

## **Municipal Solid Waste Management in Other Countries (Best Practices)**

### **Overview:**

**Municipal Solid Waste (MSW)**—more commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries.

Solid Waste Management may be defined as the discipline associated with the control of generation, collection, storage, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations.

The most commonly recognized methods for the final disposal of solid wastes are:



- Dumping on land
- Dumping in water
- Ploughing into the soil
- Incineration

### **Case study of Best practices in Austria's.**

#### **Austria's municipal waste management Performance**

##### ***Highlights***

□ Austria has one of the highest levels of municipal waste (MSW) recycling in Europe (56 % in 2014), even though for 2010–2014 total recycling rates were slightly below the ones recorded in

2007–2009.

□ Overall, for 2004–2014 Austria’s rate of MSW recycling has been stable and at a very high level,

despite a 4 % growth in the generation of MSW in absolute terms.

□ Austria has had a policy for the separate collection of biogenic waste across the entire country since 1995. In 2008, about 105 kilograms per person of biogenic waste were collected separately.

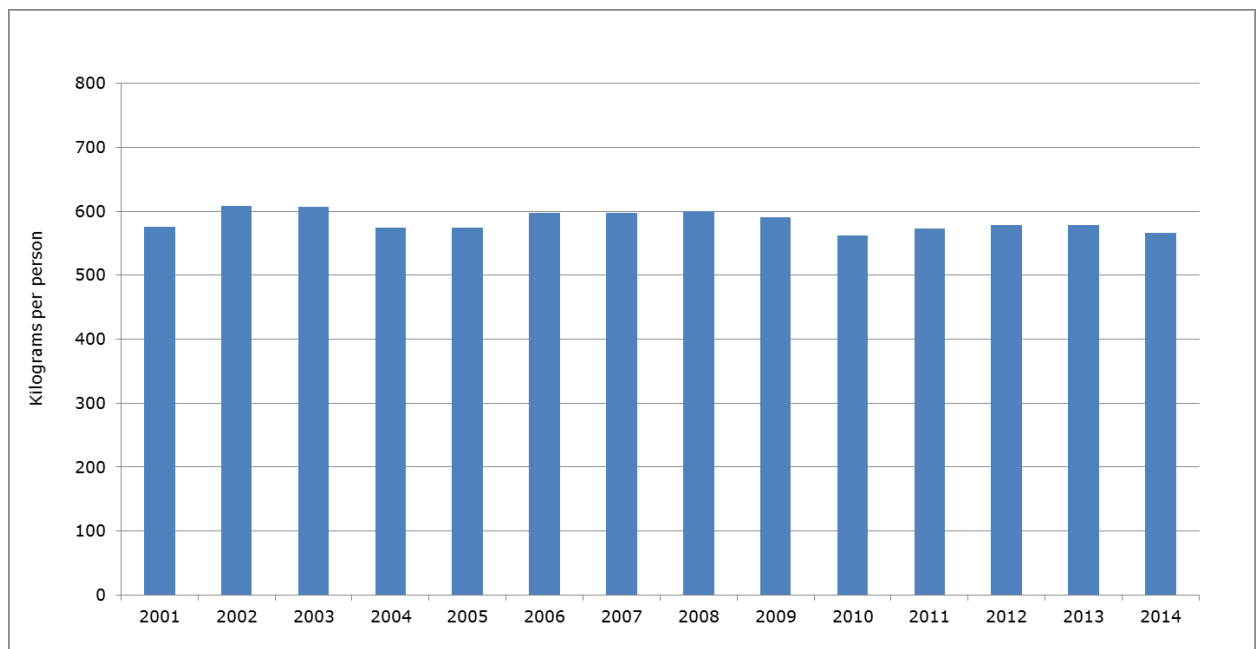
□ In 2014, Austria’s recycling rate of organic waste (31%) was by far the highest in the EU-28.

□ Austria has one of the lowest landfilling rates in the EU-28 and has eliminated the landfilling of biodegradable municipal waste.

□ Incineration of MSW has significantly increased in the last decade. Since 1991, all municipal waste incineration plants feature energy recovery for district heating.

### *Municipal waste indicators*

Following Figure (1.1) shows a rather stable development of MSW generation per person in Austria between 2001 and 2014 (Eurostat, 2016a). The highest amount of MSW generated was recorded in 2002 (608 kilograms per person), and the lowest in 2010 (562 kilograms per person). In 2014, Austria generated 4 833 000 tonnes of MSW, equal to 566 kilograms per person, which is well above the EU-28 2014 average of 474 kilograms per person. Municipal waste generation grew faster than private consumption for most of the 2000s (OECD, 2013).



**Figure 1.1 Austria, municipal waste generation, 2001–2014, kilograms per person**

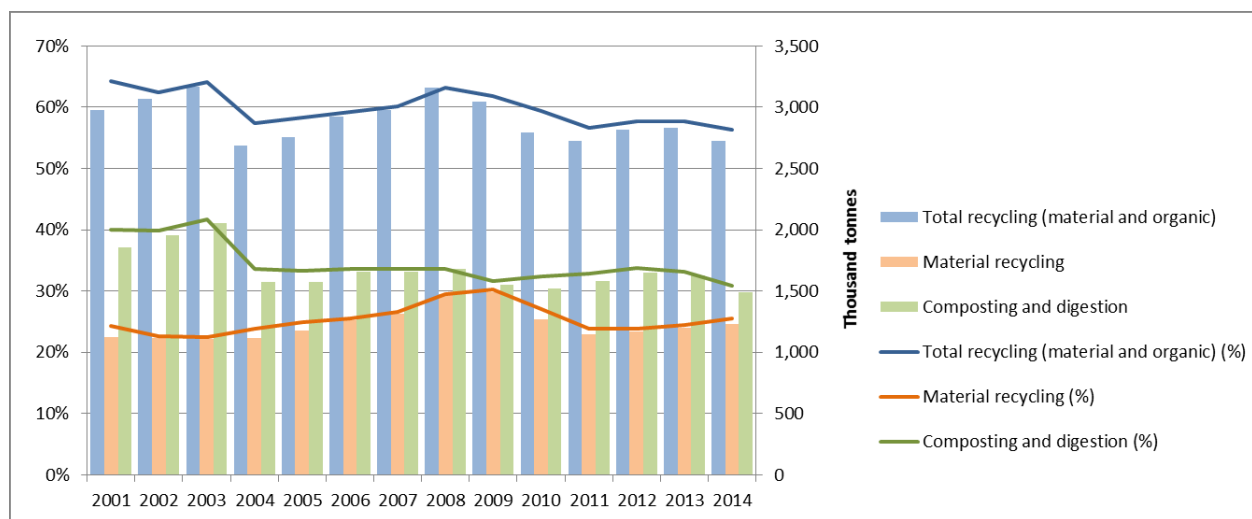
Austria has a long tradition for diverting waste from landfill and a long established and good recycling system. Most of the MSW generated in the country is either recycled or incinerated.

## Methods

### The recycling of MSW from 2001 to 2014

Over the last decade, the level of MSW recycling has remained consistently high in Austria. In 2014, around 4 170 000 tonnes of municipal waste was generated in Austria (Table 2.1). Of this, 2 483 000 tonnes were separately collected, about 1 427 700 tonnes were mixed (residual) waste, and some 259 500 tonnes were bulky waste.

As Figure 1.2 shows, over the 2004–2014 period (2001–2003 data is affected by double counting<sup>1</sup>), 56–63 % of MSW was recycled, of which 24–30 % was material recycling – including metal, glass, plastic, paper and cardboard recycling, but excluding composting – while composting and other biological treatment together accounted for the remaining 31–34 %.



**Figure 1.2 Austria, recycling of municipal waste, 2001–2014, per cent and tonnes**

### Landfilling of biodegradable municipal waste

According to the EU Landfill Directive (1999/31/EC), Member States shall reduce the amount of biodegradable municipal waste (BMW) landfilled to 75 % of the total amount of BMW generated in 1995 by 2006; to 50 % by 2009; and to 35 % by 2016.

Austria has met all three targets, well in advance, as, by 2006, no BMW was landfilled.

### Ban on biodegradable municipal waste

All the main legislation to divert biodegradable municipal waste from landfills was adopted in Austria before the respective EU legislation came into force. Austria has achieved a decrease to almost zero BMW landfilling following the full implementation of the landfill ban on waste containing more than 5 % by weight of total organic carbon (TOC) (introduced by the Landfill

Ordinance 1996, Law Gazette II No 164/1996, as revised in 2008 and amended in 2014). The TOC limit does not apply to waste from MBT plants. However, the calorific value of MSW pretreated in MBT plants has to be below 6.6 megajoules (106 joules) per kilogram of dry matter to be accepted for landfill (ETC/SCP, 2012).

### Incineration of MSW for energy recovery

In MBT, mostly residual MSW is sorted and treated. This is the part of the MSW that is not separately collected for recycling.

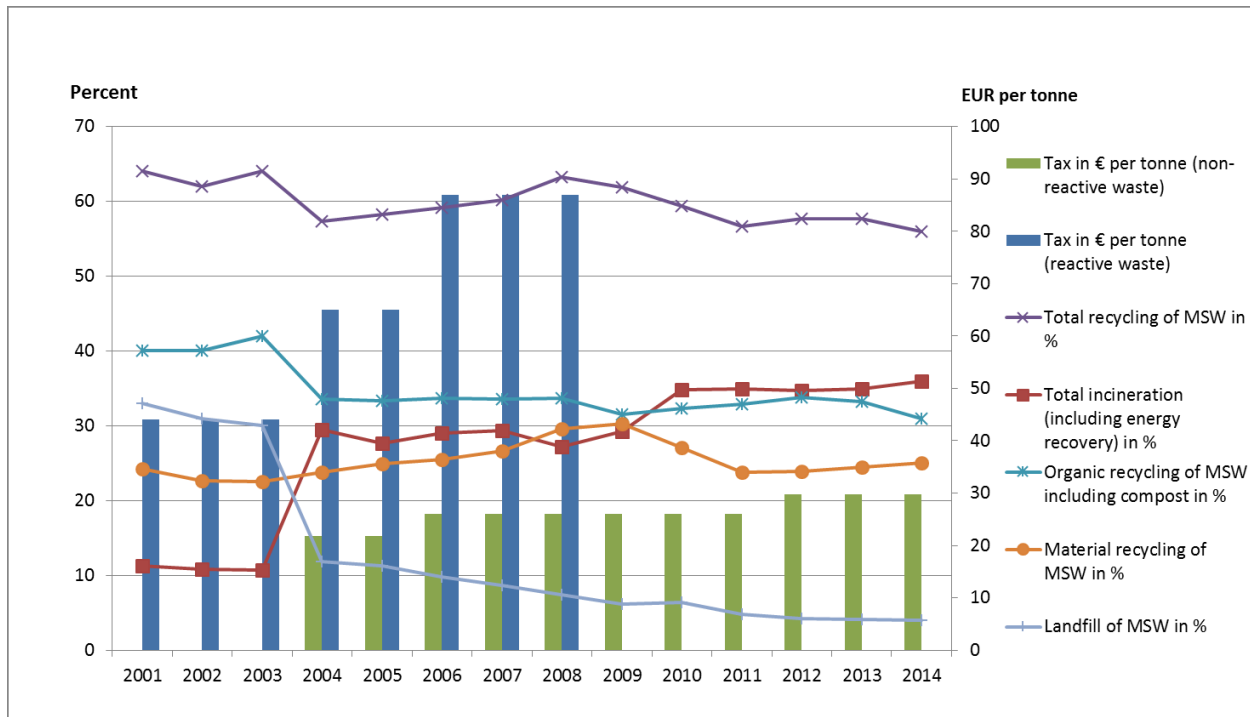
In the MBT, the residual municipal waste is separated into:

1. lower calorific value waste – the bulk of biodegradable waste;
2. higher calorific value waste – mostly plastics;
3. metals.

The lower calorific value waste is biologically treated at the MBT plants. This is meant to be a pretreatment step before landfilling, as the contamination levels in the biologically treated output are too high for it to be used for soils. The separated higher calorific value waste, mostly plastics, is forwarded to incineration for energy recovery. The metal fraction is recycled. The combined functions of MBT contribute to the diversion of MSW from landfill.

From the MBT output, in 2014, 36 % was classified as waste from households – the remainder being similar waste from commercial sources (BMLFUW, 2011 a-c).

Indicators presented in Figure 1.3 illustrate the development of the tax against that of landfilling and incineration, as well as that of total, material, and organic recycling, between 2001 and 2014.



### **Figure 1.3 Austria, development of landfilling, incineration and recycling of municipal waste and the landfill tax, 2001–2014, per cent and EUR per tonne**

The gradual increase in landfill tax rates up to 2008, coupled with the ban on landfilling BMW implemented in the 2004–2008 period, reduced landfilling. According to Eurostat (2016a), the amount of landfilled municipal waste fell by 64 % between 2004 and 2014.

A positive trend can be observed in total recycling, mainly due to an increase in material recycling between 2004 and 2008, and in incineration for 2001–2014. This, in turn, has led to a reduction in the quantity of waste going to landfill. The shift to incineration has been stimulated by the introduction of the landfill ban for biodegradable waste in 2009, and by the fact that the incineration tax, introduced in 2006, is much lower than the landfill tax – EUR 7 per tonne from 2008 to 2011 and EUR 8 per tonne from 2012 (ETC/SCP, 2012).

#### *Important initiatives taken to improve municipal waste management*

To further promote waste prevention and recovery, the BMLFUW launched a Prevention and Recycling Strategy in 2006 and adopted a Waste Prevention Programme in 2011. The former is aimed at achieving emission reduction; the reduction of hazardous substances and their dissipation; and resource efficiency. The latter, which is part of the 2011 Waste Management Plan, targets the construction sector; industries and households in general; the food sector, and particularly food industries, retailers, large scale catering establishments and households; and the re-use sector including repair networks. The programme mainly focuses on providing examples of best practice, disseminating supporting information, establishing networks and removing legislative barriers. An update of the Austrian Waste Prevention Programme, taking into account of experience gained in Austria and other EU Member States is to be prepared in 2017. In 2012, the Resource Efficiency Action Plan established a policy framework for achieving the target of improving resource productivity by 50% by 2020 (OECD, 2013). Finally, Austria is in the process of adopting a target on the reduction of preventable food waste in line with the corresponding UN sustainable development goal on halving the per person generation of food waste by 2030.

#### *Possible future trends*

Austrian waste policy aims to further ‘increase the contribution of the Austrian waste management sector to sustainable material flows and waste management’. According to the Austrian strategic approach, wastes should be seen as a source of raw materials, waste management should contribute to a reduction of greenhouse gas emissions, and to the reduction of environmental pollution. One example is that, while Austria already has a very high share of organic recycling of MSW, there is a potential to further increase the recovery of biogenic waste, and improve the capture of energy from this waste through biogas plants. Finally, Austria strongly focuses on waste prevention (BMLFUW, 2012) – its waste prevention programme, included in the 2011 Waste Management Plan, sets out a wide range of waste prevention measures, including reuse.

## Quick glance on 5 Innovative Waste Management Practices in other developed countries

Generating almost 62 million tonnes of garbage every day, India has been among the top 10 countries generating the highest amount of Municipal Solid Waste. Out of the total waste generation, more than 45 million tonnes of waste remains untreated, which is a whopping 72%. Waste management is the foremost value India needs to adopt if it has to achieve the goal of 100 per cent cleanliness by October 2019. Countries like Germany, Australia and USA have set examples of innovative waste management and India can definitely take inspiration from these and implement some of these practices.



Image Credit: Baltimore Waterfront Project

**United States Of America: Robot's Act of Collecting Waste:** Powered by sun and strong river current, the eco-friendly robotic machine picks up garbage and debris from the Baltimore River and deposits the waste into a dumpster barge which is built into this machine. Within a period of 3 years, Mr. Trash Wheel has successfully removed 1.1 million pounds of garbage.



Image Credit: BigBelly

**Australia: Bins that help in Segregation, Recycling and Composting:** SmartBelly bins treat most of its garbage by segregating the waste at the collection point and then undergoes process of composting, treating most of its waste. Bigbelly (SmartBelly or BigBelly) bins automatically create extra space for garbage when the bin is full. More garbage space means fewer collection trips, lower costs and fewer emissions. One of the major advantages of these bins is that they connect individual bins to garbage collectors that results in a more efficient management of waste.



Image Credit: Leaf Republic

**Germany: Biodegradable 'Leaf Plates' Curbs Plastic Pollution:** Inspired by India's traditional custom of eating on leaves, Leaf Republic, a company in Germany is into stitching creeper leaves that come in from India. These cost effective plates serve as an alternative to plastic plates cutting down on plastic pollution. There are eco-conscious companies in India too who are trying to make such eco-friendly and biodegradable plates but the trend is yet to catch on.

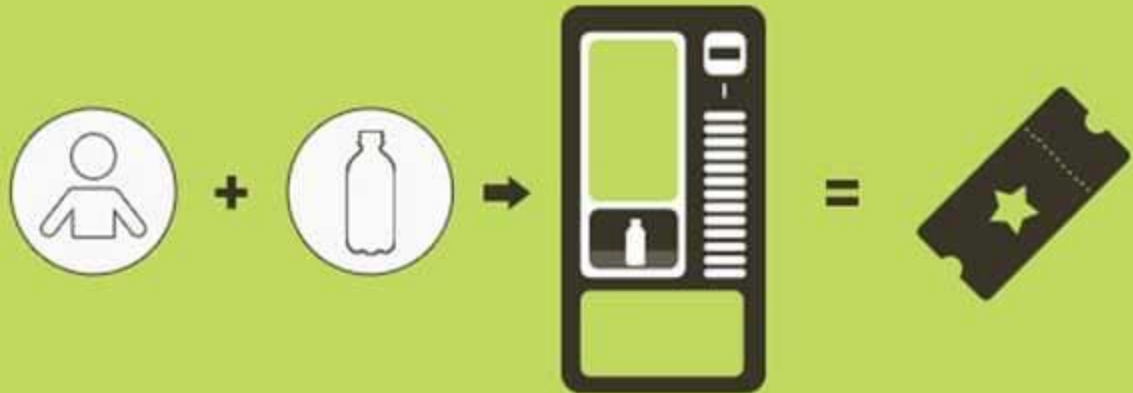




**Brazil: Use Plastic to Decorate Your House:** Did you know a plastic bottle can take up to 1000 years to decompose? A design studio Rosenbaum in Brazil helps and motivates people to reuse their plastic waste in beautifying people's houses. Brazil is also educating people on how to effectively reuse plastic.

## PUT THE PLASTIC FOR RECYCLING & GET A REWARD

Columbia's Recycling Solution



**Columbia: Rewards to Recycle Plastic:** The country produces around 28,800 tonnes of solid waste per day, with 10,000 tonnes of this waste being generated in the main cities of Bogotá, Cali, Medellín and Barranquilla. To tackle the plastic waste, authorities installed ECOBOT-Vending Machines in shopping malls, institutions and other public spaces. Every time someone deposits a plastic bottle or the bottle caps, they receive restaurant coupons or movie tickets or simply shopping dollars.

**Conclusion:** There are many more countries doing their best practices to manage MSW.

All data credit:

Austria, 2016, Information received during the Eionet consultation of the paper. E-mail of 30 May 2016 from professor Barbara Stoifl, Austrian Environment Agency. (<http://ec.europa.eu/eurostat/data/database>)

<https://www.ndtv.com/photos/news/5-innovative-waste-management-practices-india-should-adopt-from-the-world-24218#photo-298068>