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Louis Berger is an Engineering News-Record top-20 ranked, $1 billion global professional services corporation that helps clients solve their most complex infrastructure and development challenges.

- Delivering major infrastructure redevelopment programs in highly populated, urban areas.
- Constructing and rehabilitating critical infrastructure in fragile states and developing countries.
- Fostering sustainable livelihoods and economic development worldwide.
- Preserving and protecting the environment to ensure that future generations have access to clean air and water, fertile soil, open spaces and sustainable resources.
- Preserving the aesthetic, environmental, historical and cultural integrity of national and historic landmarks around the world.

With nearly 6,000 engineers, economists, scientists and planners worldwide in more than 50 nations, we are unique in our ability to adapt to local situations.

Founded in 1953, Louis Berger’s quality of work, integrity and commitment has built decades-long client relationships with local, state and federal governments; multilateral institutions; and other public and private entities. To this diverse client base we bring strategic vision and an entrepreneurial spirit, developing solutions to some of the world’s most challenging problems.

Louis Berger combines global expertise and local presence to quickly and cost-effectively complete complex projects worldwide. We have a sustained presence on every continent but Antarctica:

- More than 60 years in North America
- Nearly 60 years in Asia
- More than 50 years in Africa
- More than 40 years in Europe
- More than 40 years in the Middle East
- More than 50 years in Latin America and the Caribbean
LOUIS BERGER END MARKETS AND SERVICES

Louis Berger is a multidisciplinary global consulting firm, providing diverse leadership across industry sectors, service lines and geographies. Comprising engineers, architects, economists, scientists and planners, Louis Berger possesses the experience and expertise to quickly and cost-effectively complete complex projects worldwide.

Markets
- Power & Energy
- Agriculture
- Buildings & Facilities
- Economic & Institutional Development
- Environment
- Mining & Minerals
- Transportation
- Water

Services
- Engineering
- Architecture
- Capacity Building & Technical Assistance
- Cultural Resource Management
- Economics & Financial Services
- Emergency & Disaster Management
- Environmental Services
- Operations & Maintenance
- Planning
- Program & Construction Management
LOUIS BERGER ALTERNATIVE ENERGY EXPERIENCE

Energy touches every facet of our lives. It is the vital force powering our homes, businesses, industrial facilities and vehicles, and is a fundamental factor in achieving and sustaining a high quality of life. Because so much relies on energy, few sectors are as challenging, especially at the nexus between energy, socioeconomic needs and the environment.

Louis Berger develops and provides dependable and affordable alternative energy solutions worldwide while ensuring that existing energy technologies are further improved and implemented safely, reliably, and in a manner that is environmentally friendly. Several promising options for improving energy supplies exist—including improved biomass fuels, mini-hydropower, hydrokinetic (i.e., wave and tidal energy), solar and wind power and hybrid systems—and we are poised to implement these new technologies to reduce dependency on non-renewable energy.

Our integration of engineering, planning, economic, and environmental capabilities allows us to offer a full range of professional, energy-specific services. Our highly qualified team of engineers, planners, scientists, plant operators, and other specialists have been involved in the full lifecycle of energy-related projects, including contingency power generation; renewable energy; hydroelectric project licensing; cogeneration facility siting, permitting, and monitoring; gas pipeline siting and permitting; and electric transmission line routing.

CAPABILITIES

- Alternative Energy Projects
- Asset Management
- Auditing
- Clean Air Compliance
- Feasibility Design
- Financial and Economic Analyses
- Fossil Fuel Plant Siting and Permitting
- Gas Pipeline & Electric Transmission Line Siting
- Hydrogen Fuel Cell Vehicle Infrastructure
- Pipeline Environmental and Craft Inspectors
- Prime Power and Spot Generation
- Regulatory Compliance
- Site Investigation and Remediation
- Solid/Hazardous Waste Management
- Surveying, Photogrammetric Mapping, and Geographic Information System (GIS) Services
- Systems Planning
- Third-Party Project Review
The project consisted of a 65 MW wind farm in Turkey, considering 36 x 1.8 MW, and using Vestas' V100 as the wind turbines. Basically the works included the supervision on the site of the assembly of the 36 foundations, in which a new system of anchor cage and upper ring were to be installed, verifying that the construction activities were executed in accordance with the designing criteria and program of works.

**Wind Turbine Foundations “Kirsehir Wind Farm” in Kirsehir, Turkey**

Client: Vestas  
Date: 2011  
Service: Independent Checking Engineering (ICE)

Commisioned by “Iberdrola Distribución S.A.U.”, this is a double circuit electric transmission line connecting Distribution Substations CS-1 and CR-2, to enable the power evacuation of “Totana III” and “Totana VIII” Agroenergetic Facilities, of 2 MW installed power each, located in the municipality of Totana (Murcia).

The maximum power to be conducted through the line is 4 MW; the cable is a RZ1-k 12/20 kV, and its section is 240 mm², at a frequency of 50Hz.

The total length of the line is 3.567 m.

**Double Circuit Line Underground Connection “CR-2 to CS-1 (20 kV)”. Murcia, Spain**

Client: APIAXXI  
Date: 2011  
Service: Construction Supervision

Two MET towers are already installed and in recording phase placed in strategic places of the community of Los Molles. This project consists in the development of Jatropha Curcus cultivation in Spain, specifically in the Commonwealth of Municipalities in Lower Guadalquivir, for the production of biofuels.

The plantations are developed, initially on an experimental basis, through partnership agreements with local farmers, and once entrenched the operational phase, reverse these plantations on farmers.

To achieve this objective, it is carried out a qualitative and quantitative characterization of Jatropha-based energy crops within the Commonwealth of Municipalities of Bajo Guadalquivir, in order to evaluate its potential as region economic development instrument.

The aim is the generation of technology, products, components and systems for the harvesting and further processing (grinding) of Jatropha cultivation and study of other Jatropha and its sub-products applications.

**Industrial Development of Jatropha Crops. Andalusia, Spain**

Client: APIAXXI  
Date: 2010  
Service: R&D&I Project

The project involves the design and implementation of a combined cycle plant for power generation from natural gas. Natural gas reaches the coast in the form of liquefied natural gas, transported in large ships, with capacity for hundreds of thousands of cubic meters of LNG. Once in the coast, the LNG is regasified either by a floating storage regasification plant or through a regasification plant on land.

Then, the gas is transported by pipeline to the combined cycle plant, where it is burned in the turbines, generating electricity. The surplus heat is used to increase the overall yield to about 50% of the plant by generating electricity by steam. The generation of electricity is 200 MW, that is a 15% of the power generated in El Salvador.

**Combined Cycle Power Plant, El Salvador**

Client: Meruelo Town Council  
Date: 2002  
Service: Detailed Design

The environmental complex in San Miguel de Meruelo consists of pre-treatment and recycling facilities, composting facilities and energy recovery plant, providing service to approximately 590,000 inhabitants.

The new Energy Use Plant with a capacity of 96,000 tons per year, uses as fuel waste materials from the rejected recycling and composting processes, previously deposited in the landfill.

It has been considered a lower heating value of fuel derived from waste of 11,729 kJ / kg, being the range of permissible variation of 9,000-15,000 kJ / kg. In the horizontal zone of the boiler has been placed a number of evaporators, superheaters and economizers to produce steam by the heat release. The steam, once outside the superheater, is introduced into a turbine, generating an output of 10.5 MW, of which about 2 MW will be intended for self-consumption of the premises, and the rest will be exported to the national Electricity Network. The process is designed to meet the limits established by the Royal Decree 653/2003 on waste incineration.

**Energy Recovery Plant of the Environmental Complex in San Miguel de Meruelo. Cantabria, Spain.**
In the field of renewable energy, Louis Berger highlights for projects based on the use of solar energy, both in design and planning, and appraisal of projects carried out by other companies, for both generation of electrical energy and to produce domestic hot water (DHW). Louis Berger has developed more than 30 major projects worldwide reaching more than 100 MW, including the biggest PV-Solar installation in Andalusia (El Coronil, 20 Mw) and the Fuente Alamo PV-Solar installations in Murcia (26 Mw), among others.

These projects based on the use of solar energy for electricity production include both fixed installations placed on land as on the cover of buildings, in order to obtain the best architectural integration. We have also developed projects with solar trackers, mobile structures with solar tracking in two-axis, design patented by Louis Berger. The use of this structure involves a profit in production of a 35% compared to that obtained with a conventional fixed structure. In addition to developing their own projects have been carried out the necessary arrangements for the administrative handling of projects for other clients Louis Berger has also done consulting work in which many solar energy integration projects in facilities both administrative and industrial have been evaluated, proposing alternatives and improvements of the same.

In the field of solar energy research several agro-energy facilities have been designed and implemented. These projects have been carried out in Andalusia (Spain) and consist of a photovoltaic plant located on the roof of an agricultural facility, combining electricity generation with sustainable cultivation.
Construction of a prototype greenhouse in Qatar, describing specific aspects of the construction elements and facilities which will enable the growth of different kind of crops all year long, despite the extreme weather conditions that will be found on site. The size of the greenhouse will be 10.000 m²; initially 5.000 m² will be assigned to the growth of tomatoes and another 5.000 m² to the growth of strawberries, but the installation will be ready to produce other different kind of crops, such as cucumbers, lettuce, onions or peppers.

The installations of El Coronil (Spain), first agro-energy greenhouses in Andalusia and the only facilities of its kind in Europe, combines the functionality of a farming facility with that of a photovoltaic installation on its roof. El Coronil IV has a surface of 16500 m². Thanks to the optimization of the roof of the farming facility, a capacity of 1 nominal MW and a peak capacity of 1.2 MW were installed, what means an approx. output of 1,787.134 kWh/year, providing enough clean energy to meet the annual demand for electricity of over 450 homes and CO2 emission savings of over 700 tons per year. To generate this 1 MW capacity, 4,464 240-watt photovoltaic modules were installed. This facility was designed bearing in mind the species to be cultivated, which were selected for their ability to adapt to the climactic and light conditions that an agro-energy installation like this can offer: ornamental plants and mushroom cultivation.

El Coronil V has a surface of 11550 m². It contains inside the building all required elements for the proper running of intensive farming, and the production of 0.7 MW power through the photovoltaic facility installed on the roof, in a completely independent way from the agricultural activity. The 0.7 MW nominal power means an output of 1,250,994 kWh per year, a supply of clean energy that satisfies the energy demand of over 315 homes and prevents the emission of over 490 tons of CO2 per year. Thus, an amount of 2.880 PV modules of 280 watts were installed. Adequate species for growth were selected according to their adaptability to indoor climate and light conditions in this installation.

The Photovoltaic solar farm is composed of 400 solar trackers, becoming the biggest in Spain with its 20Mw and the second one of 66.000 fix solar panels, with 10Mw. The solar trackers of El Coronil I, distributed in 90 hectares wide, supply electricity to approximately 10.000 houses. In addition, it avoids the emission of 40.000 tons of CO2 per year to the atmosphere. It also reduces the oil imports to 2.750 tons per year what contributes to reduce the economical and energetic dependence of Spain. The system has the most advanced technology applied to the renewable energy field since its solar followers of two axes allow increasing the energy production in approximately a 30%.

El Coronil II is composed of solar panels of 175 Wp each on a fixed structure, divided in 5 groups of 2.000 Kw, each one with 4 inverters and two transformation centers united in a ring shape. Such ring is closed in the Connection and Transformation Center of 50 kVA. The main elements are photovoltaic modules composed of 72 silicon cells and three-phase inverters of 500 Kw.

This project develops three photovoltaic solar plants and their ancillary facilities, all located in Fuente Álamo (Murcia, Spain). Fuente Álamo I is divided into 80 plants of 100 Kw each and a transformation center of 160 kV. It is composed by 675 photovoltaic panels of 170 Wp each, series of 15 panels along the fixed structure. The total power is 13.000 MWh.

The plant called Fuente Álamo III is composed by an only photovoltaic plant of 9.6 Mw each. There are 32 groups of 300 Kw each. The plant is divided into 8 sub-groups of four groups each. Every subgroup has 4 inverters and a transformation center of 1.250 kVA.

The total power if this plant is 15.600 MWh.
This project develops two photovoltaic solar plants and their ancillary facilities, all located in Abanilla (Murcia, Spain), occupying several plots, total extension: 90.62 ha. The first stage, Abanilla I, is composed by 36 photovoltaic solar trackers of 170 Wp, one inverter of 5000w. The total power produced per year is 10,000kWh. The total power installed is 4,7 Mw. The panels are located on a fixed structure with 30° inclination. The project is divided into 47 plants of 99 Kw.

This project develops three photovoltaic solar plants and their ancillary facilities, all located in Calasparra (Murcia, Spain). The first stage of the project Calasparra I, is divided into 80 plants, each one of 100 Kw. It is composed by 576 solar panels of 190 Wp each put into 18 groups on panels along a fixed structure. The estimated production of the 80 plants is 13,000 Mwh. Calasparra II and Calasparra III are both composed of an only photovoltaic plant with 6 Mw power. There are 20 groups of 300 Kw each. The plant is divided into 5 subgroups, and the estimated production per year is 9,700 Mwh.

The work involves the execution of a metal structure, which is made up by bolted pillars and beams, that is based on a total of 432 fixed solar panels facing south and with the proper angle for maximum exploitation of solar radiation. The total power is 65 kW and panels have been distributed in 8 rows. It also comprises 2 inverters of 25 Kw one third of 10 Kw. The photovoltaic generator consists of a series of modules connected together electrically. The panels convert solar energy into electrical energy generating a current proportional to the solar radiation they receive. As for the structure, it has been implemented in galvanized steel and screwed for its durability. The structural design is based on vertical pillars (where there is no ditch) and inclined columns to save the ditch. These pillars brace together by profiles that will also support the photovoltaic panels’ weight. The pillars are also anchored to the ledge, to the calipers and, in radial direction, to the structure of the existing building.

This kind of projects and supervisions are thought to introduce the use of the renewable energies in installations for making the sea water drinkable. For that purpose, a photovoltaic installation in the cover of the desalinator has been recommended with the aim of compensating for the consumption derived from its lighting. The electric power varies from 100kWp to 330kWp depending on the consumption. Additionally, a road lighting system is proposed. This system is thought to be composed of solar lampposts and a pumping system for the watering of green zones run with photovoltaic solar panels. On the other hand, it is proposed the installation of solar collector that can be used either for hot water supplying or to run a refrigerator absorption system.
This project consisted in developing and implementing two Agroenergy facilities that, in a same facility, combine the photovoltaic production with the intensive farming. These installations are used for cultivating mushrooms and ornamental plants, which come combined with renewable energy generation.

Within the scope of the project, the detailed engineering of the support structure of the greenhouse, the low voltage installation, the processing centers, the evacuation line and required ancillary facilities for the proper operation of the plant were developed.

Two fixed photovoltaic solar farms were designed and defined on the roof of these two greenhouses, whose power is 0.9 MW in the case of Castilblanco I, provided by 4,554 modules, and 1 MW for Castilblanco II, provided by 5,060 modules. Both facilities have been equipped with two three-phase inverters of 400 KW power each and one three-phase inverter of 100 KW power, in Castilblanco I, and 200 KW power, in Castilblanco II.

Through this project, analysis and optimization of support structures for solar trackers was held. The project was conducted to optimize the single-pole solar tracker design of large area to maximize efficiency in its use in large solar power plants through improved understanding of solicitations and efforts supported during its operation. For this, the approach started with the analysis and evaluation of the influence of climatic conditions in structures subjected to its influence in a greater degree than is currently necessary.

Then, it was carried out an analysis and an evaluation of the influence of climatic conditions in the supporting structures for solar trackers electrical and mechanical elements that allowed to develop its role of monitoring the sun's path. Finally, the knowledge was applied to the optimization of support structures for solar trackers and determined the necessary modifications to the designs ahead of their optimization in terms of robustness, reliability and durability.
In the field of Wind Energy, Louis Berger has a solid technical team consisting of PhD and MSc Engineers, experts in performing High Innovated Solutions and responsible of having developed more than 20 major projects worldwide reaching 1,300 MW in the last six (6) years, including relevant Wind Farms as the Monte Redondo (48 MW) and Valle de los Vientos (90 MW) Wind Farms in Chile, the Kirsehir Wind Farm in Turkey (65 MW), the Istmeño (400 MW) and PIER (370 MW) Wind Farms in Mexico, the Kisielice and Poztolin Wind Farm in Poland (80 MW), among others.

The use of the potential energy of the wind for electricity production is one of the areas with more growth. The performance of these projects includes the following phases:

- **Feasibility Study (FE):** Searching for location and feasibility study, analyzing the available wind potential, first through models and mesoscale meteorological models and finally by running campaigns of measurement and calculation of the wind resource.

- **Environmental and Social Impact Assessment (ESIA):** Developing ESIA's under different legislations and regulations including the comprehensive process. From the base line of the environmental aspects, the impact statement, the design of preventive and mitigation measurements and the environmental management and monitoring program. Including the assessment of cultural and social aspects and the citizen and community participation.

- **Bankable Reports (BR):** Undertaking the report to demonstrate to banks or another financial institution that the project has sufficient collateral, future cashflow, and high probability of success, to be acceptable to institutional lenders for financing.

- **Engineering (E):** Engineering of the wind farm, including the definition of positions of the exact locations for each turbine (micrositing), the design of all park roads, both internal and access and design of civil works required for all facilities related with the activity of the park, from foundations to the pipelines that will house the electrical conductors, electrical network dimensioning in charge of distributing and dissipating the energy generated, auxiliary buildings design, etc.

- **Permitting (P):** Management and administrative processing of all permits and authorizations connected to each of the phases of the project, including the environmental permits under any scheme or regulation.

- **Construction Management (CM):** Comprehensive support to the Owner and his Project Manager. Including the technical reviewing of the detail design developed by the EPC Engineering, negotiation with EPC contractor, oversight of civil and electrical work, quality control of materials and equipment, technical assistance in negotiations with lenders or financial institutions and any another support required by the client.

- **Operating and Maintenance (OM):** Including the oversight of the commissioning implemented by the EPC contractor, reviewing of operation and maintenance (O&M) procedures, even available the option of implementing the O&M (further the warranty period) in another specific contract.
"El Ventarrón" wind farm is in the municipality of San Juan del Sur, in the Rivas Department. The park will have 33 wind turbines manufactured by Vestas, of 3 MW each adding a total installed capacity of 99 MW and will occupy an area of approximately 19.05 km². After preliminary studies using mesoscale wind data and the granting of the Provisional License by the MEM, have been installed two meteorological measurement towers to obtain data to be analyzed with specific software for the necessary modeling and calculations, in order to determine the most suitable location of the wind turbines.

The Jose Contreras wind farm is located in the community of Jamao, in the town of Moca, Espaillat province. It will have an installed capacity of 50 MW, this power may be duplicated when it has been installed the 50% of the original size requested. For this purpose, have been signed leases with landlords for a surface that will implement the original project and future expansion. It has been obtained Provisional Grant to carry out surveys, studies and analyzes necessary for the implementation of the wind farm, so they have proceeded to the installation of a meteorological measurement tower for optimal modeling of future wind farm, being planned the placing of more towers, depending on the results of the measurements recorded by the first analyzed with the specific software for the necessary modeling and calculations in order to determine the most appropriate location of the wind turbines.

Detailed replacement design of structural elements of a 105 meter high wind turbine foundation (V90 - 2 MW VCS HH) localized in the localities Skoczyklody and Scieki, Municipality of Rawa Mazowiecka, Lódz Voivodeship. Wind turbine foundation is based on 24 piles, consists of reinforced concrete slab with variable height of 1.00 m in circumference and 2.70 m in the centre. Design carried out according to the european standards: Eurocode 2: Design of Concrete Structures and Eurocode 7: Geotechnical Design. The loads used to calculate the base have been delivered by the tower’s producer (Vestas).
This project consists of the implementation, development and promotion of three wind farms (PIER, PIER II and PIER IV) located in the south-east of the State of Puebla (Mexico).

1. Previous work (identification of potential areas to implement such projects, market research and legal analysis of the applicable law, wind resource analysis through installation of meteorological towers, analysis of financial feasibility, analysis of possible business models, etc.).
2. Land Management (Leasing of land where intended to install the WF); Drafting of the Preliminary Project and Project; Processing of Permits and Licenses (including the Environmental Impact Assessment (EIA) of each WF).
3. Finding investors, search for funding and local consumers.

Projects currently under development in Puebla are:


These projects are currently in process of Permits and Licenses.

The Valle de los Vientos wind project is an alternative project located about 13.5 km south east from Calama City, II Región of Antofagasta in northern Chile (Atacama Desert; SING system), that Louis Berger is developing for Enel Chile. The estimated capacity will be 90 MW, considering 45 x 2 MW wind turbines. Wind farm (45 wind turbine positions) and transmission line have been duly approved by Environmental Qualification Resolutions (RCA) No. 0138/2010 and No. 020/2011. The site is easily reachable by concrete roads from Calama city, which has a local airport and is linked to the Pan-American highway by CH-24 and CH-25 roads.

Measurements have been done over two and a half years with a 60m met mast on-site, plus 9 months with an 80m met mast. The average wind speed of about 7 m/s at 80 m height, and the estimated Equivalent Full Load Hours (EFLH) are 2,472. The Interconnection point will be the Calama Substation.
Since 2012 Louis Berger is working on the implementation, development and promotion of a wind farm in the State of Chiapas (Mexico) which will have a total installed power of 100 MW. The project is currently in the formalization process of Permits and Licenses.

The “Monte Redondo Wind Farm” and its subsequent expansion included the construction and operation of a wind farm to generate electricity. The project consisted of 19 wind turbines, and the expansion by adding 5 machines. The location was in the coastal zone Limarí province, next to Route 5 North, about 325 km from Santiago de Chile. The project included all works and actions required, from the foundation of the machines and assembly to their final connection to the corresponding electrical substation. The wind turbine model used is the VESTAS V90, 2 MW and a hub height of 80 meters. For electrical connection of these machines, there were five groups of wind turbines, each consisting of a total of 3, 5 or 6 machines, linking them in the form of electrical distributor, ie each of them twisting through of medium-voltage input-output located at the base of the towers. With these settings, the evacuation of the energy produced is done through 5 separate circuits, which have their end in the nearby substation Transelec.

Located in the Mexican state of Oaxaca. It consists of 132 Vestas V90 3 MW, representing a total of 396 MW of installed capacity. Louis Berger is responsible for technical oversight and engineering support during construction and operation of the Park, both civil works and electrical installations. The park is located in Tehuantepec Isthmus, in an area of marsh, making it one of the world’s most complex parks from the construction point of view.

VESTAS Mediterranean asked Louis Berger to assist the Assembly and Installation of the anchor cage at the wind farm “PARK ÉOLIEN DU GATINAIS”, next to Mondreville In the province of Ile-de-France. The wind farm is composed by 9 wind turbines with nominal power of 2000 kW, completing nominal power of 18000 kW. The anchor cage is the most important mechanical part of the foundation of a wind turbine, Assembly and Installation is crucial to ensure the stability of the machine. Louis Berger has International expertise on design and supervision of foundations for wind turbines.

Louis Berger responsibility was to carry out a replacement design following alterations to the construction of access roads to wind turbines and the construction of work platforms within the wind farm situated in the localities of Hnatkowice and Orzechowce. The wind farm consists of 6 wind power stations manufactured in Spain, type Gamesa G87 -2 MW of a total power of 12 MW, mounted on 78 – meter high towers.

The service included the execution of arrangement plans, longitudinal profiles and cross sections. The designed road was 3 - meters wide, with a temporary extension of 1.25 m in the form of reinforced concrete panels. The total length of the designed access roads was 3.55 km.

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Louis Berger is specialized in the design of network infrastructures and facilities, substations, high voltage towers and power lines associated with the areas in which the Louis Berger is a specialist. Therefore, have been developed additional works for the construction of roads, high speed railway lines, solar plants, etc., such as:

- Substations of up to 132 kV. Turnkey Projects of different types and voltage levels. Development engineering, earthworks, civil and electro-mechanic works, control and protection, communications, commissioning.
- High Voltage interconnection lines (up to 132 kV).
- Medium Voltage overhead lines (15-33 kV).
- Medium Voltage underground lines (15-33 kV).
- Transformation Centres.
- Low Tension networks of every kind.
- Works at Tension.
- Preventive and corrective maintenance.
- Network Operation Tasks.
BIOFUEL

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GAS

In the use of gas as an energy source, Louis Berger has developed projects of Regasification Plants of liquefied natural gas (LNG). Three main operations are developed in an installation of this type: the reception of the ship in port transporting the LNG, the storage and, finally, the re-gasification.

LNG tankers transport the liquefied natural gas from the producer countries to the LNG plant, where are unloaded by unloading arms located in the docking of the Plant, then they are stored in cryogenic tanks and lately gasified using heat exchangers that use seawater as heating fluid.

Once the gas reaches its gaseous state, the process continues taking it to a combined cycle plant, where it is injected into a gas turbine for generating electrical energy and, at the same time, will take advantage of the heat from the exhaust gases to vaporize water and use that steam in a different turbine, called “steam turbine”, also for the generation of electricity.

An alternative to this last phase of the process is the sale of the gas, for which, once gasified, will be taken to the point of consumption through pipelines.

BIOMASS

In the area of power generation through biomass exploitation, Louis Berger has developed projects to define the structures and facilities necessary for the construction and operation of Biomass Gasification Units, where a big range of agricultural residues (straw, pruning residues, etc..) and agribusiness (olive pits, pomace, ...) with high potential for energy use, reducing deposits of such products in landfills or farms and obtaining a production of electricity.

WASTE TO ENERGY

Louis Berger has worked in the field of obtaining energy by using waste as raw material of processing.

Several systems have been designed through which it is used the fuel rejection of recycling plants for urban solid waste power generation, establishing a process to obtain power consisting on integrating various processes such as reception, storing and feeding of garbage, fuel residue incineration (FRI), heat recovery and generating steam by using the energy of the exhaust gas, treatment of exhaust gases and fly ashes, use of a steam turbine to obtain energy using steam at high outlet pressure of the boiler, etc.
ALTERNATIVE ENERGY

INDUSTRIAL DEVELOPMENT OF JATROPHA CROPS. ANDALUSIA, SPAIN

AGRICULTURAL CONDITIONS ANALYSIS FOR THE DEVELOPMENT OF BIOMASS AND BIOFUEL CROPS. ECTABIO

COMBINED CYCLE POWER PLANT, EL SALVADOR

FOUNDATIONS AND PIPING “PISZ GAS PLANT” IN PISZ, POLAND

Biomass Gasification Units. ALENTEJO, PORTUGAL

Biomass installation improvement in the Multipurpose Civic Center and Municipal Library in Begues. CATALONIA, SPAIN

Biomass installation improvement in the Multipurpose Civic Center and Municipal Library in Begues. CATALONIA, SPAIN

Energy Recovery Plant of the Environmental Complex in San Miguel de Meruelo. CANTABRIA, SPAIN