



ANNEX IV - WASTE MANAGEMENT IN SWITZERLAND AND TICINO

SWITZERLAND

The Swiss Confederation, commonly known as Switzerland, is a federal republic made up of 26 cantons. Its capital is Bern and its population is about 8 million people. It is situated in Western Europe, bordered by Germany, Austria, Italy, France and Lichtenstein. Four official languages are spoken in Switzerland: German, French, Italian and Romansh. Other demographic characteristics of Switzerland are presented schematically in figure 1 and table 2.

Politically, the Swiss Confederation is composed as follows. The federal constitution adopted in 1848 established the legal foundations of the country. This is one of the oldest constitutions in the world (Federal Chancellery, 2013). The federal constitution established the country as a direct democracy; therefore, citizens have the right to intervene in parliamentary decisions. Three levels of government exist: federal, cantonal and municipal. At the federal level, the parliament has the legislative power, the Federal Council is the executive and the Federal Court has judicial power. The parliament is composed of both the Council of States and the National Council, with 200 representatives in total. The Council of States has 46 representatives - two for each canton and 1 for half-canton. The National Council's representatives are elected proportionally to the population of each canton. Modalities of election of the representatives vary within each canton.

Switzerland is a very economically active and rich country. It has the fifth highest GDP per capita in the world (World Bank, 2013), and the majority of its businesses are from the tertiary sector. The most developed sectors in Switzerland are pharmaceutical and financial (with Zurich, Geneva and Lugano being the three biggest financial centres). The average salary in Switzerland is about 6,000 CHF a month, calculated over 13 months (see table 1).

Gross monthly wage by major region, 2010

Middle value (Median), in Swiss francs - private and public (Confederation) sectors combined

| | Level of qualifications | | | | | |
|--|-------------------------|-------|--------|-------|-------|-------|
| | Total | 1+2 | 1 | 2 | 3 | 4 |
| Major region | | | | | | |
| Lake Geneva Region | 6'083 | 8'150 | 11'917 | 7'429 | 6'067 | 4'727 |
| Espace Mittelland | 5'890 | 7'341 | 10'475 | 6'870 | 5'680 | 4'644 |
| Northwestern Switzerland | 6'220 | 7'880 | 11'963 | 7'268 | 5'850 | 4'591 |
| Zurich | 6'349 | 8'537 | 12'819 | 7'749 | 5'805 | 4'481 |
| Eastern Switzerland | 5'568 | 6'876 | 9'523 | 6'500 | 5'389 | 4'418 |
| Central Switzerland | 5'932 | 7'367 | 10'667 | 6'824 | 5'612 | 4'548 |
| Ticino | 5'076 | 6'333 | 8'690 | 5'907 | 5'274 | 3'948 |
| Switzerland | 5'979 | 7'715 | 11'311 | 7'134 | 5'724 | 4'540 |
| Level of qualifications required for the job: | | | | | | |
| 1 = Extremely demanding and difficult tasks | | | | | | |
| 2 = Independent and skilled work | | | | | | |
| 3 = Work requiring professional/technical skills | | | | | | |
| 4 = Simple and repetitive tasks | | | | | | |

TABLE 1: GROSS MONTHLY SALARY BY MAJOR REGION IN 2010 (SOURCE: UST, 2013B)

In 2010, the Swiss Confederation produced 7.562 million tons of waste. This was broken down as follows: 2.76 million tons (349 kg per capita) of residual waste was burned in incinerators, 2.808 million tons (357 kg per

capita) was recycled, and 1.990 million tons (253 kg per capita) was 'other waste' (special, bulky, medical, sludge, etc.) (Swissinfo, 2013a).

Everything concerned with waste management is included in the federal law on the environment, called RS 814.01 Legge Federale sulla protezione dell'ambiente (LPAmb). This was first introduced on 7th October 1983, and has since been modified several times, most recently in August 2010. The federal law on the environment establishes that cantons are responsible for the management of waste in Switzerland (LPAmb, art. 31). On a cantonal level, each needs to develop a plan for waste disposal and to determine the infrastructure required (i.e., incinerators, landfills, etc.) without over- or under-estimating the capacity needed. These plans must be transmitted officially to the federal level. This responsibility has, in turn, been delegated by the cantonal authority to the municipal level. The most important directive taken in recent years by the federal council was the need for municipalities to finance at least 80% of the MSW management costs with a tax that applies causality - or, the 'polluter pays' principle (see art. 32a LPAmb).

Although the federal level has no responsibilities in terms of waste management, it can exert great influence by emanating directives or laws that must be applied at the cantonal and municipal level. For example, the federal council and federal parliament, on the suggestion of the UFAFP (Ufficio Federale dell'Ambiente, delle Foreste e del Paesaggio), introduced a ban on landfills. From 1st January 2000, all residual and bulky waste (that was previously designated to landfills) had to be diverted into incinerators. This implied an increased need for incineration capacity and all cantons needed to adapt their plans to the new law.

| | |
|----------------------------|------------------------|
| Surface | 41,285 km ² |
| Population | 7,954,622 |
| Population density | 192.67 |
| Percentage men - women | 49.2 % - 50.8 % |
| Percentage Swiss - foreign | 78.3 % - 21.7 % |
| Unemployed (registered) | (%) |
| Average gross income | 5,979 CHF / month |
| Percentage population: | |
| - 0-19 | - 21.2 % |
| - 20-64 | - 62.2 % |
| - more than 65 | - 16.6 % |
| Households: | 3,505,616 |
| - 1 person | - 1,274,641 (36.4 %) |
| - couples without children | - 979,030 (27.9 %) |
| - 1 parent families | - 188,142 (5.4 %) |
| - couples with children | - 912,778 (26 %) |
| - others | - 151,024 (4.3 %) |
| Businesses | 312,900 |
| - in tertiary sector | - 239,800 (76%) |
| GDP (total) | 586,784 milion CHF |
| GDP per capita | 74,160 CHF |

TABLE 2: SUMMARY OF GEOGRAPHIC, DEMOGRAPHIC AND ECONOMIC VARIABLES IN CANTON TICINO (DATA 2010) (SOURCE: FEDERAL CHANCELLERY, 2013)

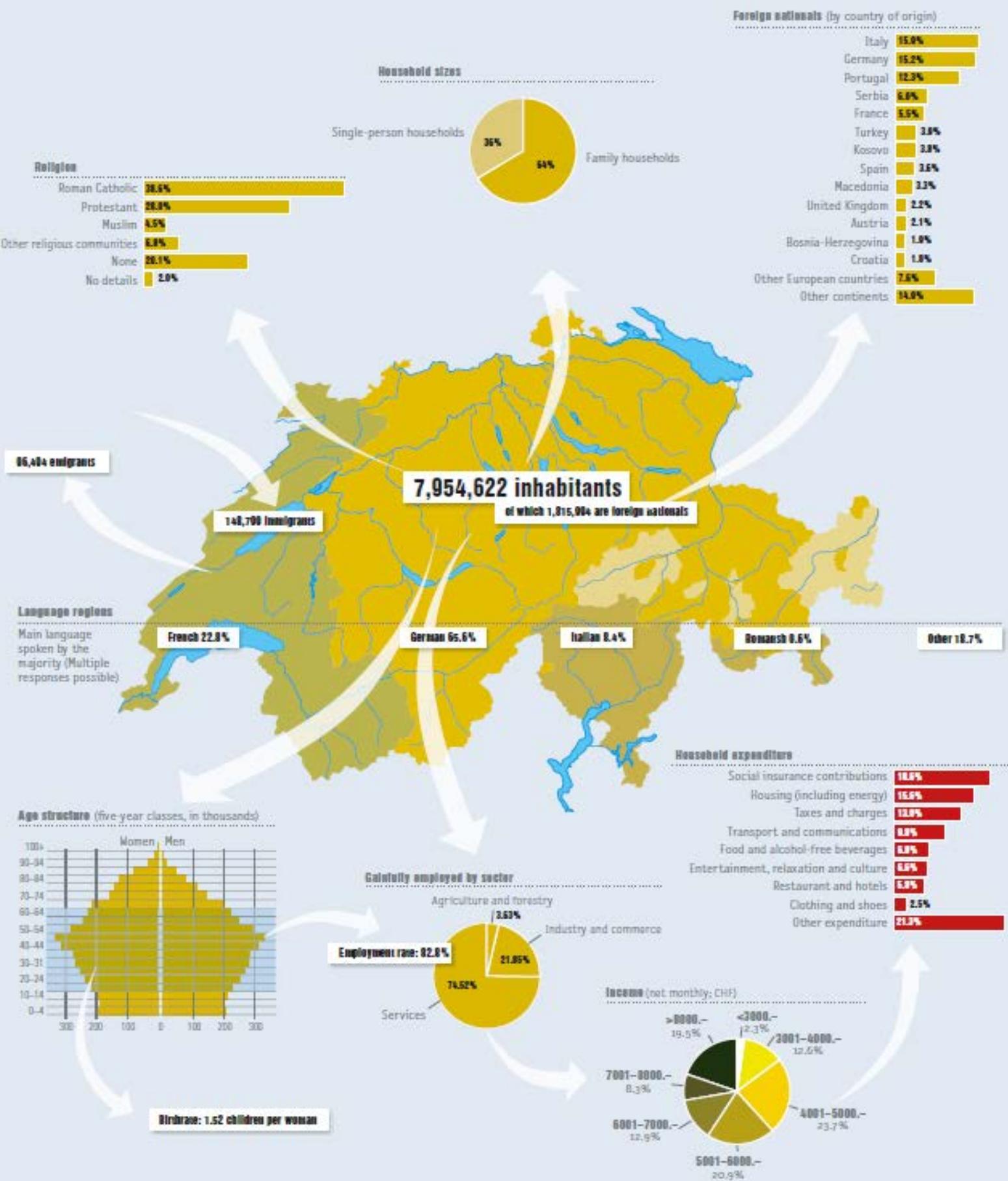


FIGURE 1: SOCIO DEMOGRAPHIC VARIABLES OF SWITZERLAND (SOURCE: FEDERAL CHANCELLERY, 2013)



TICINO

Canton Ticino is situated in the southern part of the Alps. It borders three other Swiss cantons: Valais to the west, Uri to the north, and Graubünden to the east. South of the canton are the Italian regions of Piemonte and Lombardia.



FIGURE 2: MAP OF CANTON TICINO WITH ITS DIFFERENT DISTRICTS

Ticino's administrative capital is Bellinzona. It has a surface area of 2,812.2 square kilometres and is the eighth most populous canton, with 333,753 inhabitants. According to the constitution, Ticino is a democratic republic with Italian language and culture, and is politically divided into eight districts: Bellinzona, Blenio, Leventina, Locarno, Lugano, Mendrisio, Riviera and Vallemaggia (see figure 2). These eight districts are then separated into 38 sub-districts that include 157 municipalities¹ (UStat, 2013; Repubblica e Cantone Ticino, 2013). 51.5% of Ticino's population is female and the percentage of foreign people is slightly higher than the national average: almost 87,000 foreign people currently reside in the canton (26%). In Ticino, there are 134,916 households, of which around 99,000 (73.5%) live in individual homes. This is particularly interesting for the purpose of the research.

Canton Ticino is economically very active, with more than 21,000 businesses - mainly from the tertiary sector (80%). In 2010, only 2.3% of the population was registered as unemployed. Despite this (as seen in table 1 above), Ticino has the lowest average salary of all cantons in Switzerland. Figure 3 and table 3, below, present in detail the most important socio-economic variables of canton Ticino.

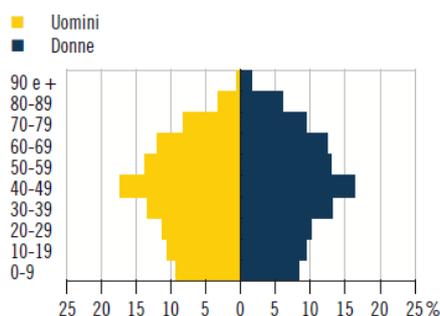
¹ Data referring to the 1.01.2012.

CANTONE TICINO



Altitudine (m s.l.m.): min. 192, mas. 3.362
 Superficie (km²): 2.812,20
 Densità popolazione (ab./km²): 118,68
 Consiglieri di Stato: 5
 Granconsiglieri: 90

Piramide delle età



Elezione del Gran Consiglio 2011 (schede) Partecipazione: 58,7%

PLR: 21,3% PS: 12,7
 LEGA: 19,6% SSI: 15,7%
 PPD: 17,2% Altri: 13,4%



Aziende secondo la dimensione in addetti equivalententi al tempo pieno (ETP)



FIGURE 3: POLITICAL AND DEMOGRAPHIC STRUCTURE OF CANTON TICINO (SOURCE: USTAT, 2013)

| | |
|--------------------------------|------------------------------------|
| Surface | 2,812.20 km ² |
| Population | 333,753 |
| Population density | 118.68 |
| Percentage male - female | 48.5% - 51.5% |
| Percentage Swiss - foreign | 74% - 26% |
| Registered unemployed | 7,593 (2.3%) |
| Average gross income | 5,076 CHF/month |
| Percentage of population aged: | |
| - 0-19 | - 18.9% |
| - 20-64 | - 60.7% |
| - More than 65 | - 20.4% |
| Households: | 134,916 |
| - One-person | - 35.8% |
| - Couples without children | - 23.5% |
| - One-parent families | - 6.3% |
| - Couples with children | - 30.6% |
| - Others | - 3.8% |
| Type of building: | 84,838 (no. residential buildings) |
| - Single household | - 73.5% |
| - Multiple households | - 26.5% |
| House size: | |
| - 1-2 rooms | - 23.5% |
| - 3-4 rooms | - 56.8% |
| - 5 or more rooms | - 19.7% |
| Businesses | 21,506 |
| GDP | 21,984 million |
| GDP per capita | 65,254 |

TABLE 3: SUMMARY OF GEOGRAPHIC, DEMOGRAPHIC AND ECONOMIC VARIABLES IN CANTON TICINO (DATA 2010) (SOURCE: USTAT, 2013)

Waste management

As already stated above, cantonal authorities delegated the responsibility of waste collection and disposal to the municipalities, most of which manage the collection and disposal of waste themselves. Others collaborate with other municipalities, or outsource the service to private companies (especially smaller municipalities). The main law that regulates the MSW management is the cantonal environmental protection law (LALPamb) that has been drawn upon the federal environmental protection law (LPamb), and was issued in 2004. In most of the municipalities, underground containers, both for residual and recyclable waste, are available. Waste that cannot be recycled (residual and bulky) is transported to the incinerator at Giubiasco (ICTR), directly or through one of the transfer stations². Giubiasco's incinerator was built in 2010 and is managed by the Azienda Cantonale dei Rifiuti (ACR). Before 2010, all non-recyclable waste was transported to other cantons for disposal. The construction of the new incinerator thus permitted a reduction of costs from 280 CHF/ton to the current 175 CHF/ton. The quantities of waste in Ticino increased (as shown in figure 4) from 150,000 tons in 1995 to almost 200,000 tons in 2006. In 2011, it decreased again to around 180,000.

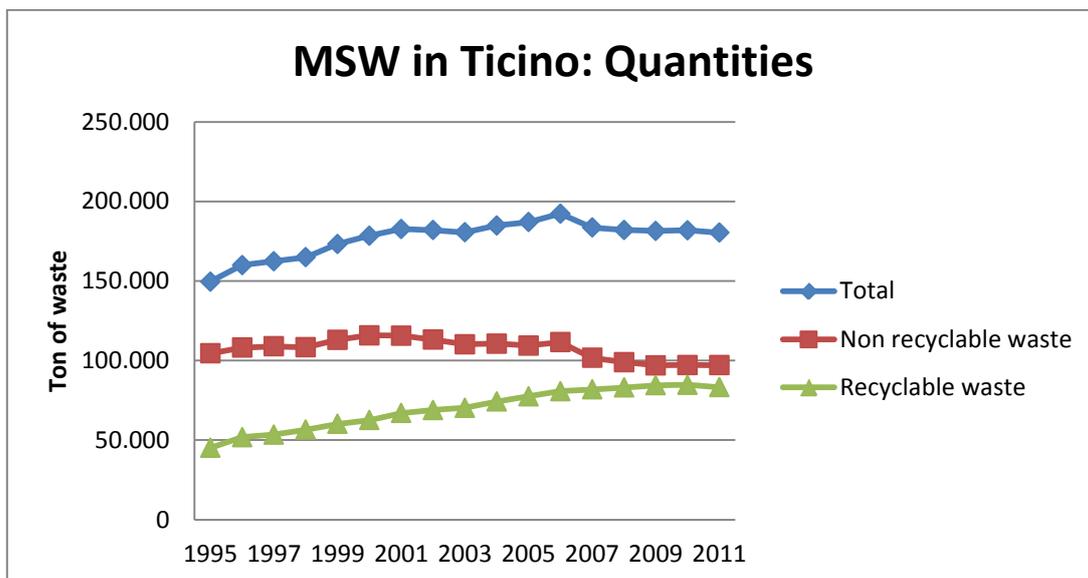


FIGURE 4: MUNICIPAL SOLID WASTE QUANTITIES IN TICINO FROM 1995 TO 2011. SOURCE: USTAT, 2013

Cost varied greatly, depending on the fees applied in the years, from a minimum of 40 million in 1995 to a peak of almost 60 million in 2005. Nowadays, MSW in Ticino costs around 45 million in total (see figure 5).

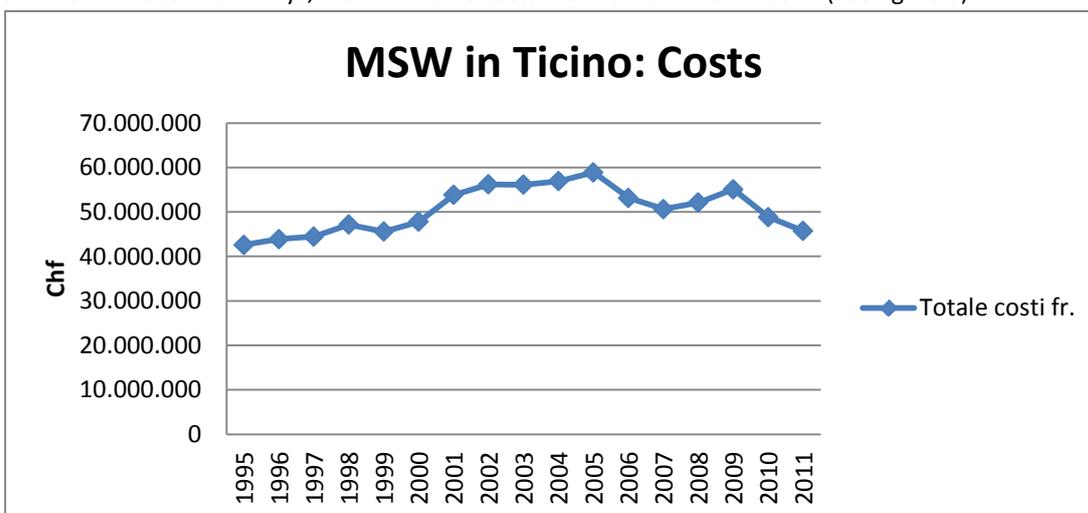
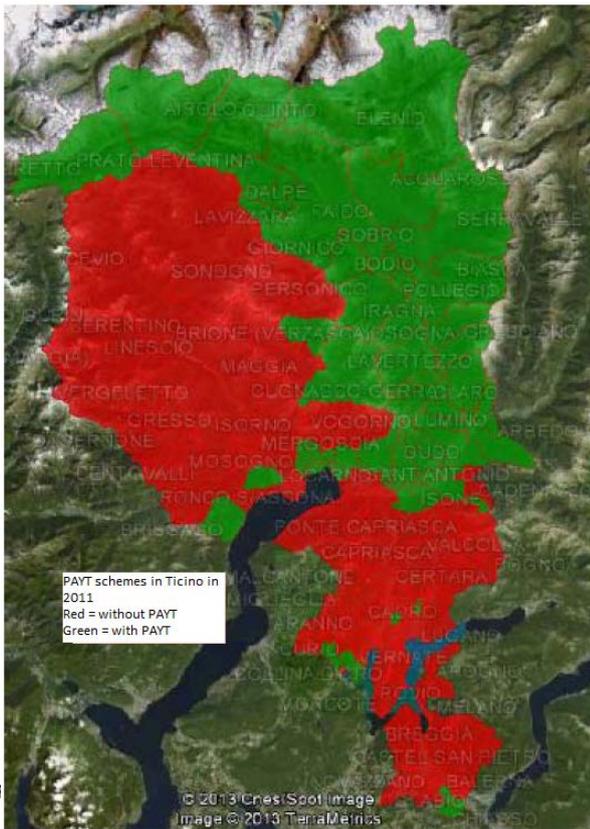


FIGURE 5: TOTAL COSTS OF MUNICIPAL SOLID WASTE IN TICINO FROM 1995 TO 2011. SOURCE: USTAT, 2013

² In canton Ticino there are 5 transfer stations: Coldrerio, Bioggio, Locarno Piano, Arbedo-Castione and Biasca.



The number of municipalities in Ticino has been reduced widely in the past years, due to the tendency of municipalities to merge together. This usually allows them to be managed more efficiently, especially for small municipalities. In fact, the number of municipalities in Canton Ticino reduced, from 245 in 1995, to 157 in 2012.

Three different schemes are used in Ticino to finance MSW management costs, to incentivise (or not) the reduction of MSW waste, and to increase separation and recycling. Two municipalities (Lugano and Stabio) of the 157 (2%), do not apply any tax on waste produced by households. They instead use general income taxes to finance waste's collection and disposal, therefore no incentives are applied to reduce MSW. Other municipalities apply a lump sum tax on waste. This is usually calculated on the number of people living in the households³. The number of municipalities that use a lump sum tax is 92 (58.5%). The third method involves applying a casual tax on waste. This tax is commonly as adopted within a PAYS scheme; it grows proportionally to the amount of waste disposed by each household. Mainly, two types of PAYS schemes are used in Ticino: the pay-by-volume (PBV) is the most used; and the pay-by-weight (PBW). In Ticino, 62 (39.5%) municipalities apply a PAYS scheme, either

PBV⁴ or PBW⁵. Therefore, according to article 18 of the LALPAmb, 95 (60.5%) are in a situation of illegality concerning the financing of MSW management's cost, since they do not apply any causal tax (UStat, 2013).

³ Other lump sum taxes are calculated on the size of the house (number of rooms) or on the characteristic of the house (primary or secondary).

⁴ 59 municipalities.

⁵ 3 municipalities (Camorino, Caslano, Vernate).