

# Trasnational Forum

“Biogas – Targets, Potential & promotion within Central Europe”

## The state of biogas in Italy potential, targets and strategies in the nREAP framework

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# Biomass and the energy strategy

*.....Biomass will have a relevant role to reach the goals of the european climate package.*

*Currently the growth of renewables is mainly in photovoltaic and wind sectors, we have to increase the amount of energy produced by biomass,*

*Taking into account the potential, biomass will represent more than 50% of our renewable energy production in 2020.....*

Alessandro Ortis, 2010

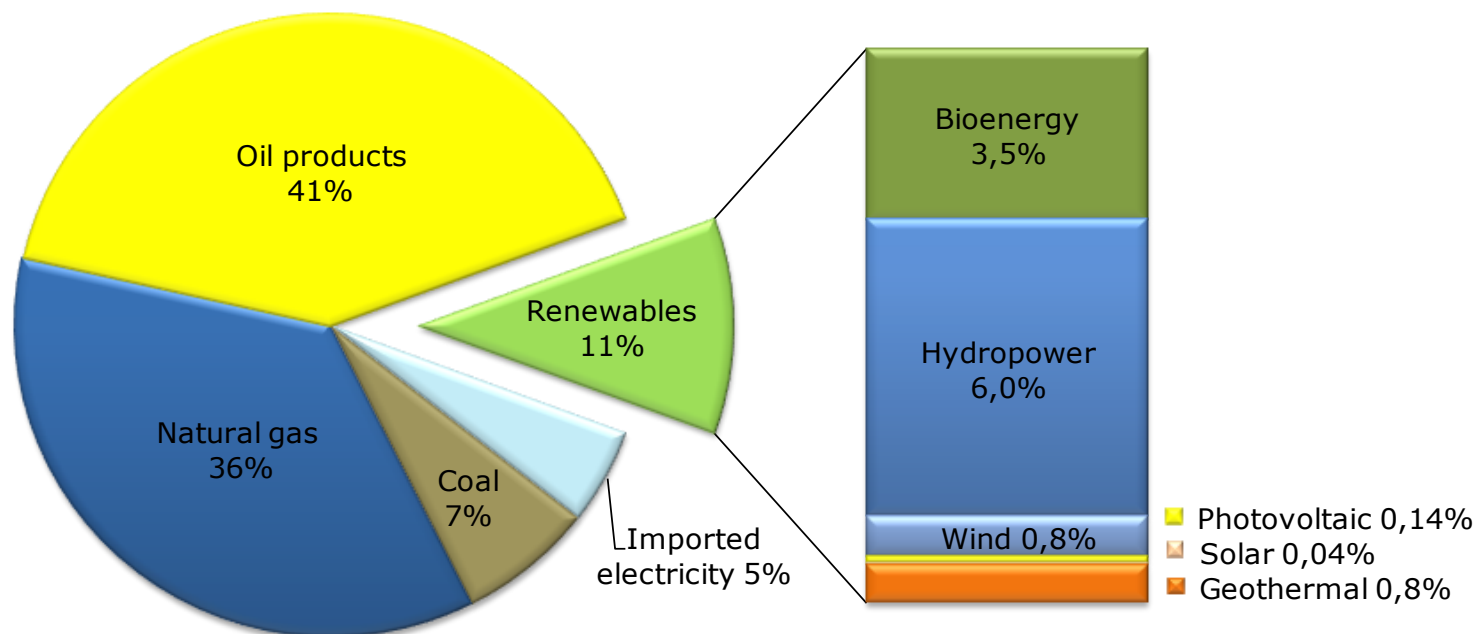
(former Chief of Regulatory Authority for Electricity and Gas)

# Contents

- **State** Bioenergy in Italy, Plants and energy, growth trends
- **Potential** How much? Assessments
- **Targets** National Plan
- **Policies and measures** Decrees, incentives, promotion
- **Open Issues** Critical points or questions on debate

# The state of bioenergy

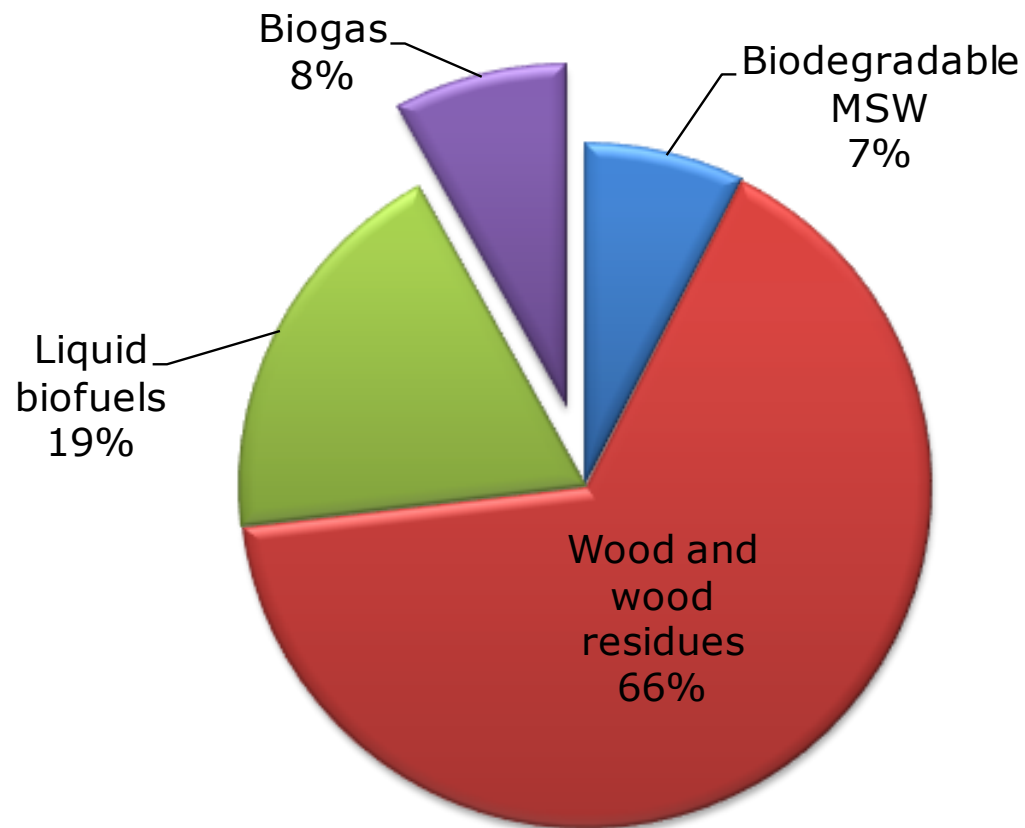
Energy use by source and bioenergy contribution, Italy, 2009



Source: ENEA 2010

# The state of bioenergy

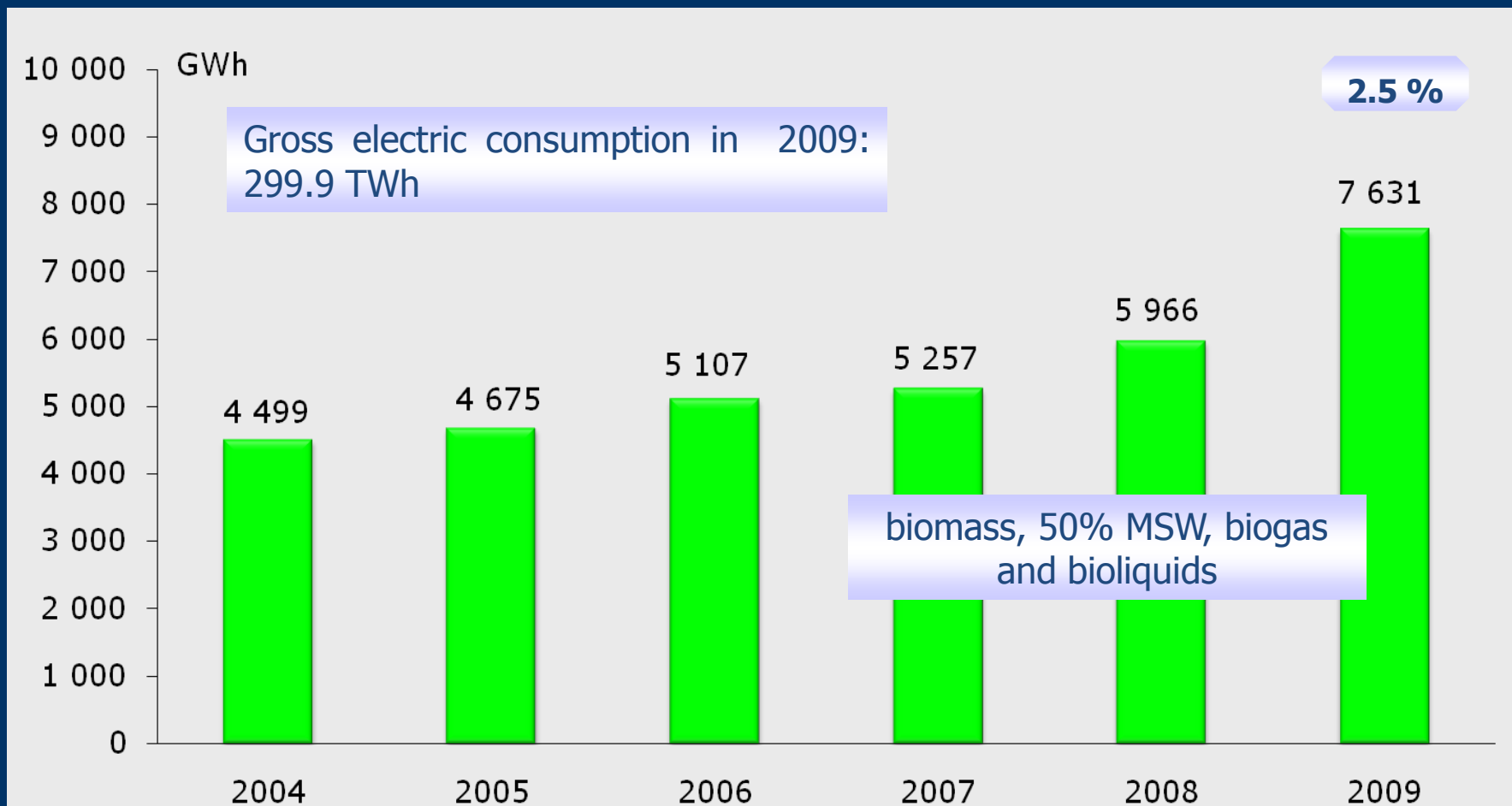
Bioenergy production by source type, Italy, 2009



Source: ENEA, 2010

# The state of bioenergy

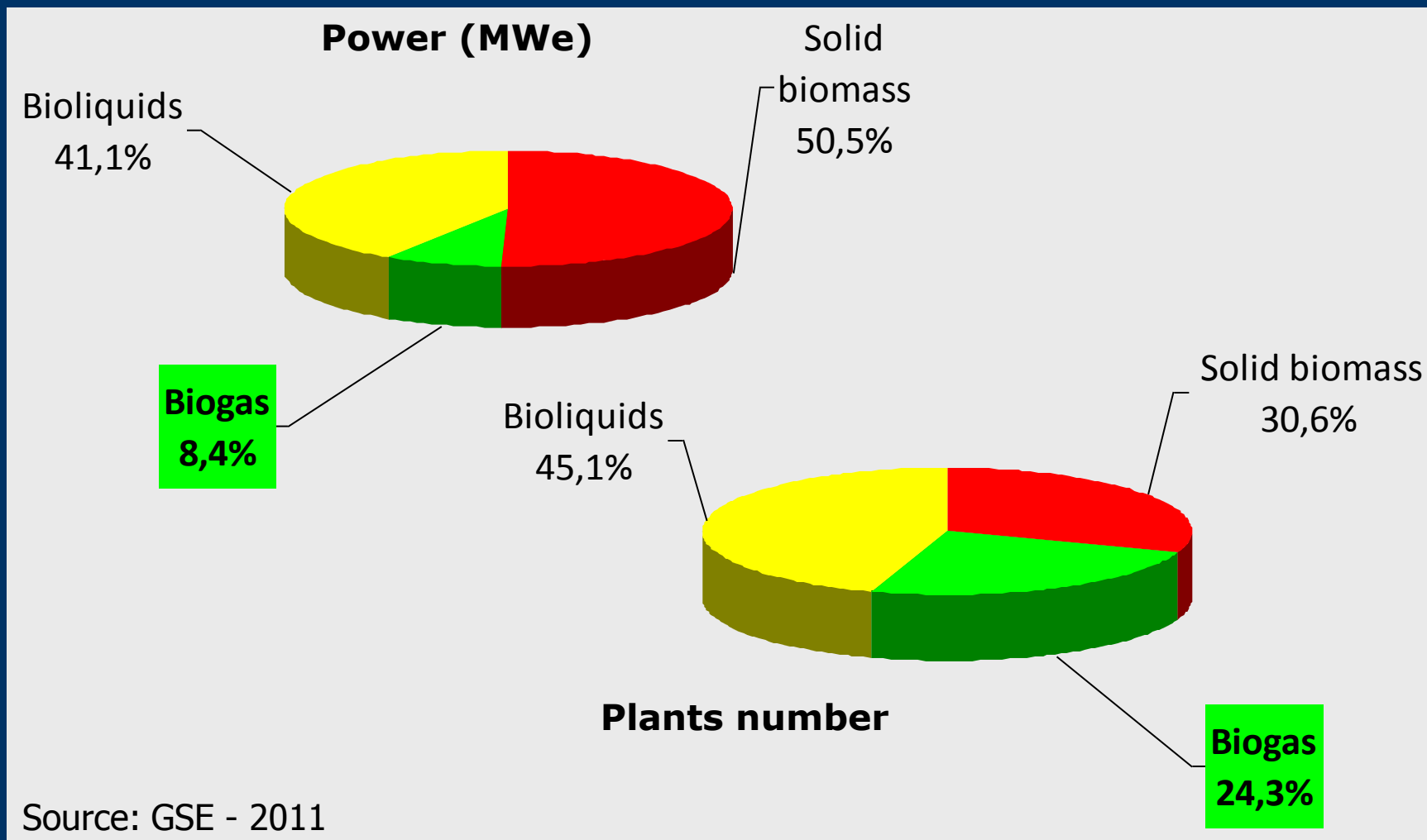
## Electricity production from "biomass" in Italy (2004 - 2009)



Source: GSE - 2011

# The state of bioenergy

## Biomass electric plants characteristics Italy, 2009



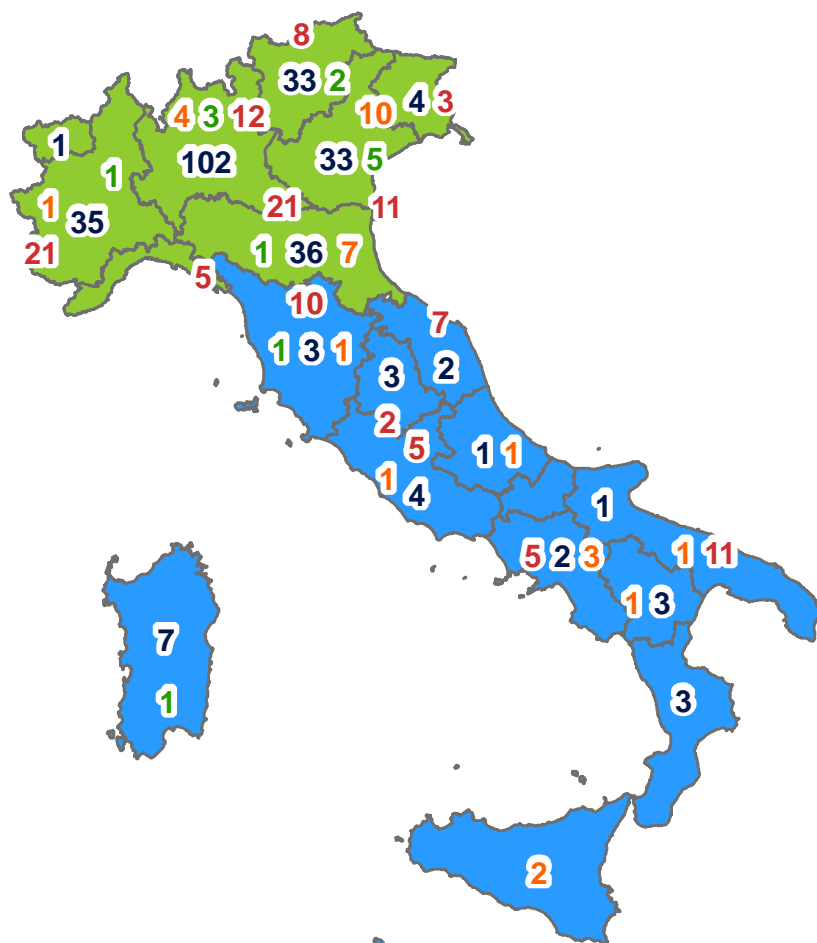
Source: GSE - 2011

# The state of biogas

## Italy 2009

- Biogas production in 2009 was about 444,3 ktoe (EurObserv'ER assessment),
- 80% of biogas production is from MSW Landfills (232 plants),
- 440 plants feeded with a mix of different substrates (from agroindustry, agrozootechnical residues and sewage sludge),
- The total installed capacity is about 450 - 500 Mwe (including landfills)
- A recent boost of biogas plants in the agro-industrial and zootechnical sector.

# The state of biogas



## Legend

- 273 Livestock manure + Agro-industrial residues + energy crop
- 14 OFMSW + Sewage sludge
- 32 Agro-industrial sludge
- 121 Sewage sludge

Source: CRPA 2010

Regional distribution shows that plants are mainly located in the northern regions and more than 60% are related with the agriculture and zootechnical sector

# The state of biogas

## National biogas plant census



## Agro..... plants

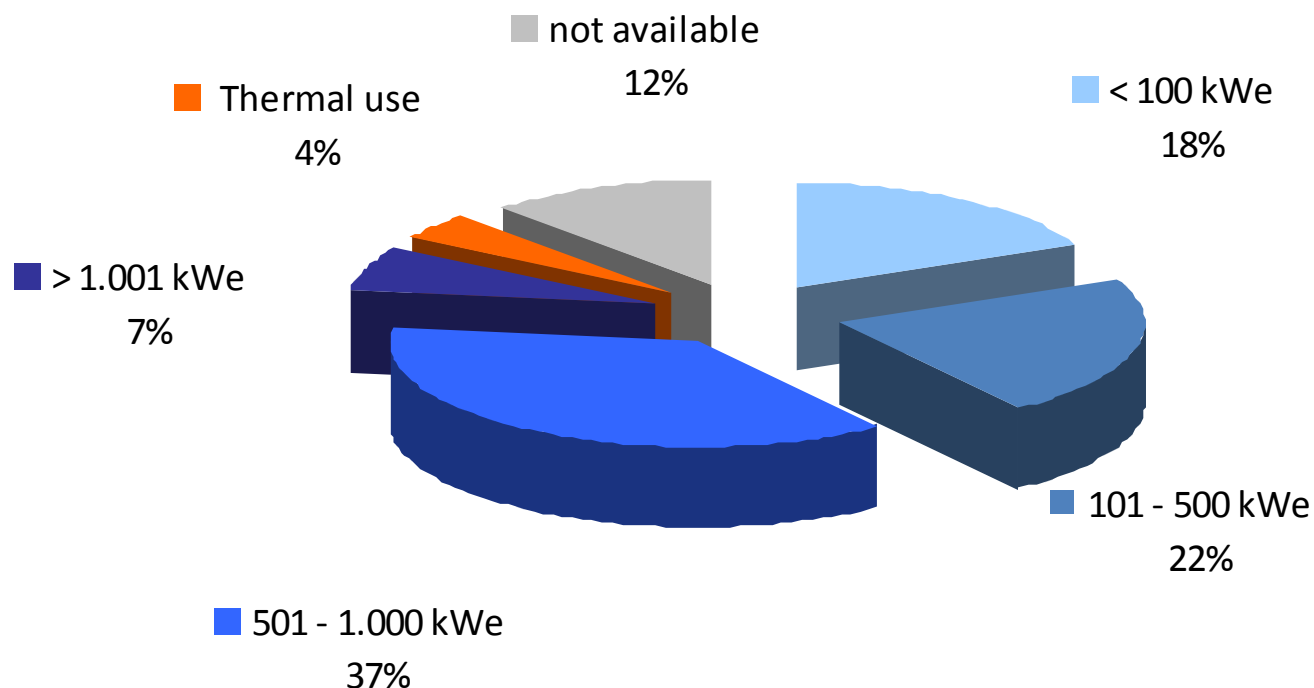
- 273 Plants, 74 out of which under construction
- 50% works in co-digestion livestock manure plus energy crops and agroindustrial residues
- 90% of plants are sited in the North (Central Europe Regions)

About 150 MWe installed power

Source CRPA, march 2010

# The state of biogas

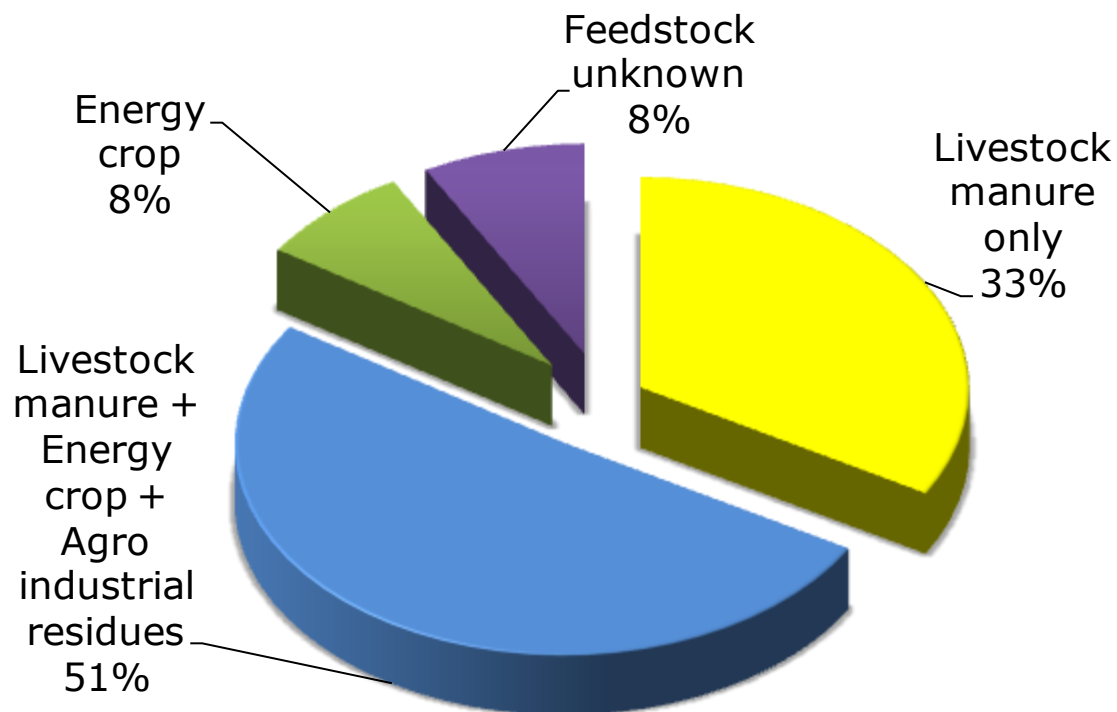
Biogas plants % by final energy use /installed capacity (kWe)



Source: CRPA 2010

# The state of biogas

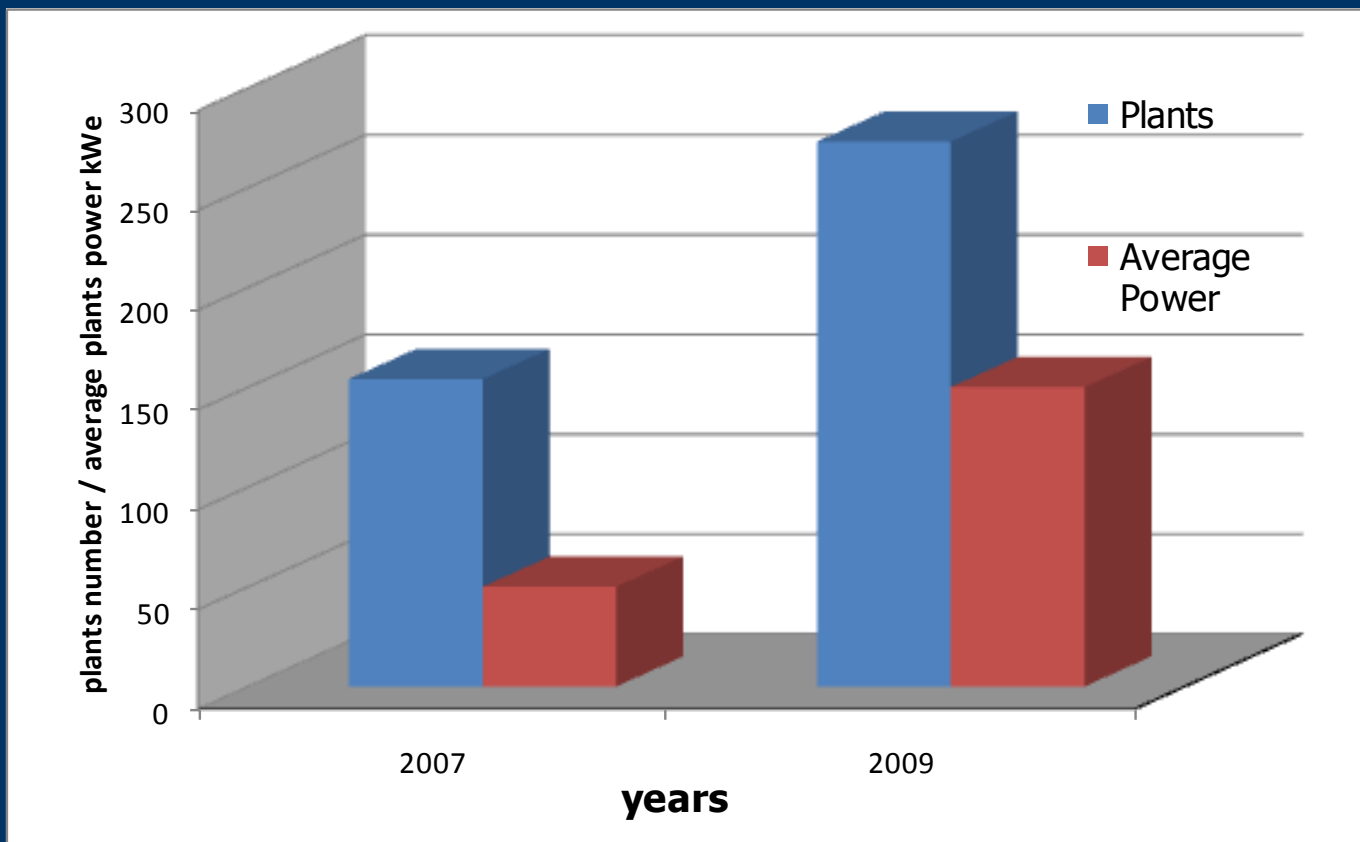
## Feedstocks used by plants (%)



Source: CRPA 2010

# Trends

A comparison between 2007 and 2010



+ 80 % plants

+ 186% Average power

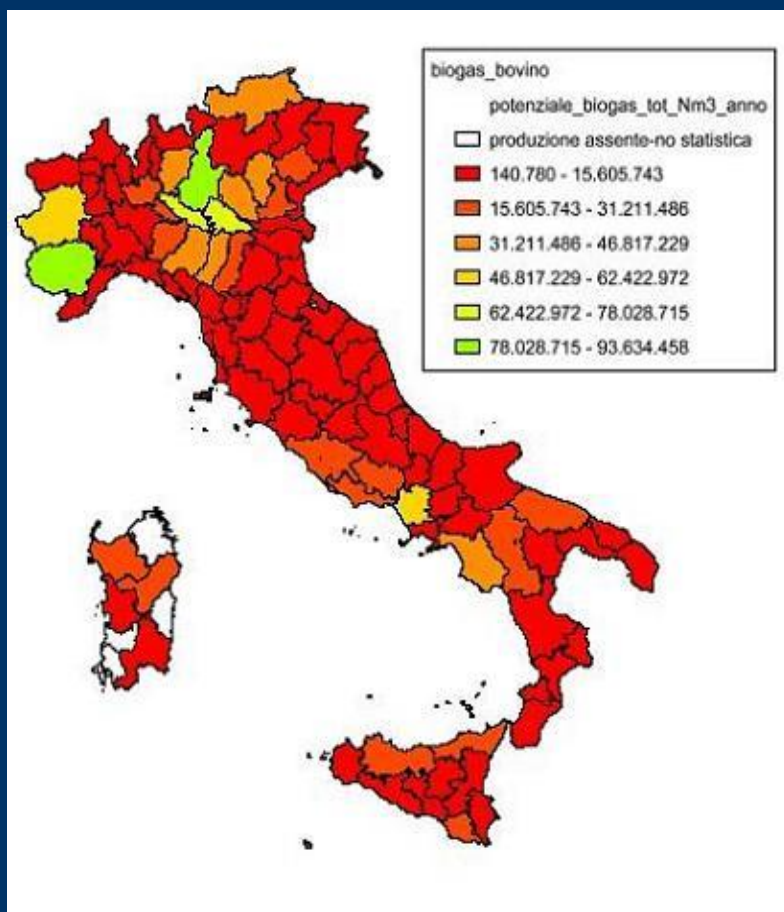
The 2010 Average Power of plants under construction is about 700 kWe

# Potential

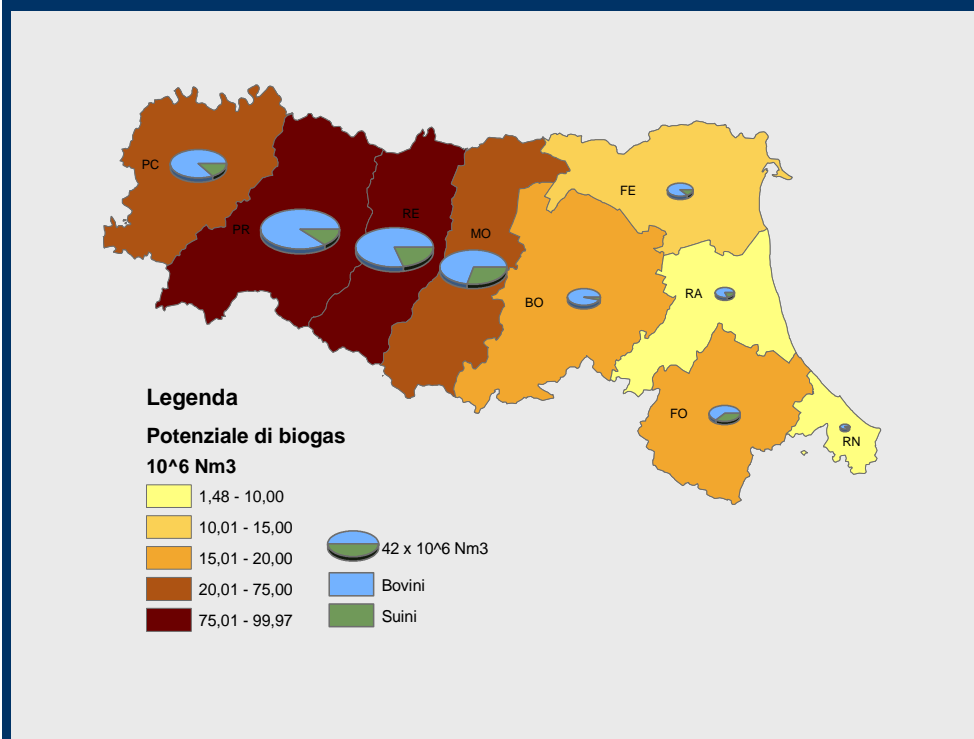
- According to a recent assessment by ENEA Italy has a huge energy potential that could derive from the anaerobic digestion of the organic fraction of municipal waste (OFMSW) and from cattle and pig manure, more agroindustrial residues
- The energy potential from OFMSW was about 1330 millions Nm<sup>3</sup> biogas in 2006, considering not only the humid fraction of municipal waste from separate waste collection, but also the residual fraction from the undifferentiated waste, to be potentially recovered or otherwise sent to the landfill
- The potential from cattle and pig manure, taking into account also small breedings, is of about 1827 millions Nm<sup>3</sup> biogas
- All potential data are included in a national biomass atlas

# Potential

The Atlas is a WebGIS tool to show, download and analyse at regional and provincial level all biomass available for energy use.



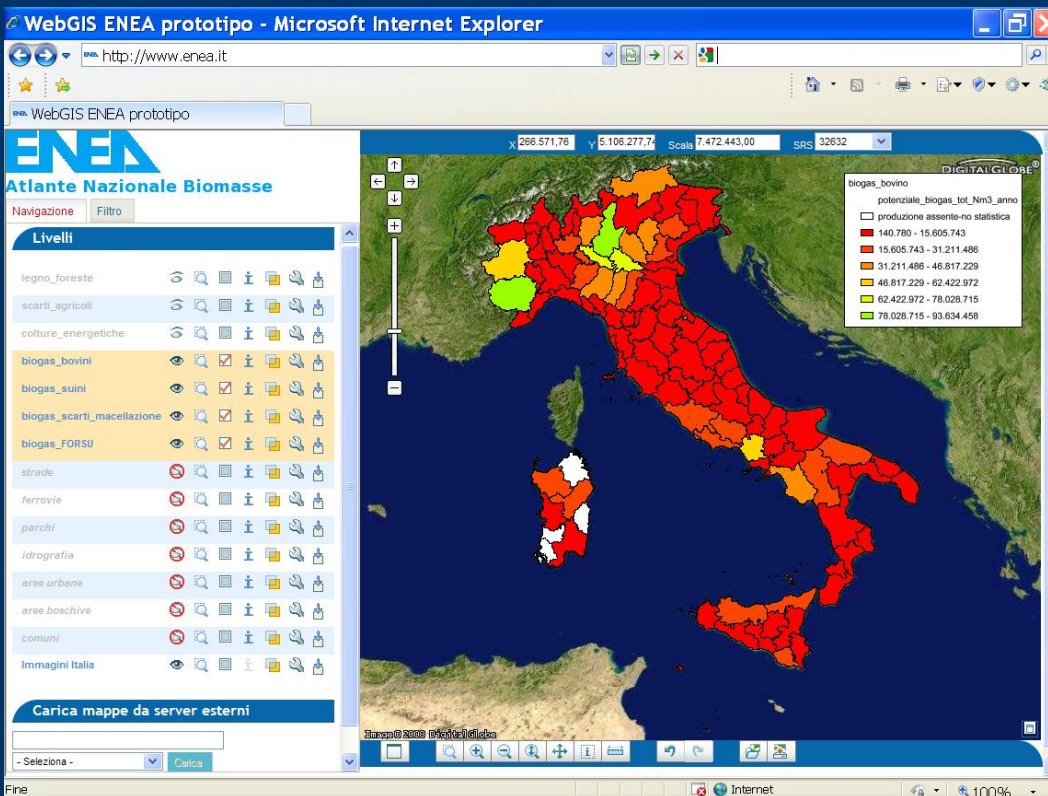
Biogas from cattle livestock, Italy 2006



Biogas from cattle and pigs, Emilia Romagna region, 2008

# Potential

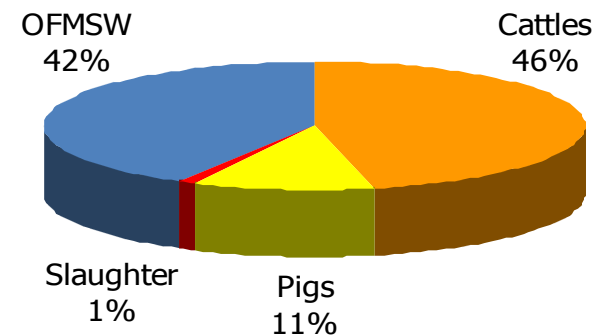
## Italian national assessment on biomass potential, 2006



Currently it includes

Biogas potential from:

- Cattles
- Pigs
- OFMSW
- Slaughter residues



[www.atlantebiomasse.enea.it](http://www.atlantebiomasse.enea.it)

3.2 billion cubic meter

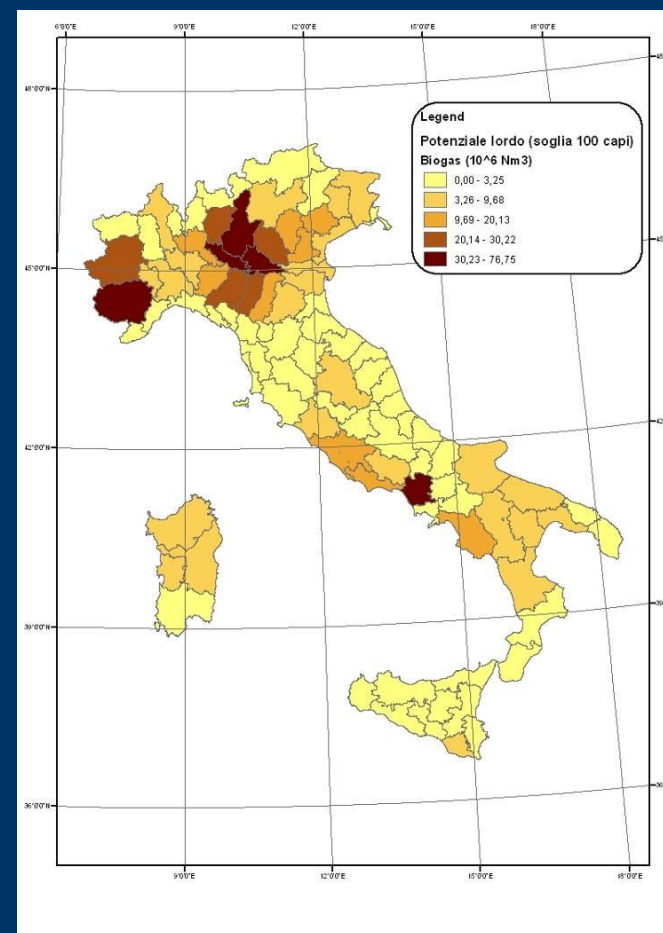
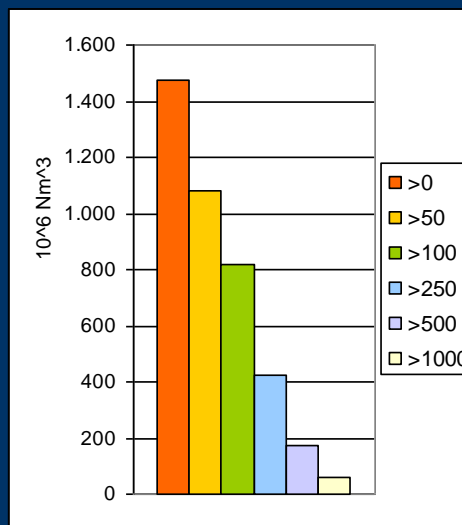
Source: ENEA "National census on biomass potential", 2009

# Potential and farm size

	Farms > 0 cattles	Farms > 50 cattles	Farms > 100 cattles
Farm number	162.733	29.918	14.947
Cattle numbers	6.359.587	4.777.709	3.717.408
Manure (10 <sup>3</sup> t/year)	10.205	7.486	5.639
Animal sewage (10 <sup>3</sup> m <sup>3</sup> /year)	80.638	59.195	44.640
Biogas (10 <sup>6</sup> Nm <sup>3</sup> /year)	1.472	1.080	815

Source: ENEA 2009

National biogas potential according to farm dimension (number of cattles)



Provincial biogas potential with a threshold of 100 cattles

# Potential

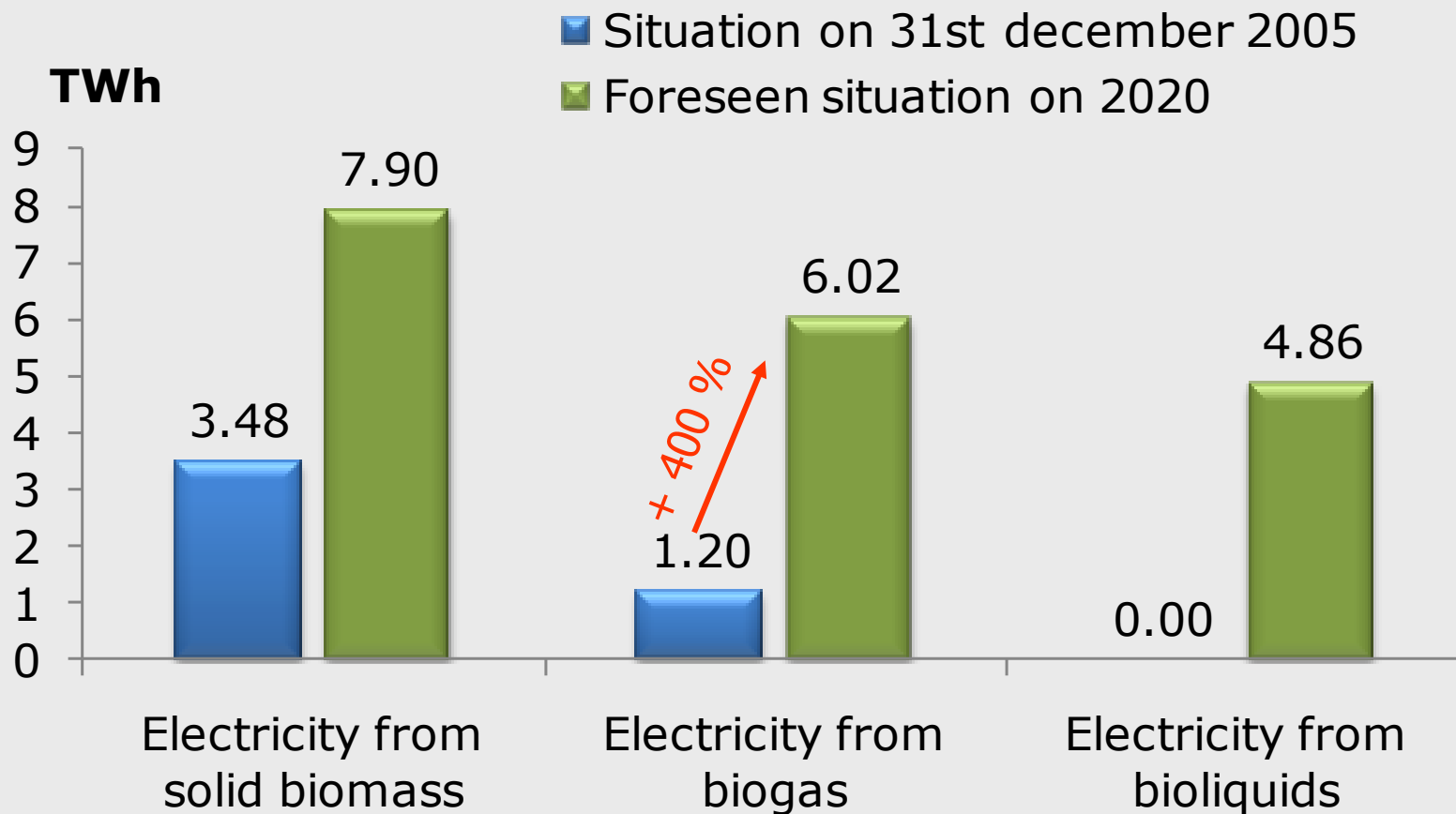
If we sum all agricultural residues plus agroindustry residues, OFMSW, sewage sludge and energy crops (over set-aside lands) we could roughly estimate a potential of about **6.5 billion** of cubic meter (CRPA, 2009)

To exploit the potential we have to address many different questions about:

- Farm size and distribution, consortia, technologies, regulations, standards and incentives
- Till last february incentives did not distinguish really beetwen one plants typology and another one except for the installed capacity

# Targets

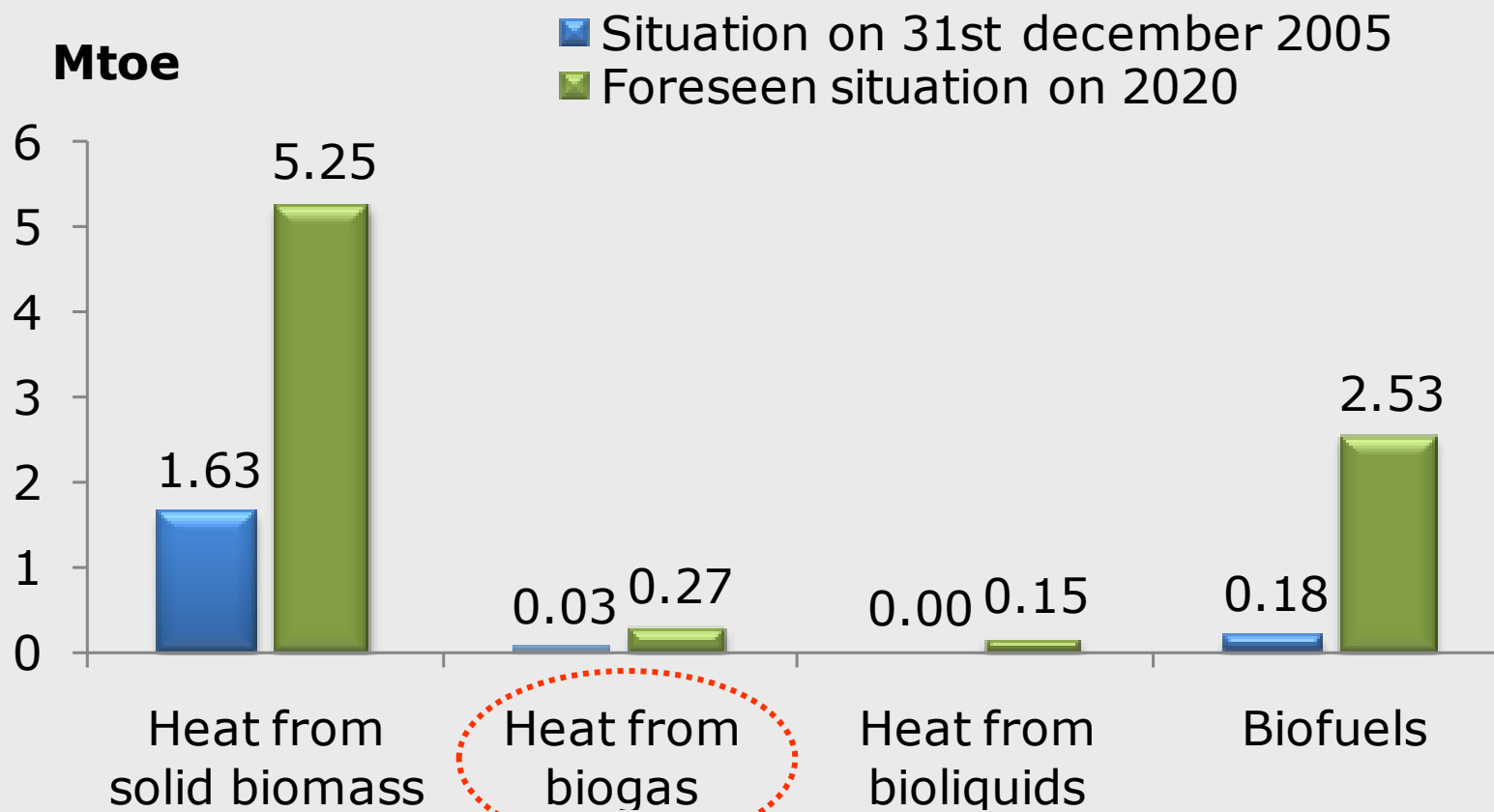
## Foreseen growth of bioenergy in Italy: Electricity



Source: nREAP italy 2010

# Targets

## Foreseen growth of bioenergy in Italy: Heat



Source: nREAP italy 2010

# Targets

## nREAP Italy

Gross electric energy production from RES, 2009 and 2020

	2009				2020				Ripartizione percentuale
	Power MWe	Energy GWh	ktoe		Power MWe	Energy GWh	ktoe		
<b>Biogas</b>	<b>1200</b>	<b>6020</b>	<b>518</b>						
	MW	GWh	[ktep]	[%]	MW	GWh	[ktep]	[%]	
Idroelettrica	16.458	42.155	3.625	67%	17.800	42.000	3.612	42%	
Geotermica	737	5.342	459	9%	920	6.750	580	7%	
Solare	1.442	676	58	1%	8.600	11.350	976	11%	
Maree e moto ondoso	-	-	-	0%	3	5	0	0%	
Eolica	4.898	6.830	587	11%	12.680	20.000	1.720	20%	
<b>Biomassa</b>	<b>1.728</b>	<b>7.631</b>	<b>656</b>	<b>12%</b>	<b>3.820</b>	<b>18.780</b>	<b>1.615</b>	<b>19%</b>	
<i>solida</i>	964	4.444	382	7%	1.640	7.900	679	8%	
<i>biogas</i>	378	1.740	150	3%	1.200	6.020	518	6%	
<i>bioliquidi</i>	385	1.448	125	2%	980	4.860	418	5%	
<b>Totale</b>	<b>24.893</b>	<b>62.634</b>	<b>5.386</b>	<b>100,00%</b>	<b>43.823</b>	<b>98.885</b>	<b>8.504</b>	<b>100,00%</b>	

Source: GSE, nREAP Italy 2010

## Political and legislative issues

The European Directive 2009/28/CE has been recently transposed into the Italian Legislative Decree n 28 of 3 March 2011.

The new decree defines tools, mechanisms and incentives to reach the European goals.

It sets a general framework and fixes some urgent *criteria* about tariffs

Several implementing regulations still have to enter into force and a lot of work must be done in the next months.

For plants under 1 MWe that will be operational by 2012, a feed-in tariff equal to 28 cents/kWh for 15 years is guaranteed.

For plants after 2012 up to 5 MW, a new tariff has to be defined.

## A new legislative framework

- Priority criteria: efficiency, micro and mini CHP for farms, focusing on local supply chains feedstocks and agreement between farmers and biogas producers,
- Incentives will take into account investments costs as well as management, substrate costs and biomass origin,
- Guarantee fund supporting new district heating networks,
- Incentives can be cumulated with other financial regional or national support tools with a cap up to 40 % of total investments (only for agro-zootechnical plants below 1 MWe power),
- New scheme of White Certificates (Energy Efficiency Certificates) with some relevant changes about validity timeframe linked to plant lifetime.

# A new legislative framework

New incentives for heat production:

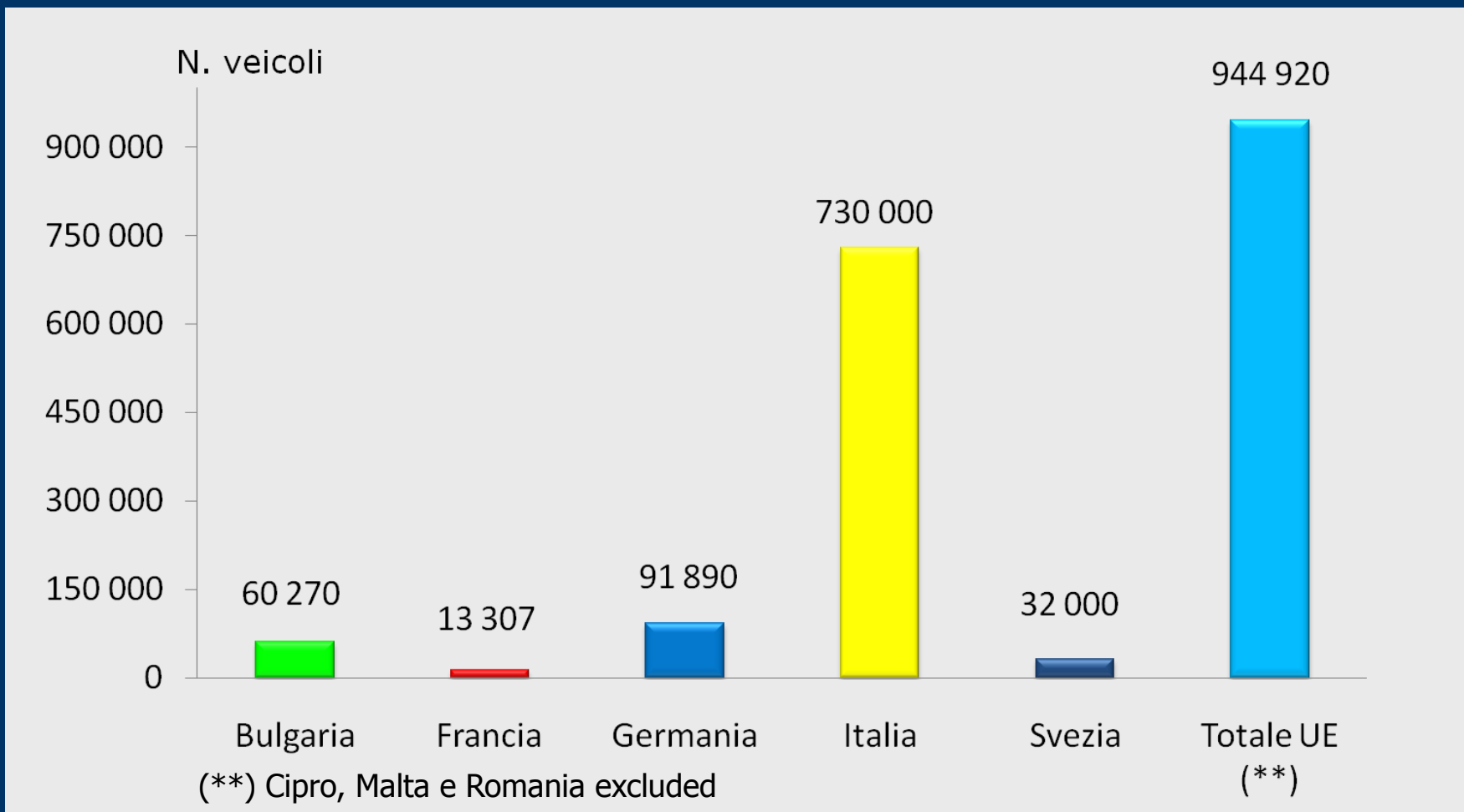
- to be defined in specific implementation decrees
- mainly dedicated to solid biomass

New Biomethane options:

- Incentives to use it for high yield CHP
- Certificates for transport use
- Specific incentives for natural gas network

# Biomethane opportunities: transport

Number of natural gas vehicles in EU countries



Source: Natural Gas Vehicle Association - NGVA Europe, 2011

# Biomethane opportunities

Biomethane has the potential to boost in the transport sector

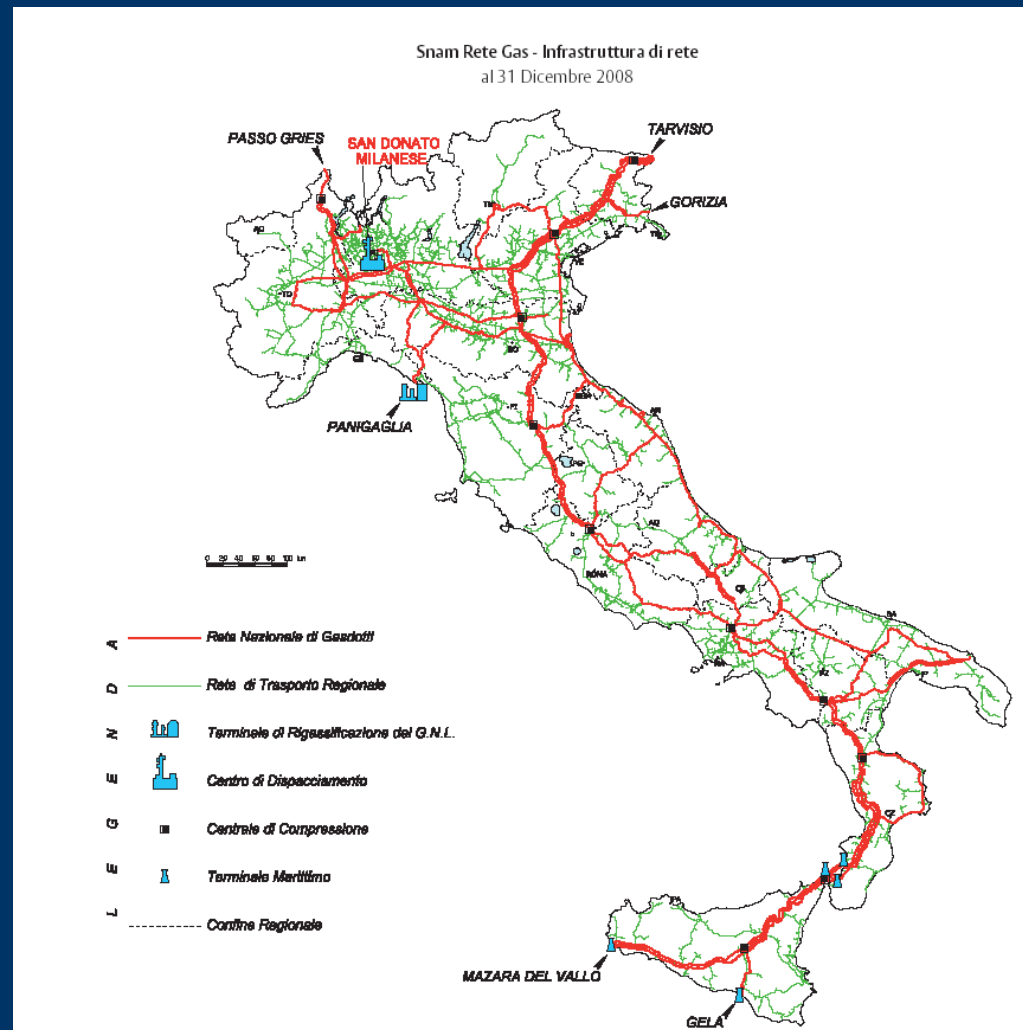
- There are more than 700 refilling gas station
- There are more than 2000 natural gas urban buses in about 50 towns
- Natural gas vehicles do not suffer from traffic restriction measure in Italian Cities
- It is cleaner than traditional fuels



# Biomethane opportunities

Biomethane has the potential to be easily integrated in the natural gas network

- The Italian gas network is one of the biggest/widest in Europe.
- Potentially each biogas plant could be sited (*statistically*) close to the NG network
- Lack of legislation



## Open issues

Addressing farm size critical issues by specific strategies

- by promoting spreading simplified technology
- by stimulating farm consortia (sharing residues)
- by specific incentives

Avoid land use conflicts with local high quality food production

- a cap to land dedicated to energy crop
- a cap to plant and dimension in specific areas
- Regional guidelines for biogas plants location

Other environmental issues

- New biogas crops for marginal and/or degraded lands
- Soil Nitrogen Load capacity according to EU nitrates directive
- Land availability for digestate application

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