

Country Report Switzerland

Jyväskylä, April 27, 2009

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Nova Energie Ltd.



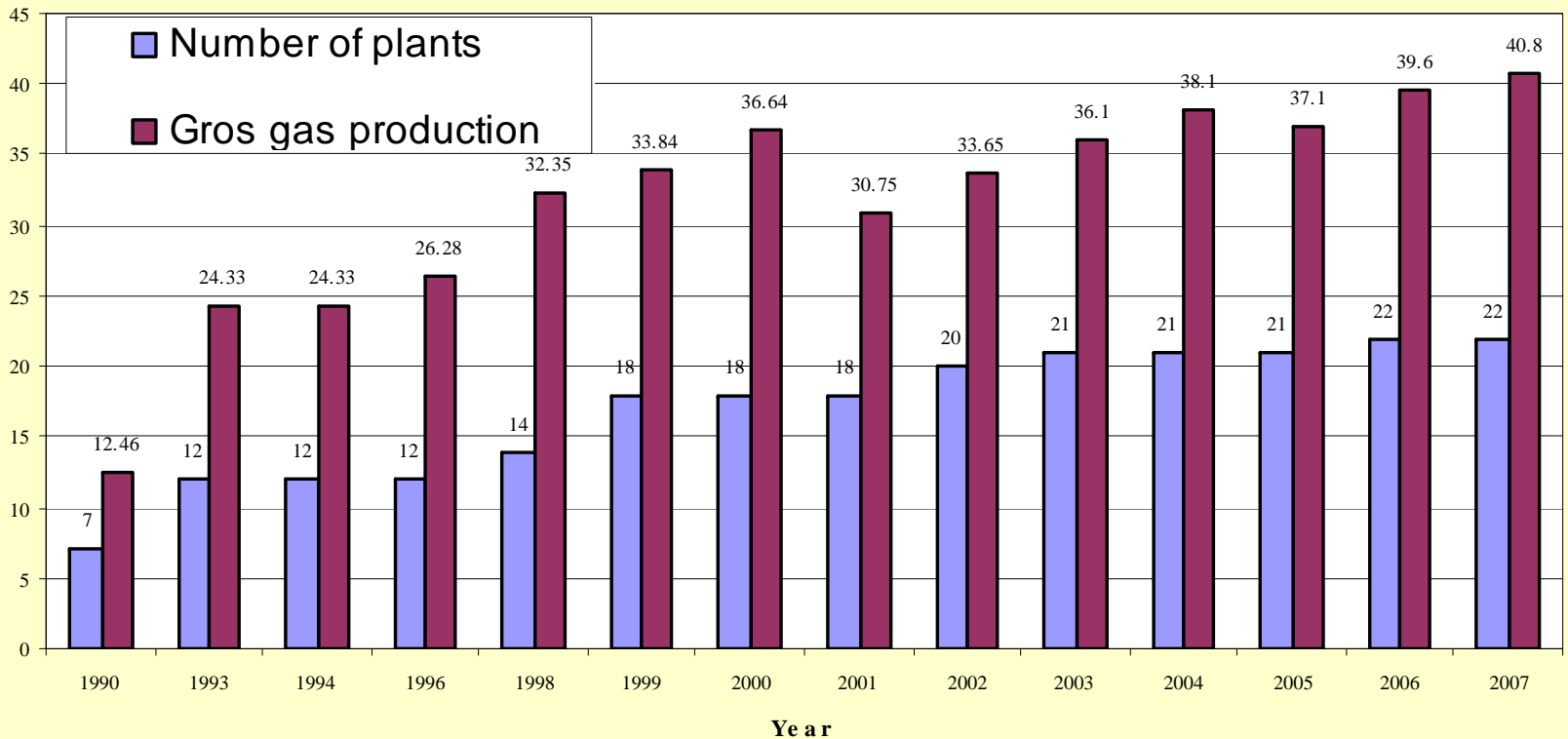
The contribution is made up of 3 parts:

- Deployment of biogas production and utilisation in Switzerland
- Technical developments
- Legal novelties

Industrial Waste Water

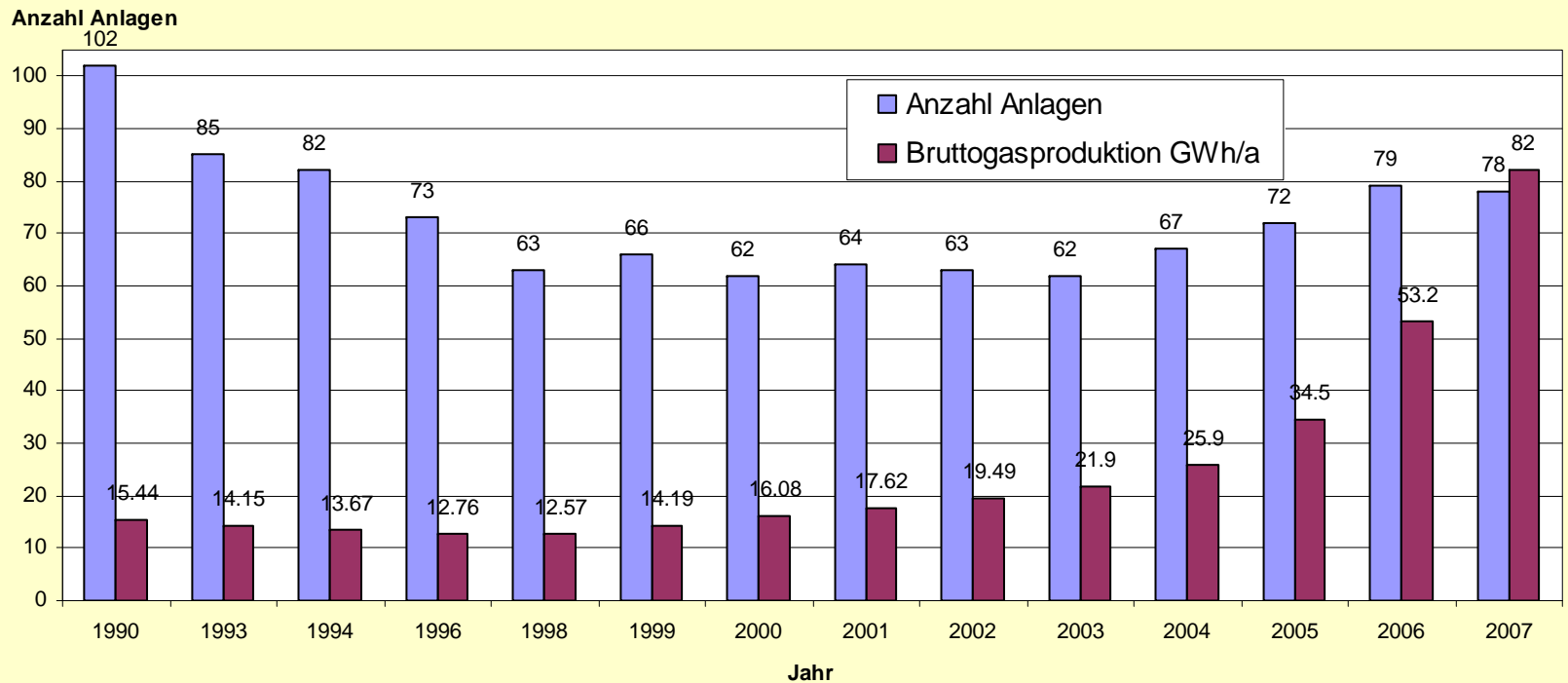
Development of Industrial WWT Plants

Number of Plants



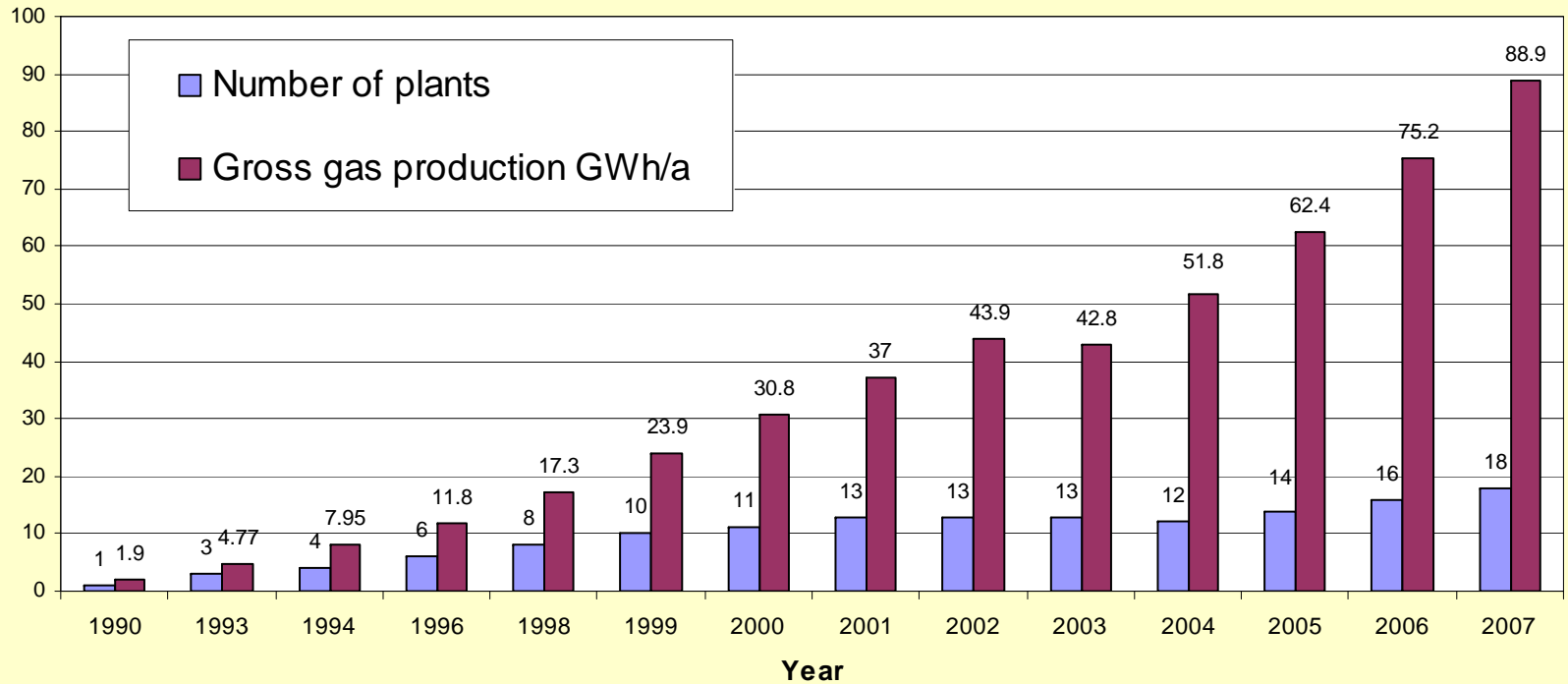
Agricultural Waste: Number of Plants & Energy Production

Entwicklung Landwirtschaft



Bio-Waste: Nr of Plants & Energy Production

Number of plants



Biogas fuel in Switzerland

	2003	2005	2006	2007	2008
Number of vehicles	730	1900	2400	5800	7163
Number of upgrading plants	4	7	6	10	12
Number of fuelling stations	35	60	70	98	106
Share of biogas [%]	45	37	26	21	21
Price at pump station	Biogas	0.62	0.64	0.8	0.68
in €/l petrol eq.	Natural Gas	1.32	1.32	1.34	0.68

Genosorb: Chemical washer



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Sterling Pratteln

PSA with activated carbon

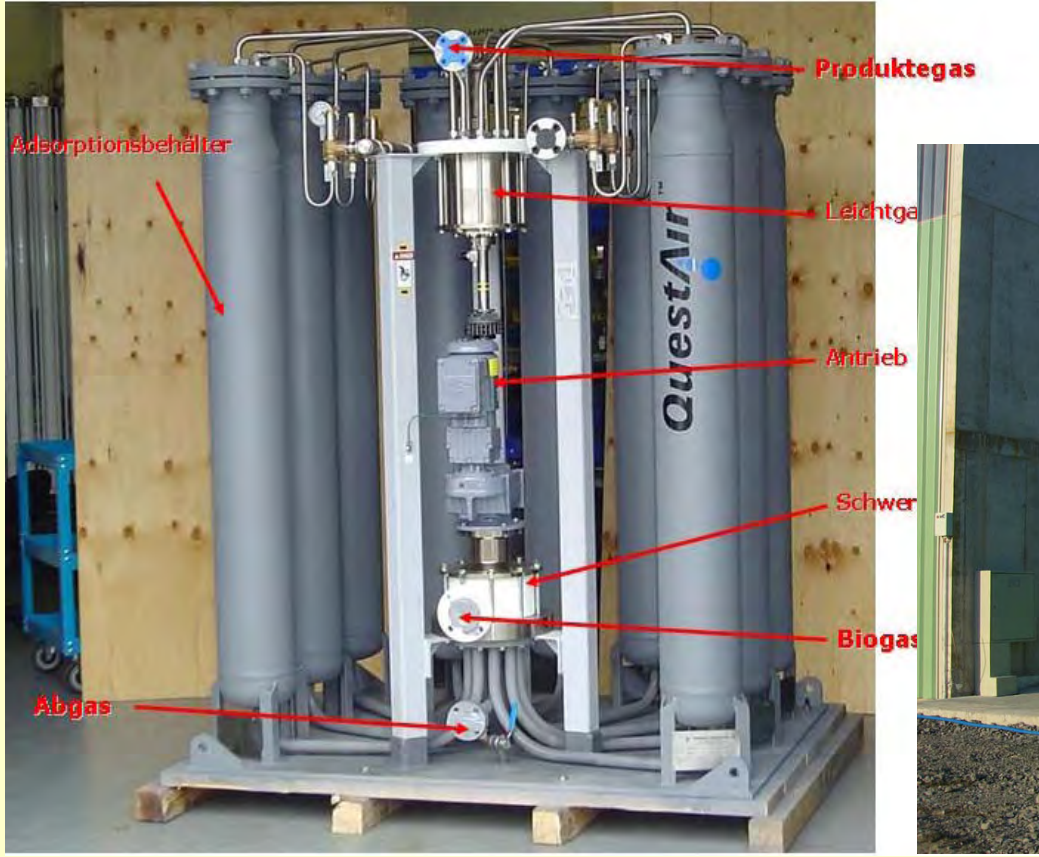


Carbotech Lucerne



Carbotech Berne

PSA with activated carbon



Verdesis, Widnau

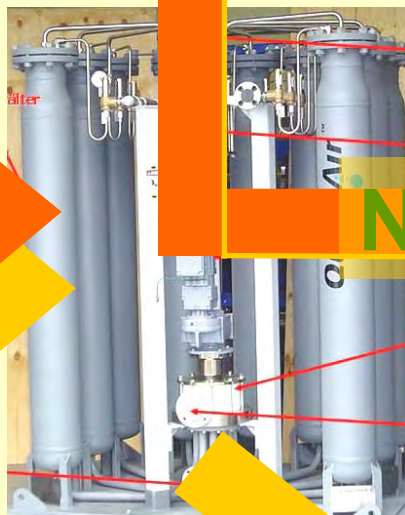
Methane slip



45% CO₂
55% CH₄

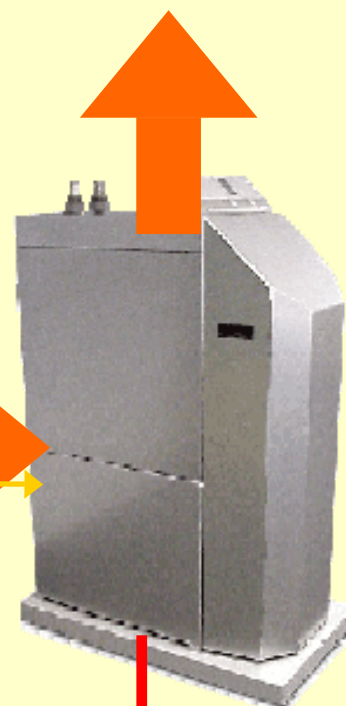
Off-gas contains
up to 12% CH₄

so far



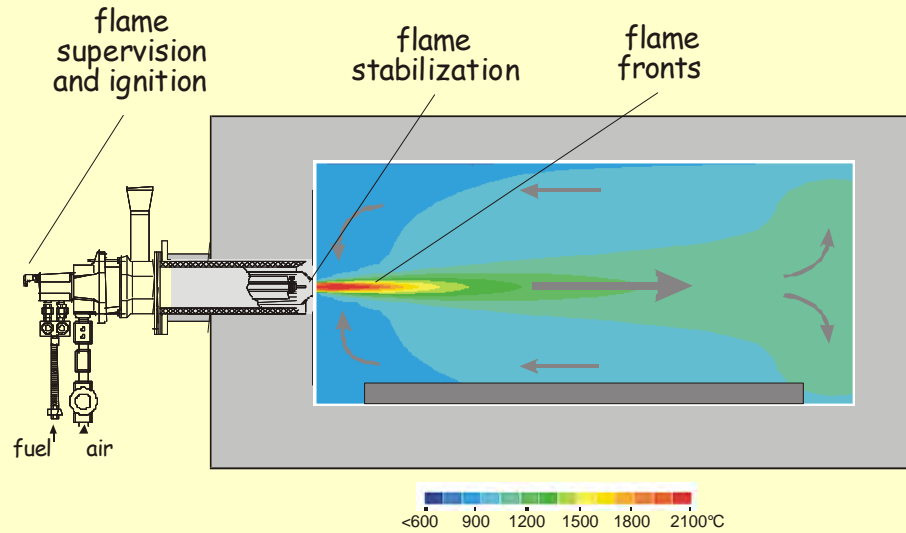
New!

District heating



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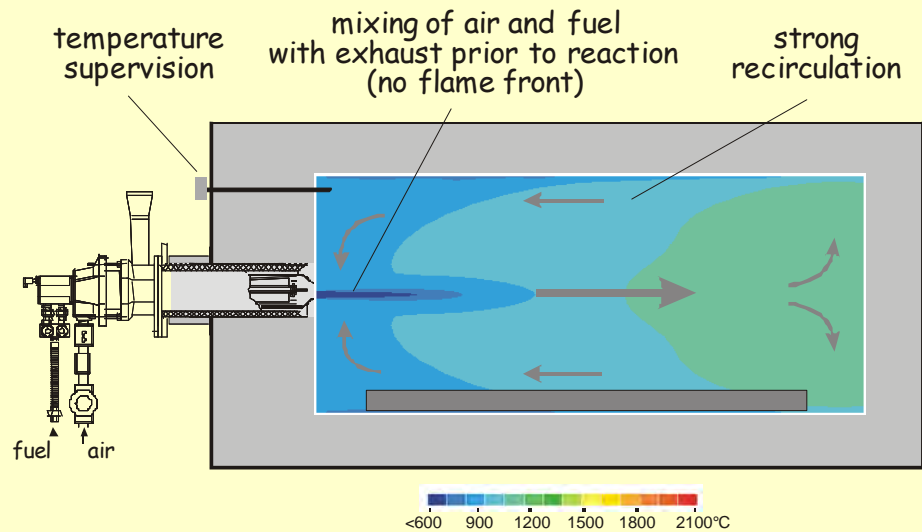
How operates a FLOX® burner?



Flame operation

FLOX-operation

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Swiss Farmer Power

- Solid waste digestion of source separated waste with Kompogas and liquid digestion of manure
- Upgrading of gas with PSA (Verdesis)
- Off-gas oxidation with a Flox burner (Verdesis)
- Treatment of separated (decanter) liquid phase through UF and RO to „drinking water“ quality (3A)
- Distribution of concentrate and solid phase to 70 farmers

Swiss Farmer Power



Swiss Farmer Power



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100kW Flox-Burner

Status: Floxbrenner

Fehler: keine

letzter Fe: Abgastemperatur; Fühlerbruch
vorletzter: Abgastemperatur; Fühlerbruch

Messwerte

Brennertemperatur: 945°C dT: -53°C/min

Abgastemperatur: -115°C

Abgastemperatur WT: 433°C

Sauerstoff: 9,2%

Reaktordruck: 21,0mbar

SekLuftDiffDruck: 26mbar

Klappenstellungen

Biogasklappe: 68%

Primärluft: 70%

Sekundärluft: 39%

Abgasklappe WT: 99%

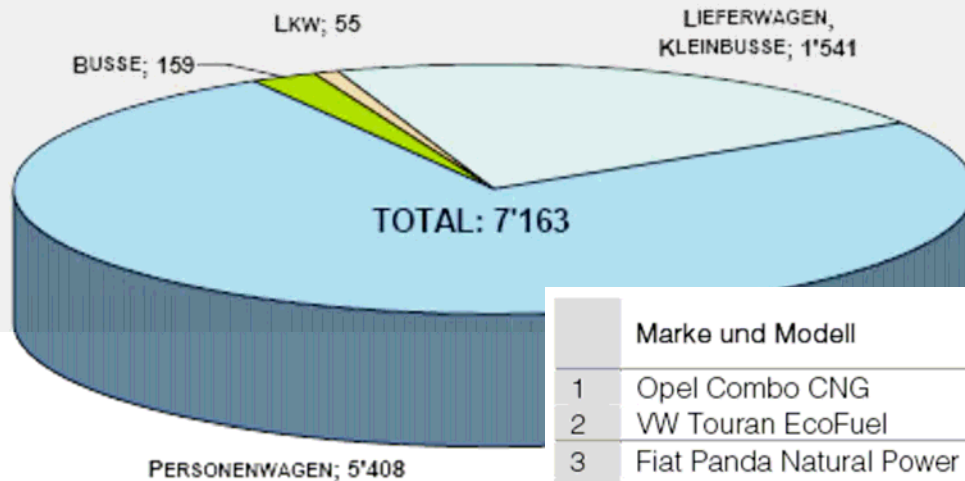
eflox
SGV 100

Swiss Farmer Power



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NGV Sales in 2008 and total



	Marke und Modell	Bestand 12.2008	Verkauf 2008	Verkauf 2007	2008 vs. 2007 [%]
1	Opel Combo CNG	1103	355	392	-9.4
2	VW Touran EcoFuel	588	197	268	-26.5
3	Fiat Panda Natural Power	465	185	280	-33.9
4	Opel Zafira CNG	1008	157	294	-46.6
5	Citroën C3 GNV	503	157	230	-31.7
6	VW Caddy EcoFuel	383	142	183	-22.4
7	Fiat Doblo Natural Power	397	53	112	-52.7
8	Ford Focus Greenpower	132	51	35	45.7
9	Opel Vivaro 2.0i 16V CNG	43	43	---	neu
10	Mercedes B170 NGT	34	34	---	neu
11	Chevrolet Nubira SW CNG	107	32	75	-57.3
12	IVECO Daily CNG	97	27	45	-40.0
13	Volvo V50 Multi-Fuel	18	18	---	neu
14	Ford Fiesta Greenpower	34	17	5	240.0
15	Mercedes Sprinter NGT	43	13	0	neu
16	Fiat Multipla Natural Power	388	11	48	-77.1
17	Ford S-Max Greenpower	12	11	1	1000.0
18	Citroën Berlingo First GNV*	118	10	23	-56.5
19	Peugeot Partner First GNV*	69	10	2	400.0
20	Ford Transit Greenpower	66	10	30	-66.7

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Feed-in law for electricity from RE

The law passed the parliament in 2007

It has a cap at 0.4 €cts/kWh additional cost (Germany is at 7cts/kWh)

theroff hydro will get max 50%

PV max 10%

Biomass max 30%

Wind max 30%

On 1st of May 2008 applications could be first placed

On May 2, the cap for PV was reached !

On February 1, 2009 the programm was stopped because the cap was over booked by about 12% !

Feed-in law: Electricity from biogas

The retribution is based on the calculated equivalent power in relation to the respective class of power:

Electric power	Basic compensation [UScts./kWh]	Agricultural bonus [UScts./kWh]
<= 50 kW	24	15
<= 100 kW	21.5	13.5
<= 500 kW	19	11
<= 5 MW	16	6
> 5 MW	15	0

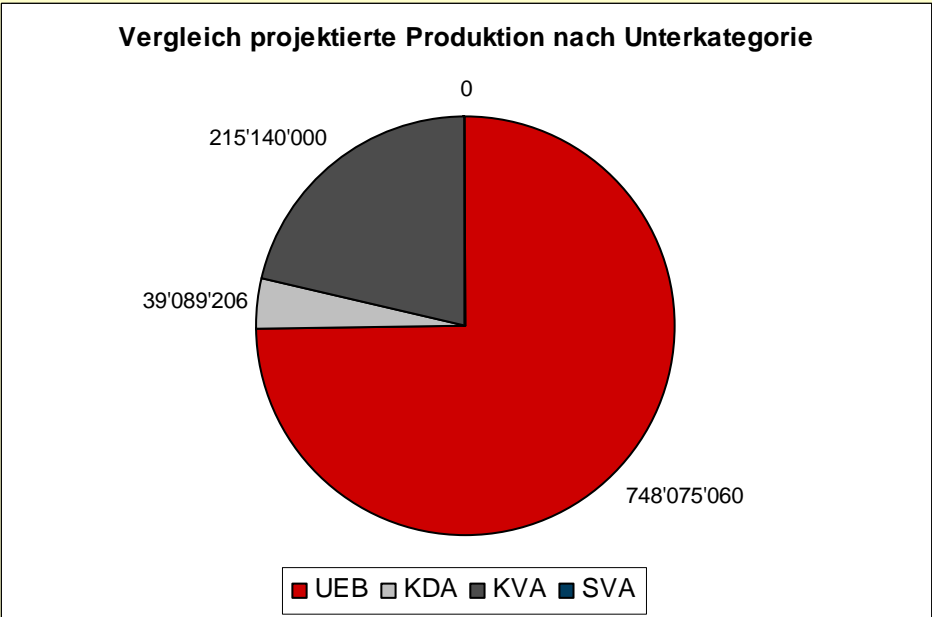
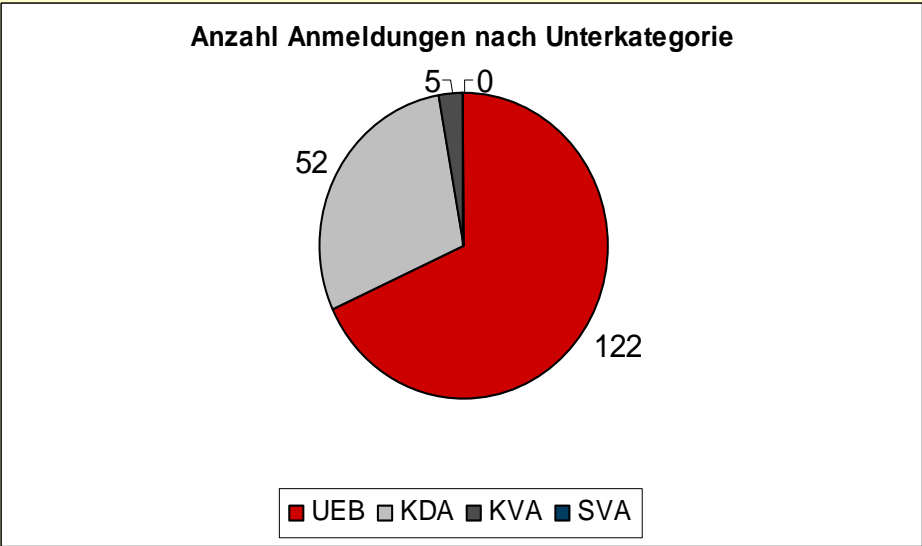
The agricultural bonus will be retributed only under condition that

- The major substrate is animal manure and waste from agricultural production
- co-substrates + energy crops < 20% (fresh weight)

Feed-in law: Electricity from biogas (2)

KVA: Waste incineration
 SVA: Incineration of sludge from WWTP
 KDA: Biogas from landfill and WWTP
 UEB: Other biogas plants and wood

47 agric. Plants with manure bonus
 26 industrial or agric. plants w/o MB



Labeling of electricity and biomethane



- Requirements:
- Local criteria
 - Global criteria (LCA)

We are working on a new LCA

→ Allocation of environmental load is a problem

LCA for mineral oil tax exemption

A new ordinance has just been released on April 3rd, 09 defining the requirements to proof sustainability

→ It is almost imposssible to produce biomethane from energy crop unless using intermediate crop or perenial grass

→ An even more pronounced fight for industrial waste material has started

GHG emission inventory

Table E-4 Switzerland's total gross GHG emissions (excluding LULUCF) in CO₂ equivalent (Gg) and the contribution of individual source categories, selected years.

Source and Sink Categories	1990		1995		2000		2005		2006		2007	
	Gg CO ₂ eq	%	Gg CO ₂ eq	%	Gg CO ₂ eq	%	Gg CO ₂ eq	%	Gg CO ₂ eq	%	Gg CO ₂ eq	%
1. Energy	42'086	79.8%	41'651	81.6%	42'433	82.2%	44'390	82.7%	43'563	82.7%	41'966	81.9%
2. Industrial Processes	3'258	6.2%	2'554	5.0%	2'789	5.4%	3'081	5.7%	3'041	5.7%	3'058	6.0%
3. Solvent and Other Product Use	468	0.9%	371	0.7%	282	0.5%	230	0.4%	229	0.4%	231	0.5%
4. Agriculture	5'903	11.2%	5'638	11.0%	5'411	10.5%	5'282	9.8%	5'287	9.9%	5'346	10.4%
5. Waste	994	1.9%	824	1.6%	733	1.4%	682	1.3%	663	1.2%	663	1.3%
Total (excluding LULUCF)	52'709	100.0%	51'039	100.0%	51'648	100.0%	53'665	100.0%	53'173	100.0%	51'265	100.0%

Goal for 2012: -8%
(as compared to 1990)

Achieved 2007: - 2.7%

Total emission: 6.73 t/capita

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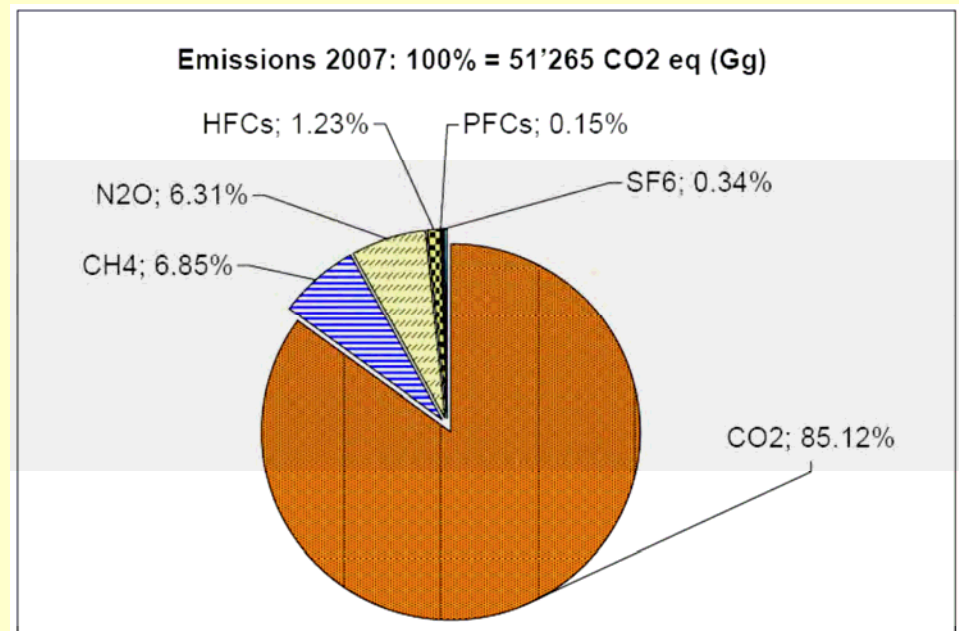


Figure E-1 Contribution of individual gases to Switzerland's GHG emissions (excluding LULUCF) in 2007. 100% = 51'265 Gg CO₂ eq.

European Biogas Association

- Founded: 3.2.2009 in Hannover
- Members: 11 founding members: Germany, Italy, Lithuania, Latvia, Austria, Poland, Roumania, Spain, Czech Republic, Switzerland
4 new members since:
France (2), U.K., Sweden,
- Seat: Brussels (EREF)
- Secretariat: Freising
- Goals: Optimisation of Information flow
Lobbying in Brussels
Acquisition of EU projects to promote biogas application

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European Biogas Association

Committee:

President: Arthur Wellinger

Vice presidents: Harm Grobrügge (D)

Franz Kirchmeyr (A)

Representatives: Pierro Gattoni (I)

Jan Štambaský (CzR)

Secretary general: Sebastian Stolpp (D)

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