

# AB ENERGY FOR INALCA

(Cremonini Group)

AN EXAMPLE OF ENERGY EFFICIENCY  
APPLIED TO THE MEAT INDUSTRY.

# PERFECT FUNCTIONAL INTEGRATION BETWEEN COGENERATION AND BIOGAS-COGENERATION.

In November 2010, the company Inalca, Italian leader in the production of beef and meat-based processed products, opened a new biogas plant in its Ospedaletto Lodigiano (LO) facility. This plant is designed to produce energy from renewable sources made up mainly of biomasses and butchering by-products.

The new plant goes to join two existing natural-gas fuelled ones and represents an interesting example of functional integration between cogeneration and biogas-cogeneration in the food industry. All the plants have been designed, made and installed by AB Energy which once more confirms itself to be an industry partner as regards the achievement of the most ambitious energy-efficiency goals.

The Ospedaletto Lodigiano industrial complex is Europe's largest and most modern facility for the butchering and processing of beef; it consumes large quantities of energy and at the same time requires electricity and an equal amount of heat and hot water for its production processes, including in order to wash the machinery.

For this reason, cogeneration represents an excellent chance for energy performance and economic saving.

Another precise aim of the Cremonini Group was to further develop the environment sustainability projects begun a few years ago (Inalca obtained ISO 14001 environment certification in 2004).

# A LEADING GROUP CLOSELY FOCUSED ON ENERGY EFFICIENCY AS A SOURCE OF COMPETITIVENESS.

Inalca is part of the Cremonini Group, Italian leader in the beef and meat-based processed product sector. Established in 1963, the Cremonini Group is today one of Europe's major food-industry operators.

The Group's headquarters are at Castelvetro (Modena) with a workforce of around 11,500. Among its business areas: production, distribution and catering. As regards food service distribution, it operates through the controlled company, MARR, while in the case of catering on-board trains, in railway stations, on motorways and of a commercial nature, it operates through the controlled company Chef Express S.p.A., with the brands Chef Express and Roadhouse Grill. Furthermore, it is European leader in the field of train catering, and a major operator in the cold-cut sector through the controlled company Montana Alimentari.

In 2009, the Cremonini Group achieved a total turnover of 2.8 billion Euro (of which 1 billion euro through Inalca alone). Inalca produces and markets a complete beef assortment, fresh and frozen, vacuum packed and in protected atmosphere, ready-to-eat cooked and processed meats, canned meats and meat extracts, as well as a broad range of by-products.

The Company operates through a production organisation consisting of 6 specialised facilities using modern production technologies and cutting-edge safety systems, which enable it to spearhead control methods, production process programmes and meat identification and labelling processes.

## The Inalca facility at Ospedaletto Lodigiano

Opened in 1999, it covers a total surface area of 400,000 sq m, 60,000 of which is covered, with a total butchering capacity of 350,000 head of cattle/year.

**Besides the first processing phase typical of the butchering industry (sides of beef, quarters, fresh and frozen cuts) the facility specialises in products with a high service content: fixed and variable-weight portions, processed meats, mincemeats and hamburgers, also sold under the Montana brand, and mainly through large-scale distribution chains.**

The boning and sectioning departments work over 100,000 tonnes of product/year. The production capacity as regards hamburgers is 10,000 tonnes and that of portioned and freshly processed meats is 5,000 tonnes. Inalca also has six distribution platforms abroad and operates extensively in Russia and in various African countries. About 35% of production turnover comes mainly from exports to Europe, Russia and Central Africa.



# COGENERATION AS AN INTEGRAL PART OF PRECISE COMMITMENT TOWARDS ECOSUSTAINABILITY.

The new plant called for an investment of 4.5 million Euro and will enable the self-production of around 7.5 GWh/year, entirely from renewable sources: the company's aim is to achieve a rate of internal self-production in 2012 able to cover about 65% of its energy requirements through industrial cogeneration and the use of renewable sources, including through new investments for the promotion and conversion of biomasses of animal origin.

Currently, the yearly energy requirement of the Inalca facilities is around 77 GWh. Thanks to major investments made in 2005 to develop cogeneration and upgrade energy efficiency, today 48% of energy needs are catered to by self-production, with an 18% saving of TOE (Tonnes of Oil Equivalent) per year and a reduction on CO<sub>2</sub> emissions equivalent to 16,000 tonnes/year not emitted into the atmosphere.

These results have been achieved thanks to the installation of four high-efficiency cogeneration plants manufactured by AB Energy (operating in the Busseto, Ospedaletto Lodigiano and Rieti facilities) for the production of electricity and heat, with a total electric power of 12.7 MW.

Furthermore, always in line with its sustainability policy, over the last four years, Inalca has cut back the production of wastes, pre-sorting over 50%, and has completed a process-water recycling system that allows saving over 82,000 m<sup>3</sup> of water/year, with a treatment capacity of a city of 300,000 people.

A photograph of an industrial facility, likely a refinery or chemical plant. The scene is dominated by large, cylindrical storage tanks and a complex network of pipes and metal walkways. The lighting suggests a bright, sunny day, with long shadows cast across the ground. In the background, there are more industrial structures and a clear sky.

**Inalca's  
commitment has enabled the  
company to achieve major  
results:**

**saved TOE:  
18 %**

**Reduced CO<sub>2</sub> emission:  
16.000 ton**

**Waste reduction:  
20 %**

**Yearly water saving:  
82.000 m<sup>3</sup>**



# NATURAL-GAS FUELLED STATION COGENERATION.

The two natural-gas fuelled cogeneration plants produce steam (1600kg/h each) and hot water (1229 kg/h each) for the production process. Inalca already had five hot water tanks used for production processes and cleaning jobs; such water was originally obtained through water/steam exchangers which produced steam by means of traditional diathermic oil boilers.

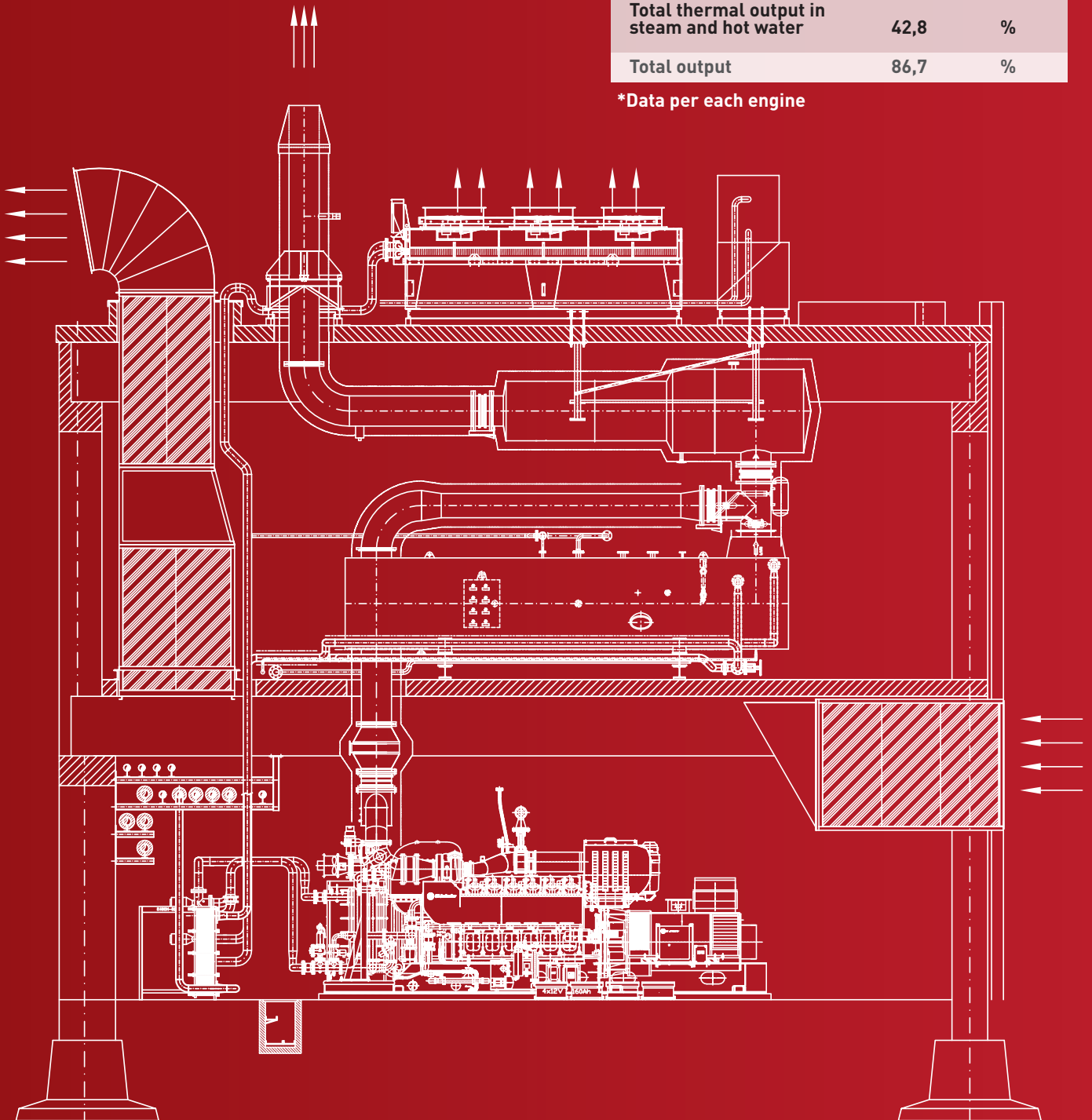
AB Energy has designed a system that interfaces with the existing one for the production/storage of hot water, maximising heat recycling during the running of the production cycle, and thereby limiting the use of existing steam generators to cover thermal load peaks, and no longer as the main producers of hot water. AB Energy has identified the right balance between the company's hot-water discontinuity requirements and the operation of the cogeneration plant which by definition works continuously. At the suggestion of AB Energy engineers, Inalca has installed high-efficiency motors (Miller cycle) which achieve a power output of 43.9% (compared to 41% of standard motors). AB Energy has also shown itself to be a customer partner at logistics level. The plant has, in fact, been designed to optimise space and performance on three different structural levels. From an electric viewpoint, the existing infrastructure had to undergo major alterations, also because of the fact that the connection point to the national electricity distribution grid was inadequate for the power levels involved.

The AB Energy engineers intervened with suitable technologies and functional optimisation solutions, including a system that allows independent operation by the company even in the case of a blackout.

## Version 2x1,824 kWe:

Fuel consumption	437	Nm <sup>3</sup> /h
Introduced power	4.152	kW
Electric power (power factor 1)	1.824	kW
Power output	43,9	%
Temperature of water to boiler	90	°C
Steam produced	810 10 184	Kg/h barg °C
Thermal output (in steam)	550	kW
Hot water return	70	°C
Hot water supply	93	°C
Thermal power output (in water)	1.229	kW
Total thermal output in steam and hot water	42,8	%
Total output	86,7	%

\*Data per each engine





**THE BIOGAS PLANT:  
THE ECOMAX<sup>®</sup> 10 BIO  
CONTAINER MODULE PLANT.**

The plant is designed for the anaerobic co-digestion of treatment sludges, the content of the first stomach (rumen), blood and fat, exploiting the biogas produced (natural gas and carbon dioxide) to run a cogeneration unit made by AB Energy using a very high-efficiency endothermic transformation motor made by the Austrian firm, Jenbacher.

The waste heat of the cogeneration plant is then exploited in a reactor (a dehydrating machine) which treats the digested solid at zero thermal cost, allowing a significant reduction of volumes to be disposed of.

The achieved aim of the Inalca project is the drastic reduction of the materials to be disposed of, through the implementation of a virtuous process which results in such materials being recycled and, at the same time, the production of electricity from an entirely renewable source.

Furthermore, the thermal energy produced (heat) is completely used for the digesters themselves (which work at a constant temperature of 40°C), for the production of facility hot water and for the digested material drying stage.



**CO<sub>2</sub> EMISSIONS KEPT OUT OF THE ATMOSPHERE PER YEAR:**  
(3,000 tonnes)



**OIL CONSUMPTION AVOIDED PER YEAR:**  
(1,300 toe)

### BIOMASS AVAILABLE YEARLY

Treatment sludge	47.000	ton
Rumen	2.605	ton
Blood disposed of	1.614	ton
<b>TOTAL</b>	<b>55.800</b>	<b>ton</b>

### PRODUCTION

Fuel consumption	521	Nm <sup>3</sup> /h
Introduced power	2.605	kW
Electric power (power factor 1)	1.063	kW
Power output	40,8	%
Cogeneration plant power	1.026	kW
Electricity production	7.500.000	kWh/a
Thermal energy output	7.200.000	kWh/a
DIATHERMIC OIL BOILER 1		
Supply temperature	241	°C
Return temperature	220	°C
Power	295	kW
DIATHERMIC OIL BOILER 2		
Supply temperature	220	°C
Return temperature	160	°C
Power	128	kW
HOT WATER		
Supply temperature	88	°C
Return temperature	70	°C
Power	603	kW
Total thermal output in oil diathermic and hot water	39,4	%
Total output	80,2	%

# PLANT OUTPUT ACCORDING TO THOSE WHO USE IT.

Interview with Ing. Roberto Clerici (Operations Director Inalca)

### **Why did you choose cogeneration?**

“The decision was reached over a certain period of time, considering the benefits of a technical-economic nature which such a solution is able to provide and in compliance with company policies which, over the years, have resulted in our implementing solutions aimed at upgrading the efficiency of the production process as a whole, with increasingly stronger focus on environmental issues. Such process was split into two distinct stages, tied together by a single logical thread, and which involved a time period of 4 years. A first step was the installation of mains gas cogeneration units. This enabled us to satisfy a good part of the facility’s energy requirements, with versatile and efficient solutions to better meet the changing production needs of not only today but also tomorrow. The subsequent building of an anaerobic digestion plant using facility wastes to produce electricity and recycle heat, both for the production processes and to considerably reduce the volumes to be disposed of, represents the de facto implementation of our company policy which requires production processes increasingly more keyed to the eco-sustainable use of resources”.

### **What is the real benefit of a cogeneration plant in the meat processing industry?**

“The benefits are numerous because meat processing and meat by-product production processes are distinguished by an important use of heat, both in the form of hot water and steam and of electricity, especially for maintaining the cold chain. Cogeneration is ideal for satisfying the energy requirements of meat processing production processes inasmuch as it allows recycling both the entire heat waste at different temperatures and electricity. The meat processing industry needs versatile solutions able to cater to changing production requirements and a well-made cogeneration plant manages to combine versatility with efficiency and inexpensive operation compared to traditional solutions. The use of biomasses obtained from production process wastes represents a further plus feature of cogeneration compared to traditional solutions because it allows minimising the environmental impact of the production process and at the same time guarantees the generation of heat and electricity with obvious economic benefits.”

### **How have the 2 cogeneration plants built by AB Energy integrated with your plant engineering setup and with existing energy dynamics?**

“The AB plants were able to integrate perfectly in the plant engineering setup of the Inalca facility at Ospedaletto Lodigiano thanks to the long period of analysis which preceded their installation and which was aimed at defining the perfect number and size of the cogeneration units. The goal was immediately set of maximising energy recycling, both as regards heat and electricity, in the different plant running conditions, rather than maximising

production. The motors were interlinked with the existing plants, designed to produce heat in the form of hot water and steam, and with the facility conditioning plant, so as to have various chances of recycling such heat. This way, the thermal energy became available in various forms and at various temperatures to better cater to the different production requirements, which can depend on the production processes under way and on the season of the year. With regard to the cogeneration plant serving the anaerobic digestion plant, such integration is even more extreme inasmuch as the heat produced is used for thermostating the digesters, for drying and stabilising the digested product and for recycling whatever remains as hot water from the production processes. With regard to the electricity, it was decided to connect the cogeneration plants to the medium-voltage distribution network of the facility by means of a single connection point, located in line with the most powerful units so as to optimise the loads of the different electrical cabinets, interfacing the different cogeneration plants so as to almost form a single unit”.

### **Have you already had a chance to verify efficiency with respect to expected benefits?**

“Both as regards the mains gas-fuelled plant and the biogas-fuelled plant we found consistency between project theory and the results actually obtained in the field. In some cases, these results were even better than initially expected, with positive effects on pay-back. And this despite energy and fuel costs having varied considerably over recent years, in a way that was only in part foreseen during the design stage”.

### **What are expectations relating to the maintenance service of a plant of such complexity?**

“Service reliability and quality have, for Inalca, always been decisive aspects as regards the choice of technical partners to whom to entrust the manufacture and running of plants and it is therefore only natural for expectations to be high. We are convinced that this is the only way of pursuing efficiency and therefore the operating profitability and inexpensive running of the plants in the medium-long term, especially as regards the Ospedaletto Lodigiano facility where the manufactured plants immediately became a part of the production process. In recent years, Inalca has always found in AB Energy and AB Service two reliable partners offering professional backing both during the stage dedicated to the technical-economic definition of the plants, and in that of daily plant running, showing themselves to be strongly focused on problem solving”.



# AB GROUP PROFILE.

Established and directed by Angelo Baronchelli, the AB Industrial Group has been operating for over 30 years in the field of cogeneration and the promotion of energy from renewable sources.

Today the AB Group counts 11 operating companies and over 350 employees. Being outright Italian market leader has also favoured its growth abroad.

The Group has designed and manufactured over 400 "turnkey" cogeneration plants. AB plants stand out for their high performance, modularity, compact design and ease of transport – all features that fully cater to the energy requirements of the different customer companies.

AB has also extended its product range to include the BIO line, purposely designed to promote the use of biogas. For its customers, AB Group is a single interlocutor, able to take care of every aspect of plant engineering. Through its Group companies in fact, it places at disposal all the technical know-how required for plant design, manufacture, installation and running, implementing the entire project, from building to start-up through to a maintenance service that covers the complete life cycle of the installation.

The AB Group has recently undertaken an expansion process, which has also taken it abroad into those European countries where cogeneration is acquiring an increasingly more strategic role. After launching onto the Spanish market, with offices in Madrid and Barcelona, the Group is now also wagering on the east-European market and, in 2009, opened a subsidiary in Bucarest. In April, 2010, AB acquired the majority share of KWE Technika Energetyczna, local distributor and service partner for GE Jenbacher motors in Poland.

Cogeneration has shown itself to be a winning choice in other sectors as well, and not only industrial:

**Chemical-pharmaceutical, textiles, plastic, paper, bricks, promotion of anaerobic digestion and waste dump biogas, etc.**

**Those who have preferred AB Energy:**

**Amadori, Assolac, Buitoni, Centrale del latte di Firenze, Cooperativa Speranza, Cottonificio Albini, Fatro, Felli Color, Gruppo Cremonini, La Farge, Martini & Rossi, Nestlè, Olimpias Benetton, Pastificio Ferrara, Pastificio Rummo, Pfizer, Polynt, Wienerberger, etc.**



**AB ENERGY, LEADING ENERGY**