

## Better management of municipal waste will reduce greenhouse gas emissions

- The amount of municipal waste is expected to grow by 25 % from 2005 to 2020.
- Increased recovery of waste, and diverting waste away from landfill play a key role in tackling the environmental impacts of increasing waste volumes.
- As recycling and incineration with energy recovery are increasingly used, net greenhouse gas emissions from municipal waste management are expected to drop considerably by 2020.
- Limiting or avoiding growth in waste volumes would further reduce greenhouse gas emissions from the waste sector and deliver other benefits to society and the environment.

### Growing waste volumes

On average, each European citizen generated 460 kg municipal waste in 1995. This amount rose to 520 kg per person in 2004, and a further increase to 680 kg per person is projected by 2020. In total, this corresponds to an increase of almost 50 % in 25 years. This projected continuing increase in waste volumes is primarily due to an assumed sustained growth in private final consumption (i.e. an average growth in the EU-15 and EU-12 respectively of 2 % and 4 % per year by 2020 (EC, 2006)) and a continuation of current trends in consumption patterns.

However, as shown in Figure 1, there are significant differences between EU-15 <sup>(1)</sup> and

EU-12 <sup>(2)</sup> Member States. While an EU-15 citizen generated 570 kg on average in 2004, the figure was only 335 kg for an EU-12 citizen. Nevertheless, as EU-12 economies further develop and consumption patterns evolve, waste volumes are likely to increase over the next 15 years and approach current EU-15 levels. Looking forward, municipal waste volumes within the EU-15 and EU-12 are expected to grow by 22 % and 50 % by 2020, respectively. Over the entire period, more than 80 % of the total municipal waste is generated in the EU-15.

If we were simply to spread all EU municipal waste generated in 2020 (i.e. about 340 million tonnes) on the ground, it would cover an area the size

of Luxembourg 30 cm thick or Malta 2.5 m thick!

These results indicate that efforts to prevent the generation of waste should be significantly reinforced, if the aim of the Sixth Environment Action Programme of a significant reduction in volumes of waste is to be achieved.

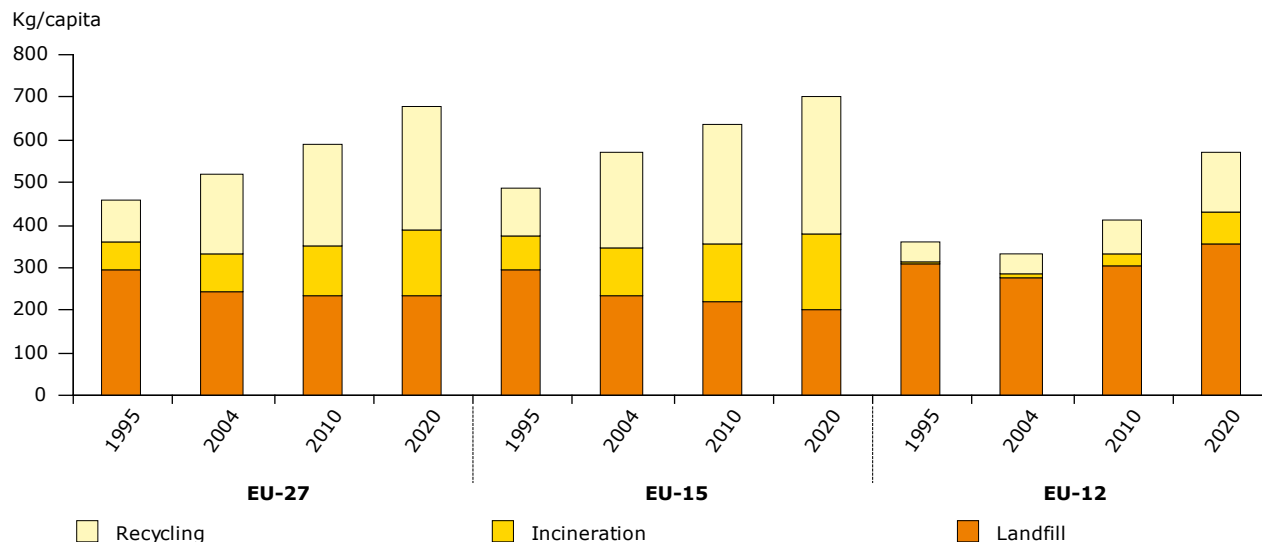
### Increasing recovery and diversion of waste from landfill

Historically, disposal by landfilling has been the predominant treatment method for municipal waste, but over the last two decades considerable reductions in landfilling have taken place. In 2004, 47 % of total EU municipal waste was landfilled

<sup>(1)</sup> Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

<sup>(2)</sup> Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovenia and the Slovak Republic.

**Figure 1 Generation and management of municipal waste in Europe (per capita)**



Source: Eurostat and ETC/RWM.

(see Figure 1). This is expected to decrease further to around 35 % by 2020. Recycling and other material-recovery operations are expected to increase from the current level of 36 % to around 42 % by 2020. Finally incineration was used for 17 % of municipal waste in 2004 and is likely to increase to about 25 % by 2020.

These past and expected trends are in part the result of dedicated policies which aim to increase the recycling and recovery of packaging waste (e.g. 1994 Packaging Directive) and to divert biodegradable municipal waste away from landfill (e.g. 1999 Landfill Directive). Overall, a further reduction of the quantity of municipal waste going to landfill is projected, which reflects the efforts made at

national and European levels to achieve, among other things, the objectives set in the Sixth Environment Action Programme.

An EEA publication (2007) illustrates patterns in Member States approaches to waste management, particularly in the context of the Landfill Directive.

### Falling net greenhouse gas emissions from municipal waste management

In 2005, greenhouse gas emissions from waste management represented about 2 % of the total emissions in the European Union.

Emissions of methane, one of the six greenhouse gases controlled by the Kyoto Protocol, are especially linked to agriculture (particularly

cattle) and landfill operations. The EU Landfill Directive can therefore help in achieving EU targets on greenhouse gas emissions reductions, for example through methane recovery and diversion of biodegradable municipal waste from landfill. Another interface between waste management and climate change policies is the consumption of energy (giving rise to greenhouse gas emissions) in the collection, treatment and manufacturing use of waste.

Net emissions of greenhouse gases from the management of municipal waste are projected to decline from a peak of around 55 million tonnes CO<sub>2</sub>-equivalents per year in the late 1980s to 10 million tonnes CO<sub>2</sub>-equivalents by 2020 (Figure 2).

This is due to two separate developments. On the one hand, waste quantities that enter management facilities are projected to continue to grow as waste generation *per capita* increases and waste collection is further improved. This pushes direct emissions of greenhouse gases from the waste management sector up. Landfilling represents 60 % of the total in 2020, and recycling and incineration about 20 % each.

On the other hand, recycling and incineration will be increasingly used. This represents savings (or avoided greenhouse gas emissions) that offset direct emissions. Recycling contributes 75 % of total avoided emissions by 2020 and incineration almost 25 %.

Overall, therefore, the projections show that better management of municipal waste will reduce greenhouse gas emissions in Europe, decoupling environmental pressures from economic growth as called for in the Sixth Environment Action Programme. Furthermore, with an expected further development of recycling and waste being increasingly used as a resource, the projections point towards achieving the long-term goal of becoming a recycling society as stated in the Thematic Strategy on Prevention and Recycling.

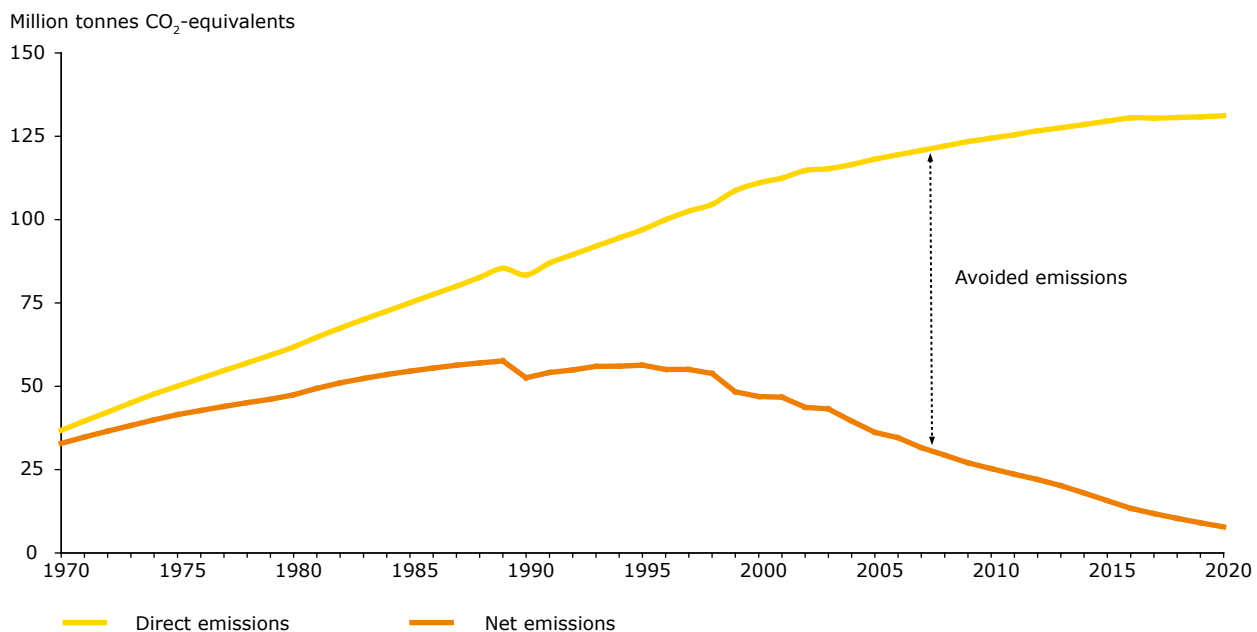
The projections used in this study assume that waste management capacity grows to match demand. However, if investment in new and

improved management capacity does not keep up with the increasing waste quantities, net greenhouse gas emissions can be higher due to inefficient management.

**Further benefits from limiting or avoiding growth in waste volumes**

While the projections show that net emissions of greenhouse gases will fall despite increasing volumes of waste, action to limit or avoid the projected growth in waste volumes will further reduce net greenhouse gas emissions from the waste management sector. The collection and transport of waste, closely linked to waste volumes, is estimated to account for less than 5 % of the direct greenhouse gas

**Figure 2 Trends and projections of greenhouse gas emissions from management of municipal waste in the European Union**



Source: ETC/RWM.

emissions of the waste sector, primarily due to the short distances over which municipal waste is usually transported. However, this figure represents 40 % of the net emissions in 2020.

Limiting waste volumes will also deliver other benefits such as reduced costs of waste management, and reduced air pollution (with particles and oxides of nitrogen) and noise related to the collection and transport of waste. The costs of waste management can

otherwise increase significantly as volumes grow. The cost of collection and treatment of waste is particularly onerous, and generating waste is by definition a loss of resources.

In conclusion, Europe cannot become complacent with regard to the continuing growth in waste — reflecting our current unsustainable consumption and production patterns — as this in the long term may outweigh the improvements taking place in the waste management sector.

## References

EC (2006), *European Energy and Transport — Trends to 2030 — update 2005*, European Communities, DG TREN, Luxembourg.

EEA (2007), *The road from landfilling to recycling: common destination, different routes*, European Environment Agency, Copenhagen.

EEA (2008), Supporting document to EEA Briefing 2008/01, *Better management of municipal waste will reduce greenhouse gas emissions*, European Environment Agency, Copenhagen. [http://reports.eea.europa.eu/briefing\\_2008\\_1/en/Supporting\\_document\\_to\\_EEA\\_Briefing\\_2008-01.pdf](http://reports.eea.europa.eu/briefing_2008_1/en/Supporting_document_to_EEA_Briefing_2008-01.pdf).

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