

IEA Bioenergy Task 37

Energy from Biogas

Swiss Country Report

Foz do Iguaçu, Brazil – April 2014

ENB

Energie Conseil Bachmann

Nathalie BACHMANN

ENB | Rte de Chambovey | CH - 1869 Massongex | Switzerland

enbachmann@gmail.com

Biogas Plant Inventory

Number of plants

Number of plants (end of 2012)

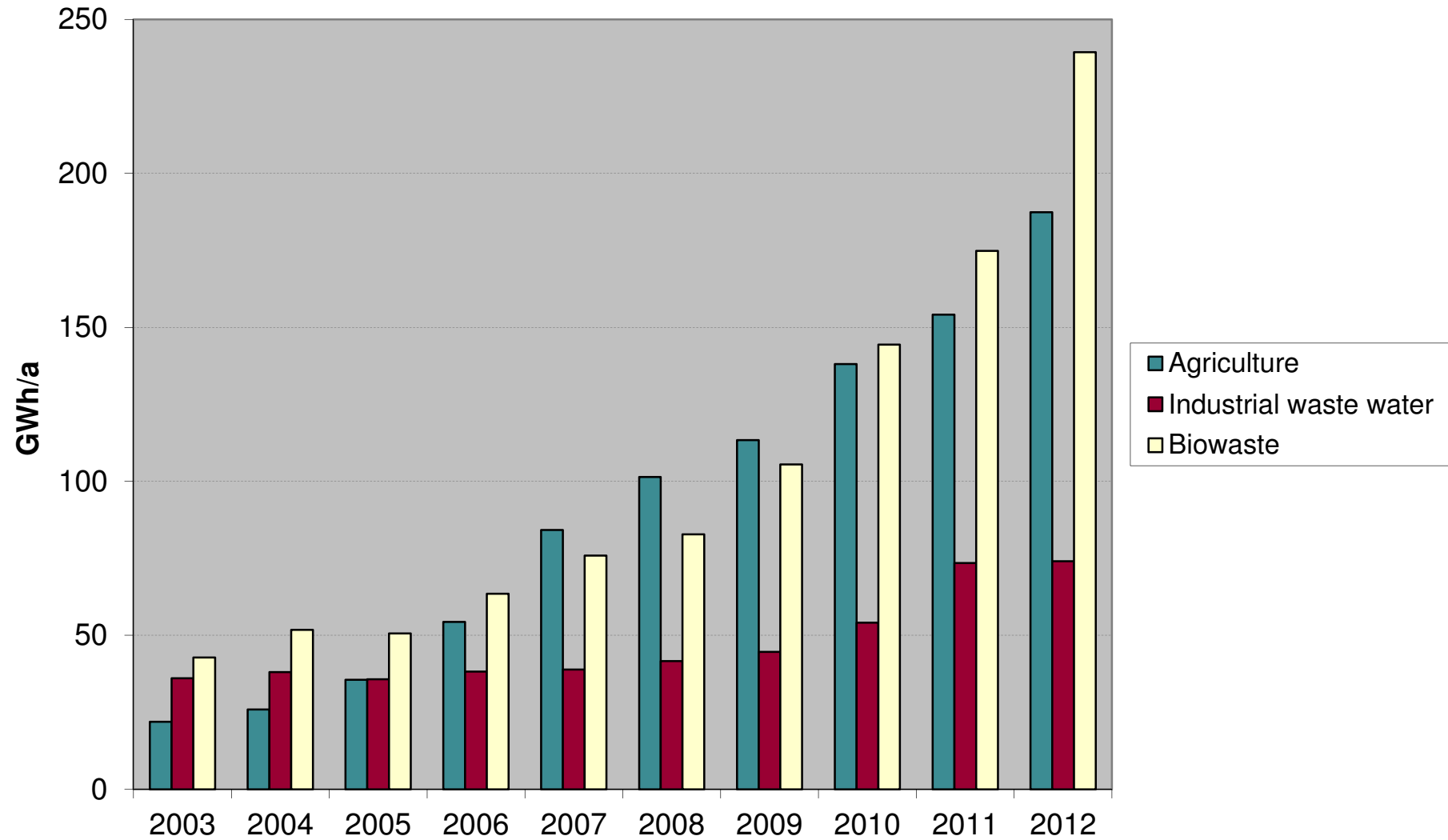
Agriculture:	89 plants
Biowaste:	26 plants
Industrial waste water:	22 plants
Waste water treatment plants:	~ 463 plants (282 with CHP)

Detailed statistic data:

http://www.bfe.admin.ch/themen/00526/00541/00543/?dossier_id=00772&lang=de

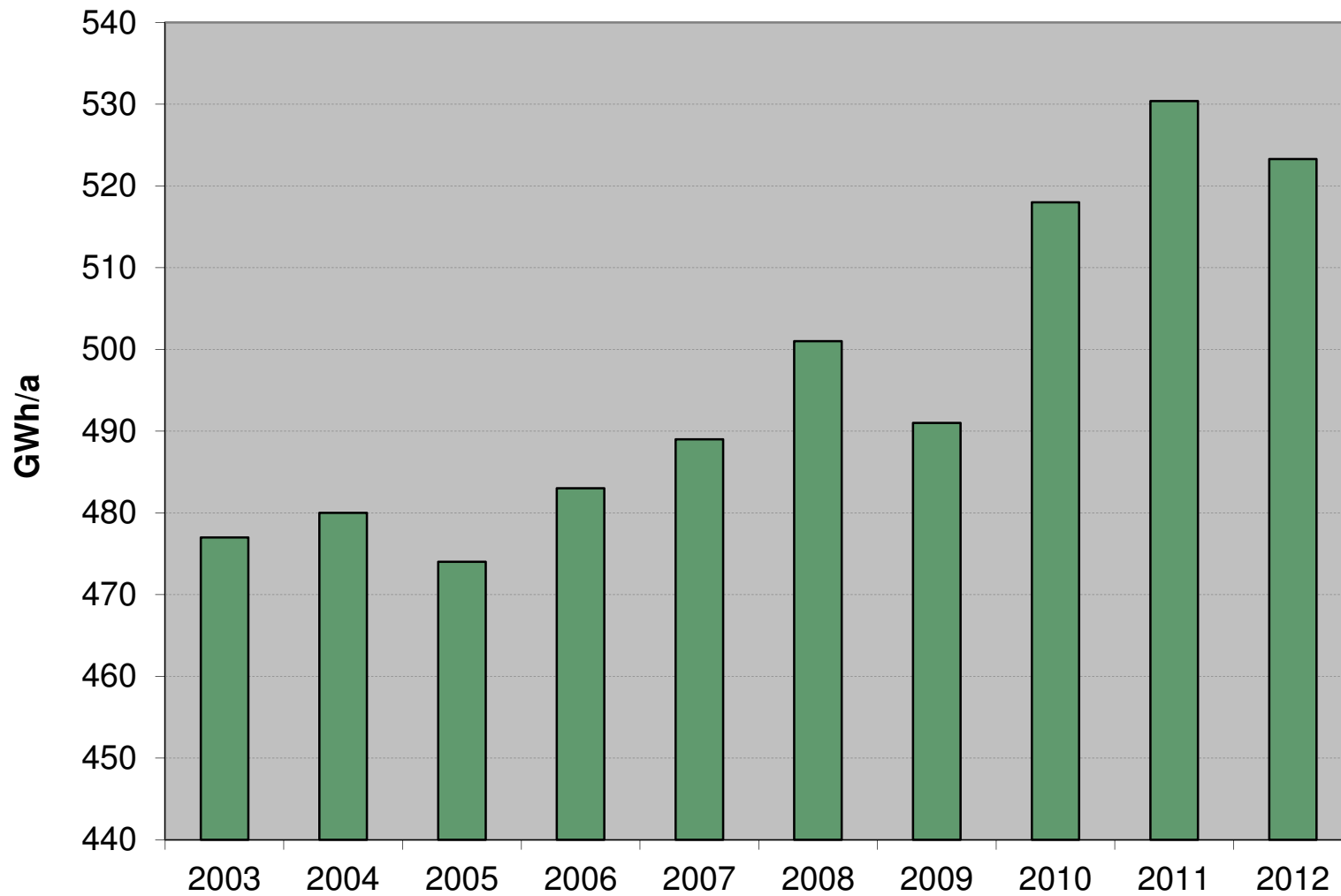
Biogas Plant Inventory

Gross gas production



Biogas Plant Inventory

WWTP – gross gas production



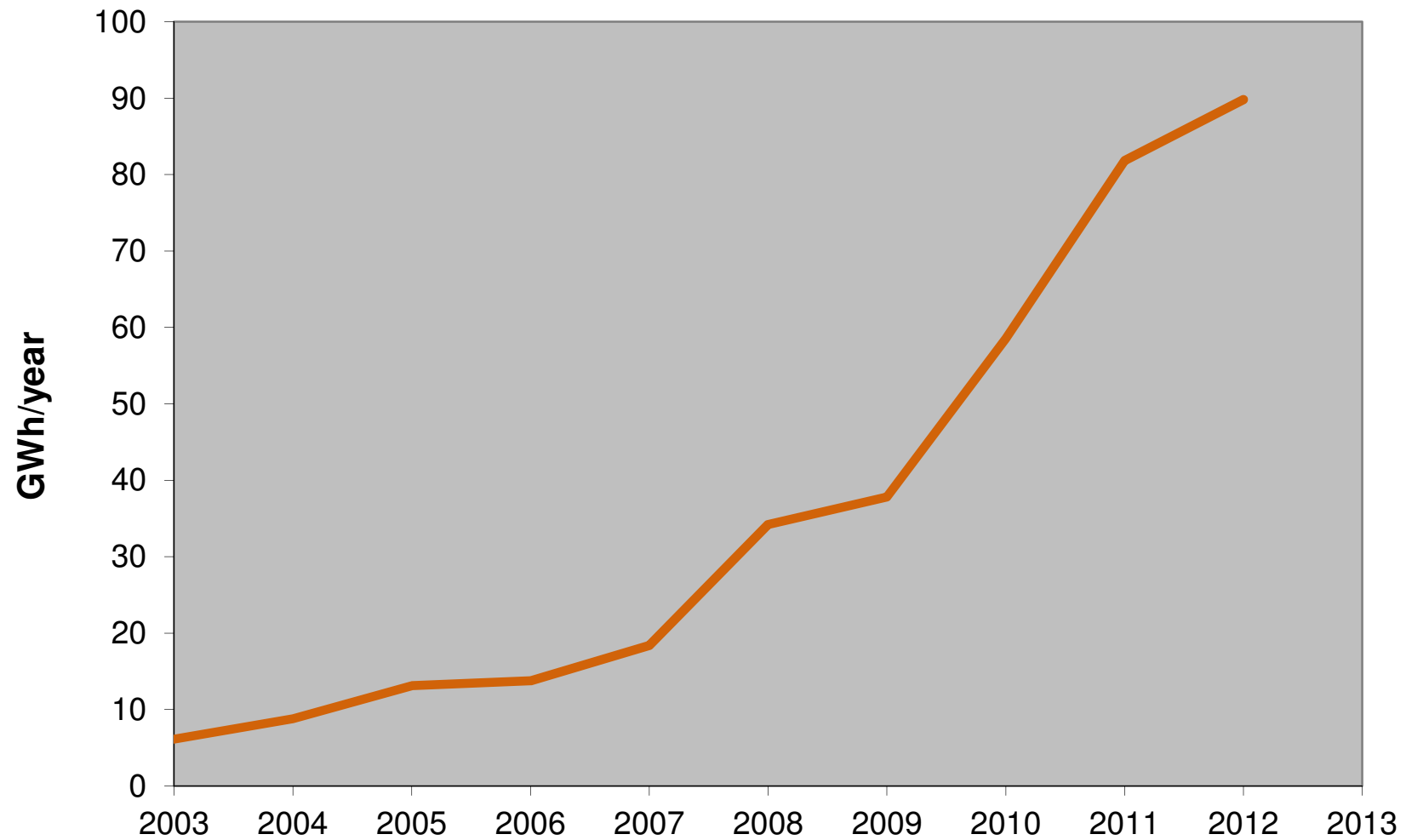
Biogas Upgrading Plant Inventory

Place	Substrate	Utilisation	Technology	Capacity	Operation start
Volketswil	Biowaste	Gas grid	Chemical scrubber	100 Nm ³ /h	2010
Lavigny	Biowaste	Gas grid	PSA	100 Nm ³ /h	2009
Utzensdorf	Biowaste	Gas grid	PSA	100 Nm ³ /h	2009
Pratteln	Biowaste	Gas grid	Organic physical scr.	100 Nm ³ /h	2006
Otelfingen	Biowaste	Vehicle fuel	PSA	50 Nm ³ /h	1998
Rümlang	Biowaste	Vehicle fuel	PSA	30 Nm ³ /h	1995
Samstagern	Biowaste	Gas grid	PSA	50 Nm ³ /h	1995
Widnau	Agr., co-digestion	Gas grid	PSA	100 Nm ³ /h	2008
Inwil	Agr., co-digestion	Gas grid	Amine scrubber	300 Nm ³ /h	2008

Biogas Upgrading Plant Inventory

Place	Substrate	Utilisation	Technology	Capacity	Operation start
Geneva	Sewage sludge	Gas grid	PSA	350 Nm ³ /h	2013
Zurich	Sewage sludge	Gas grid	Amine scrubber	1400 Nm ³ /h	2013
Fribourg	Sewage sludge	Gas grid	PSA	250 Nm ³ /h	2012
Roche	Sewage sludge	Gas grid	PSA	250 Nm ³ /h	2009
Obermeilen	Sewage sludge	Gas grid	Chemical scrubber	60 Nm ³ /h	2008
Berne	Sewage sludge	Gas grid	Amine scrubber	1500 Nm ³ /h	2007
Romanshorn	Sewage sludge	Gas grid	Organic physical scr.	20 Nm ³ /h	2007
Emmenbrücke	Sewage sludge	Gas grid	PSA	90 Nm ³ /h	2005
Münchwilen	Animal by-products	Gas grid	Chemical scrubber	650 Nm ³ /h	2011
Aarberg		Gas grid	PSA	500 Nm ³ /h	2013

Biogas Upgrading Plant Inventory



Biogas Utilisation

(numbers from 2012)

Total gross biogas production : **1024 GWh/year**
(including WWTP)

- Total electricity production: **258 GWh/year**

- Total biomethane production: **90 GWh/year**

Number of gas filling stations: **135**

New Biogas Plants (2013, 2014)

Agriculture

- **Bure** Feb 2013, CHP 360 kW
- **Gutenswil** Mai 2013, CHP 75 kW
- **Einsiedeln** June 2013, CHP
- **Seigneux** Aug 2013, CHP 150 kW
- **Densbüren** Aug 2013, CHP 120 kW
- **Seedorf** Sept 2013, CHP

Biowaste

- **Zürich** Aug 2013, Upgrading

Biogas Plants Under Construction

Agricultural installations

Cournillens (CHP)

Biowaste

Vétroz (Kompogas, upgrading)

Winterthur (Kompogas, upgrading)

Financial Support Systems

Feed-in tariff for electricity from biogas

Power class	≤ 50 kW	≤ 100 kW	≤ 500 kW	≤ 5 MW	> 5 MW
Basic tariff [CHF/kWh]	0.28	0.25	0.22	0.185	0.175
Agricultural bonus [CHF/kWh]	0.18	0.16	0.13	0.045	0
Heat bonus [CHF/kWh]	0.025	0.025	0.025	0.025	0.025
Maximum [CHF/kWh]	0.485	0.435	0.375	0.255	0.20

Found for biomethane injection

- Voluntary support program by the Swiss Gas Association
- Objective: injection of 300 GWh biomethane within 6 years

www.erdgas.ch/biogas/foerderung-der-biogas-einspeisung/

Certificates for emission compensation

Projects reducing GHG emissions can receive financial support

www.bafu.admin.ch/publikationen/publikation/00101/index.html?lang=de

News and Developments

New positive list

The federal office of agriculture has updated the input list for biogas and composting facilities (January 2014):

<http://www.blw.admin.ch/themen/00011/00076/index.html?lang=de>

Discussions about fusion

The two most important organisations involved in Biogas – Biomasse Schweiz and VKS-ASIC – consider to unify their forces. The members will vote on the fusion of the two organisations in autumn (Sept-Dec) 2014.

News and Developments

Organic fraction in household waste

A study of the federal office of environment shows that the household wastes are still composed by one third of organic material. This proves that there is still an high potential for optimisation of the waste streams and their energetic recovery.

More information: <http://www.admin.ch/aktuell/00089/index.html?lang=de&msg-id=51815>

Presidency of EBA

The Presidency of EBA is no longer held by Switzerland (A. Wellinger); new President is J. Štambaský from the Czech biogas association

News and Developments

Blue BONSAI: in pilot stage

- Project: small scale biogas upgrading plant
- Capacities: 1 and 15 Nm³/h of upgraded gas
- Technology: membrane separation
- Markets: decentralized biogas filling station or injection into the gas grid
- Goals: pilot plants shall demonstrate the economic feasibility and reliability of plants smaller than 50 Nm³/h of upgraded gas

Contacts:

U. Oester, Apex AG, Däniken, Switzerland, info@apex.eu.com or
S. Duttwiler, Duttwiler Energietechnik, Flurlingen, Switzerland, info@reg-en.ch



Blue BONSAI BB15, installed at an industrial biogas plant

Current Studies and Research Projects

NB1

Determination of methane production in laboratory

Comparison of laboratory BMP test results and real methane production in full-scale plants (2012 – 2014)

C. Holliger, EPFL (<http://lbe.epfl.ch/page-83701.html>)

ORION – Organic waste management by automated small-scale AD

Development of an on-site organic waste treatment for SME (www.project-orion.eu). EU 7th framework program.



Source: www.project-orion.eu

Slide 15

NB1

Nathalie Bachmann, 26/09/2013

Current Studies and Research Projects

Agricultural dry batch digestion

Pilot plant of a dry batch digester, fed with dry manure (2012 – 2014). C. Morrier

Hygiene of digestate

Tracking of pathogens in substrates from digester feeding until digestate spreading on agricultural fields (2012 – 2014). J. Fuchs / FIBL

Membrane separation

Establishment of a pilot plant for small-scale biogas upgrading (2012 – 2014). U. Oester / Apex AG

Studies and Research Projects

Published reports 2013 / 2014

- Post-treatment of digestate. H. Engeli et al.
- Mini-biogas. Identification and evaluation of technologies for small-scale digestion. Y. Membrez et al.
- Measurement of odour emissions and development of an odour-emission-model for biogas plants. Holger F. et al.
- Digestion of manure and Co-Substrates in a Membrane Bioreactor. Meier U. et al.

Link to publications:

<http://www.bfe.admin.ch/forschungbiomasse/02390/02720/03176/index.html?lang=de>