WASTE
MANAGEMENT
FACILITIES

Reference book
WASTE MANAGEMENT FACILITIES

Reference book
3 Waste Management Activities

3.1. Waste-to-Energy Plants
3.2. MSW Treatment Plants
3.3. C&D Waste Treatment Plants
3.4. WWTP Sludge Plants
3.5. Electronic Waste Treatment Plants
3.6. Used Tyres Recycling Plants
3.7. Biomass Energy Plants
3.8. Thermosolar Plants
3.9. Industrial Sludge Energy Plants
1.1. Business Activity

**Sacyr** is a multinational infrastructures and services company committed to innovation and international expansion.

A world leader in the building and management of infrastructures and industrial projects, and services.

**Sacyr Construcción**, with its technical and technological capacity, allows the Group to tackle highly complex projects requiring first-class staff and technology. This is amply demonstrated by contracts such as the Panama Canal, the Sants-La Sagrera tunnel in Barcelona for the high speed railway to France, the Sacyr Tower in Madrid (236 meters), etc.

**Sacyr Concesiones** occupies the 6th place in the world ranking of managers of concessions of transport infrastructures of PWF, with 37 concessions distributed throughout 9 countries (Spain, Portugal, Chile, Colombia, Italy, Ireland, Mexico, Peru, Paraguay and Uruguay) including motorways concessions (more than 4,120 kilometers), hospitals (more than 2,200 beds), transportation hubs and metro lines.

**Sacyr Industrial** activity meets all the experience and The Group’s ability to design and build a wide variety of facilities and industrial plants (waste treatment and energy recycling plants, conventional generation, co-generation plants, electrical sub-stations, Oil & Gas Infrastructures and facilities, etc.).
Among the services provided by the group, through its subsidiary Valoriza, are included those related to a complete water cycle management where Valoriza Agua is the largest Spanish company in this sector by capacity of desalinated water; development of mining projects; environmental services (complete management of different types of waste and street cleaning); complete servicing and maintenance of infrastructures, properties and health centers, catering services (road, hospitals, government agencies and transportation hubs), among others.
1.2. Highlights

58 Facilities Constructed

+5.2 Million tonnes of waste processed

41 Facilities under Operation

34 MSW Recycling Facilities

18 Waste-to-Energy Facilities

405 MW in Waste-to-Energy Generation

+5.4 Million Customers

9 Commingled Recycling Facilities
1.3. Value Drivers

**International market growing**, led by environmental (waste treatment), water (desalination plants) and energy segments (cogeneration, biomass, etc.)

**Recurring and stable cash flow** thanks to diversification of Valoriza activities and operating cash flows from concessions.

**Proven capacity** for contracting and developing new profitable businesses, leveraging (i) the technical capacity of VSM, (ii) the competitiveness generated by integration with other Sacyr Group activities, and (iii) international access to different markets where the Sacyr Group operates.

**Focus on profitable growth** with limited capital intensity: plants with public-sector financing, environmental services, engineering, etc.

**Growth in the Spanish market** (environmental services and multi-services) and abroad (engineering/turnkey construction projects, desalination, etc.)

**Contribution to financing future** growth through rotation of mature assets.
1.4. Capabilities

Company Resources

2,448 employees: 100 master’s degrees in engineering, 114 bachelors’ degrees (6 years), 67 bachelor degree (3 years), 102 administrative

Technical staff in Engineering Design and Construction area, Mechanical Engineering, Architecture, Civil Engineering, Biology, Environmental Sciences, Agronomic Engineering, Construction, Mining, Industrial Chemistry, Topography, etc.

113 Branches of VSM (91) and Consortiums (22)
1.5. Strategic Positioning

**Leadership**
Valoriza develops its activity in areas that require technical experience and high qualification, with limited competition. Therefore, these are sectors of appropriate profitability (desalination plants, incinerators and waste treatment plants, thermosolar, cogeneration and biomass, etc…). Order backlog of 12 b Euros focus on long term contracts and limited volatility sectors.

**Presence in high growth markets**
Increasing due to relevance of environmental activities supported by strengthened legal requirements and evolving corporate responsibility. Strong and proven internationalization potential in water management activities. We are present in Mediterranean countries (the last one Israel), Brazil and Australia. Leading player in the emerging renewable energies. Identified profitable growth opportunities in the multiservice sector (i.e. social and elderly services) / Energy service company.

**Outstanding growth track record coupled with operational efficiency**
Significantly above market average organic growth delivered over the recent past (22.3% revenue CAGR) Strategic decision to promote partnerships with local players has resulted in a key growth driver.

**Committed and experienced management team**
Highly experienced, committed and reputable management team. Strong technical and commercial expertise of the intermediate management levels.

Outstanding growth track record leveraging on management’s understanding of market dynamics and key constituencies.
### Municipal Solid Waste Mechanical-Biological Treatment Plant

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity (t/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quart de Poblet (Valencia-Spain)</td>
<td>400,000</td>
</tr>
<tr>
<td>Miramundo (Cádiz-Spain)</td>
<td>275,000</td>
</tr>
<tr>
<td>La Paloma (Madrid-Spain)</td>
<td>255,500</td>
</tr>
<tr>
<td>Arico II (Tenerife-Spain)</td>
<td>240,000</td>
</tr>
<tr>
<td>Armulaza (Bilbao-Spain)</td>
<td>180,000</td>
</tr>
<tr>
<td>Jerez de la Frontera (Cádiz-Spain)</td>
<td>180,000</td>
</tr>
<tr>
<td>Gomecillo (Salamanca-Spain)</td>
<td>170,000</td>
</tr>
<tr>
<td>Villamediana de Iregua (La Rioja-Spain)</td>
<td>130,000</td>
</tr>
<tr>
<td>SE Melbourne (Australia)</td>
<td>120,000</td>
</tr>
<tr>
<td>Zonzamas I (Lanzarote-Spain)</td>
<td>75,000</td>
</tr>
<tr>
<td>Salto del Negro II (Gran Canaria-Spain)</td>
<td>75,000</td>
</tr>
<tr>
<td>Talavera de la Reina (Toledo-Spain)</td>
<td>70,000</td>
</tr>
<tr>
<td>Lipor (Oporto-Portugal)</td>
<td>60,000</td>
</tr>
<tr>
<td>Abajas (Burgos-Spain)</td>
<td>58,000</td>
</tr>
<tr>
<td>Toledo (Toledo-Spain)</td>
<td>52,000</td>
</tr>
<tr>
<td>Granollers (Barcelona-Spain)</td>
<td>45,000</td>
</tr>
<tr>
<td>Aranda de Duero (Burgos-Spain)</td>
<td>35,000</td>
</tr>
<tr>
<td>Serín (Asturias-Spain)</td>
<td>30,000</td>
</tr>
<tr>
<td>Colmenar Viejo (Madrid-Spain)</td>
<td>25,000</td>
</tr>
<tr>
<td>Trigueros (Huelva-Spain)</td>
<td>25,000</td>
</tr>
<tr>
<td>Arenas de San Pedro (Ávila-Spain)</td>
<td>20,000</td>
</tr>
<tr>
<td>Molins de Rei (Barcelona-Spain)</td>
<td>20,000</td>
</tr>
<tr>
<td>Tárrega (Lleida-Spain)</td>
<td>10,000</td>
</tr>
<tr>
<td>Alt Urgell i la Cerdanya (Lleida-Spain)</td>
<td>10,000</td>
</tr>
<tr>
<td>Salamanca (Salamanca-Spain)</td>
<td>5,000</td>
</tr>
<tr>
<td>El Majano (El Hierro-Spain)</td>
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### Waste to Energy Plants

<table>
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<tr>
<th>Location</th>
<th>Capacity (t/year)</th>
</tr>
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<tbody>
<tr>
<td>Macau (China)</td>
<td>300,000</td>
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<tr>
<td>Mataró (Barcelona-Spain)</td>
<td>190,000</td>
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<tr>
<td>Funchal (Madeira-Portugal)</td>
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### Controlled Landfills

<table>
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<th>Capacity (t/year)</th>
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<tbody>
<tr>
<td>Jerez de la Frontera (Cádiz-Spain)</td>
<td></td>
</tr>
<tr>
<td>Miramundo (Cádiz-Spain)</td>
<td></td>
</tr>
<tr>
<td>Valdementígomez (Madrid-Spain)</td>
<td></td>
</tr>
</tbody>
</table>

### Commingled Recyclables Plants

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity (t/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colmenar Viejo (Madrid-Spain)</td>
<td>25,000</td>
</tr>
<tr>
<td>Trigueros (Huelva-Spain)</td>
<td>25,000</td>
</tr>
<tr>
<td>Molins de Rei (Barcelona-Spain)</td>
<td>20,000</td>
</tr>
<tr>
<td>Villamediana de Iregua (La Rioja-Spain)</td>
<td>10,000</td>
</tr>
<tr>
<td>Salamanca (Salamanca-Spain)</td>
<td>5,000</td>
</tr>
<tr>
<td>Jerez de la Frontera (Cádiz-Spain)</td>
<td>5,000</td>
</tr>
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</table>
### Organic Fraction of MSW

#### Anaerobic Digestion Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Paloma (Madrid - Spain)</td>
<td>140,000</td>
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<tr>
<td>Villamediana de Iregua (La Rioja - Spain)</td>
<td>75,000</td>
<td></td>
</tr>
<tr>
<td>Zonzamas II (Lanzarote - Spain)</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Granollers (Barcelona - Spain)</td>
<td>45,000</td>
<td></td>
</tr>
<tr>
<td>Gomecello (Salamanca - Spain)</td>
<td>45,000</td>
<td></td>
</tr>
<tr>
<td>Salto del Negro II (Gran Canaria - Spain)</td>
<td>37,000</td>
<td></td>
</tr>
<tr>
<td>Serin (Asturias - Spain)</td>
<td>30,000</td>
<td></td>
</tr>
<tr>
<td>Mataró (Barcelona - Spain)</td>
<td>30,000</td>
<td></td>
</tr>
</tbody>
</table>

### Construction & Demolition Waste Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcores (Sevilla - Spain)</td>
<td>760,000</td>
<td></td>
</tr>
<tr>
<td>Arganda del Rey (Madrid - Spain)</td>
<td>450,000</td>
<td></td>
</tr>
<tr>
<td>Vitoria (Álava - Spain)</td>
<td>300,000</td>
<td></td>
</tr>
<tr>
<td>Navalcarnero (Madrid - Spain)</td>
<td>200,000</td>
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</table>

### WWTP Sludge Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>ERAR Sur (Madrid - Spain)</td>
<td>290,000</td>
<td></td>
</tr>
<tr>
<td>Sant Adria del Besos (Barcelona - Spain)</td>
<td>230,000</td>
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</tr>
<tr>
<td>ERAR de Butarque (Madrid - Spain)</td>
<td>110,000</td>
<td></td>
</tr>
<tr>
<td>Reocin (Cantabria - Spain)</td>
<td>52,500</td>
<td></td>
</tr>
<tr>
<td>Loeches (Madrid - Spain)</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Guadalete (Jerez - Spain)</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Alcalá de Gurrea (Huesca - Spain)</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Cuesta de Burgos (Burgos - Spain)</td>
<td>44,000</td>
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### Food and Yard Waste Treatment Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>SE Melbourne (Australia)</td>
<td>120,000</td>
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</tr>
<tr>
<td>Lipor (Oporto - Portugal)</td>
<td>60,000</td>
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### Electronic Waste Treatment Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Náquera (Valencia - Spain)</td>
<td>30,000</td>
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</tbody>
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### Used Tyres Recycling Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiloeches (Guadalajara - Spain)</td>
<td>30,000</td>
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</table>

### Biomass Energy Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oleextra (Málaga - Spain)</td>
<td>150,000</td>
<td></td>
</tr>
<tr>
<td>Linares (Jaén - Spain)</td>
<td>110,000</td>
<td></td>
</tr>
<tr>
<td>Mengíbar (Jaén - Spain)</td>
<td>90,000</td>
<td></td>
</tr>
<tr>
<td>Puente Genil (Córdoba - Spain)</td>
<td>80,000</td>
<td></td>
</tr>
<tr>
<td>Extragol (Málaga - Spain)</td>
<td>70,000</td>
<td></td>
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</tbody>
</table>

### Industrial Sludge Energy Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (t/year)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Las Villas (Jaén - Spain)</td>
<td>300,000</td>
<td></td>
</tr>
<tr>
<td>Pata de Mulo (Córdoba - Spain)</td>
<td>150,000</td>
<td></td>
</tr>
<tr>
<td>Puente de Obispo (Jaén - Spain)</td>
<td>150,000</td>
<td></td>
</tr>
<tr>
<td>Linares (Jaén - Spain)</td>
<td>150,000</td>
<td></td>
</tr>
<tr>
<td>La Roda (Sevilla - Spain)</td>
<td>60,000</td>
<td></td>
</tr>
<tr>
<td>TYPE</td>
<td>SITE</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>INCINERATION and ENERGY RECOVERY</td>
<td>MATARÓ (BARCELONA-SPAIN)</td>
<td>Construction of the MBT plant, retrofitting, waste to energy process and operation during 15 years (2010-2024).</td>
</tr>
<tr>
<td>and INCINERATION from MSW</td>
<td>MADEIRA (PORTUGAL)</td>
<td>Construction and operation during 5 years of a waste to energy plant (2002-2007).</td>
</tr>
<tr>
<td></td>
<td>MACAU (CHINA)</td>
<td>Construction and operation during 5 years of a waste to energy plant (2004-2009).</td>
</tr>
<tr>
<td>THERMO SOLAR</td>
<td>LEBRIJA (SEVILLA-SPAIN)</td>
<td>Thermoelectric solar plant for electricity production with cylinder-parabolic technology.</td>
</tr>
<tr>
<td>and THERMAL ENERGY RECOVERY OF BIOMASS</td>
<td>LINARES (JAÉN-SPAIN)</td>
<td>Construction and operation of co-generation plant with combined cycle and electric generation from Biomass of Linares.</td>
</tr>
<tr>
<td></td>
<td>PATA DE MULO (CÓRDOBA-SPAIN)</td>
<td>Construction and operation of treatment plant and integral reduction of products provided from olive industry, with cogeneration in combined cycle and electric generation from Biomass origin.</td>
</tr>
<tr>
<td></td>
<td>LA RODA (SEVILLA-SPAIN)</td>
<td>Design, construction and operation of a waste treatment with co-generation plant.</td>
</tr>
<tr>
<td></td>
<td>LAS VILLAS (JAÉN-SPAIN)</td>
<td>Design, construction and operation of a waste treatment with co-generation plant.</td>
</tr>
<tr>
<td></td>
<td>PUENTE DEL OBISPO (JAÉN-SPAIN)</td>
<td>Design, construction and operation of a waste treatment with co-generation plant.</td>
</tr>
<tr>
<td></td>
<td>SANTA CRUZ (BOLIVIA)</td>
<td>Design and construction of a generation plant with electric generation in the refinery facility for the State Company YPFB Refinación S.A.</td>
</tr>
<tr>
<td></td>
<td>COCHABAMBA (BOLIVIA)</td>
<td>Design, construction and operation of a waste treatment with co-generation plant.</td>
</tr>
<tr>
<td>Project Description</td>
<td>Location</td>
<td>Power</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Zonzamas I and II (Lanzarote-Spain)</td>
<td>Design, construction and start-up of anaerobic digestion, composting and landfill deposit plant of Environmental Complex in Zonzamas.</td>
<td>1.2 MW</td>
</tr>
<tr>
<td>Salto del Negro (Grana Canarias-Spain)</td>
<td>Design, construction and start-up of anaerobic digestion plant and SORTING plant “all-in-one” of Environmental Complex in Salto de Negro.</td>
<td>1.2 MW</td>
</tr>
<tr>
<td>Gomecello (Salamanca-Spain)</td>
<td>Construction of a mechanical-biological treatment plant with anaerobic processes.</td>
<td>1.0 MW</td>
</tr>
<tr>
<td>Mataró (Barcelona-Spain)</td>
<td>MSW mechanical-biological treatment plant in Integral Centre of Waste Valorization Construction and operation during 15 years.</td>
<td>1.6 MW</td>
</tr>
<tr>
<td>Granollers (Barcelona-Spain)</td>
<td>Anaerobic Digestion plant for MSW organic fraction.</td>
<td>1.2 MW</td>
</tr>
<tr>
<td>La Zoreda (Asturias-Spain)</td>
<td>Anaerobic Digestion plant for MSW organic fraction.</td>
<td>6.0 MW</td>
</tr>
<tr>
<td>La Paloma (Madrid-Spain)</td>
<td>Design, construction and operation of anaerobic digestion plant for organic waste and biogas treatment plant for its use as fuel in public transport.</td>
<td>3.3 MW</td>
</tr>
<tr>
<td>Valdemingómez (Madrid-Spain)</td>
<td>Sealing and MSW landfill deposit degasification, with energetic valorization of biogas.</td>
<td>18.0 MW</td>
</tr>
<tr>
<td>Calahorra (La Rioja-Spain)</td>
<td>MSW landfill deposit degasification, with energetic valorization of biogas generated.</td>
<td>0.5 MW</td>
</tr>
<tr>
<td>Miramundo (Cádiz-Spain)</td>
<td>Design, construction and maintenance of installation for degasification of landfill deposit.</td>
<td>3.0 MW</td>
</tr>
<tr>
<td>Biomeruelo (Cantabria-Spain)</td>
<td>Design, construction and maintenance of installation for degasification of landfill deposit.</td>
<td>3.0 MW</td>
</tr>
<tr>
<td>Artigas (Bilbao-Spain)</td>
<td>Installation of landfill deposit degasification.</td>
<td>1.5 MW</td>
</tr>
<tr>
<td>Serrallarga (Lleida-Spain)</td>
<td>Installation of landfill deposit degasification.</td>
<td>0.5 MW</td>
</tr>
<tr>
<td>TYPE</td>
<td>SITE</td>
<td>DESCRIPTION</td>
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<tr>
<td>-------------------</td>
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</tr>
<tr>
<td>ENERGY RECOVERY</td>
<td>LINARES (JAÉN-SPAIN)</td>
<td>Design, construction and operation of electric energy production plant from Biomass.</td>
</tr>
<tr>
<td>from Biomass</td>
<td>PUENTE GENIL (CÓRDOBA-SPAIN)</td>
<td>Design, construction and operation of electric energy production plant from Biomass.</td>
</tr>
<tr>
<td></td>
<td>EXTRAGOL (MÁLAGA-SPAIN)</td>
<td>Design, construction and operation of electric energy production plant from Biomass.</td>
</tr>
<tr>
<td></td>
<td>OLEXTRA (MÁLAGA-SPAIN)</td>
<td>Design, construction and operation of waste treatment plant with cogeneration.</td>
</tr>
<tr>
<td></td>
<td>MENGÍBAR (JAÉN-SPAIN)</td>
<td>Heat and cold production for climatization of business park through Biomass boiler, absorption cold machine.</td>
</tr>
<tr>
<td>THERMAL DRYING</td>
<td>SANT ADRIÁ DEL BESÓS (BARCELONA-SPAIN)</td>
<td>Construction and operation of thermal drying plant of biosolids.</td>
</tr>
<tr>
<td>of SLUDGE from WWTP</td>
<td>BUTARQUE (MADRID-SPAIN)</td>
<td>Construction and operation of thermal drying plant of biosolids.</td>
</tr>
<tr>
<td></td>
<td>ERAR SUR (MADRID-SPAIN)</td>
<td>Construction and operation of thermal drying plant of biosolids.</td>
</tr>
<tr>
<td></td>
<td>LOECHES (MADRID-SPAIN)</td>
<td>Construction and operation of sludge treatment plant, with composting and thermal drying.</td>
</tr>
<tr>
<td></td>
<td>REOCÍN (CANTABRÍA-SPAIN)</td>
<td>Construction and operation of biosolids thermal drying plant.</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td><strong>TOTAL POWER GENERATION</strong></td>
</tr>
</tbody>
</table>
2. Research and Development Projects

The “Valoriza Technology for the Environment” Chair at the Polytechnic University of Madrid (since June 2010) guarantees the performance of Research and Development projects through a public private partnership.

The main objective of this Chair is the development and innovation of environmental technologies, especially those related to recycling and recovery with biological processes of MSW and others waste streams.

- Research project for the development of a wet pretreatment process in the anaerobic digestion of MSW.
- R&D of a new intelligent robotic system applied to biological mechanical treatment in MSW plants.
- R&D work on comprehensive management of building waste. Development of pilot preclassification systems at waste plants prior to recycling. Research into new sustainable uses for the products.
- Development of dynamic composting tunnel system as an alternative to the traditional static tunnel system.
- Development of systems to upgrade construction and demolition waste and MSW and use it as an alternative at cement plants.
- Development of grinding technologies for high-quality tyre dust. Application of tyre dust for use on asphalt road surfaces.
- Project for research and development of systems to upgrade paper waste via cocomposting, thermal drying and sealing of landfills.
- R&D project to develop a system to separate unsuitable material (sand and glass) from the organic fraction in order to optimize the anaerobic digestion process.
- Research project to optimize technology and develop new industrial applications for material from used tyres.
- R&D concerning an inertization process for incinerator fly ashes.
3. Waste Management Activities

- **Municipal Solid Waste**
  - Waste-to-Energy Plants
  - Municipal Solid Waste Mechanical Biological Treatment (MBT) Plants
  - Organic Fraction of MSW Anaerobic Digestion Plants
  - Organic Fraction of MSW Composting Plants
  - Commingled Recyclables Sorting Plants
  - Landfilling, including Landfill Gas Control and Valorization

- **Construction and Demolition Waste Plants**

- **WWTP Sludge Plants**

- **Electric & Electronic Waste Treatment Plants**

- **Used Tyres Recycling Plants**

- **Biomass Plants**

- **Thermosolar Plants**

- **Industrial Sludge Energy Plants**
Mechanical and Biological Treatment Plant (MBT) with Waste to Energy Process

Mataró
Barcelona - Spain

Process
- Design, construction and operation for MSW treatment and waste-to-energy Plant of Maresme
- Client: “Consorci per al Tractament de Residus Solids Urbans del Maresme”
- Mechanical pre-treatment of MSW
- Composting line of the Organic fraction
- Anaerobic Digestion (wet) of biodegradable organic fraction
- Thermal valorization of reject from MBT plant
- Guarantee of compliance with EU 2000/76/EC guideline for waste incineration

Time Schedule
- Construction: From May 2007 to Jun 2011
- Commencement of Operation: Jan 2010
- End of Operation: Dec 2024

Main technical data
- Recycled material: 16,000 t/year
- Compost production: 27,000 t/year
- Thermal Treatment Power Generation: 96 GWh/y
- Anaerobic Digestion Power Generation: 13 GWh/y
- Photovoltaic Power Generation: 0.4 GWh/y
Funchal
Madeira - Portugal

- 2 incineration lines of MSW with a unitary capacity of 8 t/h per line
- 2 incineration lines of medical waste with a unitary capacity of 500 kg/h per line
- Guarantee of compliance with EU 2000/76/EC guideline for waste incineration
- 1 composting line of 60 t/day
- Landfill deposit

Time Schedule
- Commencement of Operation: Dec 2003
- End of Operation: Dec 2008

Macau
China

Client:
Government of the Macao Special Administrative Region

Service:
Provision of Operation and Maintenance Services

Treatment Capacity
- Vapour production: 84 m³/h
- Energy production: 100 Gwh/year

Time Schedule
End of Operation: Dec 2004

- 2 incineration lines of MSW with a unitary capacity of 8 t/h per line
- 2 incineration lines of medical waste with a unitary capacity of 500 kg/h per line
- Guarantee of compliance with EU 2000/76/EC guideline for waste incineration
- 1 composting line of 60 t/day
- Landfill deposit

Time Schedule
- Commencement of Operation: Dec 2003
- End of Operation: Dec 2008
Power Capacity

18 MW

Treatment Capacity

21.7 million tonnes from MSW landfill

Valdemingómez
Madrid - Spain

- Electricity generation capacity achieved from landfill biogas
- 8 generators of 2.12 MW each
- Steam boiler and turbine of 1.96 MW
- Total energy generated: 140 GWh/year
- Sealing and degasification of 120 ha controlled landfill

Time Schedule

- Construction: From Jun 2002 to Jun 2003
- Commencement of Operation: Jun 2003
- End of Operation: Jun 2017
Hornillos Mechanical-Biological Treatment Plant (MBT) for Mixed MSW

Quart de Poblet
Valencia - Spain

Process
- 4 Separation sorting lines for MSW and 1 treatment line for medical waste
- Fermentation process in controlled enclosed tunnels
- Automatic maturation park
- Works and installations financed by Valoriza

Time Schedule
- Construction: From Jul 2005 to Jul 2010
- Commencement of Operation: Feb 2005
- End of Operation: Jul 2025

Capacity of treatment:
- 400,000 t/year of mixed MSW

Recycled Material:
- 25,000 t/year

Compost production:
- 35,000 t/year
Melbourne Mechanical-Biological Treatment Plant (MBT) for MSW

SE Melbourne
Australia

Process
- Organics Processing Facility
- Mechanical treatment and in-vessel composting tunnels of source separated organic fraction
- Municipal Food waste and Yard waste

Time Schedule
- Construction: From Mar 2017 to Feb 2019
- Projected commencement of operation: Mar 2019
- End of Operation: Mar 2034
Mechanical-Biological Treatment Plant (MBT) for Municipal Waste

**Armulaza**
**Bilbao - Spain**

**Time Schedule**
- Construction: **From Oct 2010 to Dec 2013**
- Commencement of Operation: **Jan 2014**
- End of Operation: **Jan 2029**

**Process**
- Recycling, Anaerobic Digestion (dry) and Composting for 130,000 t/year of MSW and 10,000 t/year of commingled recyclables
- Technological and Technical modernization of the MSW processing plant

**Design + Construction + O&M**
(15 years)

**Contract**

**Capacity of Treatment**
130,000 t/year of Mixed MSW

**Inhabitants**
550,000

**550,000**
Inhabitants Bilbao municipality and surroundings

**Villamediana de Iregua**
**La Rioja - Spain**

**Process**
- Recycling, Stabilization and SRF Preparation for 180,000 t/year of Mixed MSW

**Capacity of Treatment**
130,000 t/year of Mixed MSW

**Inhabitants**
320,000

**320,000**
Inhabitants La Rioja Region

**Contract**

**Design + Construction + O&M**
(15 years)

**Contract**

**Design + Construction + O&M**
(20 years)

**Mechanical-Biological Treatment Plant (MBT) for Municipal Waste in La Rioja (La Rioja Ecopark)**

**Time Schedule**
- Construction: **From Aug 2009 to Jul 2011**
- Commencement of Operation: **Aug 2009**
- End of Operation: **Aug 2029**

**Process**
- Recycling, Anaerobic Digestion (dry) and Composting for 130,000 t/year of MSW and 10,000 t/year of commingled recyclables
- Technological and Technical modernization of the MSW processing plant

**Inhabitants**
550,000

**550,000**
Inhabitants Bilbao municipality and surroundings
La Paloma
Madrid - Spain

Process
- Anaerobic Digestion (dry) of organic fraction: 140,000 t/year
- Classification of source separated commingled: 54,750 t/year
- Composting of organic fraction: 131,400 t/year

Time Schedule
- Construction: From Jul 2005 to Jun 2007
- Commencement of Operation: Jan 2003
- End of Operation: Dec 2022
Mechanical-Biological Treatment (MBT) Plant for Municipal Waste

Miramundo
Cádiz - Spain

Process
- Recycling, Composting, Landfilling of MSW
- Recycled material: 53,000 t/year
- Compost production: 18,000 t/year
- Gas flow: 11.5 million Nm3/year

Time Schedule
- Construction: From Jul 1998 to May 2003
- Commencement of Operation: Jul 1998
- End of Operation: Jul 2028

500,000 Inhabitants
Cádiz, San Fernando and 16 other municipalities

Design + Construction + O&M
(20 years)

Treatment Capacity
275,000 t/year

6 MSW Treatment Plants
Jerez de la Frontera
Cádiz - Spain

Process
- Pressing, baling and transporting of Rejects
- Classification of source separated commingled: 5,000 t/year

Time Schedule
- Commencement of Operation: Apr 2003
- End of Operation: Apr 2023

MSW Recycling and Composting
180,000 t/year

488,000 Inhabitants
Jerez de la Frontera and the entire northern area of the province of Cádiz

Contract
O&M
(20 years)
MSW Recycling, Composting, Anaerobic Digestion and Elimination Plant

Gomecello
Salamanca - Spain

Process
- Anaerobic digestion (wet) of organic fraction (35,000 t/y)
- Aerobic composting tunnels
- Landfill deposit with approx. capacity of 1,000,000 m³

Time Schedule
- Construction: From Apr 2003 to Jan 2007

Plant Capacity
170,000 t/year

Inhabitants
420,000 Salamanca province

Contract
Design + Construction
Cogersa Anaerobic Digestion Plant of Source Separated Organic Fraction of MSW

Serín
Asturias - Spain

Process
- Source Selected OFMSW Recycling, anaerobic digestion (wet) and composting

Time Schedule
- Construction: From Sept 2009 to Nov 2013

Vallés Oriental Anaerobic Digestion Plant of Source Separated Organic Fraction of MSW

Granollers
Barcelona - Spain

Process
- Source Selected OFMSW Recycling, anaerobic digestion (wet) and composting

Time Schedule
- Construction: From Jul 2008 to May 2011
Zonzamas-I and Zonzamas-II Composting Plant and Anaerobic Digestion of MSW

Lanzarote
Canary Islands - Spain

- Anaerobic digestion (wet) of MSW (organic fraction) and sludge organic fraction (30,000 t/y)
- Reception and preparation of WWTP sludge from sewage treatment (6,000 t/y)
- Mechanical dehydration (103,000 t/y)
- Energy valorization of generated biogas

Time Schedule
- Construction: From May 2000 to Aug 2001 (Zonzamas I)
  From Aug 2001 to Dic 2003 (Zonzamas II)

Plant Capacity
50,000 t/year
and
75,000 t/year

130,000 Inhabitants

Contract
Design + Construction
Mechanical-Biological Treatment Plant (MBT) for Municipal Waste in Burgos

**Abajas**
Burgos - Spain

**Process**
- MSW Recycling and Composting (52,000 t/year) and Source Selected commingled (3,000 t/year)

**Time Schedule**
- Construction: From Jul 2008 to May 2011
- Commencement of Operation: Apr 2011
- End of Operation: Apr 2014

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Mechanical-Biological Treatment Plant (MBT) for Municipal Waste in Burgos

**Aranda de Duero**
Burgos - Spain

**Time Schedule**
- Commencement of Operation: Jan 2008
- End of Operation: Dec 2022
“MSW” Recycling and Composting Plant

Arenas de San Pedro
Ávila - Spain

Time Schedule
- Commencement of Operation: Jun 2008
- End of Operation: Jun 2016

Process
- Sorting and anaerobic treatment (wet) of MSW and WWTP sludge organic fraction
- Sludge reception and conditioning line (6,000 t/y)
- Biogas operation (1,370 kWe)

14 MSW Treatment Plants

Recycling, and Composting for 20,000 t/year

50,000 Inhabitants
Province of Ávila

Contract O&M (8 years)

Salto del Negro Anaerobic Digestion and MSW Classification Plant

Las Palmas de Gran Canaria
Canary Islands - Spain

Time Schedule
- Construction: From Jan 2005 to Nov 2007

Process
- Sorting and anaerobic treatment (wet) of MSW and WWTP sludge organic fraction
- Sludge reception and conditioning line (6,000 t/y)
- Biogas operation (1,370 kWe)

15 MSW Treatment Plants

Plant Capacity 75,000 t/year

380,000 Inhabitants

Contract Design + Construction

Recycling, and Composting for 20,000 t/year

50,000 Inhabitants
Province of Ávila

Contract O&M (8 years)
Arico I and Arico II Waste Sorting Plants of Commingled Recyclables

Tenerife
Canary Islands - Spain

Process
- Recycling and Sorting, according to ECOEMBES specifications

Time Schedule
- Construction: From Aug 2008 to May 2011

Source Separated Organic Fraction Composting Plant

Lipor
Porto - Portugal

Process
- Primary and Secondary Mechanical Treatment
- Organic Recovery - Composting And Biological Treatment Tunnels

Time Schedule
- Commencement of Operation: 2004
- End of Operation: 2024
Talavera de la Reina
Toledo - Spain

Process
- MSW Recycling and Composting, Sorting of Packaging Waste and 2 Transfer Stations

Time Schedule
- Construction: From Aug 2001 to Dic 2002

Toledo
Spain

Process
- MSW recycling, Composting in tunnels, Sorting of used packages and end disposal landfill

Time Schedule
- Construction: From Oct 2000 to Apr 2003
Source Separated Organic Fraction and WWTP Sludge Composting Plant

Tárrega, Alt Urgell
Lleida - Spain

Process
- Composting

Time Schedule
- Construction: From Mar 1999 to Jan 2000
- Commencement of Operation: Feb 2001

Waste Sorting Plant for Source Separated Commingled

Molins de Rei
Barcelona - Spain

Process
- Recycling and Sorting, according to ECOEMBES specifications

Time Schedule
- Construction: From Mar 1999 to Jan 2000
- Commencement of Operation: Feb 2001
Colmenar viejo
Madrid - Spain

**Time Schedule**
- **Construction:** From Jul 1997 to Jul 1999
- **Commencement of Operation:** Jul 1999
- **End of Operation:** Jul 2012

**Process**
- Recycling and Classification, according to ECOEMBES specifications
- **Plant Capacity:** 25,000 t/year

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Salamanca
Spain

**Time Schedule**
- **Construction:** From May 2001 to Mar 2002
- **Commencement of Operation:** Mar 2003
- **End of Operation:** Aug 2008

**Process**
- Recycling and Classification, according to ECOEMBES specifications
- **Plant Capacity:** 5,000 t/year of commingled recyclables

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**Contract**
- **Design + Construction + O&M**
  - 13 years
- **Design + Construction + O&M**
  - 4 years

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**Inhabitants**
- **680,000**
  - Alcobendas, San Sebastián de los Reyes and 40 more municipalities of northern Madrid
- **420,000**
  - Salamanca province
**Process**
- Composting and refinement plant of organic fraction of mixed MSW

**Municipalities and Population Served**
- El Hierro Island (Canary Island)
Construction and Demolition Waste Treatment Plant

Arganda del Rey
Madrid - Spain

Process
- Recycling and Recovery from C&D waste

Time Schedule
- Construction: From Jul 2007 to Oct 2009
- Commencement of Operation: Oct 2009
- End of Operation: Oct 2013

Plant Capacity
- 450,000 t/year

Community of Madrid

3.5 million Inhabitants

Contract
- Design + Construction + O&M (4 years)
Construction and Demolition Waste Treatment Plant

Vitoria Gasteiz
Spain

Process
- Recycling and Recovery from C&D waste

Time Schedule
- Construction: From May 2006 to Apr 2007
- Commencement of Operation: May 2007
- End of Operation: May 2022

Plant Capacity
300,000 t/year

1,000,000 Inhabitants

Contract
Design + Construction + O&M (15 years)
Construction and Demolition Waste Treatment Plant and Controlled Landfill

Alcores
Sevilla - Spain

Process
- Recycling and Recovery from C&D waste
- Controlled Landfill

Time Schedule
- Construction: From Feb 2005 to Jul 2005
- Commencement of Operation: Jul 2005
- End of Operation: Jul 2025

Plant Capacity
760,000 t/year

1,000,000 Inhabitants

Contract
Design + Construction + O&M (20 years)
Navalcarnero
Madrid - Spain

Process
- Recycling and Recovery from C&D waste
- Controlled Landfill

Municipalities and Population Served
- Southwest region of the Community of Madrid

Time Schedule
- Construction: From Sept 2003 to Sept 2005
Guadalete Plant
Jerez - Spain

Production data
- Composting: 50,000 t/year
- Compost Production: 10,000 t/year

Time Schedule
- Duration of Construction: From Apr 1993 to Feb 1994
- Commencement of Operation: Mar 1994
- End of Operation: Mar 2016

Cuesta de Burgos Plant
Burgos - Spain

Production data
- Composting: 38,472 t/year
- Agricultural application: 4,848 t/year
- Compost Production: 7,694 t/year

Time Schedule
- Duration of Construction: From Nov 1995 to Jan 1997
- Commencement of Operation: Feb 1997
- End of Operation: Jul 2014
Loeches
Madrid - Spain

- Type of drying: indirect convection
- Compost Production: 28,950 t/year

Time Schedule
- Commencement of Operation: Apr 2011
- End of Operation: May 2015

Sant Adrià del Besòs
Barcelona - Spain

Process
- Drying process: Thermal Drying at Low Temperature (80°C)
- Evaporation capacity: 12.0 t/hour
- Max. Dry biosolids production: 92,500 t/year
Thermal “WWTP” Sludge Drying Energy Plant

Erar Sur
Madrid - Spain

- Type of drying: Indirect convection
- 1 gas turbine of 25.08 MW
- Constant operation with min. 8,000 h/year

Time Schedule
- Construction: From May 1999 to Oct 2000
- Commencement of Operation: Jul 2001
- End of Operation: Oct 2026

Reocín
Santander - Spain

- Dry matter: 23 %
- Lines of drying: 2
- Motors (Of Natural Gas): 2

Time Schedule
- Construction: From Dec 2006 to Dec 2008
- Commencement of Operation: Jan 2009
- End of Operation: Jun 2014
Ehar Butarque (Madrid-Spain). Thermal "WWTP"
Sludge Drying Energy Plant

Ehar Butarque
Madrid - Spain

Characteristics
- Number of lines: 2
- Type of drying: Indirect convection with total condensation

Installed Power
- Max. production of dry biosolids (90% dry matter): 28,300 t/year

Time Schedule
- Construction: From Nov 2000 to Dec 2002
- Commencement of Operation: Apr 2003
- End of Operation: Dec 2028
Náquera
Valencia - Spain

Process
- Storage and transportation to treatment and sorting
- Treatment of plastics
- Treatment of cathode ray tubes (CRT)
- Treatment of computer equipment: computers, printers, scanners
- Treatment of consumer devices: TV video

Municipalities and Population Served
- Valencia (720 Units/year)
Built & Operate Project Used Tyres Recycling Plant

Chiloeches
Guadalajara - Spain

Process
- Primary shredding
- Size reducing in secondary processing
- Granulation (grinding) process

Time Schedule
- Construction: From Oct 2008 to Jun 2009
- Commencement of Operation: Jul 2009
- End of Operation: Mar 2020
Electric Energy Production Plant by Biomass

Linares  
Jaén - Spain

Boiler
- Technology: Refrigerated grill
- Steam production: 69 t/h
- Cycle yield: 22.5%
- Fuel: Biomass from olive oil industry

Steam turbine
- Nominal power: 15 MW

Annual production data
- Energy generated: 112,500 MWh/y
- Energy introduced to the network: 101,250 MWh/y
- Energy consumed from the network: 11,250 MWh/y
- Consumption of auxiliaries: 11,250 MWh/y

Time Schedule
- Construction: From Nov 2007 to Feb 2010
- Commencement of Operation: Mar 2010
- End of Operation: Mar 2035

Treatment Capacity
110,000 t/year

Power Capacity
25 MW

Contract
Design + Construction + O&M (25 years)
Puente Genil
Córdoba - Spain

- Energy generated: **69,000 MWh**
- Energy introduced to the network: **64,170 MWh/y**
- Energy consumed from the network: **300 MWh/y**
- Consume of auxiliars: **4,830 MWh/y**

**Boiler**
- Technology: Grill
- Steam production: **41.6 t/h**
- Cycle yield: **22.5 %**
- Fuel: Biomass from olive oil industry

**Steam turbine**
- Nominal power: **9.8 MW**

**Time Schedule**
- Construction: From Mar 2005 to Jun 2007
- Commencement of Operation: Jul 2007
- End of Operation: Jul 2032
Extragol
Málaga - Spain

Boiler
- Steam production: 41.6 t/h
- Fuel: Biomass from olive oil industry

Steam turbine
- Nominal power: 8.9 MW

Annual production data
- Energy generated: 63,785 MWh/y
- Energy introduced to the network: 57,407 MWh/y
- Energy consumed from the network: 200 MWh/y
- Consumption of auxiliaries: 6,379 MWh/y

Time Schedule
- Construction: From Sept 2000 to Dec 2002
- Commencement of Operation: Jan 2003
- End of Operation: Feb 2014

Contract
Design + Construction + O&M (11 years)

Treatment Capacity
70,000 t/year

Nominal Power
8.9 MW
Plant of Sludge Thermal Drying With Cogeneration in Combined Cycle and Electric Generation from Biomass

Oleextra
Málaga - Spain

- Operation of installation: 8,410 h/year
- Operation of dryers: 5,832 h/year
- Consumption of gas turbine: 32,718 thm
- Electric power of turbine: 12,704 kW
- Average power of auxiliars: 600 kW
- Gross yield (average): 38.5 %
- Net yield (average): 36.9 %

Time Schedule
- Construction: From Jul 2001 to Dec 2002
- Commencement of Operation: Jan 2003
- End of Operation: Feb 2014
Mengíbar
Jaén - Spain

- 2 shell boilers of Biomass of 3,000 kW each
- 3 groups of absorption cooling of 2,000 kW each
- Network of isolated pipes for heat and cold within the business park
- Temperature of hot water provided: **150ºC**
- Temperature of cold water provided: **7ºC**

Consumption data with planned occupancy of the park:
- Heat consumed: **1,708,400 kWh/y**
- Cold consumed: **3,608,320 kWh/y**
- Gas consumed: **2,459 t/year**

Time Schedule
- Construction: From Nov 2008 to Dec 2009
- Commencement of Operation: Jan 2010
- End of Operation: Jan 2035
Solucia Renovables I Thermoelectric Solar Plant for Electricity Production with Cylinder-Parabolic Technology

Lebrija
Sevilla - Spain

- Occupied surface: 200 ha
- Surface of mirrors: 400,000 m²

Annual production data
- Energy supplied to network: 117,500 MWh/y
- Equivalent hours of annual production: 2,350 h/y

Time Schedule
- Construction: From Sept 2009 to Aug 2011
- Commencement of Operation: Sept 2011
- End of Operation: Sept 2036

Energy Generated
131,250 MWh/y

Nominal Power
50 MW

Contract
Design + Construction + O&M (25 years)
Linares
Jaén - Spain

Motors
- Number of motors: 3
- Electric power per motor: 8.33 MW
- Guaranteed yield: 43.7 %

Annual production data
- Energy generated: 200,000 MWh/y
- Energy introduced into the network: 193,000 MWh/y
- Energy consumed by auxiliaries: 7,000 MWh/y
- Gas consumption: 500,000 MWh/y

Time Schedule
- Construction: From Nov 2007 to Apr 2009
- Commencement of Operation: May 2009
- End of Operation: May 2034
Thermal Drying of Alperujo Plant by Cogeneration

Pata de Mulo
Córdoba - Spain

- Energy generated: 112,4 MWh/y
- Energy introduced into the network: 108,830 MWh/y
- Energy consumed by auxiliaries: 4,134 MWh/y
- Consumption of Gas Turbines: 328,488 MWh/y

Technical data
- Electric power of turbine gas: 13 MW
- Max. Electric power of steam turbine: 4 MW
- Total electric power of the plant: 17 MW
- Electric yield guaranteed for turbine gas: 33.5 %
- Electric yield of the cycle: 39.0 %

Annual production data
- Energy generated: 112,964 MWh/y
- Energy introduced to the network: 108,830 MWh/y
- Energy consumed in auxiliaries: 4,134 MWh/y
- Consumption of Gas Turbines: 328,488 MWh/y
- Thermal drying Capacity: 150,000 t/year

Time Schedule
- Construction: From Aug 2003 to Jan 2005
- Commencement of Operation: Feb 2005
- End of Operation: Feb 2030
Latex, Sevilla - Spain

Motors
- Number of motors: 3
- Electric power per motor: 2.734 MW
- Guaranteed yield: 41%

Annual production data
- Energy generated: 62,080 MW
- Energy introduced into the network: 58,399 MWh/y
- Energy consumed by auxiliaries: 3,681 MWh/y
- Gas consumption: 172,444 MWh/y

Time Schedule
- Construction: From Sept 2002 to Feb 2004
- Commencement of Operation: Mar 2004
- End of Operation: Mar 2029
Alperujo Sludge Treatment and Reduction Plant with Cogeneration

Las Villas
Jaén - Spain

- 8 dryers with max. Capacity of 12,000 t/h
- Installation operation: 8,322 h/year
- Dryers operation: 5,400 h/year
- Gas turbines fuel consumption: 59,129 thm
- Electric power of turbine: 24,977 kW
- Average power of auxiliares (1.8%): 450 kW
  - Gross yield (average): 36.4%
  - Net yield (average): 35.7%

Time Schedule
- Construction: From Dec 2006 to May 2008
- Commencement of Operation: Jun 2008
- End of Operation: Jun 2033
Cogeneration Plant with Alperujo Thermal Drying
Puente del Obispo
Jaén - Spain

- Energy generated: 200,000 MWh/y
- Energy introduced in network: 189,322 MWh/y
- Energy consumed in auxiliaries: 8,000 MWh/y
- Gas consumption: 511,326 MWh/y

Number of motors: 3
- Electric power per motor: 8.33 MW
- Total electric power of the plant: 25 MW
- Guaranteed yield: 43.4%

Time Schedule
- Construction: From Sept 2005 to Feb 2007
- Commencement of Operation: Mar 2007
- End of Operation: Mar 2032