

# Final Report

## CENTRAL EUROPEAN BIOMASS CONFERENCE 2005

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# 1. Bioenergy for Central Europe

The high level of energy dependency of the European Union and the obligation of the ratified Kyoto protocol to decrease the emission of green house gases are very important factors in the European energy and climate policy to increase the exploitation of domestic renewable energy sources. The European Union ratified the Kyoto protocol to the United Nations Framework Convention on Climate Change and is thereby obliged to reduce its emissions by 8 % until 2010 compared to the base year 1990.

The European Union and its Member States have set clear targets for renewable energy in 2010. Appropriate legal steps, which also need to be implemented by the new Member States in the wake of their accession to the EU, have been taken to achieve these targets.

The European Union defines in the White Paper on RES a strategy and action plan to promote the market penetration of renewable energy sources, with the target of doubling their use by 2010 – from 6 % of the EU's gross inland energy consumption in 1995 to 12 % in 2010. The European Union recognises the need to promote renewable energy sources as a priority measure given that their exploitation contributes to environmental protection and sustainable development.

The European Union published two important Directives, which should support the development of RES:

- The purpose of the Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market is to promote an increase in the contribution of renewable energy sources to electricity production in the internal market for electricity. The EU-25 target regarding this Directive is to increase the electricity production from RES from 12.9 % in 1997 to 21 % in 2010.
- The White Paper on RES calls also for dependence on oil (currently 98 %) in the transport sector to be reduced by using alternative fuels such as biofuels. The Directive on the promotion of the use of biofuels or other renewable fuels for transport aims at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes. Member States should ensure that a minimum proportion of biofuels and other renewable fuels is placed on their markets, and, to that effect, must set national indicative targets. The reference value for these targets is 2 % of all petrol and diesel in 2005 and will be increased to 5.75 % in 2010.

## 2. Aims of the Conference

The overall objective of the Central European Biomass Conference 2005 was to boost biomass as renewable source of energy in Europe with a special focus on the new EU Member States in Central and Eastern Europe.

**The Central European Biomass Conference 2005 pursued a three-fold objective:**

- to make decision makers from policy, administration, industry and energy sector aware of the state of the art of the utilisation of biomass as energy carrier;
- to point out strategies and necessary political and legal measures to boost bioenergy in the enlarged European Union, especially in Central and Eastern Europe;
- to elaborate concrete proposals for initiatives aimed at increasing the acceptance and the share of bioenergy within the energy system in the enlarged European Union.

**Target groups:**

- National decision makers, especially administrations and politicians active in economic, environmental, agricultural, financial and legislation issues
- Industrial decision makers
- Decision makers from energy sector
- Professionals in the RES sector and from RES industry sector
- Energy agencies, biomass associations, farmers associations
- Public and press

### 3. Structure of the Conference

The conference opened with the addresses of Heinz Kopetz, Chairman of the Austrian Biomass Association, Siegfried Nagl, Mayor of the city of Graz and Gerald Schöpfer, Minister for Economy and Europe of the Province of Styria.

In the **first plenary session** the importance of bioenergy within our future energy system was impressively demonstrated by two speakers: Kjell Aleklett, President of the Association for the Study of Peak Oil&Gas, Sweden, and Karl Kellner, European Commission, Directorate-General for Energy and Transport, Brussels. In addition, speakers from USA and Austria outlined the main challenges to bioenergy implementation, its overall economic importance and progress up to now, and prepared the ground for the conference debates.

**Technical sessions** were then held on the following themes:

- Parallel session I: Raw material supplies
- Parallel session II: Heat from biomass
- Parallel session III: Power and heat from biomass
- Parallel session IV: Biofuels

The technical sessions provided an up-to-date overview of the latest technological and economic developments in the fields of raw material supply as well as biomass utilisation for the production of heat, electricity and transportation fuels, involving principally the key factors in successful market development.

In **plenary session II** the situation of bioenergy in the new EU Member States was analysed by experts from Czech Republic, Poland, Hungary, Slovenia, Slovak Republic and Croatia.

The **final plenary session** provided a platform for the discussion of market prospects, bioenergy strategies and necessary actions at political and legislative level and suggested specific targets and proposals for awareness-building and bioenergy promotion initiatives in the enlarged European Union.

In the first part of this session the importance of renewables in the future energy mix was analysed by economic and technical experts from Austria and Poland and the Styrian Minister of Environment and Agriculture, Johann Seitinger, presented successful initiatives to promote bioenergy in the province of Styria.

In the second part of the session Josef Pröll, Federal Minister for Agriculture and Forestry, the Environment and Water Management of Austria and top-class representatives from the ministries for the environment from Poland, Hungary, Czech Republic, Slovenia and Slovak Republic presented and discussed their strategies and measures for promoting bioenergy in Europe. As concluding highlight of the conference Hermann Scheer, Chairman of the World

Council for Renewable Energies presented its visions and strategies for a full solar energy supply by 2050.

The debate on each plenary and parallel session was led by a moderator who ensured that the discussion (involving panellists and participants) and the outcome were both productive and well-balanced.

During the conference companies, universities and research institutions presented their latest technological developments and results within a **poster presentation**.

Additionally to the conference itself five **technical tours** were organised, where successful Austrian bioenergy projects in the sectors heat, electricity and transportation fuels were presented.

Five **press conferences** and ten press releases guaranteed a high number of conference participants and increased the awareness regarding bioenergy in the broad public not only during the conference, but also before and after the event.

## 4. Results of the Conference

### 4.1. Introduction

Fossil energy has to be replaced by renewable energy. That was the general tenor of the first Central European Biomass Conference, which took place from 26 to 29 January 2005 in Graz, Austria. The interest was enormous. The registration for the conference had to be stopped one week before the beginning of the conference. 920 participants coming from 28 different countries worldwide followed the invitation of the Austrian Biomass Association and the Austrian Energy Agency.



The conference provided valuable impulses in boosting bioenergy within the heat, electricity and transportation fuels market for old as well as new EU Member States. A lot of companies presenting their RES technologies at an accompanying trade fair with about 35,000 participants could deepen their economical contacts during the conference to their international partners. Furthermore the “Declaration of Graz” has been stated, encouraging governments to enact laws, facilitating the necessary change to bioenergy.

The conference made a clear contribution to implement the targets for renewable energy sources defined in the European energy policy. It helped to increase awareness about these targets and the possibilities to reach them among decision makers especially from Central and Eastern Europe. This way the conference contributed to translate EU targets for RES into real bioenergy projects in practise. It has been shown to the new Member States energy sector that bioenergy technologies are rapidly approaching market readiness and that the European bioenergy industry has a range of innovative products and services to offer. New co-operations and know-how transfer has been initiated.

## **4.2. Conclusions of the Conference**

In the following the main results and conclusions of the three plenary and four parallel (technical) sessions of the Central European Biomass Conference 2005 will be summarized. The full information on all presentations and outputs of the conference have been provided in the conference proceedings and can be downloaded at [www.oesfo.at](http://www.oesfo.at).

### **4.2.1. Conclusions of Plenary Session I**

#### **On the eve of a global energy crisis?**

The First Half of the Oil Age comes to an end. The transition to the second Half, when production declines, along with all that depends upon it, threatens to be a time of great international tension and adjustment. Realistic estimates of reserves and discovery trends suggest that non-Middle East oil production is at peak. The Middle East itself is close to current capacity with little incentive to increase, facing ever less competition. The evidence suggests that World production will peak this decade. Oil prices are accordingly set to rise until recession dampens demand.

#### **EU Member States’ strategies for implementing EU Directives on the Promotion of Biofuels and Renewable Electricity**

The 12 % target outlined in the White Paper on RES will only be reached if the national plans based on the electricity directive are achieved, the requirements of the liquid biofuel directive are fulfilled and if the policies for renewable heat are improved. With the present trends and measures the renewable energy share will range between 8 and 10 %, and the 12 % target of the White Paper will not be reached in 2010.

#### **Bioenergy in the USA – success with decentralised bioenergy utilisation**

The U.S. is facing a critical energy problem characterized by rising energy prices, declining productive capacities for oil and gas, increasing reliance on foreign oil, and the weakening of its currency. In spite of this, the U.S. bioenergy industry remains underdeveloped and inefficient. The bulk of U.S. bioenergy consumption can be credited to the industrial sector consuming its own waste products, dominated by the paper industry burning “black liquor” lignin residue. Much of the rest is from co-firing biomass in coal-fired power plants and blending ethanol into gasoline. However, there is a significant potential for communities to

protect themselves from the hardships of rising energy costs by designing bioenergy projects that maximise local economic benefits.

### **The efficient use of biomass and its overall economic importance**

The most important positive effects of an increased use of biomass are climate protection, decreasing of dependency on fossil fuels, price stability and economic impulses for rural development. Especially the use of forestry biomass creates both, new income as well as new jobs in rural regions, but it is important to use biomass in an efficient way. The faster the substitution of fossil fuels by biomass will be boosted, the better the economy will be prepared to manage increasing oil and gas prices.

### **Should we trade with biomass, electricity, renewable certificates or CO<sub>2</sub> credits?**

Demand for bioenergy is increasing as concerns about climate change lead to implementation of policy measures that favour renewable energy sources over their fossil fuel based competitors. There is not only a demand for useful energy, but also for climate friendly energy systems and energy systems that bring with them the other advantages of renewable energy (such as job creation, decreased use of fossil fuels which is a limited resource). This suggests that biomass may not have to be transported in all circumstances, especially where the demand is for the “non-energy” benefits. Instead, it may be possible to convert biomass into useful energy at the place where it occurs, and transport the produced electricity, or possibly trade only the immaterial services such as *CO<sub>2</sub> neutrality* or *renewable features* to the location where these services are in demand.

## **4.2.2. Conclusions of Parallel Session I: Raw material supplies**

### **Energy production potential in the enlarged EU area on the basis of energy plants**

The demand of agricultural area for food production depends on the life conditions of human beings and on their food behaviour. For the calculation of the necessary food area to guarantee an autarkical food production in EU-10, the realistic scenario of 0,15 to 0,2 hectare per person and capita is used. The remaining area can be used for biomass production. The different kind of energy services (heat, electricity and liquid fuel) are provided by different conversion technologies from energy plants. It was assumed that heat is provided via the thermal utilisation of miscanthus, electricity by the energetic utilisation of biogas (from the biomethanisation of corn silage), biodiesel by the conversion from rapeseeds and bioethanol by the conversion from wheat. The results show, that between 2700 PJ and 3100 PJ can be produced by energy plants in the EU-10. In the year 2000 the total energy consumption of the EU-10 was 5200 PJ. Under these conditions between 52 and 60 % of the total consumption could be provided via energy plants.

### **Potentials and opportunities for wood biomass production from forests in Slovenia**

Slovenia is a country with a lot of forest (nearly 60 % of land is covered by forests) and with traditional use of wood for heating and cooking. Share of wooden biomass in primary energy in Slovenia is only 4 %, but 35 % of apartments in Slovenia are still heated with wood as only, primary or secondary fuel. The main characteristics of present biomass use are: old technologies for biomass production and use, low efficiency and high emissions. To implement new technologies and to increase use of biomass also in bigger systems like district heating systems, CHP and in industry, the estimation of wood biomass potential is crucial. The current allowable cut represents less than 60 % of the estimated annual increment. The realisation of annual planned cut in private forests is less than 50 %. It is

estimated that the potential supply of wood fuels could more than double today's extracted volumes without limiting the timber industry or affecting the growing stock.

### **Potential and trading opportunities for biomass in Poland**

Poland is the largest country in Central Europe with an area of 312.680 km<sup>2</sup> and 38,7 million population. Forests cover 28,1 % of Poland, *i.e.* 8.8 million hectares. Agricultural lands occupies about 60 % of the Polish territory. About 38 % of the population live in the rural areas. Agriculture and forestry give only 4.8 % of GDP but 27 % of the employed in Poland work in agriculture (0.4 % in forestry). Local renewable energy sources can play a significant role in the development of rural areas in Poland. Biomass energy has been recognised as the most promising and most important renewable energy source in near future for Polish conditions. The total technical potential for biomass resource has been calculated at 755 PJ. Largest resources relates to the agricultural residues, forestry residues and forestry fuel wood. Energy crops will play more important role in mid and long term perspective. The development of biomass technologies is the fastest growing RES branch in Poland.

### **Prospects for the sustainable use of grassland areas as illustrated by the example of Waden-Württemberg**

In Baden-Württemberg 22 % (140,000 ha) of grassland area is not required for fodder production for cattles, sheeps and horses. That grassland could be used to produce 11,700 TJ bioenergy. As conversion technologies biogas production, burning or gasification technologies are possible. However biogas production based on grass silage will be economically only under favourable conditions.

### **Economic analysis of the sector concerned with energy plant production for biogas facilities**

In the recent past bigger biogas plants were built in Austria. Some co-operations were established. Old plants mainly use slurry and manure. Cattle are the main livestock on farms with biogas plants. For co-fermentation the operators use mainly maize, biomass from grassland and organic waste. The Green Electricity Act distinguishes between agricultural feedstock and organic waste. Recently energy crops became more important. New plants therefore are located in areas with high maize yields. The advantage to reduce the odour of slurry is mainly used by pig and poultry farmers. Most biogas plants are located in rural areas without the possibility to sell heat. Nevertheless farm-based biogas plants are an opportunity to increase the net income of the farm family. The size of the plants and the feedstock used determine the costs to a great extent. The biogas plants should be planed carefully to avoid complications and to establish a viable enterprise.

### **Supplying the Wien-Simmering biomass heat and power plant with wood chips – challenge for raw material procurement and logistics**

The wood chips demand for the new biomass CHP plant in Wien-Simmering will be 600,000 m<sup>3</sup> per year. That is a real challenge for Österreichische Bundesforste AG for raw material procurement and logistics. A central area at Vienna harbour is foreseen for chipping, from that the wood chips are transported by trucks (90 m<sup>3</sup>) to the CHP plant.

### **Bundling technology experiences in the Southern and Eastern Europe**

The bundling technology has had a very rapid increase in Finland, where already about 30 bundling systems are in the commercial use. Most of the large biomass power plants in

Finland have started to use the bundling method. In the East European countries the large-scale utilisation of forest bioenergy could be largely based on the bundling technology.

### **4.2.3. Conclusions of Parallel Session II: Heat from biomass**

#### **Positioning of pellet and wood chips heating for central heating boiler exchange**

Approximately 40 % of all installed heating boilers in Austria are older than 15 years. An exchange of these boilers offer the chances to increase energy efficiency and to switch to renewable energy sources. In the past mostly house-owners with old boilers based on solid fuels (coal, etc.) switched to modern wood heating systems, but there is also a potential of house-owners with an oil boiler. Information on high comfort of modern wood heating systems, low fuel costs and demand of storage capacity similar to oil have to be spread to the public. Furthermore solutions for the replacement of the old oil tank have to be offered to the house-owners with an old oil boiler.

#### **Innovative biomass combustion technology from Austria for use in high-rise housing, microgrids and heating supply systems**

The development of the market for wood chips and pellet heating systems has seen a considerable upturn in the last years. For the future multi-family houses and public buildings offer a high potential for a switch to biomass combustion technologies.

#### **Experience with biomass district heating in Poland**

Current legislation and available state-of-the-art technologies promote implementation of biomass as energy source for district heating. At present, installed power of biomass-fired heating systems can be estimated at about 1 GW. According to current forecasts, it is expected to increase up to 10 GW until 2010. Polish power plants and CHP plants operators are preparing themselves for biomass co-firing. Saw dust and wood chips are usually used for co-firing.

#### **Experiences with biomass district heating in Slovakia**

There have been published two important laws to boost bioenergy for heat and power production in Slovakia in 2004. It is a problem to realise small projects, because the lack of investment capital. The chances to realise larger projects with biomass co-firing seems to be higher.

#### **Profitable development planning for biomass heating networks**

A lot of interesting biomass district heating projects fail already through the pre-project phase, because of lack of planning instruments. The most important aspects to evaluate the economy of possible biomass district heating projects are the selection of possible customers and of the location for the heating plant. Therefore a new planning tool for the optimal dimension of the heating plant and the heat distributing network have been developed.

#### **Solar energy and biomass district heat – a success story**

More than 30 projects in Austria with a combination of solar energy and a biomass district heating plant are in operation very successfully. Most of the projects are equipped with a puffer storage tank for hot water. Solar energy lowers the operating costs within the summer and increases the lifetime of the biomass district heating plant.

## **Opportunities for particle separation and energy cost optimisation in biomass district heating plants offered by heat recovery processes**

The possibilities for integrating heat recovery technology in flue gas cleaning plants are of considerable interest especially for the sawmill and industrial planning industries, when fresh, wet biomass fuels are used.

### **4.2.4. Conclusions of Plenary Session II: Bioenergy situation in the new EU Member States**

#### **Bundling of small projects for joint implementation: A bioenergy portfolio for the Czech Republic**

Since 2001 15 bioenergy projects reducing greenhouse gas emissions in the Czech Republic with a total thermal capacity of 65 MW were implemented by BTG. These projects consist of replacement, renewal, extension or new construction of municipal or industrial heating systems, where biomass (wood and straw) boilers replace old coal or gas-based boiler systems. The owners of the systems are mainly municipalities.

#### **Options for biomass use in district heating networks in Poland**

The present situation of district heating in Poland is characterized by old-fashioned production and distribution systems based mainly on hard coal with low efficiency and high emissions. The necessary investments offer the possibility to switch to bioenergy. However there is a lack of investment incentives (because of the regulated district heating price), of know-how and of logistics solutions for biomass supply. The importance of biomass as fuel for district heating plants in Poland is expected to increase in the future, especially because of increasing prices for fossil fuels.

#### **Developments of biomass projects in Hungary**

In the past 5 years, there was no significant development in heat production. Furthermore – because of the special economical conditions of public heat supply – the rentability of woodchip based heat plants has been decreasing. As a result of the changes occurred in the Hungarian wood industry and agricultural plants, some biomass based heat plants were liquidated. At the same time, a most meaningful development has begun in electric power production on wood base. Between 2003 and 2005, three of the former coal-based power plants had been switched from coal to woodchips. Their total capacity is 100 MW<sub>el.</sub>. The fuel demand of these three plants is about 800,000 tonnes of woodchips per year.

#### **Strategy of the development of bioenergy in Slovenia**

The share of renewable energy sources in the primary energy balance of Slovenia is about 8 %, half of this coming from hydropower. Wood and wood residues are very important domestic energy sources in Slovenia besides coal and hydropower. The Resolution on National Energy Programme (ReNEP) adopted by the Slovenian parliament in April 2004 foresees increasing of RES in the primary energy consumption up to 12 % in 2010. To achieve these goals the Resolution foresees increasing of the share of RES in heat supply from 22 % in 2002 to 25 % in 2010 and increasing of the share of electricity from RES to 33.6 % in 2010.

#### **Development of bioenergy in Slovakia**

Unused forestry, wood industry and agricultural residues represent a large potential for bioenergy in the short to medium term (2005-2010) in Slovakia. Higher levels of bioenergy

utilisation will require the introduction of short rotation crops or energy crops in the longer term. Overall the EU-10 countries represent an extensive agricultural and forestry base.

### **Prospects for bioenergy use offered by forestland in the Republic of Croatia**

It is expected that the utilisation of renewable energy sources will grow in the future. Especially the use of woody biomass will be of importance. The share of biomass could be tripled compared to the year 2000. About 1 million tonnes of woody biomass would be available additionally to produce heat and power in future.

### **4.2.5. Conclusions of Parallel Session III: Power and heat from biomass**

The general conclusion of this session is the following:

There is a tendency to foster electricity production from wood without using the heat. This leads to an inefficient use of biomass and should be avoided. The main reason for this misallocation of biomass is the missing directive on heat from renewables. An European heat directive is urgently needed to reach a high overall efficiency of the renewable primary energy resources.

### **Current developments and prospects in Austria on the basis of the green electricity law**

In the year 2000 Austria got a modern legislation to foster the development of electricity production from wind, biomass, PV and small hydro. According to this new legislation in the year 2007 4 % of the electricity produced will have to come from biomass, wind or photovoltaic. To reach these targets since the year 2003 new feed-in tariffs exist, which have to be paid to the independent producer of electricity. These new feed-in tariffs have triggered a rapid development of electricity from biomass in the last years.

### **Implementation of the EU Directive on the promotion of electricity generation from renewable energy sources in Poland**

The short term priorities are energy efficiency programmes and switching from coal to gas, the longer term priority is renewables. A national target with 16 % in 2010 for CHP has been set. There is a need for modernisation as old coal fired plants will be at the end of their lifetime around 2015. According the strategy of renewable energy sector development 7.5 % of primary energy shall come from RES in 2010. Furthermore 9 % of energy sold to final consumers and 7.5 % of gross national electricity consumption shall come from RES.

### **Electricity from solid biomass – state of the art and future developments**

Especially three technologies seems to be very interesting to produce electricity from solid biomass: Stirling motor, Organic-Rancine-Cycle (ORC) process and Circulating fluidised bed steam gasification process with gas motor. The Stirling motor is interesting for plants with less than 100 kW<sub>el</sub>, the ORC process for plants between 200 and 1,500 kW<sub>el</sub>. For plants with more than 2 MW<sub>el</sub> steam turbines are state of the art. Electricity production costs for biomass CHP plants up to 10 MW<sub>el</sub> are in a range of 9 to 18 Cent/kWh<sub>el</sub>, depending on the size of the plant and the used fuels. Biomass CHP plants should have an efficiency of at least 60 %, better 80 %.

### **Biomass CHP with Stirling motor**

The stirling motor is suitable for biomass CHP with less than 100 kW<sub>el</sub>, especially for base load production in district heating plants, for small wood processing companies with process heat demand or for areas without power supply. They should be operated based on heat

demand (more than 6,000 hours/year), because the electrical efficiency is between 6 and 20 % (at the moment 12 – 14 %).

### **Biomass CHP Leoben with ORC process**

The biomass CHP plant is based on ORC process with three modules with 8.7 MW<sub>th</sub> each and a total installed electrical capacity of 4.5 MW<sub>el</sub>. The plant will be heated with 365,000 m<sup>3</sup> bark. The heat will be used in the neighbouring sawmill of Mayr-Melnhof Holz GmbH. Additionally 36 GWh of green electricity will be produced per year.

### **Forum Biogas Austria**

The “Forum Biogas Austria” is a centre of economic, technological and research excellence with the aim to optimise biogas production from agrarian biomass. It comprises horizontal and vertical co-operation between partners from research, extension service, authorities, planners, biogas plant operators, and companies that work in the field of biogas production. More than 180 new biogas plants will be built in the near future in Austria. The performance of the new biogas plants will range between 70 kW<sub>el</sub> and 1 MW<sub>el</sub>. From the digestion of animal manures, energy crops and organic wastes, about 6000 biogas plants could be operated in Austria.

### **Biogas plant in combination with waste water treatment plant and biogas feed supply to the natural gas network**

In Austria biogas is only used in CHP plants. One critical factor of success is to use the heat efficiently. Furthermore plant operation and raw material logistics have to be organised very well to be profitable. An other possibility would be to combine biogas plants with sewage plants. The produced biogas could be fed into the natural gas network at a price of 4 Cent/kWh.

### **Biogas fuel cell power plant as an interesting energy prospect?**

The basis of the CHP plant is a carbonate fuel cell with 245 kW<sub>el</sub> and 180 kW<sub>th</sub>. The advantage of this system is to combine a high electrical efficiency with heat production at a high temperature level.

## **4.2.6. Conclusions of Parallel Session IV: Biofuels**

### **Environmental aspects of biofuels for transportation in Europe**

According to the EU Biofuel Directive the use of biofuels in the transportation sector should be strongly increased in the next decades in Europe. The environmental benefits of well developed biofuels like biodiesel and bioethanol make them attractive for implementing the EU biofuel directive in the short term. In the mid-term perspective, many new biofuels like synthetic biofuels and hydrogen based on renewable energy seem to have an even higher potential to improve the environmental situation, and to support highly sustainable development of the European transportation system.

### **Situation of and prospects for bioethanol in Germany – in an European and global context**

In comparison to the direct blending of fossil fuels with bioethanol the blending with ETBE has the advantage that there are no technical problems and that it is accepted by the car and mineral oil industry. The capacities to produce MTBE and ETBE are about 5 million tonnes

in EU-25. The adaptation of MTBE plants to ETBE production has started at the beginning of 2004 in Germany.

### **Raw materials and bioethanol production technologies**

Bioethanol is a readily available, clean fuel that can be utilized in combustion engines in different ways: Hydrous ethanol (95 percent by volume) contains some water. It is used directly as a gasoline substitute in cars with modified engines. Anhydrous (or dehydrated) ethanol is free of water and at least 99 percent pure. This ethanol can be blended with conventional fuel in proportions of between 5 and 85 percent (E85). As a 5 percent additive it can be used in modern engines without modification. Higher blends require modified engines as run on so-called flexible fuel vehicles. Finally, bioethanol is also used to manufacture ETBE (ethyl-tertiary-butyl-ether), a fuel additive for conventional petrol. Basically alcohol, bioethanol is made from starch plants (grain, mostly corn, and tubers like cassava); sugar plants (sugar beet or sugar cane); and - although large-scale still in the preliminary stages - from cellulose plants.

### **Diesel from wood – a new fuel concept**

In 2006 CHOREN Industries GmbH will built a plant to produce 16 million litres of BTL (Biomass to Liquid) per year and a biomass demand of 65,000 tonnes (dry matter). Further 5 plants with a production capacity of 250 million litres each are planned to be built until 2010. The target is to substitute 4 % of the German diesel demand by “SunDiesel” made by CHOREN.

### **New key trends in developing biodiesel world-wide**

RME or Rapeseed-oil-methyl-ester was the first type of biodiesel fuel produced commercially in 1988, characterised as a single-feed-stock product of then questionable quality. Tremendous progress has been made in the past 15 years, which can be described by the following trends: broadening the feedstock basis beyond vegetable oils for food purposes; improving process technology; developing sophisticated fuel standards; establishing biodiesel production capacities in many countries all over the world; intelligent marketing strategies; obtaining numerous warranties from diesel engine producers; implementing a number of different supportive legal measures; intensify information dissemination.

### **Experience with the use of biodiesel at transport companies in Graz**

Since the year 2004 the whole public bus fleet of the city of Graz is driving with biodiesel, which is mainly produced from recovered oil. The first two buses have already been switched to biodiesel in the year 1994. The experiences are very good, there have been no technical problems. The fuel consumption is 8 % higher compared to fossil fuel, because of the lower heating value of biodiesel.

### **Biogas in the transport sector – technical possibilities, potential and importance for the environment**

The use of biogas in the transport sector is a good possibility to reduce the emissions of that sector. An important precondition for the utilisation of biogas in the transport sector is the introduction of natural gas as fuel for the transport sector. At the moment only 250 cars are driving with natural gas in Austria.

### **Biogas as transportation fuel**

The interest for biogas production for use as vehicle fuel in Sweden has increased during the last years. Different upgrading methods for produced biogas have been introduced in the country. The most common is the water scrubber absorption, and is today in operation with good results in 12 biogas plants in Sweden. The vehicles running on upgraded biogas amounts to about 500 heavy trucks and about 3500 light vehicles. The biogas plants producing fuel for transportation receive the raw material mainly from a mixture of waste from food industry, food shops, water, farms, and in some cases also from the organic fraction of the household waste.

#### **4.2.7. Conclusions of Plenary Session III: Energy supplies in Central Europe 2025**

The main conclusions of plenary session III are pointed out in the “Graz Declaration”.

##### **GRAZ DECLARATION**

The organizers of the 1st Central European Biomass Conference, the Austrian Biomass Association and the Austrian Energy Agency (E.V.A.) have tabled the following declaration on bio-energy development in Central Europe:

Adequate, secure, environmentally friendly and favourably priced energy supplies, whether in the form of electricity, fuels or heat energy, are a basic precondition for prosperity and economic development.

The gradual conversion of our energy system to significantly greater energy efficiency and the increased use of renewable forms of energy is the pressing task ahead of us if we are also to meet these requirements in the future. This is particularly the case for regions with no fossil energy sources of their own to speak of.

The change-over to renewable sources of energy such as biomass, wind, hydropower, solar heat and photovoltaics provides new development and revenue opportunities for the Central European economy. However, this project can succeed only if political decision-makers create equally effective general conditions.

The economic advantages lie in:

- increasing independence of energy imports,
- the avoidance of high foreign exchange costs for rising energy prices,
- the reduction of greenhouse gas emissions,
- the creation of new businesses,
- the creation of new technologies,
- the creation of new jobs in industry, commerce, agriculture and forestry and
- the establishment of long-term prospects for secure energy supplies based increasingly on domestic sources.

The Austrian Biomass Association and the Austrian Energy Agency, as organizers of the 1st Central European Biomass Conference, are therefore addressing the following appeal to the Governments of the countries represented:

1. The systematic ongoing development of renewable energy should be a touchstone of government policy. Its share of net national consumption for the countries of Central Europe should rise by at least one percent a year.

2. Governments are called upon to implement further ambitious measures, in the process following the successful example set by individual European countries. These measures should encompass in particular tax policy, transport policy, rules on extra power generation on the basis of renewable energy, maximum cooperation in the area of research and development and information and advisory activities.

The organizers of the 1st Central European Biomass Conference are convinced that a clear and consistent policy to promote renewable energy in Central Europe will, in addition to increasing energy efficiency, bring with it a raft of advantages for the economy, the population and the states in the area of employment, security of supplies and climate protection.