



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology

IEA FORSCHUNGS
KOOPERATION

Country Report Austria

IEA Bioenergy Task 33 Meeting

07.05.2018

Alkmaar/Petten, the Netherlands

Dr. Jitka Hrbek

Institute of Chemical Engineering

Working Group Zero Emission Technology

Prof. Hermann Hofbauer

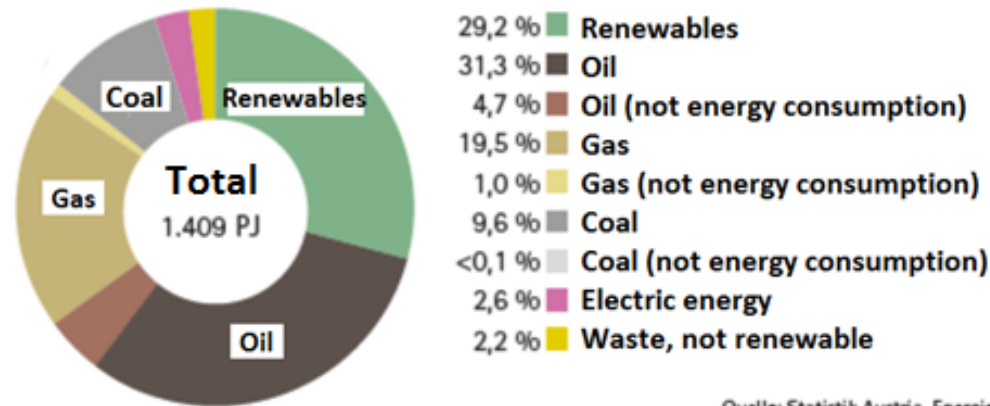
Participation in IEA Bioenergy Task 33 is financed by



Content

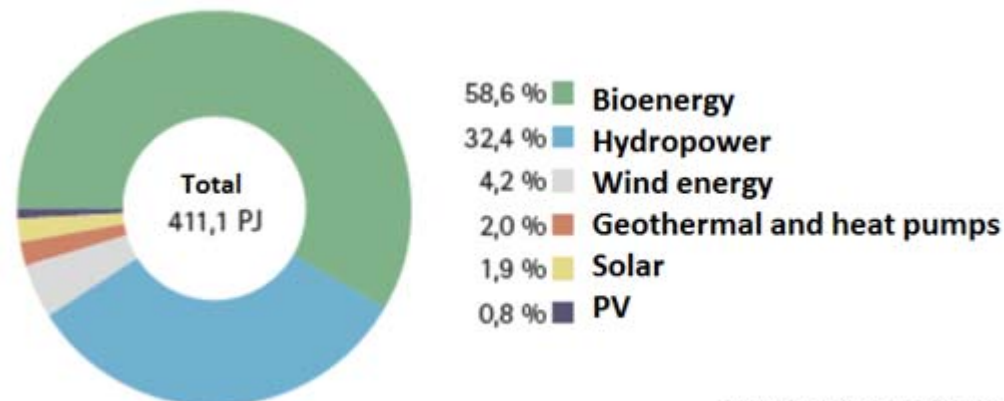
- Statistics, political frame conditions
- Research organisations and actual projects
- Companies
- Implementations

Gross energy consumption in Austria and share of renewables



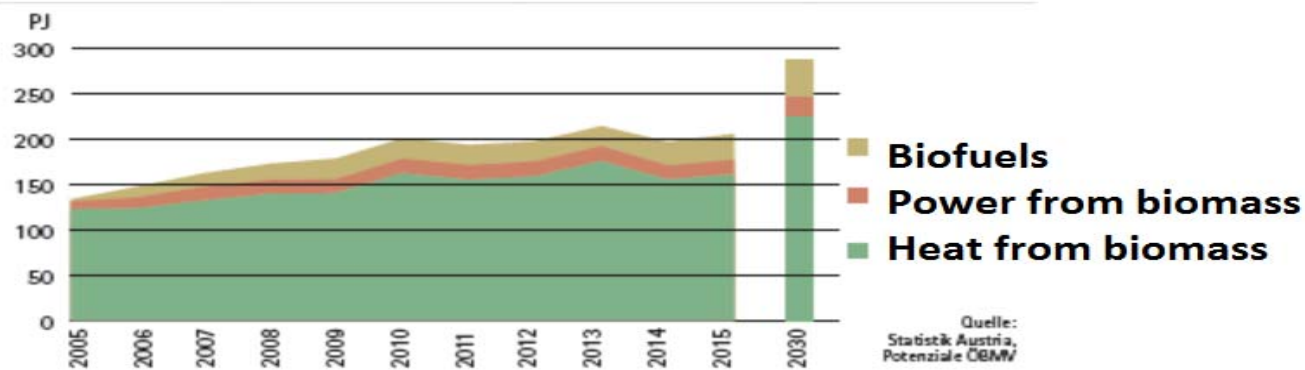
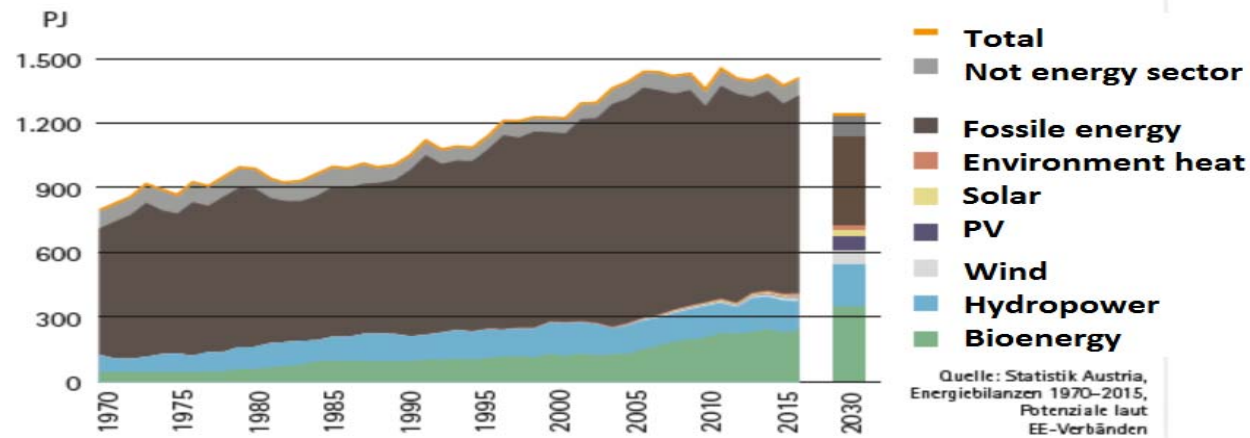
Wood share: 12,9%

Quelle: Statistik Austria, Energiebilanz 2015

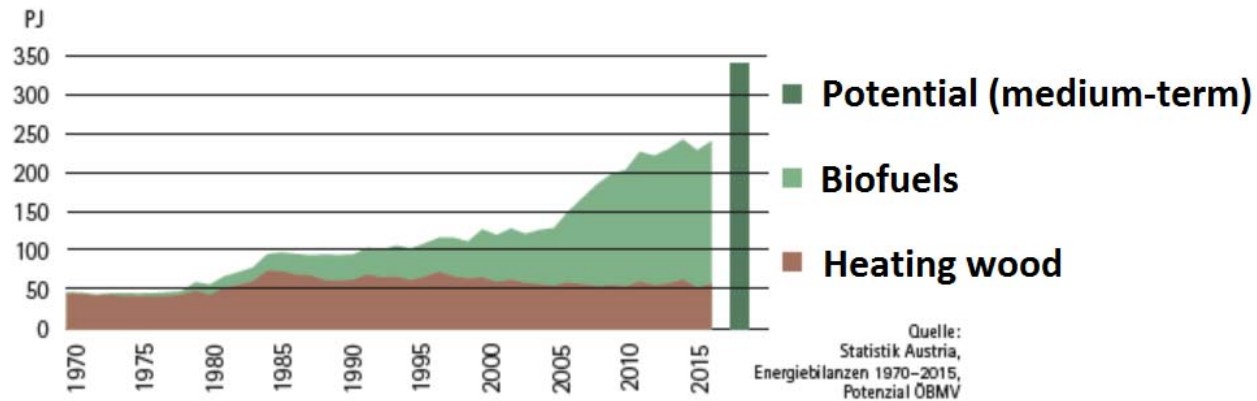


Quelle: Statistik Austria, Energiebilanz 2015

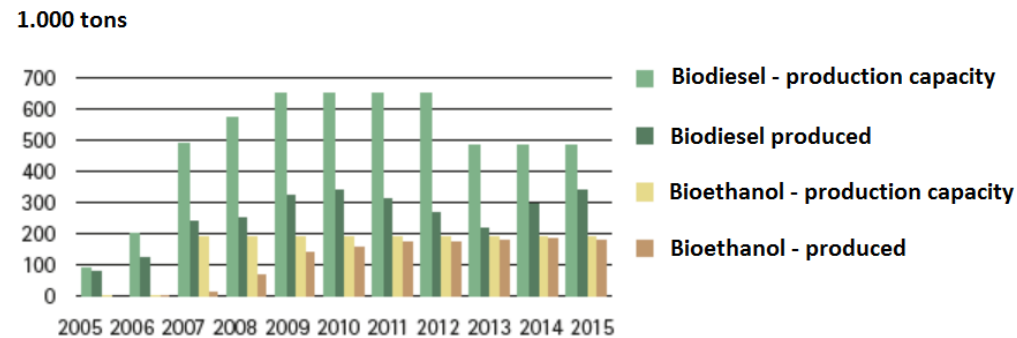
Gross energy consumption in 2015 and future potential (Fig.1)
Potential potential of biomass (Fig.2)



Bioenergy consumption 1970-2015



Biofuels capacity and production (2005-2015)



Austrian Research Organisations

Graz University of Technology – Institute of Thermal Engineering

- Combustion and gasification
- CFD-simulations
- reactive fluid flows
- solar thermal processes
- extrusion and injection molding (polymers)
- thermal Management
- Thermo-dynamical process simulation
- Fluidized bed combustion
- Second Generation Fuels and fuel cells
- CO₂-free gas- and coal-burning power plant

Joanneum Research Graz - Department of Energy Research

- Life Cycle Assessment

Austrian Research Organisations

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

- Multi-staged fixed bed gasification systems
- Valorization of biomass
- Biomass to power and heat
- Engine & emissions
- Energy distribution and storage

Bioenergy 2020+

- Product gas production/treatment/utilization
- Process development and optimization
- Measuring and analysis technology
- Fundamental R&D on ashes and bed materials
- 1st and 2nd generation biofuels
- Representative of Austria in IEA Bioenergy Task 39 liquid biofuels
- Secretary of IEA Advanced Motor Fuels
- ExCo member in IEA Bioenergy (Manfred Wörgetter)

Austrian Research Organisations

Vienna University of Technology, Institute of Chemical Engineering

- R&D in dual fluidised bed steam gasification (G-volution)
- Scientific Partner in Bioenergy 2020+



Austrian companies

- **Andritz including AE&E** (Andritz Energy & Environment)
 - No activities with FICFB, has still patent
 - Involved in Skive (over Carbona)
 - Active in UK gasification projects
 - www.andritz.com

- **GE Jenbacher**
 - Production of product gas motors
 - <http://www.jenbacher.com>

- **Güssing Renewable Energy (GRE)**
 - FICFB gasifiers for CHP, BioSNG and other synthesis (sister company of the biomass CHP Güssing)
 - <http://www.gussingrenewable.com/>

Austrian companies

- **Repotec**
 Engineering of FICFB gasifiers for CHP, BioSNG and other synthesis (Güssing, Ulm, Göteborg)
 - <http://www.repotec.at>
 - **Insolvent, new company will be established**

- **SynCraft Engineering GmbH**
 - <http://www.syncraft.at>

- **Hargassner**
 Fixed bed gasification
 - <http://www.hargassner.at>

- **Urbas**
 fixed bed gasification
 - <http://www.urbas.at>

- **Glock Ökoenergie**
 fixed bed gasification (Imbert)
 - <http://www.glock-oeko.at>

- **ZT Lettner**
 - <http://www.zt-lettner.at>

- **Fröling**
 fixed bed gasification
 - <http://www.froeling.com>

Actual projects

www.heattofuel.eu

Upgrading of alternative, residual biomass feedstocks and conversion of excess heat to liquid fuels in a combined Gasification, Fischer Tropsch and Aqueous Phase Reforming plant.

- Horizon 2020 EU-funded project
- 14 partners from across Europe
- Deliver cost-competitive technologies achieving biofuel prices below €1 per litre.
- Coordinated by Güssing Energy Technologies (www.get.ac.at),
- Started in September 2017
- Duration 4 years
- Partners: TU Wien, Güssing Energy Technologies, Beta Renewables (Italy), IREC (Spain), IChPW (Poland), RECORD (Italy), POLITO (Italy), Bioenergy2020+ (Austria), CRF (Italy), CEA (France), Johnson Matthey (UK), Atmostat (France), R2M (Spain) and Skupina Fabrika (Slovenia)

Implementations



Commercial FICFB gasifiers

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	On hold
Oberwart, AT	Gas engine / ORC / H ₂	8.5 _{fuel} / 2.8 _{el}	2008	Ortner Anlagenbau	On hold
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	On hold
Göteborg, Sweden	BioSNG	32 _{fuel} /20 _{BioSNG}	2013	Repotec/ Valmet	Operational
California	R&D	1 MW _{fuel}	2013	GRE	Operational
Gaya, France	BioSNG R&D	0,5 MW _{fuel}	2016	Repotec	Commissioning
Thailand	Gas engine	4 _{fuel} / 1 _{el}	2018	GRETHA	Commissioning

Nongbua DFB gasifier Thailand

- **Project owner:** GRETHA
(Güssing Renewable Energy (Thailand) Co. Ltd.)
- **Technology:** DFB as in Güssing
- **Input:** 3,8 MW
- **Output:** 1 MWeI, 1,25 MWth

- New improved technology to operate the plant with **different types of feedstock:**
 - Wood chips
 - Sugarcane leaves
 - Corncobs, etc.

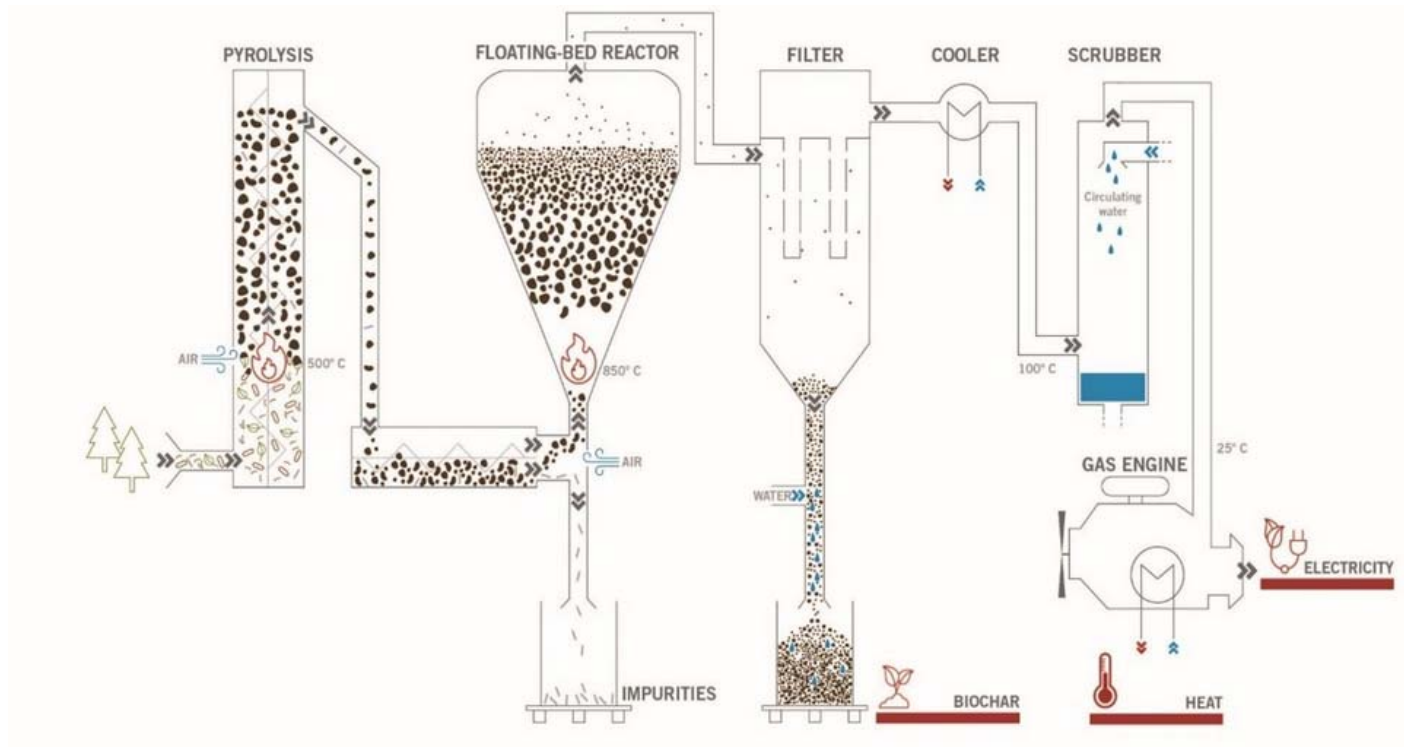


References

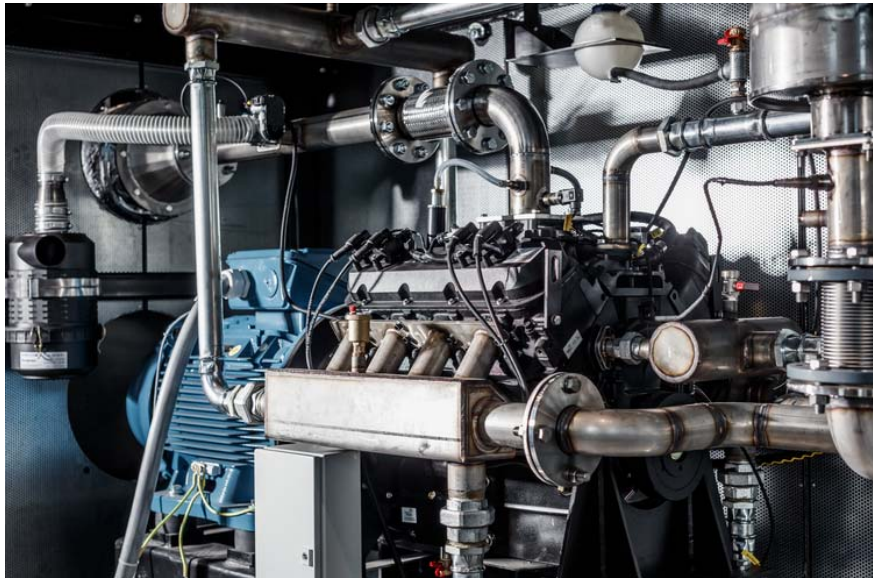
- 20 plants in operation (Austria, Germany, Italy, Bosnia)
- 5 further plants - start up End of 2017 (one in Japan)
- 2 plants – start up in 2018 (Croatia)



Presentation tomorrow



Wood gasifiers GGV 1.7 and GGV 2.7

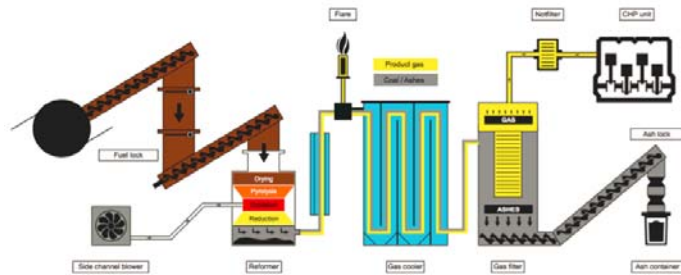


18 kW electrical power rating*
44 kW thermal power rating*
19 kg/h chips consumption*
400 V/50Hz electrical output
max. 90°C thermal output
5.209 x 2.221 x 2.620 mm dimensions

*according to: ISO 17225-4 A1 P16S-P31S

55 kW electrical power rating*
120 kW thermal power rating*
50/60 kg/h chips consumption*
400/660 V/50Hz electrical output
max. 90°C thermal output
5.000 x 2.700 x 3.400 mm dimensions

Fixed bed gasifiers



Technical data		CHP		
El. output	kW	46	50	56
Th. output	kW	95	105	115
Feedstock (wood chips)	kg/h	35	37	40
Input	kW	170	181	198
Th. efficiency	%	56	58	58
El. efficiency	%	27	28	28
Total efficiency	%	83	86	86

Container design



Indoor facility



Implementations

Biowärme Grabner, A-Wenigzell



Initially 3 facilities
In 2016 4th facility
Over 8.400 operating hours per year

Implementations

Fernwärme und Brennholz Trocknung Suhodolnik, SI-Nazarej



Near Ljubljana 10 facilities in operation since 2013

Implementations

Osserhotel, D-Silbersbach



Since 2014 – 1 facility in operation

Implementations

Fernwärme Jennersdorf, A-Jennersdorf



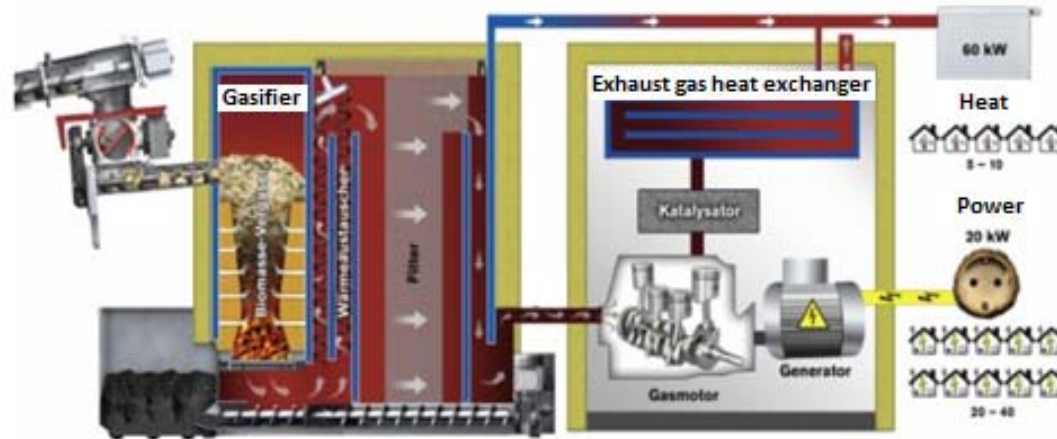
District heating + 200 kW electricity

Implementations

Molzbachhof, A-Kirchberg am Wechsel



Heating for hotel and school
2 facilities – 100 kWel + 200 kWth



Technical data		
Power output	kW	20
Heat output	kW	61
Overall efficiency	%	95,3
Feedstock (wood chips) consumption by 5000 op. hours	m ³	500



www.hargassner.at

Austria:

1 facility in operation

4 facilities in comissioning

19 facilities approved by public authorities