ENERGY EFFICIENCY AND COGENERATION

Turbine Cogeneration Systems
Engine Cogeneration Systems
Renewable energy power plants
Service
Air treatment plants

>350 MW
Service Contract

>400 MW
Installed
TODAY CEFALA IS AN INTERNATIONAL COMPANY, PRESENT INTO FOUR DIFFERENT BUSINESS AREA:

TECHNOLOGICAL SYSTEMS FOR CIVIL AND INDUSTRIAL BUILDING AND ENERGY POWER PLANTS

TURNKEY SOLUTIONS FOR SHOP AND SUPERMARKET: SHELVINGS, CHECKOUT AND INTEGRATED RACK

TURNKEY SOLUTIONS FOR COATING, DRYING AND DECORATE: WOOD, GLASS, PLASTIC AND FIBERCEMENT

DENTAL TREATMENT CENTRE, RADIOLOGY AND STERILISATION SYSTEMS

For over 80 years, Cefla has been designing, building and servicing MEP (Mechanic-Electric-Plumbing) complex systems for civil and industrial sectors:
- HVACR (Heating, Ventilation, Air Conditioning, Refrigeration)
- Electrical LV and MV distribution and power systems
- Intelligent building management systems
- Access Control and Security
- Fire Protection
- Power Generation and Recovery systems
- Cogeneration Plants for natural gas and renewable sources

Furthermore, in civil and industrial systems field, as well as in the Energy and Power Generation and in the Oil & Gas, Cefla is present with activities of Global Technologic Service. The high-quality value of our activities, the financial and assets solidity and the continuous focus on the most enhanced technologies make Cefla the ideal partner for project financing activities or EPC (Engineering - Procurement - Contracting) in high complexity contracts.

BUSINESS UNIT IMPIANTI

Castello Sforzesco (Milano)
Mechanical system and automation for control and supervision of functional/ climate ambient parameters.

Niguarda Hospital (Milano)
HVAC, Plumbing, Fire Fighting, medical gases systems.

Milano Porta Nuova (Milano)
HVAC system with exploitation of geothermal energy with heating pump.

Perugia University - Medicine and Surgery Faculty (Perugia)
Technological central station and mechanical / electrical systems.

Trade Fair (Rimini)
Centralized chilled water production with ice storage system (21,500 kW) and central cooling station for all the fairground.

Bologna City Hall Headquarter (Bologna)
Mechanical, electrical and special systems. Special sunscreen, extended over the whole building, provides also a large area of over one thousand square meters for a photovoltaic system.

Cefla was founded in 1932 with the scope to design and build electrical, plumbing, HVAC systems for civil and industrial constructions. Since then, exploiting the opportunity offered by the market, Cefla evolved and diversified its business according to its own competencies and capabilities.

The strenght of our group is expressed by the economic results, the value attributed to human resources and our worldwide presence:

- 400 million of euro of revenue
- 1700 employees

Production Sites and commercial branches in Cina, Usa, UAE, Germany, France, UK, Spain, Poland and Russia.
THE COGENERATION. WHAT IS IT?

The cogeneration is the combined production of electrical and thermal energy; the latter is made available as hot water, hot air or steam depending on the technology adopted according to the customer requirements. Moreover, the same technology may produce cold energy for refrigeration uses (tri-generation).

THE ADVANTAGES

Cogeneration allows valuable savings on energy bills that can reach 40% of the total cost: electricity, heating and refrigeration.

WITHOUT COGENERATION

WITH COGENERATION

WITH TRIGENERATION

Trigeneration system is a plant designed to produce cold water (>7°C) besides electricity and thermal energy, through the employment of a Lithium Bromide absorption chiller which use part of thermal energy produced by the Cogeneration plant. This configuration reduces the consumption of conventional electrical chillers.

THE BENEFITS

The cogeneration can give advantages to many applications as civil, industrial, commercial and oil & gas. This system is useful when the industrial process is based on at least 4,000 working hours per year as well as when there are simultaneous need of electricity, heat and refrigeration.

- ENERGY EFFICIENCY
- GREENHOUSE GAS EMISSIONS (CO2) REDUCTION
- ENVIRONMENTAL BENEFIT
- CONTINUITY ENERGY SUPPLY (‘ISLAND OPERATION’)
- POSSIBLE USE OF RENEWABLE SOURCES
- GOVERNMENTAL ECONOMIC INCENTIVES (IF ANY)
- LOW PAY-BACK PERIOD
Cefla plays on the markets a General Contractor partner, providing complete assistance to the Customer in every step necessary for development and construction of the plant.

**YOUR ENERGY EFFICIENCY SOLUTION PARTNER**

**ENERGY AUDIT**

Optimized sizing of the plant, based on the energy consumption of the user, their particular trends (if any) and the potential availability of renewable/alternative energy sources.

For this activity, Cefla can perform a preliminary study with:

- **ANALYSIS OF REAL CONSUMPTION OF THE PLANT**
- **MASS AND ENERGY BALANCES FOR COGENERATION AND ELECTRICAL GENERATION SYSTEMS**
- **DETAILED FEASIBILITY STUDY**
- **BUSINESS PLAN AND CALCULATION OF RELEVANT ECONOMICAL PARAMETERS**

**FINALLY, COMPARISON OF ALTERNATIVE SOLUTIONS WITH THE BUDGET ECONOMICAL EVALUATION**

**ELECTRICAL POWER AVERAGE CONSUMPTION**

**ELECTRICAL ENERGY REQUIREMENT - Factory working period**

<table>
<thead>
<tr>
<th>POWER (kW)</th>
<th>HOURS</th>
<th>MONTHS</th>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
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<td>3,500</td>
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</tbody>
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**FACTORY CONSUMPTION CURVE**

**PROCESS CONSUMPTION CURVE**

**ELECTRICITY FROM C OGENERATOR**

**DETAILED DESCRIPTION OF THE PURPOSES**

With the final definition of the best solution, Cefla will follow all the construction, starting from the authorization process (if needed) till the definition of the Customer’s performance warranties and service activities.

**CONSTRUCTION OF THE PLANT**

Cefla is able to propose to the Customer different kind of solutions, starting from the supply of the standard cogeneration package up to the complete TURN-KEY contract. Furthermore, Cefla offers specific financial solutions or specific contract of ENERGY SERVICE to support the investment even through partnership and relationship that Cefla has developed with the main actors in the energy market.

**TECHNOLOGICAL SERVICE**

After the construction of the plant, Cefla proposes to the Customer long-term contract for the Operation and Maintenance of Civil technological plants, Power Generation & Cogeneration systems and Oil&Gas sector. Our wide experience offer to the Customer the possibility to have a unique supplier for all the O&M activities on utility systems, also in special industrial contexts.

Hereafter our main activities:

- **ROUTINE MAINTENANCE PROGRAM, CORRECTIVE AND PREDICTIVE “ON CONDITION”**
- **AVAILABILITY FOR H24 AND 365DAYS/YEAR**
- **MAINTENANCE ENGINEERING SYSTEMS**
- **OPTIMIZATION OF THE LIFE CYCLE OF THE PLANT**
- **ANALYSIS OF ENERGY EFFICIENCY IMPROVEMENTS**
- **RISK ASSESSMENT FOR THE SAFEGUARD OF ENVIRONMENT AND SAFETY**
- **REMOTE CONTROL AND REMOTE ASSISTANCE**
- **PLANT AVAILABILITY GUARANTEE**

**OUR ENERGY SERVICE ACTUALLY MANAGE MORE THAN 350MWe**

More than 20 years maintenance activity in power generation plants based on engine and gas turbine, makes Cefla a reliable partner for power generation plants.

**WORKSHOP AND MAJOR OVERHAUL**

Cefla can directly provide Major Overhaul activity on several kind of engine, including operation on main parts of the engine core and specific maintenance activity. For instance in 2013, we have been involved in the 120,000h Major Overhall of n.5 gas engine (power of 2.600 MWe each).

**OIL&GAS SERVICE**

Cefla can directly operate for Operation&Maintenance of electrical and mechanical engines in Oil&Gas sector, both on-shore and off-shore. More we have developed a dedicated structure for this business. In 2014, there are actually more than 250 engines on-shore and off-shore serviced by contract.

**TECHNOLOGICAL PLANT SERVICE**

Since more than 30 years ago, we perform service activity in all the technological utilities of extended users, such as:

- electrical and anti-fire systems
- heating systems
- hot water boilers
- air conditioning systems and air treatment system

**Centergross Bologna**

Total thermal energy installed: 50,000 kWt
Total cooling capacity: 300 kWt
All treated about 12,000 Nmc/h
Site area: 1,000,000 square meter
The industrial sector needs flexible and high-efficiency energy systems, with a low pay-back period. For these reasons, Cefla has developed standardized solutions for cogeneration plants with the aim to satisfy all these features.

This approach provides solutions suitable for several industrial sectors, such as food industry, wood transformation industry, ceramic manufacturing, mechanical manufacturing companies, chemical industry, papermill industry, textile industry and many others.

**CASE HISTORY FOOD INDUSTRY**
**HERA COMM**
- 999 kW CHP plant
- Plant installed in existing building
- Heat recovery: steam in main manifold and hot water
- Full-service maintenance

**CASE HISTORY BEVERAGE INDUSTRY**
**CAVIRO**
- 1500 kW CHP plant
- Outdoor package installation
- Heat recovery: steam in main manifold and hot water
- Supervision system for the complete accounting of energy streams
- Full-service maintenance

**CASE HISTORY CERAMIC INDUSTRY**
**CASALGRANDE PADANA**
- 6,000 kW gas turbine, electrical power
- Heat recovery of exhaust gas to n.3 spray-driers
- Full-service maintenance

**CASE HISTORY CERAMIC INDUSTRY**
**COOPERATIVA CERAMICA IMOLA**
- n.1 gas engine 6,000 kW
- n.1 gas engine 1,800 kW
- Exhaust gas complete thermal recovery for spray-drying process (4,400 kW)
- Hot water circuit recovery for ATM combustion air pre-heating (1,200 kW) and slip pre-heating

**COGENERATION FOR DISTRICT HEATING**

The same cogeneration technology allows to exploit electrical energy and thermal energy (hot and cold) for many different users such as utilities, hospitals and residential.

**CASE HISTORY UTILITIES SECTOR**
**FIERA BOLOGNA METROPOLITANA**
- Gas turbine 4,350 kW
- Complete thermal recovery (7,860 kW)
- Production of steam and superheated water

**CASE HISTORY RESIDENTIAL SECTOR**
**HERA TELERISCALDAMENTO**
- n.2 gas engine
- Electrical power 4,850 kW
- Thermal power 4,350 kW production of superheated and hot water (120°C and 90°C)
- Thermal energy in integration 6,600 kW
Cefla provides solutions with renewable energy for several applications and for different renewable sources.

**RENEWABLE ENERGY PLANTS**

**CASE HISTORY**
**BIOGAS COGENERATION PACKAGE**
**CLAI**
- Biogas derived from anaerobic digestion of food industry by-products
- Electrical power 888 kWe
- Biogas pre-treatment system
- Total thermal recovery for digestors heating, biomass sanitization pre-treatment and heating of the nearby factory
- Full service maintenance of engine and auxiliary systems

**CASE HISTORY**
**VEGETABLE OIL COGENERATION PLANT**
**LLYOD RAVENNA** *(Micron Mineral)*
- Cogeneration plant with vegetable oil
- Electrical power 7,158 kWe
- Partial thermal recovery of 2,600 kWt for nearby industrial processes
- Full service maintenance of engine and auxiliary systems

**CASE HISTORY**
**TURN-KEY ANAEROBIC DIGESTION PLANT**
**COOP IL RACCOLTO**
- Plant for anaerobic digestion of energy crops, food industry by-products and agricultural by-products
- General Contractor Role for Turn-key complete plant
- Total power 999 kWe
- Full service contract for the cogeneration system and auxiliary systems

**OIL&GAS SECTOR**

**CASE HISTORY**
**OIL EXTRACTION FIELD**
**ROTELLO** *(CB)*
- Power generation plant
- Residual gas of oil extraction as fuel
- n.8 gas engine
- Total power 21,560 kW
- Global service for O&M
- Spare part logistic management with guaranteed availability
- Direct operation of the plant since 20 years
- Service provided through Cefla GEBC
- Major overhaul after 120,000h on n.5 engine

**AIR TREATMENT SYSTEMS**

Cefla provides air treatment systems since more than 30 years. The experience has been developed in both industrial sectors (ceramic industry, wood finishing industry, leather industry, etc...) and energy/environmental field (Waste-to-energy, landfill, renewable plants, etc...)

**CASE HISTORY**
**FLAT GLASS PRODUCTION**
- Recuperative Thermal Oxidizer
- Thermal recovery for air pre-heating of inlet air and process air

**CASE HISTORY**
**WOOD FINISHING PLANT**
- Regenerative Thermal Oxidizer