Welcome to Cannon!

Cannon is an international Group supplying worldwide a wide range of industries with dedicated engineering solutions.

Main fields of activity are currently Plastics Processing Technologies (for Polyurethanes, Composites and Thermoforming), equipment for Energy & Water treatment, Aluminium Die-casting machines, Industrial Electronic Controls.

Independence, Innovation, Internationality are three ‘Ts’ that characterize and have contributed to the success of this dynamic Group.

Continuous involvement of Cannon in their Customer’s needs and success, in their Partner’s vision and strategy, in the continuing evolution of their technologies have kept the Group ahead and well alive, in spite of the turbulences of the economy and the difficulties of a highly-competitive business environment.

Facts and Figures

In the year 2011 Cannon was able again to generate sales for over 200 Million Euro, 61% in Plastics Processing Technologies, 21% in Energy Plants, 14% in Water treatment solutions and 4% in Industrial Electronics and Aluminium Die-casting.

Steam & Water... Tailor Made!

You might have tried it before, a cheap dress bought in a department store. The tissue looks good, the cut is appealing, the price tag even more. Then, back at home, you wear it and you discover that the shoulders are right but the waist line is a bit tight. After a couple of washings the trousers are a few centimetres shorter. And the zip soon fails, in the middle of a party, of course. They told you that the tailor downtown is better, and you said that it’s too expensive. Fine.

Your money, your choice, of course.

We learned, in the past few years - caring about fast-growth markets - how to cut our plants around your measures and according to your taste and needs. You have had less time than before to take care of a number of details, and to acquire a number of new skills trying to put together a complex plant. You told us what you needed - in terms of heat, steam or electrical output - and how many square meters were available, and we supplied the whole package. You were satisfied, started saving money and called us again when you needed another solution. You allowed us to multiply by five in ten years the turnover of our thermal plants division.

If your problem was related with water treatment, squeezed between the availability of incoming liquids more and more polluted and the need to release them more and more cleaned, you appreciated our problem-solving approach and our innovative technologies. You allowed us to multiply by ten in ten years the turnover of our water treatment division.

We are the tailor. We know how to tailor-made the plant that you need. Read in this number of Cannon News a number of successful references about our most recent developments: most of them have been designed around the specifications of our customers - you.

And we are even not that expensive. We learned - in more than 50 years of continuing activity - how to design, build and install non-standard equipment maintaining the manufacturing skills and the cost structure of our industrial division, that keeps supplying several lines of standard machines.

Thank you for your continuing support.

Your Steam & Water Tailor.
Dedicated thermal plants for special applications: this is the daily activity of the Engineering Division of Bono Energia, dealing only with non-standard machines and high demanding customers.

An interview with Paolo Bugatti, Engineering Division Manager, unveils interesting aspects of their business.

Paolo Bugatti, 48, is the Director of the Engineering Division of Bono Energia S.p.A., the Cannon Group Company manufacturing special thermal plants, industrial boilers and oil heaters. Holding a degree in Mechanical Engineering from Politecnico di Milano, he works with Bono since 1994. In the past 18 years Paolo matured significant experience in the sale of special thermal plants and heat recovery boilers.

Other successful products are the thermal fluid heaters used for chemical and polymerisation processes, mainly for the production of PET plastics. In this case we supply a fluid heated up to 400 °C to the reactors where the esterification reaction takes place. Finally, we supply a range of HRSG (Heat recovery Steam Generators) that recover heat from exhaust gas of thermal engines motors and gas turbines – that also burn biofuels – in a capacity range up to 15 electric Megawatts.

Our product is always tailor-made, even when we use a standard machine – derived from our Industrial Division – we adapt it to our client’s specifications. We always quote very complex equipment, expected to perform at the highest efficiency levels for a very long time. Our range of capacity, to resume, stands between 20 and 200 Tons/h of high-pressure steam, between 10 and 40 thermal Megawatts in thermal fluid heaters, up to 80 thermal Megawatts in hot water and up to 15 electric Megawatts in HRSG.

Cannon News: What is the role of your Engineering Division within Bono Energia organisation?

Paolo Bugatti: The Engineering Division takes care of the special thermal plants made by Bono Energia. Our customers are – for 90% of our activity – Engineering Procurement Construction companies (EPCs) that design high engineered plants requiring a dedicated thermal plant to produce either steam or hot fluids for process consumers or for power generation. We also sell directly to the end user, a high-scale industrial Company requiring thermal plants for its sugar factory, paper mill, chemical or pharmaceutical plant.

Cannon News: High engineered equipment machines, then, and probably in non-standard execution?

PB: Absolutely yes. We make complete thermal plants, mostly based on water tube boilers, used for the production of steam for process and as auxiliary boilers for power generation. We burn traditional fossil fuels, hydrogen or by-product gas from process. Then we produce high capacity hot water heaters for district heating, delivering hot water to residential quarters through a network of insulated pipes. Here we work in a capacity range going from 10 to 80 thermal Megawatts for single heater.

Cannon News: An impressive portfolio. What kind of competition are you facing?

PB: We know no more than 5-6 big players – from Korea, India, US and Europe – able to deal with our technological and logistic level. Therefore our rate of success is quite high, compared with the number of offers that we issue every year. As an example, we recently supplied a 14 Million Euro plant to Iraq and this is a size of contract that we can easily deal with.

Cannon News: What makes you different from your competition?

PB: Mainly the fact that we are vertically integrated, from engineering to commissioning. We manufacture in-house all the pressurized parts, the electronic controls and the ducts. We buy the best components for our equipment, guaranteeing performances and long-lasting operations. Many competitors assemble purchased parts, or delegate to third parties critical steps as engineering and installation.

Cannon News: Where do you obtain your most significant results?

PB: Let me first say that in 2002 we were selling 10 Million Euro (50% in Italy) and today, ten years after, we expect a turnover of 20 Million Euro, with a 70% of export in five continents. While our presence in Middle East is consolidated, we are now working hard in Russia (where we have a dedicated office in Cannon Eurasia) and in Brazil, where we have recently successfully completed the first phase of the preliminary qualification procedure with Petrobras. We received in the past 4-5 years inspections and qualification from important private and public end users, such as Qatar Petroleum, Gasco, ADMA OPCS of Abu Dhabi, EdF, UHDE, Gazprom and other giants of this field.

Cannon News: How do you approach these remote clients?

PB: We first select the country with the highest potential for our range of thermal machines, then we define a strategic location for our local presence and we send on site one of our experts to start up the activity, flanked by a dedicated local hand for the interfacing with the market. When things start to work we try to team-up with the most successful player in the field and we offer him a partnership on the basis of results that have been already obtained. Very pragmatic approach, nothing fancy.

Cannon News: What do you think it makes you the best potential partner for your customers?

PB: A short list of advantages that we can offer and that others can’t, according to a survey run through our current clients:

- Our ability in understanding our prospect’s needs and in preparing an adapt commercial proposal
- Our know how and solutions
- Our list of references for specific, specialty applications
- Our workshop, able to handle large projects with internal, qualified resources
- Our competent staff, at any functional level
- Our right local partners, able to bridge efficiently between our clients and our specialists.
Forecasts on energy production from traditional sources see gas overcoming coal and getting close to oil in terms of global demand within the next 20 years (gas demand increase is estimated around 2% per year) as the result of the need of reducing CO₂ emissions and consequent higher prices of the most polluting energy sources.

Despite this, the conventional sources will still lead the energy production. The EDF group is facing these issues and has started a sustainability program aimed at integrating new technologies applied to traditional energy fonts, increasing efficiency and reducing emissions, with renewable energy production.

For that reason EDF has been carrying out an extensive modernization and development program on its fossil-fired fleet, for instance some actions are taken in Le Havre, overlooking the English Channel, where the coal-fired 1,450 MW electric power plant is operating since 1963. The plant produces 1% of the electricity produced by EDF in France, the 20% of the electricity consumed in Normandy. Furthermore EDF is developing in the same site a CCS (carbon capture and storage) demonstration plant.

Bono Energia is contributing to EDF program with the supply and installation of two auxiliary water tube boilers, fueled by fuel oil (with the possibility to change, in the future, the fuel to natural gas), with a total capacity of 130 t/h of superheated steam.

The project witnesses the evolution and the strengthening of the collaboration between Bono Energia and EDF: indeed the scope of the supply is greatly increased compared to the previous projects realised for the French thermal plants of Blonod and Martigues Penteau, West Burton in UK and Phu Ny in Vietnam since 2002. In those three projects Bono Energia worked in partnership with Edison engineering, the system integrator; in this case the job will directly be developed by BONO for EDF CIT (Centre d’Ingénierie Thermique).

In previous jobs the scope of supply was limited to the boiler package coupled with related accessories, now it is a complete turn-key project that includes the whole engineering of the system, shop manufacturing, on site delivery of all equipments, on site installation, commissioning and start-up. BONO will provide the deaerators (furnished by the sister company Artes), the feed water chemical conditioning system, control and automation system, the boiler area’s electrical power distribution plant, flue gas ducts for a total extension of more than 100 meters up to the existing stack (total height of 230 meters).

The project is very complex in terms of time scheduling, involvement of different competences and coordination of actions; for this reason it is managed by a senior project manager, who leads a team of 12 skilled people from different departments: project and process engineering, mechanical and CAD engineering, instrumentation and control, automation, quality, site engineering, commissioning.

Bono Energia is developing the engineering package with internal resources.

The technical department, composed of 27 engineers and technicians, will provide the studies for plant layout, foundation drawings, mechanical assembly and fabrication package, P&IDs and process flow diagrams, electrical, instrumentation and automation engineering, commissioning procedures and reports, quality control and use and maintenance manuals.

The boilers will be partially pre-assembled in Bono Energia’s production facilities in Peschiera Borromeo (close to Milan) and then delivered by sea to Normandy; thus the design will be very focused on the optimisation of the assembling sequence and on loading/unloading activities, in order to minimize on site work.

The delivery of the plant is foreseen for the beginning of 2013, while the installation and start-up will be completed in 2014.

10 years using PED 97/23/EC - Pressure Equipment Directive, are we going to change rules in Europe?

Source: European Commission, Enterprise and Industry

The Directive was adopted by the European Parliament and the European Council in May 1999; it came into force on 29 November 1999, from that date until 29 May 2002 manufacturers had a choice between applying the pressure equipment directive or continuing with the application of the existing national legislation.

From 30 May 2002 the pressure equipment directive is obligatory throughout the EU.

The directive provides, together with the directives related to simple pressure vessels (2009/105/EC), transportable pressure equipment (99/36/EC) and Aerosol Dispensers (75/324/EEC), for an adequate legislative framework on European level for equipment subject to a pressure hazard.

The PED directive arises from the European Community’s Programme for the elimination of technical barriers to trade; its purpose is to harmonise national laws of Member States regarding the design, manufacture, testing and conformity assessment of pressure equipment and assemblies of pressure equipment.

It therefore aims to ensure the free placing on the market and putting into service of the equipment within the European Union and the European Economic Area.

The Directive concerns items such as vessels, pressurised storage containers, heat exchangers, steam generators, boilers, industrial piping, safety devices and pressure accessories. Such pressure equipment is widely used in the process industries (oil & gas, chemical, pharmaceutical, plastics and rubber and the food and beverage industry), high temperature process industry (glass, paper and board), energy production and in the supply of utilities, heating, air conditioning and gas storage and transportation.

After 10 years the European Commission is evaluating the performance of the directive. The evaluation is being conducted by CSES (Centre for Strategy & Evaluation Services). A report on the evaluation will be made available on the DG Enterprise and Industry website from late Autumn 2012.

As part of the evaluation, CSES is collecting information from the stakeholders about their perceptions of the performance of the Directive; notified bodies, government authorities, standardisation bodies, pressure equipment manufacturers, end users are strongly invited express their opinion filling in the questionnaire:

http://www.cses.co.uk/surveys/ped/
French sweet steam for BONO Energia

Beet and sugar production in the EU is based on the common market organisation (CMO) of the sugar sector. In 2006, the CMO was thoroughly reformed, leading to a large reduction of total sugar production by around 30%.

Through years, after the adoption of the CMO reform, the number of EU sugar factories has fallen sharply and main market players have undergone major restructuring driven by the need for efficiency improvements.

Nowadays beet sugar production is distributed among 18 EU countries - 23 before the restructuring - in France and Germany accounting for more than 50% of total production, respectively 28% and 25%.

Tereos, a cooperative agroindustrial group, is one of the foremost producer in France with 16 operating plants in the country and other 23 in the rest of Europe, South America and Africa. It gathers 12,000 cooperative beet growers, for a total of 1 million hectares of cultivated land, that produce 3.6 million tons of sugars, 1.9 million tons of starch-based products and 1.7 million cubic meters of alcohol and ethanol.

The improvement of efficiency is a key factor for the success of the company that is working on the optimisation of processes and consumption reduction.

The award to BONO Energia of a 170 ton/h water tube boiler fired by four burners fuelled with natural gas, 97% efficiency, is part of the increasing efficiency activities run by Origny site, in northern France, where the Tereos group was born in 1932.

In addition to the high efficiency required, another severe condition is the emissions limit: NOx and CO less than 100 mg/Nm³ as required by the French law, regarding thermal plants above 20MW. BONO boiler is designed to reach 80 mg/Nm³ emissions introducing an efficient flue gas recirculation system.

The superheated steam, provided at 66 bar at a temperature of 485°C, will feed a steam turbine for the production of electricity that will run the sugar refinery and the distilling processes.

Since these are continuous processes (they work non-stop 24 hours a day), the supply of energy plays a fundamental role. Moreover, it is very important for economic and logistic matters that the plant doesn’t fail during the tree-months-long harvesting season of sugar beets: it would be a real problem to stock the about twenty thousand tons of beets that are delivered everyday!

Thus the steam generator must be very reliable. This issue is considered during design and shop manufacturing phases in order to guarantee constant performance and minimum maintenance except scheduled operations.

The BONO team is currently carrying out the on site erection of shop prefabricated parts of the boiler, successfully facing the interferences and the shortage of space due to the presence of other suppliers working in the same area.

BONO Energia is becoming a key player in the French boiler market, thanks to the performance of its production that successfully complies with new regulations in terms of emissions and customer economic expectations.

User interface is touch screen and two different sizes are available (5.7” and 10.4”).

Among its several features, main are:
- burner management system (BCU)
- micrometric control of the air/fuel ratio (GARC) and of the supply of oxygen
- security chain control - SI
- leak detection control - VPS
- 1 to 3 elements regulation system
- alarms and security locks registration, first-out identification
- trends, alarms, and parameters historicization
- total water and gas consumption, steam generation, boiler and pump operating hours indexes
- energy savings and green benefits accounting
- smoke analysis and data storage according to local laws
- load distribution in those thermal plants consisting of several boilers and auxiliary parts (economizer, heat exchanger, evaporator)
- local deaerator management or shared by multiple boilers
- local network supervision and control
- Bono Energia remote assistance

The OptiSpark Control System is applicable to all types of new or already operating boilers, is suitable for any burner and is interfaceable with any external system.
Are you aware about how much you spend for the operation of your boiler?

Improve energy efficiency respecting the environment!

BONO ENERGIA presents three packages that will allow your Company to reduce energy consumption, staff, operational and maintenance costs and to concur to achieve the target of reducing 20% of CO₂ emissions within 2020.

Energy Efficiency
After an energy audit, our technicians analyse the current operational plant parameters and devise a proposal of a technical intervention with the following goals:

- Fuel savings up to 15%
- Electricity savings up to 50%
- CO₂ emission reduction up to 15%
- Investment coverage by Energy Savings Certificates
- NOx and CO emission reduction

Thermal Plant Modernization
After an energy audit, our technicians analyse the current operational plant parameters and devise a proposal of a technical intervention with the following goals:

- Retrofitting and revamping
- Control and safety electronic systems
- Burner management systems
- Reconditioning and replacement of pressure parts
- Residual life assessment
- PED CE marking

Service Plus
The after sales service supports our clients in keeping and bettering performance, availability and reliability of the plants installed, providing:

- Quick repair
- Delivery and installation of genuine spare parts
- Preventing maintenance contracts
- Training courses for clients’ technicians
- 24h/365d assistance
- Remote assistance and control

Contact us at efficiency@bono.it

Peroni: 99% efficiency for brewing industry

The Peroni Beer Group, owned by the SABMiller plc Group, is today a major player in the brewing industry and has been operating for over 160 years with commitment and passion reaching an annual production of beer of around 4.8 million hectolitres. Peroni has recently put into service for the brewing process a very special BONO Energia industrial boiler.

It consists on a fire tube boiler with an effective steam capacity of 20 ton/h at 15 bar and 191°C. It can be fuelled with natural gas, heavy fuel oil and a combination of natural gas and biogas, which is produced during the processes.

The particularity of the equipment is its capacity to guarantee more than 99% efficiency rate: this is possible due to the installation of three dedicated economisers which are crossed by flux gases before being discharged to the atmosphere.

The first economiser cools down the fumes from 220°C to 120°C, and warms up the feed water for the boiler. The second warms water for the brewing processes and cools down fumes till 40°C. Finally, the third economiser prevents acid condensation by using the feed water to warm fumes up again to 80°C before being expelled.

The boiler also presents good emission performances with values less than 100 mg/m³.

This boiler is the first in its kind and it is the pioneer of a new generation of super efficient machineries for companies concerned about both environmental and economic issues.

Italian beer maker Peroni obtains more than 99% efficiency rate from his BONO boiler, fueling it with natural gas, heavy fuel oil and a combination of natural gas and biogas, which is produced during the processes!
Clear waters for a world of applications

An annual average rate of 28% characterises the growth of BONO Artes turnover in the past ten years. The whole difference is exported, and most of it comes from new applications, states Alessio Liati, Sales & Marketing Manager of Artes Ingegneria S.p.A. (BONO Artes), the Water Treatment Division of the Cannon Group. We interview him to discover the recipe of their success.

We maintained our domestic market share, in a country that is facing a serious recession, while we have literally invented our international presence making use of new technologies and applications. We moved first to the Middle East and North Africa, then to the rest of the World: Asia, Pacific, South America and Russia represent today our preferred playgrounds. How we made it? By developing our portfolio of technologies and by consolidating the positive experience grown with our traditional ones. The international presence of Cannon, active with direct branches and agents in more than 40 countries, helped to build even in our Company the right mentality and structure able to face and satisfy demanding customers living twelve time zones away from us. In one sentence, we moved from the domestic sale of commodities to the international market of specialties!

Cannon News: Can you give some examples and references?

AL: Giants like Shell, ExxonMobil, Chevron, EDIF and many others have chosen our solutions in the most recent years. When Groups like these are satisfied with our solutions we need a little effort to follow them around the globe for their following projects! They do the promotion for us, in this exclusive and extremely qualified circle of engineering companies. This confirms that we made the right choice and gives us the perspective view for our future.

CN: What are you exactly supplying them?

AL: Until 2010-2011 we mainly concentrated on the treatment of primary waters, those required by the industry for boiler feed or their processing needs. Many desaturators, filtration and demineralisation plants. In the past 18 months we have concentrated our efforts in the treatment of effluent waters produced by chemical plants and refineries during their process and moved “upstream” in the Oil & Gas sector with the treatment of the so-called “Produced and injection waters” for oil and gas wells. We also consolidated and refined our traditional membrane-based technologies for demineralisation.

KJO awarded the Engineering Procurement and Construction contract to Techint (Italy), one of the major Italian engineering and construction companies, to build a new crude oil treatment and storage facility, whose function is to maintain the oil wells’ extraction capacity at 50,000 barrels for the next 20 years. The EPC project will be delivered on a lump-sum turnkey basis and Artes Ingegneria has been selected, among qualified competitors, as supplier of the vacuum deaeration package, which reduces water’s dissolved gases concentration to meet the process requirements. The package, based on Artes’ proprietary ZeroGas Deaeration technology, allows Artes to consolidate its presence in the field of vacuum deaeration, a key issue in the upstream Oil & Gas sector. In fact only oxygen-free water can be used as injection water to keep oil reservoirs pressurized and enhance recovery of oil.

More generally vacuum deaeration is a convenient solution whenever it is mandatory to achieve negligible residual oxygen levels while not heating water.

Furthermore this contract will reaffirm Artes’ long term cooperation with Techint and its presence in the Middle East, an area that, because of its richness in natural resources, will not cease to be strategic in the years to come.

CN: Are you present in the power generation industry?

AL: Definitely, in at least six main technologies and capitalising on the positive experience made in the oil and gas applications. We offer solutions for Demineralisation, totally based on membrane systems, with Ultra Filtration, Reverse Osmosis and Electrodeionisation. Condensate polishing, with systems based on external regeneration for supercritical cycles and outputs up to 1,000 mc/hour. Pre-treatment and desalination, working with all types of water (from sea, marsh, river, recovery of effluents). Treatment of waste water from the Flue Gas Desulphurisation plants, using chemical-physical technologies. Cooling waters filtration with proprietary systems and outputs up to 3,000 m³/hour. Desaturators using our ZEROGAS technology able to treat more than 1,000 m³/h of boiler water destined to steam production for turbines.

CN: What is your most significant experience, in terms of size and capacity?

AL: We are currently supplying a large treatment plant for the effluent waters of the on-shore facilities of Chevron’s Wheatstone-LNG project in West Australia. A contract worth around 10 Million Euro, wholly designed and pre-fabricated in our Italian premises and to be commissioned by our technical staff. We can make this size of plants for the Power industry too, a sector that is used to handle huge and mission-critical projects in the remotest and harshest conditions.

CN: Any news about your future projects?

AL: We want to extend our presence in the Power generation field outside Europe. We can offer our problem-solving capacity in countries, new for us, where we see a tremendous potential of growth and customers highly interested in our products and technologies. The close synergy with our sister companies, BONO Energia and BONO Sistemi, provides a wide range of solutions and a unique interface for the client. There is a World of application, out there, waiting for the right solutions!

Cannon News: Can you tell us how BONO Artes achieved this success?

Alessio Liati: The figures first: ten years ago we were selling 3 Million Euro of water treatment plants, all in Italy. Today we sell close to 30 Million Euro worldwide, out of which 90% are exported.

Al-Khafji Joint Operations (KJO) is the product of a joint petroleum production operations agreement between Kuwait Gulf Oil Company and Aramco Gulf Operations, which commenced its activities on April 1st, 2000 at the neutral zone, an area of 5,779 km² between the borders of Saudi Arabia and Kuwait that was left undefined in 1922. Years later, the demarcation was established after the discovery of the oil deposits offshore of Khafji.

This Joint Venture owns and operates the crude oil production, processing and loading facilities at Al-Khafji, processing around 300,000 barrels of crude oil per day. It is involved in other businesses like offshore loading, power generation, water treatment and water desalination. Through the years, KJO has achieved consistency of performance and created a big facility that has been updated to expand its production.
First FLNG facility in the world: the Italian contribution

Artes Ingegneria will contribute with two water treatment plants for the Shell project - Prelude, the first FLNG vessel operating in the Australian’s coast from 2016

In the next twenty-five years, demand for energy in the world will grow even further. The increase of the demand for natural gas is supported by the liberalization of some markets, newly found reserves worldwide, the stop to nuclear decided by many countries after Fukushima, and the lower exploitation costs and price than oil.

The new natural gas reserves to be exploited are mainly "unconventional" (shale gas) or in offshore fields off the coast. In the second case the use of traditional structures would be technically complex and very expensive, compared to the time of exploitation of the reservoir.

The situation has prompted the major Oil&Gas companies in developing LNG plants installed on board of ships, known as Floating Liquefied Natural Gas (FLNG) – in which the extracted gas is treated and directly liquefied and transferred to ocean-going carriers, which will load the LNG as well as other liquid by-products (condensate and LPG) and deliver them to the market.

Conventional LNG Supply Chain

The first FLNG facility in the world, owned by Shell and developed by the consortium Technip-France & Samsung Heavy Industries (Korea), will be destined to satisfy the Asian market and would be operational by 2016, for 25 years. It will be the largest offshore facility in the world, for its total length (top view) is compared with the height of the commonly known skyscrapers, it would be as high as the Taipei Tower 101, and more than half of the Burj Khalifa in Dubai.

It represents a major engineering project of a high design complexity and very innovative application, the first of its kind to enter the operational phase. The Italian company Artes Ingegneria is extremely proud to provide its contribution: design, construction and supply of two water treatment systems to feed the steam generators.

The system consist of a condensate treatment unit that removes traces of hydrocarbons present in the condensed steam to be recovered and a demineralization unit which produces ultrapure deionized water (right).

The mechanical and process design have been influenced by the particularly severe conditions of the installation site: a floating vessel that will operate in an area subject to cyclonic events. Thus, the materials selection has to be compatible with the severe conditions of process related to the use of strong acids and bases and with the high humidity and salinity of the environment.

To reduce the assembly time of the plants inside the hull of the ship, the packages will be supplied fully modularized.

A major challenge therefore consists in the mechanical design of the structures (size: 155 x 102 x 72m) that will support the weight of the equipments and ensure stability both during lifting and fitting, with an estimated weight of 90 tons, and under operating conditions, with an estimated weight of 150 tons able to withstand multidirectional accelerations.

The engineering of Artes has developed specific construction solutions to be able to respect the process guarantees required by the customer even in the presence of significant wave motion that could alter the regular flows distribution inside the vessels irreparably compromising the packages performances.

The condensate polishing unit produces 71 m³/h of deoiled water through three granular activated carbon filters sized at 100% of capacity; two of them work in series while the other one is on stand-by, according to the "merry-go-round" scheme. An concentration of less than 0.2 mg/l of oils and residual hydrocarbons is guaranteed.

The demineralization system that treats the mixture of recovered condensate and desalinated water ensures a continuous production of 235 m³/h of demineralized water, thanks to the presence of three mixed-bed ion exchangers, containing strong cationic and anionic resin, each designed to treat 50% of the total flow rate. Two exchangers work in parallel, while the third one is on stand-by, ready to replace the first one that goes into regeneration. This process guarantees a specific conductivity of the demineralized water of less than 0.2 mS/cm.

Location | Browse Basin, 200 kilometres off Australia’s -north west coast.
--- | ---
Depth | ~250 mtrs.
FLNG facility production facility | 3.6 mtpa of LNG, 1.3 mtpa of condensate and 0.4 mtpa of LPG
Storage | Below the deck and with a capacity up to 220,000 m³ of LNG, 90,000 m³ of LPG, and 126,000 m³ of condensate. The total storage capacity is equivalent to around 175 Olympic swimming pools.
Workers | >600 engineers have spent over 1.6 million hours working on the facility’s design options
Weight | 600,000 ton - roughly six times as much as the largest aircraft carrier. Some 260,000 ton of that weight will consist of steel - around 26 times more than the quantity used to build the Eiffel Tower

In this FLNG vessel operating plant built by BOND Artes a condensate treatment unit removes traces of hydrocarbons (present in the condensed steam to be recovered) and a demineralization unit produces ultrapure deionized water.
Wheatstone LNG project, ARTES goes to Australia

Artes Ingegneria will contribute with the waste water treatment plant for the Wheatstone LNG, the second largest resource project in a Australia.

During the past years big changes on the energy market have made the major OlkifGas companies to reconsider their business. Many of them are pointing towards the development of Natural Gas, whose demand has had an unstoppable growth due to many factors such as the lower exploitation costs and price than other energy resources, and the newly found reserves around the world. Most of the new reserves are offshore fields off the coast. This situation has prompted the construction of facilities destined to harvest these Natural Gas deposits. An example of this, is the Wheatstone LNG project, which is one of the biggest resource projects in Australia.

Wheatstone LNG, along with other LNG projects in the country, evidences the technology advances achieved after many years in the market. It also represents the cheapest option for North Asian countries, thus they don’t have to ship in the gas from the Middle East, Africa and the Caribbean.

The project is being developed by a joint venture in which Chevron owns the 72%. When constructed, the facility will be dedicated to serve the Wheatstone, Lago, Jullmar and Brunello offshore gas fields, situated 250 kilometres off the coast in north-west Western Australia, an ideal location given its proximity to all the discovered gas resources in the Western Carnarvon Basin.

The main market is constituted by Australia and the Asia-Pacific region, at the moment, about 80 per cent of the initial LNG produced already has been committed to Japan and South Korea.

This project is expected to operate for at least 50 years; once operational, Wheatstone LNG will turn Australia into the world’s second largest exporter of LNG, and within a decade, could even make the country the world’s largest exporter, ahead of Qatar.

Offshore facilities will include well infrastructure, subsea installations and a processing platform in 73 metres of water, 225 kilometres from the coast. The facilities will extract and partially process gas and condensate and deliver them onshore via subsea pipelines for further processing. It is planned to have the capacity to produce up to 25 mtpa of LNG. Works will begin onsite in early fourth quarter 2012, with the first output due for export in 2016.

The onshore installation, located at Ashburton North, 12 Km west of Onslow in Western Australia’s Pilbara region, is expected to have two LNG trains with a capacity of 4.3 million tonnes per year each, and eventually it could be expanded to 25 million tonnes a year; it will also include a slug-catcher to separate the gas and liquids, LNG and condensate storage, a domestic gas processing plant and marine facilities including a shipping channel, turning basin, Materials Offloading Facility (MOF) and export jetty. It is a major engineering project of a high complexity that requires the contribution of the leading companies on different fields. In particular, the onshore section will be designed and built by Bechtel, one of the biggest Engineering and construction Companies in the world with more than 50,000 employees, revenues of ab. $30 billion and presence in 50 Countries.

The Wheatstone LNG project represents one of the bigger projects ever achieved by the Italian Artes Ingegneria. ARTES will provide engineering, fabrication, supply and site supervision of a vast number of waste water treatment packages. The plants will cater both the permanent and the construction facilities of the Complex handling sanitary water from nearly 7,000 people, oily water and the sludge to be dehydrated. Treated waste water, since meeting the most stringent Australian and international standards, will be mostly reused within the complex.

The Wheatstone development is one of Australia’s largest resource projects and represents a tremendous growth opportunity for the companies involved, providing another platform to commercialize significant natural gas resources in Australia. This project reinforces Australia as an expanding and reliable supplier of natural gas for the 21st century.

Solutions for mining in New Caledonia

One of the World’s largest Nickel mines and processing plants will soon use a waste water treatment plant supplied by BONO Artes. KONIAMBO Nickel, in New Caledonia, will start up in the second half of 2012, the exploitation of a large Nickel and Cobalt mine.

Established near Koné, the county town of New Caledonia’s North Province, Koniambo Nickel SAS is presently building a world-class industrial complex which will contribute to making New Caledonia one of the world’s largest nickel producers once production reaches full capacity. Thanks to its yet unexploited nickel deposit that is deemed to be one of the most important and of the best quality worldwide, the Company will maintain a long-term, low-cost operation that will comply with sustainable development principles.

Once construction work is finished, Koniambo Nickel will operate a mine, a pyrometallurgical nickel foundry, a power-generating station and other complementary infrastructures, notably a privately-owned deep-water port, an 11-kilometre land-based conveyor and a seawater desalination plant. The beginning of ore treatment is planned for the second quarter of 2012 with a gradual increase in power to reach an annual production of 60,000 tonnes of nickel content in 2014. A thorough feasibility study has been made in the past years, leading to a very environment-conscious design of their new ore processing plant. Great attention has been paid towards all water-related problems, to avoid the overexploitation of the existing fresh water sources and any possible pollution to the nearby sea, where a rich bio-environment is present.

Artes Ingegneria (BONO Artes) has been selected for the supply of a complete waste water treatment plant, to neutralise and re-use 150 me/h of water used to wash the Nickel-rich ores and the effluents of the melting plant that extracts metal from them.

The whole lot of processing equipment plus the engineering work for the locally-made piping, carpentry and ancillary equipment, have been supplied: a complete chemical-physical process - with a sequence of coagulation, flocculation, sedimentation, filtration technologies - will guarantee the maximum purity to the obtained clean waters. Sludge treatment, consisting of thickening and drying processes, completes the supply.

Already installed, this 7,500 m³ plant will be commissioned within the 2012, when the new mine and metal processing plant will become operational.
The answer, my friend, KEEPS blowing in the wind!

In spite of the economic turmoil, that rotates around the world like trade winds, the colic generators industry keeps growing steadily on a worldwide basis. Hit heavily in China last year by a market crisis – mostly due to the entry of low-quality, low-cost products that have spoiled the image of the whole Chinese wind blades industry – the market of colic generators keeps growing elsewhere.

“The expectations for wind power market growth...”

In 2010 the annual market shrank by 0.3% to 38.3 GW, down from 38.8 GW in 2009. The new capacity added in 2010 represents installations worth EUR 49.8 billion (USD 71.8 billion). The market installed almost 30% less than in 2009. In the European market, new installed capacity in 2010 was 7.5% down on 2009, despite a 50% growth of the offshore market in countries like the UK, Denmark and Belgium, and rapid growth in Eastern Europe, led by Romania, Bulgaria and Poland. “states the 2010 report of the Global Wind Energy Council. The main markets driving growth continue to be Asia and Europe, which installed 21.5 GW and 9.9 GW respectively in 2010. However, emerging markets in Latin America are beginning to take off, led by Brazil and Mexico. In cumulative terms, the Latin America and Caribbean market grew by more than 25% during 2010. For the first time in 2010, more than half of all new wind power was added outside of the traditional markets of Europe and North America. This was mainly driven by the continuing boom in China, which accounted for half the new global wind installations, with 18.9 GW. China had in 2010 44.7 GW installed the year before, and surpassed the US to claim the number one spot in terms of total installed capacity. But a growing number of small producers, unable to guarantee a quality level because of lack of technology and of skilled labour, generated several serious problems that somehow spoiled the image of the whole wind generators industry, cutting their production programs and sending the weakest ones to bankruptcy. Only the largest players remained in operation, and the young Chinese industry learned, once more, an old lesson: quality costs, but it pays back. Now planning, development and construction for the “Wind Base” programme, which aims to build 1516 GW of wind capacity in eight Chinese provinces, is well underway. In its Fifth Five-Year Plan, which was passed by the Chinese Parliament in March 2011, the government set a new target of building a total 90 GW of wind energy by 2015.

Catching the wind, with Cannon! This rising global activity has stimulated Cannon to dedicate human and financial resources to the development of solutions for the aero-generators industry. The series of dedicated dosing units for the infusion of Epoxy resins in the giant blades has been extended. New models are available to respond to new needs, as demanded by a growing number of international customers.

In addition to the first major customer in this field – Siemens Wind Power, that has increased in 2011 their park of Cannon Epoxy DX low-pressure machines – several new manufacturers from Germany, Denmark, Brazil, Spain, India have chosen the new Cannon machines for the infusion in their large aero blades. Being very secretive about their suppliers and new developments, they do not like us to disclose their names, then we won’t tell you whom they are... but they are all big!

New solutions, for higher industrialisation

On top of having extended the range of outputs up to 80 kg per minute, the new Cannon DX machines feature now a three-component model, with an additional stream dedicated to a second hardener: by regulating the blend of the two hardeners a complete range of reactivities can be obtained, to face any sort and size of blade.

A pneumatic three-way valve controls now the recirculation of the components immediately before the start of the infusion. Higher precision and better control of the ratio between the two components can be obtained with this fast valve, mounted very close to the head. For easier portability across their vast production halls not all the manufacturers like the idea of connecting their dosing units to the compressed air network, therefore Cannon have added a compressor on board, so the little amount of air required to operate the valve is produced locally.

To provide a faster control of the infusion rate, a remote control has been developed, that allows the operator to reduce the output when necessary without having to run through the factory.

A load cell has been added to the dosing system, to be fitted under the open container that receives the blended formulation from the metering machine and acts as a buffer for the infusion. The output of the dispenser is automatically adjusted in accordance with the weight of liquid present in the buffer: when the impregnation rate slows down, due to the internal resistance of the glass capillary to the diffusion of the liquid, the dispensing machine reduces its feed rate, to avoid an overflow of the buffering container.

The Cannon Epoxy DX 35 has been upgraded with numerous new technical solutions to increase its reliability and ease of use.

The Epoxy DX 80 infusion machine is suitable for the manufacture of the largest aero blades produced today.

More advantages, for higher rentability Cannon has been selected as a supplier of Epoxy infusion machines by numerous qualified manufacturers because of technical advantages, but the major benefit derives from its international presence and multi-technological experience.

An international network of Technical Service centres is a fundamental plus, that guarantees the continuous presence of a qualified team of specialists and of spare parts in moments of need and difficulty. The availability of several different technologies for metering and mixing the widest range of formulations – including adhesives and coatings, widely used in this industry – allows the Cannon customer to find quickly the right solution for his special needs without wasting time in trials and errors. The Cannon Group attitude of providing turnkey plants for the most complex industrial applications goes far beyond the supply of a simple dosing machine: an integrated production plant can be discussed and quoted, relying on the cooperation of different specialised companies. To resume here the different technological solutions that Cannon provides to the aero generators industry, let us mention:

- Metering and mixing machines for Polyurethane resins, that can be used for foam reinforcements instead of expensive balsa wood or blocks of XPS (Extruded Polystyrene).
- Metering and mixing equipment for DCPD resins (DiCycloPentaDiene) used to manufacture compact plastic blades and other ancillary components.
- Thermoforming machines for the largest available plastic sheets, used for the exteriors and the interior paneling elements of the nacelles.
- Complete manipulation and handling systems, already proven for the precise assembly of sophisticated aircrafts, able to handle large parts throughout vast halls.
- Aluminium die-casting presses and plants for the manufacture of electric motors and other moulded metal components.

This multi-technological approach and its multi-national presence make Cannon an ideal partner for the manufacturers of wind generators.

Talk To Us, We Know How!

Large thermoformed parts for the nacelles of the aero generators are produced by Gbo Plast A/S in Scandinavia with dedicated Cannon vacuum-infusing equipment.
Biomass plants, a game of competence and diplomacy!

We meet today Monica Grosso, Sales and Marketing Manager of BONO Sistemi, the Cannon Group company in charge of cogeneration and renewable energies: their large, tailor-made, special biomass plants require a very long and complex negotiation. A lot of competence, patience – and diplomacy – is demanded to see an order signed!

Monica Grosso, 42, was born in Genova, Italy, where she obtained her degree in Chemical Engineering in 1994. After a two-year training in the UK and significant experience in Stannprogetti and AMAA in Milano, where she worked on waste incineration and use of biomass fuel – Monica joined BONO in 1998. Her first assignment was to sell thermal oil boilers, then – thanks to her past experience with renewable energies – she was selected to handle sales of special thermal machines, in 2004. She currently manages – first woman in the Group in such position – sales and marketing for BONO Sistemi S.p.A., the Cannon company specialising in plants for cogeneration and valorisation of biomass.

Cannon News: Can you explain us what you are selling?

Monica Grosso: Bono Sistemi designs, manufactures and installs large thermal plants that burn biomass fuel, mainly agricultural waste and scrap wood from forestry and industry. We talk of huge, complete installations worth several million Euros that can be used for two purposes: co-generation of electric power and heat, or production of steam for process. According to the available fuel, a number of by-products can be derived from the process, or a number of pollutants can be present: these factors heavily influence the design of our equipment and its final price.

CN: What sort of biomass are you dealing with, mostly?

MG: Biomass is a very popular subject, today. We receive hundreds of requests for evaluation studies and preliminary offers, and obviously we must filter them severely. We have developed advanced, sealed burning technologies for a number of interesting fuels, and we try to give priority to the derivatives of the wine industry (spent grapes, called marc and lees) and of the wood industry. There is a huge market for this biomass, and we know how to deal with it efficiently.

CN: Can you give us some references and process details about the wine industry application?

MG: We have grown significant experience with distilleries processing grape residues in Italy, France and now in Australia. We sold four plants in three years, with strong commitment and technical competence. In Faenza, Italy, our customer Villapiana, after a complex series of chemical and physical treatments, obtains from grapes residues (dry “marcs” and wet “lees”) a number of pure chemicals (Tartaric Acid, Metatartaric Acid, cream of Tartar, Rochelle Salt, Potassium Tarteate, pure Ethyl Alcohol), to be sold to the food, beverage, pharmaceutical, mechanical and electronic industries. These operations leave a mountain of residues: their plant generates more than 96,000 tons per year of wet spent marc. They are fed at a rate of 5 tons/hour to a customised biomass-fired steam generator. Here they fall on a large moving grate where – using very hot combustion air – they are fully burnt to ashes. The combustion generates flue gases, which are sent through a large heat recovery boiler where they release their heat which vaporises the water and produces steam. This is sent at high pressure to a large turbine, where it produces 1.3 MW of electric power, used in the plant and sold to the national power grid. From the turbine saturated steam is extracted and sent to the nearby alcohol distillery, where it is used to extract – from a blend hydro-alcoholic solution coming from the marc’s washing line - natural Ethyl Alcohol, 96.5% proof. In figures: 36,000 tons a year of residues generate 1.3 electric MW of power and 12 thermal MW under the form of saturated steam. This means an average 70.5% of global efficiency, out of wet grape’s marc and wine’s lees. The supplied plant is 17 meter high, 17 by 20 meter wide, weighs approximately 400 tons and is fully built in anti-seismic execution. We are now going to install for ATP (Australia Tartratic Products) a very large similar plant in Australia, where it will process almost 40,000 tons a year of spent grapes, collected from the wine industry existing around their factory in Mildura, Victoria State. In France, from the same raw material, we have already installed two large biomass plants. Both our French customers – CVAA and UDM – generate only steam for their distilling process, plus of course Tartrate salts and Ethyl Alcohol. Since they previously separate grape seeds (to extract cooking oil from them) their spent residuals are almost dry: in this case we apply a totally different combustion and heat recovery method!

CN: How about the wood industry?

MG: First of all, let’s make it clear: we do not want to compete with the furniture or the panel industry in the search of the raw material. We don’t want to burn the good wood, it’s too precious, it should be used for other things. Our interest is mostly towards scrap wood: there is plenty of it around, mostly from the industry, and people don’t know what to do with it. Coming from the furniture industry, or from the production of plywood, MDF and particle board panels, or from the construction and packaging industry. It’s generally wood combined with other synthetic materials, or polluted with glues, adhesives, resins, paints. You can’t re-use it for industrial applications, and you can only burn it in a very careful way, otherwise you get in troubles with the environment and with your equipment. You must know how to handle that, and we know how!

The presence of micro- and macro-pollutants, different sizes and shapes of particles, humidity, seasonal effects and differences, final use of the produced heat (steam only or co-generation) influence the design of our thermal machine, and its construction. Flue gases treatment is mandatory, with an excess of precautions because you never know what ends up in the combustion chamber, to comply with the most stringent law requirements, to guarantee maximum respect for the environment and the highest possible thermal yield.

Waste wood is recycled with this biomass plant from BONO Sistemi to generate heat and electric power.

We recently supplied a very interesting solution to a wood panel producer near Dijon, France, that produces 19 thermal MW of steam – used for process – by burning their production scraps, waste wood and unusable minor forestry residuals (smaller branches, banks, etc.) at a rate of 7 tons per hour. Our supply includes the whole plant, starting from the air pre-heater, through the burner, the step grate combustion system, the heat recovery system, the whole flame treatment and the ash conveying and disposal system. We design, manufacture, transport and install on-site the whole plant, test it, train the client’s operators, using only our experienced personnel, from A to Z. There is only one interface for the whole project, and that’s Bono Sistemi. Not very many competitors can make the same statement!

CN: Do you deal with other biomass?

MG: Of course we do: we have had very positive experience with olive pomace, rice husks, sunflower and corn. We are actively working on projects involving “energy crops” such as rapeseed and Dapax Donax (or giant canes, a fast-growing reed used for the production of Bioethanol fuel, that leaves lignite residual) and sugar cane.

CN: What’s the main difficulty in selling these plants?

MG: The fact that, in any case, the governments are subsidising these huge investments. Some countries, say Italy for instance, pay a premium tariff for the produced energy, for at least 15 or 20 years from the start of production. Other nations – France, to name one – contribute heavily to the initial investment. In both methods precations are taken to avoid waste of public money, and this reflects in a long, nerve-taking sequence of bureaucratic steps that cannot run in parallel but, generally, only in sequence: if one piece of the puzzle is not exactly in place the next one cannot even be moved. This process – which also involves a great deal of political decisions – cannot generate a ground-breaking ceremony in less than two years from the start of commercial negotiations. We spend 30% of our efforts in technical discussion and project laydown, and the rest in dealing with third parties to help our customer to obtain all the necessary building authorisations, financing loans, environmental impact studies etc. We work for literally nothing for two-three years, and sometimes the project cannot go through; then we are back to square one... with all the expenses to pay!

CN: How do you try to optimise your efforts, then?

MG: The major problem is to identify how realistic and feasible is the submitted project. This field is full of people interested in investing in biomass power, sometimes from the construction phase – with little interest in the ongoing exploitation of the industrial project. We try to stay away from speculators and mediators, only interested in financial calculations and ROI but never involved in two fundamental steps of this business: the regular supply of the raw material and the day-by-day efficient operation of the plant. We only deal with the final user, industries with a steady supply of “feedstock” that can be burned efficiently and a regular end use for their final product, either heat or electricity. These counterparts speak our language, they can deal with a bank, are firmly installed on a territory for a long time and are there to stay and make an ongoing business. With these premises we start talking to them and to their local counterparts supposed to release all the required permissions. Other approaches are – generally – a waste of time and money. And we like to save both, for us as for our customers!
A giant “ship in the bottle” mounted on the Italian Alps!

Bono Sistemi completed on March 2010 the start-up of a biomass 28 ton/hour superheated steam boiler, main item of a power plant able to generate 6.8 MW electricity burning virgin wood in Fusine, Lombardy - Italy.

This is the result of a two years contract developed in partnership with an Italian EPC contractor for the final Swiss customer Holcim Group.

The boiler itself represents for Bono Sistemi a successful example of medium-size biomass thermal plant fully engineered “in house” and manufactured with the key supplies of Bono Energia for boiler parts, Bono Metro for the combustion system and Automata for the full control system.

The plant has been nicknamed “The Ship in the Bottle” due to the difficulties met during the engineering phase first and in the construction on site after, in order to assemble a 600-ton-weight boiler inside an existing 40-years-old concrete factory without modifying any external volume of the plant, as required by the building authorization. A task achieved with a 12-month on-site presence of up to 10 skilled technicians of Bono Sistemi.

The assembly of this 600-ton-weight steam boiler, fired with virgin wood, was carried out at Fusine, in northern Italy.
Landing in Russia with thermal plants and water treatment

Bono Energia and Bono Artes engineering ready to serve Russian Market on the field

Cannon strongly believes in the potential of the Russian market, both as an outlet for its products and as a reference point for starting new commercial actions in other members of the CIS (Commonwealth of Independent States). In particular, Russian abundance of oil and natural gas and the expansion of attractive sectors such as power generation and ecology, make this market, characterized by a fast growing rate in replacement and new installations and by an increasing awareness of environmental issues, energy efficiency and request of services, desirable for our companies with more than 50 years experience.

After several years of activity in that market with good results, which have allowed Bono to have several plants installed and operating in this area, the Cannon Group decided to increase the structure of Cannon Eurasia in Moscow (near to Oktyabrskaya subway station) by adding a qualified team dedicated to Bono’s solutions, specialized in the promotion of technologies of ‘avant-garde’ and mainly working in order to make available to the stakeholders all the information concerning new opportunities and technical solutions / technologies that Bono is able to offer. The highly qualified technical personnel is also prepared to perform all presales and post sales procedures, including installation, start up service and maintenance.

Local presence also gave Bono the possibility to more effectively benefit from its participation to SHK – ISH, international sanitation, heating and air-conditioning sector trade fair and conference, held in Moscow between the 17th and the 19th of April this year where Bono Energia introduced its Russian market its industrial boilers management and control automatic system Optipark.

The fair was also a good opportunity to start first contacts with local technical institutes, key actors that have to be taken into consideration as they embody central decision makers for what the purchase of industrial machineries is concerned, thus representing the prime target for all those companies, like Bono Energia and Bono Artes, that want to succeed in the Russian B2B market.

Visit our new website! www.bono.it