Implementing WtE plant in an integrated waste management system in Gipuzkoa (Autonomous region located in the north of Spain)

Gipuzkoa’s Environmental Complex
Introduction

GHK is the public company in charge of MSW management in Gipuzkoa (an autonomous community located in the north of Spain, 720,000 inhabitants).

We manage:

- 140,000 tn/year of **refuse** (container and door to door collection)
- 50,000 tn/year of selectively collected **organic bio – waste** (container and door to door collection)
- 25,000 tn/year of selectively collected **packaging** (container and door to door collection)
- Paper/carboard and glass are collected separately and managed by dedicated channels for these flows.

Closure of the last landfill in 2016, due to an inefficient management of the political party governing of that moment, placed Gipuzkoa in an urgent situation having nowhere to send 140,000 t/year of waste

- Urgently had to contract landfills far from us at a high economic and environmental cost and design asap new treatment facilities
Policy drivers that supported the development of the facilities

In deciding what type of infrastructure to design, different aspects were taken into account:

- **Currently no incentives for energy sales:** Until 2013 they were direct premiums for renewable energies but since then the regulations changed and it is no longer granted to all facilities. The current real situation is that only wind and photovoltaics are receiving subsidies so the waste thermal processes sell the electricity to the normal electric pool.

However..

**European and National Waste Regulations are clear in their objectives:**

- **Recycling rate** of 50% by 2020 and up to 65% in 2035
- Mandatory a progressive reduction of *landfilling* of waste, up to a landfill ban (**maximum 10%**) by 2035.
- Need to **follow waste hierarchisation** + people totally against landfilling

**Final solution ---►**

Pretreatment to recycle as much as possible + Thermal treatment (WtE for MSW and Biomethanation for municipal organic waste)

Minimise landfilling!
Phase 1: Mechanical treatment + biodrying + WtE plant

Private – Public Partnership (35 year):
Gipuzkoa´s Environmental Complex

Process: recovery of recyclable items by means of mechanical treatment (magnet, foucault, optical, separators, …)

Mechanical treatment

- Elimination of bulky items
- Segregation at source really good at Gipuzkoa but they are still present some recyclable material in the income to the Plant.

<table>
<thead>
<tr>
<th>RECYCABLE % IN THE INPUT WASTE</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>PET</td>
<td>1.77</td>
</tr>
<tr>
<td>HDPE</td>
<td>0.82</td>
</tr>
<tr>
<td>PLASTIC MIX</td>
<td>5.64</td>
</tr>
<tr>
<td>FILM</td>
<td>1.5</td>
</tr>
<tr>
<td>BRICKS</td>
<td>1.03</td>
</tr>
<tr>
<td>FERROUS</td>
<td>2.43</td>
</tr>
<tr>
<td>ALUMINIUM</td>
<td>0.48</td>
</tr>
<tr>
<td>PAPER/CARDBOARD</td>
<td>8.83</td>
</tr>
</tbody>
</table>

Recovery of about 7-9% of the total inlet to the plant
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...reduction in water and weight and increased LHV thanks to biodrying, ...

**Biodrying**

- Evaporation by fermentation
- Volume reduction (minimum weight loss of 25%)
- Increase the LHV up to 2850Kcal/kg
Waste-to-Energy plant (2 x 12.5 t/h lines = 200,000 t/year)

- Waste combustion by means of an air-cooled grate furnace
- High efficiency of the water steam cycle (R1:0,85)
- Dry treatment of combustion gases in two stages
- Minimum Waste Generation
Phase 2: Bottom ash maturation plant + organic waste biomethanation

Private – Public Partnership (20 years):
Engineering and construction September 2018– October 2019. Since then, under operation
European Waste Management

Municipal waste treatment in 2018
EU 28 + Switzerland, Norway and Iceland

Countries to emulate

Source: Eurostat
Gipuzkoa’s waste management at the level of the most developed countries

<table>
<thead>
<tr>
<th>Category</th>
<th>EU targets 2020</th>
<th>Total recycling</th>
<th>Bio-waste</th>
<th>Packaging</th>
<th>Paper &amp; Cardboard</th>
<th>Glass</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU targets 2020</td>
<td>50%</td>
<td>50%</td>
<td>70%</td>
<td>70%</td>
<td>75%</td>
<td></td>
</tr>
</tbody>
</table>

Since 2019 we have already reached the overall European targets
With the implementation of the new facilities, all our municipal waste is recovered:

<table>
<thead>
<tr>
<th>Pretreatment plant (CMG 1)</th>
<th>plastics, bricks, metals, … (5-9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WtE plant (CMG 1)</td>
<td>50% renewable energy</td>
</tr>
<tr>
<td>Bottom ash maturation Plant (CMG 2)</td>
<td>Aggregates</td>
</tr>
<tr>
<td>Biomethanation Plant (CMG 2)</td>
<td>Renewable energy and fertilizers</td>
</tr>
</tbody>
</table>

Other additional plants:

<table>
<thead>
<tr>
<th>Packaging recovery plant</th>
<th>plastics, bricks, metals, …</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composting plant (Epele)</td>
<td>Compost</td>
</tr>
</tbody>
</table>
Thank you for your attention!

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