PUBLIC PRIVATE PARTNERSHIPS FOR IMPLEMENTING ORGANIC WASTE TREATMENT PROJECTS: EXPERIENCE IN VIÑA DEL MAR, CHILE

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THE CASE OF VIÑA DEL MAR

- One of the top tourist destinations in Chile.
- Prioritized by the Chilean government to become a pilot city on waste management over 5 years ago.
- Not having a local disposal site available, collection and disposal costs are high.
- Joined the CCAC in 2013 to analyze different options to improve waste management, with a focus on organic waste.

CITY FACTS
Population: ≈ 330,000
Waste Generation Rate: ≈ 1.1 kg/person/day
Waste Collection Rate: ≈ 99%
OBJECTIVE AND ACTIVITIES UNDER CCAC

• **Objective:**
  – Support Viña del Mar to improve their waste management and reduce GHG emissions, advancing a project to an implementation-ready stage.

• **Activities:**
  – Analyze technological alternatives for organic waste management and select the most appropriate one.
  – Develop a basic design of the pilot project, including an initial financial analysis, business model and implementation plan.
## ORGANIC WASTE AVAILABLE

- **Projected capture rate:**

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Households</th>
<th>Hotels &amp; Restaurants</th>
<th>Markets</th>
<th>Wineyards and other agro-industrial sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term (2020 – 2025)</td>
<td>40%</td>
<td>80%</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>Medium-term (2026 – 2030)</td>
<td>70%</td>
<td>90%</td>
<td>90%</td>
<td>95%</td>
</tr>
<tr>
<td>Long-term (2031 – 2040)</td>
<td>90%</td>
<td>95%</td>
<td>95%</td>
<td>99%</td>
</tr>
</tbody>
</table>

**Total**

- **2020:** 50,566 TPA = 139 TPD
- **2030:** 104,709 TPA = 287 TPD
- **2040:** 170,947 TPA = 468 TPD
After careful consideration, anaerobic digestion was the selected technology.

In consultation with the Municipality, it was decided that two utilization options for biogas would be investigated in detail:

- Production of combined heat and power (CHP).
- Production of substitute natural gas (SNG), which could be used as a clean-burning vehicular fuel.
- Both options include composting the remaining digestate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Power (MW)</th>
<th>Electricity to Grid (kWh)</th>
<th>SNG Production (m³/day)</th>
<th>SNG Sold (MMBTU/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>1.3</td>
<td>25,216</td>
<td>8,947</td>
<td>304</td>
</tr>
<tr>
<td>2025</td>
<td>1.5</td>
<td>28,767</td>
<td>10,207</td>
<td>347</td>
</tr>
<tr>
<td>2030</td>
<td>2.7</td>
<td>52,217</td>
<td>18,528</td>
<td>630</td>
</tr>
<tr>
<td>2035</td>
<td>3.8</td>
<td>74,561</td>
<td>26,456</td>
<td>899</td>
</tr>
<tr>
<td>2040</td>
<td>4.4</td>
<td>85,248</td>
<td>30,248</td>
<td>1,028</td>
</tr>
</tbody>
</table>
• The mitigation potential for the CHP project has been estimated at around 300,000 tCO$_2$e during a 20 year period.
The base case scenarios (CHP vs SNG Options) indicate that CHP is more profitable than the SNG Option.

For both Options, compost sale price does not have a big impact on project viability.

Both the sale price of electricity (for the CHP Option) as well as the sale price of SNG (for the SNG Option) have a medium-level impact on project viability, as do operational and maintenance costs.

Initial capital costs have a large impact on project NPV and IRR.

The most significant parameter appears to be the tipping fees.

### Base case scenario

<table>
<thead>
<tr>
<th></th>
<th>Capital Cost (million US$)</th>
<th>NPV (million US$)</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD + CHP</td>
<td>10</td>
<td>10.8</td>
<td>14.53%</td>
</tr>
<tr>
<td>AD + SNG</td>
<td>10</td>
<td>8.9</td>
<td>13.19%</td>
</tr>
</tbody>
</table>
THE CASE FOR A PPP

For the Government:
• Large capital costs.
• Lack of technical expertise in the public sector.
• Large collection and disposal costs.
• Landfill contract negotiations due in 2021.
• Access to low cost compost/fertilizer/electricity.

For the private sector:
• Expertise in the private sector, both international and local (although not with MSW).
• Flexibility in the contracts, allowing the intake of agro-industrial waste to help with homogenization of waste (and potential for larger tipping fees).
• Long term contracts.
• Availability of public land.
• Several local and international developers have shown interest.
• The city is ready to launch a call for proposals for the construction and operation of the plant.
• Tender documents are being developed, expected summer/fall 2018.
KEY LESSONS

• For identifying the right project:
  • Focus on emission reductions from the start looking at what the major sources of organic waste are.
  • Try to ID as soon as possible what are the main sources of emissions in the city:
    • Landfill not collecting gas, outdated and/or inefficient transport, current us of waste, etc.

• For increasing the chances for project implementation:
  • Find a trusted intermediary between public and private parties.
  • Engage large organic waste producers to ensure long term contracts that can “guarantee” the correct functioning of the plant.
For finding the best financing options:

- Engage private sector early in the process:
  - Understand the main barriers to investment they are facing.
  - Usually they have already evaluated the regulations and tariff schemes preventing them from moving forward, and are familiar with the main barriers: guarantee for feedstock, regulations, etc.
- Capabilities and expertise may exist locally, even if they are not in the specific field.
NEXT STEPS

• Replicate the model around the country. After this experience all stakeholders will be better prepared to promote similar projects in other municipalities.
• Create a new market for MSW management.

Upcoming Opportunities

• Canada – Chile collaboration underway, looking at 12 other municipalities to find the best way to deal with organic waste.
• Test MRV approaches to consider the generation of ITMOs.
THANK YOU

For more information, please visit us at www.ccap.org.