

AUSTRIA

The country report for Austria was prepared by CRES.

Current situation on CHP and biomass CHP in the national energy sector.

In Austria, petroleum provides significantly lower percentage of the primary energy than the European average. Gas and coal are also significant within the overall energy picture. Hydroelectric energy and biomass are also significant, and being, together, as important as gas. This is an important example of how the use of the country's own resources has led to greater self-sufficiency, pushing it up to 33.45% in a country that is virtually devoid of energy resources.

Energy balances in Austria (Source: Energy Policies of IEA Countries, 2001)

	1999	%		1999	%
Population (millions)	8.09		Total final consumption	24.2	
Energy consumption/capita	2.99		Coal	1.1	4.5
Total energy production (Mtoe)	9.5		Oil	10.9	45.0
Coal	0.3	3.2	Gas	4.3	17.8
Oil	1.0	10.5	Biomass & Wastes	2.5	10.3
Gas	1.5	15.8	Geothermal	0.0	0.0
Biomass & Wastes	3.2	33.7	Solar/Wind/Other	0.1	0.4
Nuclear	-	-	Electricity	4.3	17.8
Hydro	3.5	36.8	Heat	1.0	4.1
Geothermal	0.0	0.0	Total industry consumption	7.3	
Solar/Wind/Other	0.1	1.1	Coal	0.8	11.0
Net energy imports (Mtoe)	18.8		Oil	2.1	28.8
Coal	2.7	14.4	Gas	2.3	31.5
Oil	11.0	58.5	Biomass & Wastes	0.6	8.2
Gas	5.2	27.7	Geothermal	-	-
Electricity	-0.2	-1.1	Solar/Wind/Other	-	-
Total supply - TPES (Mtoe)	28.4		Electricity	1.4	19.2
Coal	3.1	10.9	Heat	0.1	1.4
Oil	11.9	41.9	Transport consumption	6.5	
Gas	6.8	23.9	Total other sectors consumption	10.4	
Biomass & Wastes	3.2	11.3	Coal	0.3	2.9
Nuclear	-	-	Oil	2.7	26.0
Hydro	3.5	12.3	Gas	1.8	17.3
Geothermal	0.0	0.0	Biomass & Wastes	2.0	19.2
Solar/Wind/Other	0.1	0.4	Geothermal	0.0	0.0
Electricity Trade	-0.2	-0.7	Solar/Wind/Other	0.1	1.0
Electricity generation	5.1		Electricity	2.7	26.0
Electricity generation (TWh)	59.2		Heat	0.9	8.7

With regard to final consumption, even though petroleum derived products are very important; electricity is significant, as is biomass, which accounts for 10.5% of the consumption of final energy.

Regarding electricity production, the use of hydroelectricity is quite significant, representing 66.5% of the total, since ample use is made of Austria's water resources. The use of gas in generation plants is no less significant, and it accounts for 15.8% of the total. The relative non-importance of coal production plants (9%) is attributable, mainly, to the absence of that resource and its negative environmental impact.

In 1999 heat production reached 11,603.4 GWh after 10.861 GWh in 1998. CHP plants compile 68% of the heat production. Nevertheless natural gas is an important energy for the DH production with a share of 50%.

The total volume of heat production of the Austrian DH utilities is made up to its own production and the production of other heat producers agreed upon by contract. On the one hand they are heat suppliers or vertically integrated utilities producing electricity by CHP. But it is also the industry with CHP plants or plants of waste-heat recovery from industrial process. Up to now 3 waste incinerators have contributed to heat generation.

Utilities for the production of DH have been enhanced in quality and number (e.g. CO₂ removal and gas desulphurisation systems in plants). A particular aspect of DH in recent years has been the use of biomass. The generally small utilities in several areas are mostly organized co-operatively. Until 1999 the number of biomass-DH plants has risen up to 500. Waste materials from agricultural and forestry industries are mainly used in heating plants.

Public utilities				
In GWh	<i>Total</i>	CHP including condensing power production	“real” CHP without condensing power production	Industrial CHP including condensing power production
Electricity	14,885	8,599	3,500	6,286
Heat	22,568	7,437	7,437	15,131

RTD and Demonstration projects on biomass CHP

No data available.

Legislation and support mechanisms

Austria has committed itself to a 13% reduction of emissions as its contribution to the achievement of this target. A highly ambitious goal, which is all the more difficult and costly to achieve since the per capita share of greenhouse gas emissions in Austria is already relatively low on account of the fact that Austria meets a high percentage of its energy demand from hydropower, biomass and natural gas. Worldwide, Austria accounts for 0.26% of total carbon dioxide (CO₂) emissions and 0.1% each of methane (CH₄) and nitrous oxide (N₂) emissions.

The Austrian DH-industry endorses the national and international efforts aimed at the sustainable prevention of climate change and will contribute towards the achievement of realistic emission reduction targets also in the years to come.

The construction of CHP systems, as well as the connection to DH and the installation of modern biomass boilers, is being subsidized under the framework of environmental promotion in accordance with the Environmental Support Act.

Subsidisation for DH is an important element of developing its significance further. In 1982, federal and local governments created a common instrument. In 1994 and 1995 investments

up to 128 million ATS were guaranteed of which 58 million ATS were paid for renewable energy sources. Since the investment of 15 billion ATS was consumed by projects at the end of 1993 public subsidies of DH were stopped.

A very important fact is the rather dramatic decrease in the electricity tariffs for electricity sold from CHP plants; these low electricity prices are foreseen to continue for a long period, maybe the next 4-5 years. Afterwards, the electricity price is expected to increase to a level corresponding to the electricity price from a natural gas fired power plants of the combined cycle type.

Furthermore, the export of electricity from nuclear power station at very low prices is seen as a threat to the economy in many CHP- plants, both in Austria and in other neighbouring countries. The cheap electricity from the nuclear power stations “pushes” cheap electricity from power plants in Germany towards Austria, giving very hard competition to the CHP production.

More efficient CHP plants are also needed, i.e. replacement of CHP-plants of condensing /extraction turbines with CC plants.

Concerning the impact from the liberalization, it was mentioned that the following methods would be discussed generally in Austria:

- Introduction of an extra bonus payment for electricity produced at CHP plants. This extra payment should be the same for all CHP plants in Austria.
- Introduction of A Quota-model, i.e. all customers have to buy a certain share in percentage per year of their electricity consumption from CHP production,

The first item is seen from the Austrian District Heating Association as an urgent and necessary tool to secure survival of the CHP-production. The Quota model could be seen as method/model to implement the future trade with emissions, which is foreseen as a one of the results of the Kyoto agreements.

In June 2000 there was a political decision to establish a protection of CHP in the new EIWOG. According to this law electricity production in CHP plants as part of a DH system can be protected. But it depends on the local governments to set this regulation into force. Up to now no local government did introduce the protection of CHP on the regional level. Another problem discussed was related to the various types of taxes on fuels; especially the principles for the division of the fuel used in a CHP-plant for electricity production and for heat production were discussed.

The CHP plants would prefer that the amount of fuel for heat were calculated as the extra amount of fuel needed in the CHP plant in order to produce the same amount of electricity as if the electricity were produced in condensing mode. It was mentioned that there was the same kind of discussion in Denmark.

- **Public support for renewable energy projects and district heating**

Implementing entities: Federation, ‘Lander’. Type of policy: promotive

Most renewable energy projects still cannot be realized economically without public support. Climate change response measures in the field of renewable energy and energy efficiency have been supported through federal funding and the *Lander* and communities for similar purposes under their own schemes, not including energy within the housing schemes.

Federal Environment Fund (FEF): The Federal Environment Fund is enabled to fund environment projects with a total budget frame of actually more than 40 mill euros per year. Over the past years, increasing priority has been given to climate change related projects. For the budget periods 2001 and 2002, the total budgetary frame has been increased to reach 40 mill euros and 47 mill euros, respectively, after 36 mill euros on average during past years. All *additional* funding (15 mill euros for both years) will be channeled for climate change purposes.

Rural funding schemes for energy from biomass: The Ministry of Environment, the *Lander* and the EU also provide funding for rural biomass energy projects. Total public funding for those projects, like district heating from wood chippings, biogas CHP or individual biomass heating systems amounted to roughly 25 mill euros annually over the past

years. The *Lander* receives a share of 11,835% of the energy tax revenue (electricity and gas) that is to be spent for these and other environmental purposes. Since the federal electricity tax was raised by 100% in mid 2000, *Lander* now receive additional 25 mill euros per year for relevant support schemes, giving more flexibility to step-up resource allocation for renewables and district heating.

Another effective measure for reducing GHG emissions in the agricultural sector is the utilization of biogas in CHP devices. The technology allows avoiding CH₄ emissions from livestock to a large extent and – as a ‘double dividend’ – fossil fuels can be substituted. However, economically feasible potentials are rather limited. Improved feed-in conditions for ‘green’ electricity could have the potential to accelerate the rather slow development until now. In 1999, approximately 100 agricultural biogas CHP systems were in place.

- **Energy tax rebates for combined heat and power production (CHP)**

Implementing entities: Federation. Type of policy: fiscal

Austria’s energy taxation system exempts ‘input’-fuels for power production from mineral oils and natural gas taxes in order to avoid double taxation due to the consumption tax on electricity. On the contrary, heat from (sole) heating plants is taxed indirectly by the taxes on input fuels. Accordingly, for CHP, only a share of input fuels is exempted from taxes. In order to give incentives for heat production from CHP, efficient CHP plants benefit from tax rebates within the mineral oils and natural gas tax since 1996. Plants with a minimum electricity performance of 44% are exempted from taxes on ‘heat share’ of energy output.

- **Preferential framework conditions for combined heat and power production (CHP)**

Implementing entities: ‘Lander’. Type of policy: regulatory/economic

Within the Federal Electricity Act, the *Lander* are entitled to oblige net-operators to feed in electricity from CHP at macro-economically reliable prices. Such preferential conditions are allowed to be granted until the end of 2004.

- **Preferential framework conditions for CHP (cont. from ‘Adopted PaM)**

Implementing entities: Federation. Type of policy: regulatory/economic

The EC is also planning an initiative to double the share of electricity from CHP in the EU from actually 9% to 18% by 2010. A draft directive in that respect is scheduled to be adopted by 2002.

- **Further development of targets for renewable energy sources and implementation of the EU directive on renewables**

Implementing entities: Federation. Type of policy: regulatory/economic

According to the EU Directive on Electricity Production from Renewable Energy Sources, Austria has to set an indicative national target for 2010 that takes into account the reference value laid down in the directive, equivalent to an increase of the share of electricity from renewable energy sources from 70% in 1997 to 78.1% in 2010. The figures are not directly comparable with ‘new renewables’ targets from the Electricity Act. Given an annual increase of electricity demand of 1.6%, according to latest analysis (‘Energy Forecasts and Scenarios until 2020’, WIFO 2001), the target would be equivalent to additional 13-14 TWh electricity from renewable energy sources by 2010 compared to around 39 TWh supplied by all renewables in 1997. However, Austria states in a footnote to the directive that ‘the reference value of 78.1% would be a realistic figure, on the assumption that in 2010 gross national electricity consumption will be 56.1 TWh’. If this assumption occurs, meaning that electricity demand remains at its 1997 level, there would be a need for an additional 4.8–5 TWh, only in electricity production from renewables by 2010. The directive, which also sets framework conditions for the establishment of mutually recognised electricity labeling systems, has to be implemented by Member States by the end of 2003. Depending on the development of electricity consumption in Austria, it is likely that further efforts will be needed to get in compliance with the directive. This would require a forward projection and adequate adaptation of existing targets for renewables in the ‘Energy Liberalisation Act’. However, the targets will only be in reach when supplementary efforts will be made to slow down the growth in electricity demand.

- **Stepped-up public support for renewable energy and district heating projects**

According to the draft *Austrian Climate Strategy 2010*, public support schemes for renewable energy and DH projects need to be stepped up substantially over the coming years in order to achieve Austria's Kyoto target under the EU burden-sharing agreement. The federal government is, therefore, planning to reserve more federal money for tailor-made schemes like the FEF and the rural biomass programme. Budgetary commitments will be made in compliance with the zero-deficit target of the federal government and after careful evaluation of the effectiveness of current climate change, related subsidies in conjunction with further pending decisions with respect to an appropriate mix of instruments such as fiscal measures, national emissions trading and a national programme on Joint Implementation and the Clean Development Mechanism.

- **Green electricity purchasing for public buildings**

Implementing entities: Federation, 'Lander' and municipalities. Type of policy: contractual

Clear and reliable electricity labeling, which makes visible to the consumer the different sources of electricity delivered, is a prerequisite for green electricity purchasing. Labeling systems are due to enter into force. A green electricity purchasing policy of relatively large electricity consumers, like public services, could have considerable impact on the green electricity market. The draft *Austrian Climate Strategy 2010*, therefore, advises public entities to buy green electricity on the open market. After the amendment of the Federal Electricity Law, electricity suppliers and brokers are obliged to issue the primary energy mix of delivered electricity on the account.

- **Voluntary agreements**

Implementing entity: Federation. Type of policy: negotiated agreement, economic

Voluntary agreements between the government and (parts of) energy industries, allowing for a more flexible and cost-effective achievement of targets, are under consideration. These could aim at clearly defined emissions limitations, being also a prerequisite for the establishment of an emissions trading scheme, which is currently under discussion.

Existing CHP plants

- **Sachsenburg**

The aim was to demonstrate a small-scale CHP plant in a sawmill. Fuel is bark at about 7.5 dry kt/a. A screw type engine (new small-scale technology) runs on saturated steam at medium pressure (24 bar) and at a flow rate of 8.3 t/h. A new automatic cleaning system for biomass-fired tube boilers is used. The steam boiler capacity is 4.5 MW_{th} and the engine cycle capacity is 0.742 MW_e. The efficiency is 11.5% electrical and 74% thermal. This is the first large-scale demonstration in Europe. Nominal investment is 3450 Euro/kW_e.

- **Reuthe**

The plant located in Reuthe, Vorarlberg, which is the first CHP system of this kind in Austria, is a model for other similar projects. The plant is a CHP unit with an installed power capacity of 1.3 MW_e and 6.3 MW_{th}. The plant is fired with coarse and small fuel wood (10 kt/yr) from industrial waste and forest residues, from the near-by vicinity. The boiler for the process steam has a moving grate and a muffle burner. The annual production is 4.7 GWh of electricity and 29 GWh of DH.

- **Lienz**

The plant is operating since October 2001. Wood chips from local sawmill, sawdust and bark are burnt producing 60 GWh/a heat and 7.2 GWh/a electricity. The nominal electric capacity is 1 MW and the nominal thermal capacities are 6.5 MW for thermal oil boiler, 7.0 MW hot water boiler and 1.5 MW heat recuperation in economiser. It is the first 1 MW_e biomass CHP plant based on the ORC process worldwide and the first unit that uses a specially developed heat recuperation system for thermal oil boilers to increase the electric efficiency.