ISWA WGER Report
on
Advanced Thermal Treatment Processes

> Status of work <
Status of work

1 Goal and content
2 Target audience
3 Who is behind the report
4 Outline of report
Status of work

1 Goal and content

- Goal: Beware investors / builders / owners from wrong decisions
- Content: Independent expertise about advanced thermal waste treatment
- appendix: list of known plants with advanced treatment
2 Target audience

- Authorities implementing waste management plan
- Private investors in waste disposal market
- PPP
3 Who is behind the report

- ISWA task force
- Specialists from international companies (*)
  > 40 years activity in thermal waste treatment
  (*) independent consulting engineers
  (*) market leader thermal waste treatment systems
Status of work

4 Outline of report

- General introduction
- Technical introduction
  - waste management in general
  - remarks about pretreatment methods
  - system analysis of thermal treatment
  - different conversion systems and how they relate
  - history
  - basic points for assessing technologies
Status of work

waste treatment system

INPUT

- waste
- materials
- energy

Operating resources

- mechanical pre-treatment
- thermal pre-treatment (reductive, e.g. gasification)
- combustion (oxidative)

Energy recovery

- flue gas treatment

OUTPUT

- energy
- valuable materials
- inert materials
- flue gas

Recovered resources
Status of work

- Multistage thermal treatment processes
  - introduction
  - gasification
  - plasma gasification
  - pyrolysis

- General description on mass burning technologies

- General conclusion of technology comparison

- APPENDIX
### Thermo-Select Gasification

<table>
<thead>
<tr>
<th>Process</th>
<th>Type</th>
<th>Region</th>
<th>Plant</th>
<th>Size Type</th>
<th>Waste type</th>
<th>Energy output</th>
<th>Availability</th>
<th>Reliability Status</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>pilot/ind</td>
<td>Fondotoce</td>
<td>110 tpd</td>
<td>municipal</td>
<td>(pilot)</td>
<td>1992 - 1999</td>
<td>out of operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>industrial</td>
<td>Karlsruhe</td>
<td>750 tpd</td>
<td>municipal</td>
<td>boiler and steam turbine</td>
<td>1999-2004</td>
<td>out of operation</td>
<td>moderate technical problems</td>
<td></td>
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<tr>
<td>Germany</td>
<td>sewage sludge</td>
<td>Ansbach</td>
<td>7 - 80 tpy</td>
<td>municipal</td>
<td>3 x 1,5 MW gas engine</td>
<td>never in operation</td>
<td>building constructed</td>
<td>machine technology partly installed</td>
<td></td>
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</tbody>
</table>

### Thermo-Select JFE Gasification

<table>
<thead>
<tr>
<th>Process</th>
<th>Type</th>
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<th>Size Type</th>
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<th>Reliability Status</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>industrial</td>
<td>Chiba (Tokyo)</td>
<td>300 tpd</td>
<td>municipal</td>
<td>syngas used in steel production</td>
<td>since 1999 in operation</td>
<td>the JFE company acquired a ThermoSelect licence and developed the process further</td>
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<tr>
<td>Japan</td>
<td>industrial</td>
<td>Mutsu</td>
<td>140 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2003 in operation</td>
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<td></td>
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<tr>
<td>Japan</td>
<td>industrial</td>
<td>Nagasaki</td>
<td>300 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2005 in operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>industrial</td>
<td>Kurashiki</td>
<td>555 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2004 in operation</td>
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<td></td>
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<tr>
<td>Japan</td>
<td>industrial</td>
<td>Yorii</td>
<td>400 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2006 in operation</td>
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<td></td>
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<tr>
<td>Japan</td>
<td>industrial</td>
<td>Tokushima</td>
<td>120 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2005 in operation</td>
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<tr>
<td>Japan</td>
<td>industrial</td>
<td>Osaka</td>
<td>95 tpd</td>
<td>municipal</td>
<td>syngas</td>
<td>since 2004 in operation</td>
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</table>

### WGM Gasification

<table>
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</thead>
<tbody>
<tr>
<td>Italy</td>
<td>special wastes (plastics, tyres, syngas)</td>
<td>Malagrotta, Rome</td>
<td>75'000 tpy</td>
<td>special wastes (plastics, tyres, syngas)</td>
<td>tot energy eff.: 21 %</td>
<td>design availability 7500 hpy</td>
<td>too expensive for municipal waste</td>
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### Destrugas Pyrolysis

<table>
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<th>Availability</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>test plant</td>
<td>Kolding</td>
<td>5 tpd</td>
<td>municipal</td>
<td>gas</td>
<td>1967</td>
<td>out of operation</td>
<td>stack furnace principle</td>
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