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## AUSTRIA (Renewable Energy in Austria)

### 1. Definition of renewable energy

There is no general definition of renewable energy sources (res) for all purposes in Austria. An incomplete definition is contained in the Federal Electricity Act (Elektrizitätswirtschaftsorganisationsgesetz or EIWOG) of 1998/2000. It declares in art. 40 that electric installations operating on the basis of specifically listed renewable energy sources – i.e. solid or liquid biomass, biogas, landfill and sewage treatment plant gas, geothermal energy, wind and solar energy – are to be recognised as eco-electric plants. This also applies to hybrid plants which co-fire a high share of biogenic material, but specifically not to installations burning waste or sewage sludge. Obviously electricity from hydro-electric plants is also considered as renewable energy for certain purposes, but only “small” hydro plants (variously defined by differing *Länder* laws) are eligible for special treatment. Since these definitions all refer to the generation of electricity, they leave out solar thermal energy.

### 2. Starting position in energy policy

Austria is quite dependent on imports of fossil fuels, which make up almost 80% of Austria's total energy supply; import dependence for coal and oil is above 90%, and about 80% for natural gas. Renewable energy supply stands near 23%, the second highest ratio of any EU member state after Sweden. Austria is particularly strong with regard to hydropower, biomass from wood and in the use of thermal solar energy. In relative – i.e. per capita – terms, it is also a pioneer with regard to biodiesel (rank 2 in the EU as of 1999), photovoltaics (rank 3) and geothermal use (rank 4).

In electricity generation from renewable energy sources, hydro has a share of over 96% (including 10.6% from small hydro below 10 MW). In the market for heat, wood dominates with about 94% if electricity from waterpower for space heating is left aside (Staiß 2001: I-235-254).

Table 1: Total energy supply for national consumption (2000) (Amounts in Terajoule; shares indicate percentage of domestic origin)

	Gross national consumption (TJ)	Domestic supply (Terajoule)	Domestic share (per cent)
Coal	151,583	12,118	8%
Oil and oil products	524,976	41,247	7.9%
Natural gas	270,738	64,826	24%
Firewood	66,580	66,937	100%
Combustible waste	13,347	13,347	100%
Bio-fuels	48,985	52,675	108%
Hydropower	150,919	150,919	100%
Ambient thermal energy	7,343	7,343	100%
Wind and PV	252	252	100%
Total	1,234.723	409.664	33.17%

Source: Statistik Austria 2002: 305 (simplified)

Table 2: Relative shares in total domestic primary energy production from renewable sources (2000)

	Terajoule	Per cent
Hydropower	150.919	51.77%
Firewood	66.937	22.96%
Other biomass	52.675	18.07%
Other combustible waste	13.347	4.57
Heat pumps	4.113	1.41
Solar thermal	2.661	0.91
Deep geothermal sources	569	0.19
Wind and photovoltaics	252	0.08
Total	291.473	100%

Source: Statistik Austria 2002: 305

*Water power* was promoted strongly after World War II (some construction goes back to the war) and again after the oil crises of the 1970s. It grew steadily from about 5,000 GWh in 1950 to about 42,000 GWh in 1999. While construction of large hydro almost stopped in the 1980s, small hydro may still see some growth. As to *biomass*, traditional wood stoves still play a – declining – role in the countryside; its use for district heating and smaller heating units using wood chips is on the increase. Wood processing industries and in particular the paper and cellulose industries use significant amounts of biomass for process heat. In recent years, pellet heating systems have undergone a veritable breakthrough. Biogas from agriculture, sewage treatment plants and landfills goes back to the early 1970s but is far from its potential. In biodiesel Austria had one of the first industrial production plants world-wide, opened in 1991, but again there was no breakthrough so far due to high cost; its share in total motor fuel consumption is about 0.6%. *Solar thermal* energy use is one of Austria's great success stories; in panel surface per capita terms it has the highest values in the EU, higher even than Greece. Until the mid-1990s, a large share of these panels was installed by do-it-yourself groups on single family dwellings. New installations declined since the second half of the 1990s, but efforts are currently under way to find new applications, especially in apartment buildings and district heating. Panel producers achieved an export share of 43% in 2000 and of about 80% in 2001; that year exports increased from 112.000 to about 244.000 square metres of panel surface. *Photovoltaics* is little developed (3.2 MW at the end of 2000) but received a boost due to recent policy changes in several *Länder*. *Wind* came late, with only 78 MW of grid-connected installations at the end of 2000 due to both a relatively poor resource endowment and little policy support. Deep *geothermal* sources were largely neglected until EU membership permitted participation in the THERMIE programme; only a few projects exist (ibid: I-255-268).

### 3. Most important energy policy actors in Austria

Austria has a federal political structure. Energy policy is made at three levels: that of the federal government, the provincial or *Länder* governments (Austria consists of nine *Länder* or provinces), and of local government. The field of energy is not assigned to any particular level and is split up in many sub-fields. On some issues, several levels of government are active. There is a variety of other actors (Winkler-Rieder 1997).

At the federal level, the most important actor is the Federal *Ministry of Economic Affairs*, which is in charge of regulation regarding fossil fuels and of framework legislation regarding electricity. Other ministries also play a role: the *Ministry of Agriculture, Forestry, Environment and Water Management* directs promotion programs for renewables in general and can affect biomass

policy. Its subsidy programs for the renewables industry are handled by the *Österreichische Kommunalkredit*. The Federal *Ministry of Transport, Innovation and Technology* also subsidises specific renewable energy programs. There is also *E-Control*, the independent federal electricity regulator installed in the process of liberalisation and charged with supervising its implementation (and with regulatory intervention if necessary).

The *Länder* are very jealous of their very modest powers, something that often complicates political processes. At this level, executives (governors) play a dominant role, implementing most federal and all *Land* legislation. The *Länder* governments decide on energy subsidies to households and on specific programs (such as solar thermal). In the area of res-electricity, the *Land* legislatures adopt implementing legislation to the Federal Electricity Act. On this basis, the governors regulate feed-in tariffs by decree. Both federal and *Länder* governments also play a role as majority owners of electric and gas utilities.

Four of the nine *Länder* have energy efficiency associations with participation from government, *Land* utilities and (not always) the private energy sector, with renewable energy sources often poorly represented. In two cases though (Upper Austria, Vorarlberg) these associations became important allies for renewables.

Federal government, *Länder* and a variety of private actors (energy companies, consumer associations, research institutions and many others) also operate the *Austrian Energy Agency (EVA)* which provides support through information, market analyses, research, project co-ordination and assistance.

Local governments may own municipal utilities for electricity, gas and district heating. In smaller communities district heating is often operated on a private basis (e.g. farmer co-operatives). Municipal governments may also give subsidies for particular renewable energy installations (e.g. thermal solar panels).

From the end of World War II to 1999, Austria was governed chiefly by two parties (usually in grand coalition), the Social Democrats and the Conservative People's Party. Both parties had strong links with the energy sector due to the fact that electricity, gas, district heating and a good share of oil were in the public sector, with the management of these firms appointed partly according to political party criteria. When energy policy became controversial in the 1970s and 80s, these firms were at first able to secure strong political support. After many conflicts and two major political crises over power plant projects which were defeated in the end, the two parties became weary of openly supporting the conventional energy sector. By this time, alternatives were proposed by the Greens, parts of the Conservative Party and even of the Freedom Party (the latter questioned in particular government party influence and privileges in the public sector – and also nuclear power). With liberalisation, most of the privileges – though not political influence – were terminated.

Under the neo-corporatist system that characterised Austria until about 2000 (it has been declining lately), economic interests are grouped together in peak associations with obligatory membership (except for labour unions) and considerable political influence; there was strong interpenetration with the two core governmental parties (social democrats and conservatives). Business and labour associations favoured in particular large infrastructure construction projects such as hydro and thermal power plants, pipelines, and the like. Only some chambers of agriculture on the *Land* level deviated from this consensus; some of them supported biomass and could secure modest and somewhat irregular support from the Conservative Party.

Next in importance as key actors are *energy companies*. In the post-war period electric utilities were nationalised, because of their importance for reconstruction, the lack of private capital and the desire to avoid the risk of having to surrender them to the Allied powers as former German property. As a result, they were owned by either the federal, *Länder* or in some cases municipal governments. In the appointment of their managers, political party played an important role. This connection helped to maintain tax privileges and other forms of support even after post-war reconstruction had ended. During the late 1970s and 1980s, a series of conflicts about power plant construction projects hurt utility image, starting with the controversy about Austria's only nuclear power plant which was completed but never went on stream – due to the success of an anti-nuclear referendum in 1978 – and was finally dismantled after Chernobyl. In the mid-1980s, plans for several large hydro reservoirs and a run-of-the-river hydro plant on the Danube suffered a similar fate. The status of gas companies was similar though they escaped public attention most of the time. Political protection was also available to oil and coal. Most oil supplies are and were handled by a refinery owned by national company OMV (Österreichische Mineralölverwaltung, now partly privatised, as also gas and electricity). Coal enjoyed protection by political contracts with electric utilities which served to subsidise national coal production unable to compete with oil. The associations of boiler producers and heating fuel distributors played a similar role, but with influence based more on market power than on political privilege.

Renewable energy producers appeared fairly late on the scene. Wood was long seen as a pre-modern fuel, something to be phased out in due course. Things began to change with the energy crises of the 1970s; in the 1980s modern biomass heating systems received important impulses. In the meantime, there is a substantial number of producers in several *Länder*, and exports have become significant. In recent years, pellet systems were developed which became highly successful. The biomass association is quite important, also the small hydropower association. In the field of thermal solar collectors, Austria is in fact one of the leading countries in Europe; an early association in this field – but not exactly a business group – is the *Arbeitsgemeinschaft or ARGE Erneuerbare Energie* (renewable energy consortium) whose commitment to renewable energy is primarily motivated by environmental concerns. This association built on the above-mentioned do-it-yourself groups for mounting solar thermal panels. There are also associations for biogas, wind energy (*IG Wind*, standing for *Interessengemeinschaft Windenergie*; wind energy is still modest in Austria, despite early beginnings) and photovoltaics. A broader group is the Federal Renewable Energy Association (Bundesverband Erneuerbare Energien or BVEE), founded in 1997. Whereas environmental issues experienced a relative decline in attention, the status of these groups was greatly enhanced by recent EU policy towards renewable energy.

Environmental groups played an important role in Austrian energy policy, but paradoxically not so much with regard to renewables. The most important actors in this context were undoubtedly the specifically Austrian anti-nuclear groups in the 1970s and opposition groups against conventional power plants (hydro, thermal) in the 1980s. While they were advocating efficiency and renewables, they had little direct impact on policy in these areas. Today, associations such as Greenpeace, WWF or Global 2000 are important allies of res-producers, but their position in Austrian politics is comparatively weak.

#### 4. Instruments for promoting renewable energies

At the most general level, there are the various energy concepts formulated by the federal government and several *Länder*. These are documents of programmatic value for the medium term. Since the late 1970s they paid lip service to stepped-up energy efficiency and the use of

renewable energy sources. They were often mostly symbolic in character but probably contributed to the process of rethinking at the different levels of government. Recent concepts such as the one adopted in Upper Austria in 2000 (this *Land* uses about a quarter of all energy in Austria) are more ambitious. Very specific is the organisational support given by some *Länder* governments to renewable energy sector firms in recent years. They organise these firms in clusters, encourage contacts among them to promote research and development as well as common projects.

Energy taxation – especially in the form of a carbon tax – could do much to promote renewable energy sources. This issue is under discussion since the early 1980s. In the early 1990s the federal government declared that it would proceed only in step with other countries (“no pioneering”). A revenue-neutral ecological tax reform (with a simultaneous reduction of taxes on labour) seemed possible in 1995; the idea was very popular then with public opinion though not with the grand coalition government. In any case, the reform fell victim to a government crisis over economic policy. As a result, only a modest tax on oil products was introduced in 1995, and an equally modest tax on gas and electricity in 1996. Their goal was purely to raise revenue, not to affect patterns of energy consumption. In 2000, the tax on gas and electricity was doubled (to about 0.015 Eurocents/kWh), again for budgetary reasons and once more without exemption for res-electricity. However, given the improved competitiveness of biomass due to higher oil prices, by this time the tax made a difference for the economics of biomass. There is another area where taxation is important: biodiesel was largely exempted from the mineral oil tax for some time, since 2000 this exemption is total (Staiß 2001: I-260, I-271). On the European level, the Austrian government generally supported an energy/carbon tax.

Subsidies are pervasive in the renewable energy sector. They exist for both energy consumers (households) and for energy producers. For households, the most important instrument is federal funding for residential housing programmes of the *Länder* which make very substantial contributions to construction costs. The *Länder* can decide for what purposes these subsidies are to be used. Several of them put great emphasis, in their legislation, on high energy efficiency standards and the use of renewable energy sources. Buildings which incorporate these features are eligible for higher subsidies. As a result, in the province of Salzburg which makes a special effort in this area, 48 percent of all new housing built in 2001 is heated with biomass, while a full 63 percent in addition have solar thermal systems. A weak point of this system up to now is that only new buildings are eligible; however, this is in the process of being changed (Staiß 2001: I-269-270; *Land* sources). Since the late 1990s, the *Länder* also receive about 12% of the revenue generated by the federal tax on gas and electricity (described above), earmarked for financing environmental and energy saving measures. This opens new possibilities for res support.

Federal subsidies administered mostly by the *Kommunalkredit* also exist for renewable energy producers such as firms, associations and public entities. Typically, 30% subsidies are granted to entrepreneurs investing in small hydro plants, modern biomass-based heating systems including small networks for district heating (in the case of farmer co-operatives the subsidy ratio may go up to 50%), biogas, sewage gas and geothermal systems, heat pumps, solar thermal above 10 square metres, photovoltaic and wind installations. Regional and local energy concepts and district heating studies can be subsidised up to 66% (including *Länder* support). Support for res-electricity is extremely complex. It consists of minimum quotas, an obligation on distributors to feed in all eco-electricity on offer (independently of the quotas), minimum prices which however are only a basis for negotiations, a penalty for non-fulfilment of the quota and information requirements for electric bills. In this area federal framework laws are implemented



by legislation of the *Länder*, implemented in turn by *Land* decrees. The Federal Electricity Act EIWOG, first adopted in 1998 in the context of market liberalisation, was amended in 2000 and provides for a minimum quota of “eco-electricity” (this does not include hydroelectricity; see definition in section 1 above). Electricity distributors must carry at least the following amounts from eco-electric installations or from other distributors: 1 per cent by October 2001, 2 per cent by October 2003, 3 per cent by October 2005 and 4 per cent by October 2007. There is a penalty for non-fulfilment (to be established by the *Land* governors) consisting of the difference between the market price of electricity and the average production costs of eco-electricity. Penalty payments are to go to a fund to support eco-electric installations, though some *Länder* also support small hydro in violation of federal law (Schanda 2001: 65). Paradoxically, in addition to the quota, EIWOG lays down an obligation on distributors to accept *all* eco-electricity on offer, at the special prices provided for eco-electricity. Some *Länder* laws deviate from this provision and only include an obligation to “accept a growing amount” of eco-electricity, or to pay the special price only up to the *minimum* quota. In part this is due to fear that windpower might concentrate on the most favourable regions in Eastern Austria which would thus have to carry a disproportionate burden (a similar concern existed in Germany under the old feed-in law prior to the EEG, i.e. the StrEG). These laws seem to be unconstitutional, but to challenge them is an expensive procedure for small eco-electricity producers (ibid: 38-48). There is another quota for small hydro: each distributor must prove an 8% share of electricity from such (domestic) installations by delivering the required amount of tradable certificates. However, there is no uniform obligation on distributors, across the *Länder* laws, to physically accept power from small hydro sources (ibid: 11-13 and 57).

In addition to minimum quotas, prices for eco- and small hydro-electricity are also subject to regulation. For eco-electricity, EIWOG provides for minimum prices oriented on the average costs of production, and to be determined by *Länder* laws and implementing decrees by *Land* governors. This allows for great differentiation according to the size of the installation, their technology (wind, biomass, photovoltaics etc.), date of construction and time of generation (peak/off-peak, winter/summer etc.) and many other factors. The result is a crazy quilt of nine different *Länder* laws accompanied by nine different decrees, leading to about 100 different tariffs for only a tiny portion of total electricity production. The situation is even more complicated since these tariffs only set *minimum* prices; res-electricity generators actually negotiate their own deals (Upper Austria, the Land with the highest share of eco-electricity, practices a special system: it uses competitive bidding for 15 year contracts at guaranteed prices). All these prices vary greatly, with highest and lowest prices showing relations of 1:32 for photovoltaics and 1:8 for biomass (Cervený/Veigl 2001, 3-9). For small hydro there is a different system again: while definitions of and certain conditions for small hydro differ in the relevant *Länder* laws, prices are determined by a system of tradable certificates which the industry seems to have preferred to the parsimonious *Länder* feed-in tariffs which they expected (Staiß 2001: I-271-275; Schanda 2001; Haas et al. 2001, 136, 149, 150 and 221; Cervený-Veigl 2001). The resulting chaos is such that E-Control, the federal electricity regulator, in fall 2001 started an effort to establish a uniform national tariff for renewable electricity production (Standard, 24.10.2001). The outcome is still uncertain (Renewable Energy Report 38, April 2002: 23-24; Standard, 26.4.02; most optimistic about a new feed-in tariff is oekostrom infoletter 9, May 2002:1).

Finally, EIWOG lays down a transparent billing obligation for all electricity distributors. Electric bills for end customers must contain information as to the electricity mix they are offering, i.e. the relative shares of the different primary energy sources used (hydro, fossil, nuclear, wind etc.). There is a penalty for disregarding these provisions, ultimately such a firm can be closed

down for repeated violations. Again, implementing legislation and control is left to the *Länder*. This provision may have helped to inspire a similar effort for a directive in the European Parliament, in March 2002 (Solarthemen 28.3. 2002: 4).

## 5. Obstacles for renewable energies

The discussion of renewable energy policy would be incomplete if it did not mention efforts to improve market prospects for fossil energy sources which undercut the prospects of renewable energy development. Most important in this context were policy measures designed to restrict the deployment of biomass, particularly at a time of low oil prices (1986-1999) when biomass was very price-sensitive.

In the case of gas, an almost identical story unfolded in several *Länder* in the 1980s and early 1990s. Public policy and municipal decision-makers in many areas and towns decided in favour of a biomass-based district heating system. This led to counter-efforts by the gas company owned by the *Land* concerned and well-connected to *Land* politics resulting in *Land* government support for the construction of a gas pipeline in the area, sometimes with public funds. At the same time, available subsidies for biomass plants were reduced, and in some cases direct political pressure exerted on governments of towns located near the pipeline to scrap their biomass plans. Most mayors and town councils were quite sensitive to this kind of "persuasion" (Winkler-Rieder 1990; Spitzauer 1994).

Electric utilities also defended their share in the market for space heating. This concerned above all night-time electric storage heating, which they saw as one of the fastest growing markets in the 1980s. They argued that an expansion of electric space heating would replace oil imports by water power and reduce air pollution. In fact, water power is lowest in the winter when demand for heating is greatest, so that utilities had to resort to thermal plants running on coal or oil, with energy conversion ratios in the area of 30% (Lauber 1986). Space heating was promoted by low rates subsidised by other electricity consumers (Kok 1991) and by direct political influence of utilities via "their" *Land* government in the public housing sector, another area of pervasive party influence. Both electric and gas utilities also contributed to delaying an energy/carbon tax and exert a major de facto influence on feed-in tariffs conditions set by "their" *Land* governments.

Oil and coal also played a political role in inhibiting biomass. The Raiffeisen organisation, theoretically a co-operative structure for farmers, is the chief purchaser and supplier of farm goods and the main banker in rural areas. It might have become a natural ally of biomass interests, but in fact it seems to have preferred its involvement in the oil and coal trade. When in some *Länder* biomass lobbyists could secure a government subsidy for shifting furnaces to biomass, the fuel trade in some cases prevailed with obtaining a similar subsidy for the installation of *any* new furnace, justified by the fact that new furnaces are more efficient than older ones (Hutterer, forthcoming). This list could be continued.

The chief obstacle is probably a widespread scepticism in government that renewables can actually deliver; this seems to be changing though of late, supported by EU policy and the great popularity of renewable energy with the public. Next to this, price is an important obstacle, at least when prices for oil and conventional electric generation are low. Rising oil prices in 1999/2000 have alleviated – and in some cases removed – this problem for biomass, particularly for the new pellet technology. Solar thermal panels will also need continued subsidies. Because of budget consolidation, there were first attempts to eliminate them but these failed due to the popularity of the programmes. In the case of small hydro and eco-

electricity, this problem will decline when the current surplus in generating capacity which resulted from liberalisation will have disappeared. Even in that case however wind energy will need subsidies for a considerable length of time as wind conditions in Austria are not very favourable, similar to Germany's but without the latter's coastal regions. This applies even more strongly to photovoltaics. While the introduction of a uniform feed-in tariff (as discussed in spring 2002) would contribute to making eco-electricity more attractive to investors, it could also create new problems if that tariff were to tend towards the lower end of the current price range. However, such a change would probably place the targets of EIWOG 2000 out of reach and also make it difficult to reach the national indicative targets contained in directive 2001/77/EC; for that reason it is not very likely.

## 6. Perspectives and success conditions

There is still considerable potential for expanding the uses of renewable energy sources in Austria. The contribution of biomass is likely to increase particularly with regard to space heating (pellet systems, small district heating) and electricity generation, especially co-firing in conventional thermal plants. Solar thermal can expand strongly for apartment buildings and district heating. Biofuel production can increase by a factor of 10 to 20 without too many problems (Neubarth/Kaltschmitt 2000: 456). Wind energy will undoubtedly grow but within limits; photovoltaics has a very large potential. Whether these resources will be used depends on many different factors.

Most important are again prices of oil and gas, which depend on shifts in political and market power, internalisation of external costs and reduction of subsidies. On these developments Austria has a modicum of influence within the EU, which has these issues on its agenda. Apart from fossil fuel prices, political impulses are most likely to come from EU policy. This is visible today with the EU goal to double the use of renewable energy sources and to raise the share of res electricity in Austria, from 70% in 1997, to 78.1% in 2010, according to the annex to directive 2001/77/EC. The introduction of an energy/carbon tax, taken up again at the Barcelona summit in March 2002, would be an important step, similarly the adoption of a biofuels directive (a Commission proposal was submitted in fall 2001). Beyond this, the entry into force of the Kyoto protocol (ratified unanimously by the Austrian parliament in March 2002) would be a crucial signal; Austria is committed to a 13 per cent reduction under EU burden sharing.

Apart from its stance in the EU and in applying future EU legislation, Austria can make important contributions to the success of renewable energy sources on its own. The expansion of subsidy programmes for biomass and solar thermal to include older buildings is a case in point; both energy sources can also benefit from continued R&D and export promotion. In the area of eco-electricity, a simplified yet favourable regime for producers will be essential; right now it seems as though some distributors (in fact utilities) wanted to reserve this promising market for themselves, inducing "their" *Land* governments to use the quotas accordingly (i.e. as upper limits rather than minimum quotas). On the other hand, several *Länder* in recent years initiated programmes for a very dynamic development of photovoltaics. Overall, it should be remembered that theoretically, all of Austria's electricity and heating needs – though not its demand for motor fuels – could be satisfied on the basis of renewable energy sources (Neubarth/Kaltschmitt 2000: 418, 436, 456).



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## URLs:

- Bundesverband Erneuerbare Energien: [www.bvee.at](http://www.bvee.at)
- E-Control (Stromregulator): [www.e-control.at/Erneuerbare](http://www.e-control.at/Erneuerbare)
- Energieverwertungsagentur: [www.eva.wsr.ac.at](http://www.eva.wsr.ac.at)
- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW): [www.lebensministerium.at](http://www.lebensministerium.at) >Umwelt > Energie