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L'energia della Natura

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CONSORZIO MONVISO AGROENERGIA

**The Italian biogas sector: state of the art
and future challenges**

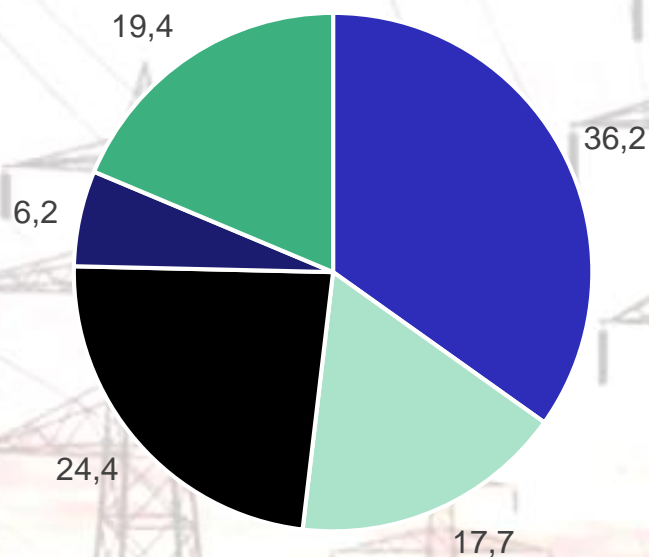


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RENEWABLE ENERGIES IN ITALY (GSE 2017)

Electricity sector

Energy production (TWh)



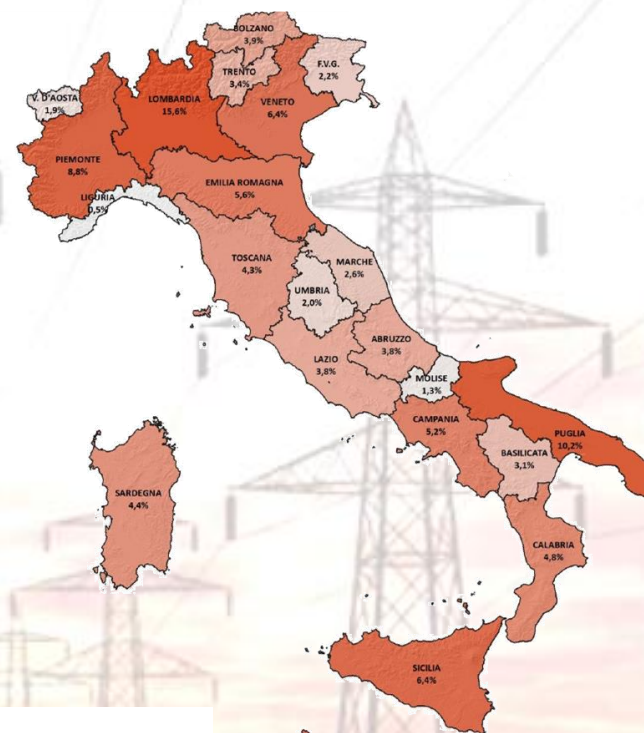
■ Hydraulic ■ Wind ■ Solar ■ Geothermic ■ Bio energy



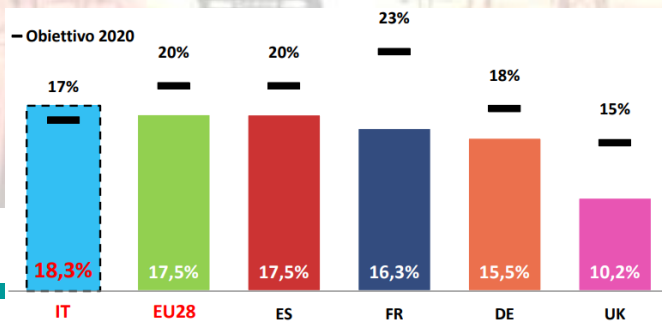
TOTAL REN ENERGY PRODUCTION
104 TWh

• Total need: 320,5 TWh

Installed Power (%)



Min Max



THE BIOGAS SECTOR IN ITALY (GSE 2017)



2.116 operating biogas plants

- 1.629 farm scale plants
- 487 other plants (ex. waste, sludge, etc)



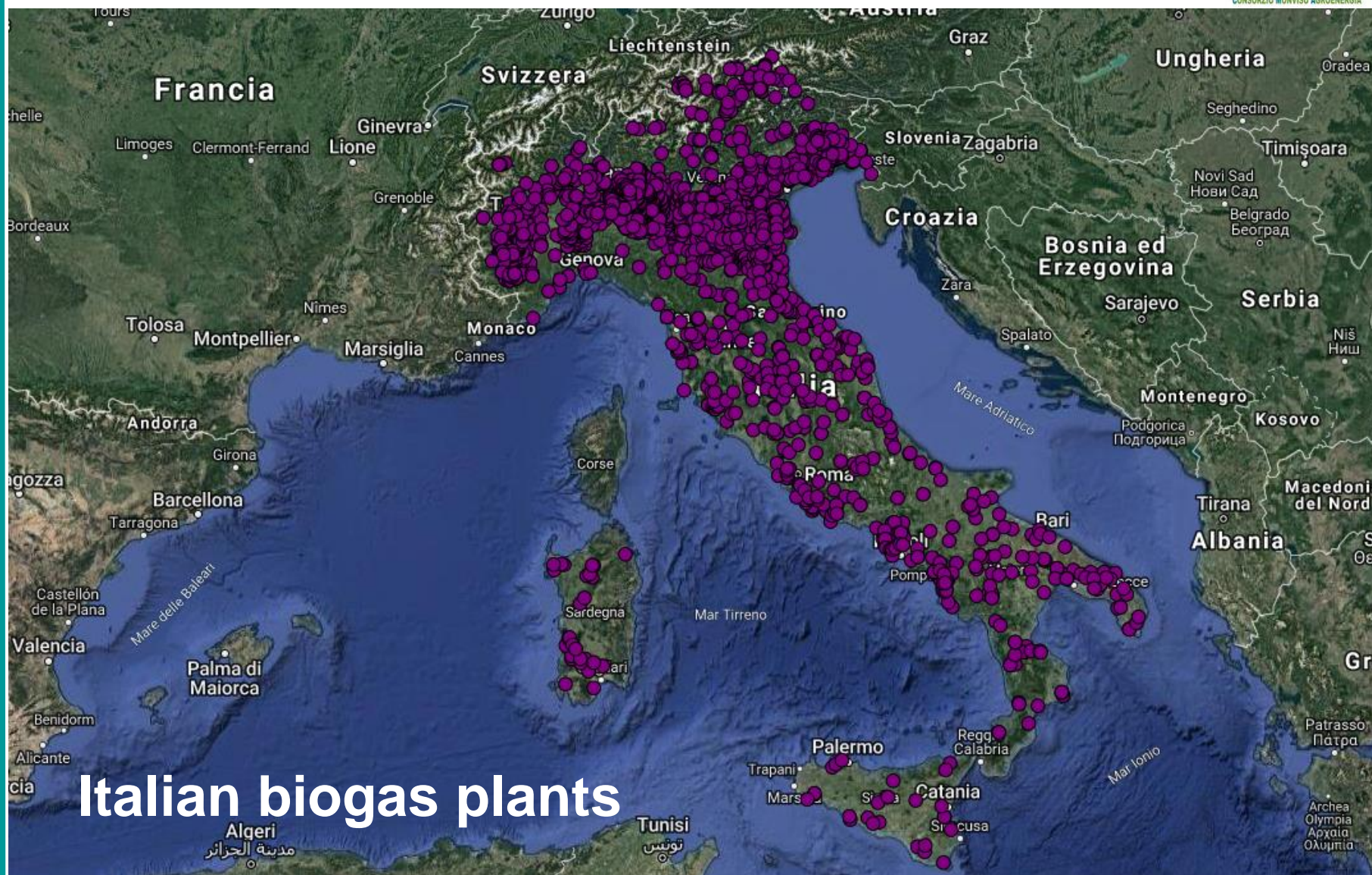
988 MWe installed in farm plants

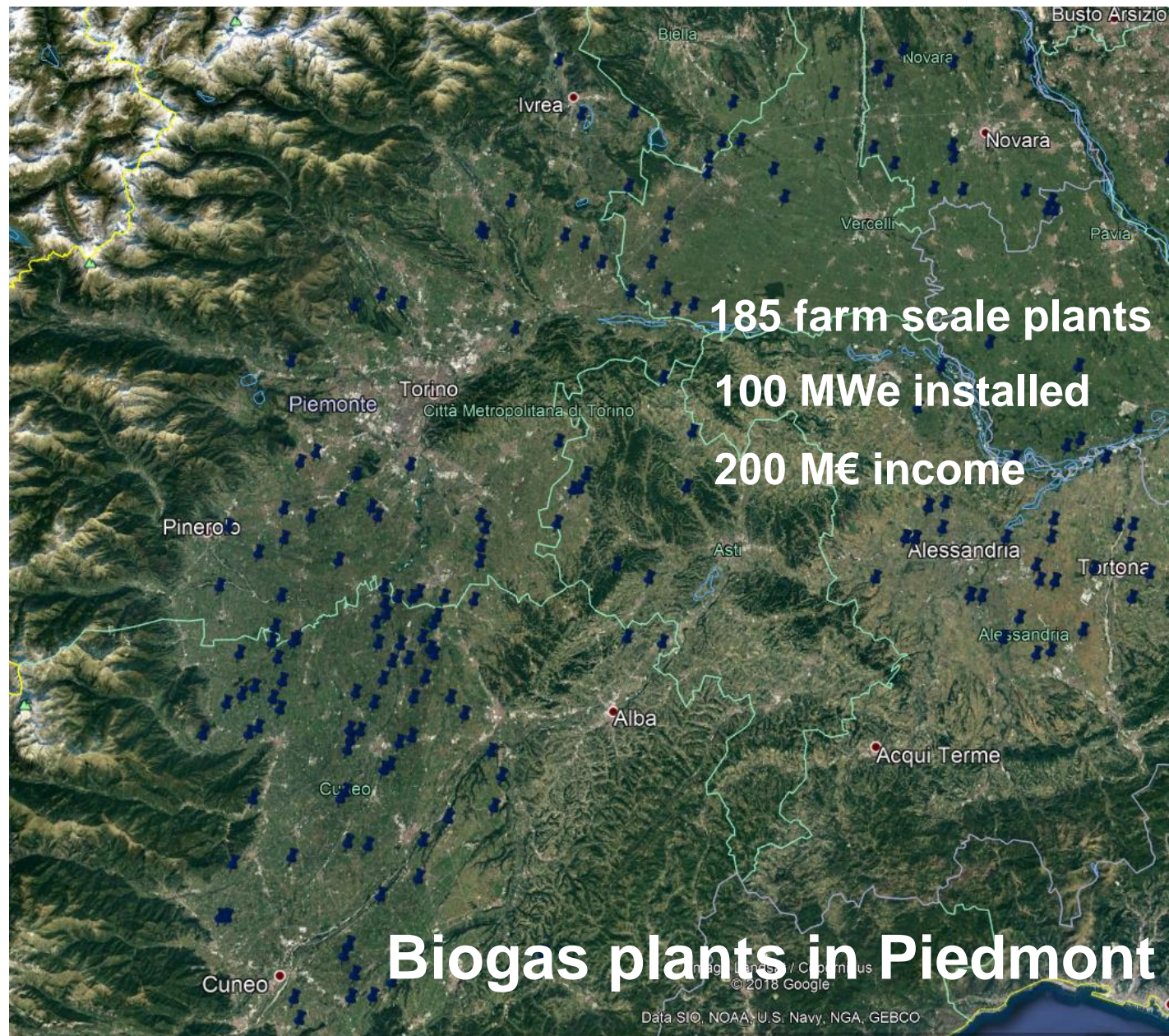
- 6,7 TWh produced electricity (6% of all renewable)
- 1,2% of the national need



19,8 Mt/year equivalent tons Maize (SMEq)

- About 16 Mt/y of vegetal feedstocks
- About 23 Mt/year of manure and byproducts





THE BIOGAS SECTOR IN ITALY (GSE 2017)

Electricity sector

Energy production (GWh)

From Wastes: 1426

From Sludge: 136

From Manure and slurry: 1194

From Agriculture matrices: 5543

Number of plants

From Wastes: 409

From Sludge: 78

From Manure and slurry: 602

From Agriculture matrices: 1027

Installed power (MW)

From Wastes: 411

From Sludge: 45

From Manure and slurry: 235

From Agriculture matrices: 752

Number of plants (%)

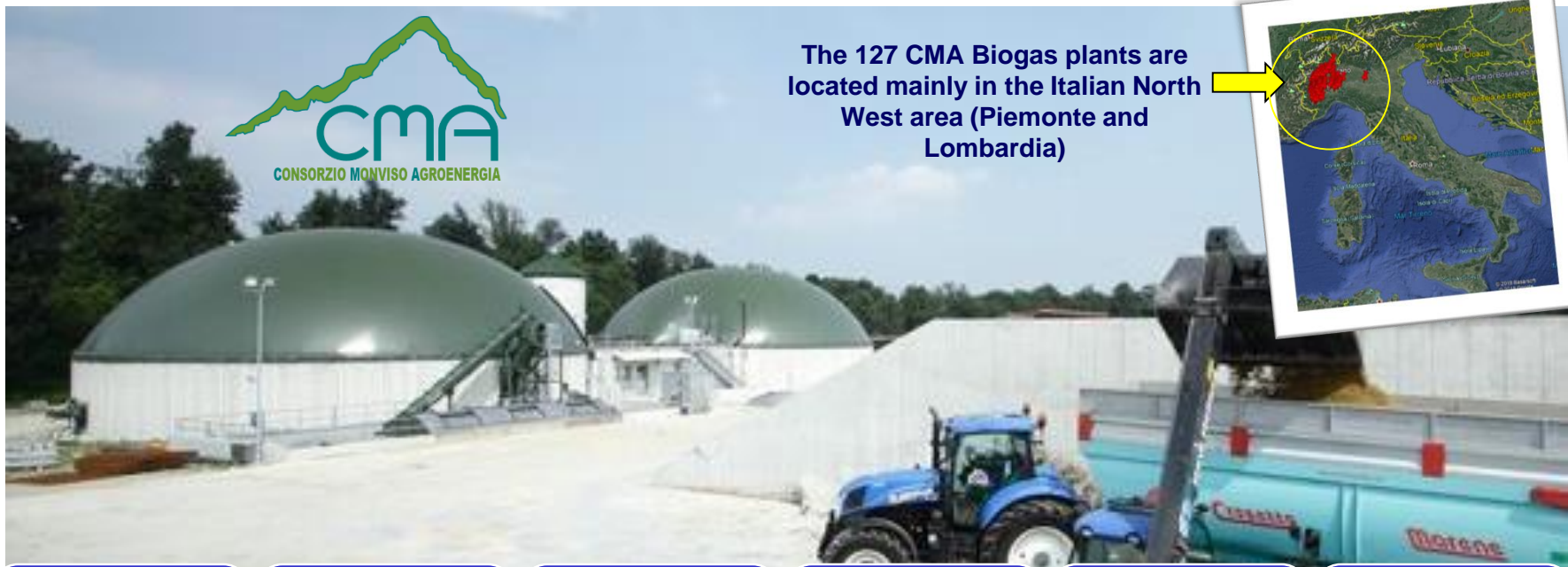


The map includes also biomass plants (468 plants) and bioliquid plants (500 plants)

Min

Max

CMA NUMBERS... 2018



127 Ordinary members
289 Provider members



1.300 ancillary farms



1.100.000 t/y livestock waste
16.700 t/y by-products



840.000 t/y vegetable biomass



153 M€ income



70 MWe installed
590.000 MWh_e produced



CMA PERFORMANCE in 2017

Performance index

	Min	Med	Max
Hours	7.833	8.567	8.735
GPI %	64,0	95,0	99,4
NPI %	57,6	85,1	93,9
Auxiliary units %	4,1	9,2	19,8

GPI = Gross Performance Index (Gross En./Theoretical En.)

NPI = Net Performance Index (Net En./ Theoretical En.)

Electricity production

	MWh
Electricity- gross	530.000
Electricity- to the grid	475.000



HAASE Energietechnik

The best 10 plants

Prov	Pow. kWe	Hours th h/y	Work hrs h/y	Th. Energy MWhe/y	Gross Energy MWhe/y	Net Energy MWhe/y	IPL %	IPN %	Aux. units %
AL	625	8.760	8.733	5.475	5.444	5.035	99,4	92,0	7,5
AL	300	8.760	8.735	2.628	2.611	2.318	99,4	88,2	11,25
CN	190	8.760	8.714	1.664	1.655	1.462	99,4	87,8	11,68
CN	249	8.760	8.718	2.181	2.168	1.909	99,4	87,5	11,94
VC	999	8.760	8.726	8.751	8.693	8.029	99,3	91,7	7,64
PV	999	8.760	8.721	8.751	8.690	8.007	99,3	91,5	7,87
TO	800	8.760	8.728	7.008	6.961	6.338	99,3	90,4	8,95
CN	999	8.760	8.707	8.751	8.671	7.902	99,1	90,3	8,87
TO	990	8.760	8.663	8.672	8.598	7.784	99,1	89,8	9,46
TO	249	8.760	8.692	2.181	2.161	1.952	99,1	89,5	9,64



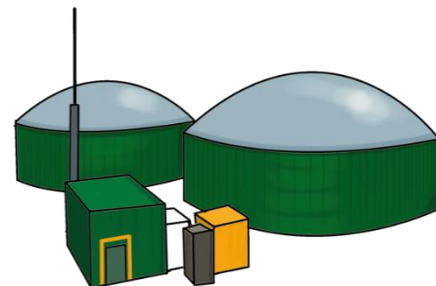
CMA: The most common feedstocks... (2017)

Type	Weight [t]	Weight [%]	Energy [t SMeq]	Energy [%]
Silages	801.947	42,79	824.113	78,32
Manure	1.033.434	55,14	176.107	16,74
Flours	14.333	0,76	34.312	3,26
By-products	16.202	0,86	8.754	0,83
Grains	2.695	0,14	6.704	0,64
Fruit	5.509	0,29	2.259	0,21
Total	1.874.119		1.052.250	

Source: collected data from CMA – year 2017 – 111 plants with full feedstock data

The most common feedstock categories... (2017)

Group	Matrix	Weight [t]	Weight [%]	Energy [t SMeq]	Energy [%]
IMA	Maize Silage	576.063	30,74	584.477	55,55
IPM	Maize ear silage	47.704	2,55	98.270	9,34
RLB	Cattle slurry	534.622	28,53	81.431	7,74
ITR	Triticale	90.099	4,81	71.570	6,80
RTB	Cattle straw manure	217.037	11,58	66.376	6,31
ISG	Sorghum	35.589	1,90	27.892	2,65
IOR	Barley silage	29.663	1,58	25.215	2,40
MFM	Maize flour	9.015	0,48	23.891	2,27
RLS	Pig slurry	246.215	13,14	15.044	1,43
RTL	Cattle husk manure	24.343	1,30	7.547	0,72
GMA	Maize grain	2.536	0,14	6.339	0,60
ILO	Rye-grass silage	9.747	0,52	6.142	0,58
RPO	Poultry manure	8.711	0,46	4.966	0,47



ISSUES OF THE ITALIAN BIOGAS SECTOR

The biogas sector has developed very considerably since 2008, with the governmental Feed-in Tariff support scheme



N° plants	2008	2009	2010	2011	2012	2013	2014	2015	2016
New	35	24	117	323	669	131	63	104	63
Existing	35	59	176	499	1168	1299	1362	1466	1529

2009 + 15

The first biogas plants will reach the end of the subsidy period in

2024

Most of the **existing plants** can, **apparently, survive just thanks to the feed-in tariff** as the production costs are much higher in comparison to other renewable sources



Will the sector be economically sustainable without public subsidies?

PROBLEM



BIOGAS PRODUCTION COST

Source: CMA





Strategia 2024

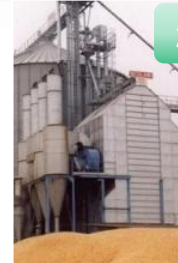
la filiera del biogas italiano al servizio dell'agricoltura



1

Higher **COMPETITIVENESS** of the plants

- Reduce feedstock costs (more livestock effluents!)
- Decrease maintenance costs
- Increase efficiency:
 - Better electric performances (new engines, fuel cells?)
 - Optimization of biologic processes
- Improve logistics and transportation (es. pipes for slurry..)



2

INTEGRATION IN THE FOOD CHAIN

- Give value to heat (greenhouses, algae, insects...)
- Self consumption of Electricity
- More value to Digestate (agronomic use, fertilizers...)
- Using CO₂ (algae, greenhouses, ecc)
- Energy for farm scale food industry
- Production of chemicals intermediates products (ie EDTA)



3

BIOMETHAN

- Self consumption (farms)
- Use for transports
- Injection in the national grid



4

ELECTRIC MARKET

- Producer self consumption (High exploitation kWe)
- Injection in the national grid at the market price
- Grid ancillary services
 - Balancing of grid, Storage, Power to gas
 - Capacity payment...
- Energy communities (Art. 22 RED2)



5

Removal of **LAW BARRIERS**

- Removal of barriers for participating the ancillary service market
- Feed-in tariff on a annual basis and not on a hourly basis
- More flexibility on the plant configuration
- Clear and simple law scheme for energy communities



6

INCENTIVE SCHEME

- More convenient incentives for biomethan
- **New incentives for electric production**
- **Tax relief on system burdens for energy communities**
- **Environmental and agricultural premium**

Goal: competitive biogas after 2024





THANKS FOR YOUR ATTENTION



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