in gross electrical consumption in Austria and in the EU-25

This high share of hydropower implies a strong dependency of the electricity production mix on climatic conditions which can also be seen from the following figure.



[March 2010 | Source: E-Control]

German	English
Fossile und Sonstige Energieträger Sonstige Kraftwerke < 10 MW sonstige erneuerbare - OeMAG Wasserkraft exkl. Pumpstrom	Fossil and other energy sources Other power plants < 10 MW Other renewable - OeMAG Hydropower excluding pumping electricity

Figure 2: Share of primary energy sources in total energy production 1980-2009 in Austria (2009: preliminary values)

Figure 2 shows the composition of total electricity production in the years 1980-2009, of which the shares of the gross domestic electricity consumption cannot be immediately deduced. It is however clear that 2003 for example, which was a particularly dry year, immediately leads to a marked decrease in the share of hydropower.

In the past, Austria has increased both the consumption of electricity as well as the quantity produced. The demand for electricity has risen steadily in all sectors. The manufacturing sector definitely saw the largest increase, followed by households and the service sector. Even with accelerated programmes to improve efficiency, demand is expected to increase.

As hydropower in Austria cannot, partly as a consequence of the requirements of the EU Water Framework Directive, be expanded to remain commensurate with the expected increases in demand and as the usable potential of wind power and biomass for electricity generation are in fact quite limited, this may lead to a diminishing share of electricity generation from renewable sources,. even though Austria, compared with the EU average, is not only prominent with regard to its expanding share of green electricity generation but is also well above average in developing wind power and biomass.

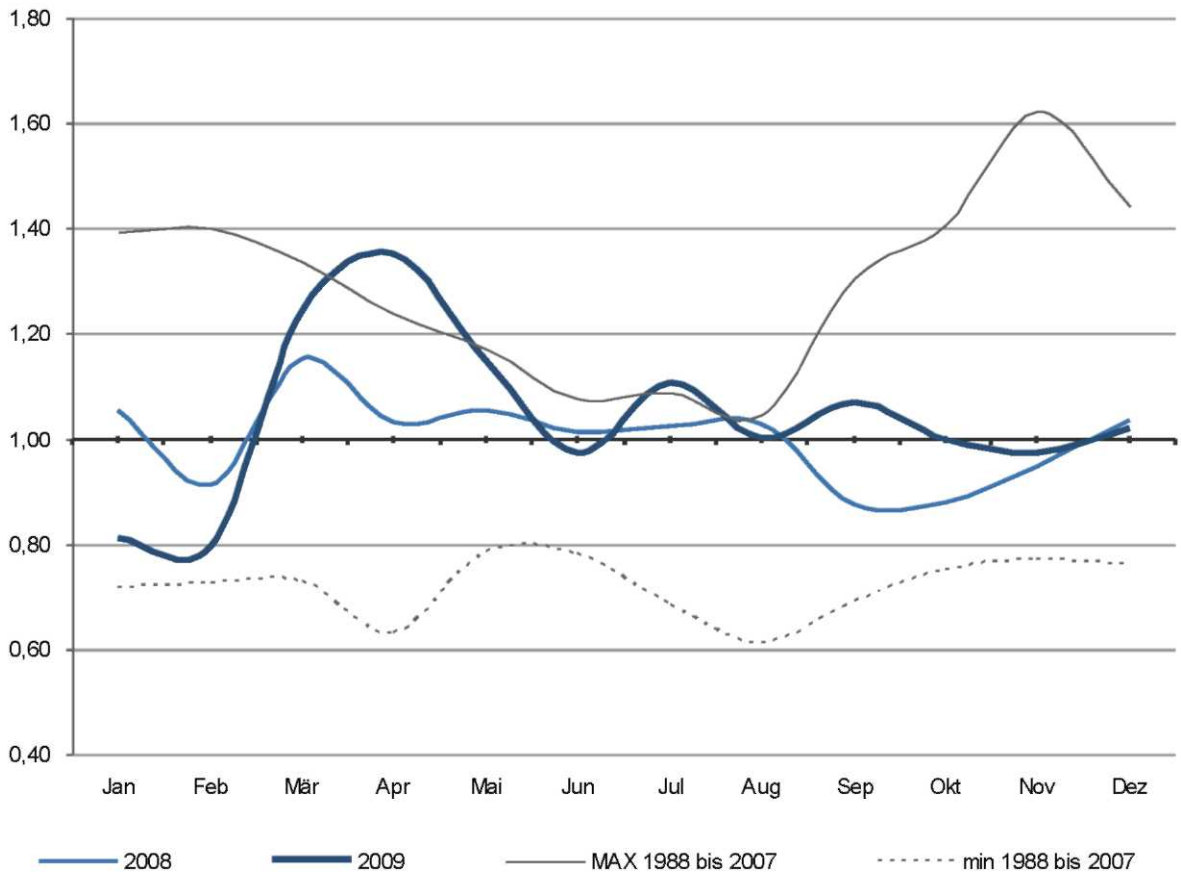
4 Climatic conditions and resource availability

Climatic conditions have a significant direct influence on two technologies, which make an important relevant contribution to electricity supply: hydropower and wind power. Photovoltaic power is also directly affected, but as this field does not contribute significantly to the power supply in Austria, this point is not examined in any greater detail here.

4.1 Hydropower

The electricity produced in hydropower plants is greatly dependent on climatic conditions. Events such as a lack of snow, drought or floods lead to marked reductions in production in the hydropower field. Figure 3 shows graphically the extent that output can vary in different months. In 2009 (after deducting pumping electricity) a total of 43.2 TWh was produced from hydropower plants, the production coefficient stood at 1.06. In a normal year, 40.8 TWh was produced.

[1] Predicted value of around 2,800 GWh.



German	English
0,40, 0,60, etc.	0.40, 0.60, etc. (commas in figures should be replaced with full stops)
Mär	Mar
Mai	May
Okt	Oct
Dez	Dec
MAX 1988 bis 2007	Max 1988 to 2007
Min 1988 bis 2007	Min 1988 to 2007

Figure 3: Monthly production coefficient for run-of-river generating stations 2008 and 2009

The following tables show the annual production coefficient for run-of-river generating stations in the years 2000-2009.

Production coefficient for run-of-river generating stations	
2000	1.16
2001	1.11
2002	1.09
2003	0.87
2004	1.00
2005	0.98
2006	0.96
2007	0.96
2008	1.00
2009	1.06

[Source: Energie-Control GmbH]

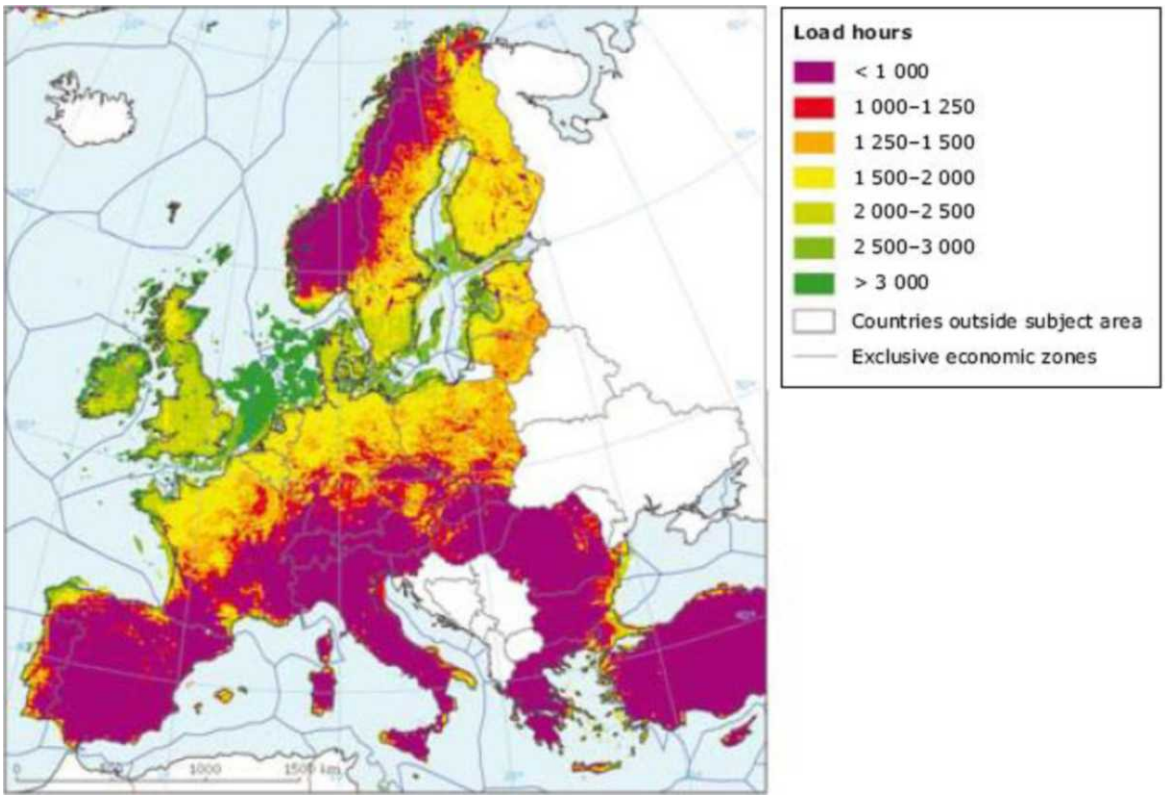
Table 1: Annual production coefficients for run-of-river generating stations 2000-2009

In recent years, several hydropower plants have been modernised and the maximum capacity thereby extended. An additional development is indeed possible but hindered on the one hand by the coming into force of the Water Framework Directive and on the other hand by a lack of acceptance in the population.
The Green Electricity Act revised by BGBl I No 104/2009 includes a further development of hydropower of 700 MW and 3,500 GWh of electricity production by 2015 as an objective.

4.2 Wind power

The average full load operation hours to be achieved with wind power are lower in Austria than in windy coastal regions of other European countries (Figure 4). The production of electricity from wind power therefore requires higher costs in Austria than in other countries. Nevertheless, wind power in Austria has been developed to a considerable extent.

Map 3.2 Distribution of full load hours in Europe (80 in hub height onshore, 120 m hub height offshore)



Source: EEA, 2008

Figure 4: Wind resources in Europe – average full load operation hours at a height of 80 (120) meters

The energy produced from wind power sharply increased despite the adverse wind conditions of a landlocked country with the coming into force of the Green Electricity Act in 2003. At the end of 2009, 995 MW wind power was in use in Austria and 1,060 MW was approved. Over 1,915 MWh of electricity was produced in Austria in 2009 with these facilities. Approximately 3.6 % of the supply to end users in Austria is from public networks. Given the above-mentioned figures, Austria ranks eighth in wind power development intensity per inhabitant.

Country	MW wind power at end 2009	Inhabitants	Inhabitants per MW wind power	Watts per inhabitant
Denmark	3,465	5,450,700	1,573	636
Spain	19,149	40,397,900	2,110	474
Portugal	3,535	10,605,900	3,000	333
Ireland	1,260	3,969,600	3,150	317
Germany	25,777	82,422,300	3,198	313
Sweden	1560	9016600	5,780	173
Netherlands	2,229	16,491,500	7,399	135
Austria	**995**	**8,192,900**	**8,234**	**121**
Estonia	142	1,324,300	9,326	107
Greece	1,087	10,688,100	9,833	102
Norway	431	4610900	10,698	93
Faroe Islands	4	47,300	11,825	85
Italy	4,850	58,133,500	11,986	83
France	4,492	60,876,200	13,552	74
Luxembourg	35	474,500	13,557	74
Great Britain	4,051	60,609,200	14,962	67
Belgium	563	10,379,100	18,435	54
Finland	146	5,231,400	35,832	28
Lithuania	91	3,585,900	39,405	25
Bulgaria	177	7,385,400	41,725	24
Hungary	201	9,981,400	49,659	20
Poland	725	38,536,900	53,154	19
Czech Republic	192	10,235,500	53,310	19
Latvia	28	2,274,800	81,243	12
Turkey	801	70,175,100	87,609	11
Croatia	28	4,494,800	160,529	6
Switzerland	18	7,524,000	418,000	2
Ukraine	94	46,710,800	496,923	2
Rumania	14	22,303,600	1,593,114	1
Slovakia	3	5,439,500	1,813,167	1
Russia	9	142,893,600	15,877,067	0
Iceland	0	299,400	-	0
Liechtenstein	0	34,000	-	0
Malta	0	400,200	-	0
Slovenia	0	2,010,400	-	0
Cyprus	0	784,300	-	0

[09.02.2010 | Source: EWEA wind data, February 2010; inhabitants data, www.welt-in-zahlen.de April 2007]

Table 2: Installed wind capacity per inhabitant 2009 in the EU-27

The Green Electricity Act revised by BGBl I No 104/2009 includes a further development of 700 MW of wind power and 1,500 GWh of electricity production by 2015 as an objective.

5 Electricity supply and green electricity supply 2002-2009

5.1 Increase in demand for electricity

In parallel with the increase in the production of green electricity, there is a continuous increase in electricity consumption.

The following table shows the public and total electricity supply in Austria in the years from 2000 to 2008.[2]

Consumption of the public grid system in Austria				Total Suppy in Austria[1]		
Calender year	*Consumption*	*Change*		*Supply incl. PSP* excl. physical exports*	*Change*	
	in GWh	*in GWh*	*in %*	*in GWh*	*in GWh*	*in %*
2000	50,678	1,547	3.1 %	60,502	2,032	3.5 %
2001	52,213	1,535	3.0 %	62,341	1,839	3.0 %
2002	53,238	1,025	2.0 %	63,578	1,237	2.0 %
2003	55,736	2,498	4.7 %	66,230	2,652	4.2 %
2004	56,979	1,242	2.2 %	67,937	1,707	2.6 %
2005	57,888	909	1.6 %	69,359	1,422	2.1 %
2006	59,196	1,309	2.3 %	70,709	1,350	1.9 %
2007	59,484	287	0.5 %	70,784	75	0.1 %
2008	60,207	723	1.2 %	71,918	1,134	1.6 %

* Pumping storage power (about 2,000 – 3,500 GWh per year)

1: These quantities are distinct from the supplies to end users covered by support contributions as internal use by power stations are not included.

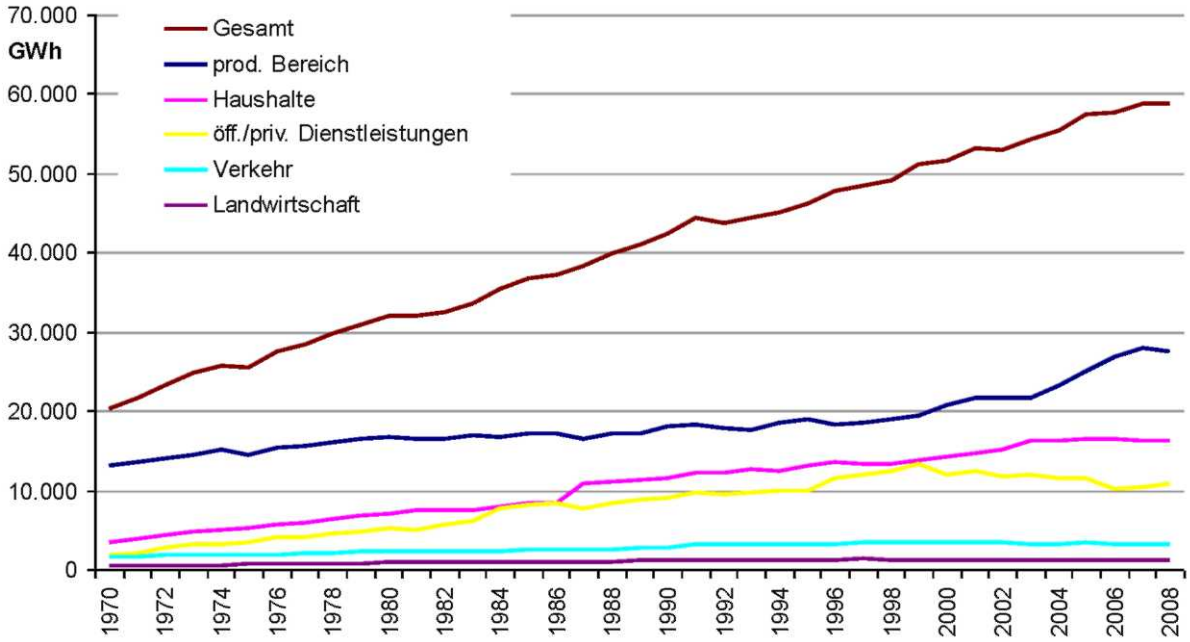
[April 2010 | Source: Energie-Control GmbH]

Table 3: Electricity supply on the public electricity grid including grid losses and including internal use by power stations, excluding ÖBB (Austrian Federal Railways) 16 2/3 Hz grid, and total electricity supply in Austria 2000 - 2008

[2] These quantities are distinct from the supplies to end users covered by support contributions as network losses and internal use by power stations are included.

The increase factors in the table relate to spring. Overall, the 2000-2008 increase in public and total supply was approximately 19 %.

Figure 5 shows the trend in electricity consumption since 1970 divided according to sectors. With 27 TWh, manufacturing consumes almost half of the total electricity, followed by households (27 %) and the service sector (18 %).



[Source: Austrian Statistics

Figure 5: Electricity consumption 1970-2008 according to sector

An increase in electricity consumption means, however, that just to maintain the already very high green electricity share in Austria each year, additional quantities of green electricity must be developed.

5.2 The support scheme for green electricity in Austria

5.2.1 Overview

Since 2003 the support scheme in Austria has been based on a grid feed-in tariff scheme that is the same throughout the country, and since the amendment of the Green Electricity Act in October 2009 it has been based on investment grants for small and medium-scale hydropower plants as well as photovoltaic plants of less than 5 kWp, and on feed-in tariffs for all other technologies. In 2008 and 2009, two amendments were made to the Green Electricity Act. On 28 February 2008, the Green Electricity Act Amendment 2008 was announced (BGBl I No 44/2008), which in particular established a raw materials price surcharge and increased the quota for the support of photovoltaic plants.

On 19 October 2009, the Green Electricity Amendment 2009 (BGBl I No 104/2009) was announced, which, amongst other things, defined the development objectives for hydropower, wind power and biomass, innovations in the green electricity support scheme and a raw materials price surcharge. Furthermore, the Combined Heat and Power Act regulated by a separate Combined Heat and Power Act, defines a cost containment for the energy-intensive economy and exemption of compensatory allowance and social welfare recipients from the fixed lump sum.

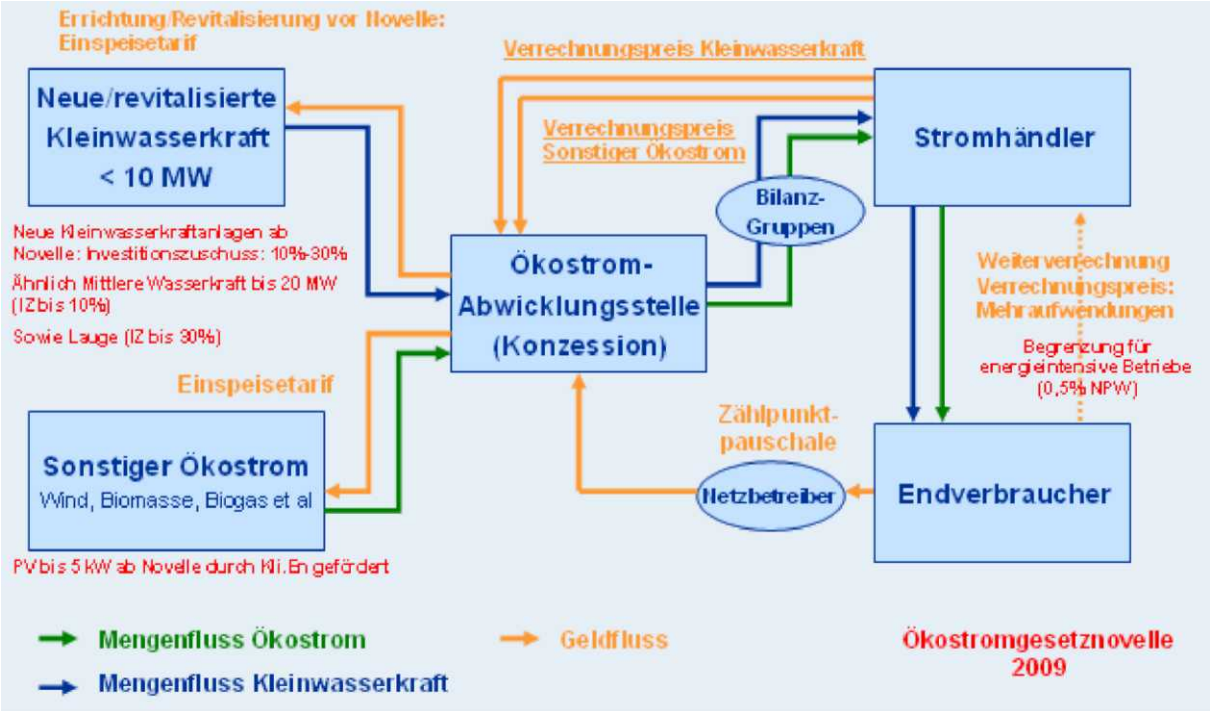
The main content of the 2008 amendment is:

- Due to the significant raw materials price increases for biogas – and biomass liquid – plants, a raw materials price surcharge for 2008 of 4 cents per kWh fed into the grid is granted. To finance the raw materials price surcharges, the part of the contracting volume (17 million euros) for 2007 that was not utilised is used. By 30 June 2008, a raw-materials balance sheet from plant operators must be established for this purpose, in which the origin and type of the raw materials used as well as the type of heat use are shown.
- The quota for the support of photovoltaic plants which were approved in 2003 and 2004 and went into operation on 30 June 2006 at the latest was raised from 15 MW to 17 MW.
- Every year Energie-Control GmbH must publish a report which shows not only the developments and the achievement of objectives in line with the Green Electricity Act, but also includes analyses on electricity consumption trends and measures to reduce electricity consumption.

The main content of the 2009 amendment is:

- Energy-intensive sectors have the opportunity from 2008 to 2010 to receive a maximum of 500,000 euros reimbursed as de-minimis support, provided that their green electricity costs are higher than 0.5 % of the net production value and energy supply reimbursements have been granted by the tax authorities.
- The amount of the fixed lump sum to (partly) finance the green electricity costs is updated until 2012, at unchanged levels.
- Small and medium-scale hydropower and photovoltaic plants < 5 kWp are supported by means of investment grants. For small-scale hydropower plants, an accumulated volume of 75 million euros at the most is available. For medium-scale hydropower plants, 7.5 million euros per calendar year is available.
- The guarantee periods for feed-in tariffs for new plants are set at 15 years for technologies that are dependent on raw materials and 13 years for those that are not.
- Every year 21 million euros of annual volume of support for new eco-power plants is available.
- Existing biogas plants can receive a raw material surcharge of 3 cent/kWh for 2009.
- Key aspects of the green electricity development until 2015 rest on new hydropower and wind plants. The development objectives are set with an additional 700 MW hydropower (350 MW from small and medium-scale hydropower), 700 MW wind power as well as 100 MW biomass for demonstrable raw material availability.
- The target value for the new construction and expansion of eco-power plants is 15 % of the amount supplied from public grids by 2015.
- The Combined Heat and Power Act was removed from the Green Electricity Act and replaced by a separate Combined Heat and Power Act (BGBl No 111/2008).
- Biogas technology support to the amount of 2 cent/kWh (el), if the gas fed into the grid was treated to reach natural gas quality.
- Exemption of compensatory allowance and social welfare recipients from paying the fixed lump sum (15 euros).

The following figure shows how funding has been allocated for green electricity after the 2009 Green Electricity Act Amendment came into force.



[March 2010 | Source: Energie-Control GmbH]

German	English
Errichtung/Revitalisierung vor Novelle:	Construction/revitalisation before amendment:
Einspeisetarif	Feed-in tariff
Neue/revitalisierte Kleinwasserkraft < 10 MW	New/revitalised small hydropower plants < 10 MW
Neue Kleinwasserkraftanlagen ab Novelle:	New small hydropower plants since the amendment:
Investitionszuschluss: 10%-30%	investment grant: 10 % - 30 %
Ähnlich Mittlere Wasserkraft bis 20 MW (IZ bis 10%)	Similar medium hydropower plants up to 20 MW
Sowie Lauge (IZ bis 30%)	(investment grant up to 30 %)
Einspeisetarif	As well as lye (investment up to 30 %)
Sonstige Ökostrom Wind, Biomasse, Biogas et al	Feed-in tariff
PV bis 5 kW ab Novelle durch Kli.En gefördert	Other green electricity wind, biomass, biogas et al
Verrechnungspreis Kleinwasserkraft	PV up to 5 kW since amendment through the Climate and Energy Fund
Verrechnungspreis	Settlement price for small-scale hydropower
Sonstiger Ökostrom	Settlement price for other green electricity
Okostrom-Abwicklungsstelle (Konzession)	Green electricity company (state owned)
Bilanz-Gruppen	Balancing group
Zählpunkt-pauschale	Green Electricity fee per metering point
Netzbetreiber	Grid operator
Stromhändler	Electricity trader
Weiter verrechnung	Further charging of settlement price

Verrechnungspreis: Mehraufwendungen Begrenzung für energieintensive Betriebe (0.5% NPW) Endverbraucher Mengenfluss Ökostrom Geldfluss Ökostromgesetznovelle 2009 Mengenfluss Kleinwasserkraft	Settlement price: Additional expenses Restriction for energy-intensive companies (0.5 % net production value) End user [illegible]en energy [illegible] 2009 Green Electricity (Amendment) Act Flow of small-scale hydropower

Figure 6: Schematic diagram of the green electricity support payment system under the Green Electricity (Amendment) Act 2009

On 2 February 2010, the 2010 Green Electricity Order (BGBl No 42/2010) was announced, in which the feed-in tariffs for new eco-power plants are defined, provided it is possible to conclude a contract with the Green Electricity Settlement Centre within the budget provided. The following table shows the current feed-in tariffs for 2010.

FEED-IN TARIFFS FOR NEW ECO-POWER PLANTS 2010 *		Tariff in cent/kWh under BGBl II No 42/2010
Technologies not dependent on raw materials		**Duration 13 years**
Wind energy		**9.70**
Photovoltaic	**Building-integrated** Up to 5 kWp	**through (Investitionszuschuss)**
	5 kWp - 20 kWp	**38.00**
	Over 20 kWp	**33.00**
	In open areas Up to 5 kWp 5 kWp up to 20 kWp over 20 kWp	**Via the Climate and Energy Fund (investment grant) 35.00 25.00**
Landfill and sewage gas	Sewage gas **6.00**	
	Landfill gas **5.00**	
Geothermal		**7.50**
Technologies dependent on raw materials		**Duration 15 years**
Solid biomass (e.g. forest wood chips or straw)	Up to 500 kW 500 kW	**14.98**
	Up to 1 MW	**13.54**
	1 - 1.5 MW	**13.10**
	1.5 - 2 MW	**12.97**
	2 - 5 MW	**12.26**
	5 - 10 MW	**12.06**
	Over 10 MW	**10.00**
HBF waste	Key no. 17, Tab. 2, e.g. bark or sawdust	Minus 25 %
	Key no. 17, Tab. 1, e.g. particle board waste	Minus 40 %
	Other 5-digit key nos in Tab. 1 and 2 ÖkoStrG	**5.00**
Cofiring		Pro rata
Cofiring at thermal power stations	Solid biomass (forest wood chips or straw)	**6.12**
	SN 17, Tab. 2, e.g. bark or sawdust	Minus 20 %
	Other 5-digit key nos in Tab. 1 and 2 Green Electricity Act	Minus 30 % Pro rata
Liquid biomass	Liquid biomass **5.80**	
	Surcharge for production in efficient CHP **2.00**	
Biogas derived from agricultural products (e.g. maize or slurry)	Up to 250 kW	**18.50**
	250 - 500 kW	**16.50**
	Over 500 kW	**13.00**
	Biogas derived from cofermation of wastes	Minus 20 %
	Surcharge for production in efficient CHP	**2.00**
	Surcharge for reaching natural gas quality	**2.00**
Cofiring		Pro rata
	Feed-in tariffs for eco-power plants dependent on raw materials after the expiration of contracting obligations	
Solid biomass (e.g. forest wood chips or straw)	Up to 2 MW 2	**8.50**
	Up to 10 MW	**7.50**
	Over 10 MW	**7.00**
Biogas derived from agricultural products (e.g. maize or slurry)		
	Biogas derived from cofermation of wastes	Minus 20 %

* First-time new contracts in line with the legal predetermined budget limits

[Source: Energie-Control GmbH, February 2010]

Table 4: Feed-in tariffs under the 2010 Green Electricity Order

The following table shows a comparison of feed-in tariffs 2003-2009

FEED-IN TARIFFS FOR ECO-POWER PLANTS		Tariff in cent/kWh under BGBl II No 401/2006 and BGBl II Nr 59/2008 10 plus 2 (reduced) years				Tariff in cent/kWh under BGBl II Nr 508/2002 13 years
		2009	2008	2007	2006	from 2003
Wind energy		7.53	7.54	7.55	7.65	7.80
	Up to 2 MW	15.63	15.64	15.65	15.70	16.00
Solid biomass (e.g. wood chips or straw)	2 - 5 MW 5 - 10 MW	14.93 13.28	14.94 13.29	14.95 13.30	15.00 13.40	15.00 13.00
	over 10 MW	11.08	11.09	11.10	11.30	10.20
	Key no. 17, Tab. 2, e.g. bark or sawdust		Minus 25 %			Minus 20 %
HBF waste	Key no. 17, Tab. 1, e.g. particle board waste		Minus 40 %			Minus 35 %
	Other 5-digit key nos in Tab. 1 and 2 Green Electricity Order	4.88	4.89	4.90	5.00	2.70
Cofiring		Pro rata				Pro rata
Cofiring at thermal power stations	Solid biomass (wood chips or straw)	6.28	6.29	6.30	6.40	6.50
	Key no 17, Tab. 2, e.g. bark or sawdust	Minus 25 %				5.00
	Key no 17, Tab. 1, e.g. particle board waste	Minus 40 %				4,00
	Other 5-digit key nos in Tab. 1 and 2 Green Electricity Order	Minus 50 %				3.00
Cofiring		Pro rata				Pro rata
Liquid biomass	Plant oil, cold pressed biooil, RME up to 300 kW	12.48	12.49	12.50	13.00	13.00 (up to 200 kW)
	Plant oil, cold pressed biooil, RME over 300 kW	9.48	9.49	9.50	10.00	10.00 (over 200 kW)
	Other liquid biofuels	5.98	5.99	6.00	6.50	
Biogas derived	Up to 100 kW	16.93	16.94	16.95	17.00	16.50
	100 - 250 kW	15.13	15.14	15.15	15.20	14.50
from agricultural	250 - 500 kW	13.98	13.99	14.00	14.10	14.50
products (e.g. maize or slurry)	Over 1000 kW	12.38 11.28	12.39 11.29	12.40 11.30	12.60 11.50	12.50 10.30
Biogas derived from cofermation of wastes		Minus 30 %				Minus 25 %
Landfill and	Sewage gas	5.93	5.94	5.95	6.00	3.00 (up to 1 MW)
sewage gas	Landfill gas	4.03	4.04	4.05	4.10	6.00 (up to 1 MW)
Geothermal		7.28	7.29	7.30	7.40	7.00
Photovoltaic	Up to 5 kWp	45.98	45.99	46.00	49.00	60.00 (up to 20 kWp)
	5 kW_p - 10 kW_p	39.98	39.99	40.00	42.00	47.00 (over 20 kWp)
	Over 10 kW_p	29.98	29.99	30.00	32.00	
Small-scale hydropower						
a) Old existing stations up to 31.12.2008 b) Following investments resulting in an electricity output increase of at least 15 % c) New station or increase of at least 50 % in electricity output		a) Established after 2007 Contract conclusion 2009 (15 years)	b) Established after 2007 Contract conclusion 2009 (15 years)	a) Support up to 12/2008	NEW 15 years Established 2008	b) OLD Established up to 12/2007	NEW 15 years Established 2008	c) OLD Established up to 12/2007
	First 1,000,000 kWh	5.94	6.23	5.68	5.95	5.96	6.24	6.25
	Next 4,000,000 kWh	4.56	4.99	4.36	4.57	4.58	5.00	5.01
	Next 10,000,000 kWh	3.79	4.15	3.63	3.80	3.81	4.16	4.17
	Next 10,000,000 kWh	3.42	3.92	3.28	3.43	3.44	3.93	3.94
	Over 25,000,000 kWh	3.29	3.76	3.15	3.30	3.31	3.77	3.78
[Feed-in tariff graduated according to annual amounts of electricity injected]								
CHP support payments for old biomass stations (approved 2003-2004)								
Heating support tariff possible (but capped)								
Heating tariff (HT)=Feed-in tariff/4.4 heating price (HP)								
HP = 2.6 cent/kWh_{th}, for stations with capacities up to 10 MW_{el} and HT= 1.8 cent/kWh_{th} for stations with capacities greater than 10 MW_{el}, HP 2009: 2.4 cent/kWh_{th}								

[Source: Energie-Control GmbH, October 2009]

Table 5: Feed-in tariffs under the Green Electricity Order 2006-2009 and under the Feed-in Tariff Order 2002

5.2.2 Legal basis

Directive 2001/77/EC was implemented in national law in Austria within the framework of the Green Electricity Act (BGBl I No 149/2002). The following amendments were subsequently made:

BGBl I No 105/2006 BGBl I No 10/2007

BGBl I No 44/2008

BGBl I No 114/2008

BGBl I No 104/2009

The Green Electricity Act itself provides the general framework for the support scheme. This legal basis is complemented by various orders which regulate sub-sections such as the actual amount of feed-in tariffs. The following orders have been issued based on the Green Electricity Act:

- Order of the Federal Minister of Economics and Labour, in which the support contributions for the payment of additional expenses of the ECO Regulation are defined for 2003.
- Order of the Federal Minister of Economics and Labour, in which the support contributions for the payment of additional expenses of the ECO Regulation are defined for 2004; BGBl II No 642/2003 (valid 01.01.2004 - 31.03.2004).
- Order of the Federal Minister of Economics and Labour, in which the support contributions for the payment of additional expenses of the ECO Regulation are defined for 2004; BGBl II No 135/2004 (valid 01.04.2004 - 31.12.04).
- Order of the Federal Minister of Economics and Labour, in which the support contributions for the payment of additional expenses of the ECO Regulation are defined for 2005; BGBl II No 533/2004 of 30.12.2004.
- Order of the Federal Minister of Economics and Labour, in which the support contributions for the payment of additional expenses of the Green Power Balancing Group officials are defined for 2006; BGBI II No 470/2005 of 29.12.2005.
- Order of the Federal Minister of Economics and Labour, in which the maximum amount of the average total cost burden for the support of green energy is redefined from 01.01.2005; BGBI II No 525/2004 of 28.12.2004.
- Order of the Federal Minister of Economics and Labour, in which the maximum amount of the average total cost burden for the support of green energy is redefined from 01.01.2006; BGBI II No 462/2005 of 28.12.2005.

- Order of the Federal Minister of Economics and Labour on the definition of a CHP surcharge for all quantities of electricity supplied to the end user (KWK Zuschlagsverordnung 2003); BGBI II No 509/2002 of 20.12.2002.
- Order of the Federal Minister of Economics and Labour on the definition of a CHP surcharge for all quantities of electricity supplied to the end user (KWK Zuschlagsverordnung 2004); BGBI II No 631/2003 of 30.12.2003.
- Order of the Federal Minister of Economics and Labour on the definition of a CHP surcharge for all quantities of electricity supplied to the end user (KWK Zuschlagsverordnung 2005); BGBI II No 524/2004 of 28.12.04.
- Order of the Federal Minister of Economics and Labour on the definition of a CHP surcharge for all quantities of electricity supplied to the end user (KWK Zuschlagsverordnung 2005); BGBI II No 524/2004 of 28.12.2004.
- Order of the Federal Minister of Economics and Labour on the definition of a CHP surcharge for all quantities of electricity supplied to the end user (KWK Zuschlagsverordnung 2006); BGBI II No 463/2005 of 28.12.2005.
- Order of the Federal Minister of Economics and Labour, in which prices for the purchase of electrical energy from eco-power plants are determined; BGBI II No. 508/2002 of 20.12.2002 as amended on 12.08.2005, BGBI II No 254/2005.
- Order of the Federal Minister of Economics and Labour, in which the prices for the purchase of electrical energy from eco-power plants is defined based on contracts, which the Green Electricity Settlement Centre is required to conclude in the calendar years 2006 and 2007; BGBI II No 401/2006 of 24.10.2006.
- Order of the Federal Minister of Economics and Labour, in which the prices for the purchase of electrical energy from eco-power plants is defined based on contracts, which the Green Electricity Settlement Centre is required to conclude in the calendar year 2008; BGBI II No 59/2008 of 14.02.2008.
- Order of the Federal Minister for Economy, Family and Youth, in which the prices for the purchase of electrical energy from eco-power plants is defined based on contracts, which the Green Electricity Settlement Centre is required to conclude in the calendar year 2009; BGBI II No 53/2009 of 23.02.2009.
- Order of the Federal Minister for Economy, Family and Youth, in which the prices for the purchase of electrical energy from eco-power plants is defined based on contracts, which the Green Electricity Settlement Centre is required to conclude up to the end of 2010; BGBI II No 42/2010 of 02.02.2010. (Green Electricity Act 2010 - ÖSVO 2010).

- Order of the Federal Minister of Economics and Labour, in which the pro rata administrative and financial expenses and the pro rata expenses for balancing energy of the Green Electricity Settlement Centre are determined for 2006 and 2007; BGBI II No 378/2006 of 10.10.2006.
- Order of the Federal Minister of Economics and Labour, in which the prices for the purchase of electrical energy from eco-power plants is defined based on contracts, which the Green Electricity Settlement Centre is required to conclude in the calendar year 2008; BGBI II No 59/2008 of 14.02.2008.
- Order of the Federal Minister of Economics and Labour, in which the pro rata administrative and financial expenses and the pro rata expenses for balancing energy of the Green Electricity Settlement Centre are determined for 2009; BGBI II No 164/2009 of 29.05.2009.
- Order of the Energie-Control Commission, in which the transfer prices for small-scale hydropower and other green electricity are determined for the calendar year 2007 (Transfer Price Order 2007).
- Order of the Federal Ministry of Economics and Labour, in which the transfer prices for small-scale hydropower and other green electricity are determined for the calendar year 2008 (Transfer Price Order 2008).
- Order of the Federal Ministry of Economics and Labour, in which the transfer prices for small-scale hydropower and other green electricity are determined for the calendar year 2009 (Transfer Price Order 2009).
- Order of the Federal Ministry of Economy, Family and Youth, in which the transfer prices for small-scale hydropower and other green electricity are determined for the calendar year 2010 (Transfer Price Order 2010).
- Order of the Federal Minister of Economics and Labour, in which the raw materials surcharge for plants based on liquid biomass and biogas for the calendar year 2008 are determined, BGBl II No 212/2008 of 19.06.2008.
- Order of the Federal Minister for the Economy, Family and Youth, in which the raw materials surcharge for plants based on biogas for the calendar year 2009 are determined (Raw Materials Surcharge Ordinance), BGBl II Nr 41/2010.

5.3 Approved eco-power plants

5.4 Green electricity production

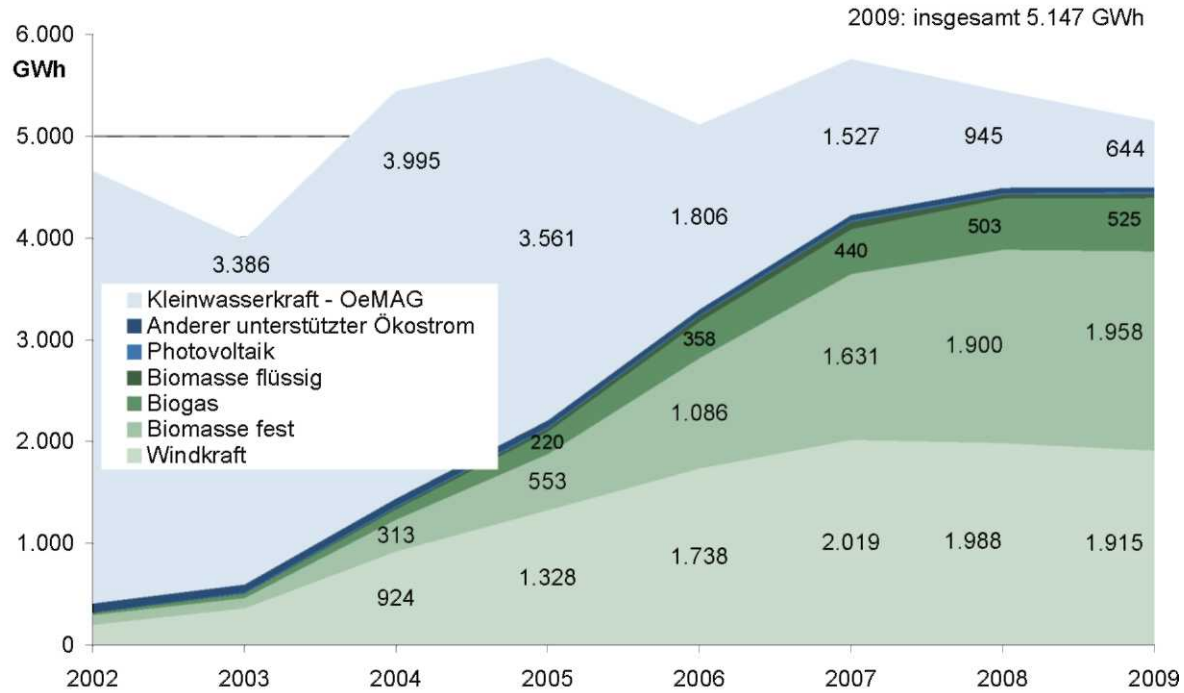
The quantities from OeMAG (formerly the Green Power Balancing Group officials) of other green electricity (excluding small-scale hydropower) increased in 2002-2009 from 412 GWh to 4,496 GWh (see following figure) reaching a share in 2009 of 8.4 % of the quantity supplied to end users.

In total, 5,441 GWh of supported green electricity was collected in 2009 by OeMAG (9.6 % of the total electricity supply).

The quantities of small-scale hydropower collected by OeMAG vary greatly as many small-scale hydropower operators leave OeMAG due to increased market prices and sell their electricity on the liberalised market or the approval of existing small-scale hydropower plants with feed-in tariffs expired at the end of 2008.

Key for Figure 7 below

German	English
2009: Insgesamt 5.147 GWh	2009: Total 5,147 GWh
1.000, 2.000… 6.000	1,000, 2,000… 6,000
Kleinwasserkraft – OeMAG	Small-scale hydropower – OeMAG
Anderer unterstützter Ökostrom	Other supported green electricity
Photovoltaik	Photovoltaic
Biomasse flüssig	Liquid biomass
Biogas	Biogas
Biomasse fest	Solid biomass
Windkraft	Wind power
	Nb. All figures in the graph should be punctuated replacing the full stop with a comma, e.g. 3.995 = 3,995.



[Sources: Energie-Control GmbH, OeMAG]

Figure 7: Green electricity collected by OeMAG (Green Power Balancing Group officials) 2002-2009

The following table shows the quantities fed in and the payments provided as well as the green electricity shares for each technology in 2009 compared to 2008. Solid biomass and wind power have the highest with 3.7 % and 3.6 % respectively.

Green electricity – Quantities fed in and payments provided in Austria 2009 and comparison with 2008

Energy source	Quantity fed in (in GWh) 2009	Net payment in millions of euros 2009	Supported green energy feed-in share in % of the total supply quantity 2009[1]	Average payment in cent/kWh 2009	Quantity fed in (in GWh) 2008	Net payment in millions of euros 2008	Supported green energy feed-in share in % of total supply quantity 2008[2]	Average payment in cent/kWh 2008
Small-scale hydropower (supported)	**644**	**33.3**	**1.2 %**	**5.17**	**945**	**53,1**	**1,7 %**	**5,62**
Other green electricity plants	**4,503**	**514.2**	**8.4 %**	**11.42**	**4,496**	**523.1**	**8.1 %**	**11.64**
Wind power	1,915	148.8	3.6 %	7.77	1,988	154.8	3.6 %	7.79
Solid biomass incl. waste with high biogenic fraction	1,958	270.9	3.7 %	13.84	1,900	258.5	3.4 %	13.61
Gaseous biomass *	525	73.7	1.0 %	14.05	503	89.0	0.9 %	17.71
Liquid biomass *	39	5.4	0.1 %	13.85	36	6.3	0.1 %	17.71
	21	12.1	0.04 %	57.02	17	10.4	0.03 %	60.05
Photovoltaic								
Landfill and sewage gas	44	3.1	0.1 %	7.00	50	3.8	0.1 %	7.61
Geothermal	1.5	0.19	0.003 %	12.71	1.6	0.18	0.003 %	11.15
Total small-scale hydropower and other green electricity plants	**5,147**	**547.5**	**9.6 %**	**10.64**	**5,440**	**576.2**	**9.8 %**	**10.59**

* including raw materials surcharge 4 cent/kWh payment included for the 1st to the 4th quarters of 2008.

1) related to the total supply quantity from public grids to end users 53,439 GWh for the whole of 2009 (preliminary value)

2) related to the total supply from public grids to end users of 55,438 GWh for the whole of 2008

[16.02.2010 | Source: OeMAG, February 2010 – preliminary values]

Table 6: Quantities of green electricity fed into the grid and compensated in 2009 compared to 2008

A further slight increase in the quantity of green electricity, especially wind power, is presumed for 2010.

[Sources:OeMAG/green electricity balancing group representative , E-Control]

Supported quantity of green electricity [in GWh]								
Energy source	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010 projection***
Wind power	366	924	1,328	1,738	2,019	1,988	1,915	2,150
Solid biomass	99	313	553	1,086	1,631	1,900	1,958	1,980
Biogas	42	102	220	358	440	503	525	530
Liquid biogas	2	18	33	54	71	36	39	40
Photovoltaic	11	12	13	13	15	17	21	23
Other supported green electricity	78	76	65	55	54	52	46	52
Total "other" green electricity	**598**	**1,445**	**2,212**	**3,304**	**4,230**	**4,496**	**4,503**	**4,775**
Small-scale hydropower (OeMAG)[1]	3,386	3,995	3,561	1,806	1,527	945	644	656
Total supported green electricity	**3,984**	**5,440**	**5,773**	**5,110**	**5,757**	**5,440**	**5,147**	**5,431**

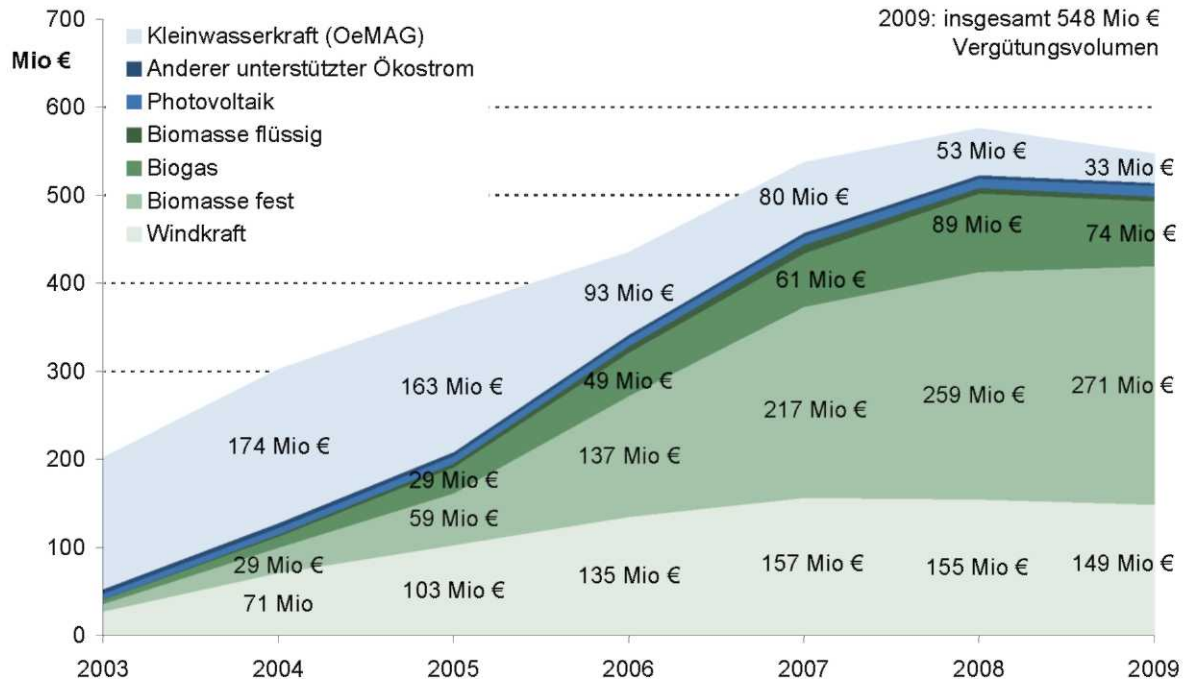
[1] A large proportion of the small-scale hydropower (and landfill and sewage gas) left the support system because higher prices could be achieved on the liberalised market.

Table 7: Quantities of green electricity fed in 2003-2010 (2010: projection)

5.5 Volume of compensation

The 2009 volume of compensation (quantities of green electricity x feed-in tariff) has decreased slightly compared to the previous year following annual increases and amounts to 548 million euros, of which 514 million euros was used to pay for other green electricity.

This fall can be explained on the one hand by the reduced amounts of small-scale hydropower compensation, and on the other hand by the fact that the raw materials surcharges for 2009 are not yet considered in these values.[3]



[Sources: Energie-Control GmbH, OeMAG]

German	English
2009: Insgesamt 548 Mio € Vergütungsvolumen Kleinwasserkraft – OeMAG Anderer unterstützter Ökostrom Photovoltaik Biomasse flüssig Biogas Biomasse fest Windkraft Mio €	2009: Total € 548 million Volume of compensation Small-scale hydropower – OeMAG Other supported green electricity Photovoltaic Liquid biomass Biogas Solid biomass Wind power million € (on y-axis, but €xxx million in figure) Nb. All figures in the graph should read as follows: 174 Mio € = € 174 million

[3] On 2 February 2010 the Raw Materials Surcharge Ordinance was passed for biogas plants for 2009 of 3 cent/kWh. This results in an additional compensation volume of approximately € 15 million.

Figure 8: Compensation volumes (including market value) 2003-2009

5.6 Volume of support

The support needed for green electricity is the result of the compensation volumes less the market value of the electricity produced plus expenses for balancing energy, administrative and financial expenses and expenses for technology funding.

The market value of the produced, supported green electricity was presented as the average of the market prices contained in the baseload quarter future for the respective year released by Energie-Control GmbH pursuant to Section 20 of the Green Electricity Act.[4]

The expenses for balancing energy are divided according to the expenses of OeMAG in wind power and all other technologies, where wind power in 2009 accounted for the largest part of balancing energy expenses with 88 %.

The administrative and financial expenses (2.9 million euros in total in 2009) and rural technology funding (7 million euros) were divided pursuant to the Aliquotierungsverordnung (ordinance on monthly facturing) into different technologies.

In total, the support needed in 2009 for other green electricity amounts to 284 million euros and for the total supported green electricity (including small-scale hydropower) 280 million euros.

For small-scale hydropower in 2009 there is a negative volume of support of minus 4 million euros as the market price in 2009 was mostly higher than the feed-in tariffs.

[4] For example, the baseload future for the first quarter in 2009 is contained in the published market prices pursuant to Section 20 of the Green Electricity Act of 01.04.2008, 01.07.2008, 01.10.2008 and 01.01.2009, each as one of the four fractional values. These four fraction values are used for the green electricity market evaluation of the first quarter in 2009. Together with the fractional values for the second and final quarter in 2009, which are calculated by analogy, show the annual value for 2009.

The following table shows the development of the support needed since 2003, including the projection for 2010 with the corresponding market prices.

Volume of support (€ million)								
Energy source	*2003 Market price 2.574 Cent/kWh*	*2004 Market price 3.063 Cent/kWh*	*2005 Market price 3.787 Cent/kWh*	*2006 Market price 5.208 Cent/kWh*	*2007 Market price 5.108 Cent/kWh*	*2008 Market price 6.425 Cent/kWh*	*2009 Market price 5.909 Cent/kWh*	*2010 projection Market price 4.493 Cent/kWh*
Wind power	24	50	75	71	74	42	49	86.18
Solid biomass	16	26	43	87	156	142	160	191.95
Biogas	17	18	25	32	51	61	60	52.07
Liquid biogas	1	2	3	5	10	4	3	3.83
Photovoltaic	8	8	8	8	8	9	11	11.45
Other supported green	3	3	2	1	3	1	1	
(excl. hydropower)								1.82
Total "other" green electricity	**70**	**108**	**155**	**205**	**303**	**259**	**284**	347.31
(supported) small-scale	69	77	67	-7	12	-7	-4	5.23
Total supported green electricity	**139**	**184**	**223**	**198**	**315**	**252**	**280**	352.54

[Sources: OeMAG/Green Power Balancing Group officials, E-Control]

Table 8: Development of volume of support 2003-2010 (2010: projection)

6 Attainment of national green electricity objectives

6.1 Basics

In recent years, pursuant to the relative applicable Green Electricity Act, the following national development targets were specified for green electricity:

Green Electricity Act 2002 (BGBl I No 149/2002):

- 9 % of the amount supplied in the public grid from small-scale hydropower by 2008
- 4% of the amount supplied in the public grid from other green electricity by 2008

Green Electricity Act 2006 (BGBl I No 105/2006):

- 10% of the amount supplied in the public grid from other green electricity by 2010
- 9 % of the amount supplied in the public grid from small-scale hydropower by 2008

Green Electricity Act 2009 (BGBl I No 104/2009):

- 15 % of the amount supplied in the public grid from green electricity by 2015
- an additional 700 MW hydropower, 700 MW wind power, 100 MW biomass by 2015

Section 4 of the current Green Electricity Act, as amended by BGBl I No 104/2009, formulates the objectives of the act in detail as follows:

- achievement of the 78.1% target in accordance with Directive 2001/77/EC, taking account of the 56.1 TWh base indicated in the Directive,
- more efficient use of support resources,
- technological prioritisation towards market readiness,
- security of investment for current and future plants,
- new constructions of eco-power plants to the extent that in 2015 15 % of the amount supplied to end users from public grids consists of plants eligible for support (through feed-in tariffs and investment grants),
- additional construction of 700 MW hydropower (of which 350 MW is from small and medium-scale hydropower), 700 MW wind power and – with a demonstrable dependence on raw materials – 100 MW biomass by 2015.

6.2 Performance of small-scale hydropower

The 2002 Green Electricity Act (BGBl I No 149/2002) lays down the target for 2008 that the share of small-scale hydropower in 2008 should amount to 9 %. This target is also maintained in the 2006 Green Electricity Act (BGBl I No 105/2006).

> ***'Section 4.*** *(1) The aim of this federal act is, in the interest of climate and environmental protection* ***(...)***
> *5. to achieve an increase in the share of electricity produced through hydropower plants with a maximum capacity of up to and including 10 MW for which a purchase and compensation requirement is fixed, up to 2008, at 9 % at the least. '*

In fact, in 2008, 55,438 GWh was delivered from the public grid to end users. There is only incomplete data for the amount produced from small-scale hydropower. As construction measures, besides new constructions, often include the modernisation of existing facilities, revitalisation projects and also a large number of very small facilities, there are currently only incomplete statistics on the additional electricity thereby produced. Evaluations of the total output of newly constructed small-scale hydropower plants and revitalised small-scale hydropower plants show an additional electricity production of approximately 700 GWh can be expected since the effectiveness of the 2002 Green Electricity Act. With a base value of approximately 4,400 GWh in 2002, this means an increase to 5,300 in 2008 (9.5 %). Other evaluations point to a somewhat lower current small-scale hydropower share.

In the 2009 Green Electricity Act (BGBl l No 104/209) the targets for small and medium-scale hydropower were combined with those for other green electricity in a common target. This target is assessed in the following Chapter ('Performance of "other" green electricity')

6.3 Performance of 'other' green electricity

The 2002 Green Electricity Act (BGBl I No 149/2002) defined a target to increase the share of other green electricity to 4 % in 2008:

> *'Section 4 (2) For achieving the national indicative target as defined by para.1 subpara. 1, the proportion of electricity produced from renewable energy sources for which a purchasing and payment requirement is set, save electricity from hydropower, shall be gradually increased to at least 4% by 2008, measured against total annual electricity supplied by all of Austria's grid operators to the final customers connected to public grids, so that as of 1 January 2004 approximately 2%, as of 1 January 2006 approximately 3% and as of 1 January 2008 at least 4% shall be achieved. Electricity produced from animal meal, spent lye, sewage sludge or waste, save waste containing a high percentage of biogenous materials, shall not be included in the national indicative targets referred to above.'*

In 2008, 4,496 GWh of other green electricity was collected from OeMAG which was supported with feed-in tariffs. This corresponds in total to a share of 8.1 %. Thus this target was exceeded.

In the 2006 Green Electricity Act (BGBl I No 105/2006) the target share for other green electricity was raised accordingly to 10 % in 2010:

> *'Section 4 (2) For achieving the energy produced from renewable energy sources by 2010 the conclusion of contracts on the purchase of electric energy from renewable energy sources, save electricity from hydropower, by the Green Electricity Settlement Centre aims at for a resulting share of10 %, as measured by the total annual electricity supply of all grid operators in Austria to end users connected to public grids. Electricity produced from animal meal, spent lye, sewage sludge or waste, save waste containing a high percentage of biogenous materials, shall not be included in the national indicative targets referred to above.'*

The achievement of this target cannot yet be definitively judged – it depends on the green energy produced and the amount supplied in the public grid in 2010. In 2009, 4,503 GWh of other green electricity was collected from OeMAG and 53,439 GWh (preliminary value) was supplied in the public grid.

In 2009, the share of other green energy was therefore 8.4 % and thus corresponds to a large extent to the 10 % target.

With the 2009 Green Electricity Act (BGBl I No 104/2009), the target quota rose to 15% and the definition was adjusted:

> *'Section 4 (2) By 2010, new constructions and expansions of eco-power plants shall be supported to such an extent that a total share of 15 % is produced by eco-power plants with contracting responsibility through the Green Electricity Settlement Centre, by eco-power plants based on spent lye eligible for investment grants, as measured by the total annual electricity supply of all grid operators in Austria to end users connected to the*

public grids. In this target value is the energy produced from newly constructed small-scale hydropower plants and medium-scale hydropower plants including the additional electricity produced through the optimisation and expansion of existing small-scale hydropower plants since the Green Electricity Act, BGBl I No 140/2002, came into force, but not the new construction or expansion of hydropower plants with a maximum capacity of more than 20 MW. '

Further construction development is specified with this latest increase in the national target for 2015.

The development of hydropower (59 % hydropower of the total supply in 2009) is of great importance for the Austrian situation.

A balanced implementation of the Water Framework Directive taking into account the importance of hydropower production for Austria as a whole is essential for the share of total electricity production that is produced from renewable energy sources in the future.

6.4 Development of feed-in tariffs and allocation of subsidies

Key to Figure 9

German	English
Cent/kWh Biogas Biomasse fest Windkraft Kleinwasserkraft Marktpreis 17,71 inkl. 3,91 Cent/kWh Rohstoffzuschlag in 2008 17,05 Biogas (+5,68 seit 2003) inkl. 3 Cent/kWh Rohstoffzuschlag in 2009 13,84 BioM fest + AbfmhbA (+5,26 seit 2003) 7,77 Windkraft (+0,18 seit 2003) 5,17 KWKW (+0,76 seit 2003) 4,72 *) Marktpreis 2009 (+2,02 seit 2003) *) Abweichungen zum gemittelten Marktpreis in anderen Veröffentlichungen ergeben sich durch verschiedene Betrachtungen über unterschiedlich lange Zeiträume	Cents/kWh Biogas Solid biomass Wind power Small-scale hydropower Market price 17.71 incl. 3.91 cents/kWh raw material in 2008 17.05 biogas (+5.68 since 2003) incl. 3 cents/kWh raw material in 2009 13.84 solid biomass + waste with high biogenic fraction (+ 5.36 since 2003) 7.77 wind power (+0.18 since 2003) 5.17 small-scale hydropower plants (+0.76 since 2003) 4.72 market price 2009 (+2.02 since 2003) *) Deviations from the mean market price in other publications are the result of different observations over different periods of time

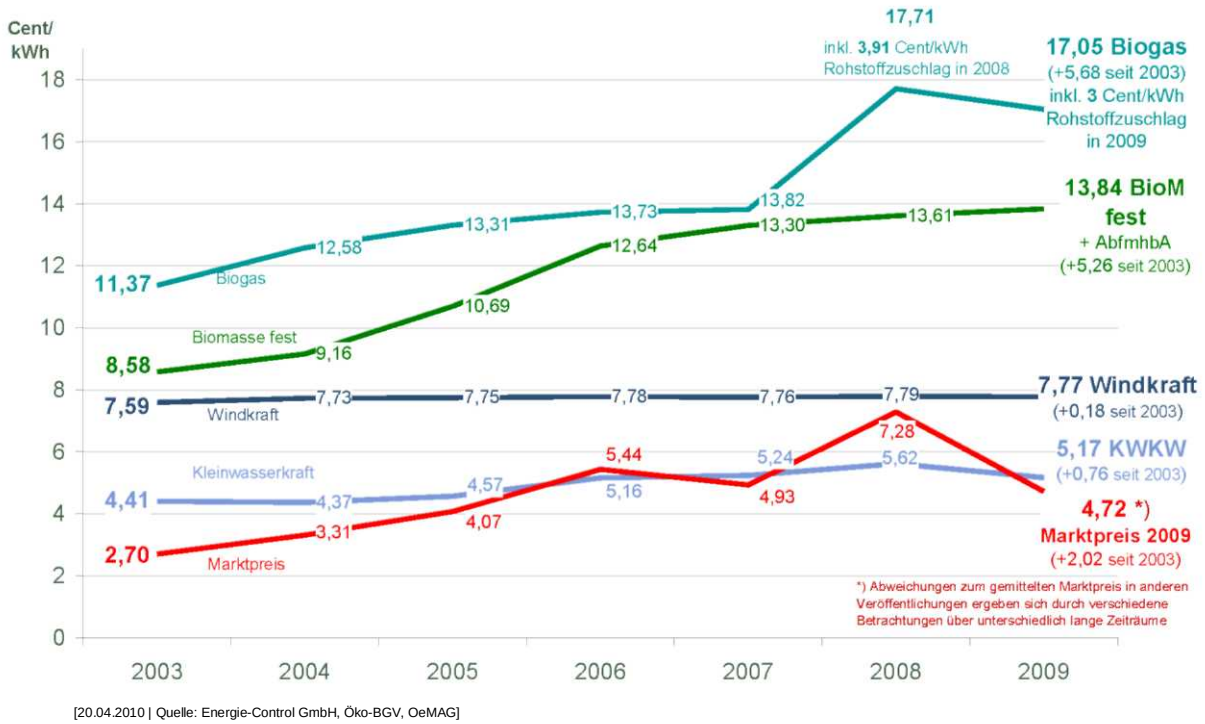


Figure 9: Average feed-in tariffs compared to the market price 2003-2009

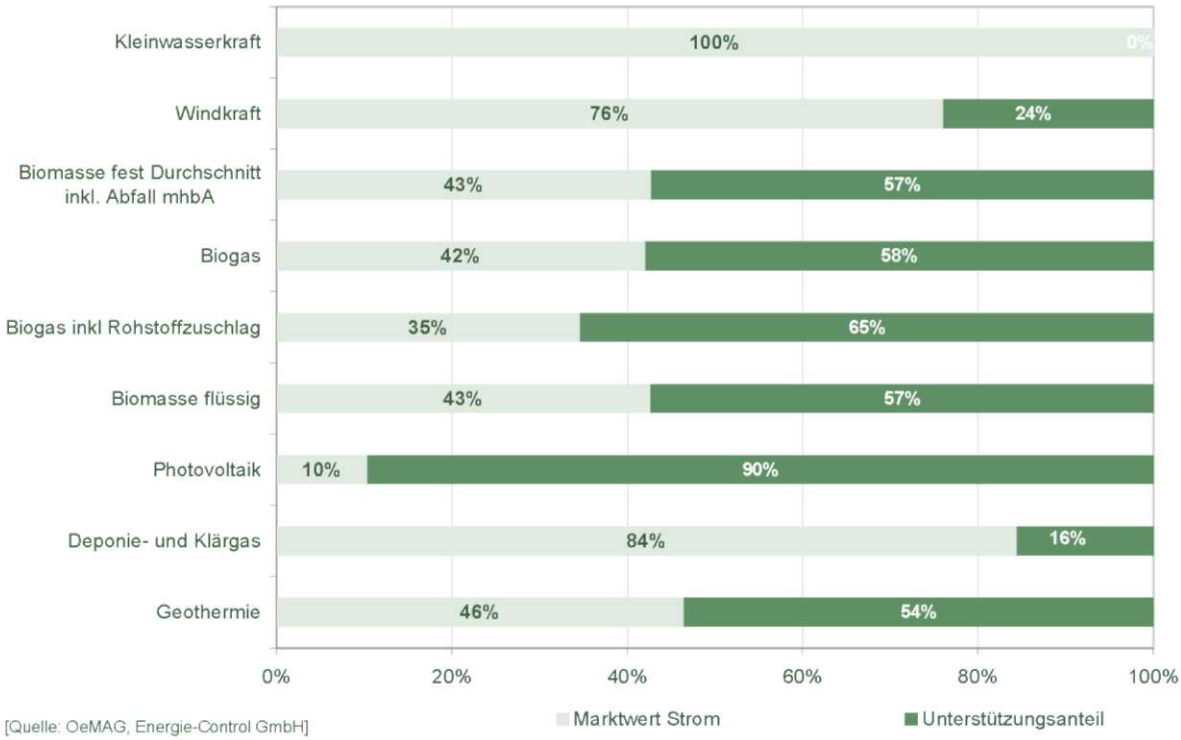
The average feed-in tariffs paid by the Green Electricity Settlement Centre have increased significantly, particularly for biomass and biogas green electricity technologies that depend on raw materials, and are very different from the market price (Figure 9). The average feed-in tariffs paid by the Green Electricity Settlement Centre for small-scale hydropower lay, particularly in 2008, below the market price. Consequently, many small-scale hydropower plant operators left the support scheme and sold the electrical energy they produced on the liberalised market.

According to the Green Electricity Act, operators of eco-power stations must be paid fixed feed-in tariffs as defined in an ordinance for electrical energy that is fed into the public grid. If these feed-in tariffs are set according to the market price that electricity consumers pay for electrical energy, this produces the subsidy component to be financed by the electricity consumers in addition to the actual cost of electricity (without taking into account balancing energy and other support) as a percentage according to the following formula:

$$\textit{Subsidy component} = -\frac{\textit{(feed-in tariff – market price)}}{\textit{feed-in tariff}}\ 100$$

The following figures show the results of calculations using the average feed-in tariffs paid in 2009 with reference to the average market price in 2009 (5,909 cent/kWh).
For biogas, the assessment included the feed-in tariffs as well as the additionally granted raw materials surcharge of 3 cent/kWh.

When interpreting these results it should be borne in mind that the balancing power expenditure occasioned by wind power is not included in the subsidy component shown here. Moreover, no account is taken of the fact that grid connected wind power capacity generates very low sales revenue because it cannot be stored and output is difficult to forecast.



German	English
Kleinwasserkraft	Small-scale hydropower
Windkraft	Wind power
Biomasse fest	Solid biomass
Durchschnitt inkl. Abfall mhbABiogas	Average incl. HBF waste
Biogas inkl Rohstoffzuschlag	Biogas incl. raw materials surcharge
Biomasse flüssig	Fluid biomass
Photovoltaik	Photovoltaic
Deponie- und Klärgas	Landfill and sewage gas
Geothermie	Geothermal
[Quelle: OeMAG, Energie-Control GmbH] Marktwert Strom	[Source: OeMAG, Energie-Control GmbH] Electricity market value
Unterstützungsanteil	Share of support

Figure 10: Share of support for green electricity in 2009 (2009 market price: 5.909 cent/kWh)

With an electricity market price of 59/09 €/MWh, all biomass technologies have a subsidy component of at least 57 %. In view of the Green Electricity Act's objective of focusing support on technologies capable of attaining commercial maturity, at current costs these systems are unsuitable for further widespread application in full-scale generating stations. The raw materials surcharge paid in 2008 and 2009 for biogas plants (also for liquid biomass plants in 2008) of a further 3.91 cent/kWh (2008) and 3 cent/kWh (2009) further increases the subsidy components and thus the distance from commercial maturity.

7 Attainment of objectives under Directive 2001/77/EC

EU Directive 2001/77/EC provides that measures shall be established in Member States to increase the electricity produced from renewable energy sources.

According to Directive 2001/77/EC of the European Union of 27 September 2001, numerous investments took place in Austria and funding programmes were implemented, through which the electricity produced from renewable energy sources based on an already very high base value in 1997 once again increased very sharply. Overall, considering the 46,978 GWh of green electricity not fed into the public grid in 2009, 9,976 GWh more electricity was produced than in 1997 (37,002 GWh).

This 9,976 GWh increase means that the additional electricity produced from renewable energy sources compared to the gross domestic electricity consumption in 1997 corresponds to a share of 17.6 %, and a share of 14.1 % compared to gross domestic electricity consumption in 2009.

Substantial subsidies have been agreed on for this development, in particular for energy produced from 'new' renewable energy sources, as feed-in tariffs are granted which often amount to a multiple of the 'normal' electricity market value. Approximately 250 million euros to 320 million euros (varied depending on the amount of the electricity market price and thus the difference between the feed-in tariff and the electricity market price) are spent per year for this support which must be granted based on the feed-in tariff guarantee period.

Indicative targets for the individual Member States are set out in the annex to the directive. Austria is a special case in that it was the only country already drawing over half of its electricity consumption - some 70% - from RES in the 1997 base year, mostly from hydropower.[5] An indicative target of 78.1% was therefore set, explained by a footnote in the annex: *'Austria states that 78.1% would be a realistic figure, on the assumption that in 2010 gross national electricity consumption will be 56.1 TWh.'*

The electricity produced in Austria from renewable energy sources was 46, 978 GWh in 2009 (83.7 % of the 56.1 TWh reference value) and is predicted to be 47,526 GWh (84.7 % of the 56.1 TWh reference value) for 2010. Therefore the share related to the above-mentioned reference value is significantly higher than the 78.1 % target.

[5] Followed by Sweden (49.1 %), Portugal (38.5 %) and Spain (19.9 %).

In view of Austria's far higher starting point than other Member States and of growing electricity demand, failure to take account of the absolute reference value for consumption would have resulted in unjustifiable discrimination. Merely to maintain the 70% share, Austria would have had to expand its RES generating capacity much more rapidly than other Member States would have to do to attain their indicative targets.

Unlike the sub-targets for small-scale hydropower and 'other' supported renewable electricity defined by the Green Electricity Act, the directive counts all electricity derived from renewable energy sources, including large-scale hydropower, own use and non-supported renewable electricity, e.g. biomass-fired autogeneration stations.

The dynamic effect of the high base value of 70 % in combination with an increased demand for electricity (requiring high additional green electricity production just to retain the 70 % base value also in the face of increasing demand) means that with an (also prevalent in other countries) increase in the demand for electricity, 78.1 % from renewable energy sources in relation to gross domestic electricity consumption in 2010 cannot be produced in Austria.

The following table shows the development of electricity production from renewable energy sources from 1997 to 2009 together with the development of gross domestic electricity consumption. It also indicates a forecast up to 2010 on the basis of the Green Electricity (Amendment) Act. This development in Austria is compared with the average development in the European Union.

Achievement of targets under Directive 2001/77/EC	1997*	2009 (preliminary)	Additional other capacity expected for 2010	2010 projection	Growth 1997-2010
	GWh	GWh	GWh	GWh	GWh
Gross domestic electricity consumption (incl. pumping electricity consumption) **	56,083	69,628		70,526	14,443
Large-scale hydropower (> 10 MW), excl. pumped power**	31,400	36,000	-	36,000	4,600
Small hydro power (< 10 MW) incl. 5 % internal use	4,152	4,800	100	4,900	748
Of which is supported small-scale hydropower		*644*			
Medium-sized hydropower (investment grants under Green Electricity Act [Amendment])			107	107	107
"Other" supported green electricity (wind, biogas, etc.) inc. 5 % own use*	605	4,728	312	5,040	4,435
"Other" non-supported green electricity (lye, etc., incomplete statistical capture)***	845	1,450	29	1,479	634
Total renewable generation	37,002	46,978	548	47,526	10,524
Pro rata Austrian contribution to EU-25 target scenario (from 12.9 % in 1997 to 21 % in 2010)	7,235			14,810	7,576
Pro rata Austrian contribution to forecast EU-15 scenario (from 14 % in 1997 to 19 % in 2010)	7,852			13,400	5.548
RES contribution 56,100 GWh **	66 %	84 %	1 %	85 %	
RES contribution to gross domestic electricity consumption	66 %	67 %		67 %	

* Data for small hydro and biomass taken over from 1998 operating statistics
** The 70% base level in 1997 in EU directive apparently arrived at by inadvertent inclusion of pumped storage; energy capability factor for run-of-river generating stations was 0.98 in 1997 and 0.96 in 2006; generation by pumped storage stations (less pumping power) can vary between approximately 9.5 TWh/year and approximately 10.8 TWh/year; increase between 1997-2004 was principally due to Freudenau (plus 960 GWh) and Lambach (plus 64 GWh) generating stations and increased output from pumped storage stations (plus 700 GWh). 2010 assumed to be an average year. Efficiency of 70% assumed for pumped storage.
***Figures for "other non-supported green electricity can vary from 1 200-1 500 GWh depending on the primary energy sources used
[April 2010 | Source: Energie-Control GmbH]

Table 9: Extent of attainment of the indicative target of Directive 2001/77/EC

If these projections hold good Austria will be producing 10,524 GWh more renewable electricity in 2010 than in 1997.

The DG-TREN evaluation report of 1997-2010 sees the EU-15 share of electricity production from RES rising from 14 % to 18-19 %. Austria's pro rata share of this increase would amount to about 5,548 GWh. If the average EU-25 target, which allows for an increase in the 1997 share from 12.9 % to a share of 21 % in 2010, is applied to Austria, the pro rata share of the development of electricity produced from renewable energy sources for Austria would amount to 7,387 GWh (69,628 GWh multiplied by 21 % minus 56,083 GWh multiplied by 12.9 %). The actual amount produced of approximately 10,500 is significantly higher than this pro rata target share.

It is thus apparent that Austria is fulfilling its pro rata share of the indicative 21 % target up to 2010.

However, the electricity consumption in Austria since 1997, also through external influencing factions, also rose above average. Due to changes in Central and Eastern Europe there has been a population growth in Austria linked to a growth in the number of jobs and an increase in industrial production which has only paused momentarily for the current financial crisis.

8 Evaluation of the development of green electricity and CO2 reduction from the viewpoint of national climate protection

The effect of climate protection through the energy produced from renewable energy sources is apparent from direct comparison with the energy produced which would have to cover the electricity requirement without this energy produced. If one takes as the standard of comparison electricity produced from combined cycle gas and steam generating stations then in this type of facility an average of approximately 0.44 tonnes of CO_2 is emitted per MWh electricity produced.

The electricity produced from renewable energy sources of 46.978 GWh thus avoids 20.7 million tonnes of CO_2 emissions which would otherwise be emitted when producing the same amount of energy with combined cycle gas and steam generating stations.

Even if only the amount of electricity which has been additionally produced from renewable energy sources since 1997 in Austria is evaluated, there is a substantial avoidance of CO_2 emissions: The additional electricity produced from renewable energy sources of 9,976 GWh after 1997 avoids 4.4 million tonnes of CO_2 emissions which would otherwise be emitted when producing the same amount of energy with combined cycle gas and steam generating stations.

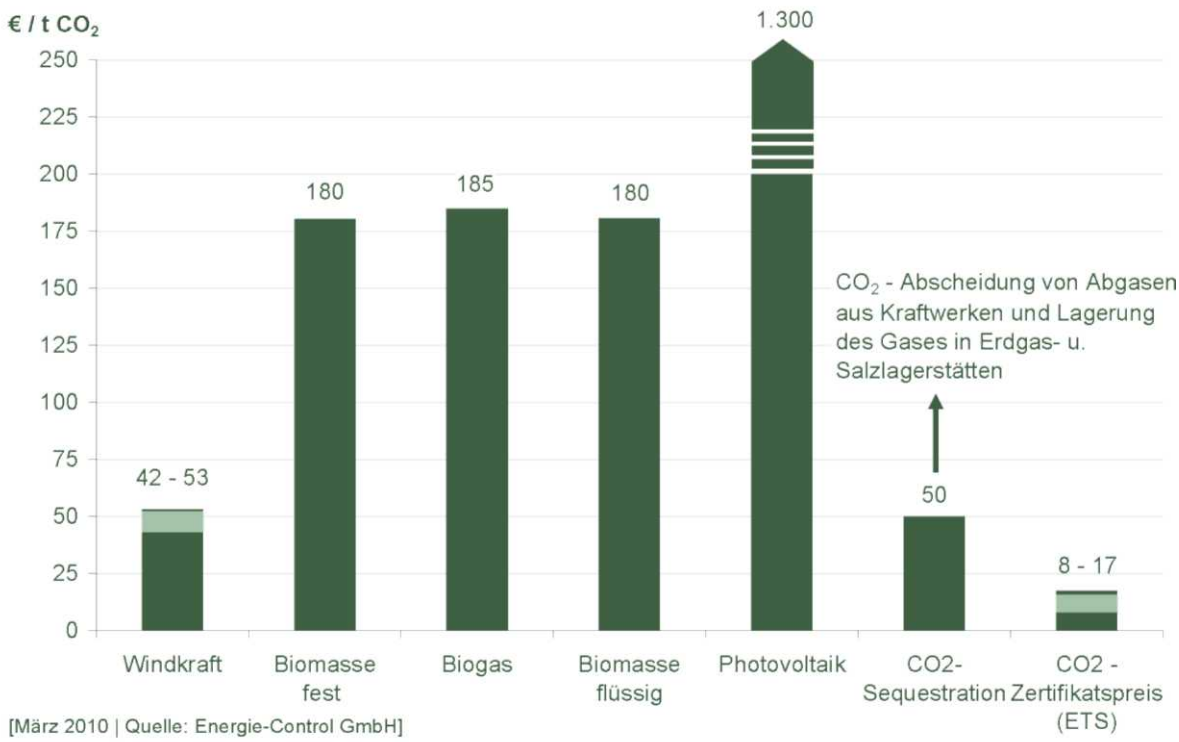
The mentioned amounts of CO_2 avoidance through electricity produced from renewable energy sources in Austria represent a substantial share compared to the total CO_2 emissions in Austria (88 million tonnes CO_2 equivalent or 74 million tonnes CO_2 in 2007).

The degree of support is relatively low for electricity produced from hydropower with under 20 euros per tonne for the most part; for electricity produced from wind power it is approximately 50 euros per tonne of CO_2 reduced. For electricity produced from biomass/biogas (on average approximately 180 euros per tonne of CO_2 reduced) and photovoltaics (in 2009 support granted for asset investment approximately was 1,300 euros per tonne of CO_2 reduced) it is however considerably higher and thus a multitude of current CO_2 prices in the Emissions Trading System (approximately 13 euros per tonne of CO_2 reduction, Status April 2010).

In Austria in 2009, 46, 978 GWh of electricity from renewable energy sources was produced.

The CO_2 reduction costs shown in detail in the chart below were calculated by dividing the subsidy per kWh (in simple terms, the feed-in tariff less the average market price) by the average emissions avoided by a modern combined cycle gas and steam generating station (0.44 t CO_2/MWh or 0.44 kg CO_2/kWh).

On the basis of the average feed-in tariffs in 2009 and the above ratios, the Green Electricity Act gives rise to the CO2 avoidance costs depicted in Figure 20. The costs for balancing energy for wind power and the additional costs for biogas and liquid biomass were also considered in the figure, as a result of the raw materials surcharge granted in 2009.



German	English
€ / t CO2 Windkraft Biomasse fest Biogas Biomasse flüssig Photovoltaik CO2- Sequestration CO2 - Zertifikatspreis (ETS) 1.300 CO2 - Abscheidung von Abgasen aus Kraftwerken und	€ / t CO2 Wind power Solid biomass Biogas Liquid biomass Photovoltaics CO2 sequestration CO2 certificate price (ETS) 1,300 CO2 – removal of waste gases from power plants and

Lagerung des Gases in Erdgas- u. Salzlagerstätten [März 2010 | Quelle: Energie-Control GmbH]	storage of gas in natural gas fields and salt cavities [March 2010 | Source: Energie-Control GmbH]

Figure 11:CO2 reduction costs for renewable technologies

9 The traceability system in Austria

9.1 Overview

According to the provisions of Directive 2001/77/EC, the requirements concerning traceability were to be implemented in the Member States by mid-2004. In Austria this legislation has already been fully implemented with the entry into force of the Green Electricity Act on 1 January 2003. There is now a fully functional traceability system, including an electronic electricity certificate database, which is administered by Energie-Control GmbH in cooperation with the grid operators.

9.2 Legal basis

Section 8 of the Green Electricity Act implements the requirements concerning the issue of guarantees of origin as described in Article 5 of Directive 2001/77/EC. Based on these principles, every operator of a eco-power plant has the right to receive from the grid operator, to whose grid the generating station is connected, a guarantee of origin for energy fed into the grid.

According to Section 8 of the Green Electricity Act, a guarantee of origin must include the following information:

- amount of energy generated,
- nature and maximum capacity of the generating station,
- time and location of the generation,
- the energy sources used.

The legal requirements allow the issuer to select the format (paper or electronic). For the automation supported issue of the guarantee of origin, a certificate shall be issued monthly on the basis of the first clearing and provided to the plant operator.

The supervisory authority for the issue of guarantees of origin is the State Governor.

9.3 Quality criteria for the issue of origin and implementation in Austria

In connection with the traceability system, Article 5(5) Directive 2001/77/EC stipulates the following:
The Member States or competent authorities should (…) describe in the report according to Article 3(3) the measures implemented in order to guarantee the reliability of the traceability system.

The reliability of the traceability system depends essentially on the factual accuracy of the available information. This accuracy may affect several levels of the transfer of information:

1. issuing the guarantee of origin,
    a) certificate concerning the energy produced,
    b) certificate concerning the energy sources used,
2. transfer of the guarantee of origin,
3. use of guarantees of origin.

9.3.1 Issue of guarantees of origin

9.3.1.1 General quality criteria

At the first level of information transfer two areas can be identified, in which incorrect information can occur. Incorrect information can concern the amount of energy produced and the primary energy source used. It is important that the relevant information is confirmed by an independent third party (e.g. regulator or certification agencies), as an essential quality characteristic aimed at preventing incorrect information in the above-mentioned areas. Together with this requirement, it is also extremely relevant whether one or more agencies are permitted to issue the certificate. Sole authorisation to issue certificates prevents potential errors that may occur when several issuing offices work have to be coordinated.

9.3.1.2 Implementation in Austria

In 2004, Energie-Control GmbH made the electricity certificate database available for the issue of guarantees of origin. For amounts of energy that are handled by OeMag, the guarantees of origin are automatically generated

in the database for each month and automatically transferred to the end user for the account of the electricity suppliers according to output. Each electricity supplier thus receives the same share of renewable energy.[6]

As well as processing these amounts of energy, the database can also be used on a voluntary basis by any grid operator or accreditation agency for the issue of guarantees of origin or certificates in accordance with Section 45a(7) EIWOG. Grid operators have made use of this facility and the Austrian electricity production is almost exclusively managed using the electricity certificate database. This increases reliability both in terms of guarantees of origin and power labelling, as a database prevents the risk of fraudulent activities or double counting.

In Austria, two independent agencies work to guarantee the quality of information for the issue of guarantees of origin. The use of (different) primary energy sources is confirmed by notification from the relevant State Governor. Confirmation of the amount of energy is provided by the grid operator and thus again by an independent body that has sole authorization in this area. This means that in Austria only one competent body can exist for the issue of guarantees of origin. In terms of quality of information for the issue of certificates, Austria is therefore already at a very advanced stage.

9.3.2 Transfer of guarantees of origin

9.3.2.1 General quality criteria

In the European context, guarantees of origin are used for various purposes. They can be used in the following ways:

- as evidence for power labelling,
- for the transfer of green electricity between Member States in order to meet the indicative targets of Directive 2001/77/EC,
- as a basis to secure state assistance (feed-in tariffs, quota models),
- as evidence for a quality label.
- for marketing purposes.

[6] For further information visit: https://www.stromnachweis.at.

As guarantees of origin are highly valuable on the market, it is vital that the same information cannot be transferred ('sold') several times. In order to avoid the multiple selling of information, the technical design of the traceability system is important. With an electronic database the duplication of information is practically impossible. If certificates are issued using other media (paper), there is the potential risk of multiple selling.

9.3.2.2 Implementation in Austria

Section 8 of the Green Electricity Act does not stipulate which medium should be used by the grid operator for the issue of guarantees of origin. It is possible to use the above-described database or to issue paper certificates. As a result of this option any potential double transfer is prevented by law. Going forward, a single electronic solution will be considered.

9.3.3 Use of guarantees of origin

9.3.3.1 General quality criteria

The risk of double use of a guarantee of origin is closely linked to a (potential) multiple transfer (e.g. for power labelling and for quality labels, which exist independently). For this reason, it must be ensured that different market participants can be involved in the use of guarantees of origin (e.g. when generating station operators apply for feed-in tariffs or electricity traders apply for tax reductions). Precisely this fact leads to potential interface problems and multiple uses, for which reason the technical design of the traceability system also assumes major significance in this case. Within the database, the guarantee of origin can only be used for one purpose and not multiple purposes. Obviously, several systems can be operated parallel with a guarantee of origin (so that the receipt of assistance does not prevent it being used for power labelling), but clear delimitations must be implemented within the database and particularly at interfaces to other systems.

9.3.3.2 Implementation in Austria

The main area in which guarantees of origin are used in Austria is for power labelling, as Section 45a(7) WIWOG determines that certificates from the accredited agencies may be dispensed with, provided guarantees of origin exist.

As described in Chapter 9.3.2.2, improvements would likewise be necessary at this level of information, as potential fraudulent ‘double use’ is not dealt with by any legal principle that prevents such activities. The mandatory use of an electronic database (in Directive 2009/28/EC) would represent a solution in this area together with the clear definition of interfaces to other systems (both legally and technically).