



Beyond innovation.

COMPANY PROFILE

Energy efficiency and sustainability



CORE BUSINESS

Production of



- **Cogenerators and Trigenerators**

[standard size from 35 to 200kW, over 200kW on demand]

- **Anaerobic digestion plants**

[modular solutions from 50kW to 250kW; customized solutions over 250kW]

- **Structures for photovoltaic systems installation**

- **Agro-food industries equipments for energy components installation or high value added**

- **Inverter broad-spectrum input voltage**

- **Innovative mini wind turbines**

- **Hydrogen energy islands**

- **Robotic systems for greenhouses management**

- **Structural and ventilated facades**

- **Sustainable construction materials and energy saving**

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VISION

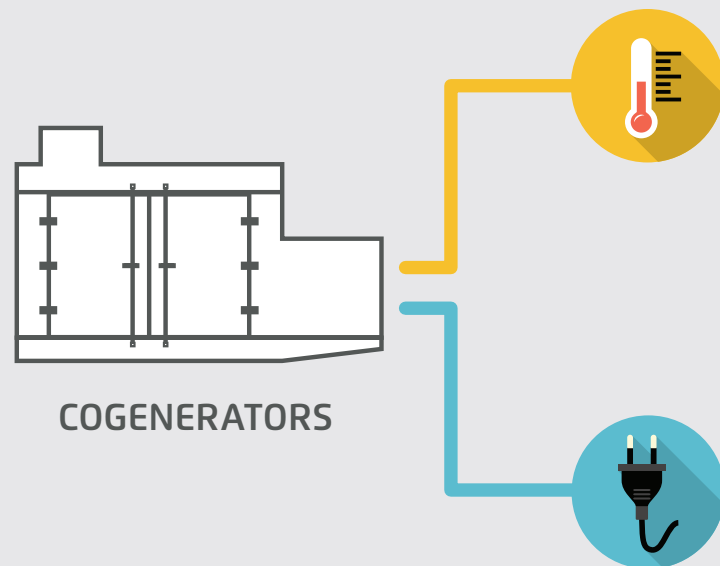
Make our customers satisfied with innovative solutions, best quality/price ratio customized offers with highest service level, quality and reliability.



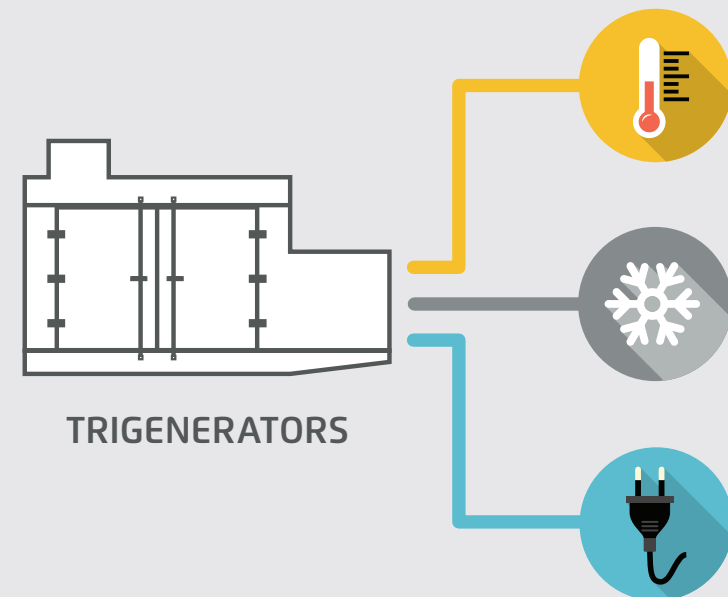
MISSION

Create a business subject dedicated to transformation of technological developed innovation, by the group, in products for everyone.

• **COGENERATORS** is the electricity and heat combined and contemporary production from a single energy source, implemented in a singular integrated system, with consequent economic and environmental benefits for the client, compared to detached production of electricity and heat.



• **TRIGENERATION** is the electricity, heat and cooling power simultaneous production.





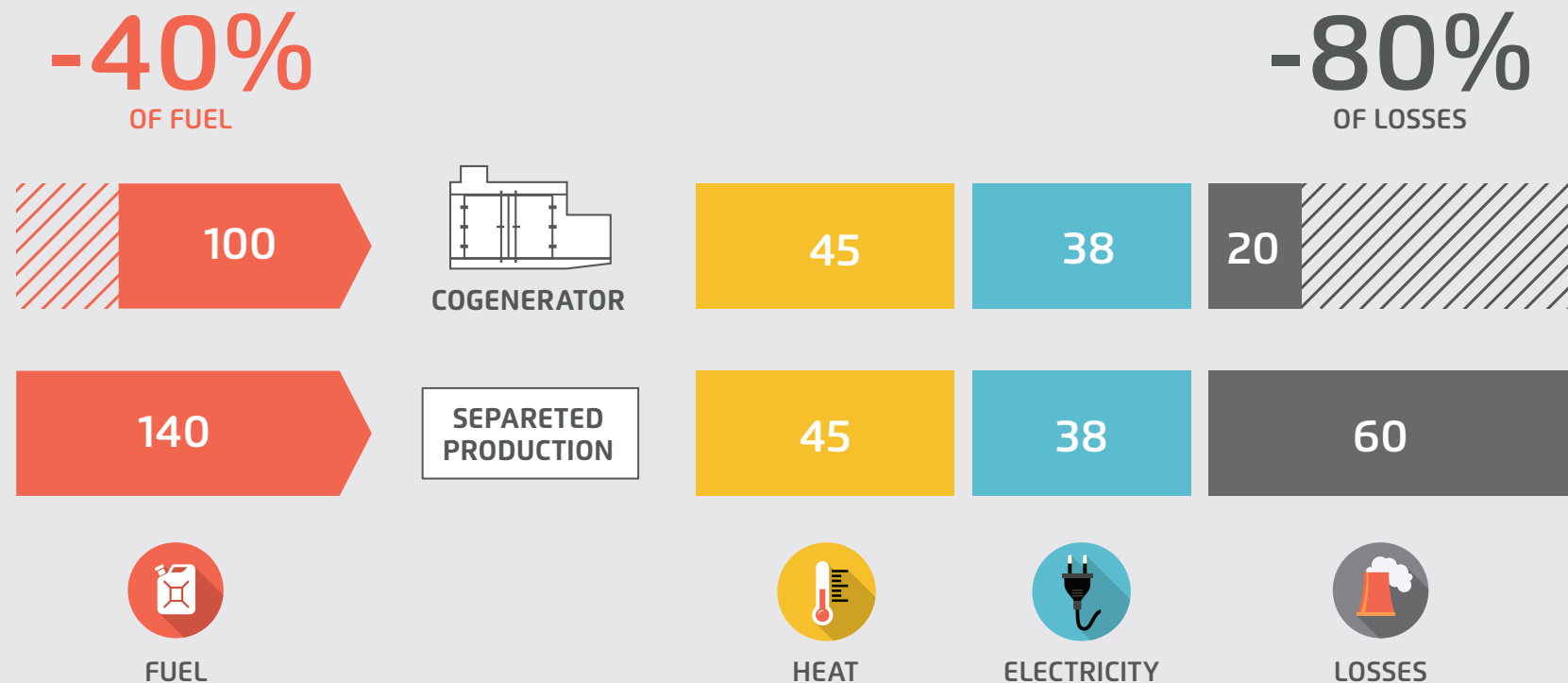
Cogeneration is a mature technology, that can give an important contribution in terms of environmental benefits and energy savings, especially in view of the European targets for 2020.

The European Parliament, with Directive 2004/8/EC, recognizes the energy efficiency and cogeneration potential and has linked the Community priorities to this technology promotion.

COGENERATION PRODUCTION ECONOMIC BENEFITS

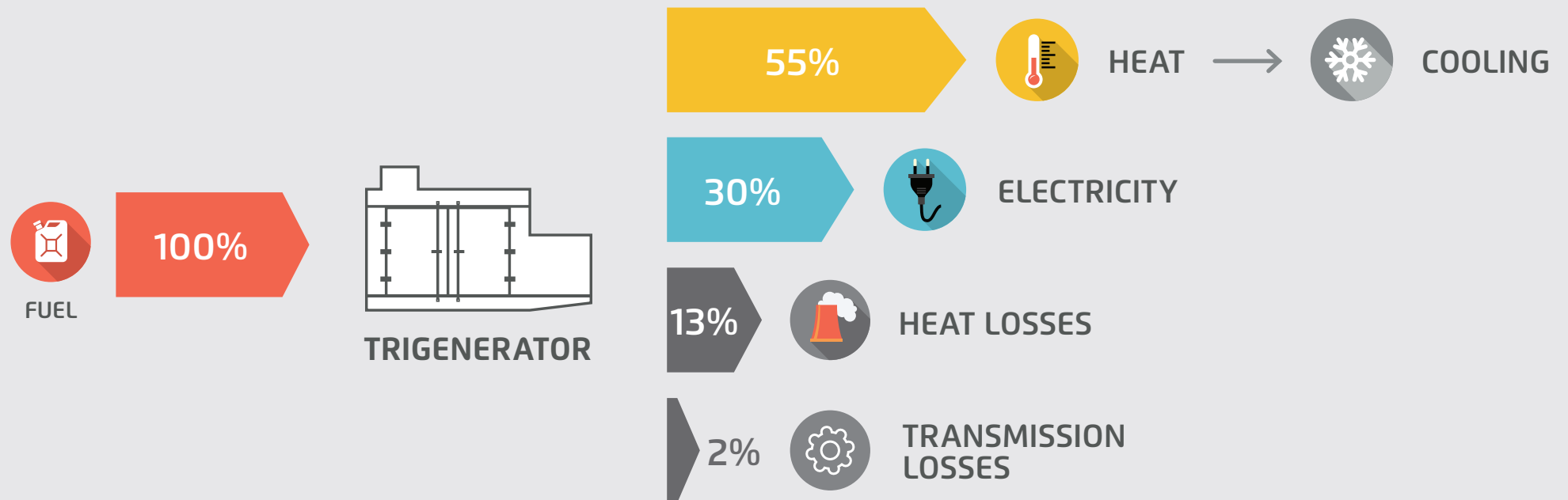
In terms of efficiency, a cogeneration plant has an average amount efficiency around 80-90%. Compared to separated production of heat and electricity, **efficiency increase is about 30-40%**.

Combined production can increase fossil fuel efficiency use **over and above 80%**; this corresponds to **lower costs and lower emissions** of pollutants and GHG, compared to electricity and heat separate production.



TRIGENERATION

Trigeneration term, means a particular form of cogeneration that involves three energy forms simultaneous production, starting from a single fuel: electricity, thermal in the form of heat and thermal energy in the form of cold (CHCP= Cogeneration of Heat, Cooling and Power).



POTENTIAL DEVELOPMENT OF THE COGENERATION APPLICATIONS

Cogeneration could be applied in all those fields in which there's demand for electricity and heat (and possibly cold). The three main markets target are:



RESIDENTIAL SECTOR

Residential sector, which more properly falls within the micro and which has a large untapped potential.



TERTIARY SECTOR

Tertiary sector, which has shown, in recent years, the highest growth rate for installed machines number.



INDUSTRIAL SECTOR

Industrial sector, in which cogeneration plants are very common especially in large companies, but with unexplored market as the vast network of small and medium-sized enterprises.

POTENTIAL DEVELOPMENT OF THE COGENERATION APPLICATIONS

Tertiary sector is a very promising field for cogeneration applications, it can boast of numerous installations throughout the country in present day. Tertiary sector concerns different consumptions of a certain size, characterized by high electrical and thermal consumption, often with cooling demand (trigeneration). Among the most interesting applicants, there are:



HOTELS



SHOPPING CENTERS



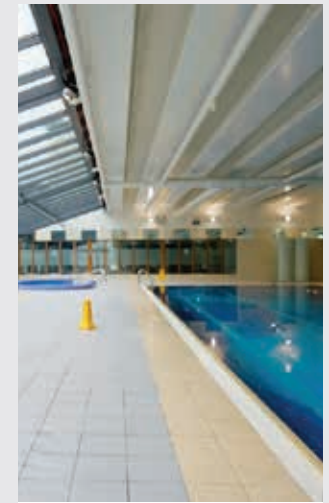
SUPERMARKETS



HOSPITALS



UNIVERSITIES



SPORT CENTERS

COGENERATION AND TRIGENERATION IN DIFFERENT INDUSTRIAL PRODUCTION PROCESSES

Industrial cogeneration large size is a reality for a long time in Europe, with important amount in installed plants number and capacity. Many types of industries that require large amounts of heat and electricity in cogeneration, found the best way to halve their energy bills in cogeneration solutions.

Among most effected industrial sectors and fields in which CHP already has a certain distribution, we find:



FOOD INDUSTRY



PAPER MILL



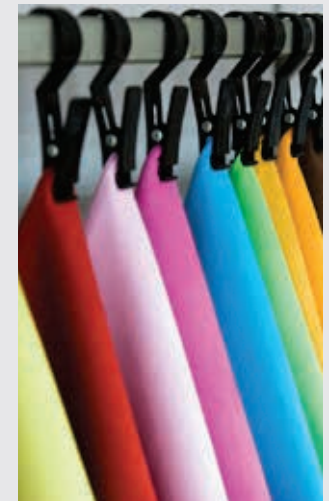
CERAMIC / BUILDING



CHEMICAL



ENGINEERING
INDUSTRY



TEXTILES

COGENERATION AND TRIGENERATION TYPICAL APPLICATION



SPORTS CENTERS	Power consupcion > 300.000 kWh/year Methane consupcion > 100.000 kWh/year
SWIMMING POOLS	Swimming pool volume > 500-800 mc
HOTELS	Room number > 100
REST HOMES - COMUNITIES	Beds number > 100
HOSPITALS, NURSING HOMES	Beds number > 100
CONDOMINIUM COMPOUND	Apartment number > 100
URBAN NEIGHBORHOODS	
HANDCRAFTED COMPOUND	

COGENERATION AND TRIGENERATION MODULAR SYSTEMS FROM 20 TO 200kW



WHY SMALL SIZE PLANTS

Small plants have different advantages



ADVANTAGES

- To adapt to most users energy needs
- To permit overall heat reuse
- Favoured system for permits
- Ease connection to network distribution

PHASE 1

Energy consumption data collection

Energy carrier production system analysis

Electrical and mechanical systems
functional diagrams analysis

Check the availability for technical "areas"
to place CHP plants

PHASE 2

Plant sizing by choosing CHP dimensions
and total operation hours

Electricity and heat investment evaluation
and resulting estimate of systems
produced saving

Plant achievement investment evaluation

Calculation of initiative pay back



The choose of the unite size to be place take care in regard:

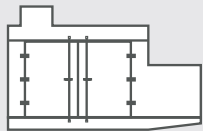
Electricity and gas historical consumption trend

The largest possible covering of heat absorption

COGENERATION UNIT



It has been estimated an annual CHP operation, from 90 kWe, equal to 5.650 hours, based on the structure thermal and electrical loads, obtained from data in our possession, calibrated on a maximum economic condition benefit in terms of electricity and heat saving.



DATA / MODEL
EG90

Consumption power (kW)	290
Electrical power (kWe)	90
Thermal power (kWt)	170
Total efficiency (%)	89,7
Displacement (cm ³)	11.700
N° of cylinders	6
Gas consumption (St m ³ /h)	30,23
Dimensions (LxBxH mm)	3310x1100x2400

Operation hours considered are shared as follows:

RANGE	Operating hours CHP
ON PEAK	2.300 H
OFF PEAK	3.350 H

COGENERATION UNIT



	CUSTOMER HEAT CONSUPTION (Total kWh)	COGENERATOR THERMAL ENERGY PRODUCTION (kWh)	
MONTH	Heating requirement	Thermal Energy produced by CHP	Thermal Energy produced by boiler
January	332.336	119.850	212.486
February	279.138	108.800	170.338
March	250.905	119.950	131.055
April	123.795	119.850	3.945
May	62.565	62.050	512
June	22.540	22.440	100
July	16.878	16.660	218
August	4.933	-	4.933
September	31.785	31.450	335
October	145.783	119.850	25.933
November	232.630	119.850	112.780
December	266.610	119.850	146.760
TOTAL	1.769.900	960.500	809.400

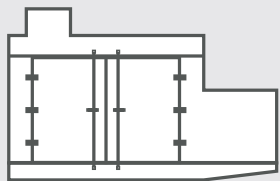
SOLUTION: PRODUCE ELECTRICAL ENERGY



	CUSTOMER HEAT CONSUPTION (Total kWh)	COGENERATOR THERMAL ENERGY PRODUCTION (kWh)		
MONTH	Electrical requirement	Electric energy produced	El. En. sold to the grid	El. En. taken from the grid
January	153.664	63.450	-	90.214
February	153.664	57.600	-	96.064
March	134.601	63.450	-	71.151
April	136.695	63.450	-	73.245
May	87.894	32.850	-	55.044
June	95.330	11.880	-	83.450
July	92.900	8.820	-	84.080
August	79.726	-	-	79.726
September	96.034	16.650	-	79.384
October	115.995	63.450	-	52.545
November	126.034	63.450	-	62.584
December	266.610	63.450	-	69.452
TOTAL	1.405.439	508.500	0	896.939

SOLUTION: ECONOMIC ANALYSIS

PRIMARY ENERGY PRESENT AND FUTURE CONSUPTION



COGENERATOR 90kW

CHP FEATURES

Electrical power	90 kW
Thermal power	170 kW
Natural gas consumption	30,23 Smc
Operation Expected Hours	5.650 h

COGENERATOR SIZING

Electricity produced CG	508.500 kWh
Thermal energy produced CG	960.500 kWh
Natural gas consumed CG	170.800
Natural gas in addition to CT	105.500

FUTURE NATURAL GAS ANNUAL CONSUPTION (WITH CHP)

Total	276.300 mc
Defiscalized	127.125 mc

THERMAL DATA PER YEAR

Methane gas consumption	230.696 mc
Natural gas cost	91.157 €

ELECTRICAL DATA PER YEAR

Consumption power	1.405.439 kWh
Electricity cost	181.695 €

HEAT EQUIVALENT CONSUPTION PRODUCTION IN THE BOILER

Thermal energy	960.500 kWh
Estimated efficiency boilers	80%
Equivalent methane consumption	125.196 mc



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