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# Current Status, Waste Management Strategies and Planning in Finland

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## 1. Current status

### 1.1. General information

The objective of Finnish waste policy is to promote the sustainable use of natural resources and to prevent the environmental and health hazards and harmful effects posed by waste and waste management. In addition, the aim is also to reduce the amount and adverse effects of waste and to prevent the accumulation of litter. The Finnish Ministry of the Environment takes part in the preparation of the EU and international waste policy and is responsible for the preparation of the national waste legislation. The Finnish waste legislation has been reformed almost in its entirety in the 2010s. The main purpose has been to update the Finnish legislation to correspond with the reformed waste legislation of the European Union.

The most significant legislative reform in the 2010s has been banning the landfilling of biodegradable and other organic waste starting from 2016. The restrictions apply to waste that contains over 10 % organic matter. For the part of construction and demolition waste, the restrictions will not, however, fully enter into force in Finland until 2020.

Another significant policy instrument has been the introduction of the municipal waste tax, which landfill owners are subject to. The waste tax is intended to be added on to the overall price charged for the receipt and processing of waste, to be paid by the producers of waste. No tax has been levied for the disposal of hazardous waste.

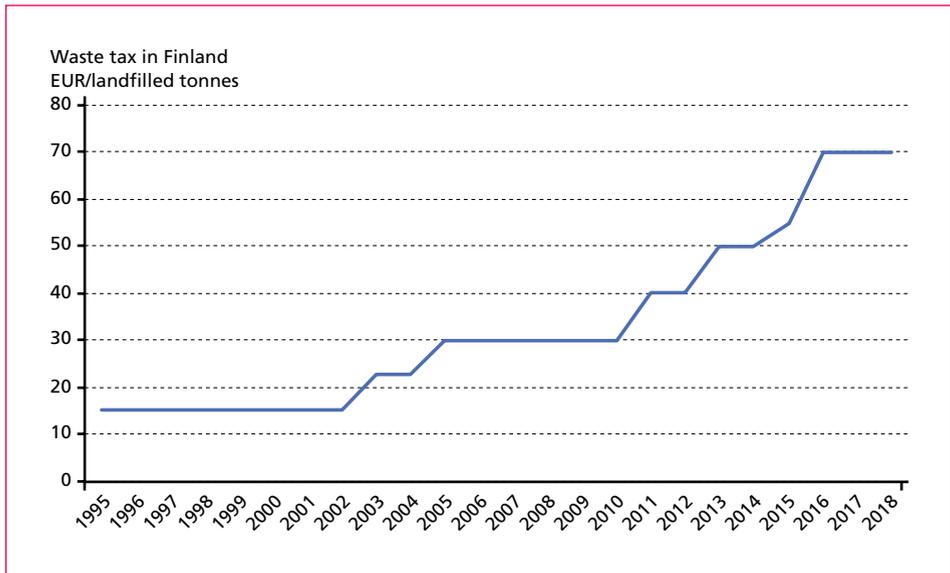


Figure 1: Waste tax in Finland between 1996 and 2018

Source: Ministry of Finance

The proceeds from the waste tax levied by the Finnish government peaked at the beginning of the 2010s at 60 million EUR. Even though the waste disposal tax levied by the state has been significantly increased in the 2010s, the proceeds from it have dropped quickly as waste incineration has become more popular. In 2017, the proceeds from waste taxation comprised only 12 million EUR, since the disposal of municipal waste at landfill sites had been reduced so rapidly.

## 1.2. Recovery of waste has replaced the disposal of municipal waste at landfill sites

Disposal of municipal waste (MSW) at landfill sites has decreased strongly, which has been the trend in recent years. In 2016, only 3 % of municipal waste was disposed of at landfill sites. Landfilling has been replaced by the recovery of waste for energy (55 %) and material recovery (42 %). Finland has a long-standing tradition of recycling materials. Separate collection and recycling of biodegradable waste, paper, glass, metal, plastic and other packaging materials is comprehensive and effective. In 2016, approximately 97 % of municipal waste was recovered, which is a new record for Finland.

In recent years, using municipal waste to produce energy, such as district heat and electricity, for built-up areas has been the most common treatment method. At the same time, approximately 130,000 tonnes of municipal waste have been exported to Sweden and Estonia due to the lack of waste incineration capacity in Finland.

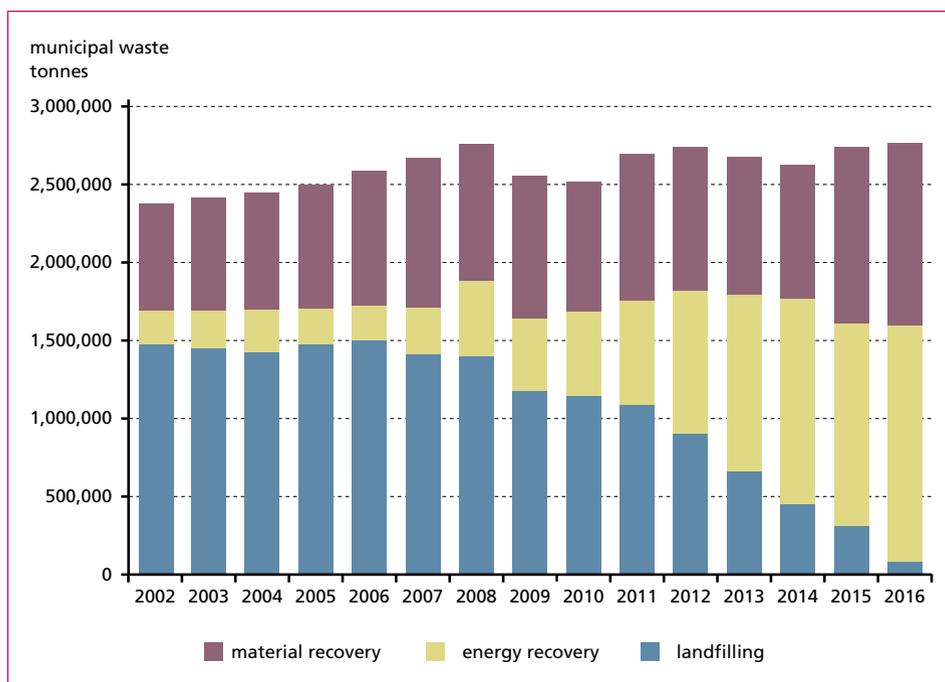


Figure 2: Amount of municipal waste in Finland by treatment method between 2002 and 2016

Source: Waste statistics 2016, Statistics Finland

After the turn of the millennium, the amount of municipal waste in Finland has varied from 2.4 to 2.8 million tonnes a year. In recent years, the total amount of municipal waste has slightly grown in terms of numerical value. When calculated by inhabitant, the growth has been small, and the amount has stabilised at around 500 kilogrammes per inhabitant. The growth in the total amount of municipal waste is explained by the increasing number of inhabitants.

### 1.3. Division of responsibility in municipal waste management

According to the Finnish Waste Act, the holder of waste, such as a private individual, property owner, or company, is primarily responsible for organizing waste management. As an exception to this general rule, municipalities and the manufacturers and importers of some products are partly responsible for the organizing of waste management. In 2017, the total turnover of the waste management industry was approximately 2.5 to 3.0 billion EUR, of which the share of municipal waste management sector was approximately 430 million EUR.

## 1.4. Waste management provided by municipalities

Municipalities' responsibility for arranging municipal waste management provides the basis for ensuring proper waste management in all circumstances and across the country. Of the overall amount of municipal waste, approximately 56 % is the responsibility of municipalities, which constitutes less than 3 % of the total amount of waste generated in Finland. Municipalities are responsible for the management of municipal waste produced by households, public service activities, social and health services, and educational activities. In addition, municipalities have a subsidiary management responsibility for commercial and industrial waste. Market-based activities by municipality-owned waste management companies has constituted, on average, 10 % of their turnover. For the reception of recyclable waste, municipality-owned waste treatment plants have a nationwide network of recycling points, which is managed in collaboration with producer associations. The reception of hazardous waste has also been comprehensively organised.

In general, municipalities fulfil their obligation to meet the requirements of the Waste Act jointly via waste management companies or municipal enterprises. There are 33 municipality-owned waste management companies in Finland. There are still slightly more than 20 municipalities that manage waste independently, although even they usually collaborate with a waste management company. Municipality-owned waste treatment plants order waste transport, and the majority of treatment services, from private environmental companies, after a tendering process. Municipality-owned waste management companies have also acquired waste treatment capacity through tendering or constructed their own waste incineration plants or biowaste treatment plants for processing waste that falls under the responsibility of municipalities. The concentration of waste management in large units has improved the quality of Finnish waste management and enabled the large treatment plant investments required for the development of waste management. In the future, the recycling objectives becoming even more demanding at the EU level will probably affect the waste management infrastructure and increase particularly the number of mechanical pre-treatment plants and biowaste digestion plants in Finland, which will also increase the waste recycling rate.

The fees of municipality-owned waste management plants can be assessed with the aid of the annual comparisons produced by the Finnish Real Estate Federation. In 2017, the average municipal solid waste fee for Finnish residential buildings was EUR 0.17/m<sup>2</sup> per month. Waste management costs vary greatly between different parts of the country in the range of EUR 0.11-0.27/m<sup>2</sup> per month (250 %). The cost variation depends particularly on whether waste transport is arranged by the municipality and how low the gate fee is for waste incineration in the area. Tampere has the lowest waste fees in Finland due to the cost-effective waste transport system, high waste recycling rate, and energy-efficient waste incineration plant. As a general rule, cities with a waste incineration plant have the lowest municipal waste fees. In Finland, the average waste fee cost is 6 % of the annual municipal property fees and thus in the same range as the property tax. In the case of Finnish blocks of flats, the greatest expense item is district heating, at EUR 0.66/m<sup>2</sup> per month (25 %).

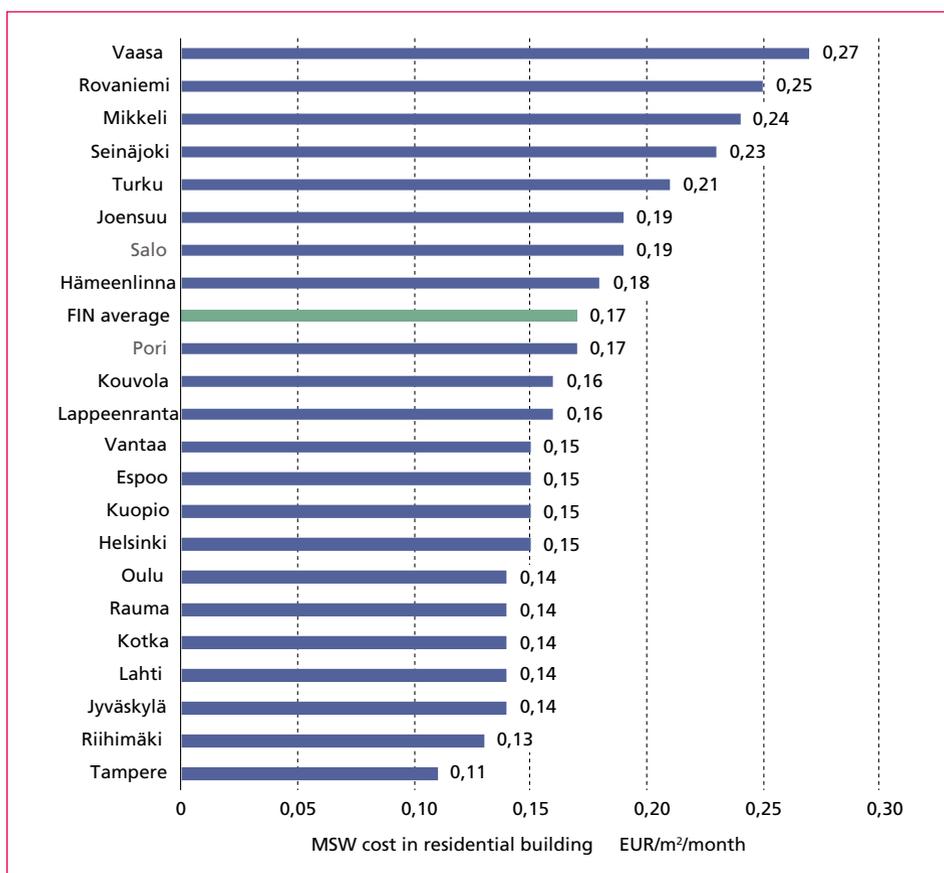


Figure 3: Municipal waste cost for residential buildings in Finland in 2017

Source: The Finnish Real Estate Federation 2017

## 1.5. The private waste management sector

Waste falling under extended producer responsibility constitutes, in total, 25 % of the entire amount of municipal waste. The manufacturer and importer are responsible for the collection, pre-treatment, recycling, and recovery of the products they no longer use. In addition, they are also responsible for the provision of other kinds of waste management and the related costs. These entities can either meet the responsibilities themselves or transfer the responsibility to a producer association. The aim of extended producer responsibility is to make the recycling of materials more effective and to direct product design in a way that results in as little waste as possible. Producer responsibility is already in use in the waste management of car tyres, paper, scrap vehicles, packaging waste, electrical and electronic equipment, and batteries. The producer associations and municipality-owned waste treatment plants maintain separate collection systems for different types of household waste.

The producer or other holder of waste is responsible for the management of the rest of the municipal waste, which constitutes approximately 19 % of the overall amount. In addition, the holder of waste is also responsible for the processing of all other types of waste produced in Finland, which constitutes 97 % of the overall amount of waste produced in Finland.

## 1.6. Current situation and future prospects of waste incineration

In recent years, waste incineration has replaced landfilling as the most common final form of processing municipal waste. At the moment, there are a total of nine waste incineration plants (seven grate incinerators, one gasification plant, and one fluidized bed plant) operating in eight localities. In addition, the construction of a new plant, with production set to start in 2020, is about to begin in Western Finland. Since 2012, waste incineration has rapidly become more popular in Finland.

There are also over 20 co-incineration CFB plants (circulating fluidized bed), where the combustion of waste fuel SRF (Solid Recovered Fuel) is possible. These are the most spread plants. In addition, there is also one hazardous waste incineration plant in Finland, in Riihimäki.

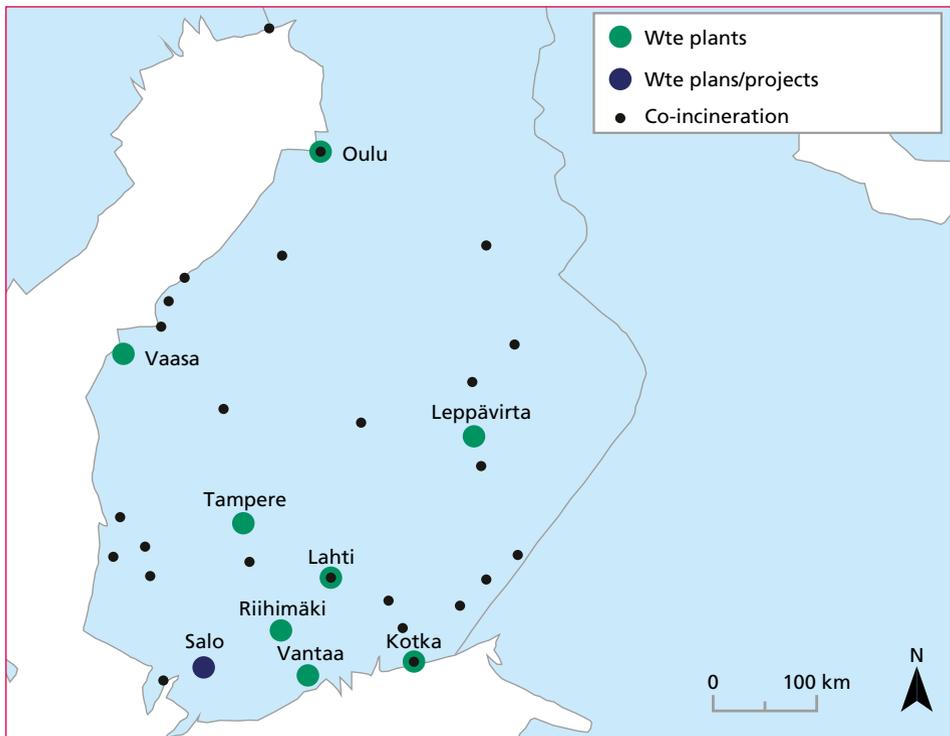


Figure 4: Waste-to-energy plants in Finland

Source: Pöyry Management Consulting Oy, 6 June 2017

Table 1: Waste-to-energy plants in Finland in 2017

Location	Company	Start-up	MSW t/a	Dual fuel t/a	Technology
Riihimäki 1	Fortum Waste Solution Oy	2007	150,000		grate
Riihimäki 2	Fortum Waste Solution Oy	2012	120,000		grate
Kotka	Kotkan Energia Oy	2009	110,000		grate
Lahti	Lahti Energia Oy	2012	100,000	MSW SRF+140,000 recycled wood	gasification
Oulu	Oulun Energia Oy	2012	140,000		grate
Vaasa	Westenergy Oy Ab	2012	180,000		grate
Vantaa	Vantaan Energia Oy	2014	360,000		grate, 2 lines
Tampere	Tammervoima Oy	2015	160,000		grate
Leppävirta	Riikinvoima Oy	2016	145,000		CFB
<b>total capacity 2017</b>			<b>1,465,000</b>		
Salo (under construction)	Lounavoima Oy	2020	120,000		grate
<b>total capacity 2020</b>			<b>1,585,000</b>		

Source: Annual reports of the companies for 2016 and 2017

In 2017, a total of almost 1.5 million tonnes of municipal waste was recovered for energy. Despite that, 130,000 tonnes of waste had to be transported to Sweden and Estonia for incineration, and Finland will not have a sufficient waste incineration capacity to recover all unrecyclable Finnish waste for energy until 2020. It is estimated that in 2020, the share of energy produced by waste incineration in Finland will increase, for the part of district heating, to 8 % (2.9 TWh) of the estimated overall district heating consumption of 36 TWh and, for the part of electricity, to 1.3-1.4 % (1.2 TWh) of the predicted 87-90 GWh total electricity consumption.

In 2017, a total of 0.6 million tonnes of recovered fuel refined from waste was also combusted in co-incineration (CFB) plants. Recovered fuel is mainly made of sorted and crushed demolition waste, as well as packaging waste and a small amount of municipal waste. The use of recovered fuel has decreased over the years. At the moment, Finland produces a surplus of recovered fuel, due to which the gate fees are about to become negative, at least for the part of poor-quality fractions.

For a long time, significantly less municipal waste was recovered for energy in Finland than in most Western European countries. Finland does, however, have strong potential for waste incineration, as the most common form of heating in all cities is district heating, with a market share of 90-95 %, and even in summers the consumption of district heating is almost always sufficient for the waste treatment plants' combined production capacity of electricity and heating. A few plants also produce steam for industrial use.

In the European countries where a large share of municipal waste is recovered for energy, the level of recycling is also high. Recovering waste for energy in accordance with European waste management practices has also supplemented the level of recovery

achieved by recycling in Finland. The recycling rate has increased over 10 % in ten years, and in 2017 it had risen to the level of 44 %. Finland has all the prerequisites for achieving the EU target of recycling at least 50 % of municipal waste by 2020.

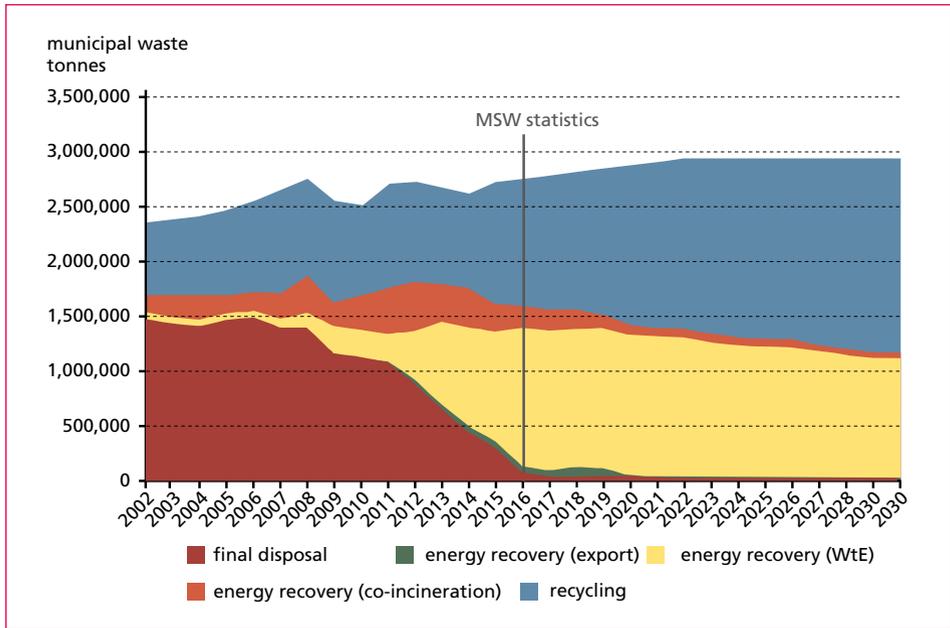


Figure 5: Waste to energy success story in Finland – recovery rate 97 % –

Source: KIVO, Finnish Solid Waste Association, 2016

## 2. Waste management strategies and planning

### 2.1. From recycling to a circular economy – The National Waste Plan 2030

The National Waste Plan, approved and adopted by the Finnish Government in 2017, is a strategic plan laying down the objectives and measures for waste management and prevention in Finland.

The target set for the year 2030 in the National Waste Plan is:

1. High standard waste management is part of the sustainable circular economy.
2. Material-efficient production and consumption save natural resources and mitigate climate change.
3. Volumes of waste have decreased. Reuse and recycling have risen to a new level.
4. The recycling market works well. Reuse and recycling create new jobs.
5. Valuable raw materials present in small concentrations are also recovered from recycled materials.

6. Material cycles are innocuous, and less and less hazardous substances are used in production.
7. In the waste sector, the level of research, experiments, and competence in waste-related matters is high.

The four key areas in the National Waste Plan are: construction and demolition waste, biodegradable waste, municipal waste, and waste electrical and electronic equipment. These priorities have been selected because the waste streams in question are particularly challenging in terms of reducing the amount and harmful effects of the waste and promoting recycling.

#### **Construction and demolition waste**

- The amount of construction waste will decrease.
- The recovery rate of construction and demolition waste will be increased to 70 %.
- The recovery of construction waste will be increased in a way that manages the related risks.
- The accuracy and correctness of construction and demolition waste statistics will be improved.

#### **Biodegradable waste**

- The amount of food waste will be halved by 2030.
- There will be a recycling rate of 60 % for all municipal biowaste.
- The use of fertiliser products made of recycled materials will increase, and they will be used to replace fertilisers made of virgin raw materials.

#### **Municipal waste**

- The increase in the amount of municipal waste will slow down in relation to GDP, and a relative decoupling will be achieved.
- In 2025, 55 % of municipal waste will be recycled.
- The recycling of packaging materials will increase in accordance with the target level determined in the EU's Waste Directive.

#### **Waste electrical and electronic equipment**

- The operating life of electrical and electronic equipment will be prolonged and its utilisation rate will be increased.
- The share of waste electrical and electronic equipment in mixed waste will decrease and its recycling will increase.
- The critical raw materials and valuable materials contained by waste electrical and electronic equipment will be recovered and put into circulation more efficiently.

- Undesirable substances contained by waste electrical and electronic equipment will be taken out of circulation.
- Monitoring the export of used electrical and electronic equipment from one country to another will become more effective.

The most important effects of the National Waste Plan are related to the increase in the sustainable and safe use of resources and the advancement of environmental protection. Realisation of the plan will reduce the amount of waste and increase the recycling rate at the same time. With the aid of the measures determined in the waste plan, the environmental awareness and competence related to the circular economy and waste will be strengthened. The realisation of the plan will also create the conditions and opportunities for introducing new circular economical operating models and economically viable solutions.

## 2.2. Could the new Waste Act promote the circular economy?

The objective of the Act is to promote market-based competition and the development of business operations in the waste management sector, as well as the achievement of the increasingly demanding recycling objectives. Efforts are being made to develop the waste industry in a market-based manner by creating a marketplace for waste and side streams. The aim of the strategic programme created by the Finnish Government is to amend the Waste Act by limiting the exclusive rights of municipalities to waste produced in connection with habitation. In this case municipalities could, in future, only provide waste management services to entities other than households via a public marketplace and under their subsidiary waste management responsibility.

The market activities of municipality-owned waste management companies will be restricted to 10 % by 2029 and permanently to 5 % starting from 2030. The Government has justified the restriction of the market activities of municipality-owned waste management companies on the basis of the fact that, in Finland, the stricter selling limits deviating from the Procurement Directive are also applied to other industries to ensure competition neutrality. On the basis of this, it is consistent to also introduce the 5 % selling limit to the waste management sector.

In addition to this, an amendment to the Emissions Trading Act is being prepared in Finland to integrate waste incineration into the EU's emissions trading system (ETS). The Finnish Energy Authority (FEA) has been given the task of preparing guidelines for the technical details and analytical methods related to waste incineration emissions trading. The FEA is responsible for the EU register of national operations as the responsible controller for Finland.

The Finnish Ministry of the Environment is working actively towards integrating waste incineration into the emissions trading system in order to affect the calculations of the burden-sharing sector external to emissions trading. Regardless of the decision of the European Commission, additional taxes and costs will, in any case, be introduced for waste incineration in Finland. With these actions, the Finnish Government will attempt to restore the proceeds from the decreased waste taxes levied in connection with

landfill sites to the previous higher level while simultaneously promoting the circular economy. Unfortunately, the waste incineration sector will have to transfer the created additional costs to the citizens and producers of waste in the form of increased waste management prices.

### 3. Summary

A great reform has taken place in Finnish waste management in the 2010s, as waste incineration has rapidly become more popular. Waste recovery has quickly increased to the level of 97 %, and only less than 3 % of municipal waste is disposed of at landfill sites. At least one new waste incineration plant will be constructed in Finland by 2020, at which point Finland will have achieved self-sufficiency in waste incineration, with an incineration capacity of 1.6-1.7 million tonnes. The objective of the waste legislation under reformation is to make waste management more market-based and, correspondingly, to decrease the role of municipalities in waste management. Finland will fulfil the EU target of recycling at least 50 % of municipal waste by 2020.

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