Energy from Waste Reference Projects
by Hitachi Zosen since 2000
in chronological order
**JP, Mito, Ibaraki**

- **Start of operation:** 2020
- **Combustion Concept:** Air-cooled Grate
- **Fuel:** Municipal Solid Waste
- **Number of Lines:** 3
- **Throughput per line:** 4.58 t/h

**JP, Yokosuka, Kanagawa**

- **Start of operation:** 2020
- **Combustion Concept:** Air-cooled Grate
- **Fuel:** Municipal Solid Waste
- **Number of Lines:** 3
- **Throughput per line:** 5.00 t/h

**TR, Istanbul**

- **Start of operation:** 2019
- **Combustion Concept:** Air-cooled Grate
- **Fuel:** Hospital Waste, Municipal Solid Waste
- **Number of Lines:** 3
- **Throughput per line:** 46.00 t/h
- **Thermal power per line:** 86.81 MW
- **Boiler Concept:** 5-pass boiler
- **Steam:** 111 t/h at 72 bar(a) and 426 °C
- **Flue gas treatment Concept:** SNCR, Entrainment reactor, Fabric Filter
- **Reactant:** Calcium Hydroxide, Activated Carbon
- **Throughput per line:** 173,720 m³/h (STP)

**CN, Shunde**

- **Start of operation:** 2019
- **Combustion Concept:** Air-cooled Grate
- **Fuel:** Municipal Solid Waste
- **Number of Lines:** 4
- **Throughput per line:** 35.42 t/h
- **Energy recovery Output Electrical Power:** 77.21 MW (gross)

*by Hitachi Zosen since 2000*
CN, Jimo
Start of operation: 2019
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 3
Throughput per line: 12.50 t/h

CN, Tancheng
Start of operation: 2019
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 1
Throughput per line: 16.70 t/h

JP, Kyoto (Nambu No.2)
Start of operation: 2019
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 2
Throughput per line: 10.42 t/h
Thermal power per line: 39.06 MW
Energy recovery Output: Electrical Power

JP, Nagano, Nagano
Start of operation: 2019
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 3
Throughput per line: 5.60 t/h
Thermal power per line: 17.90 MW
Energy recovery Output: Electrical Power

TH, WPP Phetchaburi
Start of operation: 2019
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 1
Throughput per line: 19.83 t/h
Energy recovery Output: Electrical Power
GB, Ferrybridge Multifuel 2 (FM2)

Start of operation: 2019
Combustion Concept: Water-cooled Grate
Fuel: Municipal Solid Waste, Refuse Derived Fuel
Number of Lines: 2
Throughput per line: 42.26 t/h
Thermal power per line: 117.7 MW
Boiler Concept: 5-pass boiler
Steam: 145 t/h at 73 bar(a) and 430 °C
Flue gas treatment Concept: SNCR, Fabric Filter, Semi-dry System
Reactant: Calcium Hydroxide, Activated Carbon
Throughput per line: 238'866 m³/h (STP)
Energy recovery Concept: Condensation Turbine
Electric power output: 79.17 MW (gross)

GB, Edinburgh

Start of operation: 2018
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste, Refuse Derived Fuel
Number of Lines: 1
Throughput per line: 24.00 t/h
Thermal power per line: 50.00 MW
Boiler Concept: 6-pass boiler
Steam: 64 t/h at 60 bar(a) and 400 °C
Flue gas treatment Concept: Entrainment reactor, Fabric Filter
Reactant: Calcium Hydroxide, Activated Carbon
Throughput per line: 103'178 m³/h (STP)
Energy recovery Concept: Condensation Turbine
Electric power output: 12.49 MW (gross)

CN, Laohuchong

Start of operation: 2018
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste
Number of Lines: 4
Throughput per line: 31.25 t/h

CN, Changsha

Start of operation: 2018
Combustion Concept: Air-cooled Grate
Fuel: Refuse Derived Fuel, Municipal Solid Waste
Number of Lines: 6
Throughput per line: 35.42 t/h
Energy recovery Output: Electrical Power
<table>
<thead>
<tr>
<th>Location</th>
<th>Compost Concept</th>
<th>Fuel Type</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
<th>Start of Operation</th>
<th>Digestion Details</th>
<th>Waste Type</th>
<th>Throughput per Year</th>
<th>Biogas Utilisation</th>
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<td>CN, Rénhuái</td>
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<td>Municipal Solid Waste</td>
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<td>50.00 t/h</td>
<td>2018</td>
<td>Combustion Concept</td>
<td>Fuel</td>
<td>Number of Lines</td>
<td>Throughput per line</td>
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<td>FR, Combrand</td>
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<td>Anaerobic Digestion</td>
<td>Number of Digester(s)</td>
<td>Net volume per digester</td>
<td>Digestor Design</td>
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<td>US, San Luis Obispo</td>
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<td></td>
<td>Anaerobic Digestion</td>
<td>Number of Digester(s)</td>
<td>Net volume per digester</td>
<td>Digestor Design</td>
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<td>SE, Högbytorp</td>
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<td></td>
<td></td>
<td></td>
<td>Anaerobic Digestion</td>
<td>Number of Digester(s)</td>
<td>Net volume per digester</td>
<td>Digestor Design</td>
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<tr>
<td>TH, Nong Khai</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>1</td>
<td>15.42 t/h</td>
<td>2018</td>
<td>Combustion Concept</td>
<td>Fuel</td>
<td>Number of Lines</td>
<td>Throughput per line</td>
</tr>
</tbody>
</table>

**FR, Combrand**

- **Start of operation**: 2018
- **Anaerobic Digestion**: Number of Digester(s) 3, Net volume per digester 1300 m³, Digestor Design Concrete, Digestor Type PF1300, Waste Type Solid Manure, Crop Residues, Net Throughput per Year 46000 t/a, Biogas Utilisation Biomethane for gas-grid injection

**US, San Luis Obispo**

- **Start of operation**: 2018
- **Anaerobic Digestion**: Number of Digester(s) 1, Net volume per digester 1800 m³, Digestor Design Steel, Waste Type Bio Waste, Green Waste, Net Throughput per Year 30000 t/a, Biogas Utilisation Combined Heat and Power

**SE, Högbytorp**

- **Start of operation**: 2018
- **Anaerobic Digestion**: Number of Digester(s) 3, Net volume per digester 2100 m³, Digestor Design Steel, Waste Type Bio Waste, Food Waste, Green Waste, Solid Manure, Net Throughput per Year 83050 t/a, Biogas Utilisation Biomethane for gas-grid injection

**TH, Nong Khai**

- **Start of operation**: 2018
- **Combustion Concept**: Air-cooled Grate
- **Fuel Type**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 50.00 t/h
- **Energy recovery Output**: Electrical Power
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Combustion Concept</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
<th>Thermal power per line</th>
<th>Energy recovery Concept</th>
<th>Electric power output</th>
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<tbody>
<tr>
<td>JP, Orii</td>
<td>2018</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
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<td>JP, Yatsushiro, Kumamoto</td>
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<td>Municipal Solid Waste</td>
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<td>2.79 t/h</td>
<td>9.93 MW</td>
<td>Condensation Turbine</td>
<td>2.88 MW (gross)</td>
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<td>13.60 MW</td>
<td>Entrainment reactor, Fabric Filter, SCR Calcium Hydroxide, Activated Carbon</td>
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<td>CN, Pingxiang</td>
<td>2018</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
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<td>16.70 t/h</td>
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<tr>
<td>Location</td>
<td>Start of operation</td>
<td>Combustion Concept</td>
<td>Fuel</td>
<td>Number of Lines</td>
<td>Throughput per line</td>
<td>Energy recovery</td>
<td>Electric Power</td>
<td></td>
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<tr>
<td><strong>CN, Ninghé</strong></td>
<td>2018</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>1</td>
<td>20.83 t/h</td>
<td></td>
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<td><strong>MY, SMART WTE</strong></td>
<td>2018</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>1</td>
<td>25.00 t/h</td>
<td>Condensation Turbine</td>
<td>17.70 MW (gross)</td>
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<td><strong>CN, Déyáng</strong></td>
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<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
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<td>50.00 t/h</td>
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<td><strong>CN, Huairou</strong></td>
<td>2017</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
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<td>12.50 t/h</td>
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<td><strong>CN, Ningbo</strong></td>
<td>2017</td>
<td>Air-cooled Grate</td>
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<td>3</td>
<td>31.25 t/h</td>
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</table>
### CN, Chengdu Wanxing
- **Start of operation**: 2017
- **Combustion**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 4
- **Throughput per line**: 25.00 t/h
- **Thermal power per line**: 48.60 MW
- **Flue gas treatment**: Fabric Filter, SCR, Semi-dry System, SNCR, PAC Entrainment
- **Reactant**: Calcium Hydroxide, Sodium Bicarbonate, Activated Carbon
- **Energy recovery**: Electrical Power

### CN, Yulin
- **Start of operation**: 2017
- **Combustion**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 16.67 t/h

### JP, Joetsu, Niigata
- **Start of operation**: 2017
- **Combustion**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 3.54 t/h
- **Thermal power per line**: 15.60 MW
- **Flue gas treatment**: SNCR, Entrainment reactor, Fabric Filter
- **Reactant**: Calcium Hydroxide, Activated Carbon
- **Throughput per line**: 20'330 m³/h (STP)
- **Energy recovery**: Hot Water, Electrical Power

### CN, Bazhou
- **Start of operation**: 2017
- **Combustion**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 25.00 t/h
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Combustion Concept</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
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<tr>
<td>CN, Muping</td>
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<td>CN, Tonghua</td>
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<td>Municipal Solid Waste</td>
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<td>16.70 t/h</td>
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<td>CN, Meishan</td>
<td>2017</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
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<td>20.83 t/h</td>
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<td>CN, Shijiazhuang</td>
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<td>Municipal Solid Waste</td>
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<td>31.25 t/h</td>
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### IE, Dublin

- **Start of operation**: 2017
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 41.00 t/h
- **Thermal power per line**: 102.5 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 125 t/h at 62 bar(a) and 443 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Scrubber, Semi-dry System
  - **Scrubber Reactant**: Caustic Soda
  - **Reactant**: Lignite Coke, Calcium Hydroxide
- **Throughput per line**: 189’000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Electric power output**: 68.80 MW (gross)
- **Output**: Electrical Power, Hot Water

### CN, Lhasa

- **Start of operation**: 2017
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 14.60 t/h

### CN, Wuhu

- **Start of operation**: 2017
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 25.00 t/h

### CN, Bozhou

- **Start of operation**: 2017
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 12.50 t/h
<table>
<thead>
<tr>
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<th>Combustion Concept</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
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</thead>
<tbody>
<tr>
<td>CN, Kaixian</td>
<td>2017</td>
<td>Air-cooled Grate</td>
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<td>12.50 t/h</td>
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<td>CN, Linqu</td>
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<td>Municipal Solid Waste</td>
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<td>12.50 t/h</td>
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<td>CN, Huaxi</td>
<td>2017</td>
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<td>25.00 t/h</td>
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<td>VN, Hanoi</td>
<td>2017</td>
<td>Rotary Kiln</td>
<td>Industrial Waste</td>
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<td>3.13 t/h</td>
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**GB, Herefordshire and Worcestershire**

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<tr>
<td>Fuel</td>
<td>Municipal Solid Waste</td>
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<tr>
<td>Number of Lines</td>
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<tr>
<td>Throughput per line</td>
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<td>Thermal power per line</td>
<td>67.89 MW</td>
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<td>Boiler Concept</td>
<td>5-pass boiler</td>
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<td>Steam</td>
<td>89 t/h at 60 bar(a) and 415 °C</td>
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<tr>
<td>Flue gas treatment</td>
<td>SNCR, Fabric Filter, Semi-dry System</td>
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<tr>
<td>Reactant</td>
<td>Calcium Hydroxide, Activated Carbon</td>
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<tr>
<td>Throughput per line</td>
<td>126'000 m³/h (STP)</td>
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<tr>
<td>Energy recovery</td>
<td>Condensation Turbine</td>
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<tr>
<td>Electric power output</td>
<td>20.00 MW (gross)</td>
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**CN, Haikou II**

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<th>Start of operation</th>
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<td>Fuel</td>
<td>Municipal Solid Waste</td>
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<tr>
<td>Number of Lines</td>
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<tr>
<td>Throughput per line</td>
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<tr>
<td>Thermal power per line</td>
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<td>Flue gas treatment</td>
<td>Concept</td>
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<td>Throughput per line</td>
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**CN, Guangan**

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<td>Municipal Solid Waste</td>
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<td>Number of Lines</td>
<td>2</td>
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<tr>
<td>Throughput per line</td>
<td>12.50 t/h</td>
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<td>Thermal power per line</td>
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<td>Throughput per line</td>
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**CN, Xiamen (Ruikepang reCulture)**

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<td>Combustion Concept</td>
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<tr>
<td>Fuel</td>
<td>Municipal Solid Waste</td>
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<tr>
<td>Number of Lines</td>
<td>1</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>10.42 t/h</td>
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<tr>
<td>Thermal power per line</td>
<td>24.05 MW</td>
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<tr>
<td>Flue gas treatment</td>
<td>Concept</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>54'257 m³/h (STP)</td>
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**JP, Tokyo (Suginami)**
- **Start of operation**: 2017
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 12.50 t/h
- **Thermal power per line**: 49.70 MW
- **Energy recovery Output**: Hot Water, Electrical Power

**Combustion Concept**
- Air-cooled Grate
- Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 12.50 t/h
- Thermal power per line: 49.70 MW
- Energy recovery Output: Hot Water, Electrical Power

**CN, Zhuhai**
- **Start of operation**: 2016
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 25.00 t/h

**JP, Fujimino, Saitama**
- **Start of operation**: 2016
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 3.00 t/h
- **Thermal power per line**: 10.30 MW

**PL, Poznan**
- **Start of operation**: 2016
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 15.00 t/h
- **Thermal power per line**: 31.50 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 38 t/h at 62 bar(a) and 422 °C
- **Flue gas treatment Concept**: SNCR, Semi-dry System, Fabric Filter
- **Reactant**: Calcium Hydroxide
- **Throughput per line**: 66,000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Electric power output**: 17.30 MW (gross)
- **Output**: Electrical Power, Hot Water
GB, Severnside L1, L2

- Start of operation: 2016
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 24.24 t/h
- Thermal power per line: 62.61 MW
- Boiler Concept: 5-pass boiler
- Steam: 78 t/h at 62 bar(a) and 422 °C
- Flue gas treatment Concept: SNCR, Semi-dry System, Fabric Filter
  Reactant: Calcium Hydroxide
  Throughput per line: 127'000 m³/h (STP)
- Energy recovery Concept: Condensation Turbine
  Electric power output: 37.40 MW (gross)

IN, Essel Jabalpur

- Start of operation: 2016
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 1
- Throughput per line: 25.00 t/h
- Thermal power per line: 47.97 MW
- Boiler Concept: 4-pass boiler
- Steam: 57 t/h at 46 bar(a) and 410 °C
- Flue gas treatment Concept: Evaporation cooler, Fabric Filter
  Reactant: Calcium Hydroxide, Activated Carbon
  Throughput per line: 112'178 m³/h (STP)

TH, Bangkok (Nong Khaem)

- Start of operation: 2016
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 10.40 t/h
- Thermal power per line: 9.40 MW

JP, Tsuyama, Okayama

- Start of operation: 2016
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 2.67 t/h
- Thermal power per line: 9.40 MW
### CN, Wuxi Xidong

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2016</th>
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<td>Combustion Concept</td>
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<td>Number of Lines</td>
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<tr>
<td>Throughput per line</td>
<td>20.83 t/h</td>
</tr>
<tr>
<td>Thermal power per line</td>
<td>38.77 MW</td>
</tr>
<tr>
<td>Flue gas treatment Concept</td>
<td>SNCR, Spray Absorber, Fabric Filter</td>
</tr>
<tr>
<td>Reactant</td>
<td>Activated Carbon, Calcium Hydroxide</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>100'950 m³/h (STP)</td>
</tr>
<tr>
<td>Energy recovery Output</td>
<td>Electrical Power</td>
</tr>
</tbody>
</table>

### CN, Yongji

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustion Concept</td>
<td>Air-cooled Grate</td>
</tr>
<tr>
<td>Fuel</td>
<td>Municipal Solid Waste</td>
</tr>
<tr>
<td>Number of Lines</td>
<td>1</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>10.40 t/h</td>
</tr>
</tbody>
</table>

### PL, Jarocin

<table>
<thead>
<tr>
<th>Anaerobic Digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of operation</td>
</tr>
<tr>
<td>Number of Digester(s)</td>
</tr>
<tr>
<td>Net volume per digester</td>
</tr>
<tr>
<td>Digester Design</td>
</tr>
<tr>
<td>Digester Type</td>
</tr>
<tr>
<td>Waste Type</td>
</tr>
<tr>
<td>Waste Throughput per Year</td>
</tr>
<tr>
<td>Biogas Utilisation</td>
</tr>
</tbody>
</table>

### GB, Buckinghamshire

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustion Concept</td>
<td>Air-cooled Grate</td>
</tr>
<tr>
<td>Fuel</td>
<td>Municipal Solid Waste, Industrial Waste</td>
</tr>
<tr>
<td>Number of Lines</td>
<td>1</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>39.40 t/h</td>
</tr>
<tr>
<td>Thermal power per line</td>
<td>101.7 MW</td>
</tr>
<tr>
<td>Boiler Concept</td>
<td>5-pass boiler</td>
</tr>
<tr>
<td>Steam</td>
<td>127 t/h at 52 bar(a) and 402 °C</td>
</tr>
<tr>
<td>Flue gas treatment Concept</td>
<td>SNCR, Fabric Filter, Semi-dry System</td>
</tr>
<tr>
<td>Reactant</td>
<td>Activated Carbon, Calcium Hydroxide</td>
</tr>
<tr>
<td>Throughput per line</td>
<td>180'714 m³/h (STP)</td>
</tr>
<tr>
<td>Energy recovery Concept</td>
<td>Condensation Turbine</td>
</tr>
<tr>
<td>Electric power output</td>
<td>26.50 MW (gross)</td>
</tr>
<tr>
<td>Output</td>
<td>Electrical Power</td>
</tr>
</tbody>
</table>
### JP, Namie
- **Start of operation**: 2015
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Radioactive waste
- **Number of Lines**: 1
- **Throughput per line**: 12.50 t/h
- **Thermal power per line**: 45.00 MW
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter
- **Reactant**: Calcium Hydroxide, Activated Carbon
- **Throughput per line**: 154'040 m³/h (STP)

### CH, Horgen
- **Start of operation**: 2015
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 4.20 t/h
- **Thermal power per line**: 15.00 MW
- **Boiler Concept**: 3-pass boiler with external economizer
- **Steam**: 18 t/h at 30 bar(a) and 0 °C
- **Flue gas treatment Concept**: Entrainment reactor, Electrostatic Precipitator (1 Field), Fabric Filter, Heat exchanger, SCR
- **Reactant**: Adsorbent, Sodium Bicarbonate
- **Throughput per line**: 25'300 m³/h (STP)

### GB, Ferrybridge
- **Start of operation**: 2015
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste, Biomass, Refuse Derived Fuel, Wood
- **Number of Lines**: 2
- **Throughput per line**: 42.25 t/h
- **Thermal power per line**: 117.4 MW
- **Boiler Concept**: 5-pass boiler
- **Steam**: 104 t/h at 72 bar(a) and 427 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Heat Exchanger, Semi-dry System
- **Reactant**: Activated Carbon, Calcium Hydroxide
- **Throughput per line**: 208'000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Output**: 75.00 MW (gross)

### CN, Yingtan
- **Start of operation**: 2015
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 16.67 t/h
- **Thermal power per line**: 25.20 MW
- **Flue gas treatment Concept**: Throughput per line
- **Throughput per line**: 63'115 m³/h (STP)
### CN, Shanghai Chongming

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combustion</strong></td>
<td>Air-cooled Grate</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>Municipal Solid Waste</td>
</tr>
<tr>
<td><strong>Number of Lines</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Throughput per line</strong></td>
<td>10.42 t/h</td>
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<tr>
<td><strong>Thermal power per line</strong></td>
<td>18.78 MW</td>
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<tr>
<td><strong>Flue gas treatment</strong></td>
<td>Concept</td>
</tr>
<tr>
<td><strong>Throughput per line</strong></td>
<td>44’189 m³/h (STP)</td>
</tr>
</tbody>
</table>

### JP, Hagi Nagato, Yamaguchi

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combustion</strong></td>
<td>Municipal Solid Waste</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Number of Lines</strong></td>
<td>2.16 t/h</td>
</tr>
<tr>
<td><strong>Throughput per line</strong></td>
<td>4.75 MW</td>
</tr>
<tr>
<td><strong>Thermal power per line</strong></td>
<td>Hot Water</td>
</tr>
</tbody>
</table>

### JP, Gotemba Oyama, Shizuoka

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combustion</strong></td>
<td>Municipal Solid Waste</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Number of Lines</strong></td>
<td>2.97 t/h</td>
</tr>
<tr>
<td><strong>Throughput per line</strong></td>
<td>9.80 MW</td>
</tr>
<tr>
<td><strong>Thermal power per line</strong></td>
<td>Electrical Power</td>
</tr>
</tbody>
</table>

### JP, Murakami, Niigata

<table>
<thead>
<tr>
<th>Start of operation</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combustion</strong></td>
<td>Municipal Solid Waste, Sewage Sludge</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Number of Lines</strong></td>
<td>1.96 t/h</td>
</tr>
<tr>
<td><strong>Throughput per line</strong></td>
<td>6.10 MW</td>
</tr>
<tr>
<td><strong>Thermal power per line</strong></td>
<td>Hot Water, Electrical Power</td>
</tr>
<tr>
<td><strong>Energy recovery</strong></td>
<td>Output</td>
</tr>
<tr>
<td>Location</td>
<td>Start of Operation</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------</td>
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<tr>
<td><strong>CN, Nanchong</strong></td>
<td>2015</td>
</tr>
<tr>
<td><strong>CN, Xiamen West</strong></td>
<td>2015</td>
</tr>
<tr>
<td><strong>CH, Lucerne Perlen</strong></td>
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<tr>
<td>Location</td>
<td>Start of operation</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------</td>
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<tr>
<td><strong>CN, Shanghai Liming</strong></td>
<td>2014</td>
</tr>
<tr>
<td><strong>CN, Xiangtan</strong></td>
<td>2014</td>
</tr>
<tr>
<td><strong>CN, Sanya</strong></td>
<td>2014</td>
</tr>
<tr>
<td><strong>CN, Shanghai Laogang</strong></td>
<td>2014</td>
</tr>
</tbody>
</table>
CN, Harbin
Start of operation 2014
Combustion Concept
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 25.00 t/h
Flue gas treatment Concept
Semi-dry System, Fabric Filter

JP, Bekki Hayami, Oita
Start of operation 2014
Combustion Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 4.90 t/h
Flue gas treatment Concept
Semi-dry System, Fabric Filter

CN, Tianjin Binghai
Start of operation 2014
Combustion Concept
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 20.83 t/h
Thermal power per line 38.80 MW
Flue gas treatment Concept SNCR, Spray Absorber, Fabric Filter
Reactant Calcium Hydroxide, Activated Carbon
Throughput per line 100'250 m³/h (STP)
Energy recovery Output Electrical Power

CN, Zhuzhou
Start of operation 2014
Combustion Concept
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 20.83 t/h
Flue gas treatment Concept Entrainment reactor, Semi-dry System, Fabric Filter
**CN, Rongcheng**

- **Start of operation**: 2014
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 14.58 t/h
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter, Semi-dry System

**CN, Shuyang**

- **Start of operation**: 2014
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 14.58 t/h
- **Flue gas treatment Concept**: Semi-dry System, Fabric Filter

**CN, Xingyi**

- **Start of operation**: 2014
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 12.50 t/h
- **Flue gas treatment Concept**: Semi-dry System, Entrainment reactor, Fabric Filter

**FI, Vantaa**

- **Start of operation**: 2014
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 24.00 t/h
- **Thermal power per line**: 64.20 MW
- **Boiler Concept**: 4-pass boiler with external economizer
- **Steam**: 83 t/h at 91 bar(a) and 400 °C
- **Flue gas treatment Concept**: SNCR
- **Throughput per line**: 111'100 m³/h (STP)
by Hitachi Zosen since 2000

**CN, Dalian**
- **Start of operation**: 2014
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 3
- **Throughput per line**: 20.83 t/h
- **Thermal power per line**: 38.80 MW
- **Flue gas treatment Concept**: SNCR, Spray Absorber, Fabric Filter
- **Reactant**: Activated Carbon, Calcium Hydroxide
- **Throughput per line**: 100'250 m³/h (STP)
- **Energy recovery Output**: Electrical Power

**CH, Winterthur**
- **Start of operation**: 2014
- **Anaerobic Digestion Number of Digester(s)**: 1
- **Net volume per digester**: 1500 m³
- **Digester Design**: Steel
- **Waste Type**: Bio Waste, Food Waste, Green Waste
- **Waste Throughput per Year**: 25000 t/a
- **Biogas Utilisation**: Biomethane for gas-grid injection

**CH, Vétroz**
- **Start of operation**: 2014
- **Anaerobic Digestion Number of Digester(s)**: 1
- **Net volume per digester**: 1300 m³
- **Digester Design**: Concrete
- **Digester Type**: PF1300
- **Waste Type**: Bio Waste, Green Waste, Liquid Manure, Waste Oil
- **Waste Throughput per Year**: 20000 t/a
- **Biogas Utilisation**: Biomethane for gas-grid injection

**PT, Amarsul**
- **Start of operation**: 2014
- **Anaerobic Digestion Number of Digester(s)**: 3
- **Net volume per digester**: 1300 m³
- **Digester Design**: Concrete
- **Digester Type**: PF1300
- **Waste Type**: Organic Fraction of Municipal Solid Waste
- **Waste Throughput per Year**: 60000 t/a
- **Biogas Utilisation**: Combined Heat and Power
**PL, Olawa**

- **Start of operation**: 2014
- **Anaerobic Digestion**
  - Number of Digester(s): 2
  - Net volume per digester: 1300 m³
  - Digester Design: RM18
  - Digester Type: Concrete
  - Waste Type: Organic Fraction of Municipal Solid Waste
  - Waste Throughput per Year: 25000 t/a
  - Biogas Utilisation: Combined Heat and Power

**KR, Namyangju**

- **Start of operation**: 2013
- **Combustion**
  - Concept: Fluidized Bed Gasification
  - Fuel: Municipal Solid Waste
  - Number of Lines: 1
  - Throughput per line: 2.66 t/h

**CN, Changshu**

- **Start of operation**: 2013
- **Combustion**
  - Concept: Air-cooled Grate
  - Fuel: Municipal Solid Waste
  - Number of Lines: 3
  - Throughput per line: 12.50 t/h
  - Flue gas treatment: Semi-dry System, Fabric Filter

**CN, Yantai**

- **Start of operation**: 2013
- **Combustion**
  - Concept: Air-cooled Grate
  - Fuel: Municipal Solid Waste
  - Number of Lines: 2
  - Throughput per line: 20.83 t/h
  - Flue gas treatment: Entrainment reactor, Fabric Filter, Semi-dry System

**JP, Nantan**

- **Start of operation**: 2013
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 1030 m³
  - Digester Design: Steel
  - Waste Type: Organic Fraction of Municipal Solid Waste
  - Waste Throughput per Year: 10000 t/a
  - Biogas Utilisation: Combined Heat and Power
### JP, Nishiharima, Hyogo
- **Start of operation**: 2013
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 1.85 t/h
- **Thermal power per line**: 5.80 MW
- **Energy recovery Output**: Electrical Power, Hot Water

### JP, Matsuyama, Ehime
- **Start of operation**: 2013
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 3
- **Throughput per line**: 5.83 t/h
- **Thermal power per line**: 16.90 MW
- **Energy recovery Output**: Electrical Power

### JP, Nakakita Sorachi, Hokkaido
- **Start of operation**: 2013
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 1.77 t/h
- **Thermal power per line**: 8.20 MW
- **Boiler Concept**: 3-pass boiler
- **Energy recovery Output**: Electrical Power

### DE, Coesfeld
- **Start of operation**: 2013
- **Anaerobic Digestion**: Number of Digestor(s)
  - 2
- **Net volume per digester**: 1300 m³
- **Digester Design**: PF1300
- **Waste Type**: Bio Waste, Green Waste
- **Waste Throughput per Year**: 40000 t/a
- **Biogas Utilisation**: Biomethane for gas-grid injection

### JP, Hadano Isehara, Kanagawa
- **Start of operation**: 2013
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 4.16 t/h
- **Thermal power per line**: 13.30 MW
- **Energy recovery Output**: Electrical Power
### CN, Haikou
- **Start of operation**: 2013
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 25.00 t/h
- **Thermal power per line**: 46.00 MW
- **Flue gas treatment Concept**: SNCR, Semi-dry System, Fabric Filter
- **Reactant**: Calcium Hydroxide, Activated Carbon
- **Throughput per line**: 121'220 m³/h (STP)
- **Energy recovery Output**: Electrical Power

### CN, Rudong II
- **Start of operation**: 2013
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 20.83 t/h
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter

### CN, Longyan
- **Start of operation**: 2013
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 12.50 t/h
- **Flue gas treatment Concept**: Entrainment reactor, Semi-dry System, Fabric Filter

### GB, Cleveland L4, L5
- **Start of operation**: 2013
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste, Industrial Waste
- **Number of Lines**: 2
- **Throughput per line**: 19.00 t/h
- **Thermal power per line**: 45.85 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 56 t/h at 50 bar(a) and 410 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Semi-dry System
- **Reactant**: Activated Carbon, Calcium Hydroxide
- **Throughput per line**: 95'400 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Electric power output**: 26.00 MW (gross)
- **Output**: Electrical Power
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Anaerobic Digestion</th>
<th>Number of Digester(s)</th>
<th>Net volume per digester</th>
<th>Digester Design</th>
<th>Waste Type</th>
<th>Waste Throughput per Year</th>
<th>Biogas Utilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE, Fulda</td>
<td>2013</td>
<td>2</td>
<td>1300 m³</td>
<td>Concrete</td>
<td>PF1300</td>
<td>Bio Waste, Green Waste</td>
<td>32000 t/a</td>
<td>Biomethane for gas-grid injection</td>
</tr>
<tr>
<td>NL, Tilburg</td>
<td>2013</td>
<td>2</td>
<td>1300 m³</td>
<td>Concrete</td>
<td>PF1300</td>
<td>Bio Waste, Green Waste</td>
<td>46000 t/a</td>
<td>Biomethane for gas-grid injection</td>
</tr>
<tr>
<td>CH, Zurich Werdhölzli</td>
<td>2013</td>
<td>1</td>
<td>1500 m³</td>
<td>Steel</td>
<td>PF1300</td>
<td>Bio Waste, Food Waste, Green Waste</td>
<td>25000 t/a</td>
<td>Biomethane for gas-grid injection</td>
</tr>
<tr>
<td>FR, Clermont-Ferrand</td>
<td>2013</td>
<td>1</td>
<td>1300 m³</td>
<td>Concrete</td>
<td>PF1300</td>
<td>Bio Waste, Green Waste</td>
<td>15000 t/a</td>
<td>Combined Heat and Power</td>
</tr>
<tr>
<td>JP, Hofu</td>
<td>2013</td>
<td>2</td>
<td>750 m³</td>
<td>Steel</td>
<td>Organic Fraction of Municipal Solid Waste</td>
<td>17500 t/a</td>
<td>Combined Heat and Power</td>
<td></td>
</tr>
</tbody>
</table>
### CN, Huzhou

**Start of operation**: 2012  
**Combustion Concept**: Air-cooled Grate  
**Fuel**: Municipal Solid Waste  
**Number of Lines**: 1  
**Throughput per line**: 8.33 t/h  
**Flue gas treatment Concept**: Fabric Filter, Semi-dry System, SNCR  
**Energy recovery Output**: Electrical Power

### Fi, Vaasa

**Start of operation**: 2012  
**Combustion Concept**: Water-cooled Grate  
**Fuel**: Municipal Solid Waste, Industrial Waste  
**Number of Lines**: 1  
**Throughput per line**: 20.00 t/h  
**Thermal power per line**: 61.00 MW  
**Boiler Concept**: 4-pass boiler  
**Steam**: 74 t/h at 42 bar(a) and 402 °C  
**Flue gas treatment Concept**: SNCR  
**Throughput per line**: 104'140 m³/h (STP)  
**Energy recovery Output**: Hot Water, Electrical Power

### CH, Hinwil

**Start of operation**: 2012  
**Combustion Concept**: Air-cooled Grate  
**Fuel**: Municipal Solid Waste, Industrial Waste  
**Number of Lines**: 2  
**Throughput per line**: 87'500 m³/h (STP)  
**Boiler Concept**: Entrainment reactor, Fabric Filter, Heat Exchanger, SCR  
**Steam**: 50 t/h at 40 bar(a) and 400 °C  
**Flue gas treatment Concept**: Sodium Bicarbonate, Activated Carbon  
**Throughput per line**: 87'500 m³/h (STP)  
**Energy recovery Output**: Hot Water, Electrical Power

### ES, Sant Adrià de Besòs L1-L3

**Start of operation**: 2012  
**Combustion Concept**: Air-cooled Grate  
**Fuel**: Municipal Solid Waste, Industrial Waste  
**Boiler Concept**: 3-pass boiler  
**Steam**: 50 t/h at 40 bar(a) and 400 °C
CN, Ningde
Start of operation 2012
Combustion Concept
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 12.50 t/h
Flue gas treatment Concept
Air-cooled Grate
Entrainment reactor, Semi-dry System, Fabric Filter

TH, Phuket
Start of operation 2012
Combustion Concept
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 14.58 t/h
Flue gas treatment Concept
Semi-dry System, Fabric Filter

CH, Limmattal
Start of operation 2012
Flue gas treatment Concept
Number of Lines 2
Fuel Municipal Solid Waste
Reactant Activated Carbon
Throughput per line 47'000 m³/h (STP)
PAC Entrainment
Municipal Solid Waste
Activated Carbon
47'000 m³/h (STP)

DE, Witten
Start of operation 2012
Anaerobic Digestion
Number of Digester(s) 1
Net volume per digester 1300 m³
Digester Design Concrete
Digester Type PF1300
Waste Type Bio Waste, Green Waste
Waste Throughput per Year 26300 t/a
Biogas Utilisation Combined Heat and Power
### DE, Trittau
- **Start of operation**: 2012
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: PF1300
  - Waste Type: Bio Waste
  - Waste Throughput per Year: 20000 t/a
  - Biogas Utilisation: Combined Heat and Power

### IT, Faedo
- **Start of operation**: 2012
- **Anaerobic Digestion**
  - Number of Digester(s): 2
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: PF1300
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 32000 t/a
  - Biogas Utilisation: Combined Heat and Power

### IT, Terni
- **Start of operation**: 2012
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: PF1300
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 17500 t/a
  - Biogas Utilisation: Combined Heat and Power

### NL, Weurt
- **Start of operation**: 2012
- **Anaerobic Digestion**
  - Number of Digester(s): 2
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: PF1300
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 38000 t/a
  - Biogas Utilisation: Biomethane for gas-grid injection

### IT, Novi Ligure
- **Start of operation**: 2012
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: PF1300
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 16800 t/a
  - Biogas Utilisation: Combined Heat and Power
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Anaerobic Digestion</th>
<th>Number of Digester(s)</th>
<th>Net volume per digester</th>
<th>Digester Design</th>
<th>Digester Type</th>
<th>Waste Type</th>
<th>Waste Throughput per Year</th>
<th>Biogas Utilisation</th>
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<tr>
<td>FR, Vannes</td>
<td>2012</td>
<td>1</td>
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<td>Bio Waste, Green Waste</td>
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**GB, Newhaven**

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<th>Start of operation</th>
<th>Combustion</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
<th>Thermal power per line</th>
<th>Boiler</th>
<th>Concept</th>
<th>Steam</th>
<th>Concept</th>
<th>Flue gas treatment</th>
<th>Concept</th>
<th>Throughput per line</th>
<th>Energy recovery</th>
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<td>Air-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>2</td>
<td>14.50 t/h</td>
<td>35.85 MW</td>
<td>4-pass boiler</td>
<td>44 t/h at 50 bar(a) and 400 °C</td>
<td>SNCR, Semi-dry System, Fabric Filter</td>
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<td>19.25 MW (gross)</td>
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NO, Oslo

Start of operation: 2011
Combustion Concept: Water-cooled Grate
Fuel: Municipal Solid Waste, Industrial Waste
Number of Lines: 1
Throughput per line: 24.00 t/h
Thermal power per line: 66.70 MW
Boiler Concept: 4-pass boiler
Steam: 78 t/h at 42 bar(a) and 402 °C
Energy recovery Concept: scrubber Reactant Lye
Throughput per line: 130’000 m³/h (STP)

JP, Iwata Bannan II, Shizuoka

Start of operation: 2011
Combustion Fuel: Municipal Solid Waste
Number of Lines: 2
Throughput per line: 4.67 t/h
Thermal power per line: 3.00 MW
Energy recovery Output: Hot Water, Electrical Power

GB, Riverside, London

Start of operation: 2011
Combustion Concept: Air-cooled Grate
Fuel: Municipal Solid Waste, Industrial Waste
Number of Lines: 3
Throughput per line: 32.44 t/h
Thermal power per line: 81.10 MW
Boiler Concept: 4-pass boiler
Steam: 99 t/h at 72 bar(a) and 427 °C
Flue gas treatment Concept: SNCR, Semi-dry System, Fabric Filter
Throughput per line: 169’800 m³/h (STP)
Energy recovery Concept: Condensation Turbine
Electric power output: 73.00 MW (gross)
Output: Electrical Power
### NL, Roosendaal

Start of operation: 2011  
Combustion: Water-cooled Grate  
Fuel: Municipal Solid Waste  
Number of Lines: 2  
Throughput per line: 21.00 t/h  
Thermal power per line: 62.00 MW  
Boiler: 5-pass boiler  
Steam: 76 t/h at 62 bar(a) and 422 °C  
Flue gas treatment: Entrainment reactor, Fabric Filter, SCR  
Reactant: Sodium Bicarbonate  
Throughput per line: 127'000 m³/h (STP)  
Energy recovery: Condensation Turbine  
Electric power output: 28.70 MW (gross)  
Output: Hot Water, Electrical Power

### DE, Neunkirchen EEW

Start of operation: 2011  
Flue gas treatment: Spray Dryer, Fabric Filter, Scrubber  
Number of Lines: 2  
Fuel: Municipal Solid Waste  
Throughput per line: 50'000 m³/h (STP)

### CN, Rudong

Start of operation: 2011  
Combustion: Air-cooled Grate  
Fuel: Municipal Solid Waste  
Number of Lines: 2  
Throughput per line: 10.42 t/h  
Flue gas treatment: Entrainment reactor, Fabric Filter

### CN, Xiangyang

Start of operation: 2011  
Combustion: Air-cooled Grate  
Fuel: Municipal Solid Waste  
Number of Lines: 2  
Throughput per line: 16.67 t/h  
Flue gas treatment: Semi-dry System, Fabric Filter
### IT, Belluno
- **Start of operation**: 2011
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Food Waste, Green Waste
  - **Waste Throughput per Year**: 22000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### DE, Ennigerloh
- **Start of operation**: 2011
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Green Waste
  - **Waste Throughput per Year**: 21000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### DE, Backnang-Neuschöntal
- **Start of operation**: 2011
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 2
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Green Waste
  - **Waste Throughput per Year**: 36000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### CH, Wauwil
- **Start of operation**: 2011
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Green Waste
  - **Waste Throughput per Year**: 16000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### CH, Chavornay
- **Start of operation**: 2011
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1500 m³
  - **Digester Design**: Steel
  - **Waste Type**: Bio Waste, Food Waste, Green Waste
  - **Waste Throughput per Year**: 23000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

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*a company of Hitachi Zosen Corporation*
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<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Anaerobic Digestion</th>
<th>Number of Digester(s)</th>
<th>Net volume per digester</th>
<th>Digester Design</th>
<th>Digester Type</th>
<th>Waste Type</th>
<th>Waste Throughput per Year</th>
<th>Biogas Utilisation</th>
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<td>DE, Ingolstadt</td>
<td>2011</td>
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<td>Concrete</td>
<td>PF1300</td>
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<td>20000 t/a</td>
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<td>DE, Aurich-Grossefehn</td>
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<td>PF1300</td>
<td>Bio Waste</td>
<td>18000 t/a</td>
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<td>NL, Rijsenhout</td>
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<td>42000 t/a</td>
<td>Biomethane for gas-grid injection, Biogas Filling Station</td>
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<td>CH, Villeneuve</td>
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<td>PF1300</td>
<td>Bio Waste, Food Waste, Green Waste</td>
<td>20000 t/a</td>
<td>Combined Heat and Power</td>
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<td>Location</td>
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<tr>
<td>NL, Zwolle</td>
<td>2010</td>
<td>2</td>
<td>2 m³</td>
<td>Concrete</td>
<td>PF1300</td>
<td>Bio Waste, Green Waste</td>
<td>45000 t/a</td>
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<tr>
<td>LU, Leudelange TABA</td>
<td>2010</td>
<td>Water-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>79 t/h at 40 bar(a) and 400 °C</td>
<td>Entrainment reactor, Fabric Filter, SCR</td>
<td>Sodium Bicarbonate, Lignite Coke</td>
<td>136'642 m³/h (STP)</td>
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<tr>
<td>US, Olmsted L5, MN</td>
<td>2010</td>
<td>Air-cooled Grate</td>
<td>Municipal Solid Waste, Waste Oil</td>
<td>29 t/h at 44 bar(a) and 346 °C</td>
<td>SNCR, Fabric Filter, Spray Dryer</td>
<td>Electrical Power, Steam</td>
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<tr>
<td>JP, Yamagata, Gifu</td>
<td>2010</td>
<td>Municipal Solid Waste</td>
<td>0.75 t/h</td>
<td>Water Injection</td>
<td>Steam</td>
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**NL, Zwolle**
- **Start of operation**: 2010
- **Number of Digester(s)**: 2
- **Volume per digester**: 2 m³
- **Digester Design**: Concrete
- **Digester Type**: PF1300
- **Waste Type**: Bio Waste, Green Waste
- **Waste Throughput per Year**: 45000 t/a
- **Biogas Utilisation**: Biomethane for gas-grid injection

**LU, Leudelange TABA**
- **Start of operation**: 2010
- **Combustion Concept**: Water-cooled Grate
- **Number of Lines**: 1
- **Throughput per line**: 22.00 t/h
- **Thermal power per line**: 67.00 MW
- **Boiler Concept**: 3-pass boiler
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter, SCR
- **Reactant**: Sodium Bicarbonate, Lignite Coke
- **Throughput per line**: 136'642 m³/h (STP)
- **Energy recovery Output**: Electrical Power

**US, Olmsted L5, MN**
- **Start of operation**: 2010
- **Combustion Concept**: Air-cooled Grate
- **Number of Lines**: 1
- **Throughput per line**: 7.93 t/h
- **Thermal power per line**: 23.30 MW
- **Boiler Concept**: 2-pass boiler
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Spray Dryer
- **Throughput per line**: 46'300 m³/h (STP)
- **Energy recovery Output**: Electrical Power

**JP, Yamagata, Gifu**
- **Start of operation**: 2010
- **Combustion**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 0.75 t/h
- **Boiler Concept**: Water Injection
- **Steam**:
### NO, Bergen L2
- **Start of operation**: 2010
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 16.00 t/h
- **Thermal power per line**: 44.80 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 57 t/h at 43 bar(a) and 402 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Scrubber, Semi-dry System
  - **Scrubber Reactant**: Caustic Soda
  - **Reactant**: Lignite Coke, Calcium Hydroxide
- **Throughput per line**: 92'000 m³/h (STP)
- **Energy recovery Output**: Hot Water, Electrical Power

### BE, Intradel
- **Start of operation**: 2009
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste, Sewage Sludge
- **Number of Lines**: 2
- **Throughput per line**: 23.63 t/h
- **Thermal power per line**: 67.10 MW
- **Boiler Concept**: 3-pass boiler with external economizer
- **Steam**: 80 t/h at 40 bar(a) and 400 °C
- **Flue gas treatment Concept**: Electrostatic Precipitator (1 Field), Ext. Eco, SCR, Spray Absorber
- **Throughput per line**: 141'000 m³/h (STP)

### CN, Chengdu Luodai
- **Start of operation**: 2009
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 3
- **Throughput per line**: 16.70 t/h
- **Flue gas treatment Concept**: SNCR, Entrainment reactor, Fabric Filter
- **Reactant**: Activated Carbon, Calcium Hydroxide
- **Throughput per line**: 93'720 m³/h (STP)
- **Energy recovery Output**: Electrical Power

### KR, Iksan
- **Start of operation**: 2009
- **Combustion**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 4.17 t/h
- **Thermal power per line**: 3.90 MW
- **Energy recovery Output**: Electrical Power
### JP, Osaka (Higashiyodo)
- **Start of operation**: 2009
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 8.33 t/h
- **Thermal power per line**: 12.00 MW
- **Energy recovery Output**: Steam, Electrical Power

### JP, Aira
- **Start of operation**: 2009
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 1.54 t/h
- **Boiler Concept**: Steam
- **Energy recovery Output**: Water Injection

### GB, Cleveland L3
- **Start of operation**: 2009
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 19.00 t/h
- **Thermal power per line**: 45.80 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Semi-dry System
- **Reactant**: Calcium Hydroxide, Activated Carbon
- **Throughput per line**: 94'600 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Output Electric power**: 10.00 MW (gross)

### AT, Zistersdorf
- **Start of operation**: 2009
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 19.79 t/h
- **Thermal power per line**: 57.80 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter, SCR
- **Reactant**: Sodium Bicarbonate
- **Throughput per line**: 97'000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Output Electric power**: 14.90 MW (gross)
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<th>Combustion Concept</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
<th>Thermal power per line</th>
<th>Boiler Concept</th>
<th>Steam</th>
<th>Throughput per line</th>
<th>Energy recovery</th>
<th>Notes</th>
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<tr>
<td>ES, Mallorca</td>
<td>2009</td>
<td>Water-cooled Grate</td>
<td>Municipal Solid Waste, Sewage Sludge</td>
<td>2</td>
<td>27.00 t/h</td>
<td>70.00 MW</td>
<td>3-pass boiler</td>
<td>82 t/h at 52 bar(a) and 400 °C</td>
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</table>
### CH, Oensingen
- **Start of operation**: 2009
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Food Waste, Green Waste
  - **Waste Throughput per Year**: 18,000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### FR, Saint Lô
- **Start of operation**: 2009
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 2
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Green Waste, Organic Fraction of Municipal Solid Waste
  - **Waste Throughput per Year**: 22,000 t/a
  - **Biogas Utilisation**: Combined Heat and Power

### CH, Volketswil
- **Start of operation**: 2009
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete
  - **Digester Type**: PF1300
  - **Waste Type**: Bio Waste, Food Waste, Green Waste
  - **Waste Throughput per Year**: 20,000 t/a
  - **Biogas Utilisation**: Biomethane for gas-grid injection, Combined Heat and Power

### FR, Argenteuil L4
- **Start of operation**: 2008
- **Combustion**
  - **Concept**: Air-cooled Grate
  - **Fuel**: Municipal Solid Waste
  - **Number of Lines**: 1
  - **Throughput per line**: 18.15 t/h
  - **Thermal power per line**: 48.60 MW
- **Boiler**
  - **Concept**: 4-pass boiler
  - **Steam**: 54 t/h at 47 bar(a) and 380 °C
- **Flue gas treatment**
  - **Concept**: SNCR, Semi-dry System, Fabric Filter
  - **Throughput per line**: 207'100 m³/h (STP)
- **Energy recovery**
  - **Output**: Steam, Electrical Power

### DE, Witzenhausen
- **Start of operation**: 2008
- **Combustion**
  - **Concept**: Fluidized Bed
  - **Fuel**: Refuse Derived Fuel, Pulp Sludge
  - **Number of Lines**: 1
  - **Throughput per line**: 34.92 t/h
  - **Thermal power per line**: 125.3 MW
- **Flue gas treatment**
  - **Concept**: SCR, Semi-dry System, Fabric Filter
  - **Throughput per line**: 207'100 m³/h (STP)
- **Energy recovery**
  - **Output**: Steam, Electrical Power
JP, Osumi-kimotsuki, Kagoshima Pref.
Start of operation 2008
Combustion Concept Fluidized Bed Gasification
Fuel
Number of Lines 2
Throughput per line 2.66 t/h

CH, Giubiasco
Start of operation 2008
Number of Lines 2
Fuel Municipal Solid Waste
Scrubber Reactant Caustic Soda
Reactant Lignite Coke
Throughput per line 67'430 m³/h (STP)

FR, Pithiviers
Start of operation 2008
Combustion Concept Air-cooled Grate
Fuel Municipal Solid Waste
Number of Lines 2
Throughput per line 4.00 t/h
Thermal power per line 10.90 MW
Boiler Concept 4-pass boiler
Steam 13 t/h at 40 bar(a) and 380 °C
Flue gas treatment Concept SNCR, Entrainment reactor, Fabric Filter
Reactant Sodium Bicarbonate
Throughput per line 24'000 m³/h (STP)
Energy recovery Output Steam, Electrical Power

NL, Moerdijk L4
Start of operation 2008
Combustion Concept Water-cooled Grate
Fuel Municipal Solid Waste
Number of Lines 1
Throughput per line 38.33 t/h
Thermal power per line 95.80 MW
Boiler Concept 2-pass boiler
Steam 121 t/h at 107 bar(a) and 400 °C
Flue gas treatment Concept SNCR, Fabric Filter, Ext. Eco, Scrubber
Reactant Lye
Throughput per line 199'200 m³/h (STP)
Energy recovery Concept Back-pressure Turbine
Electric power output 13.47 MW (gross)
Output Steam, Electrical Power
### CN, Xiamen Garbage Treatment

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<td>Steam</td>
<td>18 t/h at 40 bar(a) and 400 °C</td>
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<td>Throughput per line</td>
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<td>Energy recovery Output</td>
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### DE, Flörsheim Wicker

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### CH, Klingnau

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<td>Digester Design</td>
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<td>Digester Type</td>
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<td>Waste Type</td>
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### CH, Lavigny

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<td>Waste Type</td>
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<td>Biomethane for gas-grid injection, Combined Heat and Power</td>
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<td>FR, Montpellier</td>
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<td>NL, Wilp-Achterhoeck</td>
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<tr>
<td>JP, Sano, Tochigi Pref.</td>
<td>2007</td>
</tr>
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</table>
### NO, Trondheim L3
- **Start of operation**: 2007
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 17.29 t/h
- **Thermal power per line**: 45.80 MW
- **Boiler Concept**: 2-pass boiler
- **Steam**: 911 t/h at 16 bar(a) and 180 °C
- **Flue gas treatment Concept**: SNCR, Semi-dry System, Fabric Filter, Scrubber
- **Scrubber Reactant**: Lye
- **Throughput per line**: 84'000 m³/h (STP)
- **Energy recovery Output**: Hot Water

### JP, Toyota, Aichi Pref.
- **Start of operation**: 2007
- **Combustion Concept**: Fluidized Bed Gasification
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 3
- **Throughput per line**: 5.63 t/h

### FR, Dunkerque
- **Start of operation**: 2007
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 12.00 t/h
- **Thermal power per line**: 29.30 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 35 t/h at 40 bar(a) and 380 °C
- **Flue gas treatment Concept**: SCR, Scrubber
- **Scrubber Reactant**: Caustic Soda
- **Reactant**: Lignite Coke
- **Throughput per line**: 50'000 m³/h (STP)
- **Energy recovery Output**: Condensation Turbine
- **Electric power output**: 6.00 MW (gross)
- **Output**: Electrical Power
### DE, Stassfurt EVZA
- **Start of operation**: 2007
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste, Industrial Waste
- **Number of Lines**: 2
- **Throughput per line**: 22.50 t/h
- **Thermal power per line**: 55.60 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 64 t/h at 40 bar(a) and 400 °C
- **Flue gas treatment Concept**: SNCR, Semi-dry System, Fabric Filter
- **Throughput per line**: 116'000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Electric power output**: 28.14 MW (gross)

### FR, Issy-les-Moulineaux
- **Start of operation**: 2007
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 34.90 t/h
- **Thermal power per line**: 85.23 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 104 t/h at 50 bar(a) and 400 °C
- **Flue gas treatment Concept**: Entrainment reactor, Fabric Filter, SCR
- **Reactant**: Sodium Bicarbonate, Lignite Coke
- **Throughput per line**: 151'000 m³/h (STP)
- **Energy recovery Concept**: Condensation Turbine
- **Electric power output**: 28.14 MW (gross)
- **Output**: Electrical Power, Hot Water

### DE, Bamberg L1 - L3
- **Start of operation**: 2007
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste, Industrial Waste, Sewage Sludge
- **Number of Lines**: 3
- **Throughput per line**: 6.00 t/h
- **Thermal power per line**: 17.50 MW
- **Boiler Concept**: 5-pass boiler
- **Steam**: 20 t/h at 40 bar(a) and 400 °C
- **Energy recovery Concept**: Condensation Turbine
- **Output**: Hot Water

### JP, Kitashiribeshi, Hokkaido
- **Start of operation**: 2007
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 4.10 t/h
- **Thermal power per line**: 2.00 MW
- **Energy recovery Concept**: Condensation Turbine
- **Output**: Electrical Power
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<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Anaerobic Digestion</th>
<th>Number of Digester(s)</th>
<th>Net volume per digester</th>
<th>Digester Design</th>
<th>Digester Type</th>
<th>Waste Type</th>
<th>Waste Throughput per Year</th>
<th>Biogas Utilisation</th>
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<td>DE, Amtzell</td>
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<td>1</td>
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<td>Energy Crops</td>
<td>17000 t/a</td>
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<td>DE, Ilbenstadt</td>
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<td>Bio Waste, Energy Crops, Green Waste</td>
<td>18000 t/a</td>
<td>Combined Heat and Power</td>
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### DE, Rostock
- **Start of operation**: 2007
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 3
  - **Net volume per digester**: 1300 m³
  - **Digester Design**: Concrete RM18
  - **Digester Type**: Organic Fraction of Municipal Solid Waste
  - **Waste Type**: 40000 t/a
  - **Waste Throughput per Year**: Combined Heat and Power

### CH, Utzenstorf
- **Start of operation**: 2007
- **Anaerobic Digestion**
  - **Number of Digester(s)**: 1
  - **Net volume per digester**: 720 m³
  - **Digester Design**: Concrete GG12
  - **Digester Type**: Bio Waste, Green Waste, Liquid Waste
  - **Waste Type**: 12000 t/a
  - **Waste Throughput per Year**: Biomethane for gas-grid injection, Combined Heat and Power

### FR, Sète
- **Start of operation**: 2006
- **Flue gas treatment**
  - **Concept**: Entrainment reactor, Fabric Filter
  - **Number of Lines**: 1
  - **Fuel**: Municipal Solid Waste
  - **Reactant**: Sodium Bicarbonate
  - **Throughput per line**: 30'000 m³/h (STP)

### JP, Ariake, Kumamoto Pref.
- **Start of operation**: 2006
- **Combustion**
  - **Concept**: Fluidized Bed Gasification
  - **Fuel**: Municipal Solid Waste
  - **Number of Lines**: 2
  - **Throughput per line**: 1.04 t/h
- **Boiler**
  - **Concept**: Water Injection
**CH, Lausanne (Tridel)**

Start of operation: 2006

Combustion Concept: Water-cooled Grate

Fuel: Municipal Solid Waste, Hospital Waste

Number of Lines: 2

Throughput per line: 12.50 t/h

Thermal power per line: 40.00 MW

Boiler Concept: 4-pass boiler with external economizer

Steam: 46 t/h at 52 bar(a) and 403 °C


Scrubber Reactant: Caustic Soda

Throughput per line: 63'200 m³/h (STP)

Energy recovery Output: Hot Water, Electrical Power

**JP, Tamura, Fukushima**

Start of operation: 2006

Combustion Concept: Air-cooled Grate

Fuel: Municipal Solid Waste

Number of Lines: 1

Throughput per line: 1.60 t/h

Energy recovery Output: Steam

**JP, Tokyo (Shinagawa)**

Start of operation: 2006

Combustion Concept: Air-cooled Grate

Fuel: Municipal Solid Waste

Number of Lines: 2

Throughput per line: 12.50 t/h

Thermal power per line: 15.00 MW

Energy recovery Output: Hot Water, Electrical Power

**JP, Jonan Haseyama II**

Start of operation: 2006

Combustion Concept: Air-cooled Grate

Fuel: Municipal Solid Waste

Number of Lines: 2

Throughput per line: 5.00 t/h

Thermal power per line: 4.90 MW

Energy recovery Output: Electrical Power
DE, Erfurt
Start of operation: 2006
Combustion Concept: Water-cooled Grate
Fuel: Municipal Solid Waste, Refuse Derived Fuel

Number of Lines: 1
Throughput per line: 9.75 t/h
Thermal power per line: 26.00 MW

Boiler Concept: 3-pass boiler
Steam: 29 t/h at 40 bar(a) and 400 °C

Flue gas treatment Concept: SNCR, Fabric Filter, Semi-dry System
Reactant: Calcium Hydroxide, Lignite Coke
Throughput per line: 54'000 m³/h (STP)

Energy recovery Concept: Condensation Turbine
Electric power output: 4.90 MW (gross)
Output: Steam, Hot Water, Electrical Power

CH, Aarberg
Start of operation: 2006
Anaerobic Digestion Number of Digester(s): 1
Net volume per digester: 1300 m³
Digester Design: Concrete
Digester Type: GG20
Waste Type: Bio Waste, Food Waste, Green Waste
Waste Throughput per Year: 20000 t/a

Biogas Utilisation: Combined Heat and Power

CH, Langenthal
Start of operation: 2006
Anaerobic Digestion Number of Digester(s): 1
Net volume per digester: 240 m³
Digester Design: Steel
Waste Type: Bio Waste, Green Waste
Waste Throughput per Year: 5600 t/a

Biogas Utilisation: Combined Heat and Power

CH, Ottenbach
Start of operation: 2006
Anaerobic Digestion Number of Digester(s): 1
Net volume per digester: 960 m³
Digester Design: Concrete
Digester Type: GG16
Waste Type: Bio Waste, Food Waste, Green Waste
Waste Throughput per Year: 16000 t/a

Biogas Utilisation: Combined Heat and Power
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<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Anaerobic Digestion</th>
<th>Number of Digester(s)</th>
<th>Net volume per digester</th>
<th>Digester Design</th>
<th>Digester Type</th>
<th>Waste Type</th>
<th>Waste Throughput per Year</th>
<th>Biogas Utilisation</th>
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<tbody>
<tr>
<td>CH, Pratteln</td>
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</table>
**KR, Incheon South**

- Start of operation: 2005
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 10.42 t/h
- Energy recovery Output: Steam

**JP, Odate, Akita**

- Start of operation: 2005
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 1.88 t/h
- Energy recovery Output: Hot Water

**TW, Yunlin**

- Start of operation: 2005
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 12.50 t/h
- Thermal power per line: 15.80 MW
- Energy recovery Output: Electrical Power

**DE, Ludwigslust**

- Start of operation: 2005
- Combustion Concept: Water-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 1
- Throughput per line: 6.00 t/h
- Thermal power per line: 16.00 MW
- Boiler Concept: 3-pass boiler
- Flue gas treatment Concept: SNCR, Fabric Filter, Semi-dry System
- Reactant: Calcium Hydroxide, Lignite Coke
- Throughput per line: 34'000 m³/h (STP)
- Energy recovery Concept: Condensation Turbine
- Electric power output: 3.00 MW (gross)

by Hitachi Zosen since 2000
<table>
<thead>
<tr>
<th>Location</th>
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<th>Combustion Concept</th>
<th>Fuel</th>
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<th>Throughput per line</th>
<th>Thermal power per line</th>
<th>Boiler Concept</th>
<th>Steam</th>
<th>Flue gas treatment Concept</th>
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<th>Energy recovery Output</th>
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<td><strong>DE, Zorbau</strong></td>
<td>2005</td>
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<td><strong>US, Corn Plus, Winnebago, MN</strong></td>
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<td>Fluidized Bed</td>
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<td>Fluidized Bed</td>
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<td>Scrubber</td>
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<td><strong>SE, Uppsala (Block 5)</strong></td>
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<td>Municipal Solid Waste</td>
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<td>26.40 t/h</td>
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<td>4-pass boiler</td>
<td>100 t/h at 20 bar(a) and 212 °C</td>
<td>Electrostatic Precipitator (2 Fields), Scrubber, Fabric Filter, SCR Lye</td>
<td>Steam, Hot Water</td>
<td>148’900 m³/h (STP)</td>
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</table>
**FR, Rennes L1+L2**
- **Start of operation**: 2005
- **Flue gas treatment**
  - Concept: Semi-dry System, Fabric Filter, SCR
  - Number of Lines: 2
  - Fuel: Municipal Solid Waste
  - Throughput per line: 40,400 m³/h (STP)
- **Energy recovery**
  - Output: Steam, Electrical Power

**FR, Rennes L3**
- **Start of operation**: 2005
- **Flue gas treatment**
  - Concept: Semi-dry System, Fabric Filter, SCR
  - Number of Lines: 1
  - Fuel: Municipal Solid Waste
  - Throughput per line: 61,900 m³/h (STP)
- **Energy recovery**
  - Output: Steam, Electrical Power

**CH, Jona**
- **Start of operation**: 2005
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 330 m³
  - Digester Design: Concrete
  - Digester Type: ZAFE
  - Waste Type: Bio Waste, Food Waste, Green Waste
  - Waste Throughput per Year: 5000 t/a
  - Biogas Utilisation: Combined Heat and Power

**ES, La Rioja**
- **Start of operation**: 2005
- **Anaerobic Digestion**
  - Number of Digester(s): 6
  - Net volume per digester: 1050 m³
  - Digester Design: Concrete
  - Digester Type: ZAFB
  - Waste Type: Organic Fraction of Municipal Solid Waste
  - Waste Throughput per Year: 75000 t/a
  - Biogas Utilisation: Combined Heat and Power

**CH, Lenzburg**
- **Start of operation**: 2005
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 340 m³
  - Digester Design: Steel
  - Digester Type: Bio Waste, Food Waste, Green Waste, Liquid Waste
  - Waste Throughput per Year: 5000 t/a
  - Biogas Utilisation: Combined Heat and Power
### MQ, Martinique

- **Start of operation**: 2005
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 750 m³
  - Digester Design: Steel
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 20000 t/a
  - Biogas Utilisation: Combined Heat and Power

### CH, Uzwil 2

- **Start of operation**: 2005
- **Anaerobic Digestion**
  - Number of Digester(s): 1
  - Net volume per digester: 1300 m³
  - Digester Design: Concrete
  - Digester Type: ZAFB
  - Waste Throughput per Year: 20000 t/a
  - Biogas Utilisation: Combined Heat and Power

### DE, TREA Breisgau

- **Start of operation**: 2004
- **Combustion**
  - Concept: Water-cooled Grate
  - Fuel: Municipal Solid Waste
  - Number of Lines: 1
  - Throughput per line: 22.00 t/h
  - Thermal power per line: 61.10 MW
- **Boiler**
  - Concept: 3-pass boiler with external economizer
  - Steam: 74 t/h at 40 bar(a) and 400 °C
- **Flue gas treatment**
  - Concept: Electrostatic Precipitator (2 Fields), SCR, Semi-dry System, Fabric Filter, Scrubber
  - Scrubber Reactant: Lye
  - Throughput per line: 116'000 m³/h (STP)

### JP, Takamatsu, Kagawa Pref.

- **Start of operation**: 2004
- **Combustion**
  - Concept: Fluidized Bed Gasification
  - Fuel: Municipal Solid Waste
  - Number of Lines: 3
  - Throughput per line: 4.17 t/h
### NL, Alkmaar L4
- **Start of operation**: 2004
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 1
- **Throughput per line**: 27.50 t/h
- **Thermal power per line**: 75.00 MW
- **Boiler Concept**: 4-pass boiler with external economizer
- **Steam**: 89 t/h at 42 bar(a) and 405 °C
- **Flue gas treatment Concept**: Electrostatic Precipitator (2 Fields), Electrostatic Precipitator (3 Fields), SCR, Scrubber
- **Scrubber Reactant**: Caustic Soda
- **Reactant**: Activated Carbon
- **Throughput per line**: 155'900 m³/h (STP)
- **Energy recovery Output**: Electrical Power

### US, MCES, St. Paul, MN
- **Start of operation**: 2004
- **Combustion Concept**: Fluidized Bed
- **Fuel**: Sewage Sludge
- **Number of Lines**: 3
- **Throughput per line**: 4.00 t/h
- **Thermal power per line**: 9.40 MW
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Scrubber
- **Scrubber Reactant**: Lye
- **Throughput per line**: 40'190 m³/h (STP)
- **Energy recovery Output**: Steam

### TW, Taitung
- **Start of operation**: 2004
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 6.25 t/h
- **Energy recovery Output**: Electrical Power

### JP, Kyoto 1
- **Start of operation**: 2004
- **Anaerobic Digestion**: 2
- **Number of Digester(s)**: 2
- **Net volume per digester**: 1150 m³
- **Digester Design**: Steel
- **Waste Type**: Food Waste, Organic Fraction of Municipal Solid Waste
- **Waste Throughput per Year**: 15000 t/a
- **Biogas Utilisation**: Combined Heat and Power
**DE, Passau**

- **Start of operation**: 2004
- **Anaerobic Digestion**
  - Number of Digester(s): 3
  - Net volume per digester: 980 m³
  - Digester Design: Concrete
  - Digester Type: ZAFB
  - Waste Type: Bio Waste, Green Waste
  - Waste Throughput per Year: 39000 t/a
  - Biogas Utilisation: Combined Heat and Power

**CH, Thun**

- **Start of operation**: 2003
- **Combustion**
  - Concept: Water-cooled Grate
  - Fuel: Municipal Solid Waste, Sewage Sludge
  - Number of Lines: 1
  - Throughput per line: 18.40 t/h
  - Thermal power per line: 46.00 MW
  - Boiler Concept: 4-pass boiler with external economizer
  - Steam: 55 t/h at 40 bar(a) and 400 °C
  - Flue gas treatment Concept:
  - Scrubber Reactant: Lye
  - Throughput per line: 78'000 m³/h (STP)

**FR, Poitiers**

- **Start of operation**: 2003
- **Combustion**
  - Concept: Air-cooled Grate
  - Fuel: Municipal Solid Waste
  - Number of Lines: 2
  - Throughput per line: 3.30 t/h

**FR, Evreux**

- **Start of operation**: 2003
- **Combustion**
  - Concept: Air-cooled Grate
  - Fuel: Municipal Solid Waste, Sewage Sludge
  - Number of Lines: 2
  - Throughput per line: 5.63 t/h
  - Thermal power per line: 14.40 MW
  - Boiler Concept: 2-pass boiler
  - Steam: 17 t/h at 40 bar(a) and 380 °C
  - Flue gas treatment Concept:
    - Fabric Filter, SCR, Semi-dry System
    - Reactant: Sodium Bicarbonate, Lignite Coke
    - Throughput per line: 31'000 m³/h (STP)
  - Energy recovery Concept: Back-pressure Turbine
  - Electric power output: 6.00 MW (gross)
  - Output: Electrical Power
by Hitachi Zosen since 2000

**JP, Ishikawahokubu, Ishikawa Pref.**
- Start of operation: 2003
- Combustion: Fluidized Bed Gasification
- Fuel
- Number of Lines: 2
- Throughput per line: 3.33 t/h

**JP, Fukue, Nagasaki Pref**
- Start of operation: 2003
- Combustion: Fluidized Bed Gasification
- Fuel
- Number of Lines: 2
- Throughput per line: 1.20 t/h

**FR, Perpignan**
- Start of operation: 2003
- Combustion: Air-cooled Grate
  - Fuel: Municipal Solid Waste
  - Number of Lines: 2
  - Throughput per line: 12.10 t/h
  - Thermal power per line: 32.40 MW
- Boiler: 4-pass boiler
  - Steam: 35 t/h at 40 bar (a) and 380 °C
- Flue gas treatment: SNCR, Semi-dry System, Fabric Filter
  - Throughput per line: 61'000 m³/h (STP)
- Energy recovery: Condensation Turbine
  - Electric power output: 21.00 MW (gross)
  - Output: Electrical Power

**US, WWTP Lynn, MA**
- Start of operation: 2003
- Combustion: Fluidized Bed
  - Fuel: Sewage Sludge
  - Number of Lines: 1
  - Throughput per line: 1.07 t/h
  - Thermal power per line: 2.10 MW
- Flue gas treatment: Scrubber, Electrostatic Precipitator (1 Field)
  - Throughput per line: 40'100 m³/h (STP)
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of Operation</th>
<th>Combustion Concept</th>
<th>Fuel</th>
<th>Number of Lines</th>
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<th>Thermal Power per line</th>
<th>Boiler Concept</th>
<th>Steam at</th>
<th>Energy Recovery</th>
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<td>Municipal Solid Waste</td>
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<td>1.00 t/h</td>
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<td>Steam, Hot Water, Electrical Power</td>
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<td>Water-cooled Grate</td>
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<td>7.20 t/h</td>
<td>22.80 MW</td>
<td>3-pass boiler</td>
<td>30 t/h at 40 bar(a) and 0 °C</td>
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<td>Anaerobic Digestion</td>
<td>Number of Digester(s)</td>
<td>Net volume per digester</td>
<td>Digester Design</td>
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<td>Waste Throughput per Year</td>
<td>Biogas Utilisation</td>
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<td>DE, Weissenfels 1</td>
<td>2003</td>
<td>1</td>
<td>980 m³</td>
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<td>Combined Heat and Power</td>
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<td>DE, Bremerhaven Duotherm</td>
<td>2002</td>
<td>1 Water-cooled Grate</td>
<td>Municipal Solid Waste</td>
<td>8.00 t/h</td>
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<td>23.30 MW</td>
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<td>27 t/h at 40 bar(a) and 0 °C</td>
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<td>JP, Sakurai, Nara Pref.</td>
<td>2002</td>
<td>2 Fluidized Bed Gasification</td>
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<td>2 t/h</td>
<td>Throughput per line</td>
<td>3.12 t/h</td>
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</table>
**FR, Le Mans L2bis**

- **Start of operation**: 2002
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste, Hospital Waste
- **Number of Lines**: 1
- **Throughput per line**: 9.00 t/h
- **Thermal power per line**: 24.10 MW
- **Boiler Concept**: 3-pass boiler
- **Steam**: 29 t/h at 30 bar(a) and 350 °C
- **Flue gas treatment Concept**: Fabric Filter, SCR, Semi-dry System
- **Throughput per line**: 50'000 m³/h (STP)
- **Energy recovery Output**: Electrical Power

**JP, Okinoerabu, Kagoshima Pref.**

- **Start of operation**: 2002
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 1.00 t/h
- **Boiler Concept**: Water Injection
- **Energy recovery Output**: Steam, Hot Water

**JP, Nasu, Tochigi Pref.**

- **Start of operation**: 2002
- **Combustion Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 2.50 t/h
- **Energy recovery Output**: Steam, Hot Water

**CH, KEBAG Emmenspitz L4**

- **Start of operation**: 2002
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste, Industrial Waste, Sewage Sludge
- **Number of Lines**: 1
- **Throughput per line**: 10.00 t/h
- **Thermal power per line**: 28.50 MW
- **Boiler Concept**: 3-pass boiler
- **Steam**: 32 t/h at 38 bar(a) and 385 °C
- **Flue gas treatment Concept**: SNCR, Fly Ash Treatment, Scrubber, NH4OH-Stripper, Lye
- **Throughput per line**: 58'040 m³/h (STP)
- **Energy recovery Output**: Back-pressure Turbine, Electric power output, Electrical Power

*by Hitachi Zosen since 2000*
<table>
<thead>
<tr>
<th>Location</th>
<th>Start of operation</th>
<th>Fuel</th>
<th>Number of Lines</th>
<th>Throughput per line</th>
<th>Combustion Concept</th>
<th>Energy recovery Output</th>
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<tbody>
<tr>
<td>JP, Osaka (Maishima)</td>
<td>2001</td>
<td>Municipal Solid Waste</td>
<td>2</td>
<td>18.75 t/h</td>
<td>Fabric Filter, Heat Exchanger, SCR, Scrubber</td>
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<td>2.08 t/h</td>
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<td>Hot Water</td>
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<td>FR, Rouen</td>
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<td>46 t/h at 36 bar(a) and 0 °C</td>
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</table>
### DE, Nuremberg L1-L3
- **Start of operation**: 2001
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 3
- **Throughput per line**: 10.50 t/h
- **Thermal power per line**: 35.00 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 41 t/h at 45 bar(a) and 400 °C
- **Flue gas treatment Concept**: SCR, Scrubber
- **Scrubber Reactant**: Lye
- **Throughput per line**: 64'250 m³/h (STP)
- **Energy recovery Output**: Steam

### FR, Maubeuge
- **Start of operation**: 2001
- **Combustion Concept**: Air-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 5.50 t/h
- **Thermal power per line**: 14.10 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 17 t/h at 36 bar(a) and 360 °C
- **Flue gas treatment Concept**: Semi-dry System, Fabric Filter
- **Throughput per line**: 30'500 m³/h (STP)
- **Energy recovery Output**: Steam, Hot Water, Electrical Power

### FR, Salaise L3
- **Start of operation**: 2001
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste, Industrial Waste
- **Number of Lines**: 1
- **Throughput per line**: 19.00 t/h
- **Thermal power per line**: 48.60 MW
- **Boiler Concept**: 3-pass boiler
- **Steam**: 77 t/h at 42 bar(a) and 350 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Semi-dry System
- **Throughput per line**: 140'000 m³/h (STP)
- **Energy recovery Output**: Steam, Electrical Power

### IT, Trezzo
- **Start of operation**: 2001
- **Combustion Concept**: Water-cooled Grate
- **Fuel**: Municipal Solid Waste
- **Number of Lines**: 2
- **Throughput per line**: 16.16 t/h
- **Thermal power per line**: 41.20 MW
- **Boiler Concept**: 4-pass boiler
- **Steam**: 49 t/h at 40 bar(a) and 400 °C
- **Flue gas treatment Concept**: SNCR, Fabric Filter, Semi-dry System
- **Throughput per line**: 84'000 m³/h (STP)
- **Energy recovery Output**: Electrical Power
**US, McKay Bay, Tampa, FL**
- Start of operation: 2001
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 4
- Throughput per line: 9.46 t/h
- Thermal power per line: 26.30 MW
- Boiler Concept: 2-pass boiler
- Steam: 24 t/h at 45 bar(a) and 0 °C

**CH, Oetwil am See 1**
- Start of operation: 2001
- Anaerobic Digestion Number of Digester(s): 1
- Net volume per digester: 750 m³
- Digester Design: Steel
- Waste Throughput per Year: 10000 t/a
- Biogas Utilisation: Combined Heat and Power

**AT, Roppen**
- Start of operation: 2001
- Anaerobic Digestion Number of Digester(s): 1
- Net volume per digester: 750 m³
- Digester Design: Steel
- Waste Type: Bio Waste, Green Waste
- Waste Throughput per Year: 10000 t/a
- Biogas Utilisation: Combined Heat and Power

**JP, Minamikawachi-2, Osaka Pref.**
- Start of operation: 2000
- Combustion Fuel: Municipal Solid Waste
- Number of Lines: 2
- Throughput per line: 3.96 t/h
- Boiler Concept: Water Injection
- Steam

**JP, Hitachi, Ibaraki Pref.**
- Start of operation: 2000
- Combustion Concept: Air-cooled Grate
- Fuel: Municipal Solid Waste
- Number of Lines: 3
- Throughput per line: 4.17 t/h
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<thead>
<tr>
<th>Location</th>
<th>Start of Operation</th>
<th>Combustion Concept</th>
<th>Fuel</th>
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<th>Throughput per line</th>
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by Hitachi Zosen since 2000

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<th>US, Palo Alto, CA</th>
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<td>Flue gas treatment</td>
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<td>Throughput per line</td>
<td>Scrubber</td>
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<td>18'500 m³/h (STP)</td>
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