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Waste to Energy

The Worldwide Market for Waste Incineration Plants 2011/2012

Extract

Cologne / Oberhausen, May 2011

ecoprogram / Fraunhofer UMSICHT

Waste to Energy 2011/2012 – The World Market for Waste Incineration Plants

The energetic use of waste continues to grow throughout the world – global incineration capacities increased by three per cent per year from 2005 to 2010. In the next five years, this growth will increase to six per cent per year. The worldwide incineration capacities by 2015 will be twice as high as those ten years before.

This boom is caused by the international population increase, urban growth and an increasingly tightened environmental legislation. Areas for the landfilling of municipal waste run short, thermal waste recovery becomes more attractive.

Again, industry insiders in the most important worldwide markets – like Eastern Europe, North America, Japan or South Korea – contributed to the latest edition of the worldwide largest data collection on waste incineration.

The market study “Waste to Energy 2011/2012” includes:

- A detailed analysis of pros and cons, technology and costs of waste incineration, including all the important political, economic, managerial and technical trends.
- A concrete description of the current and future market volumes by countries, up to and including 2015, based on a transparent and comprehensible methodology.
- A project list with new construction, extension and renewal projects, of which more than 125 are under construction, almost 58 have been approved and over 220 are being planned.
- A presentation of around 1,000 incineration plants worldwide, including essential technical data and contact addresses. This also includes the description of more than 2,200 incineration lines with information on capacities, manufacturers and commissionings.
- An analysis and description of the world’s most important operators and plant manufacturers, including market shares.

Furthermore, all our clients of the market study will receive, for one year, a biweekly e-mail newsletter with the evaluation of all news on projects and companies in the WTE segment.

The study is available in **German and English from 3,900,- euros plus VAT.**

Contact:

Jana Stienen

ecoprogram GmbH

Tel. +49 221 788 03 88-12

Fax +49 221 788 03 88-10

j.stienen@ecoprogram.com

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Denmark

| | | | |
|---------------------------------|-------|-------------------------------------|-------|
| Inhabitants (million people) | 5.5 | Number of waste incineration plants | 34 |
| Municipal solid waste (1,000 t) | 4,390 | Incineration capacity (1,000 t/a) | 3,171 |
| Incineration share (%) | 48.5 | Average age of incineration units | 20.3 |

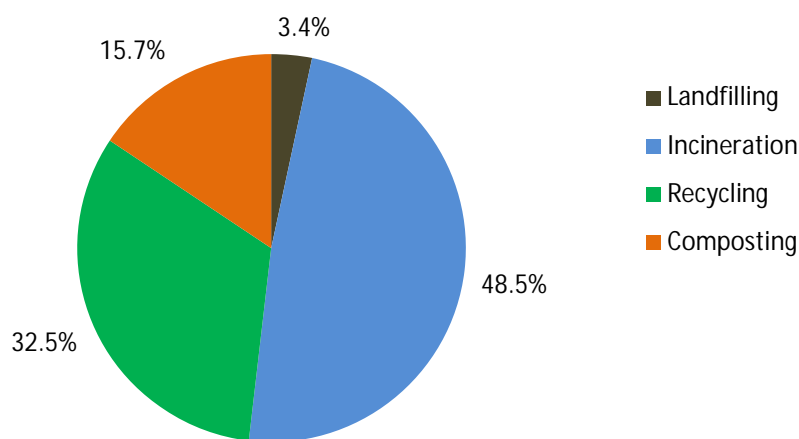
Management summary

Only few new constructions can be expected for Denmark, as the existing capacities are large enough and the utilisation specifications of the EU are strict. Nevertheless, due to the existing strict environmental protection and safety regulations as well as possible efficiency increases, investments in modernisation and maintenance will be made in the years to come.

Background / market factors / legal framework

There is a long tradition of waste incineration in Denmark. Incineration capacities have been built up since the 1970s. Currently, about 48.5 per cent of the total amount of municipal solid waste is incinerated. Furthermore, 48 per cent of the municipal solid waste is recycled and composted. Hence, Denmark is complying with the specifications of the EU Landfill Directive.

Figure 49: Shares of incineration, recycling, and landfilling of municipal solid waste in Denmark



Graph: ecoprolog
Source: Eurostat, Data for 2009

Some of the existing plants in Denmark are more than 20 years old, hence they have to be modernised or replaced in the years to come. Modernisations are not only pushed by the age of the plants but also by the governmental requirement that at least 90 per cent of the operational lines should produce electricity and heat by 2016. In 2007, a total of 59 lines were operational, 24 of them produced heat exclusively. They have to be converted by 2016.

Plants

At the end of the 1980s, the then USSR ordered 15 waste incineration from its socialist sister state of Czechoslovakia. The building was of the same construction type as those in Brno and Kosice, which CKD Dukla had built as a licensee with support from the German firm Babcock. CKD Dukla was also the supplier of the Soviet plants.

Only four of the planned 15 plants were actually constructed. Meanwhile, two were shut down because of economic reasons. According to the latest information, only the plants in Kiev (after modernisation) and in Dnepropetrowsk are operational. The technical capacities of the plant in Kiev are not fully tapped; only about 100,000 tons of waste is incinerated per year. The technical capacity of both operational facilities amounts to 530,000 annual tons.

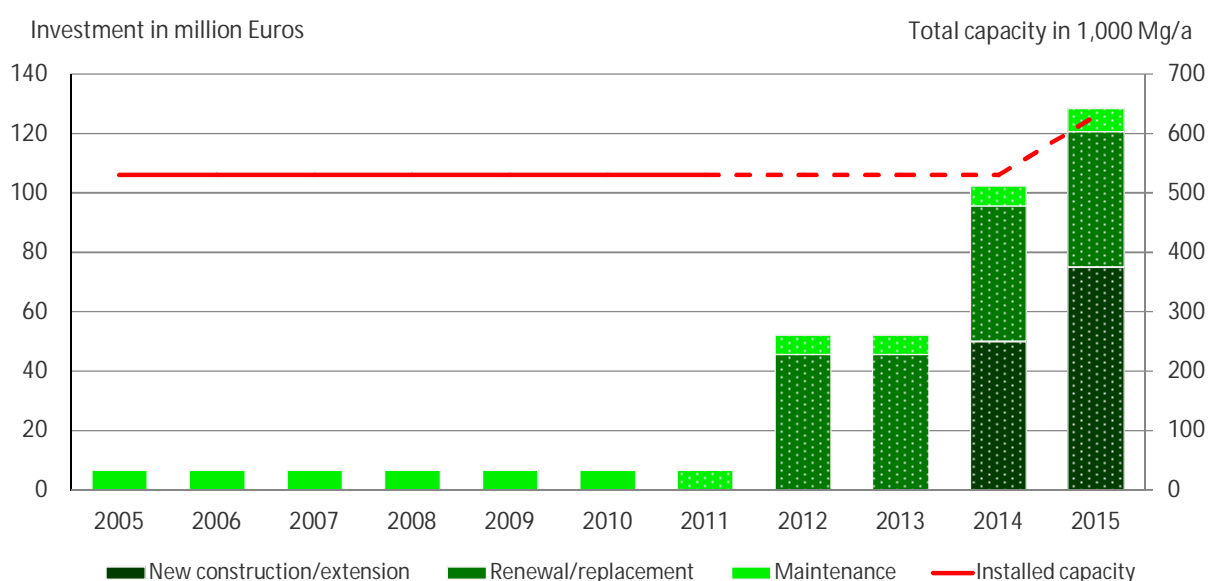
Market development

Figure 143: Project outlook Ukraine

| Plant | Type of investment | Capacity (t/a) | Start | Status |
|--------|--------------------|----------------|-------|---------|
| Odessa | new construction | n/a | n/a | planned |

The government granted funds for the modernisation of the waste management within the framework of the law for the modernisation and development of the utility industry, which was passed in summer 2009. In June 2009, the Ukraine government commissioned Swedish company Ecoenergy to construct 14 waste incineration plants. However, there is no information on an eventual concretisation of these plans. Hence, we do not expect the plants to go on line.

Figure 144: Forecast investment volume Ukraine



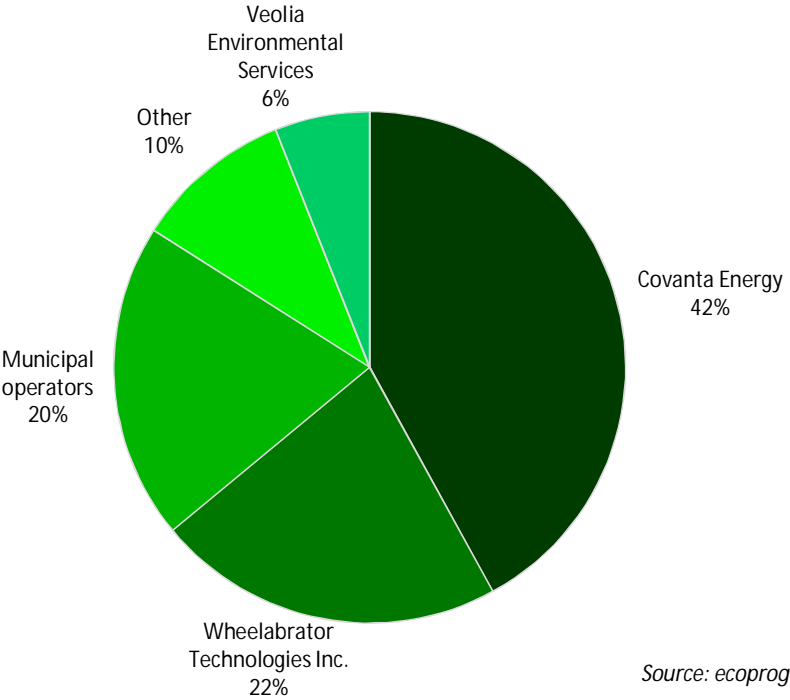
Forecast from 2011 on, Source: ecoprogram

Competition

More than 50 per cent of the plants in the USA are owned by the municipalities. By contrast, more than 80 per cent are operated by private companies.

Covanta has been the largest operator in the USA, since Veolia sold a major part of its incineration business to the company in 2010. Wheelabrator, subsidiary of the largest American disposal company Waste Management Inc., operates 19 plants and is the second largest competitor. Veolia kept five of its plants and ranks third.

Figure 158: Shares of operators of plants constructed until 2010 in the USA



More than a third of the plants in the USA are equipped with a grate from Martin; about 20 per cent with technology from Von Roll and their successor companies respectively (today Hitachi Zosen Inova). Third strongest supplier is Fisia Babcock. When waste incineration was booming, American companies like Detroit Stoker were also active in this segment. However, in contrast to their European competitors they were not able to establish outside of their own domestic market. They left the market when the market development slowed down. Currently active suppliers like Energy Answers also only work in individual projects. Repeatedly over the past years, start-ups were founded that primarily wanted to offer innovative solutions in the segment of (plasma) gasification. However, they were so far not able to implement themselves on the domestic market.

Anji

Status: under construction
Capacity (t/a): 90.000
Electric power production (MWh/a): 300.000

Annan

Annan
Status: planned
Capacity (t/a): 219.000

Anqing

Anqing China GEE environmental protection power Ltd.(Beijing China Science GEE Group)
Anqing -

Status: under construction
Capacity (t/a): 260.000

Baicheng

Baicheng Tongfang new energy Ltd.
Baicheng -

Status: active
Capacity (t/a): 256.000

Unit 1

Start of operation: 2010
Capacity (t/h): 20,00
Manufacturer furnace: Baicheng Tongfang new energy Ltd.

Unit 2

Start of operation: 2010
Capacity (t/h): 20,00
Manufacturer furnace: Baicheng Tongfang new energy Ltd.

Baoding

Hebei Construction Investment Ltd.
Baoding -

Status: active
Capacity (t/a): 384.000

Unit 1

Start of operation: 2010
Capacity (t/h): 25,00
Incineration mode: SITY 2000
Manufacturer furnace: Martin

Unit 2

Start of operation: 2010
Capacity (t/h): 25,00
Incineration mode: SITY 2000
Manufacturer furnace: Martin

Baotou 1

Baotou BOQI Environmental protection technology Ltd.(China BOQI(Holding) Ltd.)
Baotou -

Status: active
Capacity (t/a): 384.000

Unit 1

Start of operation: 2009
Capacity (t/h): 12,50
Incineration mode: grate furnace
Manufacturer furnace: China Boqi

Unit 2

Start of operation: 2009
Capacity (t/h): 12,50
Incineration mode: grate furnace
Manufacturer furnace: China Boqi

Unit 3

Start of operation: 2009
Capacity (t/h): 12,50
Incineration mode: grate furnace
Manufacturer furnace: China Boqi

Unit 4

Start of operation: 2009
Capacity (t/h): 12,50
Incineration mode: grate furnace
Manufacturer furnace: China Boqi

Baotou 2

Inner Mongolia Pratt Transport Energy Co.

Status: under construction
Capacity (t/a): 432.000
Electric power production (MWh/a): 2.100

Remarks: The site covers an area of 132.69 acres.

Unit 1 (under construction)
Capacity (t/h): 16,60

Unit 2 (under construction)
Capacity (t/h): 16,60

Derry

Derry

Status: discussed

Remarks: An incinerator could be constructed in Derry. Sinn Féin councillor Gerry MacLochlainn said that the motion would allow market forces to decide the exact type of incinerator to be built. It is said that MacLochlainn believes the motion paves the way for a traditional grate incinerator.

Doncaster

Doncaster

Status: under construction

Capacity (t/a): 120.000

Electric power production (MWh/a): 76.000

Remarks: Doncaster Energy Recovery Ltd and Lancashire-based BioGen Power have submitted a planning application for a WTE plant using gasification technology. The plant would produce enough energy to power 20,000 homes and it would be one of the first plants of its type in the UK. Construction work commenced in late 2010.

Doncaster 2

Doncaster 2

Status: planned

Remarks: Two out of four companies have been shortlisted to treat household waste from Barnsley, Doncaster and Rotherham (South Yorkshire) at the Bolton Road site in Doncaster. Sita Lend Lease wants to construct the plant. 3SE, a joint venture of UK waste management company Shanks Group plc and Scottish and Southern Energy Limited, said it will use proven waste treatment technology to produce a renewable and green fuel.

Douglas (Isle of Man)

SITA Isle of Man
Richmond Hills
Douglas IM4 1JH
Tel.: 0044-1624 695260
Fax: 0044-1624 660252

Status: active

Capacity (t/a): 65.000

Electric power production (MWh/a): 2.004

Unit 1

Start of operation: 2004

Capacity (t/h): 8,25

Incineration mode: Moving grate

Flue gas cleaning: Semi Dry Scrubbing

Manufacturer furnace: Babcock

Manufacturer flue gas cleaning: Seghers

Remarks: Planned to shut down in 2029.

Unit 2

Start of operation: 2005

Capacity (t/h): 1,00

Incineration mode: Stepped

Flue gas cleaning: Semi Dry Scrubbing

Manufacturer furnace: Techtrol

Manufacturer flue gas cleaning: Seghers

Remarks: Planned to shut down in 2029.

Drumshangie

Covanta Energy

Status: approved

Capacity (t/a): 300.000

Electric power production (MWh/a): 192.000

Thermal power production (MWh/a): 184.000

Remarks: Start of construction is planned for autumn 2011.

Dudley

Dudley Waste Services
Lister Road
Dudley DY2 8JT
maria@mesenvironmental.co.uk

Status: active

Capacity (t/a): 90.000

Remarks: In January 1996 Dudley Metropolitan Borough Council awarded Martin Engineering Systems Ltd (MES) the contract to redevelop, upgrade, and operate the incinerator. Dudley Waste Services is jointly owned by CNIM (39%) and two private investors, Innisfree and CIBC.

Unit 1

Start of operation: 1998

Capacity (t/h): 11,00

Incineration mode: grate

Manufacturer furnace: Martin

Dumfries RDF

Scotgen
Dargavel Store off Lockerbie Road
Dumfries DG1 3PG

Status: active

Capacity (t/a): 60.000

Electric power production (MWh/a): 496.000

Plant register

| | | | |
|-----------------------|-----|-----------------------|-----|
| Aalborg | 185 | Anji | 129 |
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ecoprogram GmbH
Krefelder Str. 18
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Tel. +49 221 788 03 88 - 0
Fax. +49 221 788 03 88 - 10

Amtsgericht Köln, HRB 56660
Stadtsparkasse Köln
BLZ 370 501 98
Kto.Nr. 1900209287