Gasification Survey Country: **Austria**

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1. Policy

Austria has a strong policy on promotion and implementation of renewable energy. It has already a share of more than 30% of renewables and obligated a reduction of CO_2 emissions of 16% by 2020. Biomass has to play an important role for this reduction.

Although the share of renewable energy is relatively high in Austria across the heating, electricity and transport sectors, renewable energy growth has been sluggish over the last few years, despite the country's hydropower and biomass potential.

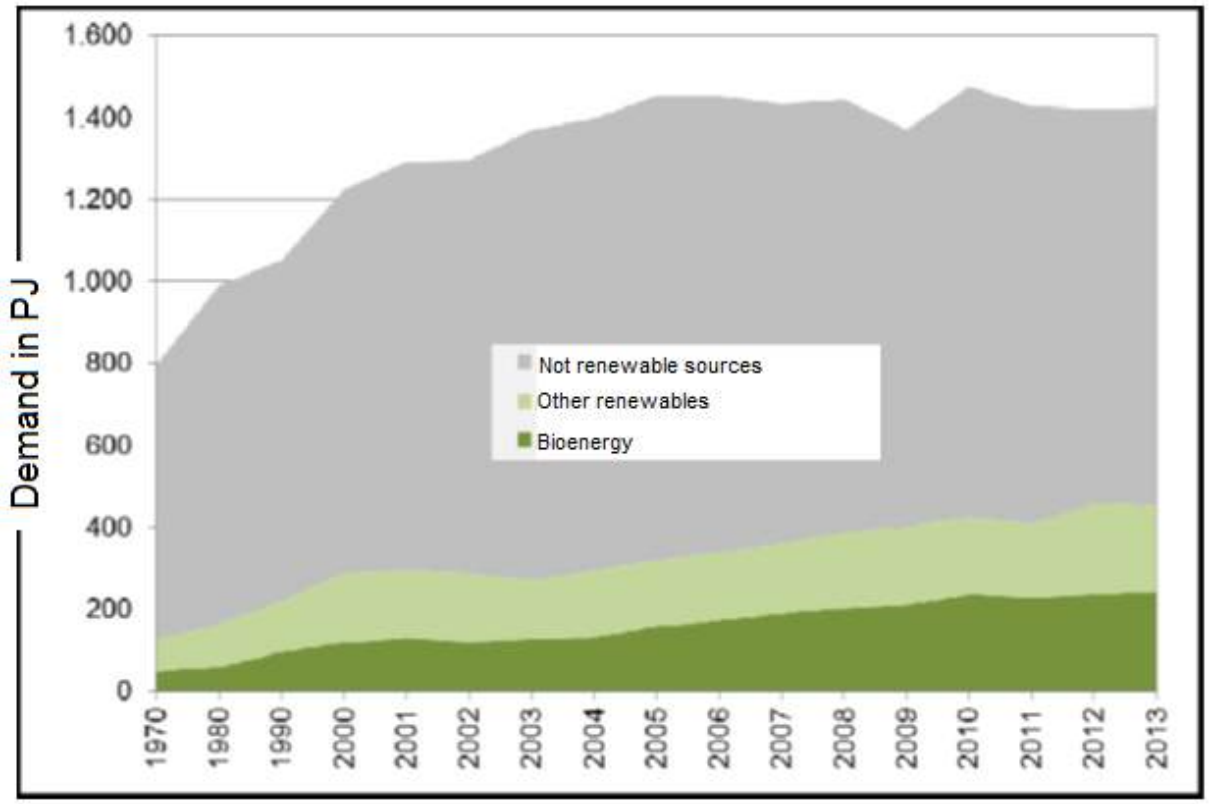

Figure 1: Energy demand in Austria (Source: Statistik Austria (2015))

Faster development of RES in Austria is hindered by the fact that the targets formulated in the National Renewable Energy Action Plan (NREAP) are not ambitious enough, though they are in line with Austria's target of 34% RES by 2020. Targets should be accompanied by measures resulting from the Green Electricity Act, the Energy Efficiency Act, the Climate Protection law and the Electricity law. [1]

Table 1: Primary production of renewable energy, 2003 and 2013

	Primary production (thousand toe)		Share of total, 2013 (%)				
	2003	2013	Solar energy	Biomass & waste	Geothermal energy	Hydropower	Wind energy
EU-28	104 094	191 961	5.5	64.2	3.1	16.6	10.5
Belgium	708	2 929	8.4	79.7	0.1	1.1	10.7
Bulgaria	952	1 826	7.5	65.0	1.8	19.2	6.5
Czech Republic	1 663	3 640	5.2	87.2	0.0	6.5	1.1
Denmark	2 252	3 240	2.1	68.1	0.2	0.0	29.5
Germany	12 614	33 680	9.6	70.8	0.4	5.9	13.2
Estonia	667	1 122	0.0	95.7	0.0	0.2	4.1
Ireland	235	766	1.5	41.0	0.0	6.5	51.0
Greece	1 538	2 487	20.1	43.1	0.5	21.9	14.3
Spain	9 196	17 377	15.4	39.6	0.1	18.2	26.7
France	15 521	23 073	2.1	64.5	1.0	26.3	6.0
Croatia	800	1 499	0.6	50.1	0.5	45.9	3.0
Italy	9 999	23 500	8.6	45.3	21.3	19.3	5.5
Cyprus	48	109	64.1	16.3	1.4	0.0	18.3
Latvia	1 728	2 137	0.0	87.8	0.0	11.7	0.5
Lithuania	794	1 288	0.3	92.1	0.1	3.5	4.0
Luxembourg	41	107	8.2	75.5	0.0	9.6	6.6
Hungary	906	2 074	0.4	90.3	5.4	0.9	3.0
Malta	0	10	72.6	27.4	0.0	0.0	0.0
Netherlands	1 625	4 294	1.6	86.3	0.6	0.2	11.3
Austria	6 130	9 466	2.4	56.2	0.4	38.1	2.9
Poland	4 150	8 512	0.2	91.1	0.2	2.5	6.1
Portugal	4 241	5 621	2.0	55.4	3.2	21.0	18.4
Romania	4 002	5 561	0.7	68.8	0.5	23.1	7.0
Slovenia	714	1 071	2.6	56.7	3.6	37.0	0.0
Slovakia	651	1 467	3.8	67.3	0.4	28.4	0.0
Finland	7 887	9 934	0.0	88.2	0.0	11.1	0.7
Sweden	12 389	16 770	0.1	63.4	0.0	31.5	5.0
United Kingdom	2 642	8 404	4.3	61.7	0.0	4.8	29.1
Norway	10 277	12 458	0.0	10.0	0.0	88.7	1.3
Montenegro	0	389	0.0	44.7	0.0	55.3	0.0
FYR of Macedonia	313	304	0.3	52.0	3.0	44.8	0.0
Albania	620	812	1.5	24.8	0.0	73.7	0.0
Serbia	1 750	1 989	0.0	55.7	0.2	44.1	0.0
Turkey	10 021	13 718	5.8	33.0	19.2	37.2	4.7

Source: Eurostat (online data codes: ten00081 and nrg_107a)

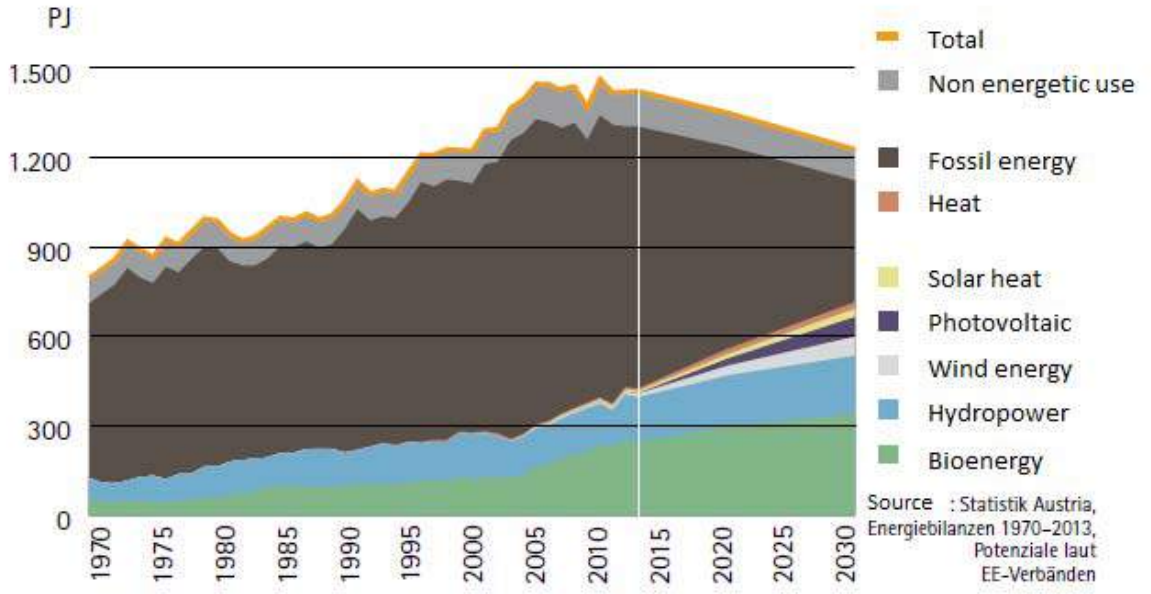

Figure 2: Gross inland energy consumption from 1970 to 2013 and potential in 2030

The following diagram depicts the two scenarios "final energy consumption by 2020 with implementation of Energy Strategy" and " without implementation of the Energy Strategy.

Stabilising the final energy consumption at 1.100 PJ corresponds to an increase of energy efficiency by approx. 200 PJ.

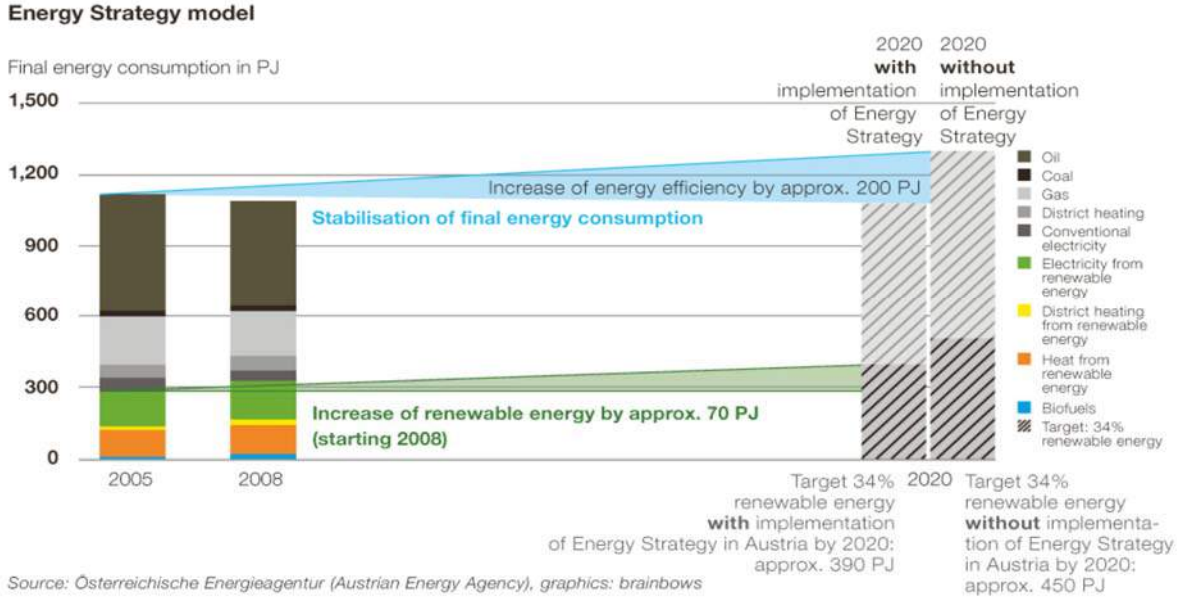

Figure 3: Energy strategy model for 2020

The following table "Energy Strategy in numbers" shows the development of final energy consumption in Austria (2005, 2008 and 2020) for conventional energy sources (oil, coal, natural gas, district heating and conventional electricity) as well as re newable energy sources (electricity from RES, district heating from RES, heating from RES and biofuels) [3]

Table 2: Energy strategy in 2005, 2008 and as planned in 2020

The Energy Strategy in numbers (in PJ)	2005	2008	2020
Oil	496.0	444.2	362.3
Coal	24.8	24.3	27.3
Natural gas	202.7	187.8	191.2
District heating	55.1	62.2	59.0
Conventional electricity	57.7	44.1	42.9
Electricity from renewable energy	147.8	163.0	179.9
District heating from renewable energy	14.9	23.5	38.2
Heating from renewable energy	117.0	121.6	143.4
Biofuels	2.3	17.9	34.0
Total renewable energy	**282.0**	**326.0**	**395.6**
Total final energy consumption	**1,118.4**	**1,088.5**	**1,078.3**
Consumption by energy industry and electricity/district heating losses	37.7	43.2	36.6
Gross final energy consumption*	**1,156.0**	**1,131.8**	**1,114.9**
Renewable energy share of gross final energy consumption	**24.40%**	**28.80%**	**35.48%**

** Final energy consumption + consumption by energy industry & electricity/district heating losses. Calculation basis for share of renewable energy according to EU guidelines*
Source: Austrian Energy Agency

ELECTRICITY SECTOR

The Austrian Government supported green electricity via the adoption of the first Green Electricity Act in 2003. However, several amendments to this act made in the following years reduced the yearly growth rates in the renewable electricity (RES-E) sector.

The implementation of an annual "financial support volume cap" led to reduced investments in RES technologies. Many projects were delayed because of this maximum financial support cap. The Green Electricity Act was positively amended in 2012, following Fukushima. Now, higher annual growth rates for RES-E from 2012 to 2020 are expected, in spite of the annual financial support cap.

The Austrian FiT system is characterized by a series of ups and downs.
With its first introduction in 2002, it provided great impulses to the renewable energy industry. A later revision in 2006 resulted in a downturn and decrease of installations. In the aftermath of Fukushima, a new FiT was introduced leading to new investments in renewable electricity and a growing share of renewable power: 67% of electric energy was produced from renewable energy in 2013.

Nevertheless, the current European Union initiatives concerning the state aid guidelines put pressure on the existing FiT system, and adaptations are hardly possible, which will cause more and more problems.

HEATING SECTOR

Regarding the use of RES in the heating sector, Austria is in a favourable starting position with a more than 30% share of RES and with its long-term strategy of constantly reducing the country's heat demand.

The renewable heat sector in Austria had a very positive development and excellent growing rates in the past. In the last few years market distortions were observed, due to the low oil price. Along with that, two mild winters in a row led to a drop in sales of renewable heating systems.

TRANSPORTATION SECTOR

Austria fulfilled the EU 2010 biofuels target (5.75 %), mainly by blending biodiesel and ethanol into fossil diesel and gasoline.
However further developments are hindered due to the suspension by the Government of E10 on the market.
In September 2012, the Austrian Government postponed its introduction, until the situation is clarified at EU level.

The total renewable energy share in the transport sector was 7.3% of final energy consumption in 2013. In 2020 should be 10% of transportation fuels covered by biofuels.
Positive incentives for a higher RES-T share would be investments in the public transport sector and a shift in the modal split. [2]

2. Programs

AUSTRIAN ENERGY RESEARCH PROGRAMMES

The ministry accountable for the strategic setup and implementation of applied energy R&D programmes is the Ministry of Transport, Innovation and Technology (BMVIT). The BMVIT establishes the research programmes and takes the primary role in coordinating energy research activities within the government. The BMVIT also works together with the Ministry for Agriculture, Forestry, Environment and Water Management (BMLFUW) as well as the individual states. Other ministries involved in energy research include the Ministry of Economy, Family and Youth (BMWFJ) and the Ministry of Finance – the latter contributing horizontal budgetary competence.

Austrian Climate and Energy fund

BMVIT started the strategy finding process „Energie 2050“ to develop a long term vision, serving as a starting point to deduct concrete concepts and strategies for future research priorities.
Based on the first outcomes in 2007, the new programme for energy research „ENERGIE DER ZUKUNFT“, was launched.
In 2008 continued with the call „Neue Energien 2020“ (New Energies 2020) in the framework of the „Austrian Climate and Energy Fund“.

There are three different sub-programmes:

- Efficient Energy Use
- Renewable Energies
- Intelligent Energy Systems

Energy Research Initiative (Energieforschungsinitiative)

The Energy Research Initiative is the most recent initiative initiated by the Federal Ministry of Economy, Family and Youth. The objective of this programme, starting in the year 2013, is the motivation of Austrian companies to follow new ways of transforming research into their competitive advantage by the realisation of prototype and demonstration facilities in the frame of the European Energy Roadmap 2050. The initiative should support the development of new processes for the CO2 free generation of hydrogen and the use of pure CO2 as a raw material for market relevant products and for industrial processes. The initiative is bundling existing funding instruments of BMWFJ and FFG for dedicated calls on energy research and demonstration projects.

Comet

COMET is a Program for funding Competence Centres for Excellent Technologies, funded by the Ministry of Transport, Innovation and Technology. This program is the continuation of the very successful programs K_{NET} and K_{IND}.
One Centre for Bioenergy has been established, which is the merger of Renet Austria and the Austrian Bioenergy Centre. The name of the centre is “Bioenergy 2020+” and the focus of R&D in this centre is biomass combustion for small scale and large scale applications, biomass gasification and simulation and modelling.

Austrian Research Promotion Agency (FFG)

The Austrian Research Promotion Agency (FFG) is the national funding institution for applied research and development in Austria. It offers a comprehensive range of services to Austrian enterprises, research institutions and researchers – from the management of public funding programmes to consulting services in all phases of technology development and innovation. With regard to energy the agency promotes technologies that enable more efficient use of energy, supports the creation and development of new smart energy infrastructures, and facilitates the development and optimisation of renewable energy sources.

About 16 % of all FFG funding is used for activities covering the environment, energy or sustainability (average figure for 2008–2010). A large number of projects under these headings are funded under the FFG's General Programmes and other programmes that are open to all fields, e.g. the Structural Programmes. This includes COMET Competence Centres and K projects as well as COIN projects. Apart from these generic programmes, funding schemes like New Energies 2020, House of Tomorrow Plus and Smart Energy Demo (FIT4SET) are particularly suited to research in the areas of environment and energy.

3. R&D Institutes

1. **Graz University of Technology**

Department of Heat Processes
Institute for Apparatus Design, Particle Technology and Combustion Technology

- *Heat pipe reformer*
- *Small scale CHP with heat pipe reformer*
- *Distributed SNG production*
- *Health, Safety and environmental issues for gasification systems*
- *Fixed bed gasification*

Adress: Rechbauerstrasse 12 ,A-8010 Graz
Contact: info@TUGraz.at

2. **Joanneum Research,**

Department of Energy Research

- *Life Cycle Assessment*
- *Microchannel FT technology*

Adress: Leonhardstrasse 59, A-8010 Graz
Contact: prm@joanneum.at

3. **Vienna University of Technology,**

Institute of Chemical Engineering

- *R&D on the next generation of dual fluidised bed steam gasification (G-volution)*
- *Production of Fischer Tropsch fuels*
- *Production of hydrogen for refineries*
- *Scientific Partner in Bioenergy 2020+*
- *Representative of Austria in IEA Bioenergy Task 33 Thermal Gasification of Biomass*

Adress: Getreidemarkt 9/166, A-1060 Vienna
Contact: Reinhard.rauch@tuwien.ac.at

4. Bioenergy 2020+, (location in Wieselburg)

- *1st and 2nd generation biofuels*
- *Representative of Austria in IEA Bioenergy Task 39 liquid biofuels*
- *Secretary of IEA Advanced Motor Fuels*

Adress: Gewerbepark Haag 3, A-3250 Wieselburg-Land
Contact: office-wieselburg@bioenergy2020.eu

5. Bioenergy 2020+, (location in Guessing)

- *Production of FT liquids*
- *Production of Hydrogen (as polygeneration in Oberwart and full conversion in Güssing)*
- *Mixed alcohols*
- *BioSNG*
- *Waste gasification in FICFB gasifier*

All projects are done in cooperation with Vienna University of Technology

Adress: Wienerstraße 49, A-7540 Guessing
Contact: office-guessing@bioenergy2020.eu

6. MCI – University of Applied Sciences for Environmental-, Process- and Biotechnology

- *Multi-staged fixed bed gasification systems*

Adress: Universitätsstraße 15,, A – 6020 Innsbruck
Email: office@mci.edu

4. Industries

1. **ANDRITZ Energy & Environment GmbH**

Energy and environmental systems, fluidised bed gasifiers
At the moment no activities with FICFB, has still patent
Involved in Skive (over Carbona)

Adress: Waagner-Biro-Platz 1, A-8074 Raaba/Graz
E-mail: info-aee@andritz.com
Web: www.andritz.com/aee or www.aee-austria.at

2. **AGT Agency for Green Technology**

Low Temperature Conversion (LTC) (thermo-catalytic decomposition process operating without air supply)

Adress: Ledererg 3, A-4861 Schoerfling
E-mail: info@agt-world.com
Web: http://www.agt-world.com

3. **GE Jenbacher Energiesysteme AG**

Gas engines

Adress: Achenseestraße 1 – 3, A-6200 Jenbach
E-Mail: robert.gamweger@ge.com
Web: https://information.jenbacher.com/index.php

4. **Repotec Umwelttechnik GmbH**

Biomass Power Plants

Adress: Europastraße 1**,** A-7540 Guessing
E-mail: office@repotec.at
Web: http://www.repotec.at/

5. **Urbas GmbH**

Fixed bed gasifiers

Adress: Billrothstraße 7, A-9100 Völkermarkt
E-Mail: urbas@urbas.at
Web: http://www.urbas.at

6. **XYLOGAS Energieanlagenbau und Handel GmbH**

Fixed bed gasifiers

Adress: Kohlberg 80, A-8342 Gnas
E-Mail: e.schiefer@xylogas.com
Web: http://www.xylogas.com

7. SynCraft Engineering GmbH

Decentralized power plant technology

Adress: Münchnerstrasse 22, 6130 Schwaz
E-mail: office@syncraft.at
Web: http://www.syncraft.at

8. ZT Lettner

Thermochemical conversion of biomass

Adress: Körösistr. 66, A-8010 Graz
E-Mail: office@zt-lettner.at
Web: www.zt-lettner.at

9. Güssing Renewable Energy (GREG)

A cosmopolitical managed enterprise aiming at the global market, offering customized instantly usable CO2-neutral solutions all over the world to usher the way from the present-day CO2 society to a post-CO2 society.

Adress:Wiener Straße 49, A-7540 Güssing
Email: info@gussingrenewable.com
Web: http://www.gussingrenewable.com/

5. Implementations

5.1 FICFB gasification plants

Table 3: Biomass gasification facilities in Austria and abroad

Location	Usage / Product	Fuel / Product MW, MW	Start up	Supplier	Status
Güssing, AT	Gas engine	8.0_{fuel} / 2.0_{el}	2002	AE&E, Repotec	Operational
Oberwart, AT	Gas engine / ORC / H_2	8.5_{fuel} / 2.8_{el}	2008	Ortner Anlagenbau	Operational
Villach, AT	Gas engine	15_{fuel} / 3.7_{el}	2010	Ortner Anlagenbau	On hold
Senden/Ulm,DE	Gas engine / ORC	14_{fuel} / 5_{el}	2011	Repotec	Operational
Burgeis, IT	Gas engine	2_{fuel} / 0.5_{el}	2012	Repotec, RevoGas	Operational
Göteborg, Sweden	BioSNG	32_{fuel}/20_{BioSNG}	2013	Repotec/ Valmet	Operational
California	R&D	1 MW $_{fuel}$	2013	GREG	Operational
Gaya, France	BioSNG R&D	0,5 MW $_{fuel}$	2016	Repotec	Under construction
Thailand	Gas engine	4_{fuel} / 1_{el}	2016	GREG	Under construction

FICFB PLANT GÜSSING

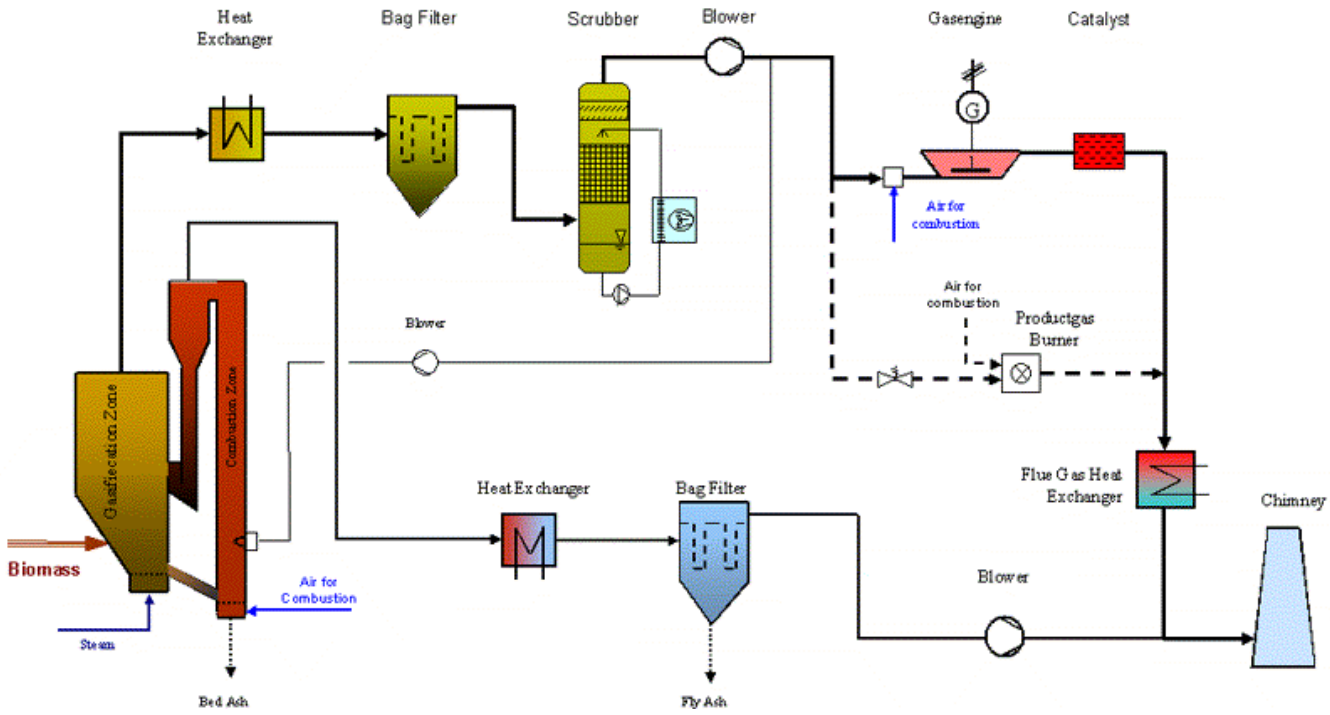

Fig. 4: Flow sheet FICFB gasifier in Guessing

In Guessing a Biomass CHP with the concept of the FICFB gasification system was realised. The basic idea of the FICFB concept is to divide the fluidised bed into two zones, a gasification zone and a combustion zone. Between these two zones a circulation loop of bed material is created but the gases should remain separated. The circulating bed material acts as heat carrier from the combustion to the gasification zone. The fuel is fed into the gasification zone and gasified with steam. The gas produced in this zone is therefore nearly free of nitrogen. The bed material, together with some charcoal, circulates to the combustion zone. This zone is fluidised with air and the charcoal is burned. The exothermic reaction in the combustion zone provides the energy for the endothermic gasification with steam. With this concept it is possible to get a high-grade product gas without the use of pure oxygen.
The construction of the demonstration plant started in July 2000 and it started operation in November 2001. After first tests of the gasifier, the gas engine was started in April 2002. With this demonstration plant the scale up of the FICFB gasification process was realised and now the R&D on the gasifier and all ancillary units is going on, that the turn key contractor Repotec can bring an economical and commercially viable biomass driven power station to the market. The developmental aim is for a current-led heat power combination with high electrical efficiency for larger capacity applications.
Due to the favourable characteristics of the product gas (low nitrogen, high hydrogen content) there are several research projects, which use slip streams of the product gas. The most important are:

- production of Fischer Tropsch Diesel
- production of Methane (synthetic natural gas)
- usage the gas in a SOFC
- catalytic cracking of the tars

FICFB PLANT IN OBERWART

In Oberwart the second biomass CHP with the concept of the FICFB gasification system was realised.
It consists similar to the biomass CHP Guessing of gas generation in a DFB system, gas cooling and gas clean-up in a bag filter followed by a tar scrubber. The cooled and cleaned producer gas is fed into two gas engines for power generation. In addition, there is a biomass drying unit and an organic ranking cycle (ORC) integrated, to have a higher electric efficiency. For the ORC all heat at the biomass CHP is collected by thermo-oil and transferred in the ORC in electricity.
The construction was completed in December 2007 and since 2008 is in operation.

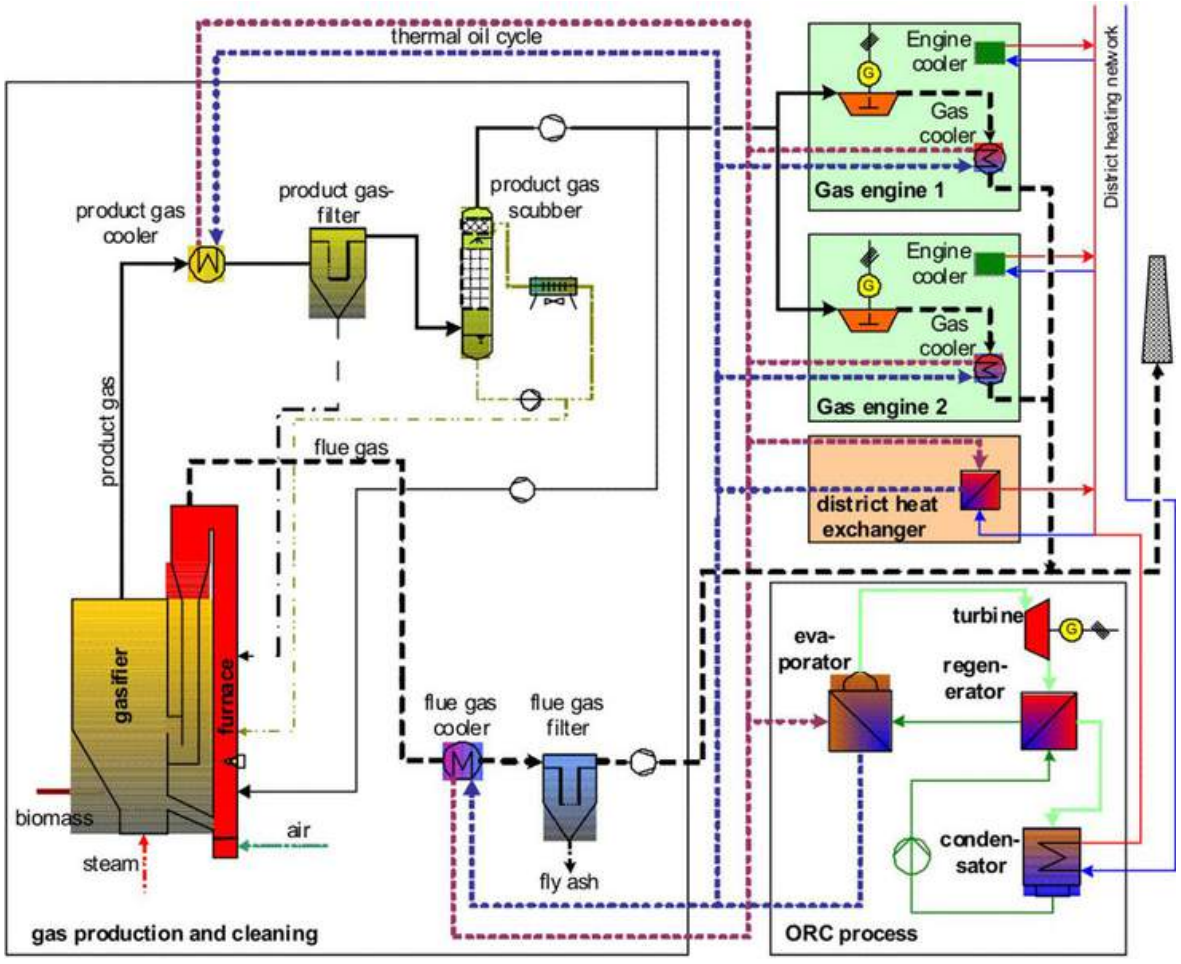

Figure 5: FICFB plant with ORC - flow sheet

5.2 CHP gasification plants

5.2.1 URBAS gasification facilities

The combined generation of heat and electricity ensuring maximum efficiency in the utilization of biomass fuels.

URBAS has realized such CHP plants based on the steam cycle which are available as turnkey, URBAS biomass cogeneration plants.Systems and technology developed by Urbas make it possible to produce electricity and heat at a very impressive efficiency and low cost from a containerised unit using specific dry wood. [4]

0,9 Kg Wood = **1 kWh** Electricity + **2 kWh** Thermal.

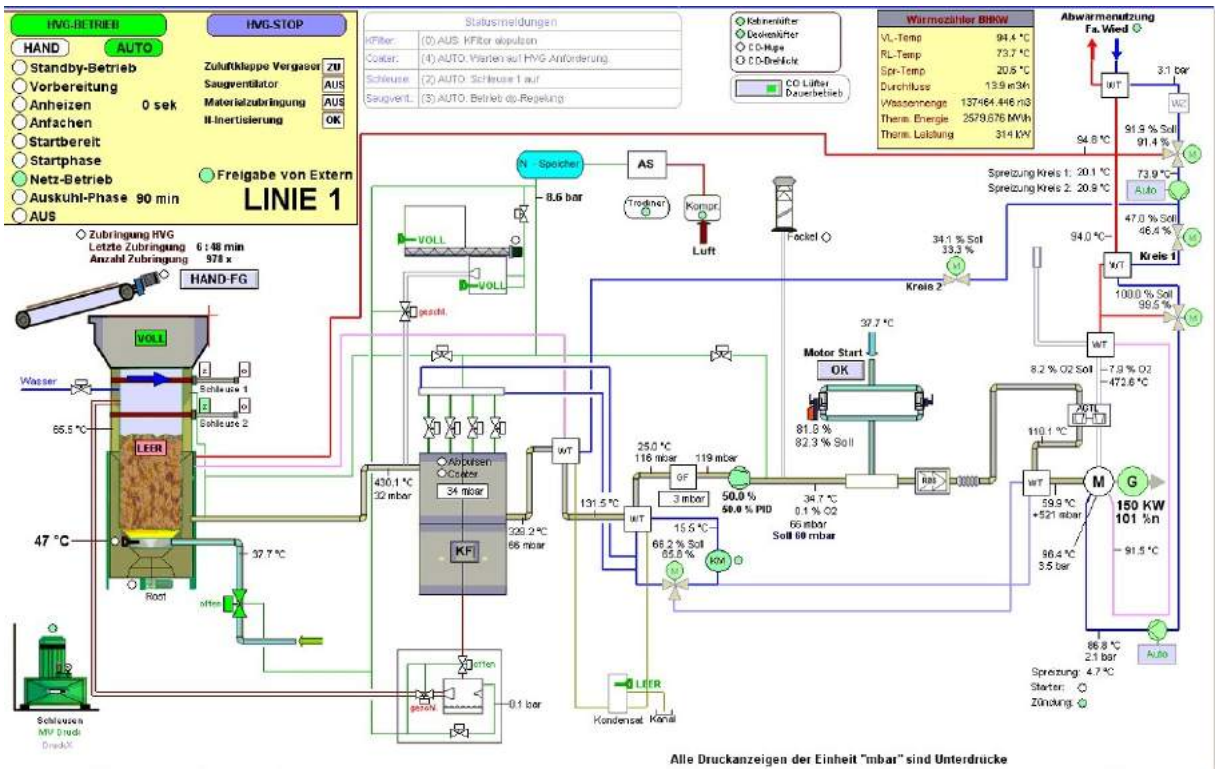

Figure 6: Flow sheet – Urbas gasifiers

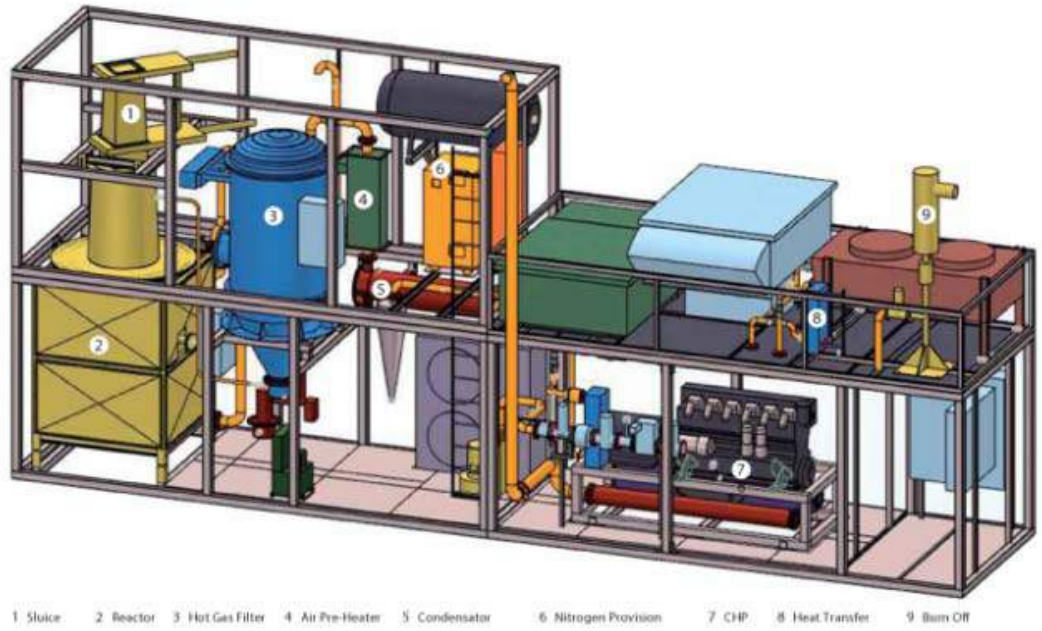

Fig. 7: Urbas gasifier – container type

Output: 150 $kW_{el.}$ ŋ el. = 27%
310 $kW_{th.}$ ŋ th. = 57%
Feedstock: Wood chips (8-15 % moisture, size < 150 mm)

Through a thermochemical process within a reactor, wood is transformed into a combustible gas. Dust particles that are contained in the raw gas are separated in filters; the refined wood gas then drives a gas motor with a generator. Through the cooling process of the engine valuable thermal energy is produced.

The wood gasification system requires a very specific fuel type. Clean factory or industrial off cuts with no fines and a moisture content of less than 10%.

The following table offers an overview on URBAS gasifiers.

Table 4: Urbas gasification plants

	Project	Start up	Contact	Output	Application	Feedstock	
						Wood chips	Off - cuts
1	**Demonstrationsanlagen URBAS** A - 9113 Ruden	Development since 2001	Ing. Peter Urbas DI Wolfgang Felsberger	150 kWel +300 kWth + Kessel	CHP - Process heating for own supply	x	x
2	**Fernwärme Neumarkt Ges.m.b.H. & Co KG** A - 8820 Neumarkt	August 08	BM Herbert Ofner fernwaerme8820@gmail.com + 43 664 4501564	2 x 120 kWel + 580 kWth	CHP - District heating	x	
3	**Friedrich Wahl GmbH & Co. KG** D - 74429 Sulzbach Laufen	October 09	GF Sabine Mertzlufft s.mertzlufft@wahl-holzwerk.de +49 7976 9858 40	1 x 130 kWel + 280 kWth	CHP - Process heating for own supply		x
4	**Holzstrom GmbH** A - 5145 Neukirchen an der Enknach	July 11	GF Johann Wurhofer johann.wurhofer@aon.at + 43 664 2425408	2 x 175 kWel + 600 KWth	CHP - District heating	x	
5	**Stadtwerke Konstanz GmbH** D - 78467 Konstanz	December 11	DI Olaf Westerhoff +49 7531 803 266	1 x 140 kWel + 300 kWth	CHP - District heating	x	
6	**Biowärme Mallnitz Gmbh** A - 9822 Mallnitz	November 13	Hr. Anton Glantschnig glantschnig.anton@peak.at + 43 664 156 78 58	1 x 250 kWel + 540 kWth	CHP - District heating	x	
7	**Rau GmbH** D - 72336 Balingen	December 13	GF Joahim Rau linda.rau@rau-gmbh.de + 49 7433 9882 14	1 x 150 kWel + 280 kWth	CHP - Process heating	x	x
8	**Energieversorgung Vals GmbH** I - 39037 Mühlbach	December 14	Kurt Bacher + 39 0472 979042	1 x 296 kWel + 550 kWth	CHP - District heating	x	
9	**Biowärme Eberndorf** A - 9141 Eberndorf	March 15	Ing. Peter Urbas p.urbas@urbas.at + 43 664 1235923	1 x 130 kWel + 250 kWth; 1 x 300 kWel + 600 kWth	CHP - District heating	x	
10	**green Power GmbH** A - 8230 Hartberg	July 15	Andreas Windhaber andreas.windhaber@gat-solar.at +43 3176 8127 0	1 x 200 kWel + 320 kWth	CHP - District heating	x	
11	**Energia Uno** I - 05100 Terni	August 15	Marco Cinaglia +39 3408191329	1 x 199 kWel + 340 kWth	CHP - Process heating	x	
12	**Lamprecht GmbH** I - 3902 Kastelbell	November 15	Hr. Oskar Pfeifer info@lamprecht-holz.com + 39 0473 624131	1 x 199 kWel + 320 kWth	CHP - Process heating	x	
13	**Azienda. Agri. S.A.B.I** I - 47010 Galeata	December 15	Luca Zannotti luca1407@gmail.com + 39 0543 981793	1 x 199 kWel + 320 kWth	CHP - District heating	x	
14	**Prijedor** BIH - 79101 Prijedor	December 15	Zoran Knezevic knezevic.zoran@toplanapd.com +38 765 845 232	1 x 250 kWel + 530 kWth	CHP - District heating	x	
15	**FW Mals** I - 39024 Mals	December 15	Dr.Mag. Ulrich Veith ulrich.veith@gemeinde.mals.bz.it + 39 349 5707 171	2 x 149 kWel + 280 kWth	CHP - District heating	x	
16	**Azienda Agricola Isca di Calvello**	January 15	Gianfranco Misuriello +39 3334711383	1 x 199 kWel + 340 kWth	CHP - Process heating	x	
17	**Chetra SK s.r.o.** SK - 06801 Medzilaborce	January 16	Olga Hethy +49 1637227525	3 x 150 kWel + 840 kWth	CHP - Process heating	x	

5.2.2 SynCraft

The aim of the company has since its creation in 2007 been not just the development of a local wood-energy system, but also to design a highly efficient process that delivered more heat – particularly electricity – than all other existing systems, yet at the same time could employ those raw materials that not especially popular as energy sources. With these objectives in mind, the SynCraft team developed the so-called floating-fixed-bed gasifier, which forms the basis of SynCraft's wood-gas technology and with which the company can now offer turnkey wood-gas plants under the CraftWERK name, with unique selling points that make them highly attractive products.

To ensure the best possible automation for the wood-gas power plants, a own automation department was founded in 2010. Since then, many automation projects in wood industry, high-frequency technology and waste water treatment plants have been completed sucessfully in addition to wood-gas power plants. [5]

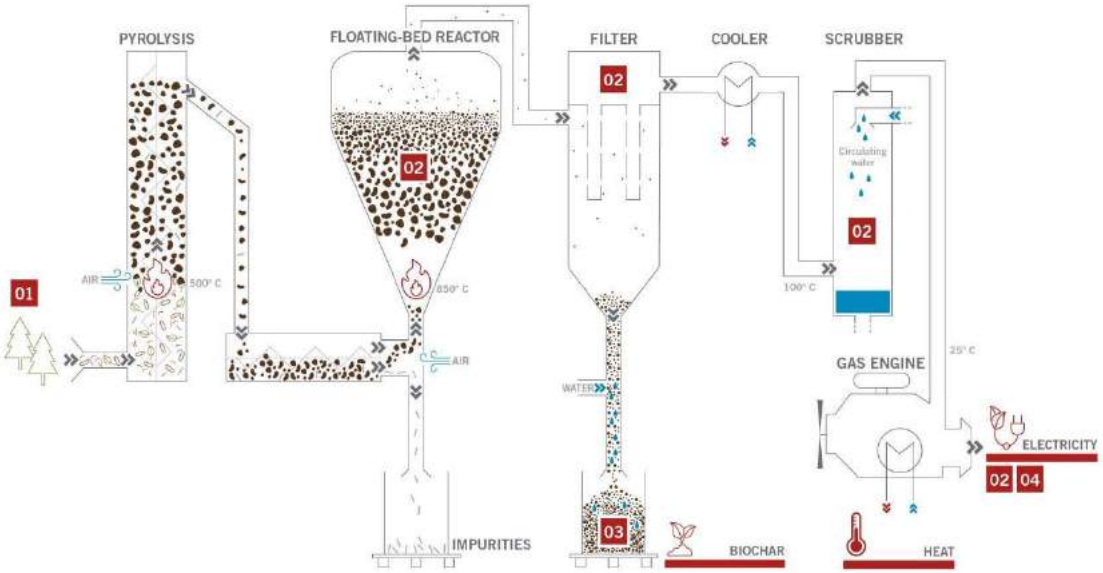

Figure 8: SynCraft technology – flow sheet

1. Operates on low quality, dry wood chips including bark and fines
2. No need for additives.
   Still the condensate is as clear as water and free of tar
3. By-product
   premium quality charcoal
4. 30% overall electric efficiency
   due to high-tech gas engines

SynCraft gasification plants

1. CraftWERK Alpha / Schwaz / Austria

The biomass co-generation plant CraftWERK Alpha was founded on site of Stadtwerke Schwaz in 2009 and has since served as the development platform of the floating bed gasification technology. At this plant, the continuous development of the technology takes place together with our project partners and the MCI - Internationale Hochschule Gmbh. Also the use of alternative, biogenic raw materials such as bark, straw and waste wood is studied and researched in depth. The plant has a thermal capacity of about 500kW.

Figure 9: CraftWerk Alpha

2. CraftWERK Beta / Vierschach / South Tyrol / Italy

Figure 10: CraftWerk Beta

The biomass cogeneration plant CraftWERK Beta was built 2011/12 in addition to an existing biomass district heating plant in Innichen / San Candido and went to the grid by the end of 2012...

This demonstration plant has a thermal capacity of 990kW and an electrical power output of around 250kW. CraftWERK Vierschach makes use of commercially available, dried wood chips (G30 / G50), including barks and fines.

The power generation of the product gas takes place in an agenitor 312 gas engine of 2G, which was specially developed for the efficient processing of wood-gas and promises the highest efficiency.

3. CraftWERK CW700 / Dornbirn / Austria

Craftwerk Dornbirn was built in 2014 with a construction period of only 3 months and was successfully connected to the grid by the end of 2014.

The plant of type Craftwerk 700 has a thermal capacity of 650kW and produces 180kW electrical and more than 350kW thermal power. CraftWERK Dornbirn makes use of commercially available, dried wood chips (G30 / G50), including barks and fines. The power generation of the product gas takes place in an agenitor 406 gas engine of 2G with an electrical efficiency of 40%.

4. CraftWERK CW1600 / Wörgl / Austria

The largest so far conceptualized and planned cogeneration plant of SynCraft type Craftwerk 1600 with well over 400kW of electrical power will be built in the next years for Stadtwerke Wörgl. The planning work is already well advanced. The plant will be able to process commercial dried wood chips (G30 / G50), including barks and fines. The commissioning is planned in 2016.

Figure 11: CraftWerk CW1600

Literature

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