

ROBOX evolution BIO



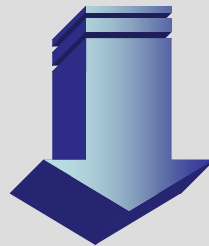


- Ø Waste disposal
- Ø Reduction of polluted emissions
- Ø Energy production



BIOGAS

Biogas applications

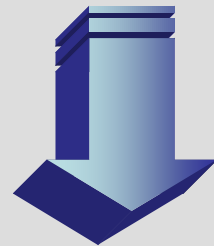


Landfill plants



WWT plants

Biogas applications

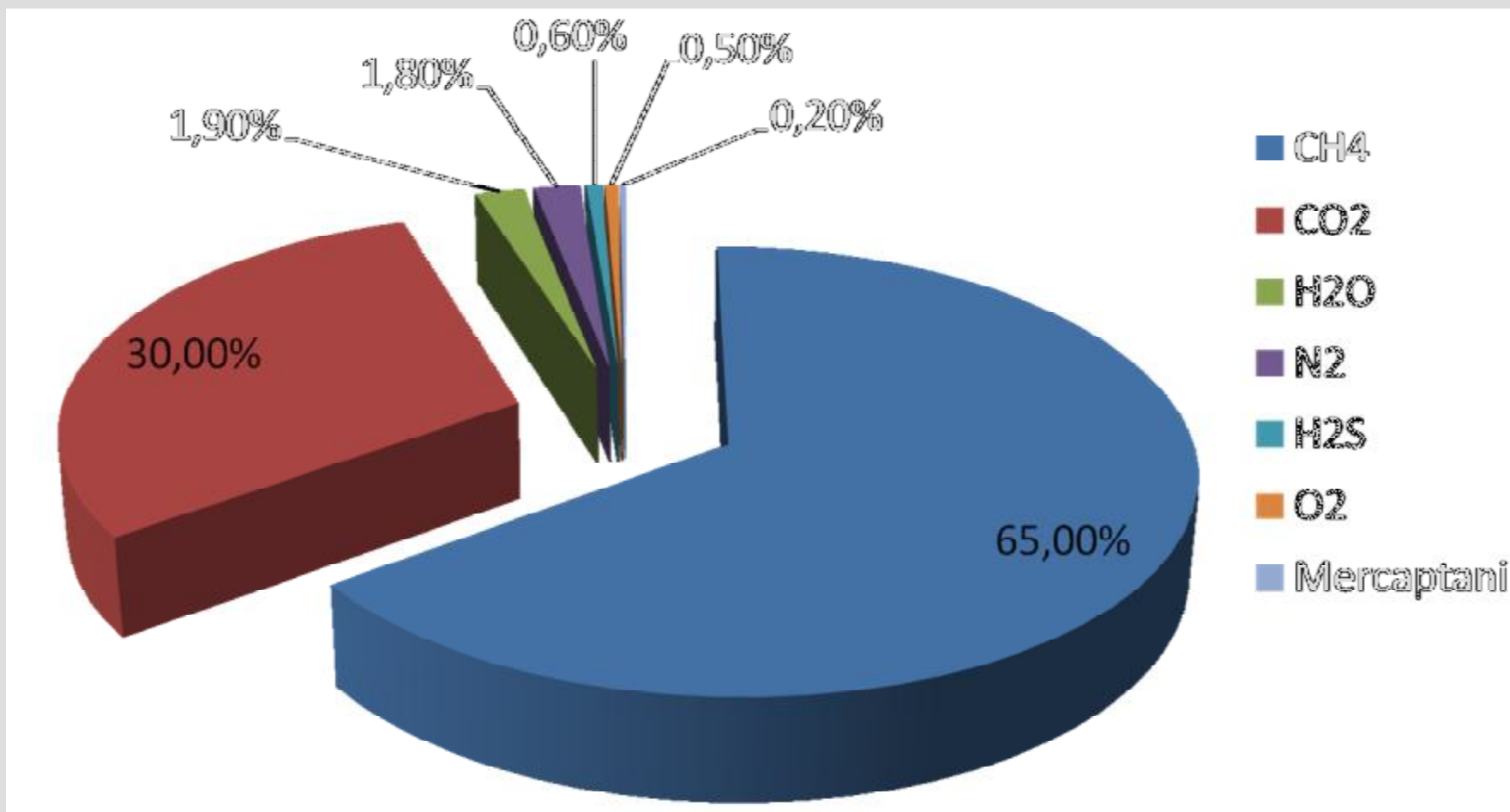


Animal manure plants



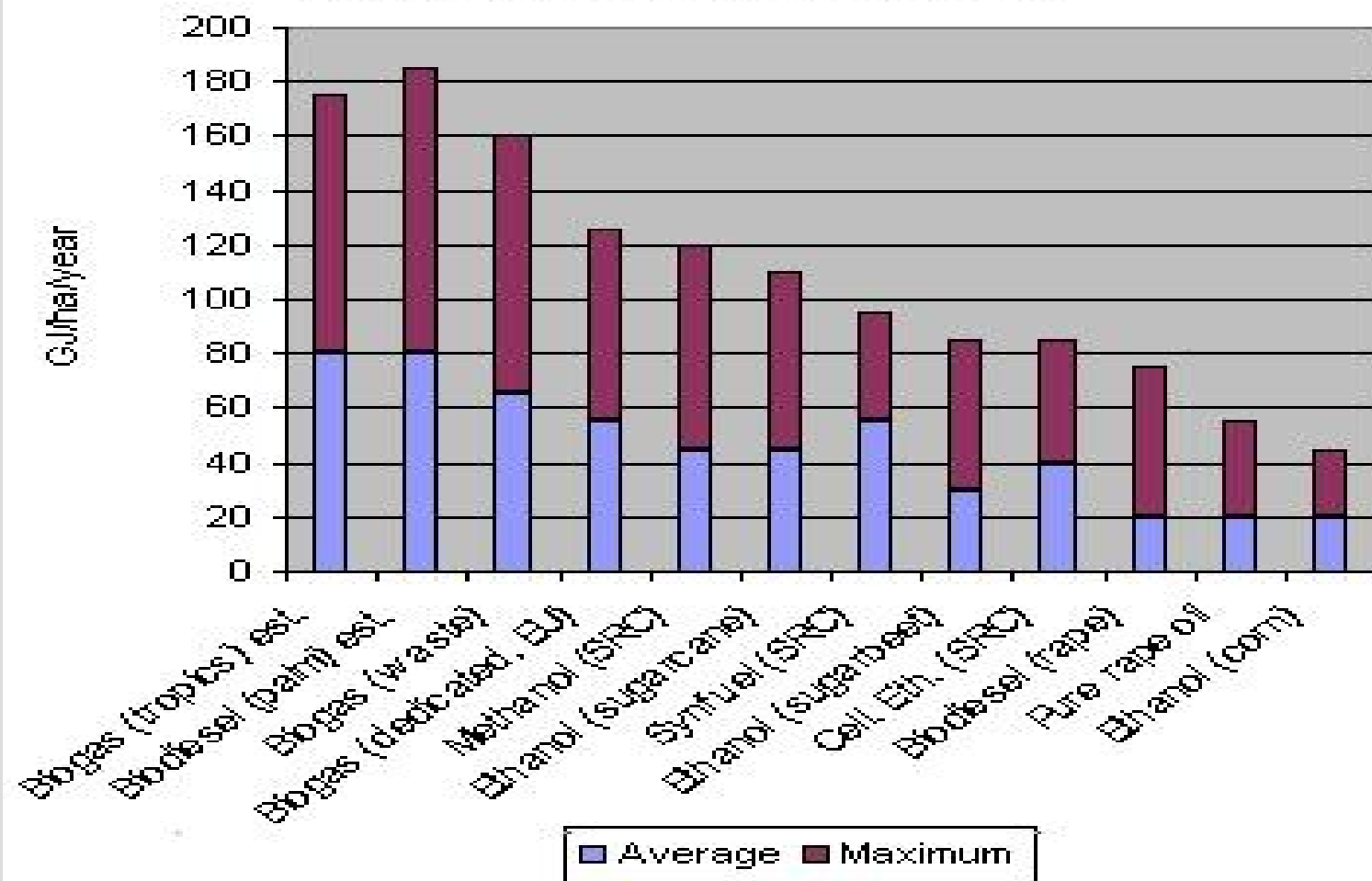
Agricultural plants

Biogas composition (%)



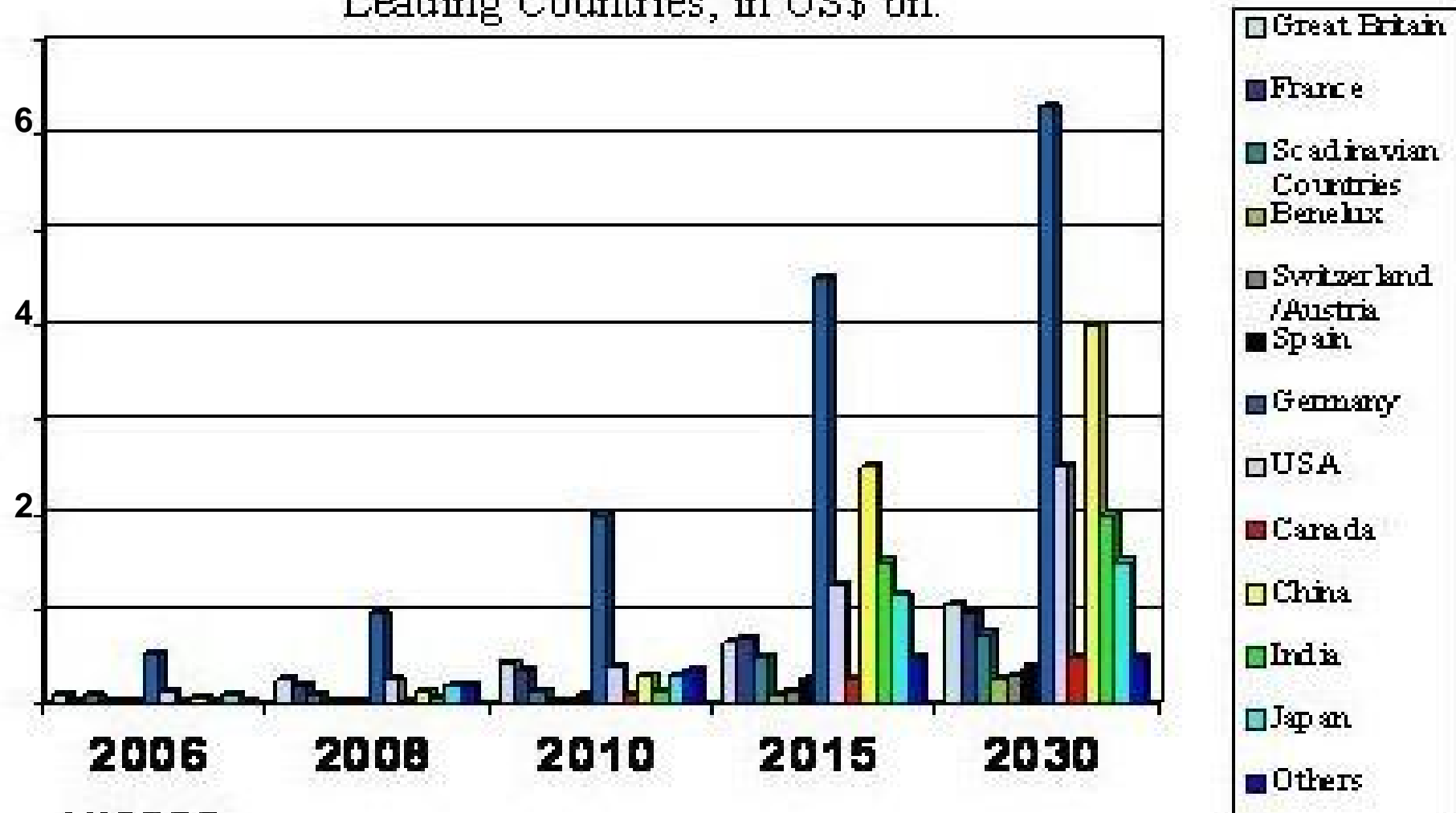
Biogas calorific power: 4740-6150 kcal/Nm³

Biofuels: net energy per hectare, convertible into liquid or gaseous automotive fuels



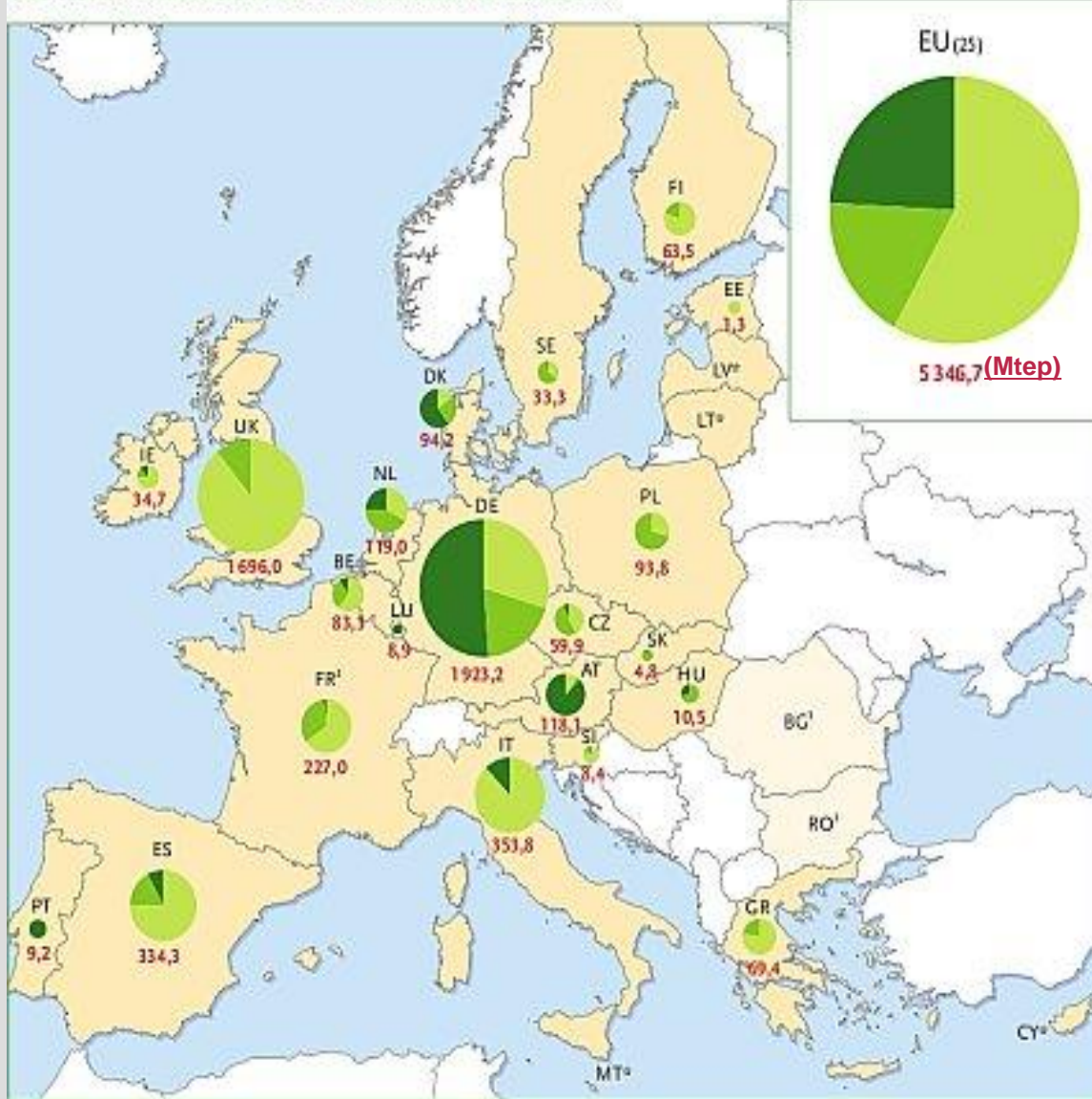
Sources: GM Well-to-Wheel Studie, Ergebnisse und Schlüsse, 2003
 Biopact, Tropical Biofuels: Energy and GHG Balances, forthcoming

Market of Biogas Plants Worldwide 2006-2030 by Leading Countries, in US\$ bn.



HKC22 : Helmut Kaiser Consultancy - May 2008

PRODUCTION PRIMAIRE DE BIOGAZ EN EUROPE
PRIMARY PRODUCTION OF BIOGAS IN EUROPE 2006



In 2006 there was an increase of 14% of Biogas production in Europe, compared to 2005.

The graphic shows: in light green the Biogas percentages resulted from landfill; in green from WWT and in dark green from agriculture.

The main sources of Biogas are the landfill plants.

In Germany, every month 50 new Biogas plants are installed.

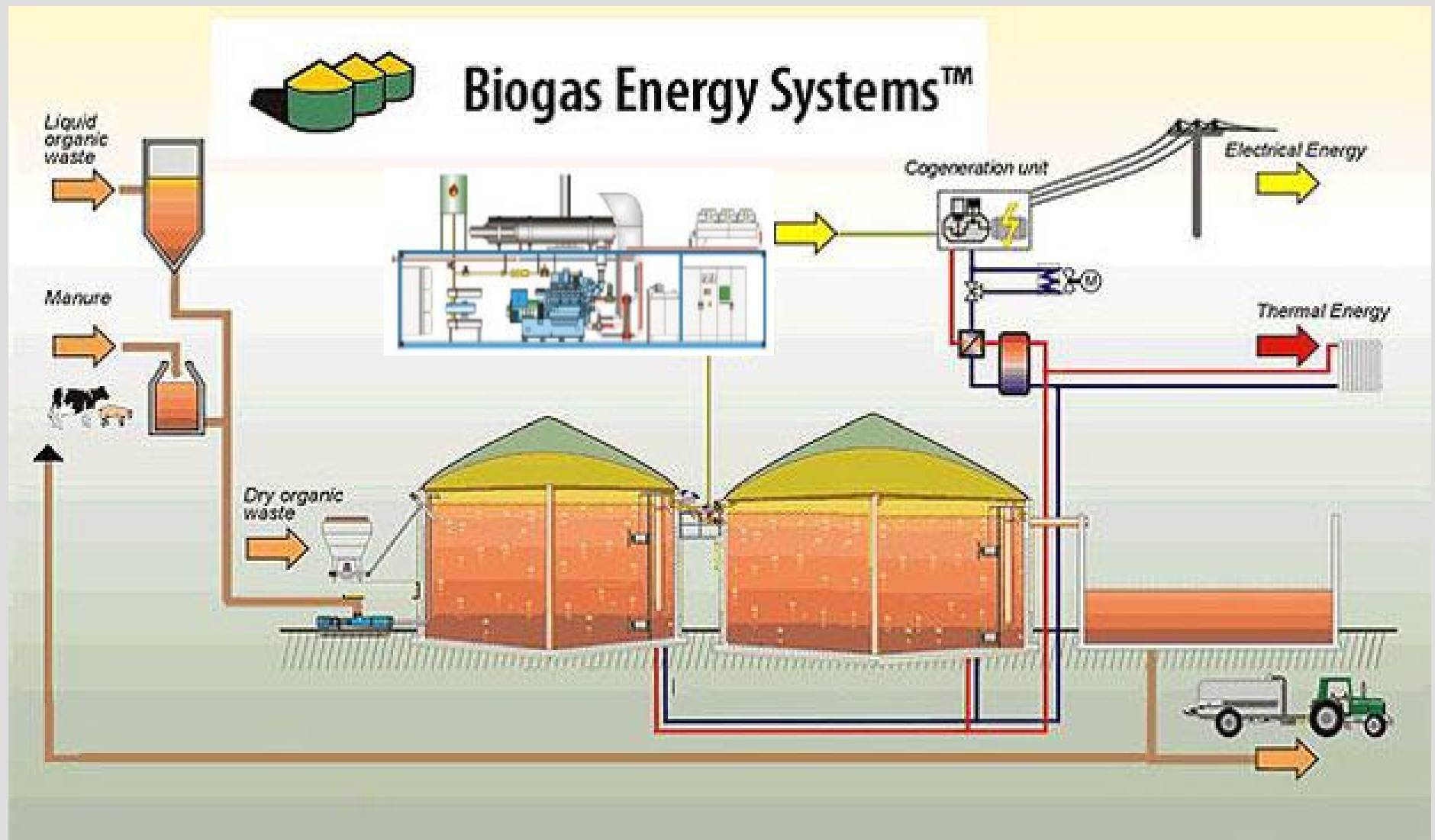
It is possible to obtain also Heating from organic waste.

Source: *EurObserv'ER - Biogas Barometer 2007*

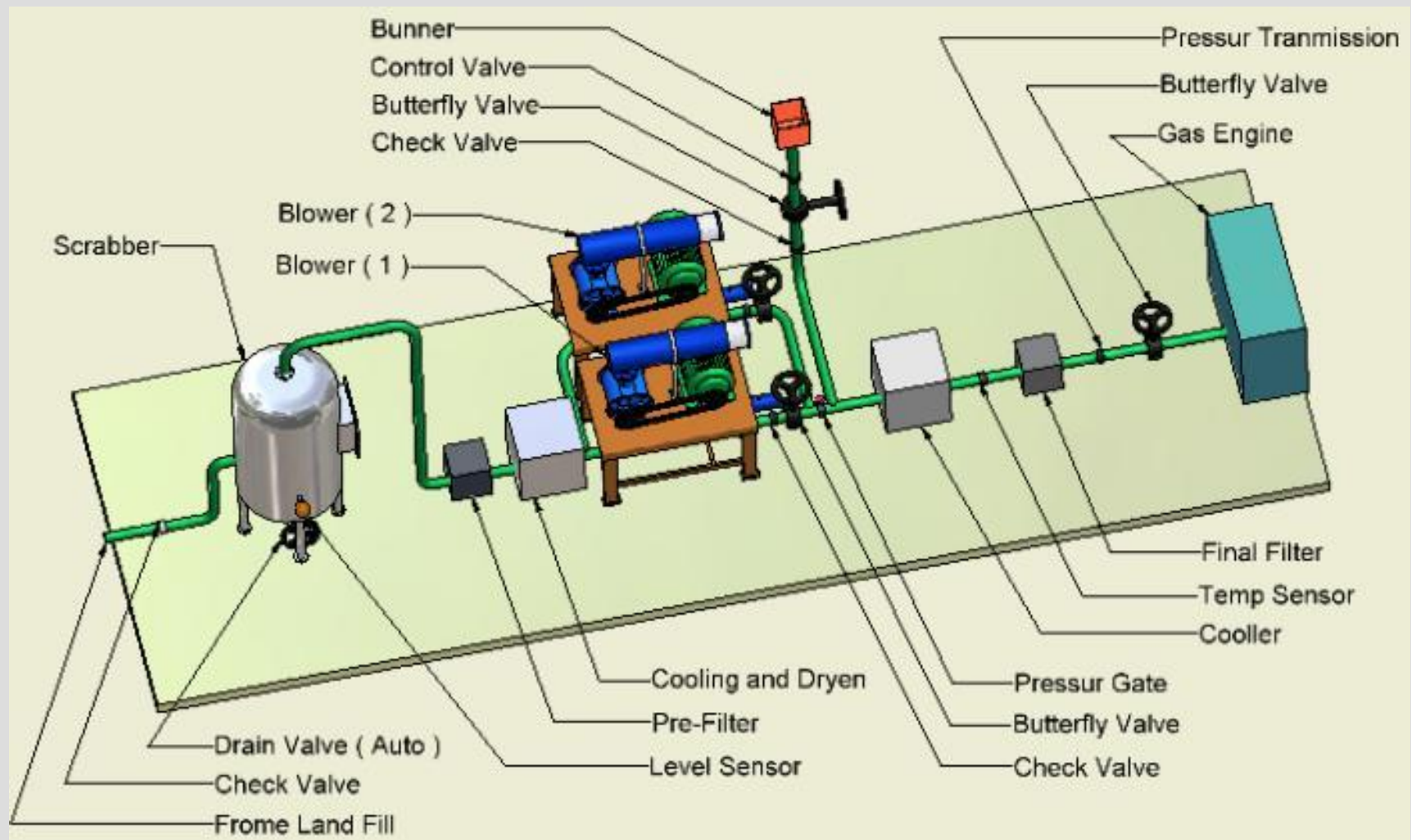
BIOGAS: Gas compressors applications

- ü Supply of endothermic motors for energy and hot water production
- ü Supply of gas turbine for electrical energy production
- ü Supply of gas burners
- ü Recycle of biogas in the digesters
- ü Biogas cleaning and dehumidification
- ü Landfill depollution treatment
- ü Extraction of mine's gas
- ü Extraction of landfill gas
- ü Medium and long distance gas transportation
- ü Compressed tank stocking

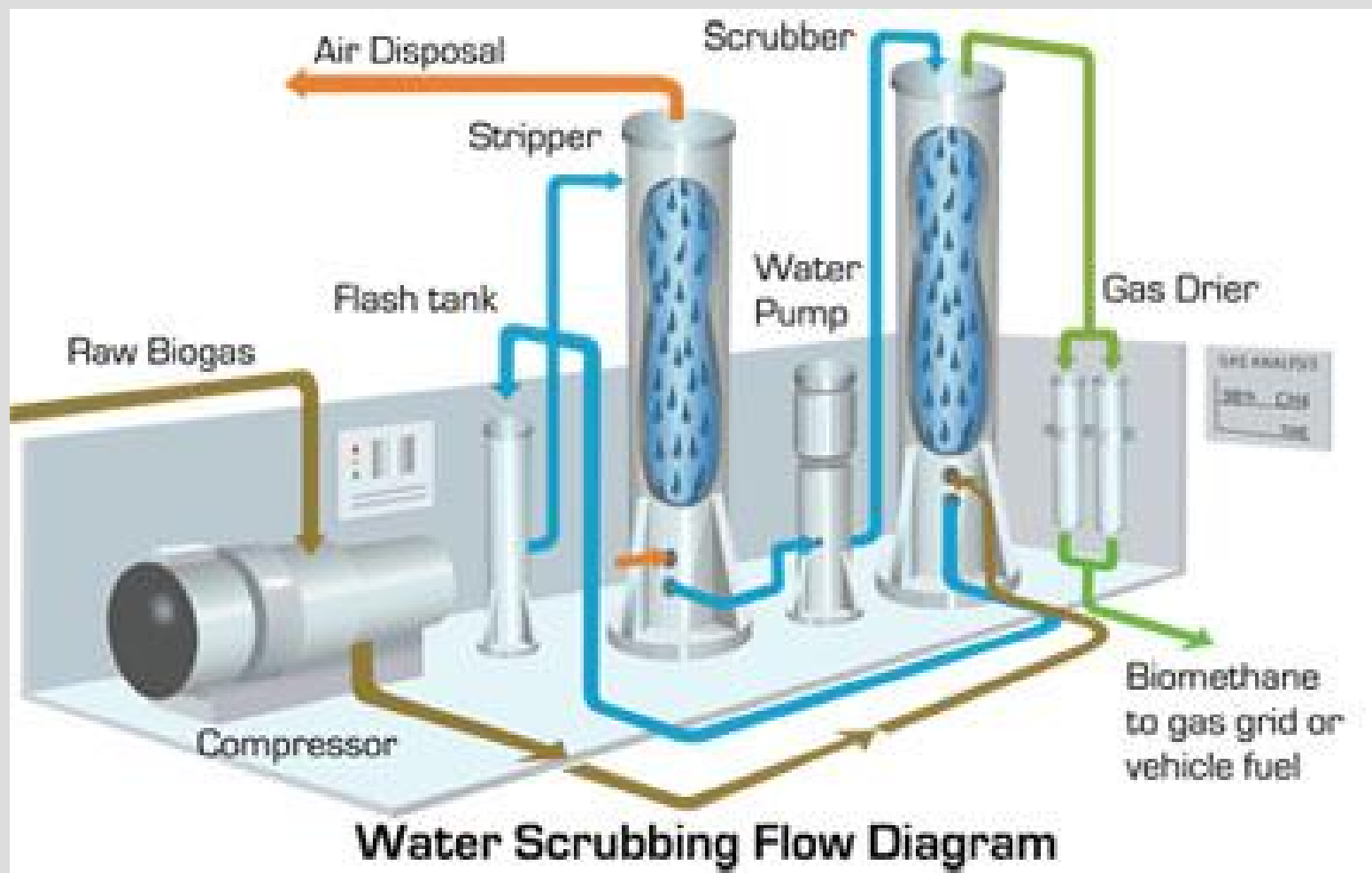
Plant Layout for Biogas cogeneration



Cogeneration Plant Layout (CHP)



Biogas Plant layout



BIOGAS: Technologies

- ü P. D. Blowers “oil free” in compression and suction
- ü Lateral channel Blowers Blowers in compression and suction
- ü Centrifugal Compressors “oil free” in compression and suction
- ü Vane Compressors in compression and suction
- ü Liquid ring vacuum pumps in compression and suction
- ü Piston Compressors “oil free” and with oil
- ü Screw Compressors oil free” and with oil
- ü Single and multistage Turbo Blowers

BIOGAS: Technologies Comparasion

Machine type	Advantages	Disadvantages
<i>P. D. BLOWERS</i>	<ul style="list-style-type: none"> üReliability üStrenght üPerformances range 	<ul style="list-style-type: none"> üCorrosion resistance
<i>LATERAL CHANNEL BLOWERS</i>	<ul style="list-style-type: none"> üPrice üEasy construction 	<ul style="list-style-type: none"> üReliability üPerformances range üEnergy consumption
<i>CENTRIFUGAL COMPRESSORS "oil free"</i>	<ul style="list-style-type: none"> üEnergy savings 	<ul style="list-style-type: none"> üReliability üHigh capacity üHard construction
<i>VANE COMPRESSORS</i>	<ul style="list-style-type: none"> üReliability üCorrosion resistance üPerformances range 	<ul style="list-style-type: none"> üPrice üMaintenance's complexity
<i>LIQUID RING VACUUM PUMPS</i>	<ul style="list-style-type: none"> üReliability üCorrosion resistance üPerformances range 	<ul style="list-style-type: none"> üPrice üEnergy consumption üMaintenance üSistem's complexity

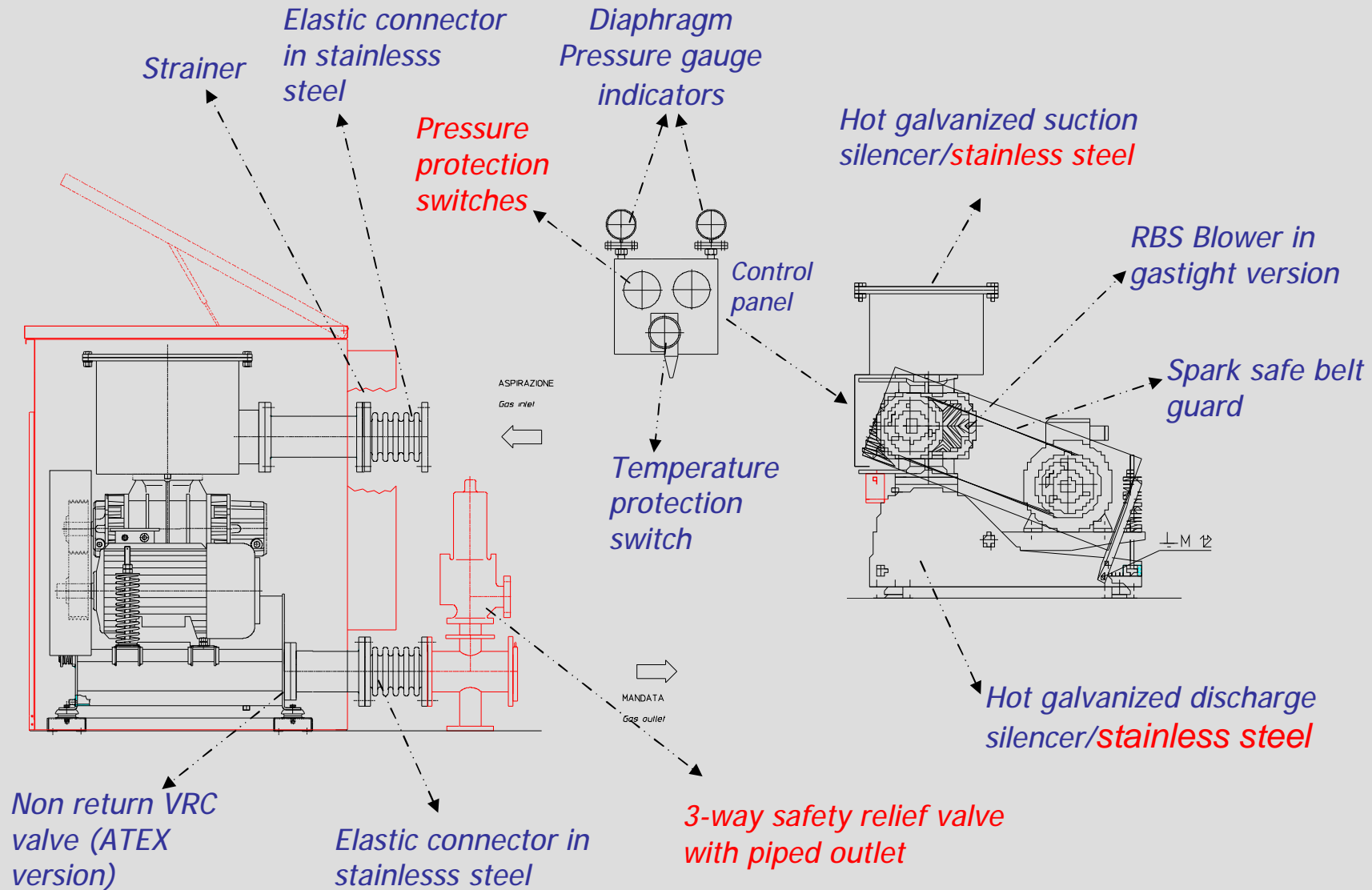
ROBOX evolution BIOGAS Range

	ROBOX BIO1	ROBOX BIO2	ROBOX BIO3
Range	RBS 15-25-35*	RBS 35-45-46-55-65	RBS 65-66-75-85-86
Pressure max.(mbar)	700 - 1000	700 - 1000	700 - 1000
Capacity (m ³ /h)	240 - 480	480 - 1080	1370 - 2850

Note: data to be checked according to the compressor size and suction pressure

** Maximum motor size:15kW*

Standard version

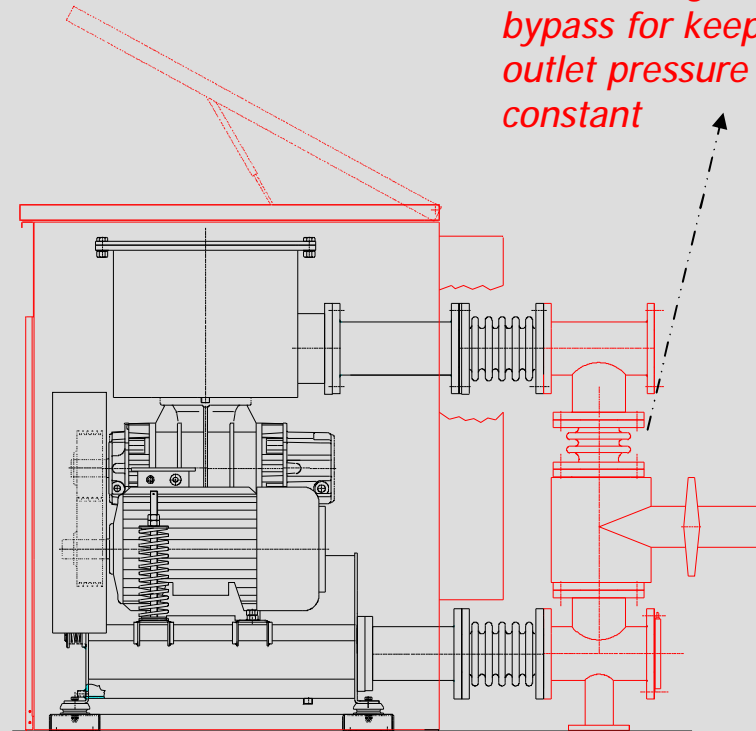
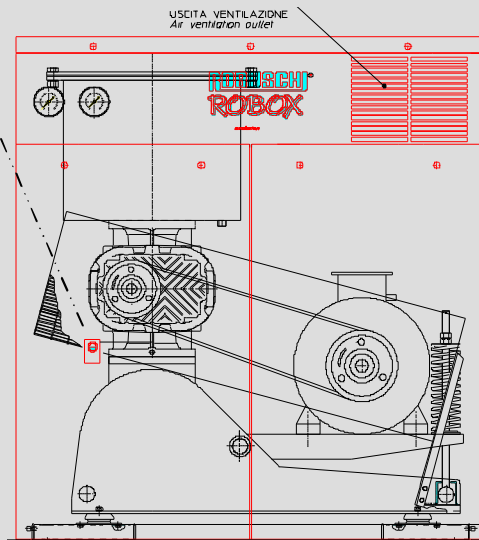


Optional version

*Stainless steel
gas humidity
drainage system
with tank*

*Noise enclosure
in ATEX vers.*

*Pressure regulator with
bypass for keeping
outlet pressure
constant*



*Special corrosion protection coating of all
the blower component in contact with the gas*

Certification

The new ROBOX BIO group has been developed and certified, according to the most important and recent EC guidelines and more, to guarantee the best safety usage in this range of application.

The suction and discharge silencers are designed, manufactured and certified for 1,3bar pressure, in accordance with the **guideline 97/23/EC (PED)** and also **explosion proofed up to 12 bar**.

The complete group is designed and manufactured to be used in accordance of the **guideline 94/9/EC (ATEX)** for the applications of **group II** in **category 2** and into **zone 1** internal and external within **temperature in class T3**).