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Confédération suisse
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Bundesamt für Energie BFE
Office fédéral de l'énergie OFEN
Ufficio federale dell'energia UFE
Swiss Federal Office of Energy SFOE

Thermal Gasification of Biomass Country Report Switzerland (brief update)



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IEA Bioenergy, Task 33, Meeting April 2012, Istanbul, Turkey



General Swiss Energy Policy + Programs

- General policy made by Swiss Federal Office of Energy (SFOE)
 - High efficiency
 - Increasing renewable energy
- CO₂ Act (Kyoto)
 - emissions reduction of 10% by 2010 (aim not fulfilled)
 - and of 20% by 2020 compared to 1990 levels
- Approved action plans by Swiss Federal Council 2008
 - 50% renewable energy to overall energy consumption
 - reduce the consumption of fossil fuels by 20 per cent by 2020
 - 2010 -2020 max 5% increase of electricity consumption
 - After 2020 stabilise electricity consumption
- Vision
 - The 2000 Watt society is a long-term vision of sustainable per capita energy consumption



General Swiss Energy Policy + Programs

- Programs
 - REN-Projects by the Cantons (financed over CO₂ -contribution)
 - Cost-covering remuneration for feed in the electricity grid (KEV)
 - El. + 5'400 GWh/a from renewables (+10% of total) by 2030
 - Biomass: Large increase of power production with CHP up to 2011
 - **But for new projects program politically stopped**

Further Information Swiss Federal Office of Energy (SFOE)

- www.admin.bfe.ch
 - [Position papers](#) : Bio fuel, Energy from Biomass, Energy from Biomass Wood
 - [Federal government energy research concept 2008-2011](#)
 - [Biomass and Wood energy research concept 2008-2011](#)
 - [Swiss Strategy for production, treatment and use of biomass](#)
- Facts
 - 2009, 56.15% of Switzerland's overall electricity production by renewable sources; hydropower contributes 96.5%.to RE



Research Activities 2012

Thermal Gasification of Biomass

PSI

www.psi.ch

- Gasification of dry biomass (wood, grass)
 - Co-firing in NGCC for power generation
 - High temperature fuel cells for CHP
 - Gas processing for SNG production <http://tpe.web.psi.ch/>
 - Dr. Serge Biollaz http://tpe.web.psi.ch/person/per_biollaz.htm
- Gasification of moist biomass (manure, algae)
 - For SNG production
 - Dr. Frédéric Vogel http://cpe.web.psi.ch/CPE/per_Vogel.html
- EU Infrastructure Project, collaboration with: BRISK
(Biofuels Research Infrastructure for Sharing Knowledge)
<http://www.briskeu.com/>



Research Activities Situation April 2012

Thermal Gasification of Biomass

CCEM Competence Center Energy and Mobility (PSI)

3 Projects related to "Thermal Gasification of Biomass".

- ARRMAT (Attrition Resistant Reactive Bed Materials in Fluidised Beds)
- WOODGAS-SOFC II
- SYNGAS Diagnosis

http://www.ccem.ch/MediaBoard/Annual_Activity_Report_2011.pdf

NFP66 (National R Program) 3 Project related to "Thermal Gasification of Biomass"

1. Hot gas cleaning of producer gas from wood gasification for production of bioSNG and electricity from wood (Hot gas cleaning wood gasification) (PSI)

<http://www.nfp66.ch/E/projects/wood-source-energy/gas-cleaning-economical-energy-wood/Pages/default.aspx>

2. Predicting the complex coupling of chemistry and hydrodynamics in fluidised bed methanation reactors for SNG production from wood (PSI) (bio-SNG - fundamentals of methanation)

<http://www.nfp66.ch/E/projects/wood-source-energy/synthetic-natural-gas-wood/Pages/default.aspx>

3. Distributed production of ultra-pure hydrogen from woody biomass (ETHZ)

<http://www.nfp66.ch/E/projects/wood-source-energy/production-ultra-pure-hydrogen-wood/Pages/default.aspx>



Swiss Industries Situation April 2012

Thermal Gasification of Biomass

- EKZ

www.ekz.ch



- Supplier for turnkey biomass gasifier plants (BMG technique similar to WILA Woodpower)
- Energy contracting for biomass cogenerating plants

- Pyroforce Energietechnologie AGv / Gemperle und Partners AG

www.pyroforc



- Supplier for turnkey biomass gasifier plants (BMG technique according to WILA Neudorf)
- Other projects: Güssing: 300 kW_{el} 2 gasifiers; 2009
Spiez: 200 kW_{el} 1 gasifier; 2000-2007

out of business

- XyloPower AG

www.xylopower.com



- Supplier for turnkey biomass gasifier plants (BMG Technique similar to WILA)

- Foster Wheeler AG (published March 2010 Infos about BTL-Plant in Finland)

- Foster Wheeler AG in Baar Switzerland (April 2010 Zug)
- Foster Wheeler Management AG in Geneva Switzerland

only office in Switzerland



News Swiss Projects April 2012

Thermal Gasification of Biomass

- EMPA EAWAG Dübendorf CHP gasifier Plant
Project is in the stage of detail planning; still awaiting building permission
 - Supplier will be EWZ Woodpower-type gasifier
 - 2 x 350 kW el
- 3 MW Gasifier Project for brick production in rotating furnace
 - fuel gas shall replace fossil fuel
 - The **Project cancelled due to financial reasons** gas will be produced by 3 gasifier units each 1 MW
 - Test with 1 MW unit gasifier estimated to be completed in 2012
 - similar CO₂ reduction project in discussion for several brick plants
- PSI: Biomethane Development => 20-80MW BM-to-SNG plant in discussion based on BFB methanation technology



Thermal Biomass Gasification CHP-Plants in Switzerland Summary 1

	Aerni in Pratteln	Holzstrom in Stans	Woodpower Wila	Woodpower EMPA
Gasifier	1 Kuntschar	8 Pyroforce	1 modified Dasagren	2 modified Dasagren
Type	downdraft	2-zone downdraft	downdraft	downdraft
Gas engine	1 x 1170 kW Adapt MAN	2 x 690 kW Jennbacher	1 x 350 kW Jennbacher	2 x 350 kW Jennbacher
Waste heat therm	230 kW for district heating	1,2 MW for district heating	425 kW for wood chip drying	district heating
extra Boiler	2 MW wood chip for district heating	1,6 MW W'chips + 1,7 MW oil for district heating	200 kW waste coal for district heating	?
Commissioning	2009	2007	2007	2012/13
Remarks	in modification	24h_7d p week operation	in 24h_7d p week operation	

Plant in modification

Out of operation since July 2011

Approved project awaiting building permission



Thermal Biomass Gasification CHP-Plants in Switzerland Summary 2

	Aerni in Pratteln	Holzstrom in Stans	Woodpower in Wila	Woodpower EMPA
Fuel	Dry clean wood chips	Dry demolition wood/scrap wood chips	Dry waste wood chips	Dry waste wood chips
Moisture	8%	10%	12%	?
Operating hours last 12 Months		Block 1: 8 006 h Block 2: 7 742 h		n.a
Declared revision / modification	Gasifier	Block 1: non Block 2: non		
Total live time operation h April 2012	?	Block 1: 16 206 h Block 2: 23 642 h	16 000 h Motor 20 000 h Gasifier	n.a
Remarks	New design of gasifier		5 Year approval as waste incineration plant	

Plant in modification

out of operation since 1. July 2011

Approved project awaiting building permission



Thermal Biomass Gasification CHP-Plants Pratteln Switzerland

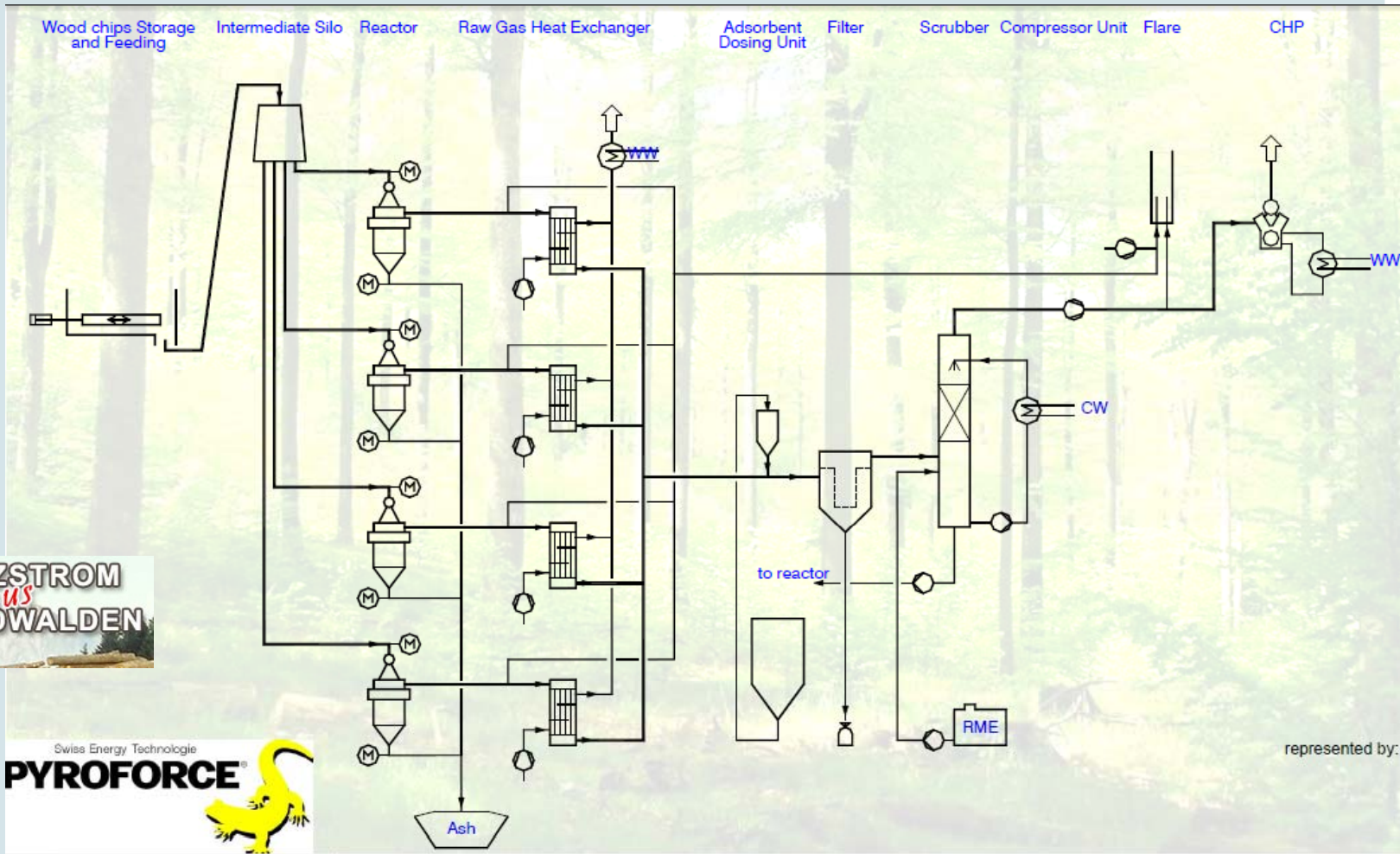


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Istanbul Turkey
April 2012

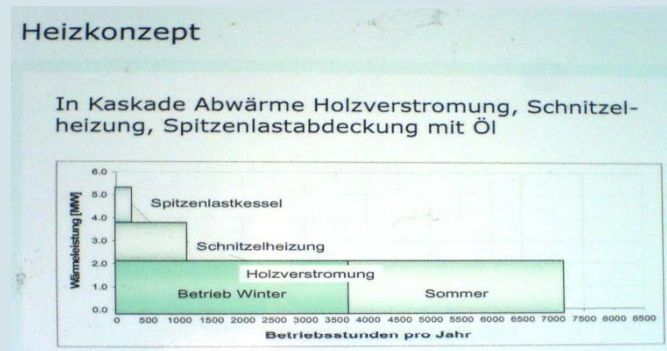
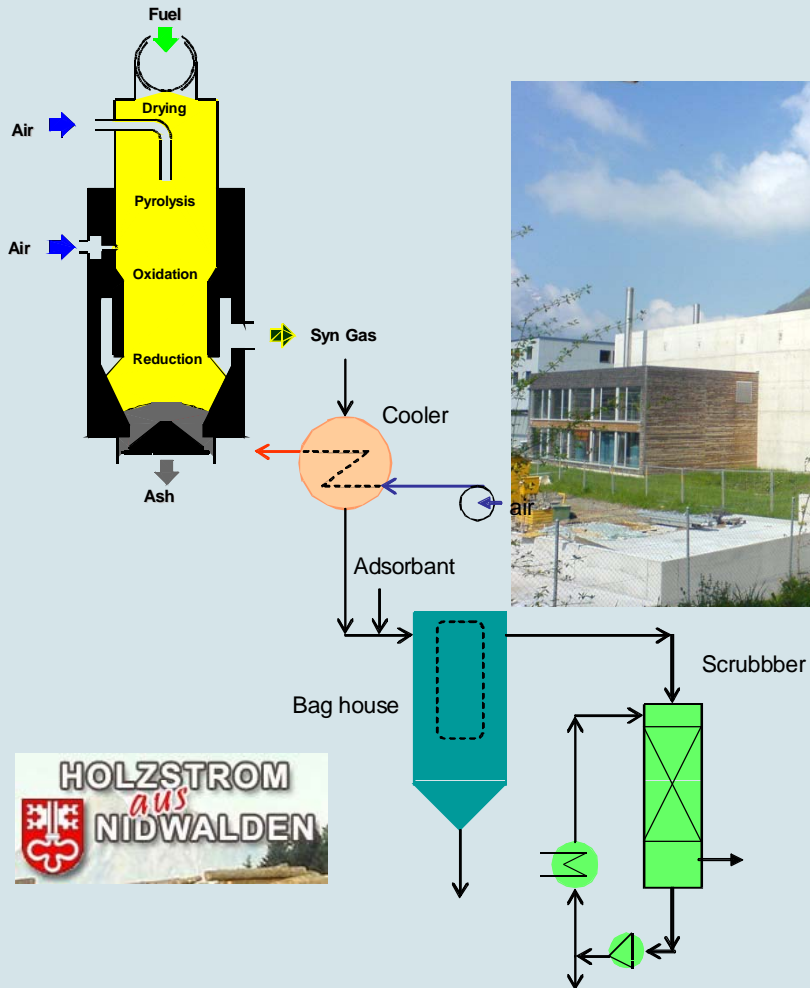


Thermal Biomass Gasification CHP-Plants Stans Switzerland 1





Thermal Biomass Gasification CHP-Plants Stans Switzerland 2



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P+D Projects in Switzerland? Thermal Gasification of Biomass

Facts today:

- 1 Plant in stable operation (Stans)
- 1 Project in waiting position for realization
- 1 Plant in modification

Facts of the past 3 years:

- 1 Plant closed down
- 3 Planned projects abandoned
- 1 Main supplier out of business

Politics:

Visions clearly for Renewable Energy

Reality:

- Cost-covering remuneration (KEV) for new projects pending
- Thermal gasification is technically complex (higher costs)
- Risk investments for biomass-energy projects not existing
- CO₂ -certificates, -contributions and -compensations unsecure in the future
- Public and private frames not in line with political visions
- Volatile biomass-fuel-price



Thanks for your attention,
any Questions?

