

BIOMASS AND WASTE TO ENERGY POWER PLANTS





ENERGY CLUSTER is the **Productive**

System in Lombardy for energy, the only one officially recognised by the **Lombardy Region**, which is founded on traditions and skills which are deeply rooted in the entire territory of Lombardy.

Energy Cluster is comprised of *companies from the Lombardy Region which manufacture, or contribute to the manufacturing, of products used for the generation and distribution of energy.*

Energy Cluster is a network comprised "of companies for companies" in order to promote and create an integrated offer for the various areas of energy.

Energy Cluster is made up of companies recognised as leading suppliers of energy: a "made in Italy" online with the world which is characterised **for its quality products and services**, as well as a rich and important know-how.

A cluster that has been gradually established and that acquires all of the current and future technical skills thanks to the presence of various research centres and universities specialised in the energy sector.

Our territory: **LOMBARDY**

Lombardy: a network of companies and districts

A series of indicators prove the vitality of the Lombardy economic system: the GDP amounts to 296 billion Euro and represents 20% of the national GDP. The GDP pro capite exceeds the domestic average by 29% and the European average by 37% (EU 25).

Moody's has attributed an Aa1 rating to the Lombardy Region.

Lombardy: a motor for all of Europe

The region is one of the Four Motors of Europe; a network of the most advanced European regions and also includes Baden-Württemberg (Germany), Rhône-Alpes (France) e Catalunya (Spain).

Over a third (36.3%) of all Italian exports is concentrated in the Lombardy Region as well as almost 50% of the imports. 36.6% of all foreign multinational companies present in Italy have their headquarters in the region.

Companies of Lombardy

The companies with their headquarters in Lombardy amount to approximately 800 thousand and those which export their products or services abroad are more than 50 thousand.

Lombardy is home to 50% of Italian industrial plants and the electrical energy sector is represented by approximately 23,000 employees and 500 companies.

Energy Cluster and the Lombardy Region: strong points

Energy Cluster is located in a territory which represents the "electro-mechanical pole of excellence" in the field of supply for production plants and transmission and distribution systems of electrical energy ranging from traditional energy to that relevant to renewable sources with a know how which is well known on a worldwide level.

A "made in Italy" online with the world with an export quota equal to 70%.

A cluster for strategic energy which, notwithstanding important restructuring, was able to re-consolidate itself over time, becoming a true product of excellence for Lombardy and Italy, both in constant evolution. Medium-Large companies with numerous niches of excellence.

The companies of the sector were awarded on various occasions on an international level by IPMA (International Project Management Association) confirming the elevated technical, organisational and management skills.



Who we are

Energy Cluster companies supply services, products, systems and engineering to the production plant and transmission and distribution system starting from the works in progress up to the final completed product installed at the production site.

Energy Cluster is a horizontal chain which has the possibility to form a vertical cooperation chain, an interlacing which offers high potential to forms of cooperation for new clients and the market in general.

The chain starts from the works in progress up to final end products and services for clients and is supported at all stages by planning and analysis activities. For many islands of the power plant various companies can perform the role of EPC.

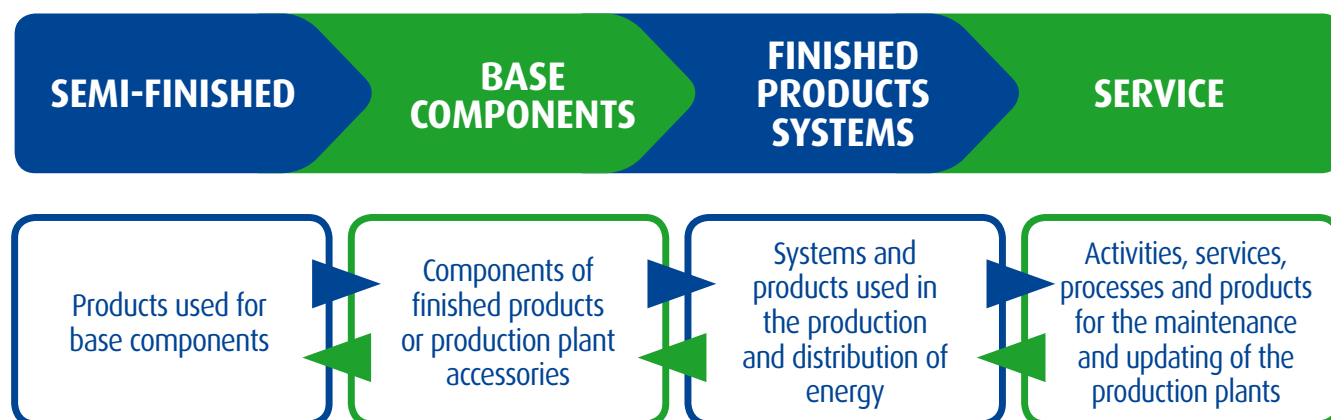
All of the classic electromechanical processes are present in the production system. Often the productive technologies are established in a binding manner at the design level in order to guarantee the continuity of the services and compatibility between the various products and components. The capability to customise the products and design is also important, in function of the services, the operating conditions and the regulations requested by the client.

An innovative offer

Energy Cluster companies become **stronger and more competitive** because:

- they operate in an **organised network** which facilitates communication throughout the entire chain in order to optimise the services and final costs
- they increment their **skills** thanks to the sharing of knowledge over the entire production process and by uniting competitiveness and cooperation (co-opetition)
- they can exploit the **advantages deriving from relations** with institutions, the world of research, centres of excellence (some are institutional partners of Cluster) and big clients

Our offer is **innovative, different** from that which is currently on the market: overall the Energy Cluster companies can supply a finished product and even an entire "island" of any type of electrical energy power plant regardless of the raw material source: fossil, nuclear, solar, wind, water, geothermal, biomass,...



Added value for clients

The opportunity to take advantage of a "prearranged package" of qualified companies which act as a group with a system of relations and exchange of information structured with a consequent reduction and reliability of delivery times.

The brochure


The brochure summarises the joined potentials of the companies, divided into islands which characterise the plant:

BOILER island
TURBINE island
B.O.P. island
TREATMENT island
DISTRIBUTION island

Each island presents a specification of the activities which make up the same. Different components/services/products are indicated for every activity as well as the companies which manufacture them.



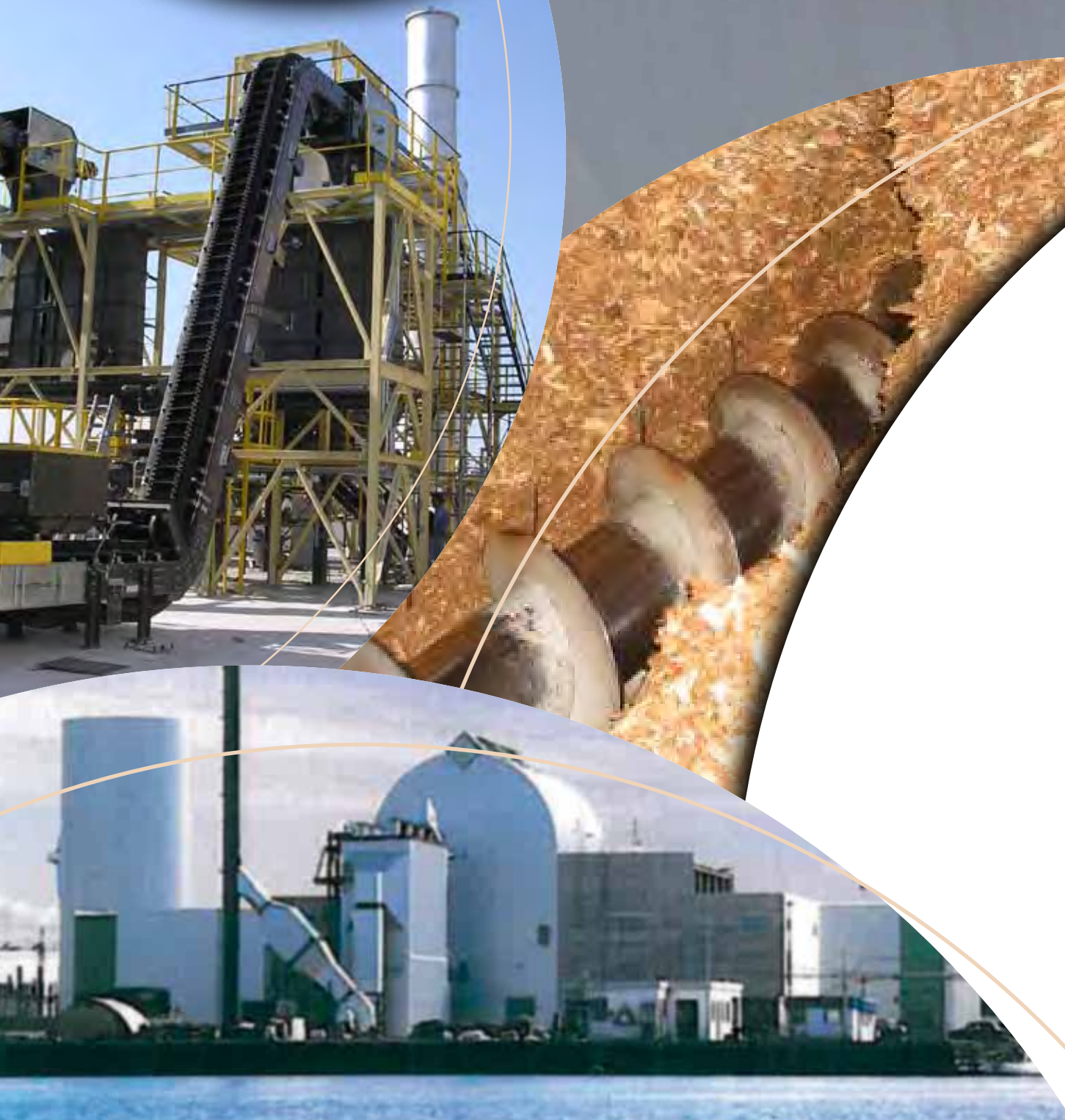
BOILER *island*



The steam generator which uses **biomasses as fuel** (wood, straw, waste,...) although conceptually similar to various types of traditional boilers, **requires special features in the fuel supply and combustion systems, and heat transfer to the fluid water/steam**; the combustion systems are fundamentally two types, grate and fluidised bed.

The **material** which comes into contact with the flue gas often **must be highly corrosion and erosion resistant**.

The **flue gas purification systems and the continuous detection of pollutants are very important** especially in the waste to energy systems. To eliminate combustion residue or potentially toxic combustion products a gas or fuel powered post-combustion chamber is often provided. Overall, the biomass steam generators in most cases have a medium to low power (up to 100 thermal MW) and, given the same thermal power, sizes and costs which are significantly higher than conventional fuel boilers.

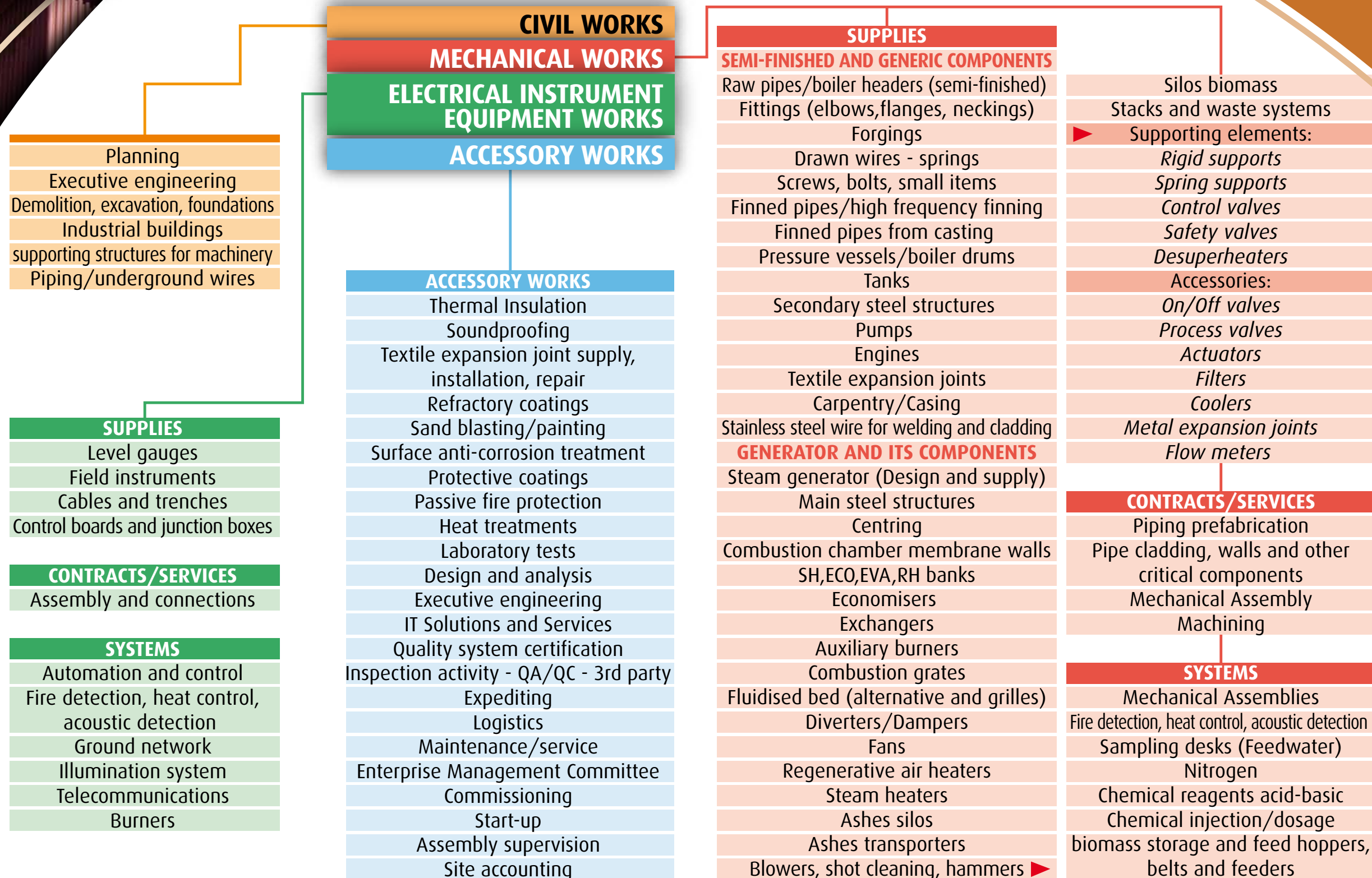




BOILER *island*

EPC CONTRACTOR

The **BOILER island** is structured by the following works, that can be all performed by the companies of the Energy Cluster.





TURBINE *island*

The turbine island is essentially the together of all machinery and auxiliary systems which allow the production of electrical energy starting from thermal energy. The heart of the island is the turbo-generator set, inclusive of the **turbine** that converts **the thermodynamic energy** from steam into **mechanical energy**, and the **generator** which converts mechanical energy into **electrical energy** supplied to the distribution island, together with dedicated **systems and auxiliaries** located around the machine itself.

A second important function is, in the cogeneration plants, to supply controlled pressure steam to the users (i.e. district heating)

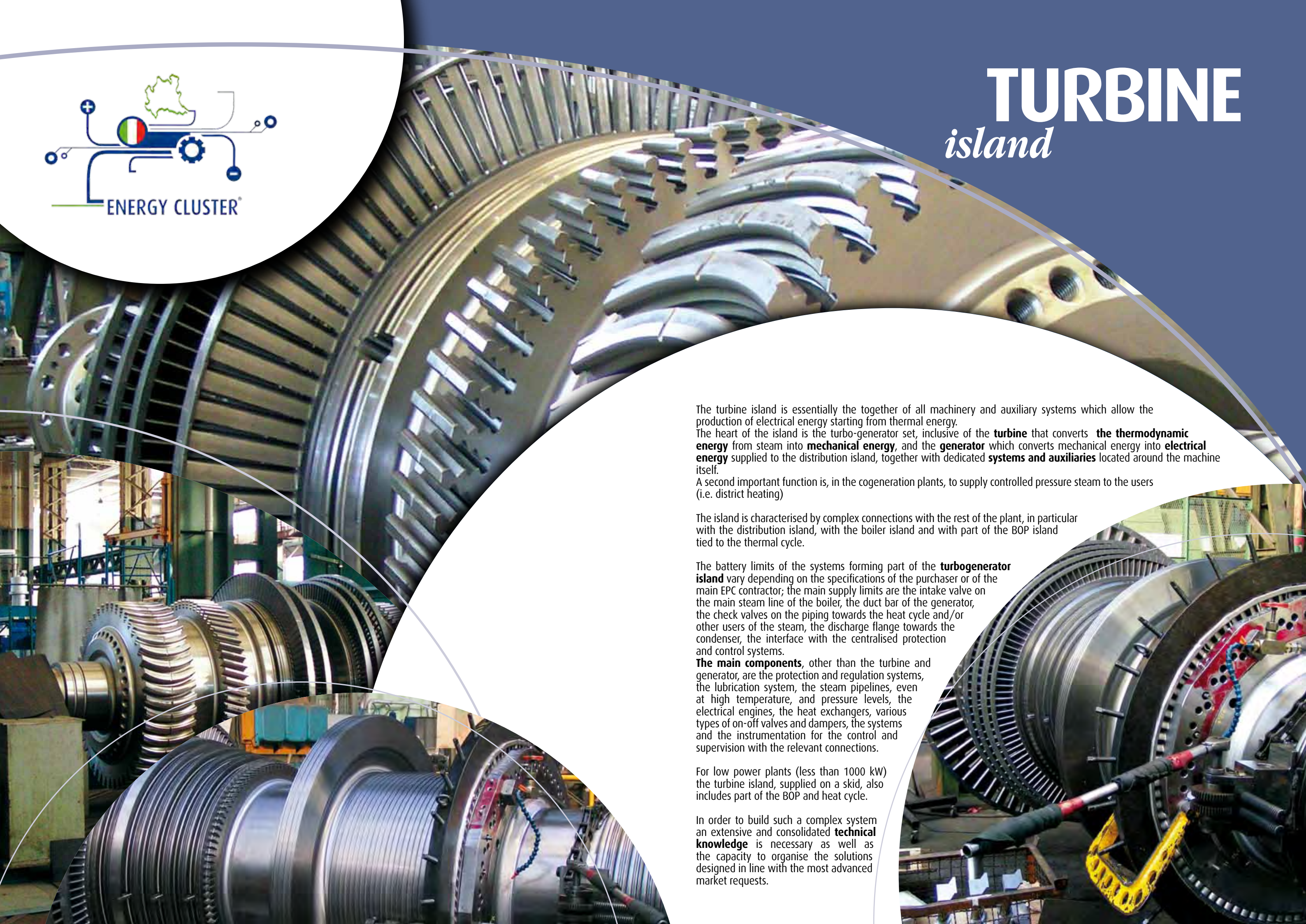
The island is characterised by complex connections with the rest of the plant, in particular with the distribution island, with the boiler island and with part of the BOP island tied to the thermal cycle.

The battery limits of the systems forming part of the **turbogenerator island** vary depending on the specifications of the purchaser or of the main EPC contractor; the main supply limits are the intake valve on the main steam line of the boiler, the duct bar of the generator, the check valves on the piping towards the heat cycle and/or other users of the steam, the discharge flange towards the condenser, the interface with the centralised protection and control systems.

The main components, other than the turbine and generator, are the protection and regulation systems, the lubrication system, the steam pipelines, even at high temperature, and pressure levels, the electrical engines, the heat exchangers, various types of on-off valves and dampers, the systems and the instrumentation for the control and supervision with the relevant connections.

For low power plants (less than 1000 kW) the turbine island, supplied on a skid, also includes part of the BOP and heat cycle.

In order to build such a complex system an extensive and consolidated **technical knowledge** is necessary as well as the capacity to organise the solutions designed in line with the most advanced market requests.





TURBINE *island*

EPC CONTRACTOR

CIVIL WORKS

MECHANICAL WORKS

ELECTRICAL INSTRUMENT EQUIPMENT WORKS

ACCESSORY WORKS

The **TURBINE island** is structured by the following works, that can be all performed by the companies of the Energy Cluster.

| |
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| Planning |
| Executive engineering |
| Demolition, excavation, foundations |
| Industrial buildings |
| Supporting structures for machinery (foundation) |
| Piping/underground wires |

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|-----------------------------------|
| SUPPLIES |
| Field instruments |
| Control boards and junction boxes |

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|---------------------------|
| CONTRACTS/SERVICES |
| Assembly and connections |

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| SYSTEMS |
| Automation and control |
| Fire detection, heat control, acoustic detection |
| Ground network |
| Illumination system |
| Telecommunications |

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| ACCESSORY WORKS |
| Thermal Insulation |
| Textile expansion compensator supply, installation, repair |
| Soundproofing |
| Refractory coatings |
| Sand blasting/painting |
| Surface anti-corrosion treatment |
| Protective coatings |
| Passive fire protection |
| Heat treatments |
| Laboratory tests |
| Design and analysis |
| Executive engineering |
| IT Solutions and Services |
| Quality system certification |
| Inspection activity - QA/QC - 3rd party |
| Expediting |
| Logistics |
| Maintenance/service |
| Enterprise Management Committee |
| Commissioning |
| Start-up |
| Supply and development of technical and scientific SW |

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| SUPPLIES |
| SEMI-FINISHED AND GENERIC COMPONENTS |
| Smelting |
| Castings for application at high temperatures |
| Forgings |
| anti-erosion/anti-corrosion carry on palettes and other parts |
| Forges for application at high temperatures |
| Screws, bolts, small items |
| Auxiliary system valves |
| Carpentry |
| Stainless steel wire for welding and cladding |
| TURBOALTERNATOR AND ITS COMPONENTS |
| Steam turbine: design and manufacturing |
| Generator group (synchronous or asynchronous) |
| Turbine mechanical components according to design (semi-finished and finished) |
| Blades (from forgings and bars) |
| Turbine valve |
| Reducers |
| Bolts, assembly elements |
| Valves on taps and joints |
| Journal bearings (metal white) |

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| CONTRACTS/SERVICES |
| Mechanical Assembly |
| Machining |
| SYSTEMS |
| Fire fighting |
| Fire detection, heat control, acoustic detection |
| Oil/hydraulic control and lubrication systems |
| Turbine by-pass valve |



B.O.P. *island*

Giving a complete and thorough definition of “**B.O.P.**” (Balance Of Plant) is not easy at all, also because it is interpreted differently by Clients and Main Contractors.

Literally B.O.P. (Balance Of Plant) indicates all supplies, prefabrications and assemblies to complete the plant necessary **to interconnect the main components** (boiler, turbine, flue gas treatment plant, etc.). We are dealing mainly with **pipings, valves, pipe fittings and other secondary components/systems** and, sometimes, even with the **equipment for the heating cycle** (exchangers, condenser, etc.)

Increasingly, the B.O.P. supplier is required to have the skill, capacity and availability to complete the supply with a series of highly qualified “**accessory**” **activities and services**, such as detailed engineering, civil works and electrical instrument equipment, the application of insulation and paint as well as any environmental protection works; sometimes, as an additional service, assistance is requested for the authorisation procedures, practices connected to environmental rules (VIA, VAS, IPPC) including relations with the competent Entities, the procurement of the biomasses. That’s why the B.O.P. is a high technological level “integrated and multidisciplinary supply”.

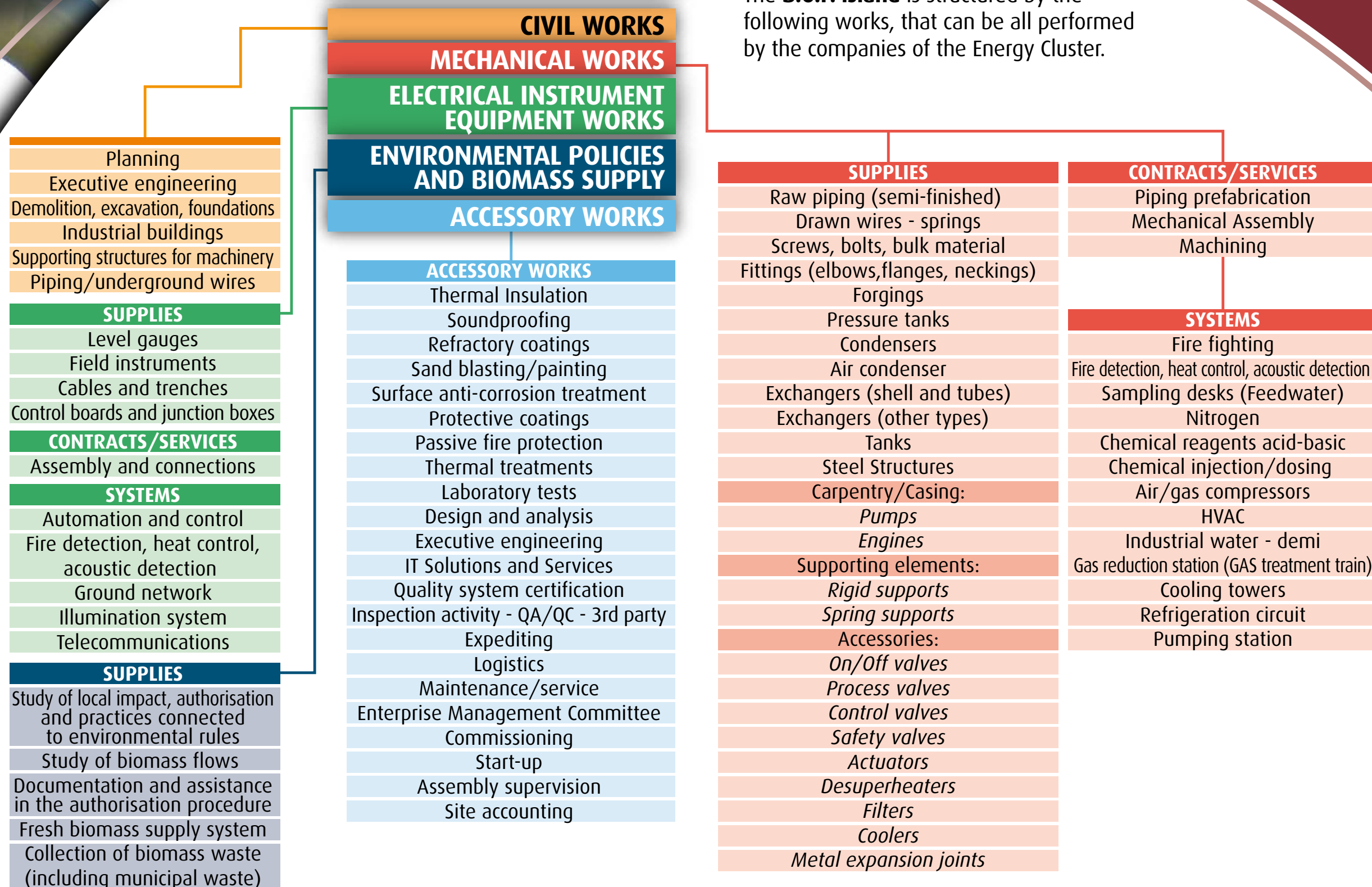
It is for this reason that Energy Cluster has inserted a series of qualified Companies in the individual sectors, which are able to cover all of the activities attributable to B.O.P.



B.O.P. island

EPC CONTRACTOR

The **B.O.P. island** is structured by the following works, that can be all performed by the companies of the Energy Cluster.





TREATMENT *island*

The treatment island is characterised by three main areas: the actually present systems depend on the type of plant:

1. AIR TREATMENT AREA (Forced draft fan air intake)

A filter system installed on **the combustion air intake** of forced air fans.

2. FGTS AREA (FLUE GAS TREATMENT SYSTEM)

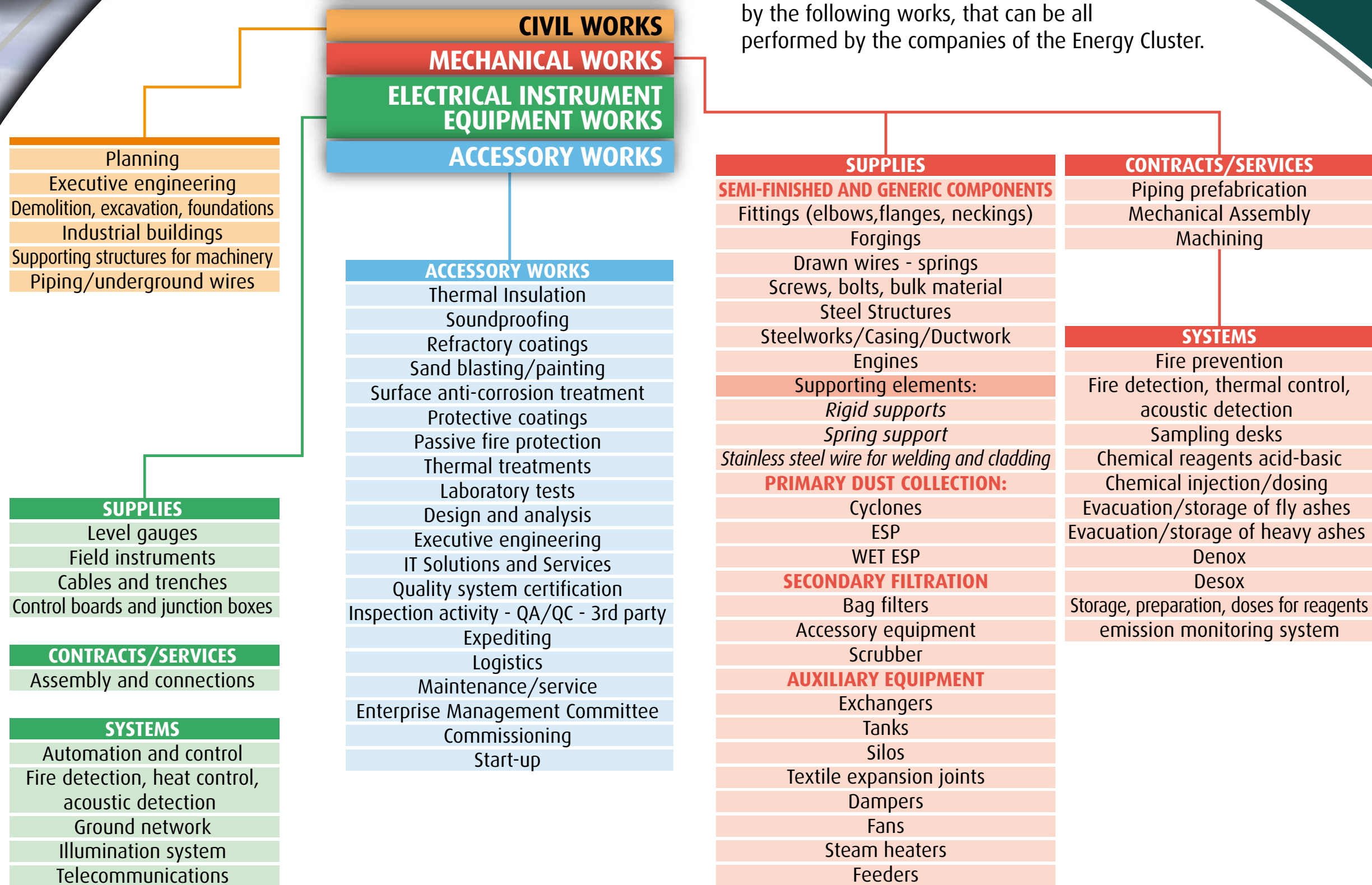
- **Primary dust collection system** A collection and transport system directs the powders collected into a storage section.
 - **Storing, preparation and dose of basic reagents and adsorbents** The storage system of the basic reagent used to neutralise the flue gases is made up of a vertical cylindrical silo with a filter, level gauges and a suitable extraction system which powers the dosing system. The latter is controlled on the basis of the quantities required by the purification process and, following suitable preparation performs the release of the chemicals into the flow of flue gas. A similar system is used for the adsorbent.
 - **Reagents-Gases Contact Reactor** The blending reactor is an ascending-descending type with a vertical cylindrical shape.
 - **Bag Filter complete with accessories** From the reactor the gases enter into the final filtration section, represented by the bag filter, at times preceded by a cyclone system. The function is to reduce the powders present in the gases until achieving the requested limit for atmospheric dust emissions, and to bring to completion the reactions of the neutralisation of acid gases and absorption processes of micro pollutants on the "cake", which have formed on the bags. The bag filter is composed of the following elements:
 - Central section
 - Compartments (Bottom hopper, Bag Case, Bag-holder plate, Filter Bags, Purified Gas Tank
 - Cleaning System
 - Preheating System with air recirculation and electric batteries.
 - **System for the Transport and Storage of Powders** The powders captured by the filter bags and gathered in the hoppers are extracted and transported to the storage silo.
 - **Reactor DeNOx (should a NOx reduction system not be foreseen in the boiler)** The removal of the nitric oxides (NOx) is performed on a honeycombed catalyst contained in a reactor inside which the flue gases are channelled. The main components of a DeNOx SCR system are:
 - Storage and powering system for the reagent
 - Dosage and injection system for the reagent
 - SCR Reactor and DeNOx catalyst with static mixers and flow distributors.
 - **Heat Exchanger** Transfers the heat of the flue gases to a service fluid to be subsequently used in other parts of the system.
 - **Flue Gas Extraction Fan** In order to compensate for the pressure loss of the flue gasses in the purification plant, a flue gas extraction fan can be provided for before the stack. In order to maintain a constant pressure as much as possible at the opening of the purification plant, a regulation by inverter is foreseen.
 - **CEMS continuous emission control system** This system is very important for plants with waste combustion and in general for plants located in residential areas; it must automatically and continuously provide information on the main elements, which could potentially be hazardous to health, contained in the flue gases with alarm systems should they exceed the permissible levels.
- ## 3. WATER PREPARATION AND TREATMENT AREA
- **Water demineralisation plants** For the preparation of the water which powers the thermal cycle.
 - **Waste water treatment plant** Treatment systems for acid/alkaline, oily water from the various washing or purification systems through chemical physical processes.



TREATMENT *island*

EPC CONTRACTOR

The **TREATMENT island** is structured by the following works, that can be all performed by the companies of the Energy Cluster.





DISTRIBUTION *island*

The Distribution island is essentially made by the duct lines through which electrical energy is transferred **from the turbo-generators to the supply lines** outside of the power station. The above lines are provided with control, protection and voltage transforming devices, connected amongst themselves by a system with various bars and ducts.

The configuration possibilities are many and depend on the power and the number of the turbo-generator sets, the type of service performed by the power station, the level of continuity of service requested, etc.

For simplification purposes, the distribution island can be defined as being made up of:

A SYSTEM OF BARS:

- Uprights: establish the longitudinal connection generator-relevant transformer-electrical supply cable.
- Duct Bars: establish the transversal connection between the various machines.

SWITCHES WITH RELEVANT PROTECTION RELAYS

- High or medium voltage generator switch
- Medium voltage electrical board
- Low voltage electrical board

TRANSFORMERS

- Motor transformer
- Auxiliary Transformer
- Transformer for exciter machines

HIGH VOLTAGE STATION

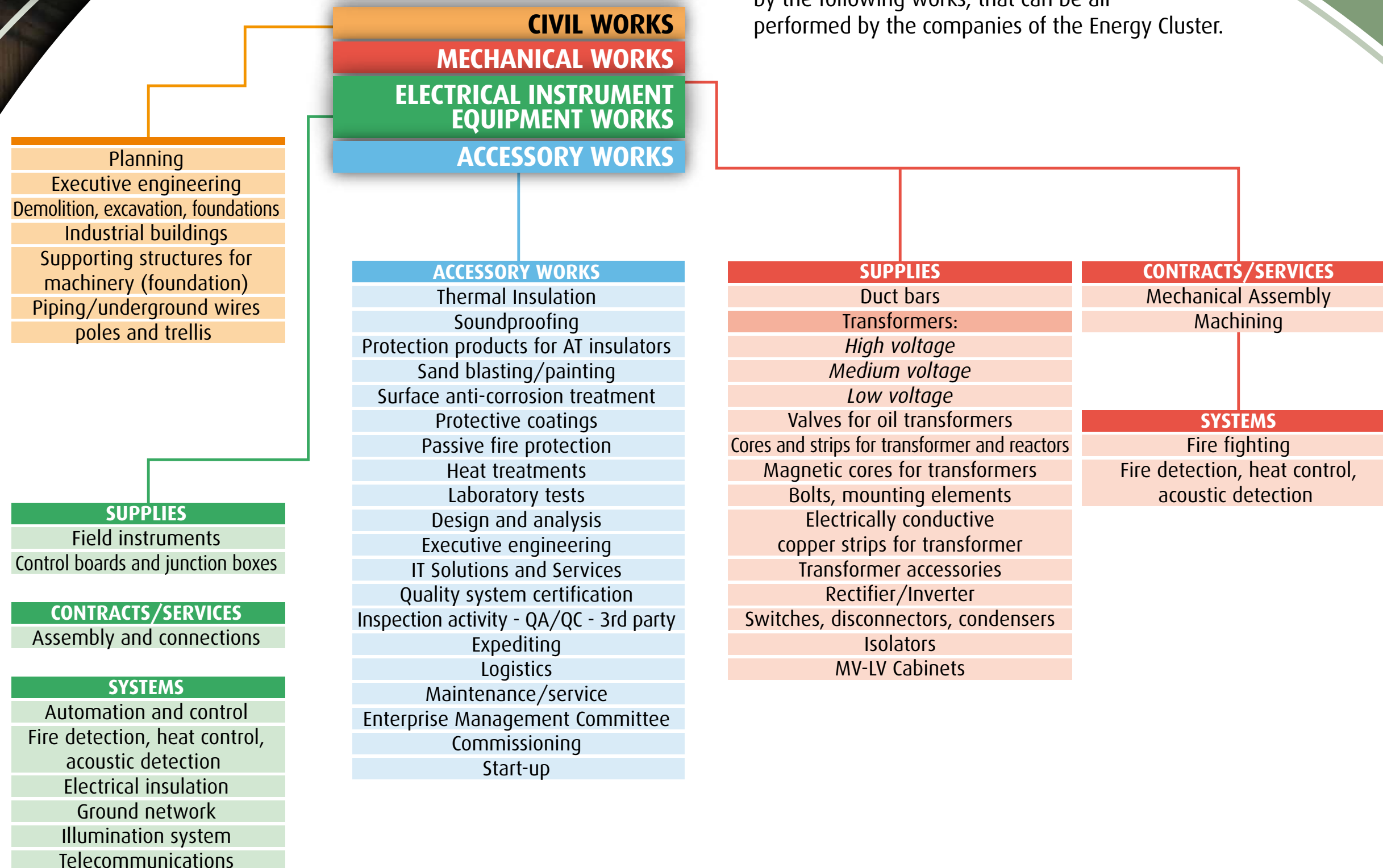
Station which also includes equipment and control systems and from which the connection to the network originates

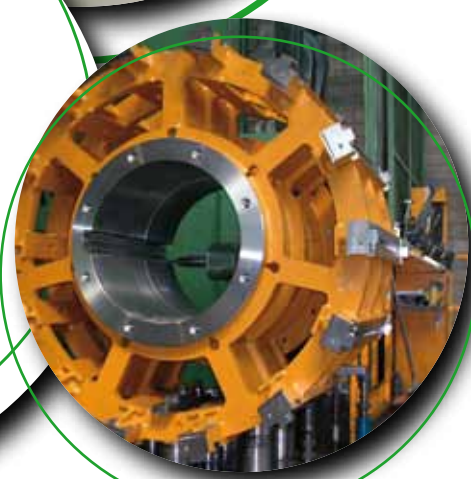


DISTRIBUTION *island*

EPC CONTRACTOR

The **DISTRIBUTION island** is structured by the following works, that can be all performed by the companies of the Energy Cluster.





The group of companies

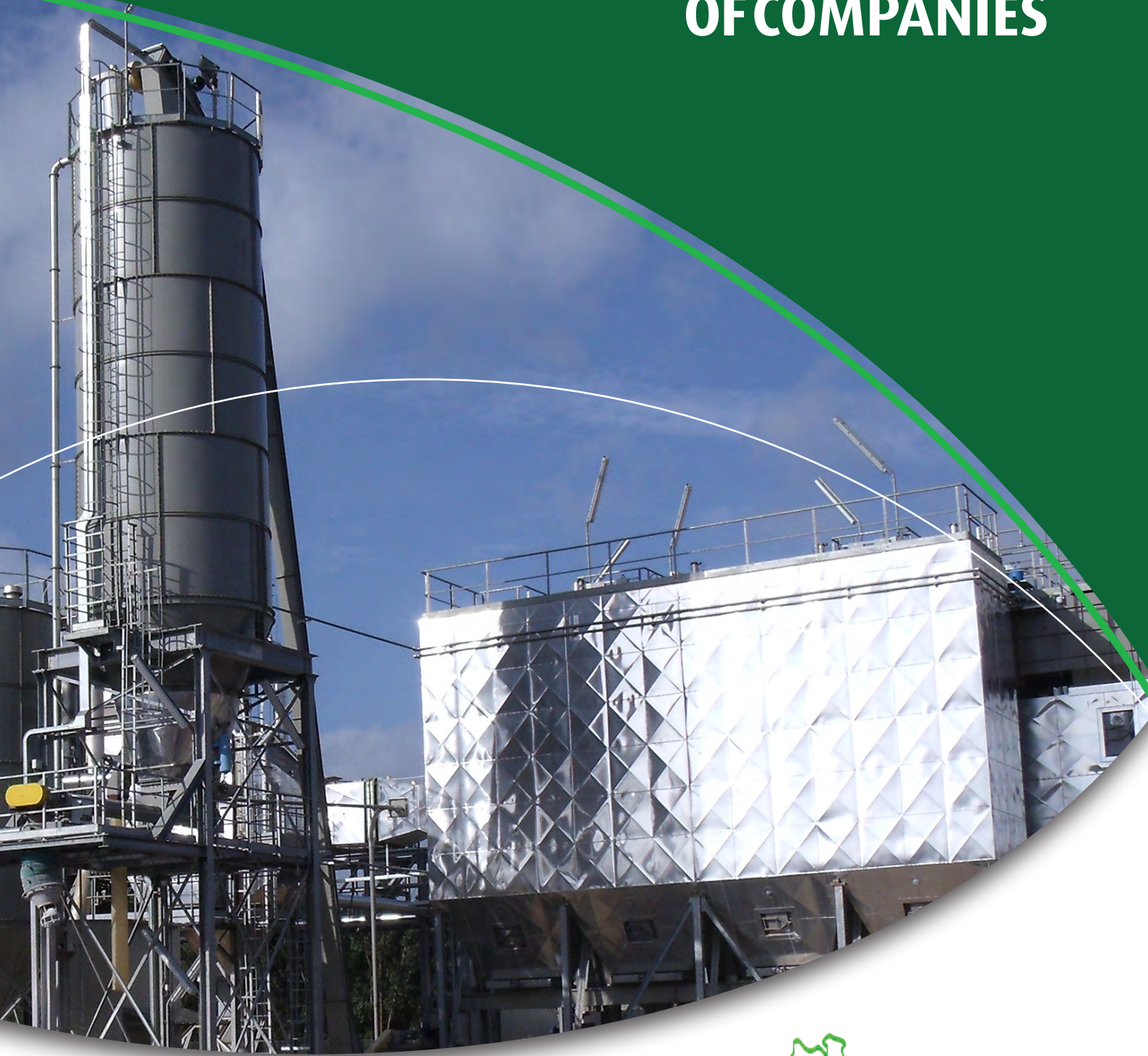
In the attached brochure are the details of the companies that can provide, working jointly, the complete package of an individual island of the power plant.



THE PRODUCTIVE NETWORK OF LOMBARDY FOR POWER GENERATION

www.energycluster.it
info@energycluster.it

THE GROUP OF COMPANIES



*Biomass and waste
to energy power plants*





The group of companies of Energy Cluster for biomass and waste to energy power plants



www.abb.it Leader in energy and automation technologies which allow clients to improve their services while at the same time reducing environmental impact. Supplies products, systems and services for energy transmission and distribution networks and power stations.

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www.stranich.it Design, manufacturing, installation of dry and wet dust collector systems and industrial heavy-duty fans through a line of diversified products including machinery for the reduction of dust emissions (bag filters, cyclones, scrubbers), process control machinery, industrial cleaning systems, pneumatic conveying systems, centrifugal and axial fans, dampers and guillotines.

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www.alfaquadri.it Since 1963 designs and manufactures electrical switchgears such as: Medium Voltage swgs up to 36kV- L.V. swgs type POWER CENTER; L.V. swgs type MOTOR CONTROL CENTER fixed and withdrawable type; L.V. distribution, lighting and monitoring panels; busducts, Assistance and Maintenance. The users can be integrated in a system (also designed by AQ) operating by DCS. Alfaquadri Spa manufactures its products wholly inside its factory thanks to its design, frame manufacturing, wiring and assembling, technical and testing departments using the most advanced equipments/machines. Thank to its long experience in its field, AQ boasts a strong competitiveness on the market thanks to its structure, quick and flexible organization, manufacture of equipment "ad hoc".

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www.boldrocchi.eu Aimed at the heavy-duty industry, from power to special industrial applications, manufactures on order upon "tailor made" solutions and also supplies "turnkey" plants. The products include: high powered centrifugal and axial fans, air coolers and heat exchangers with finned tubes for electrical machines, on-off/by-pas multi blades and diverter dampers, equipments and treatment plants for gas/fumes, silencers and noise protection systems for simple or combined cycle Gas-Turbines.

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www.brembana.it Heat exchangers, equipment and systems for energy.

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www.alpisrl.eu Engineering and consultancy company which offers plant engineering services (piping, residential, carpentry, boilers, layout, etc.), design and consultancy for power plants, pumping stations and various types of industrial plants.

It also offers accounting services for work yards, plants and works in progress.

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www.arsambiente.it ARS ambiente Srl is a consultancy company involved in integrated waste management and energy issues, supporting private companies and public bodies on issues concerning the whole cycle of municipal and industrial waste, on projects and management of treatment facilities, environmental monitoring, and on the production of energy from renewable sources. ARS ambiente is "Analysis, Research and Services for the environment".

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www.assi.it Operates in the ITC sector as manufacturer and supplier of software applications for business: designs and develops solutions tailored to help to optimise procedures and to improve the efficiency of various corporate systems.

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www.castiglionsrl.com Beton Cabo, company of Castiglioni SRL, active in electrical installations since 1952, has designed, in conjunction with ENEL, a series of manufactured buildings for electricity distribution. Experience gathered allows us to offer high quality, flexible products, able to satisfy any size requirements.

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www.cedaspe.com Design and manufacturing of bushing insulators, accessories for electrical distribution and power transformers, components and terminal boards for electric machinery and equipment.

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www.atsecologia.it Study, design, build, erection and start up equipment and/or "turnkey" flue gas treatment systems for waste burners and biomasses (dry and wet electrostatic precipitator, dry reactor, bag filters, honeycomb and shell SCR system, air conditioning towers)

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www.bama-technologies.com Highly qualified in the field of metal protection and anti-corrosion (chemical degreasing treatments, pickling and passivation and chemical-physical treatment of the electro-polishing). The company achieved excellence in the superficial finish sector of metals and metal alloys.

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www.betoncabo.it Market leader in construction and maintenance of power lines and electrical plants on behalf of the National Electricity Company (Enel), of concrete prefabricated electrical substations, of general constructions under contract to the local government or private clients, stadies the experience started since 1952 from Castiglioni S.r.l., now her whip.

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www.cesare-bonetti.it Manufactures valves and level gauges for industrial use used in the generation of thermal electric, conventional or nuclear energy, in the Oil & Gas field, in the steam and in the liquids used and for the industrial process in general. The line is completed with a wide range of specific valves and accessories.

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www.cavesrl.com Tradition and excellence in the Mechanical Construction sector, for over 50 years the company has a consolidated experience in the complete manufacturing and service of the main parts of turbines and compressors for the Energy and Oil & Gas sector.

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The group of companies of Energy Cluster for biomass and waste to energy power plants



www.cdelettrica.it Design, construction of special and photovoltaic electrical systems, control boards both for the distribution of electrical energy and for the control of industrial automation in general.

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www.cmgproduction.it Consolidated presence on the market of mechanical works, the company is able to supply a complete service which includes carpentry, thermal treatments, design and machining (Injection presses, hydraulic cylinders, Retrofitting of machine tools, etc.). Turbine construction and energy parts.

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www.corna.it A company long present on the design, construction and installation market of electrical systems and similar, low or medium voltage substations, generators and industrial automations.

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www.elenews.com Specialised in fire detection systems, fire prevention alarm systems and thermal control systems in high risk areas such as: Power Generation, Oil & Gas and Industrial Chemicals. Exclusive Agent in Italy for Continuous Thermocouple Linear Sensors and sole Italian manufacturer of fibre optic systems for the thermal control of large areas such as: pipelines for oil & gas, district heating ducts, long-distance lines. Electronic News supplies "turnkey" solutions.

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www.elettrocolombo.com One of the oldest Italian companies in the electrical sector, for the manufacturing of electric distribution and power transformers with a capacity of 60,000 MVA installed. An experience ranging over many years both for oil and resin transformers, established in over 50 countries worldwide where it also offers assistance services.

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www.ctmtermodeco.it Design, execution and installation of industrial insulation, as well as planning and execution of service of land reclamation and asbestos removal; the activities of design, assembly, dismantling and hiring of metal scaffolding and the supply and installation of residential and industrial roofs complete the range of services offered.

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www.dedalo.info The mission is to direct customer's energy consumptions towards a more efficient energy management. Dedalo ESCO provides material and financial assistance necessary to achieve the savings targets. With the third-party financing, Dedalo Escio finances the project, assumes the whole risk and maintains the system. Through the energy savings, Dedalo Escio is able to payback the total capital investment.

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www.donelli.it/alexo Donelli Alexo is a specialised applicator of anti-corrosion and high resistance coatings and linings for process vessels, water tanks, boilers, valves, tube bundles and finned pack heat exchangers. Special applications include thermal spray, FBE, passive fire protection. Being Sakaphen Licensee, it also supplies products for the cleaning and protection of high voltage isolators.

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www.elphi.it Supports its clients during all manufacturing stages of secure and high technology electrical plants, centralised telecommunication and control systems in the industrial, tertiary and advanced tertiary sectors. It has developed significant skills in the field of renewable energy, particularly photovoltaic.

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www.exergy-orc.com Exergy ORC designs and supplies complete systems utilizing the Organic Rankine Cycle, based on its in house expertise in organic fluids applications and machines.

Exergy can complete the entire project, from the design of the innovative ORC turbine to complete system testing and commissioning, providing turnkey solutions with both standardized and tailor made machines, from 100 kW to 3 MW, suitable for biomass, geothermal, CSP and heat recovery. Exergy is controlled by SECI Energia grouping all the energy investments of Maccaferri Industrial Group: biomass, solar PV, combined cycles, biogas and wind.

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www.diplomatic.com Designs and manufactures a complete line of components and hydraulic systems. Works together with important manufacturers of steam turbines, gas turbines, hydraulic turbines, geothermic and solar plants and with manufacturers of process valves. The company offers a high skill level for the design and building of systems, regulating and on-off actuators and complete oil hydraulic stations.

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www.ecisgroup.it Engineering, Procurement and Construction for Power, Oil and Gas and Petrochemical industries, including multidisciplinary engineering (process, mechanical & piping, electrical, telecom etc...) procurement of bulk materials, analyzer shelters, wellhead control panels, metering skids, chemical injection and dosing, water treatment. Automation of complete plants, DCS, PLC, ESD, F&G, SCADA etc. with specialisation in safety PLC and SIL systems (Company certified by TUV for Functional Safety Management), system integration for third parties, electrical panels for safe areas and ATEX certified zones. Installations, commissioning and start-up.

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www.ecm-impianti.com Designs and manufactures special systems and components for ecological, thermal and metallurgical plants. Specialised in conveying systems of ashes and powders, solid fuel powered systems and boiler cleaning, Denox SNCR and SCR, gas treatment (ESP and bags filters) from combustion and waste incineration of any type and from any type of industrial process.

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www.ezioselva.it Mainly manufactures electrically conductive copper strips for the energy sector (power transformers and generators), as well as a line of drawings and galvanic electroplating for the manufacturing of the tinned in barrel wire for the condenser sector. The product line includes individual, double and triple metal straps and wires insulated in paper composed of multiple metal straps.

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www.felm.it Operates in the electrical engines sector with a consolidated experience in the electric machinery market. Specialised in the production of standard and special Electrical Engines upon specific instructions from the customer.

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The group of companies of Energy Cluster for biomass and waste to energy power plants



www.fitechitalia.com Carries out design, fabrication, construction, testing, qualification, marketing and sales activity for valves in compliance with buyer specifications.

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www.flamespray.it Development and supply of products and services realised with thermal spray coating technology and cladding with particular application to the turbogas, hydroelectric, geothermal and waste burner sectors. Leader in Europe for the niche market of coating processes.

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www.flowserve.com Leader for the design, manufacturing and marketing of components for the control and movement of industrial fluids. Recognised on the market as a supplier of high performance solutions designed specifically for the energy sector. The main types of products are: valves and heavy duty on-off valves, process valves, complete desuperheating systems, automation systems, pneumatic and electric actuators, steam line components, instrumentation to regulate the boiler, equipment for energy recovery.

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www.glfsrl.com We manufactured high quality fasteners, standard and customised in compliance with the ASTM, ISO, DIN regulation in very large range of dimension and materials. The main application regards high pressure, high or low temperature components and plants or where resistance to corrosion is the most important demand.

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www.ingsrl.it Company with years of experience in designing and construction plants for the sustainable exploitation of renewable energies: photovoltaics, cogeneration, trigeneration, biomass, geothermal heating, solar thermal. Consultancy for energy audits and thermal insulation also by thermographic measurements.

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www.fonderiacolombo.com A second-smelting foundry which manufactures unrefined or semi-finished parts of machines for various industrial sectors. Specialised in the supply of smelting for machinery for the production of electrical energy and desalination plants. Proven experience in the field of wear-resistant alloys.

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www.forgiaturasg.it With over 50 years experience in Open Die Forging activity, Rough Machining and Heat Treatments. Forged steel components according to drawings, from 15 to 3500 Kg. Materials: Carbon Steel; Low Alloy Steel; Special Steel; Martensitic, Austenitic, Duplex, Super Duplex Stainless Steel; Precipitation Hardening Stainless Steel; Stainless Steel for food industries; Special Austenitic Stainless Corrosion Resistant Steel (316L UREA; 310MoLN).

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www.francotosimeccanica.it Important point of reference for the thermal and hydraulic energy production industry, manufactures: Steam turbines, generation and cogeneration. Hydraulic machinery, such as turbines, pump turbines, pumps and storage for hydroelectric plants. Heat exchangers for regeneration cycles and geothermal plants. Supply of aggregated plants.

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www.icim.it Amongst the leading Italian Entities in the certification sector - both for management systems and products - and Inspections, the company has developed consolidated skills and experience in the activities of technical due diligence for renewable energy powered plants. Thanks to a consolidated network of agreements it operates on an international level with local resources for the expediting services, quality control, supplier qualification, welding and welder qualifications as well as inspections of any type of product. Notified body PED; ATEX; SPVD and accredited UNI ISO 17020 for the Inspection activities.

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www.paginegialle.it/lqs-01 Operates in the sector of industrial valves and gate valves with know-how specifically in the electromechanic, chemical and plant engineering sectors, building, upon request of the client, industrial valves for all types of liquid plants.

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www.galbiatigroup.it From the execution of mechanical works for third parties, the design, construction and revamping of machinery and plants, operates in all of those sectors which require special high-quality standard mechanics and machinery, also specialises in the machining of oversize components..

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www.gefran.com World leader for the design and manufacturing of systems and components for the automation and control of industrial processes. Engineers, develops and manufactures the primary types of electric controls and energy regeneration systems used for the control of engines and application systems.

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www.gencantieri.it Gencantieri is a leading company in industrial construction. It's a fast growing and growing Italian company that works in the following fields: construction and maintenance of power plants and industrial buildings in general, including systems and auxiliary and related works as excavations, demolitions, roads, sewerage systems, scaffoldings, structural components, heat and acoustic insulations, paintings and asbestos decontamination.

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www.lamarsrl.it Operates in the precision mechanics sector. Specialises in the energy sector for the manufacturing of "palettes for turbines".

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www.loterios.com The activity includes the design and manufacturing of pressure equipment (Tube Bundle Exchangers, Pressure Vessels, Columns, Reactors...), in special materials (Titanium, Hastelloy, Inconel, Incoloy, Nickel201, Zirconium, Duplex, Superduplex, Copper and Aluminum Allots...) and the stocking of mill products, pipes and fittings in titanium. The company also manufactures special components (components for agitators, valves and pumps etc.), mostly in Titanium, Zirconium and high quality Nickel Alloys.

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The group of companies of Energy Cluster for biomass and waste to energy power plants



www.lpspa.it Established on a worldwide level for the manufacturing and supply of components and equipment for petrochemical plants and the production of energy: Finned Tubes, Steel Studded Tubes, Prefabricated Units (Radiants, Convections, heat recovery boilers, regenerators, etc.) and Special Units (Cold collectors for reforming units, pigtails, etc.).

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www.ltc.it World leader in the processing of steel for magnetic cores for electric transformers and reactors, in compliance with client specifications and guaranteeing constant energy savings and very low noise level. The electrical steel is chosen in compliance with the highest quality standards and checked upon arrival at the laboratory.

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www.maproint.com The company was established in 1959, under the company name of M.P.R. Italiana S.p.A., as manufacture, on order, of special rotary compressors and vacuum pumps to compress and evacuate gaseous fluids (Biogas, Methane, Air, etc.). The main products are manufactured in compliance to ATEX and PED regulation. Any problem of conveyance of air or industrial gases can be solved with reliable and economic solutions, thanks to a solid experience acquired through the manufacturing of machines for all industrial sectors, from textile to energy and paper industry, for all sort of industrial process and for any biomass gas transfer.

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www.parisiefornillo.it Design, supply and installation of heat insulation in industrial environments. The skills developed in the field of energy allows the company to deal with any problems relevant to the insulation for waste burners, biomass and turbogas plants.

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www.pensottifcl.com Design, engineering, fabrication, erection, commissioning & start up of industrial boilers and relevant equipment even on turn-key basis; after sales service. Steam boilers for fossil fuels (gas, oil, hydrogen, coal) "FB" type, with one or two drums - heat recovery steam generators "HRSG" downstream of gas turbine - steam boiler for biomass and municipal waste with grate or fluidized bed.

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www.mesit.com Main products manufactured are: PED and ATEX certified measurement systems & assemblies with EC marking; Design, manufacturing, testing, assistance and maintenance of: sensors and management of measurement systems for temperature, carrying capacity, pressure and level, scribing and heating systems, control and automation systems, electric and electronic components; Medium and low voltage control boards; Control systems and management of gas turbines; Engineering, assistance, on site installation, servicing, upgrading, retrofit, training; Gas holding and fire prevention complete systems.

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www.newcomponit.com Manufactures and markets textile expansion joints and sound proofing pillows for various applications as well as passive fire prevention systems. Proven experience in the field of glass fibres, basalt, silica, ceramics for use in industrial plants. The products are primarily intended for use in traditional or combined cycle thermoelectric plants, waste burners and cogeneration plants.

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De Vecchi Fratelli

www.officinedv.com Established over fifty years ago, the company stands out in the mechanics of the "Power Generation" and "Oil&Gas" sectors. The company is a critical supplier of the main components for thermal/hydro/wind turbines and high power generators for leading European manufacturers. White metal gears, cylinders, shaft parts, hydro turbines, fan rings, collectors, wedges, connections. Rotary tables and mechanical assemblies for on-shore and off-shore equipment.

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www.ressolar.it Many years of experience in energy sector, with particular attention to sustainable systems and plants with low impact on the environment. Specialized in photovoltaic, solar thermal and geothermal plants with a full service, the company performs also the activities of engineering in renewable energy power plants, specially mini-hydroelectric plants and cogeneration plants, with the promotion of energy efficiency and the use of renewable energy sources.

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Rockwell Automation

www.rockwellautomation.it Worldwide leader for solutions for the control and management of information in the field of industrial automation and energy, Rockwell Automation offers products, services and solutions for an improvement in terms of services and sustainability, of production processes of consumer goods and energy.

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www.offinemara.it The company has been operating for fifty years in the high precision machining sector on medium and large scale chipping specifics. The company offers a "design and development" service to its clients. The types of machining are: Drilling, Tapping, Milling, Reaming Company specialised in the machining of large scale engine blocks (up to 100 Tonnes) for the naval, energy and nuclear sectors. It also performs machining of specifics for the wind power sector. Qualified staff conducts hydrostatic testing to customer specifications.

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www.omniacert.com The core business involves the II and III part inspection activities in the scope of pressure equipment (valves, exchangers, columns, etc.) and technical assistance for the achievement of compliance with the mandatory Directives (97/23/CE PED, 1999/36/CE TPED, 99/92/CE ATEX). It also supports companies for quality, environment and safety certifications.

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PARCOL

www.parcol.com Specialised in the design, manufacturing and marketing of control valves, safety valves and steam desuperheaters. Specifically referenced worldwide for the supply of boiler control valves, for turbogas, desuperheating and steam turbine by-pass systems, as well as for the capability to design, manufacture and market heavy-duty control valves for problems such as low noise level, anti-cavitation, high temperatures and high differential pressures, toxic fluids and cryogenic service.

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saipem

www.saipem.com Saipem is a world leader in providing a full range of engineering services, procurement, project management and construction, mainly for the energy industry, with distinctive capabilities in the design and execution of very large facilities on land and at sea. Presently, Saipem is the biggest general contractor in the oil & gas market.

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www.sicesgroup.com Active in the production of machinery, installation and maintenance of industrial plants. The main products are: medium/high thickness sheet metal work (pressure tanks, heat exchangers, reactors, columns, boilers), assembly of complete on-shore and off-shore plants on skids, prefabrication of high, medium and low pressure steam and water pipes. The company also performs activities of assembly and mechanical maintenance of the industrial plants, specialising in "revamping" and "turnaround".

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www.son-energy.com Studio, in-house design, marketing, installation, maintenance and management of technological plants and accessories for the production and distribution of energy, including cogeneration. Has ownership of international patents which improve the efficiency of combined cycle power plants. Has the ability to be an ESCO in various industrial plants recovering heat from process streams and producing electrical energy without the emission of CO₂.

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www.tecnodeltaitaly.com Offers solutions for illumination, distinguishing itself for the ability to design and manufacture products based on applications which necessitate a continuous relationship between the company and the lighting design, promptness of the response and high technological level, even through the use of evolutionary material such as fibre optics, LEDs and electroluminescent sheets. The company also deals in energy production from renewable resources offering the supply of materials, studio services, design, manufacturing and installation of plants.

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www.tmcservice.eu Successfully operates for the main players of the energy sector by building and/or maintaining traditional, cogeneration, biomass, biogas plants in the scope of thermodestruction. The company is capable of supplying the necessary assistance at the power plants for the production of energy, operating in the construction and erection (new plants and/or revamping), mechanical and building maintenance and building construction.

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www.stf.it STF Spa in Power field designs, supplies, installs and commissions: Heat Recovery Steam Generators, Utility Boilers, Biomass Fired Boilers, Industrial Boilers, Steam Surface Condensers, Feed Water Heaters, Daereators, Rotating Air Preheaters and Gas Gas Heaters, Nuclear Component as Low and High Pressure Power Heaters, Exchangers, Vessels.

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www.tecnolafer.it Activities in the field of carbon, stainless steel and aluminum sheet-steel machining, precision mechanical machining, metallic structures (light and heavy), piping, skid assembly, and also the building of silos, tanks and heat exchangers. Other than the realisation of a vast range of metallic products, the company guarantees a post sale service and technical support for the assembly of the machines and the erecting of the plants.

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www.timet.it The company has been operating for many years in the high and medium frequency tempering on various types of: Beds, Cylinders, fifth wheels-gears-bearings particularly used in the energy sector, Small parts. The vast range of durometers issued consent the performance of tests such as Rockwell, Brinell or Vickers and the control of complex geometries or having large dimensions. They perform non destructive controls with the use of penetrating liquids or magnetic particles, issuing "trial tests" upon request.

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www.tamini.com Manufacturer of any type and size of power and special electric transformers and reactors, for any possible application. Centre of excellence for the production of large GSU transformers for electric power plants, large power transformers, autotransformers, regulating & PST units, as well as shunt reactors, for national and international transmission and interconnection grids. Leading manufacturer of special transformers and reactors for industrial applications (iron&steel, ferroalloys, non-ferrous metals, electrochemical etc.). In the sector of renewable energy it is also worth to mention the numerous supplies of substation transformers for wind farms and solar plants.

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www.termoresine.it Specialised in low and medium voltage electrical insulation. Operating as a manufacturer, for the customised supply of complete and resin-bonded products; or as tertiaries for only the resin-bonding of products on account for manufacture. Resins and epoxy powders to guarantee electrical isolation, silicone elastomers and polyvinyl chloride resins; as well as heat resistant silicone resins and polyester resin for the outside..

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www.brambillaspa.it Production of drawn wires made of stainless steel for the production of springs, conveyor belts and fasteners, raw or soluble. Moreover, the company is a recognised leader for the manufacturing of stainless steel wires for welding and own TUV and DB product certificates. It has developed important know-how for the manufacturing of metal alloy non-ferrous drawn wires (Nickel and Cobalt based), specifically studied for the cladding of boilers and superheaters, turbines, reactors, gas pipelines and oil pipelines.

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www.ttnspa.it Specialised in the heat treatment of steels, mechanical machining, forging:
- Traditional treatments (hardening and tempering, normalisation, drawing) up to 3 m x 3 m x 15 m
- Nitriding up to 1.2 m x 12 m and 4 m x 4 m
- Cementation up to 4 m x 4 m
- Mechanical process of turning and deep hole drilling up to 2 x 15 m
- Free forging for pieces up to 25 tonnes
- Steel warehouse for steel from nitriding and cementation
TTN is the ideal metallurgy partner for the certification of the steel up to the final treatment.

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www.vergaengineering.it Vergaengineering is specialised in the design, engineering, fabrication, and erection of Fired Heaters (Crude Heaters, Vacuum Heaters, Waste Heat Boilers, Regeneration Gas Heaters, Hot Oil Heaters, Water / Oil Heaters, etc) and related equipment for the oil, gas and petrochemicals industries. Vergaengineering supplies packages including fans and pumps, air pre-heater systems, stacks and ducts, control instrumentation, analysers, external piping, manual and control valves and any kind of spare parts. In addition, Vergaengineering designs and supplies skids for combustion control and burner management systems, minimizing risk, ensuring quality and guarantying reliability of the complete heater package. Vergaengineering activities include process design, process mechanical design, project management, procurement, expediting, inspections, fabrication, transportation and erection. Commissioning, start-up, maintenance, training and site supervision are also provided by Vergaengineering. Further, Vergaengineering expertises cover feasibility study and revamping.

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www.weiroilandgas.com The Company manufactures and markets centrifugal pumps suitable for any applications dedicating a specific Job for each Client's order.

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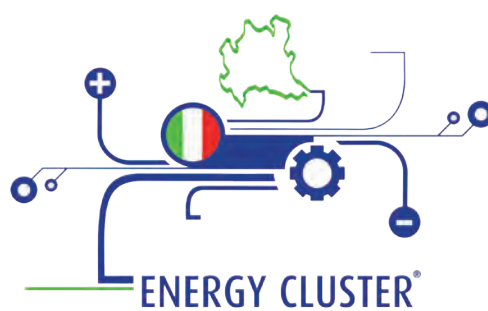
www.unitermsrl.com A fifty years old company, highly qualified in design and manufacturing of heat exchangers for various applications: in the processes of industrial drying, in the waste incineration ovens, in boilers, in pollutant reduction systems, in cogeneration systems, in power plants, in oil & gas plants, in industrial refrigeration.

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www.walley-design.it The company performs basic and detail engineering activities including design of machines, equipment, structures, piping, supports, residential and industrial buildings, design of hydroelectric power plants, thermoelectric combined cycle power plants and industrial plants. Having been in the energy field for years, it operates in the development, design and detail engineering of industrial plants: calculations, advanced structural assembly and shop drawings for civil works, steel structures, piping, pressure vessels.

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THE PRODUCTIVE NETWORK OF LOMBARDY FOR POWER GENERATION

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