Solid recovered fuel production from municipal solid waste: a tourist area plant case study

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OBJECTIVES

- To analyze the selective collection data in the touristic season in comparison to the rest of the year
- To assess the results of the implementation of the new door to door selective collection in touristic area of the principal city of Apulia
- To evaluate the potentiality of enhancing the waste to energy plant efficiency in Apulia
APULIA - Monthly per-capita generation of MSW
H: high season; M: medium season; L: low season.
APULIA - Percentage of Selective Collection
H: high season; M: medium season; L: low season.
APULIA (Taranto)
Residual Municipal Solid Waste and Selective Collection

- Street waste, 75.3%
- Inert, 0.7%
- Others, 2.2%
- Organic, 6.9%
- Paper & Cardboard, 6.4%
- Glass, 2.9%
- Plastic, 1.9%
- Wood, 1.0%
- Metal, 0.2%
- Textils, 0.3%
- WEEE, 0.4%
- Multimaterials, 1.0%
APULIA (Taranto)
Residual Municipal Solid Waste stream composition

- Organic waste, 33.11%
- Packaging waste, 20.63%
- Paper, 14.10%
- Plastic (non-packaging), 6.49%
- Textile, 3.66%
- Inert, 6.78%
- Undersized waste, 6.67%
- Others, 8.56%
Santo Spirito – Bari - Door to Door (83,2%) Touristic quartiers on the sea 2017-2018
Composition of the MSW after the Door to Door SC Percentage on the total SC + RMSW - BARI

<table>
<thead>
<tr>
<th>Material</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIC FRACTION</td>
<td>45.65%</td>
</tr>
<tr>
<td>PAPER</td>
<td>7.77%</td>
</tr>
<tr>
<td>PAPERBOARD</td>
<td>7.66%</td>
</tr>
<tr>
<td>MULTIMATERIALS</td>
<td>10.72%</td>
</tr>
<tr>
<td>GLASS</td>
<td>10.72%</td>
</tr>
<tr>
<td>OTHER</td>
<td>17.48%</td>
</tr>
</tbody>
</table>
Main characteristics of the CISA Ltd plant:
Pre-selection and bio-stabilization for RDF/SRF production.

<table>
<thead>
<tr>
<th>START</th>
<th>July 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days of operation</td>
<td>365 days per year</td>
</tr>
<tr>
<td>Location</td>
<td>Massafra (Taranto)</td>
</tr>
<tr>
<td>Eligible quantities</td>
<td>220.000 tons/year of MSW and 50.000 tons/year of residual dry fraction from ATO/TA3 - Taranto Area</td>
</tr>
<tr>
<td>Eligible EWC (European Waste Codes)</td>
<td>160103; 190501; 191212; 191203; 191204; 191210; 200140; 200203; 200301; 202302; 200303; 200307</td>
</tr>
</tbody>
</table>
CISA Spa plant, Massafra: Pre-selection and bio-stabilization for RDF/SRF production - Process
<table>
<thead>
<tr>
<th>Type of stream</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary input</strong></td>
<td>[tons/year] [%,]</td>
</tr>
<tr>
<td>RMSW stream</td>
<td>160538.4 100</td>
</tr>
<tr>
<td>Unprocessed waste</td>
<td>6384.5 4</td>
</tr>
<tr>
<td><strong>Effective input</strong></td>
<td></td>
</tr>
<tr>
<td>Waste stream input (bio stabilisation)</td>
<td>154153.9 96</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Landfilled waste from the bio stabilisation process</td>
<td>4682.6 3</td>
</tr>
<tr>
<td>Landfilled waste from SRF production line (inert)</td>
<td>75748 49</td>
</tr>
<tr>
<td>Wastewater</td>
<td>2742.3 2</td>
</tr>
<tr>
<td>Recyclable metals</td>
<td>328 0</td>
</tr>
<tr>
<td>Dust from filter sleeves</td>
<td>1.5 0</td>
</tr>
<tr>
<td>Processes losses</td>
<td>20659.5 13</td>
</tr>
<tr>
<td>RDF/SRF stream</td>
<td>49991.7 32</td>
</tr>
</tbody>
</table>
Massafra – MBT Plant
RDF/SRF stream composition

- Undersize, 55.80%
- Cellulose, 20.77%
- Wood, 1.67%
- Plastics, 16.77%
- Textils, 2.89%
- Aluminium, 0.58%
- Inerts, 0.08%
- Others, 1.44%
Appia Energy – Waste to Energy (WtE) Plant in Massafra:

Gross Electric Power: 12,25 MW
Net Electric Power: 10 MW
Fuel consumption (RDF): 12,5 tons/h
Hours of operations per year: 7,500 h/year
Production of Electric Energy: 75,000,000 kWh/y
Fluidised bed system allows the RDF burning into a fluidised sand layer.

Fluidisation is obtained by air blown from the furnace at the bottom.

High combustion efficiency (over 99%) thanks to simultaneous control of temperature, turbulence and residence time.
CONCLUSIONS

- Importance of adopting an effective campaign of information to implement a good selective collection in tourists area
- Door to door SC data are higher than 80% (2018)
- A change in the composition of MSW after door to door SC has been noted
- Enhancing SC better performance of WtE plant should be reached
- Well Managed Mechanical Biological Treatment - MBT - and WtE are useful processes to comply with the European Union requirements