Session Bioenergy Production in Rural Areas: creation of a biomass market in Mediterranean areas and regions with declining water resources

Biomass power plants to produce electricity

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1. Introduction
1.1 Introduction

- Dalkia Group is one of the **leading players** rendering **energy services** in Europe. The Group, is owned by Veolia Environnement (66%) and EDF (34%)
  - It is present in **42 countries**
  - It has reported a total turnover of **€8,600 mn** in 2010
  - It employs over **53,000 people**
  - DG has more than 250 biomass power plants in operation and maintenance globally
  - Dalkia manages more than 2 M tones of biomass annually
- Its Spanish subsidiary, **Dalkia España**, is undertaking an ambitious expansion plan within its biomass unit, which consists of **developing 9 biomass power plants** ranging from 10 MWe to 16 MWe **totalling 126 MWe** that will be fully operational by 2017
  - EPC and O&M contracts to be provided by Dalkia
2. What is Dalkia?
2.1. Dalkia at a glance (i)

Dalkia is a global leading energy solutions provider that is present in all the value chain.
2.1. Dalkia at a glance (ii)

Revenue breakdown by Region

- Europe: 90%
- Americas: 7%
- Asia-Pacific: 2%
- Africa, Middle East: 1%

Total 2010 €8.614 mn

Revenue breakdown by Business

- Thermal: 35%
- Heating & cooling: 13%
- Industrial utilities: 6%
- Public lighting: 6%
- Building management: 6%
- Installations: 6%
- Industrial maintenance: 1%

Total 2010 €8.614 mn
2.1. Dalkia at a glance (iii)

Dalkia is a global leading player in energy efficiency resulting from a partnership involving two Tier-I European Utilities
2.3. International presence

### Facilities managed globally
- Housing units managed: 5,679,364
  - Total: 5,679,364
  - France: 10,6%
  - Development: 39,8%
  - Proxiserve: 19,3%
  - Northern Europe: 29,1%
  - South: 1,1%

- Healthcare institutions: 6,159
  - Total: 6,159
  - France: 9,5%
  - Development: 49,1%
  - Proxiserve: 29,7%
  - Northern Europe: 8,7%
  - South: 2,9%

- Educational and sport facilities: 23,786
  - Total: 23,786
  - France: 19,9%
  - Development: 63,0%
  - Proxiserve: 7,5%
  - Northern Europe: 8,3%
  - South: 1,3%

- Industrial facilities: 4,505
  - Total: 4,505
  - France: 21,8%
  - Development: 47,4%
  - Proxiserve: 13,2%
  - Northern Europe: 10,5%
  - South: 7,1%

### International presence
- Dalkia’s presence: Global Leader: 42 countries
2.4. Dalkia in Spain

Dalkia has a broad presence within the Spanish market with over 20 regional offices throughout the country.
2.4. Dalkia Spain

Dalkia’s activities in Spain

€412 mn Revenue in 2010
4.307 MW Thermal installed capacity
3.045 Employees
3,84 mn of m² managed
8.008 Installations under management

Revenue breakdown

By Business segment
- Healthcare: 45.90%
- Facilities: 51.80%
- Industrial: 11.5%
- H & C industrial utilities: 6.5%
- Industrial mantainance: 1.24%
- Building management: 1.47%

By Client
- Services: 35.2%
- Housing: 42.0%
- Public entities: 5.0%
- Industrial: 11.5%
- Healthcare: 6.5%
3. Dalkia Biomass capabilities
3.1. Dalkia biomass capabilities (i)

1. 255 Biomass installations – 1.325 MW as of 2010

2. 103 Biomass Power Plants under development (1)

3. 2 million tons of biomass managed annually

**Wood energy installation capacity**

- Capacity (MW)
  - Total 1.325 MW

**Wood energy installation units**

- Number
  - Total 255

(1) As of 2009
3.2. Dalkia biomass capabilities

Dalkia services cover the whole biomass energy value chain
### 3.3. Dalkia selected Biomass credentials (i)

#### 1. PECS (Hungary)

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Heat &amp; Cooling network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>PECS (162,500 people)</td>
</tr>
<tr>
<td>Facilities</td>
<td>Thermal capacity: 160 MW Electrical power: 50 MWe Steam production: 200 t/h at 99°C and 540°C Technologies: BFB (Kvaerner)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dalkia services</th>
<th>Power plant operations</th>
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<tbody>
<tr>
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<td>Network management</td>
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| Fuel                   | Chips (100%)            |

#### 2. Vilnius (Lithuania)

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Heat &amp; Cooling network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>Vilnius (542,000 people)</td>
</tr>
<tr>
<td>Facilities</td>
<td>Thermal capacity: 62 MW Electrical power: 12 MWe Steam production: 78 t/h at 40°C and 450°C Technologies: BFB (Kvaerner)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dalkia services</th>
<th>Construction of the power plant</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Power plant operations</td>
</tr>
<tr>
<td></td>
<td>Supply operations for 140,000 dwellings</td>
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</table>

| Fuel                   | Chips (70%)                      |
### 3.3. Dalkia selected Biomass credentials (ii)

#### 3 Smurfit Kappa (France)

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Industrial cogeneration</th>
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</thead>
<tbody>
<tr>
<td>Client</td>
<td>Smurfit Kappa</td>
</tr>
<tr>
<td>Facilities</td>
<td>Thermal capacity: 130 MW Electrical power: 47 MWe Steam production: 180 t/h at 120b and 520°C Technologies: BFB (KVAERNER)</td>
</tr>
<tr>
<td>Dalkia services</td>
<td>Construction of the power plant Power plant operations Network management</td>
</tr>
<tr>
<td>Fuel</td>
<td>Chips/Bark</td>
</tr>
</tbody>
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#### 4 Masisa (Chile)

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Industrial cogeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>Masisa Cabrero</td>
</tr>
<tr>
<td>Facilities</td>
<td>Thermal capacity: 51MW Electrical power: 8,8MWe Steam production: 26 t/h at 45b and 430 °C Technologies: spread stocker &amp; travelling grate (Gotakverken)</td>
</tr>
<tr>
<td>Dalkia services</td>
<td>Construction of the power plant Power plant operations Network management</td>
</tr>
<tr>
<td>Fuel</td>
<td>Chips + sawdust + bark (100%)</td>
</tr>
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</table>
### 3.3. Dalkia selected Biomass credentials (iii)

#### Tallinn (Estonia)

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<thead>
<tr>
<th>Type of facility</th>
<th>Heat &amp; Cooling network</th>
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</thead>
<tbody>
<tr>
<td>Client</td>
<td>Tallinn (430,000 people)</td>
</tr>
</tbody>
</table>
| Facilities       | Thermal capacity: 75MW  
                    Electrical power: 25.4MWe  
                    Steam production: 110b and 530 °C  
                    Technologies: BFB (Noviter) |
| Dalkia services  | Construction of the power plant  
                    Power plant operations  
                    District Heat & Cooling network for 128,777 dwellings |
| Fuel             | Chips (90%) |

#### Boras (Sweden)

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<tr>
<th>Type of facility</th>
<th>Heat &amp; Cooling network</th>
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</thead>
<tbody>
<tr>
<td>Client</td>
<td>Boras (62,000 people)</td>
</tr>
</tbody>
</table>
| Facilities       | Thermal capacity: 130MW  
                    Electrical power: 45MWe  
                    Steam production: 180 t/h at 50b and 400°C  
                    Technologies: spread stocker & travelling grate (Gotakverken) |
| Dalkia services  | Construction of the power plant  
                    District Heat & Cooling network for 50,000 dwellings |
| Fuel             | Chips (100%) |
4. Biomass sector in Spain
Strong growth potential as biomass energy generation in Spain is currently unemployed (3% of total renewable energies), while Spain is the third EU country by forestall area subject to be used for biomass energy generation.
4.1. Snapshot of the Spanish biomass sector (ii)

Current situation & future perspective

- The Ministry of Industry of Spain is implementing several measures to foster biomass energy and maintain price visibility, vis a vis other actions taken towards other renewable energy sources.

- High barriers to entry: installing a biomass power plant is complex and requires a lot of expertise, experience, and access to the fuel.

Installed capacity evolution (MW) and power plants evolution (Units)

*Solid biomass installed capacity of 533MW as of 2010 out of 1.350 MW 2020 target from Spanish regulatory bodies*
5. Feedstock supply
5.1. The importance of feedstock

1. Complex biomass supply
2. Know-how required
3. Logistics are key
4. Specific regulation
5. Investments required to grow crops

Feedstock supply is critical to the development of the biomass Project and an appropriate strategy is fundamental for its success.
5.2. Our feedstock supply strategy (i)

Broad experience in Biomass has lead Dalkia to achieve an optimal supply strategy

Biomass supply

- **Forestry energy crops**
  - **Tariff**: b.6.1
  - **Supplier**: Dalkia
  - **Length**: 25
  - **Price**: CPI Indexed

- **Agricultural energy crops**
  - **Tariff**: b.6.1
  - **Supplier**: Specialist
  - **Length**: 15
  - **Price**: CPI Indexed

- **Agricultural waste**
  - **Tariff**: b.6.2
  - **Supplier**: Local
  - **Length**: 1-5 years
  - **Price**: CPI Indexed/Open market

- **Forestry waste**
  - **Tariff**: b.6.3
  - **Supplier**: Local
  - **Length**: 1-5 years
  - **Price**: Open market

**Guaranteed supply flexibility**:
1. Diversification
2. Guarantee supply
3. Supply flexibility
4. Vertical integration
5. Price control
## 5.2. Our feedstock supply strategy (ii)

### Goals of the supply strategy

<table>
<thead>
<tr>
<th>1</th>
<th>Diversification</th>
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<tbody>
<tr>
<td></td>
<td>No dependence on any particular source of biomass</td>
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<tr>
<th>2</th>
<th>Guarantee supply</th>
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<tr>
<td></td>
<td>Long term contracts with Dalkia Biomasa and biomass specialist suppliers (framework agreement)</td>
</tr>
<tr>
<td></td>
<td>Establishment of penalties (bank warranty) in case of no supply</td>
</tr>
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<td>Establishment of stepping rights in favor of the SPV in case of liquidation</td>
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<th>3</th>
<th>Supply flexibility</th>
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<td>In case of efficiency improvements (less biomass required), up to 1/3 of supply is purchased at open market</td>
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<th>4</th>
<th>Vertical integration</th>
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<td>Capability to exploit Dalkia Biomass’ rights on forestry energy crops</td>
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<th>5</th>
<th>Price control</th>
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<td>Through long term contracts and opportunistic purchases at open market</td>
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6. Project Cieza
### 5.2. Project Cieza (i)

**Current Development stage:**

**In process**

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<tr>
<th><strong>REGISTERED NAME:</strong></th>
<th>Ecoenergías de la Vega del Segura</th>
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<tbody>
<tr>
<td><strong>SHAREHOLDERS STRUCTURE:</strong></td>
<td>Dalkia España and subsidiaries (99,5%)&lt;br&gt;ARGEM (0,5%)</td>
</tr>
<tr>
<td><strong>POWER:</strong></td>
<td>16 MWe</td>
</tr>
<tr>
<td><strong>ACCESS AND CONNECTION:</strong></td>
<td>SE Cieza (Iberdrola)</td>
</tr>
<tr>
<td><strong>TYPES OF FUEL:</strong></td>
<td>Acacia, poplar and pine tree (b.6.1.)&lt;br&gt;Fruit tree pruning. Agricultural waste (b.6.2.)&lt;br&gt;Pine tree. Forestry waste (b.6.3.)&lt;br&gt;Annual supply 140,000 Tn/yr</td>
</tr>
<tr>
<td><strong>MAIN BIOMASS SUPPLIERS:</strong></td>
<td>Local suppliers&lt;br&gt;Dalkia Biomass</td>
</tr>
</tbody>
</table>
5.3. Project Cieza(ii)
5.4. Project Cieza(iii)  Example design: Engabiomasa
Thank you!