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Marktstudie zu Sonderabfallverbrennungsanlagen in Europa

Anlagen, Projekte, Akteure und in der thermische Behandlung gefährlicher Abfälle

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ecoprog GmbH

Marktstudie zu Sonderabfallverbrennungsanlagen in Europa

Zwischen 2012 und 2022 ist die Menge an gefährlichen Abfällen in der EU um 25 % gestiegen. Dies war unter anderem auf strengere Umweltvorschriften, komplexere Materialien sowie eine Zunahme der getrennten Abfallsammlung zurückzuführen. Trotz Maßnahmen zur Steigerung des Recyclings und der thermischen Behandlung erhöhte sich die Menge der deponierten gefährlichen Abfälle um 14 %.
Um die zukünftige Entsorgungssicherheit zu gewährleisten und gleichzeitig mehr Abfälle zu verwerten, benötigen viele Länder zusätzliche thermische Behandlungskapazitäten. Inwieweit dieser Bedarf durch die aktuelle Krise der europäischen Chemieindustrie langfristig reduziert wird, ist bislang unklar.
Vor diesem Hintergrund hat ecoprog eine detaillierte Analyse des Marktes für Sonderabfallverbrennungsanlagen (Hazardous Waste Incineration Plants, HWIP) in Europa durchgeführt.

Konkret umfasst die Marktstudie zu Sonderabfallverbrennungsanlagen in Europa:

- Daten zu über 100 Sonderabfallverbrennungsanlagen und Projekten in Europa, einschließlich Angaben zu Kapazitäten, Einsatzstoffen und Verbrennungstechnologien (sofern verfügbar),
- Zusätzliche Informationen zu rund 60 industriellen Sonderabfallverbrennungsanlagen sowie spezialisierten medizinischen Abfallverbrennungsanlagen, einschließlich Angaben zu Kapazitäten, Einsatzstoffen und Verbrennungstechnologien (sofern verfügbar),
- Analyse zentraler Marktfaktoren und Trends,
- Überblick über Wettbewerber im Anlagenbetrieb und -bau,
- Marktanalysen für 31 nationale Märkte, einschließlich Struktur und regulatorischem Umfeld, Anlagen, Projekten, Marktausblick und Wettbewerb.

Die Studie ist **in englischer Sprache** ab 3.900,- € zzgl. MwSt. erhältlich. Abonnenten unseres w&b Monitors erhalten einen Preisnachlass ab 600,- €.

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1 Basics and Definition

This report analyses the market for hazardous waste incineration plants (HWIPs) in Europe. In the following, we will explain this topic in greater detail.

1.1 Demarcation by type of waste

HWIPs focus on the treatment of hazardous waste. In the EU, this hazardousness is defined by the European Waste Catalogue (EWC), which was established by Commission Decision 2000/532/EC.

The EWC distinguishes 20 waste source categories. The first 18 categories are economic sectors, based on the classification of economic activities in the European Community (*Nomenclature des Activités Économiques dans la Communauté Européenne*, NACE). Category 19 comprises secondary waste, meaning waste that has already been treated in a waste infrastructure. Category 20 includes municipal waste, i.e. public waste for which public waste management authorities, usually municipalities, are responsible for collection and disposal. This also includes municipal waste collection.

The EWC recognizes approximately 900 waste codes. For each code, the EU also has defined whether this type of waste is “hazardous” or not. In total, over 400 waste codes are classified as hazardous waste.

1.2 Demarcation by type of treatment

The report focusses on facilities that use thermal treatment technologies. Most prominent of these are combustion technologies, in some case also gasification or pyrolysis technologies.

Facilities that treat types of hazardous waste by using other technologies, such as chemical or organic treatment, will not be included. These facilities usually focus on other hazardous waste streams than HWIPs, therefore, such facilities are parts of separate markets.

1.3 Demarcation by type of thermal treatment

The report focusses on facilities providing thermal treatment in regard to the definition of hazardous waste according to the EU’s Directive 2010/75/EU on Industrial Emissions (IED).

The IED mandates special treatment for hazardous waste that contains >1% of halogenated organic substances or other high-risk organic compounds requiring enhanced destruction.

This treatment includes, amongst others:

- Minimum flue-gas temperature: ≥1100 °C
- Residence time: ≥2 seconds
- Controlled and monitored oxygen concentration

- Continuous emissions monitoring (CEMS)
- Specific flue-gas cleaning performance
- Compliance with IED Annex VI emission limits
- Permit conditions specific to co-incineration

Figure 1: Types of thermal waste treatment plants and their role for this report

Type	Abbr.	Characteristics	Role in this report
Standalone hazardous waste incineration plant	HWIP	- Facility of its own - Dedicated mono-incinerator for hazardous waste - Fulfils hazardous waste incineration requirements according to IED - Open for external costumers	Main focus of this report
Combustion unit for hazardous waste	HWI FU	- Combustion line that is part of a larger facility, usually a Waste-to-Energy plant - Dedicated mono-incinerator for hazardous waste - Fulfils hazardous waste incineration requirements according to IED - Open for external costumers	
Medical waste incinerator	MedInc	- Dedicated mono-incinerator for medical waste, not for hazardous waste	Will be described wherever information is available Listed in annexes as far as information is available Not included in the market outlook
Chemical waste incinerator	ChemInc	- Facility or combustion line with a focus on a smaller number of dedicated hazardous waste streams - Part of an industrial production, treats only waste from this production, not open for external costumers - May fulfil hazardous waste incineration requirements according to IED	
Waste-to-Energy facility	WtE	- Mono-incinerator of waste with a focus on non-hazardous waste - May co-incinerate some waste streams that are classified as hazardous	Co-incinerators of hazardous waste Mentioned in some country chapters when it helps understanding the hazardous waste market Not listed in annexes Not included in the market outlook
Cement kilns	CK	- Co-incinerator of different waste streams - May co-incinerate some waste streams that are classified as hazardous	
Waste wood combustion plants	WW	- Mono-incinerator of biomass with a focus on waste wood - May co-incinerate some biomass waste streams that are classified as hazardous with a focus on non-hazardous waste	
Fossil fuel co-incinerators	FF	- Power plants using fossil fuels, especially coal and co-incinerating some waste streams - Can be coal and lignite plants in the public grid as well as industrial plants - May combust some waste streams that are classified as hazardous	

As a result, for instance, “common” Waste-to-Energy facilities that usually combust waste at a temperature of around 850 °C are not able to provide this type of thermal treatment. This also holds true for other waste infrastructure for thermal waste treatment such as waste wood combustion plants or most cement kilns. Many of these facilities do combust hazardous waste according to the definition of the European Waste Catalogue, but not according to the stricter requirements of the IED.

For a better understanding, the different types of infrastructure for thermal waste treatment and their role in this report are listed above.

In practice, it is not that easy to unambiguously categorise the individual types of plants. For instance, many medical waste incinerators work according to the requirements of the IED, and some of them even combust smaller amounts of non-medical hazardous waste. Theoretically, this would classify them as standalone hazardous waste incineration plants, even though they have a clear focus on medical waste. Other medical waste incinerators do not meet requirements for hazardous waste incineration according to the IED and cannot even combust all medical waste. In many cases, the available information makes it difficult to exactly determine the type of plant according to this methodology. Nevertheless, the authors of this report even in case of uncertainties took a decision for one category, the information is provided in the plant register.

1.4 Reduced statements on waste volumes

The report focuses on the plant market for HWIPs. This does, of course, also include the analysis of the situation of waste amounts and their current and future development (wherever possible). However, it is not possible to analyse the waste volumes on the basis of public statistics to full extent.

The criteria of hazardous waste for special treatment according to the IED are not fully reflected in the EWC. For the same waste code (for instance 16 01 07*), some waste amounts may fall under the closer definition of the IED due to their material characteristics, while another charge is “common” hazardous waste. Of course, some waste codes within the EWC chapter 07 (Wastes from organic chemical processes) are more likely regarded than other waste streams, but EWC and IED do not really match. Whether or not special treatment is necessary, must be decided on the basis of each individual charge.

As a result, the categories on public waste statistics based on the EWC give only a vague evidence about waste amounts for thermal treatment according to the IED.

Therefore, we will analyse waste streams insofar as it serves to understand the plant market and is based on centralised Eurostat data. A detailed examination of hazardous waste volumes and their disposal for all 31 countries based on their respective national statistics is not possible within the scope of this study.

Such analyses, for example, regarding the planning of individual infrastructure projects, must be conducted on a case-by-case basis.

Figure 2: Geographical scope of the report

1.5 Incineration and energy recovery

Some hazardous waste incinerators use the energy produced in this process so efficiently that they apply to the R1 criteria of the EU's Waste Framework Directive and their process is therefore acknowledged as energy recovery. Others, which do not reach such an efficiency, are classified as incineration (D10).

For this report, this difference is of no major impact. However, in some countries, differences between R1 and D10 help to understand the market.

1.6 Demarcation by size

Incineration plants that primarily or exclusively thermally treat hazardous waste are often small when compared, for instance, to WtE plants. A prominent example are smaller incinerators in hospitals. Such facilities have been regarded when we have become aware of them. Nevertheless, the identification of HWIPs with a capacity of less than 1 kt/a has not been the purpose of this report.

1.7 Geographical demarcation

This study focuses on the main European markets within the European Economic Area (EEA) plus the UK. The includes:

- The 27 Member States of the European Union.
- Iceland, Norway, and Switzerland, which are part of the European Free Trade Association (EFTA). The economies and environmental policies of these EFTA countries are closely linked to those of the EU and are largely integrated into the EU internal market through the EEA. Liechtenstein, too, is member of EFTA and EEE, however, for the purpose of this report, it was excluded because of its very small size.
- The United Kingdom is no part of EU, EFTA, and EEA, but one of the largest country markets in Europe. Since late 2020, the economic relationship between EU/EFTA and the UK is ruled by the „Trade and Cooperation Agreement“ (TCA).

To provide a comprehensive market overview, the 31 countries surveyed were grouped into different areas: France and Benelux, Central, Eastern, Scandinavia, Southern, United Kingdom, an Ireland.

6 Country Chapters

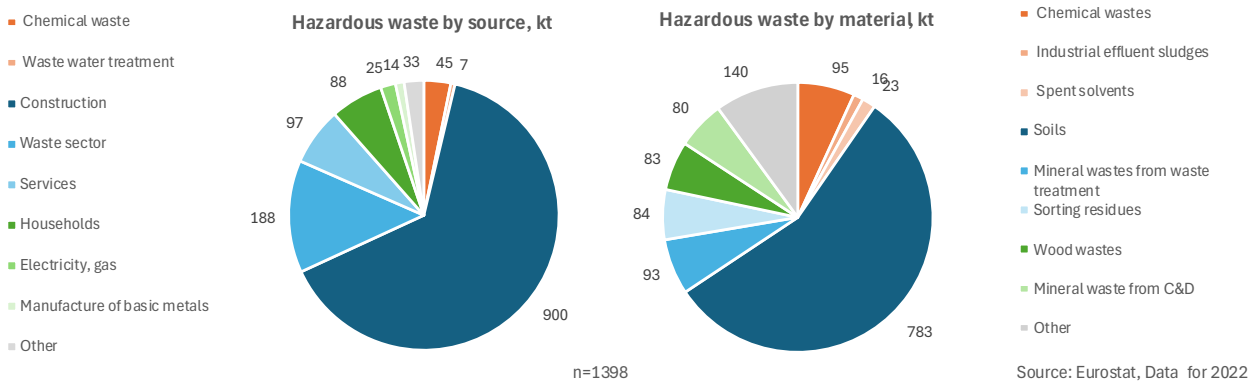
1.8 Denmark

Inhabitants [million]	5.9	GDP [billion €]	374
Hazardous waste [1,000 t/a]	1,398	of which chem. waste, sludges, solvents [1,000 t/a]	135
HWIPs	1	HWIP capacity [1,000 t/a]	180

Hazardous waste amounts

According to Eurostat, in 2022, 23.8 million tonnes of waste arose in Denmark, 1.4 million of which were classified as hazardous. Of these, 900 kt (65%) resulted from construction activities. Chemical waste and industrial effluent sludges amounted to 112 kt.

Figure 1: Composition of hazardous waste in Denmark



Legal framework

In Denmark, hazardous waste is regulated under the Environmental Protection Act (*Miljøbeskyttelsesloven*) as the overarching law, supplemented by detailed regulations. The key regulation is the Executive Order on Waste (*Affaldsbekendtgørelsen*), which defines specific rules for classification, collection, and treatment of hazardous waste, aligning with the EU Waste Framework Directive. Additional sector-specific rules are in effect (for example, the WEEE Order covers electronic waste).

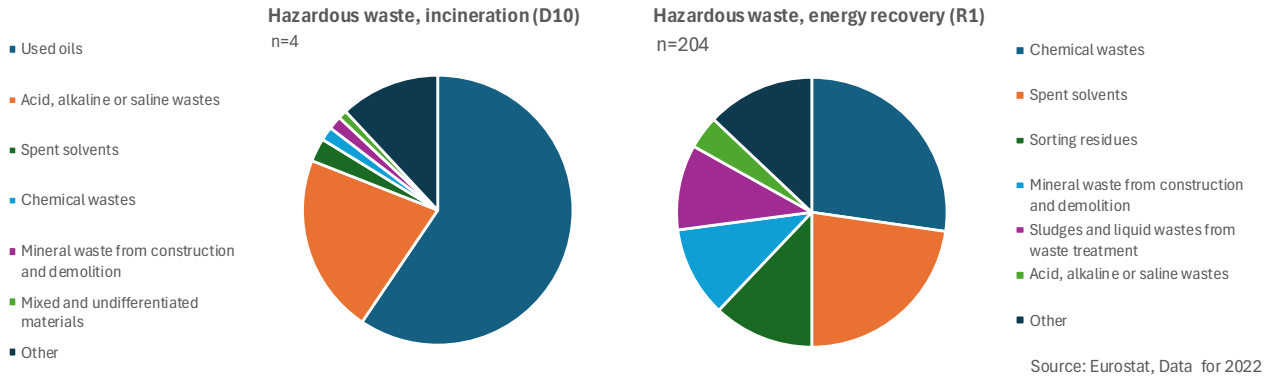
Denmark's hazardous waste management is governed by its national waste management plan. The current plan is the "Action Plan for Circular Economy – National Waste Prevention and Management Plan 2020-2032 (*Handlingsplan for cirkulær økonomi – national plan for forebyggelse og håndtering af affald 2020-2032*). In this plan, Denmark expects a further increase of hazardous waste. The main focus is to avoid the landfilling of hazardous waste and to push recycling and high-standard treatment of hazardous waste, such as combustion with energy recovery, instead.

Combustion infrastructure

As of now, there is one active hazardous waste incineration plant in Denmark. It is operated by NG Nordic and located in Nyborg, a town in central Denmark. The plant treats 180 kt/a of hazardous waste using three rotary kilns and therefore is one of the largest in Europe.

A much smaller facility by Special Waste System A/S, located in Alslev, was shut down after a severe explosion in the rotary-kiln incineration plant caused major damage to the furnace in 2023.

Figure 2: Thermal treatment of hazardous waste in Denmark



Hazardous waste treatment

According to Eurostat, 224 kt of hazardous waste were thermally treated in Denmark in 2022, mostly by energy recovery (220 kt); only 4 kt were incinerated without energy recovery. Taking into account that smaller amounts of hazardous waste were combusted in common Waste-to-Energy facilities and waste wood combustion plants, it can be assumed that most of these waste amounts were treated in the 2 combustion facilities mentioned above.

Regarding import and export of waste, Denmark has both comparatively strong import and export relations, depending on the precise material. While Denmark exported especially hazardous construction waste to the Netherlands, it received a similar amount of mixed and chemical waste from the country in return. Basically, Denmark received most hazardous waste from Italy, and most exports went to Germany.

Figure 3: Known projects in Denmark

name	country	status	Type	t/a	start	Operator
Nørre Alslev	Denmark	planned	HWIP	14,000	2026	Special Waste System A/S (SWS)

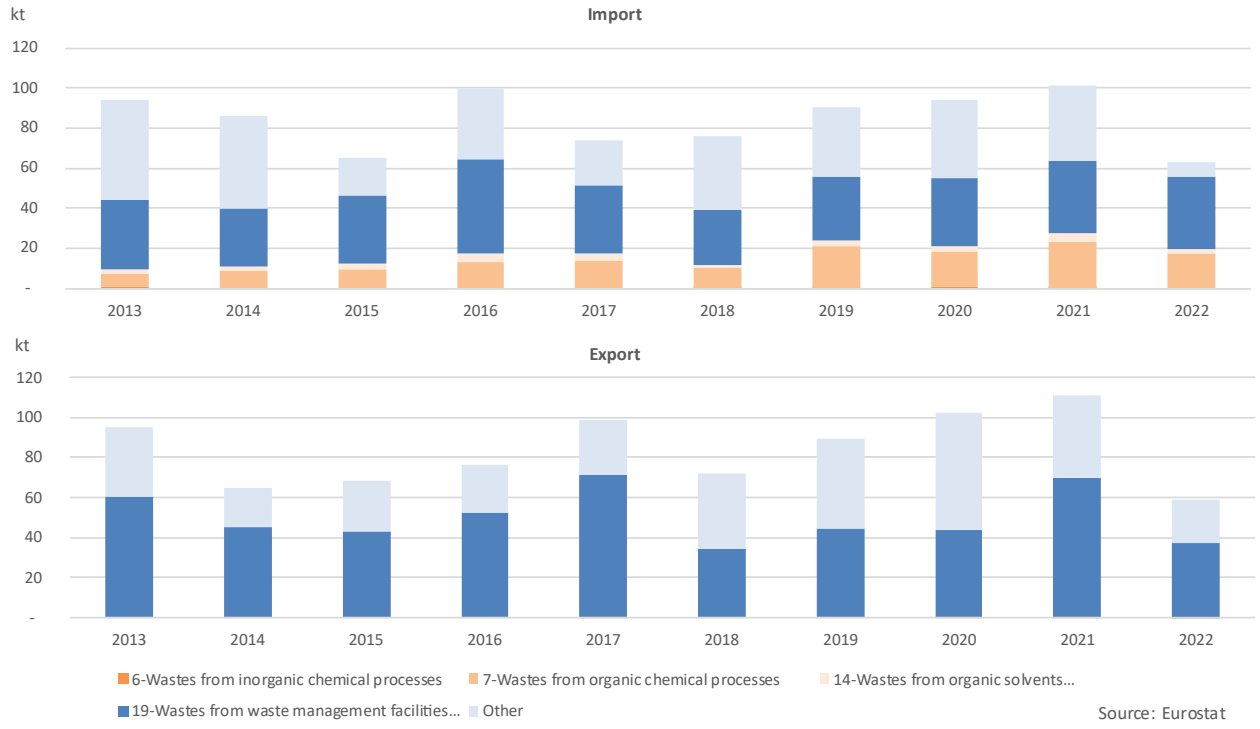
Market, projects

In Alslev, there are plans to rebuild the damaged HWIP and, in the process, increase its capacity from 6kt/a to 14 kt/a. As of autumn 2025, the project is still undergoing the environmental assessment and permitting process.

In Nyborg, further investments are being planned. In 2025, the operator started trial operations for carbon capture. When these plans were announced in 2022 by former operator Fortum, it was also said that the plant was planned to be operational another 50 years.

When considering the installed capacities, available planning documents and the statistic on imports and exports, we do not expect further projects in the years to come.

Figure 4: Import and export of HW for combustion in Denmark



Competition

NG Nordic operates the hazardous-waste facility in Nyborg (formerly Fortum Waste Solutions).

Special Waste System (SWS) has 24 years of experience in handling and incinerating hazardous waste. It was originally built to treat and destroy infectious clinical waste from hospitals, clinics, veterinary practices, and other healthcare facilities.

Details on plants & projects

Nørre Alslev

Category: HWIP
Operator: Special Waste System A/S (SWS)
Status: planned

Input capacity [t/a]: 14.000
Waste input: hazardous and clinical waste
Start of operation: 2026
Technology: rotary kiln incineration
Number of units: 1

The facility shall replace an old plant that was shut down in 2023.

Nyborg

Category: HWIP
Operator: Fortum Waste Solutions A/S
Status: active

Input capacity [t/a]: 180.000
Waste input: industrial chemical waste
Start of operation: 1975
Technology: rotary kiln
Number of units: 3