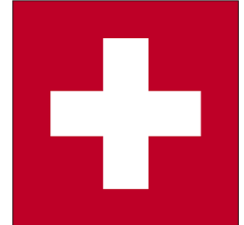


Municipal waste management in Switzerland



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Context

The Topic Centre has prepared this working paper for the European Environment Agency (EEA) under its 2012 work programme as a contribution to the EEA's work on waste implementation.

Disclaimer

This ETC/SCP working paper has been subjected to European Environment Agency (EEA) member country review. Please note that the contents of the working paper do not necessarily reflect the views of the EEA.

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Highlights

Most important factors and initiatives in Switzerland

- Although the total amount of MSW generated in Switzerland has increased by 16 % percent between 2001 and 2011, the percentage of recycling has remained constant at a high level of 50 %;
- In 2000, Switzerland introduced a ban on the landfilling of combustible waste, and took steps to ensure that incineration capacity was expanded;
- Although the EU waste targets are not binding for Switzerland, the country currently has a recycling performance that meets and slightly exceeds the EU Waste Framework Directive's 2020 target to recycle 50 % of MSW;
- Similarly, a level of zero BMW landfilling has been achieved by the combination of incineration and recycling;
- There are no national waste plans on the federal level. Cantons have to draw up their own management plans, and review it periodically. A Technical Ordinance on Waste defines the content of waste management plans and Cantons have to submit the plan to BAFU, for conformity assessment.

1 Introduction

1.1 Objective

Based on historical MSW data for each country and EU targets linked to MSW in the Waste Framework Directive, the Landfill Directive and the Packaging Directive, the analysis undertaken for Switzerland includes:

- The historical performance on MSW management based on a set of indicators;
- Uncertainties that might explain differences between the countries' performance which are more linked to differences of what the reporting includes than differences in management performance;
- Relation of the indicators to the most important initiatives taken to improve MSW management in the country; and
- Assessment of the future possible trends and achieving of the future EU targets on MSW by 2020.

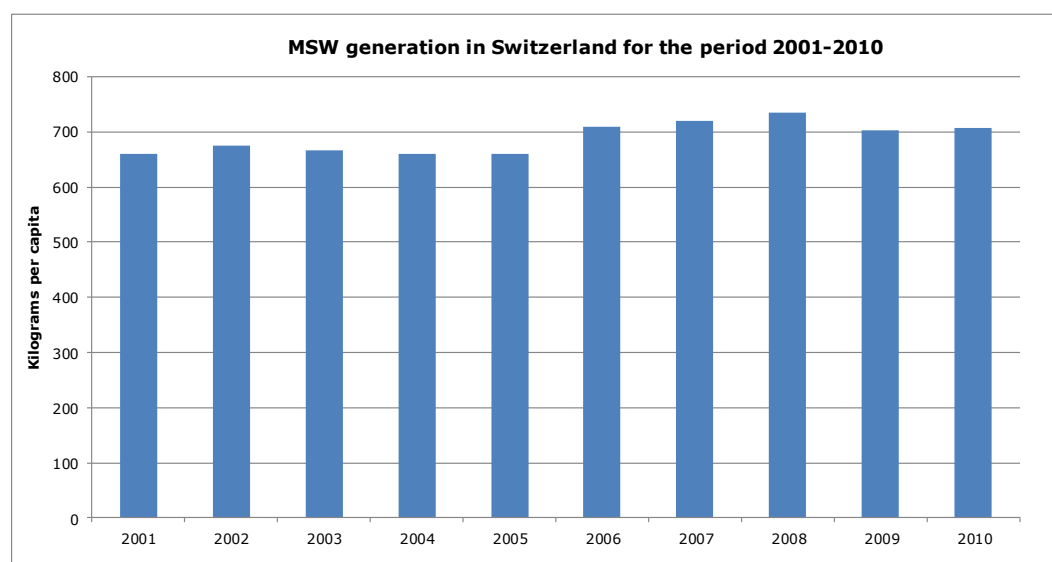
2 Switzerland's MSW management performance

2.1 MSW Indicators

Figure 2.0 shows the development of MSW generation per capita in Switzerland from 2001 to 2010. There has been an increase during the period.

The total amount of MSW generated in Switzerland has increased by 16 % percent from 4.79 million tonnes in 2001 to 5.56 million tonnes in 2011.

Figure 2.0 MSW generation per capita in Switzerland



Eurostat, 2012

Switzerland has a long tradition in diverting waste from landfill and has a long established good recycling system and performance. Most of the MSW generated in the country is either recycled or incinerated. Below some indicators are shown regarding the development of MSW management.

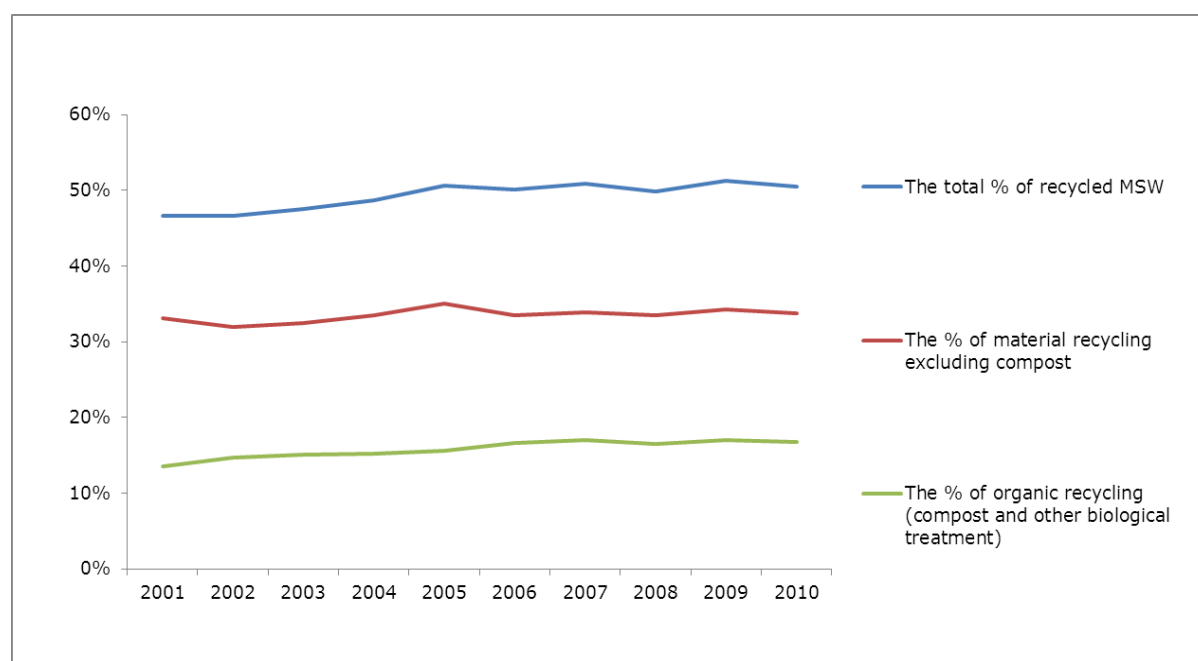
2.1.1 The recycling of MSW from 2001 to 2010

Despite the above mentioned increase in waste generation, the overall performance in terms of MSW recycling has been very stable at a rather high level in Switzerland over the last decade.

As illustrated by Figure 2.1, in the ten year period the total recycling accounted for 50 %, out of which 33 % was material recycling (including metal, glass, plastic, paper and cardboard, but excluding composting), while composting and other biological treatment together accounted for 15 % between the years 2001 and 2010.

The recycling rates increased only very slightly with approximately 2-3 percentage points over the last decade, mainly organic recycling.

Figure 2.1 Recycling of MSW in Switzerland



Note: percentages are calculated as % of generated MSW. Source: Eurostat, 2012

2.1.2 The yearly increase rate of recycling of MSW

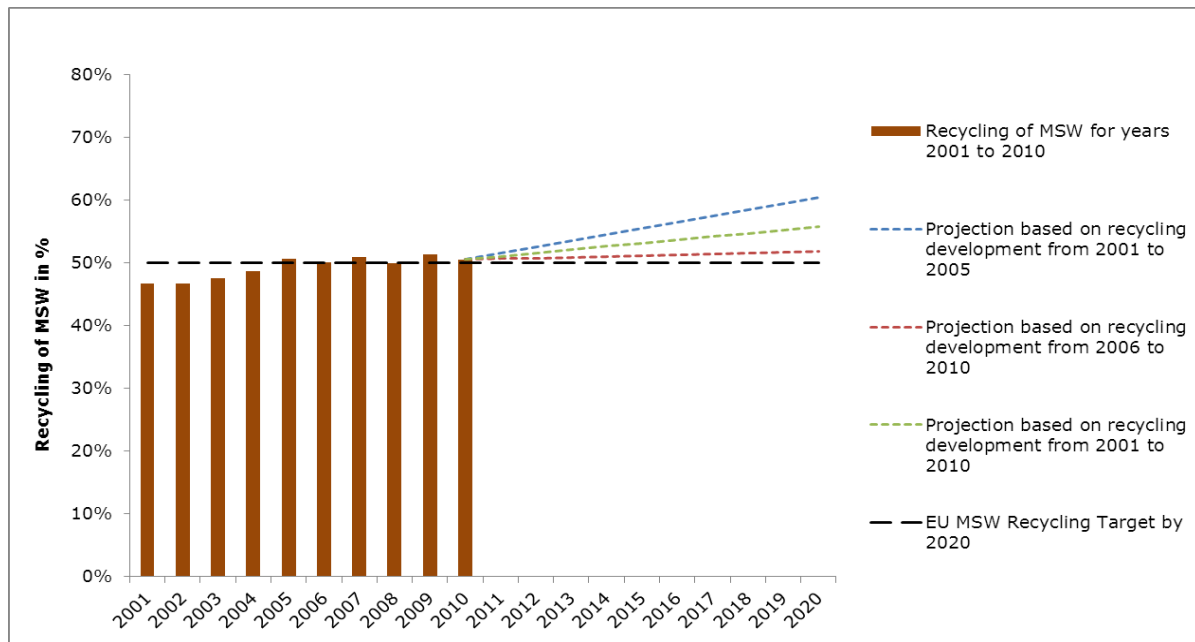
Figure 2.2 shows how the level of MSW recycling has changed in Switzerland per year from 2001 to 2010. The indicators presented below show that the country has already had a recycling performance of 50 % in 2005 which obviously already met the 50 % target set for 2020 by the EU legislation¹. This is despite the fact that Switzerland was not obliged to meet this target as the country is neither a member of the European Union nor the European Economic Area.

In order to assess the prospects for the further development of recycling rates, three scenarios have been calculated. The scenarios assume that recycling in the period 2010 to 2020 develops, based on a linear regression, with the increase rates of recycling in the periods 2001-2005, 2006-2010 and 2001-2010.

¹ EU's updated Waste Framework Directive from 2008 (EU, 2008) includes a new 50 % recycling target for waste from households, to be fulfilled by 2020. In 2011, the European Commission decided that countries can choose between four different calculation methods to report compliance with this target. One of these methods is to calculate the recycling rate of MSW as reported to Eurostat (EC, 2011).

In the case of Switzerland, the projections suggest, that a further improvement, up to 60 % in the rate of recycling would be achieved based on the extrapolation of performance observed in three different periods calculated based on the data from 2001-2010 respectively.

Figure 2.2 Future recycling of MSW in Switzerland



Source: Calculation by Copenhagen Resource Institute (CRI), based on Eurostat, 2012

It has to be kept in mind that these three scenarios are very simplistic and do not take into account any planned policy measures. The scenarios in Figure 2.2 should therefore be interpreted only as to give some rough indications and assessment.

2.1.3 Landfilling of biodegradable municipal waste

According to the EU Landfill Directive, it is a general requirement that all Member States have to reduce the amount of biodegradable municipal waste landfilled (BMW) by 2006, 2009 and 2016. However, these targets do not apply for Switzerland. Nevertheless, for the SOER2010 report of the EEA, the Swiss Federal Office for the Environment (BAFU) had reported zero landfilling of BMW already by 2006 (EEA, 2010).

Although the country has no expressed targets (ETC/SCP, 2009), a strategic goal is to guarantee the good quality of compost and increasing energy production through anaerobic digestion.

For example, in 2006 approx. 880 000 tonnes of biodegradable waste was collected separately. 740 000 tonnes were recycled in compost of good quality, whereas 140 000 tonnes were treated in anaerobic digestion plants to produce energy and fertilizer.

Different technical ordinances on waste (including the one on organic waste from 1990, and on combustible waste from 2000) are the reference regulation for municipal waste (ETC/SCP, 2009). According to the reference regulation, recyclable fractions of municipal waste – also including biodegradable fractions like paper, and compostable waste – have to be collected separately and recovered. The landfilling of combustible waste is prohibited (also including biodegradable fractions).

2.1.4 Regional differences of MSW recycling from 2001 to 2010

Switzerland has not reported regional waste data to Eurostat.

2.1.5 The relation between landfill tax level and recycling level of MSW

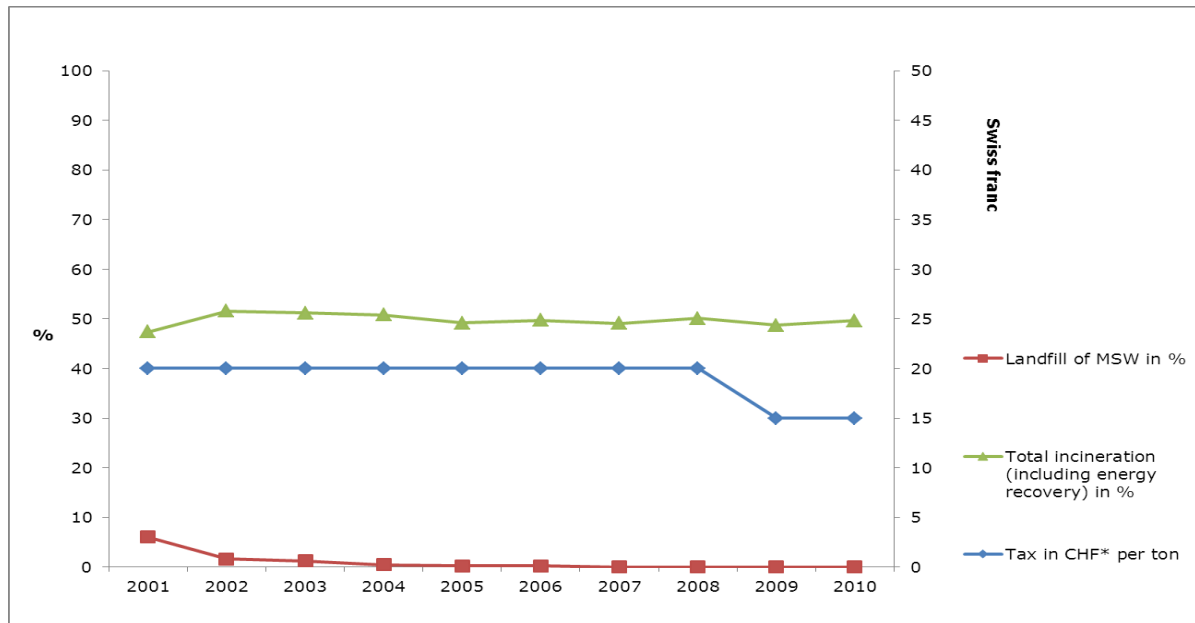
Switzerland introduced a landfill tax, the so called VASA-tax in 2001 which is a federal tax applied in all Cantons (ETC/SCP, 2009 and ETC/SCP, 2012).

Tariffs apply for landfilling on sanitary landfills (15 CHF/t = 11.17 EUR/t), residue landfills (17 CHF/t = 12.65 EUR/t), inert materials landfills (3 CHF/t = 2.23 EUR/t) and export for underground storage (22 CHF/t = 16.38 EUR /t). In 2009 the revenues were CHF 27.3 million (EUR 20.3 million). The Swiss tax is solely spent on cleaning up contaminated sites.

Indicators presented in Figure 2.3 and 2.4 illustrate the development of the tax against that of material and organic recycling as well as landfilling and incineration between 2001 and 2010.

Since both the tax rate and the trends in treatment methods (landfilling and incineration) are rather constant from 2002, it is difficult to assess whether the tax had further impacts after the immediate change observed in 2001 and 2002.

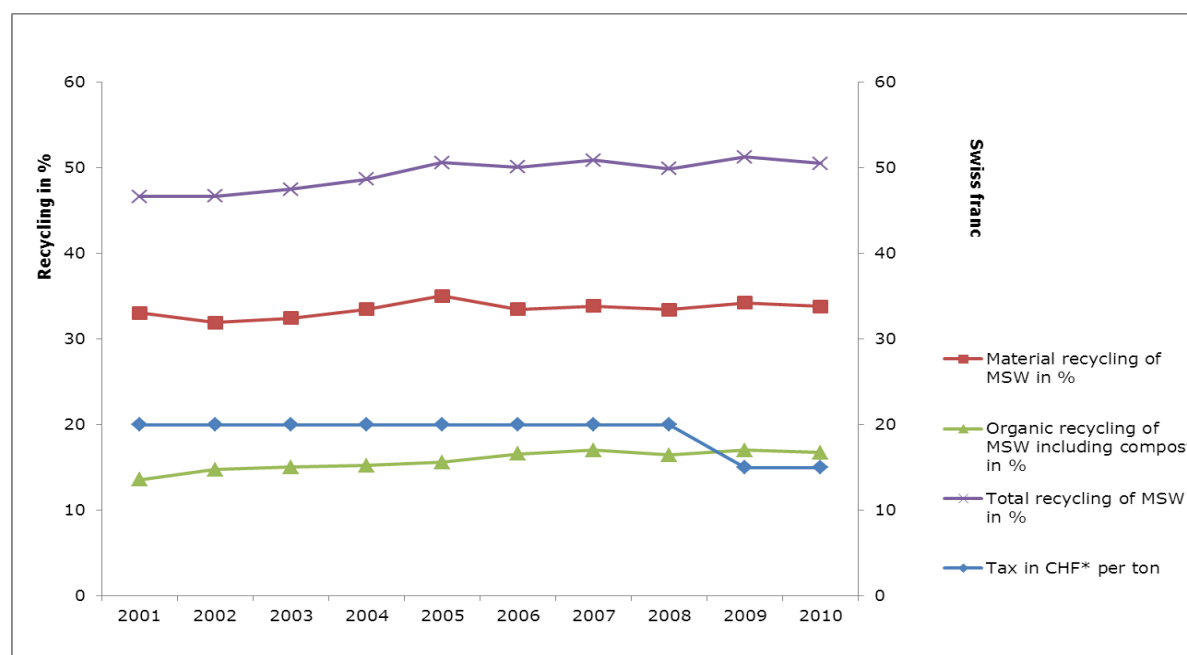
Figure 2.3 Development of landfilling and incineration of MSW and landfill in Switzerland



Source: ETC/SCP, 2012 and Eurostat, 2012. * EUR 1 = 1.23 Swiss francs (2011 annual average currency exchange rate)

From the figures 2.3 and 2.4 no apparent trend appears that would suggest that the tax had an impact on waste treatment routes of MSW.

Figure 2.4 Development of MSW recycling and landfill tax in Switzerland



Source: ETC/SCP, 2012 and Eurostat, 2012. * EUR 1 = 1.23 Swiss francs (2011 annual average currency exchange rate)

It is difficult to assess the impact of the tax on landfilling, since Switzerland already had a rather low percentage of landfilling of municipal waste before the introduction of the tax. In a paper on waste handling in Switzerland from 2006, it is reported that the amount of waste going to sanitary landfills decreased by 12 % to 1.3 million tonnes between 2002 and 2004.

Since 2010, also the waste exported for recovery or treatment is subject to landfill tax in case it is to be landfilled abroad after treatment in case the amount of landfilled waste is more than 15 % of the exported waste in weight. This is to make sure the export of waste is not financially more attractive than landfilling in Switzerland and in fact the ETC/SCP found (ETC/SCP, 2012) that this landfill tax did not result in the increased export of waste. The export of waste for landfilling abroad is prohibited by law (except for underground storage).

2.1.6 Environmental benefits of better MSW management

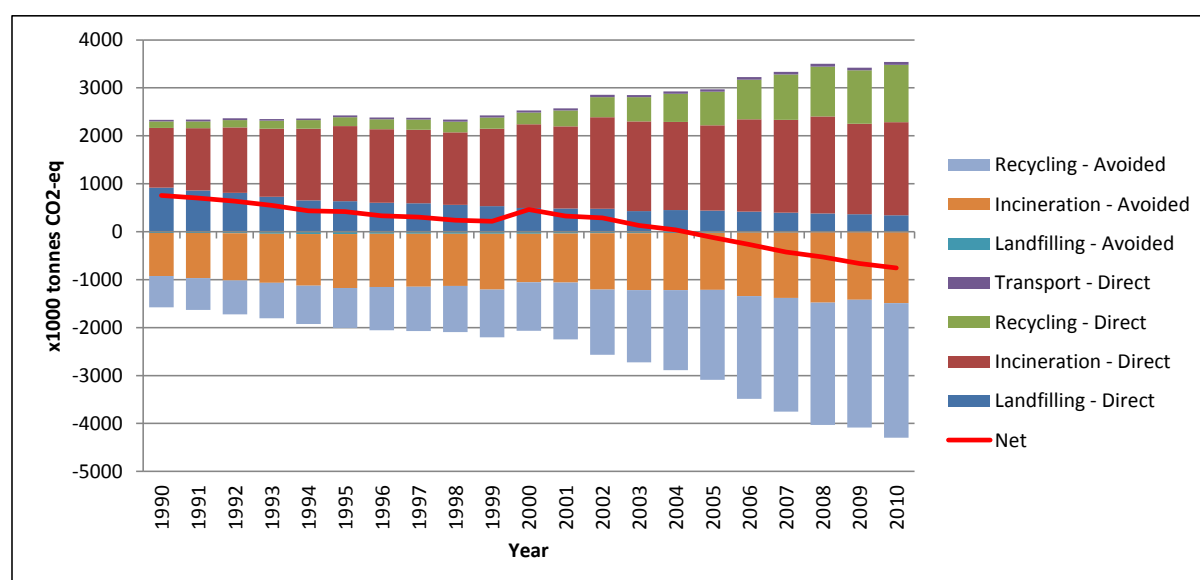
Figure 2.5 shows the development of GHG emissions from MSW management, calculated by using a life-cycle approach. The graph shows the direct emissions, the avoided emissions and the net emissions of the MSW management.

All the GHG emissions (positive values) represent the direct operating emissions for each waste management option. These direct operating emissions have been calculated with the use of the IPCC methodology for landfills and incineration and life-cycle modelling for the other technologies (recycling, bio-treatment and transport).

For the indirect avoided emissions (negative values), the calculations integrate the benefits associated with the recovery of energy (heat and electricity generated by incinerators, electricity generated by the combustion of landfill gas or methane from anaerobic digestion). Other avoided emissions include the benefits of recycling of food and garden waste, paper, glass, metals, plastics, textiles and wood in the municipal solid waste. Recycling is here assumed to include material recycling and bio-treatment. Avoided emissions of bio-treatment include fertilizer substitution.

All processes generating electricity are assumed to substitute the electricity mix of Switzerland based on EIA in 2009. Processes generating heat are assumed to substitute the average heat mix for the EU-25 in 2002. The electricity mix and heat mix are assumed to remain constant throughout the whole time series. The compositions of the MSW disposed in landfills, incinerated or recycled respectively are based on ETC/SCP (2011). In an Eionet consultation process, initiated by the EEA in 2012, Switzerland updated the compositions of the recycled and incinerated MSW for 2010. The complete methodology is available from ETC/SCP (2011).

Figure 2.5 GHG emissions from MSW management in Switzerland



Results presented in this figure should not be used for the compilation of GHG reporting (national inventory report of the IPCC) or compared with IPCC figures, as the methodology employed here relies on life-cycle thinking and, by definition, differs from the IPCC methodology.

Figure 2.5 shows that the direct emissions from landfilling have been steadily decreasing from around 1 million tonnes to 300 000 tonnes.

However, the increased recycling of MSW results in more and more avoided greenhouse gas emissions because products based on virgin material generate more emissions than if the products are based on recyclables.

2.2 Uncertainties in the reporting

Some uncertainties or differences in the reporting of MSW can result in different levels of recycling, for example regarding inclusion of packaging waste in recycled MSW and the methodology of reporting on MSW sent to Mechanical-Biological Treatment (MBT). However, for Switzerland no data is available for packaging recycling and MBT, therefore it is not addressed here.

2.3 Important initiatives taken to improve MSW management

As illustrated by the indicators, Switzerland is among the countries achieving the highest rates of recovery and recycling.

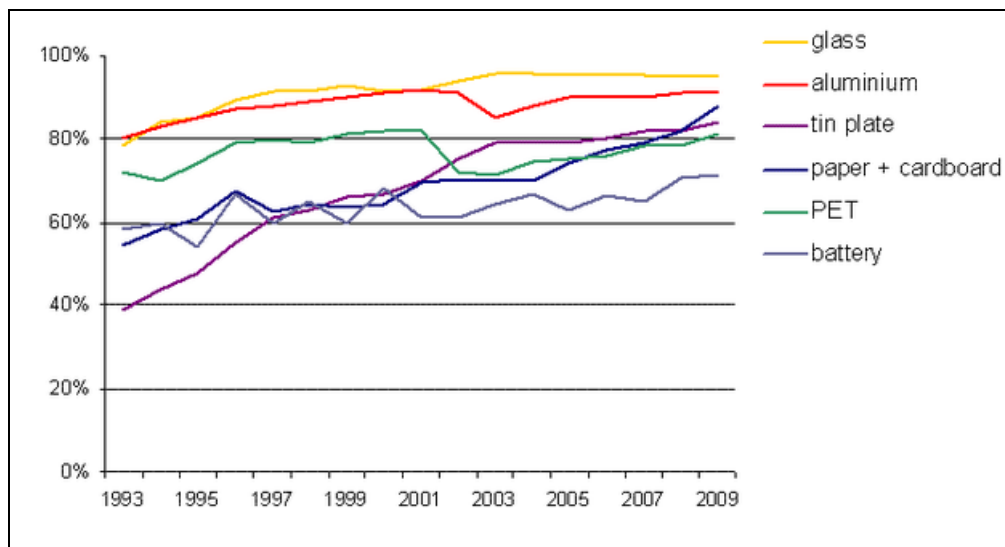
The responsibilities are shared between the three levels in Switzerland: the federal state, cantons (26) and communes (around 2 800). At the federal level the Federal Office for the Environment is

responsible for developing legislation and policies to ensure the recovery and environmentally sound disposal of waste, controlling the import and export of waste, and coordinating the planning of waste disposal facilities. The cantons and municipalities are also responsible for the implementation of the policy framework.

There are no national waste plans at the federal level. Cantons have to draw up their own management plan and review them periodically. A Technical Ordinance on Waste defines the content of waste management plans (ETC/SCP, 2009). The Cantons have to submit the plan to BAFU, for conformity assessment.

Furthermore, separate collection on MSW has been improving continuously and especially separate collection of waste paper and cardboard has improved further between 2001 and 2010 (BAFU, 2011) which is also supported by a framework agreement for the financing of the collection of used paper (ETC/SCP, 2009) by setting a purchase guarantee and minimum price for the used paper collected by municipalities.

Figure 2.7 Recycling ratios for different fractions in MSW collected separately



Source: EEA, 2010 (submitted by BAFU)

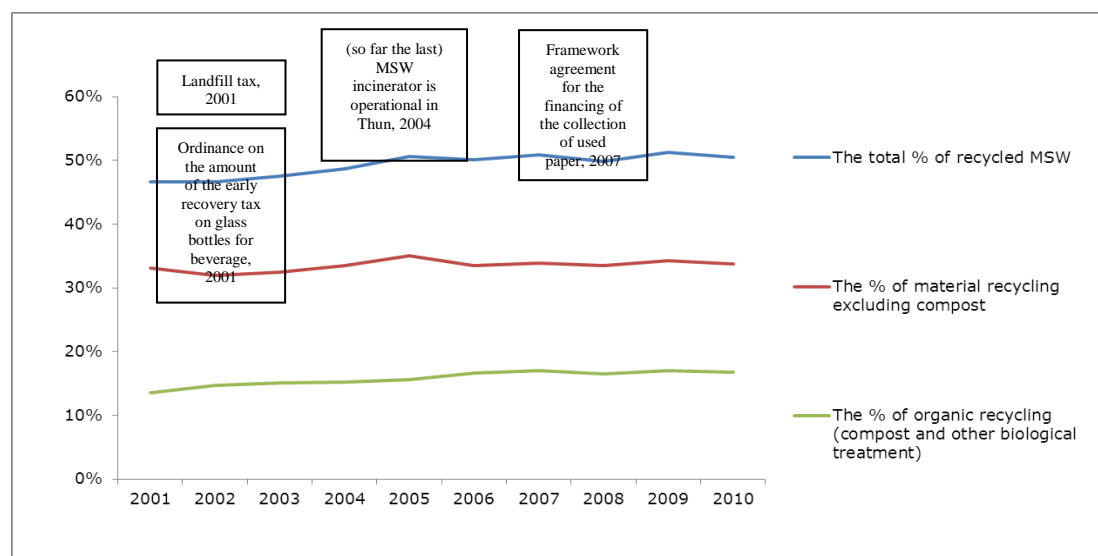
In 2008, 50 % of the total municipal waste was collected separately and then recycled (EEA, 2010).

According to data presented in Figure 2.7 from the Swiss Federal Office for the Environment (BAFU), the recycling ratio for separate collected MSW was 95 % of glass, 91 % of aluminium, 82 % of tinplate, 82 % of paper and cardboard, 78 % of PET and 71 % of batteries (EEA, 2010).

In 2000, Switzerland introduced a ban on landfilling of combustible waste, and took steps to ensure that incineration capacity was expanded accordingly. Today, combustible waste is no longer landfilled in Switzerland. All 30 municipal waste incinerators have a thermal efficiency coefficient of over 65 %.

Since the instalment of the MSW incinerator in the city of Thun in 2004, the total incineration capacity available in Switzerland is 3.29 million tonnes which is sufficient to avoid the landfilling of any combustible MSW (BAFU).

Figure 2.8 Recycling of MSW in Switzerland and important policy initiatives



2.4 Future possible trends

Development in waste treatment has been very stable in all aspects presented insofar despite growing MSW amounts. Although the EU waste targets are not binding for Switzerland, the country currently has a recycling performance that meets and slightly exceeds the EU 2020 targets.

Similarly, the landfilling of biodegradable municipal waste is practically zero, which would rank Switzerland amongst the best performing EU Member States.

2.5 Existing and planned responses

According to the results of the survey the ETC/SCP and the EEA conducted in 2011 on resource efficiency policies (EEA, 2011) and the Swiss SOER2010 country profile (EEA, 2010), Switzerland is expecting a change of paradigm in the future, meaning the focus of waste management policy will be switched from the control of waste treatment emissions to closing the product cycles. The latter is to be achieved by improved recycling techniques and product design that will contribute to the protection of primary resources.

In support to this development, an efficiency analysis was commissioned by BAFU in order to assess the 1986-2004 waste policy of the country and define the main axes of the future waste management policy.

It is expected that legislation on chemicals and development of industrial products will improve the recycling of materials. The process will be supported by increasing costs of raw materials and more efficient recycling technologies. Inefficient recovery and treatment of waste that is not environmentally sound will be prevented by waste legislation. The quality of waste to be landfilled will be improved in order to reduce the environmental impact. On the other hand new products and chemicals will be put on the market demanding for appropriate treatment technologies and regulations.

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