



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology

IEA FORSCHUNGS
KOOPERATION

Country Report Austria

IEA Bioenergy Task33 Meeting

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Pitea, Sweden

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Institute of Chemical Engineering

Working Group Zero Emission Technology

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Participation in IEA Bioenergy is financed by



Content

- Policy
- Research organisations
- Companies
- Implementations

Policy Targets

- ↓ Green house gas reduction of 16% by 2020
- ↑ Efficiency increase of 9% by 2016
- ↑ Increase of Renewables from 23% to 34% by 2020
(30.9% in 2009)
- ↑ Increase use of Biofuels for Transportation to 10% by 2020 (7.2% in 2009)
- ↑ Research expenditure increase to 3% of GDP

Targets of the Energy Strategy

Main target

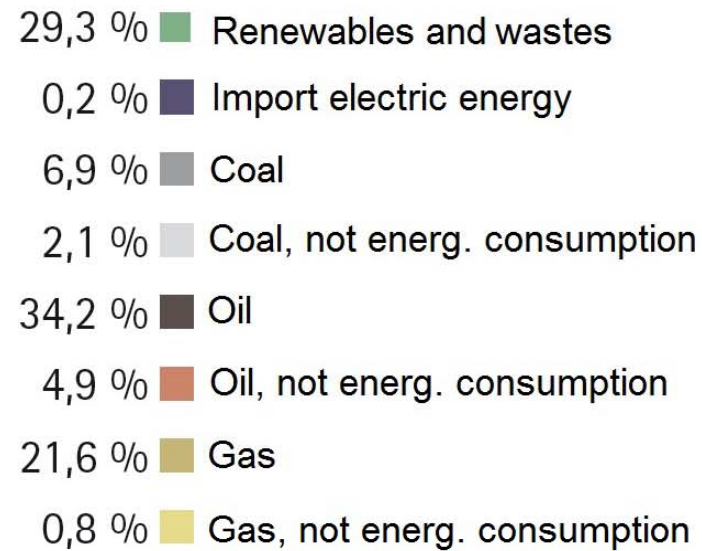
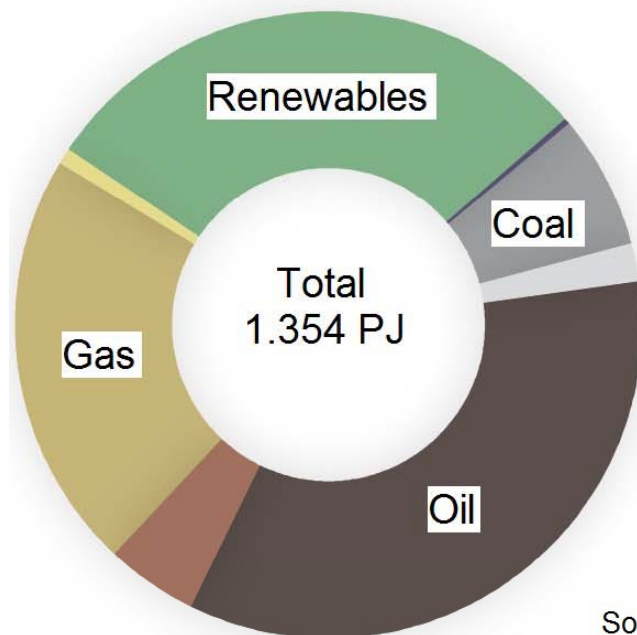
- Security of energy supply – environmental friendly – cost effective
- Innovation oriented modification of the energy system

Additional target

- Attractive research- and technology location
- Market leadership and employment through research and technology development

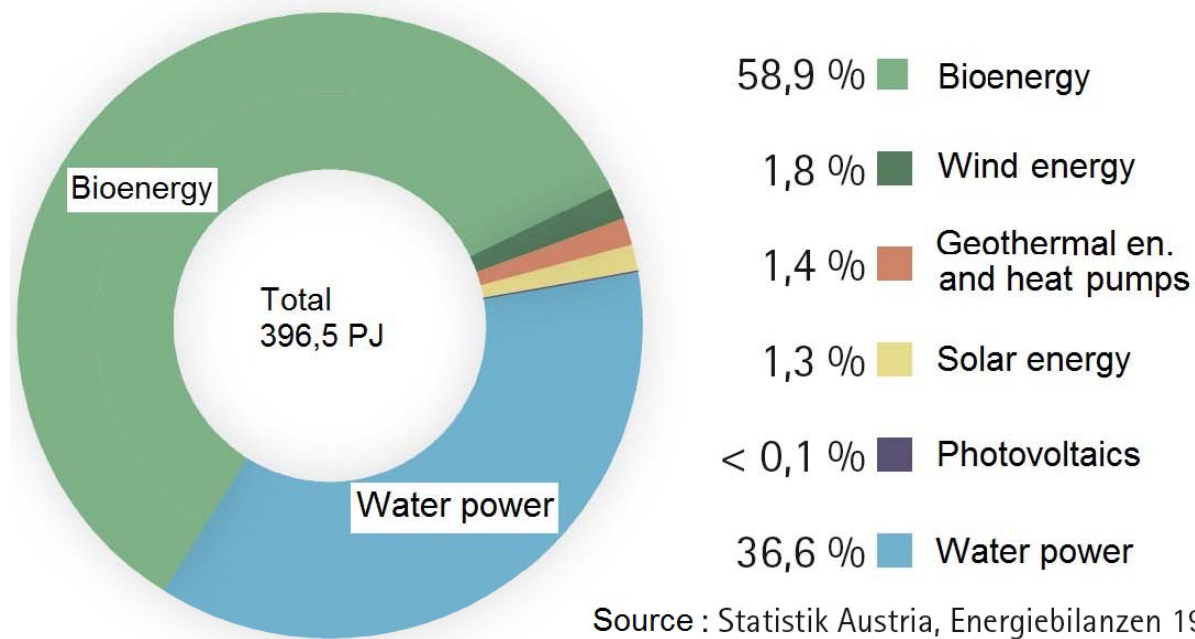
Conflict of aims and win-win situation

Energy consumption in Austria (2009)



Source: Statistik Austria, Energiebilanzen 1970-2009, Österreichische Energieagentur

Renewables in Austria (2009)

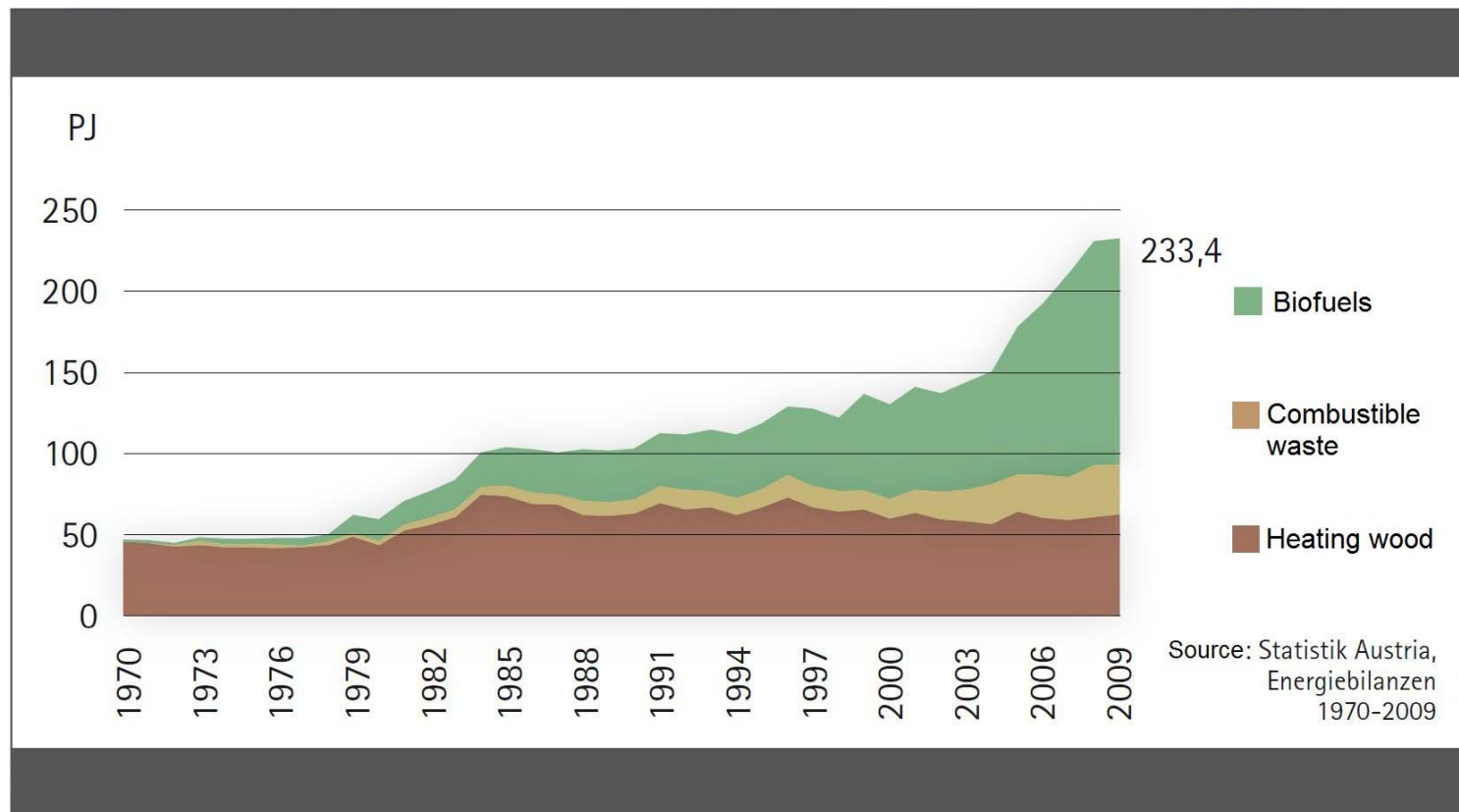


Source : Statistik Austria, Energiebilanzen 1970-2009, Österreichische Energieagentur

Bioenergy consumption (2009)

		2005	2009	Potencial 2015	Potencial 2020
		PJ	PJ	PJ	PJ
Local heating	Wood-based	97,2	95,4	103,9	110,9
	Other	18,6	23,7	27,9	31,5
	TOTAL	115,8	119,1	131,8	142,4
District heating	Wood-based	10,4	20,6	26,1	30,7
	Other	2,3	3,9	6	7,7
	TOTAL	12,7	24,5	32,1	38,4
Power from biomass	Wood-based	2,6	7,3	8,4	9,3
	Other	6,7	8,2	9,9	11,4
	TOTAL	9,3	15,5	18,3	20,7
Biofuels	Pur	0,9	5	6,2	8
	Mixture	1,4	17,5	22,5	27,7
	Bioethanol	0	2,7	4,9	5,3
	Biodiesel	1,4	14,9	17,6	22,3
Bioenergy total		140,2	181,5	210,9	237,2

Bioenergy consumption in Austria (1970-2009)



Austrian Research Organisations

Graz University of Technology – Institute of Thermal Engineering

- Heat pipe reformer (former Technical University Munich, Prof. Jürgen Karl changed to University of Erlangen, Germany, work is still going on in Graz)
- Small scale CHP with heat pipe reformer
- Distributed SNG production
- Health, Safety and environmental issues for gasification systems

Joanneum Research Graz - Department of Energy Research

- Life Cycle Assessment
- Microchannel FT technology

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

- Multi-staged fixed bed gasification systems

FJ-BLT Wieselburg (HBLFA)

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

Austrian Research Organisations

Bioenergy 2020+ (in cooperation with Vienna University of Technology)

- Pressurised gasification
- Usage of product gas from biomass CHP Güssing in a SOFC
- Production of FT liquids
- Production of Hydrogen
- Waste gasification in FICFB gasifier (a 1MW gasifier is designed at the moment)

Vienna University of Technology, Institute of Chemical Engineering

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

Austrian companies

- **Andritz including AE&E (Andritz Energy & Environment)**
 - Activities with FICFB unclear, has still patent
 - Involved in Skive (over Carbona)
 - <http://www.aee-austria.at/>

- **AGT Agency for Green Technology**
 - Low Temperature Conversion (LTC) is a thermo catalytic decomposition process operating without air supply
 - <http://www.agt-world.com/>

- **Austrian Enviro Technologies**
 - <http://www.austrian-enviro.com>

- **GE Jenbacher**

- **Ortner Anlagenbau**
 - builds FICFB gasifiers for CHP applications (Oberwart, Villach)

Austrian companies

- Repotec
 - builds FICFB gasifiers for CHP, BioSNG and other synthesis (Güssing, Ulm, Göteborg)
 - <http://www.repotec.at>
- SynCraft Engineering GmbH
 - <http://www.syncraft.at>
- Urbas
 - fixed bed gasification (2 units in Upper Austria)
 - <http://www.urbas.at>
- Xylogas
 - fixed bed gasification
 - <http://www.xylogas.com/>

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	Operational
Oberwart, AT	Gas engine / ORC	8.5 _{fuel} / 2.8 _{el}	2008	Ortner Anlagenbau	Operational
Villach, AT	Gas engine	15 _{fuel} / 3.7 _{el}	2010	Ortner Anlagenbau	Commissioning
Klagenfurt, AT	Gas engine	25 _{fuel} / 5.5 _{el}	2011	Ortner Anlagenbau	planing
Ulm, DE	Gas engine / ORC	14 _{fuel} / 5 _{el}	2011	Repotec	Commissioning
Göteborg, Sweden	BioSNG	32 _{fuel} /20 _{BioSNG}	2012	Repotec	planing
Vienna, OMV	Hydrogen	50 _{fuel} /30 _{hydrogen}	2015	Repotec	planing

Commercial CHP gasifiers

Location	Product kW	Start up
Ruden, AT	150el./300th. 70el./150th.	Development since 2001
Eberndorf, AT	2x120el + 70el./650th.	2006-2008
Neumarkt, AT	2x120el./580th.	2008
Sulzbach-Laufen, DE	130el./280th.	2009
Neukirchen, AT	2x150el./300th.	2011
Konstanz, DE	150el/300th	End of 2011

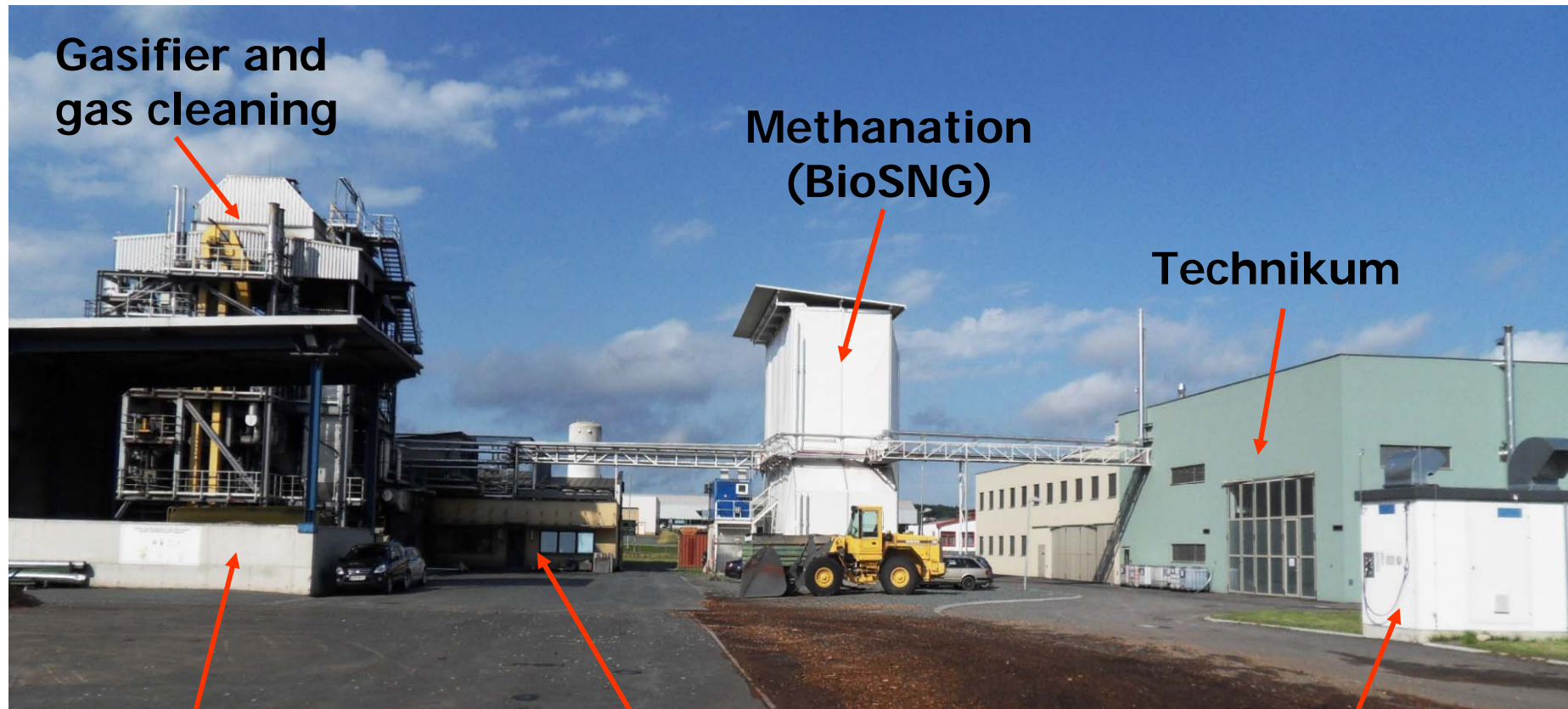
OBERWART (AT):

> 10.000 operating hours



VILLACH (AT):

GÜSSING (AT):



**Gasifier and
gas cleaning**

**Methanation
(BioSNG)**

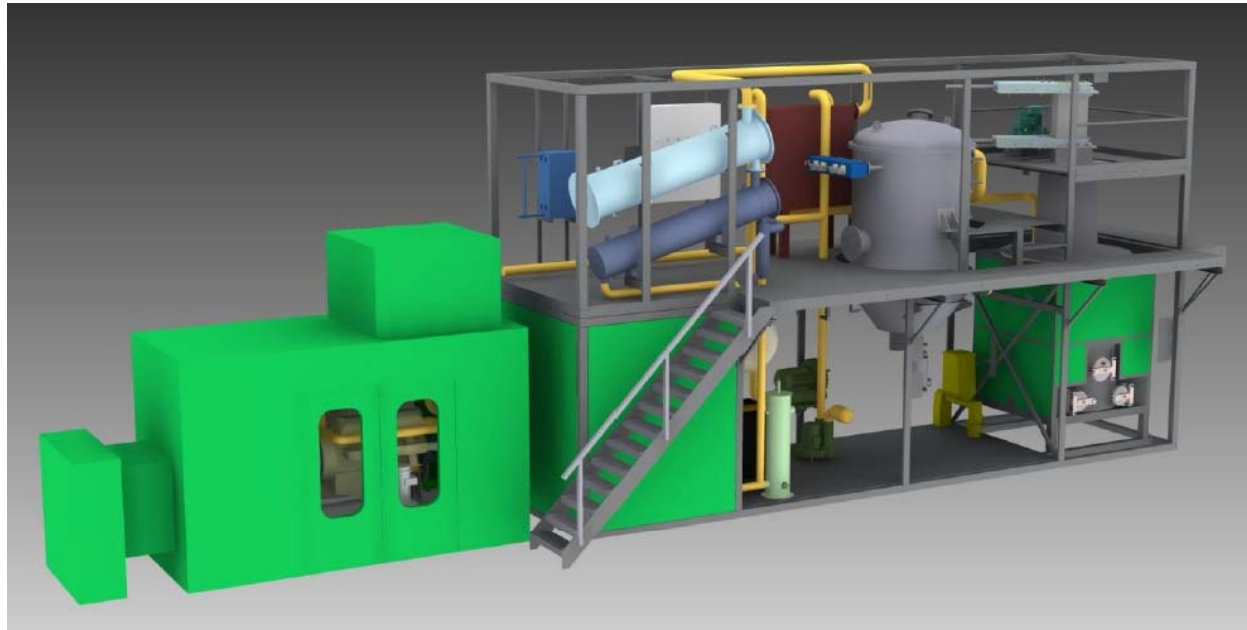
Technikum

Fuel bunker

Control room

**BioSNG filling
station**

Urbas – Wood gasifiers

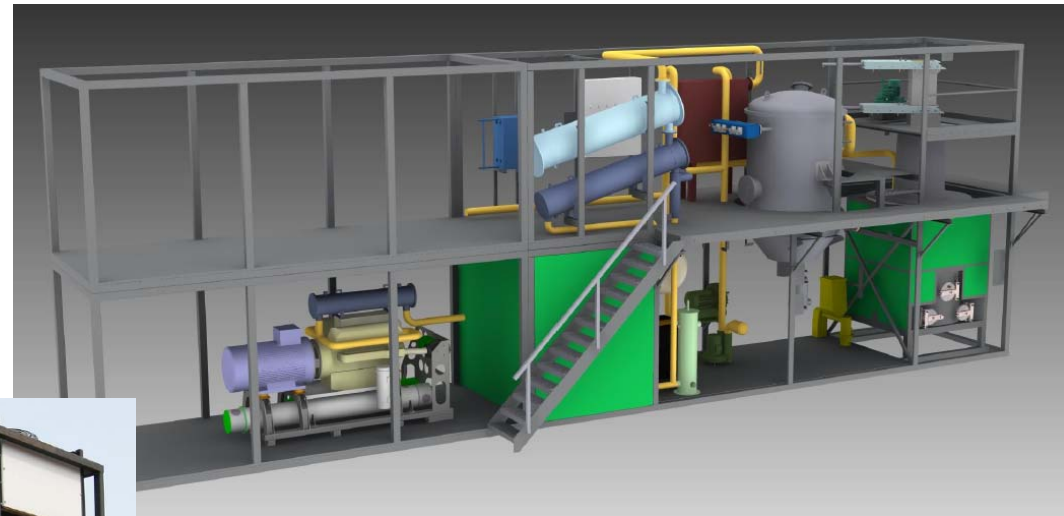


Output: $150 \text{ kW}_{el.}$ $\eta_{el.} = 27\%$

$310 \text{ kW}_{th.}$ $\eta_{th.} = 57\%$

Feedstock: *Wood chips (8-15 % moisture, size < 150 mm)*

Urbas – Wood gasifiers (Container technology)



**Long-term test:
30.000 operating
hours**

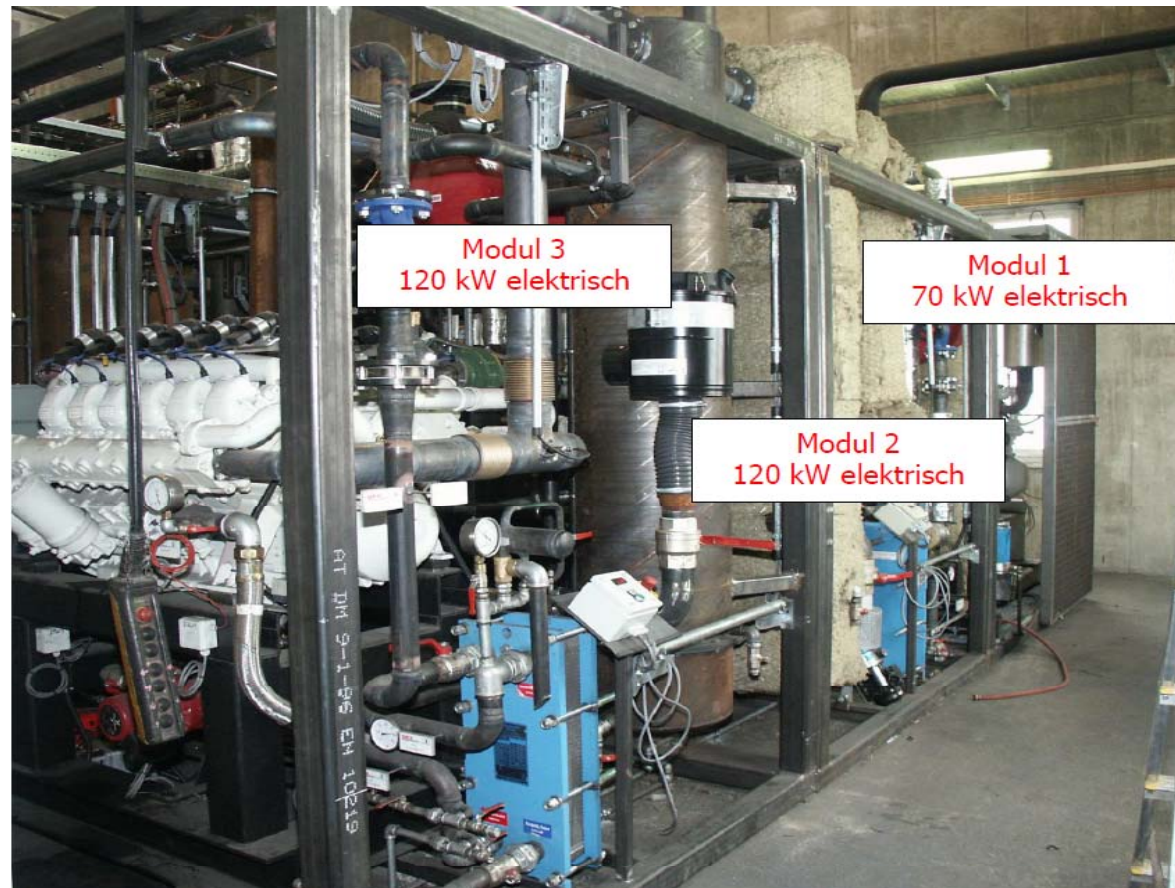
Biowärme Eberndorf (2006)

300 kW el.

650 kW th.

20.000

Operating hours



Sägewerk – Wahl (Germany) (2009)

130 kW el.

280 kW th.



12.500
Operating hours

Holzstrom – Neukirchen (2011, no feed in tarif yet)



2x150 kW_{el.}

1.000

2x310 kW_{th.}

Operating hours



Summary

Work is going on!