



# FSO News

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## 2 Territory and environment

Neuchâtel, November 2014

# Environmental accounts

Air emissions and environmentally related taxes  
by economic player

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# Summary

In 2012, the economy was responsible for 65% of Switzerland's greenhouse gas emissions (41.2 million tonnes of CO<sub>2</sub> equivalent), while the remaining 35% were attributed to households (21.8 million tonnes). Since 1990, the economy's greenhouse gas intensity has fallen by 25%, with economic growth outstripping growth in emissions by the economy. The country's greenhouse gas intensity amounted to 74 grams of CO<sub>2</sub> equivalent per franc of gross value added in 2012. Meanwhile, the emissions of fine particles fell by 31% between 1990 and 2012, particularly thanks to technical progress in the secondary sector.

Environmentally related taxes increase the price of goods and services that harm the environment, encouraging consumers and producers to consider the consequences of their decisions, in line with the "polluter pays principle". Such taxes are often linked to greenhouse gas emissions. In 2012 revenue from these taxes amounted to CHF 10.7 billion, of which CHF 4.9 billion was paid by households, CHF 4.3 billion by the economy and CHF 1.6 billion by households and businesses not resident in Switzerland. Between 1990 and 2012, revenue from environmentally related taxes more than doubled, going from 1.4% to 1.7% of gross domestic product (GDP).

These results come from the environmental accounts, a statistical tool developed coherently with the national accounts to highlight interactions between the environment and the economy.

# Introduction

The environmental accounts are satellite accounts of the national accounts. They complement the latter with an environmental dimension while complying with their concepts, definitions, classifications and accounting rules. In this way they highlight interactions between the environment and the economy. They provide both economic information on the environment and environmental information on the economy.

The environmental accounts comprise several types of accounts. For example, the physical accounts provide statistical information regarding materials requirements, emissions of atmospheric pollutants and energy consumption. The monetary accounts concern in particular revenue from environmentally related taxes, environmental protection expenditure and the economic significance of the sector producing environmental goods and services. The results of these accounts are generally available by economic player (households and sectors, or in more detail, by economic activity in accordance with the NOGA General Classification of Economic Activities, 2008).

The coherence between the environmental accounts and the national accounts means cross-sectional analyses can be conducted between them, allowing a better understanding of interactions between the environment and the economy. For example, it is possible to compare the greenhouse gas emissions of an economic activity with the environmentally related taxes paid, the energy used, the gross value added generated and the jobs it represents.

The environmental accounts are based on a wide range of different sources. Therefore, the data have to be adapted to ensure consistency between the accounts. In some cases, when information regarding the breakdown by activity is not available, estimations are carried out.

Internationally, the methodological reference regarding environmental accounts is the *System of Environmental-Economic Accounting* (SEEA), developed by the UN in collaboration with the European Commission (EC), the Food and Agriculture Organization of the United Nations (FAO), the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD) and the World Bank (WB).

In Europe, application of the SEEA is coordinated by Eurostat, the statistical office of the European Union, which develops manuals and compilation guides intended for the production of environmental accounts in the member states of the European statistical system (ESS), which includes Switzerland.

This publication focuses on two environmental accounts: air emissions accounts, which concern emissions of greenhouse gases (CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, HFC, PFC and SF<sub>6</sub>) and other atmospheric pollutants (PM<sub>2.5</sub>, PM<sub>10</sub>, NH<sub>3</sub>, CO, NMVOC, SO<sub>2</sub>), and environmentally related taxes accounts which concern tax revenues where the basis of calculation is a physical unit (or the equivalent of a physical unit) of something that has a known negative impact on the environment, such as CO<sub>2</sub> emissions or fuel consumption.

The results of each of these accounts are broken down by economic player. Those concerning environmentally related taxes are published here in this form for the first time.

# Air emissions by economic player

In 2012, greenhouse gas emissions<sup>1</sup> by the economy and households totalled 63 million tonnes of CO<sub>2</sub> equivalent (including CO<sub>2</sub> emissions from the combustion of biomass<sup>2</sup>). The economy was responsible for around 65% of these emissions; the primary sector generated 10%, the secondary sector 29% and the tertiary sector 26%. The remaining 35% were attributable to households.

Between 1990 and 2012, greenhouse gas emissions increased by 2 million tonnes of CO<sub>2</sub> equivalent, which corresponds to a rise of 3.2% (G 1). More than three quarters of this increase is down to the tertiary sector, where the 2.5% decrease in stationary emissions failed to offset the 23.2% increase in emissions linked to transport.

If we exclude CO<sub>2</sub> emissions from the combustion of biomass, which are usually considered as carbon neutral<sup>3</sup>, greenhouse gas emissions declined by 0.5% between 1990 and 2012.

## An increasingly efficient economy

Between 1990 and 2012, greenhouse gas emissions by the economy (excluding households) grew by 1.6 million tonnes of CO<sub>2</sub> equivalent, which corresponds to a rise of 4%. During the same period, gross domestic product (GDP) increased by 39.5% in real terms<sup>4</sup>. The greenhouse gas intensity of Switzerland's production system therefore declined, as emissions increased less quickly than economic growth (G 2). Therefore, whereas the creation of one franc of value added entailed the emission of 98 grams of CO<sub>2</sub> equivalent in 1990, in 2012 this value amounted to 74 grams, which equates to a decline of 25%.

### Greenhouse gas emissions by economic player

G 1



Source: FSO – Environmental Accounts

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<sup>1</sup> In order to be consistent with the national accounts, these emissions differ from those reported in the greenhouse gas emissions inventory under the Kyoto Protocol (see note on methodology, page 19).

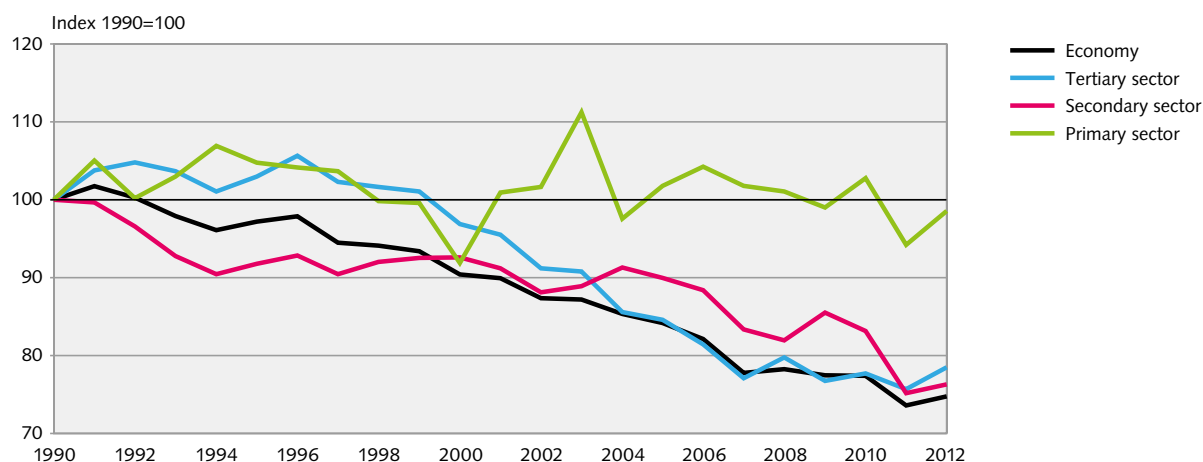
<sup>2</sup> Unless indicated otherwise, the greenhouse gas emission values presented in this publication include emissions linked to the combustion of biomass.

<sup>3</sup> See note on methodology, page 19

<sup>4</sup> Based on the previous year's prices, reference year 2005

## Greenhouse gas intensity of the economy, by sector, in CO<sub>2</sub>-equivalents per swiss franc of gross value added

G 2



Source: FSO – Environmental Accounts

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The evolution of greenhouse gas intensity depends on the sector in question, however. Emissions per franc of value added by the secondary and tertiary sectors fell by around a fifth between 1990 and 2012, while the greenhouse gas intensity of the primary sector fluctuated during this period with no clear trend. For this sector, the deviations noted in 2000 and 2003 can be explained by extreme weather events which influenced its gross value added (Hurricane Lothar in December 1999; drought in 2003).

### Biomass: a fuel that is gaining ground

Since 1990, CO<sub>2</sub> emissions from the combustion of biomass<sup>5</sup> (wood, biodiesel, bioethanol, biogas, biowaste, etc.) have increased by 44% (G3). This rise has mainly occurred since the end of the 90s.

In 2012, 7.4 million tonnes of CO<sub>2</sub> were emitted through the use of biogenic fuels, which equates to 11.7% of total greenhouse gas emissions. This figure was 8.4% in 1990. The increase is due to the economy, where emissions from the combustion of biomass have increased by 75%, while those from households have fallen by 5%. In absolute values, emissions have seen the biggest rise in the secondary sector (+1.8 million tonnes of CO<sub>2</sub>), although the primary sector recorded the fastest growth (+173%).

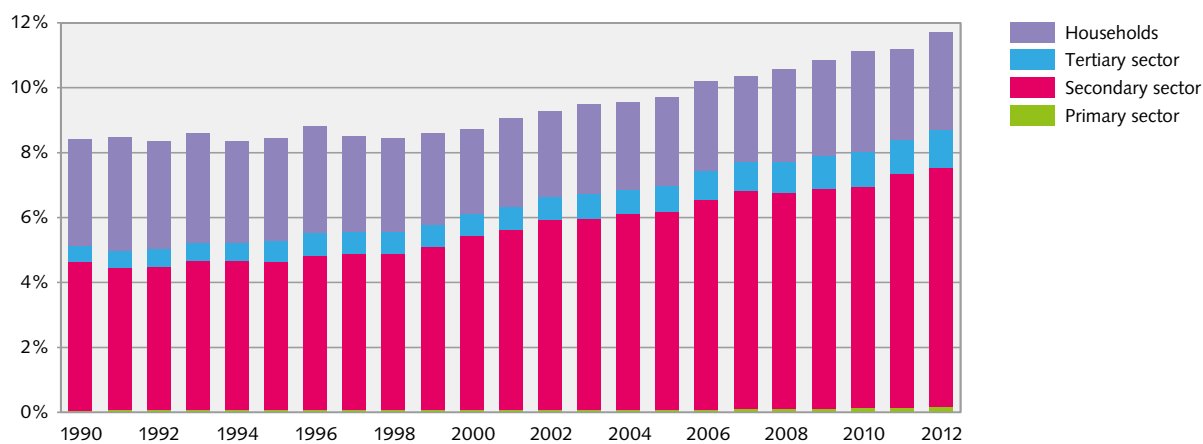
### Mobility has negative impact on results for households

In 2012, households emitted 21.8 million tonnes of CO<sub>2</sub> equivalent, which is 1.7% more than in 1990 but 0.9% less than in 2000. The evolution of emissions between 1990 and 2012 is the result of two opposing trends: on the one hand, stationary emissions – essentially due to heating and hot water production – have fallen by 12.9%, while on the other, emissions linked to transport have risen by 27.7% (G4). The fall in stationary emissions is mainly due to advancements in heating technology and improved insulation in buildings, whereas the increase in transport emissions is principally due to demographic growth and increased mobility of households. Advancements in vehicle fuel consumption have failed to offset these trends. Emissions due to other household activities (gardening, painting, etc.) remain marginal (<1% of total household emissions).

<sup>5</sup> Including CO<sub>2</sub> from fermentation

### Share of CO<sub>2</sub> emissions from biomass combustion in the total greenhouse gas emissions

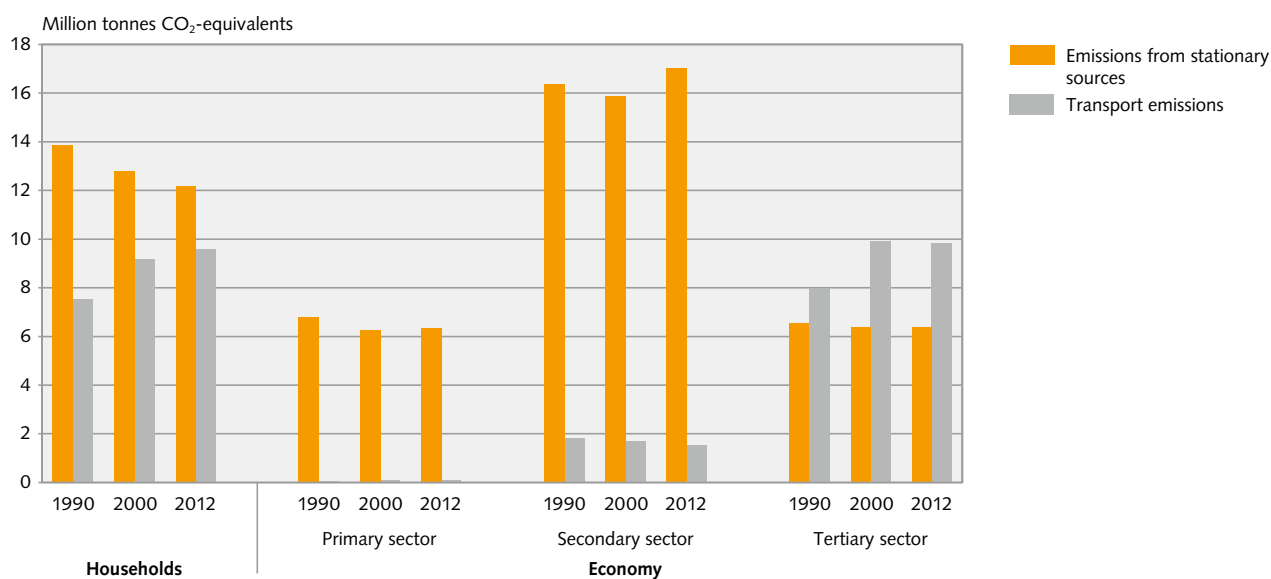
G 3



Source: FSO – Environmental Accounts

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### Greenhouse gas emissions from the economy and the households, by source type G 4



Source: FSO – Environmental Accounts

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### Contrasting emission sources from sector to sector

In the tertiary sector, 61% of emissions came from transport in 2012, which equates to 9.9 million tonnes of CO<sub>2</sub> equivalent (G 4). These emissions have increased by 23% since 1990, mainly on account of air transport. In the secondary sector, 92% of emissions came from

stationary sources in 2012. They remained relatively stable during the period under review. Transport emissions, on the other hand, have declined by 15% since 1990.

In the primary sector, emissions were almost exclusively from stationary sources (98% in 2012). Of these, half came from methane released into the atmosphere by livestock.

## “Hidden” emissions

The production and transport of imported products cause emissions outside Switzerland which are not included in the air emissions accounts or in the inventory data. According to a recent study conducted by the Federal Office for the Environment, the balance between “hidden” emissions in imports and exports amounted to around 53 million tonnes of CO<sub>2</sub> equivalent in 2011, which is more than the emissions directly released by the Swiss economy the same year.

The increase in imports of finished products, in some cases from countries with higher CO<sub>2</sub> intensity and a tertiary sector based economy, are factors which influence air emissions by the economy and which should be taken into account if we want to compile a complete assessment of emissions resulting from a country's consumption.

## International comparison

Air emission accounts are drawn up by most European countries and the results are published every year by Eurostat. Compared with other countries in Europe, Switzerland has the lowest greenhouse gas intensity<sup>6</sup> (G5).

Per unit of gross domestic product (GDP), Switzerland emitted around three times less greenhouse gas in 2011 than the European Union (EU 27) and more than ten times less than some countries. This international comparison also reveals that the share of greenhouse gas emissions attributed to households is highest in Switzerland. This could be explained by several factors, such as more emission-heavy motor vehicles and a low energy intensity economy as well as an energy mix that is comparatively low in CO<sub>2</sub>. Climatic, institutional and economic differences between countries could also have a significant impact on the results. The presence of transport companies operating globally (for example maritime transport in the case of Denmark) results in an increase in the importance of the tertiary sector and a contraction in the share attributed to other sectors and households. Moreover, the way in which certain activities are organised can have an impact on emissions: if heating for homes is supplied by a company, for example in the case of district heating, the emissions would be attributed to the economy, whereas if it is supplied by individual boilers, the emissions would be assigned to households.

<sup>6</sup> For the international comparison, total greenhouse gas emissions, including emissions by households, were divided by GDP (in current prices).

## Fewer fine particles thanks to technical improvements

Emissions of fine particles (PM<sub>10</sub><sup>7</sup>) have fallen by 31% since 1990, going from 28.5 thousand tonnes to 19.6 thousand tonnes in 2012 (G6).

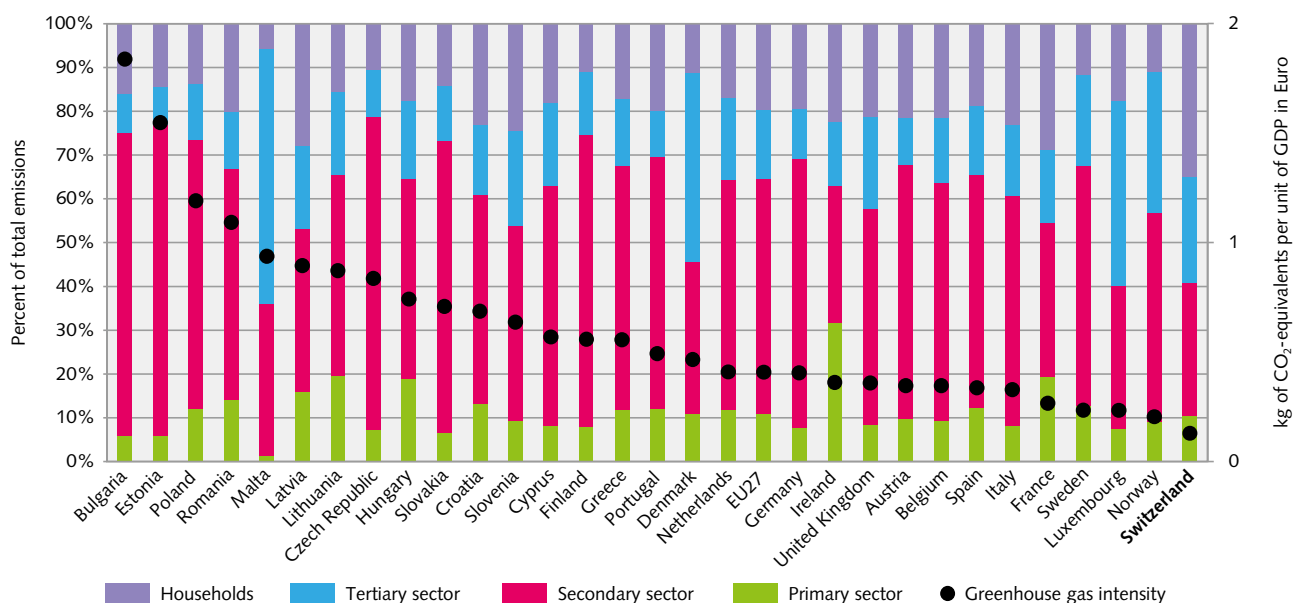
Around a third of this decline is linked to the fall in emissions related to heating of households, in particular thanks to technical advances in heating installations. However, the fall in emissions of fine particles has been hampered by the overall increase in mobility. All three economic sectors have also contributed to this decline, which essentially took place during the first half of the period under review. The most significant declines were observed in the secondary sector (–42%) and in households (–37%), while they were more moderate in the tertiary sector (–22%) and even more so in the primary sector (–9%).

<sup>7</sup> PM<sub>10</sub> refers to fine airborne particles with a diameter of less than 10 µm (thousandths of a millimetre).



## Greenhouse gas intensity and emissions distribution among economic sectors and households in Europe in 2011

G 5

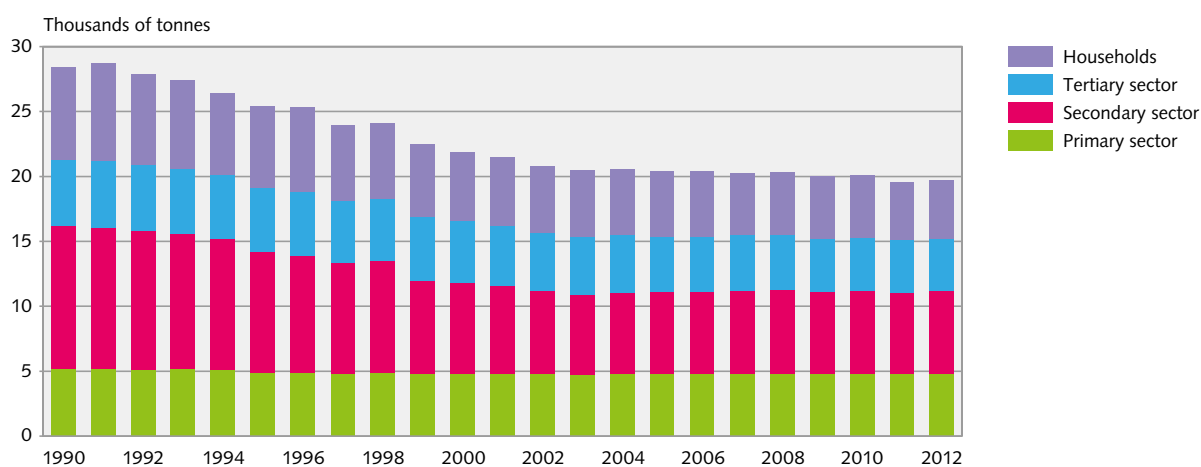


Sources: FSO – Environmental Accounts; Eurostat (status: September 2014)

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## Fine particles emissions (PM10)

G 6



Source: FSO – Environmental Accounts

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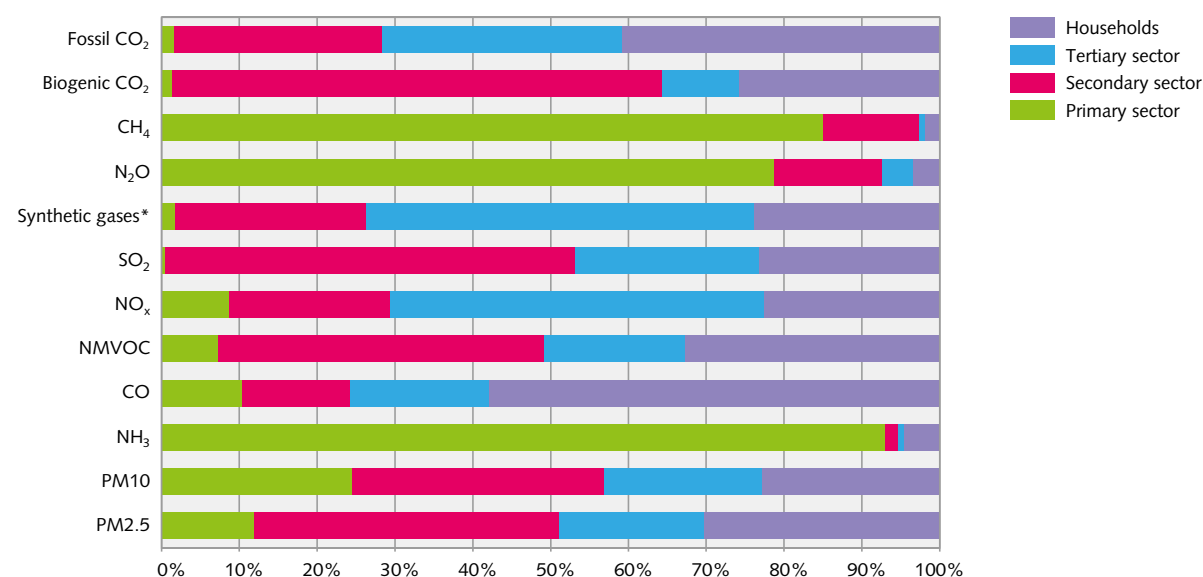
## Every sector has its pollutants

The distribution of emissions between households and the three economic sectors depends on the gas in question (G7).

In 2012, households generated more than half of carbon monoxide emissions (CO, 58%), which mainly come from burning petrol. The primary sector was responsible for the majority of emissions of methane (CH<sub>4</sub>, 85%), nitrous oxide (N<sub>2</sub>O, 79%) and ammonia (NH<sub>3</sub>, 93%) due to rearing livestock and use of fertilisers. The secondary sector, meanwhile, was the main emitter of sulphur dioxide (SO<sub>2</sub>, 53%), generated by combustion processes in refineries and cement works, and volatile organic compounds (NMVOC, 42%), released particularly when using detergents and solvents. Finally, the tertiary sector emitted the majority of synthetic gases (HFC, PFC and SF<sub>6</sub>, 51%), which are especially used in research and development activities, and nitrogen oxides (NO<sub>x</sub>, 48%), mainly from transport activities.

Air pollutant emissions of the economy and the households in 2012

G 7



\* HFC, PFC and SF<sub>6</sub> in CO<sub>2</sub>-equivalents

Source: FSO – Environmental Accounts

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# Environmentally related taxes by economic player

Between 1990 and 2012, revenue from environmentally related taxes more than doubled, going from 4.9 to 10.7 billion francs, based on current prices<sup>8</sup> (G8).

Environmentally related taxes are compulsory payments to the government without individual counterpart whereby the tax base is a physical unit of something that has a proven, specific negative impact on the environment. They cause the price of goods and services that are harmful to the environment to rise and therefore encourage consumers and producers to consider the effects of their decisions, in line with the "polluter pays" principle.

On an international level, environmentally related taxes can be split into four categories: tax on energy, transport, emissions and resources.

## Significance of mobility

In Switzerland, the category that generates the highest revenues is the tax on energy category, which includes taxes on mineral oils and the CO<sub>2</sub> steering levy on fossil combustible fuels (T1). Between 1990 and 2012, revenue from taxes in this category increased by 92%, jumping from 3.1 to 6 billion francs (G8).

**T1 Environmentally related taxes, revenue<sup>1</sup> by tax category, in 2012**

			in Mio. CHF	%
Energy	Mobile	Tax on mineral oil (fuels)	5 089	47
		Sanction applied to passenger cars	4	0,04
	Stationary	CO <sub>2</sub> steering levy on fossil fuels (combustible)	563	5
		Compensatory feed-in remuneration (CFR)	256	2
		Tax for electricity conservation (Canton of Basel-Stadt)	57	1
		Tax on mineral oil (combustibles)	20	0,2
Transport	Mobile	Cantonal tax on motor vehicles	2 159	20
		Heavy vehicle charges (performance-related and lump-sum)	1 612	15
		Automobile Tax	412	4
		Motorway tax sticker (vignette)	361	3
Pollution	Stationary	Incentive tax on volatile organic compounds (VOC)	127	1
		Charge for the Remediation of Contaminated Sites	35	0,3
		Other cantonal taxes on waste and wastewater	34	0,3
Total			10 729	

<sup>1</sup> Tax collection costs included

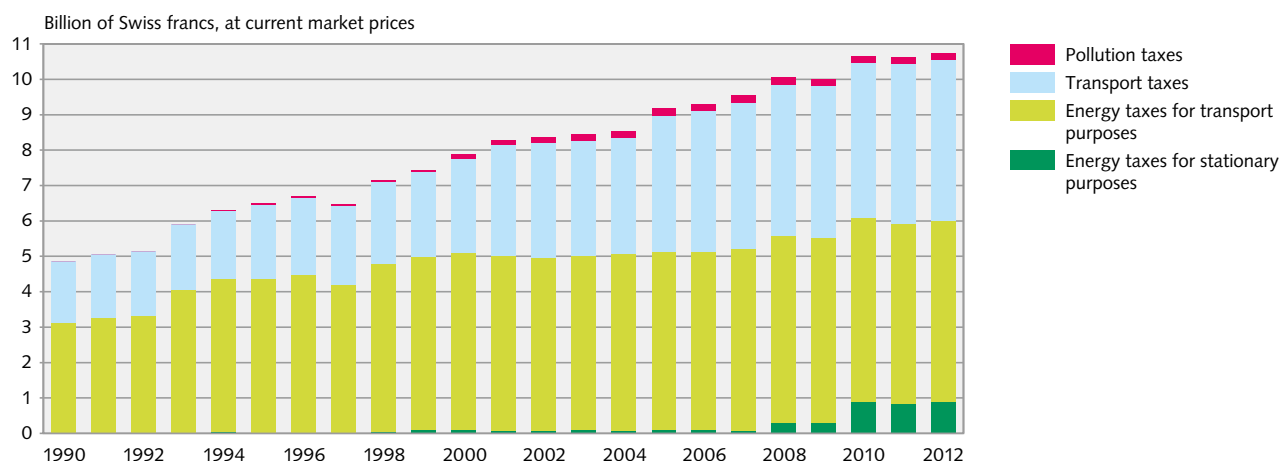
Source: FSO – Environmental Accounts

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<sup>8</sup> Unless otherwise stated, the environmental tax revenues presented in this chapter are quoted based on current prices.

## Environmentally related taxes revenue by tax category

G 8



Source: FSO – Environmental Accounts

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Despite this increase, the relative significance of energy taxes declined from 64% to 56%. In fact, the second category in order of significance, tax on transport, saw its revenues increase by 162%, rising from 1.7 billion francs in 1990 to 4.5 billion francs in 2012. These taxes, imposed mainly on ownership of motor vehicles and use of roads – for example in the form of cantonal tax on motor vehicles, the motorway tax sticker and the performance-related heavy vehicle charge – represented 36% of total tax revenues in 1990 and 42% in 2012. The reasons for this increase include the rise in the number of motor vehicles as well as the introduction of the performance-related heavy vehicle charge in 2001, and the increase of its rate since. The third category is that of taxes on emissions, which include in particular the incentive tax on volatile organic compounds (VOC) and the clean-up tax on contaminated sites. Although revenues from this category have increased in the last few years, they only represented 2% of total environmental tax revenues in 2012. The fourth and final category is the one of tax on resources, taxes which do not exist in Switzerland.

Environmentally related taxes linked to mobility include energy taxes and all transport taxes (T 1). In 2012, revenues from these taxes represented 90% (9.6 billion) of total environmental tax revenues.

## Households are main contributors

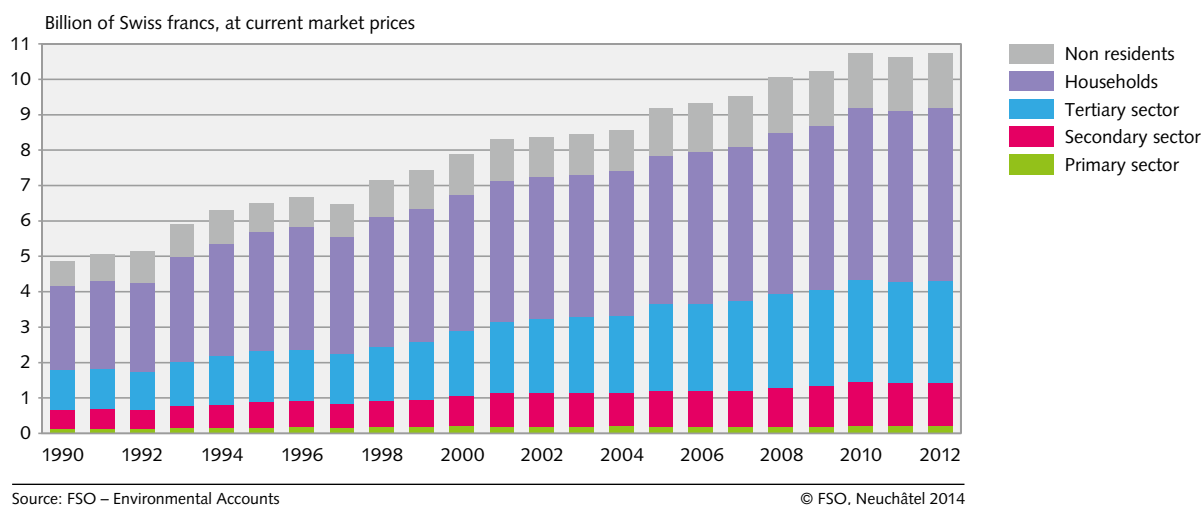
Between 1990 and 2012, environmentally related taxes paid by households doubled, rising from 2.4 to 4.9 billion francs (G 9). Their share in total revenues declined from 49% to 45%, however. Meanwhile, the share of revenues generated by the economy went from 37% to 40%, with actual revenues rising from CHF 1.8 billion to CHF 4.3 billion. A portion of the environmental tax revenues comes from households and companies not resident in Switzerland that are mainly subject to taxes on fuel and road use. This share remained unchanged at 14% between 1990 (CHF 0.7 billion) and 2012 (CHF 1.6 billion). The distribution of environmentally related taxes revenues by economic player therefore remained relatively stable from 1990 to 2012.

## Revenues from transport taxes on the rise

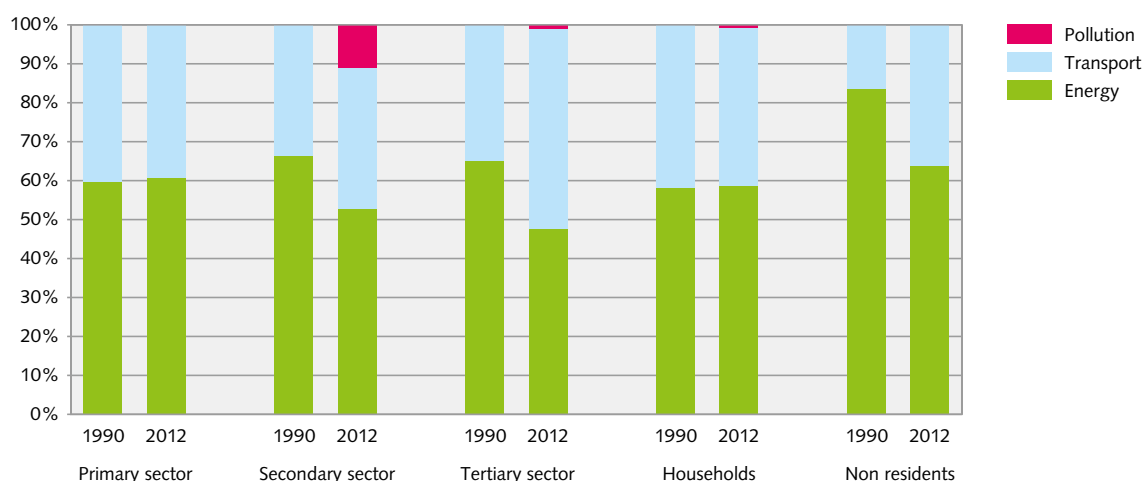
In the primary sector in 1990, energy taxes represented around 60% and transport taxes around 40% of total environmentally related taxes revenues, and this ratio remained almost unchanged in 2012 (G 10).

## Environmentally related taxes, revenue by economic player

G 9



## Share of environmentally related taxes, revenue by category and economic player G 10



In the secondary sector, energy tax revenues represented around two thirds of total environmental tax revenues in 1990. In 2012, they represented around half. This development is due in particular to the introduction of emissions taxes (e.g. tax on volatile organic compounds, VOC). The same development can be seen in the tertiary sector. This is mainly due to the increase in revenues from transport taxes, which is the result of a rise in some taxation rates as well as an increase in transport performances.

Where households are concerned, energy taxes accounted for around 58% of the total in 1990, with the rest coming from transport taxes. This ratio remained stable until 2012.

Concerning non-resident units, the share of their transport tax revenues grew, rising from 16% in 1990 to 36% in 2012.

## Moving towards a greener tax system?

Environmentally related tax revenues not only increased in absolute terms, but also as a percentage of gross domestic product (GDP), rising from 1.4% to 1.7% between 1990 and 2012, and as a percentage of total revenues from tax and social security contributions, progressing from 6.3% to 6.4% between 1995 and 2012 (G 11). These values are close to those of the European Union where, in 2012, environmentally related taxes revenue corresponded to 2.4% and 6.2% of the total tax and social security contributions.

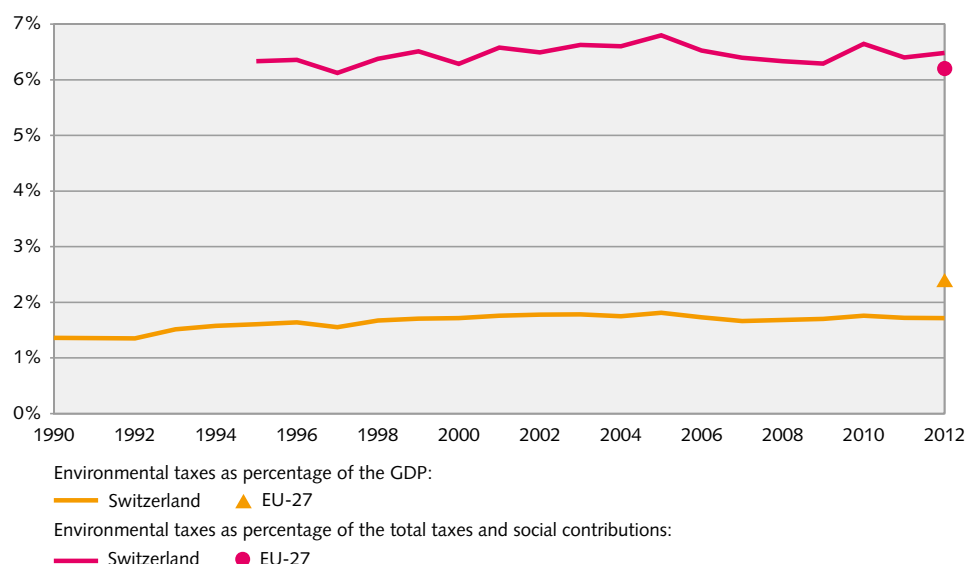
These two ratios highlight the importance of an environmental tax system and a potential shift in the tax burden towards polluting activities. However, they do not indicate if the state of the environment is improved or worsened. Indeed, revenues may increase either as a result of higher taxation rates or an increase in the number of taxes (development that favours the environment), or as a result of an increase in polluting activities (development that does not favour the environment).

## Environmental tax burden varies by activity

In 2012, environmentally related taxes equated to 4.9% of the gross value added of the primary sector, made up of "agriculture, forestry and fishing" activities, compared with 1.5% in 1990 (G 12). This rise is due to the fact that the environmentally related taxes paid by this economic sector have increased. At the same time, its gross value added has declined, mainly due to a fall in agricultural prices. However, agriculture benefits from direct payments not recorded in its value added. In the "transportation, storage, information and communication" activity, the environmental tax burden equated to 2.9% of its gross value added in 2012, compared to 1.4% in 1990. In 2012 this tax burden amounted to 1.4% of gross value added in construction and 1.3% in the branch "energy supply, water supply, and waste management". In the other sectors this figure was less than 1%.

### Environmentally related taxes, revenue in relation to the GDP and the total taxes and social contributions

G 11

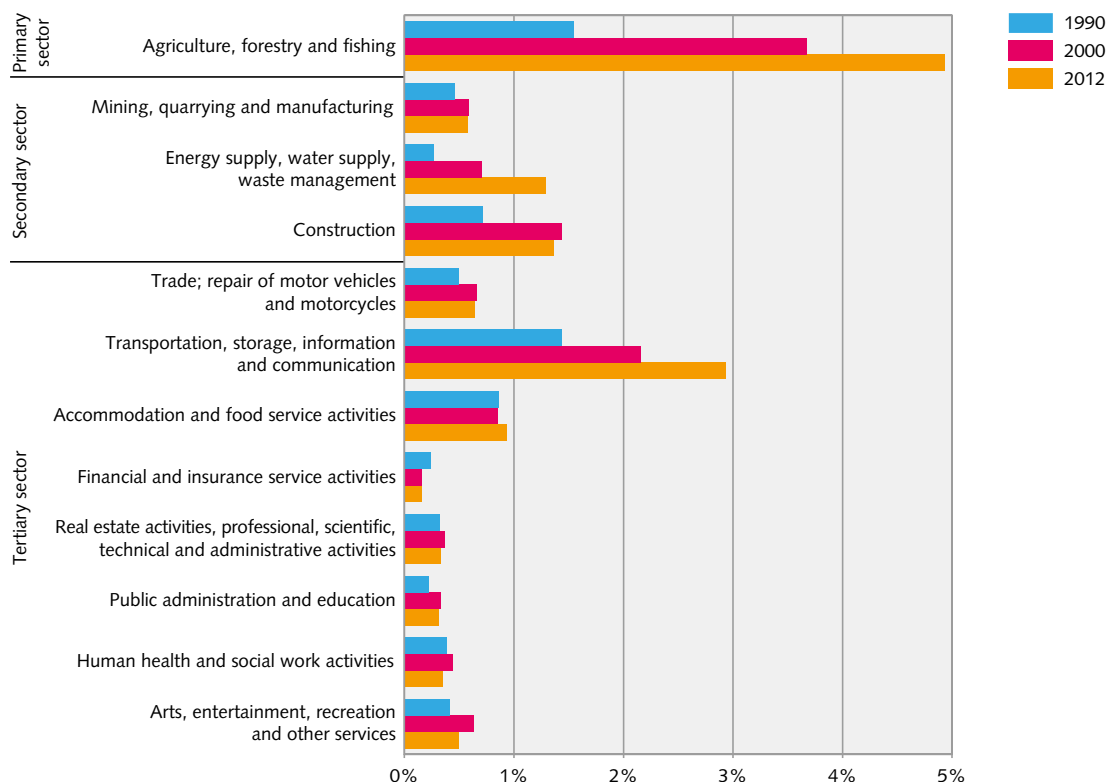


Sources: FSO – Environmental Accounts; Eurostat (status: September 2014)

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## Environmentally related taxes, revenue in relation to the gross value added by economic activity

G 12



Source: FSO – Environmental Accounts

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### A rise in implicit tax rates on energy

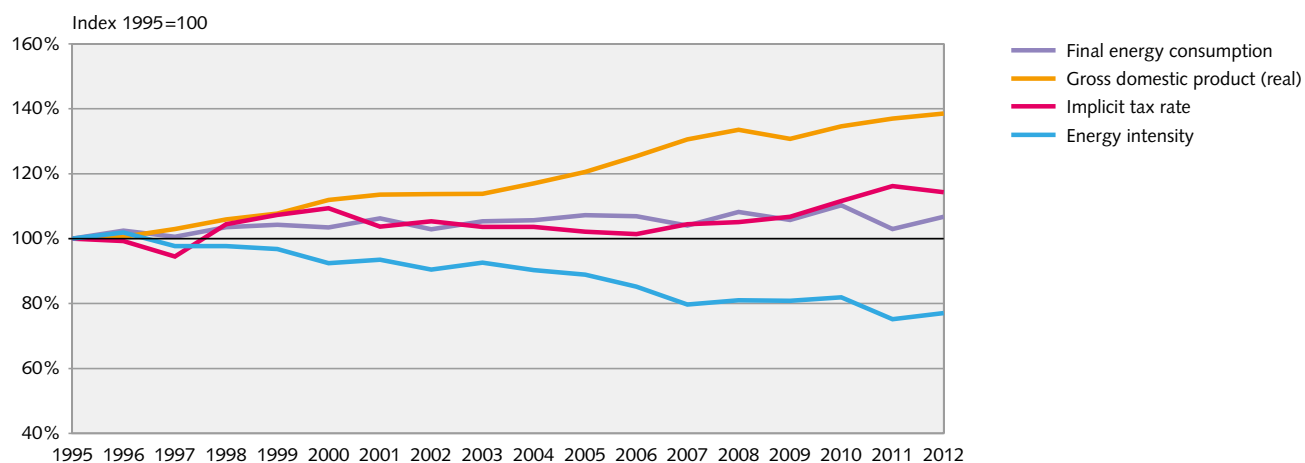
The implicit tax rate on energy corresponds to the ratio between energy tax revenues, corrected for inflation<sup>9</sup>, and final energy consumption, expressed in tonnes of oil equivalent (TOE). It indicates the actual tax burden on the potential taxable base, specifically energy. Between 1995 and 2012, the implicit tax rate on energy in Switzerland went from 239 to 273 CHF/TOE, which equates to an increase of 14% (G 13). This rise is the result of a 22% increase in tax revenues in the energy category (corrected for inflation) and slower growth (7%) in final energy consumption. Energy intensity, meanwhile, which indicates the final energy consumption necessary to generate one franc of GDP, fell by around 23%.

By international standards, Switzerland was ranked fourth in Europe in 2012 based on its implicit tax rate on energy, behind Denmark, the United Kingdom and Italy (G 14).

<sup>9</sup> Corrected with the final domestic demand deflator, year of reference 2005

## Implicit tax rate on energy and energy intensity

G 13

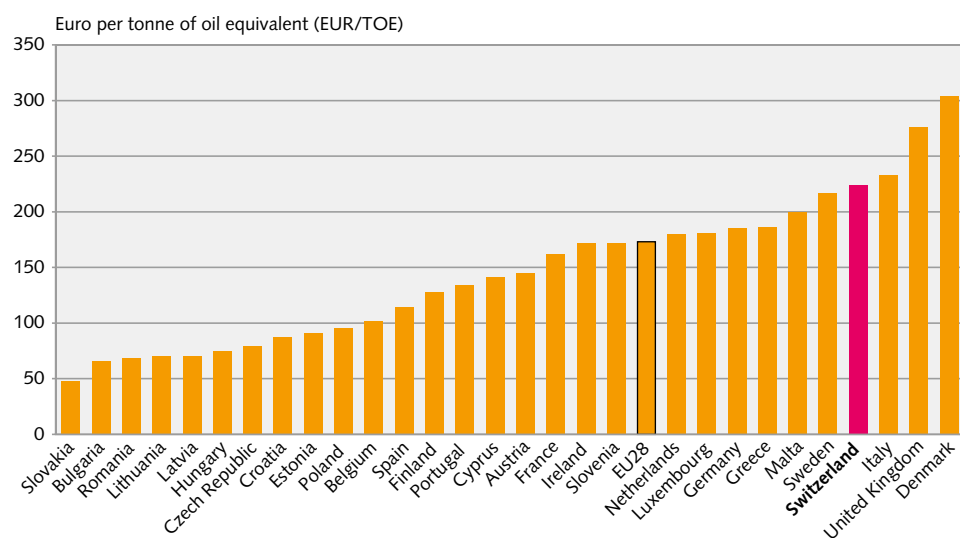


Sources: FSO – Environmental Accounts, National accounts; SFOE – Overall energy statistics

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## Implicit tax rate on energy in Europe in 2012

G 14



Sources: FSO – Environmental Accounts; Eurostat (status: September 2014)

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# Conclusions

Since the environmental accounts are methodologically compatible with each other and with the national accounts, it is possible to compare greenhouse gas emissions from one economic sector with the environmentally related taxes it pays, the gross value added it generates and the jobs it represents. It is necessary, however, to bear in mind that some greenhouse gas emissions are not taxed (e.g. methane emissions by agriculture), and that some environmentally related taxes are not directly linked to greenhouse gas emissions (e.g. the clean-up tax for contaminated sites). We should also remember that air emission accounts include emissions generated outside Switzerland by units (households and companies) resident in Switzerland, but not those generated in Switzerland by non-resident units. On the other hand, the environmentally related tax accounts include taxes paid in Switzerland by non-resident units but not those paid overseas by resident units.

## Implementation of the “polluter pays” principle?

In 2012, extractive and manufacturing industries were responsible for 25% of greenhouse gas emissions by the economy (G 15). These industries paid 16% of the environmentally related taxes and generated 19% of the gross value added. The activity “production and distribution of energy, water and waste management” was also responsible for a significant share of greenhouse gas emissions (17%), particularly owing to incineration of waste. Such waste, as it is used as a fuel, is not taxed, however. This activity therefore did not pay many environmentally related taxes (3%) compared with its emissions. Moreover, it generated 2% of the gross value added of the economy. Meanwhile, financial and insurance activities generated 1% of greenhouse gas emissions, paid 2% of environmentally related taxes and generated 10% of gross value added.

As the majority of energy taxes are linked to CO<sub>2</sub> emissions from fossil fuels, it is possible to compare the revenues generated by these taxes with CO<sub>2</sub> emissions.

In 2012, households generated 41% of fossil fuel CO<sub>2</sub> emissions and paid 57% of energy taxes (G 16). The tertiary sector, which produced 31% of the economy's CO<sub>2</sub> emissions, was also the sector that paid the largest share of energy taxes (27%). Meanwhile, the secondary sector emitted 27% of CO<sub>2</sub> from fossil fuels and generated 13% of energy tax revenues, versus 1.6% of fossil-based CO<sub>2</sub> emissions and 2.4% of energy tax revenues for the primary sector.

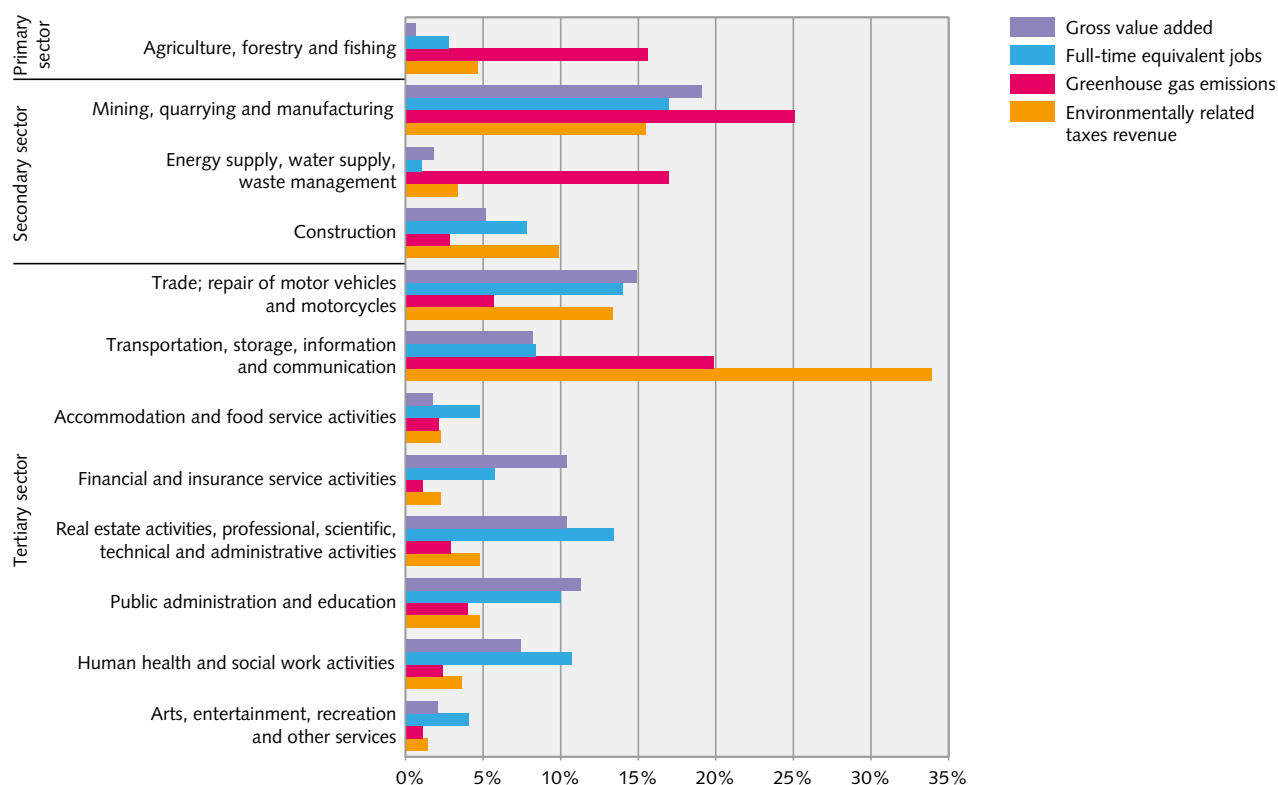
The distribution of emissions between the different economic players therefore does not coincide with the spread of energy tax revenues. A more in-depth analysis can be made if we consider their types of activities: transport and stationary activities.

Concerning transport activities, the kerosene used by the aviation sector represented around 60% of fossil-based CO<sub>2</sub> emissions linked to transport by the tertiary sector in 2012. As this fuel is largely exempt from tax, the share of energy tax revenues due to transport in the tertiary sector was therefore lower than its share of fossil-fuel CO<sub>2</sub> emissions linked to transport.

Meanwhile, if we consider stationary activities, some companies benefit from exemptions or tax refunds in order to remain economically competitive. Such refunds are sometimes linked to a commitment on the part of companies to lower their emissions. Moreover, some companies use fuels that are not subject to taxation, such as waste burned in incinerators or cement works, but which still emit fossil-based CO<sub>2</sub>.

## Comparison between economic activities in 2012

G 15

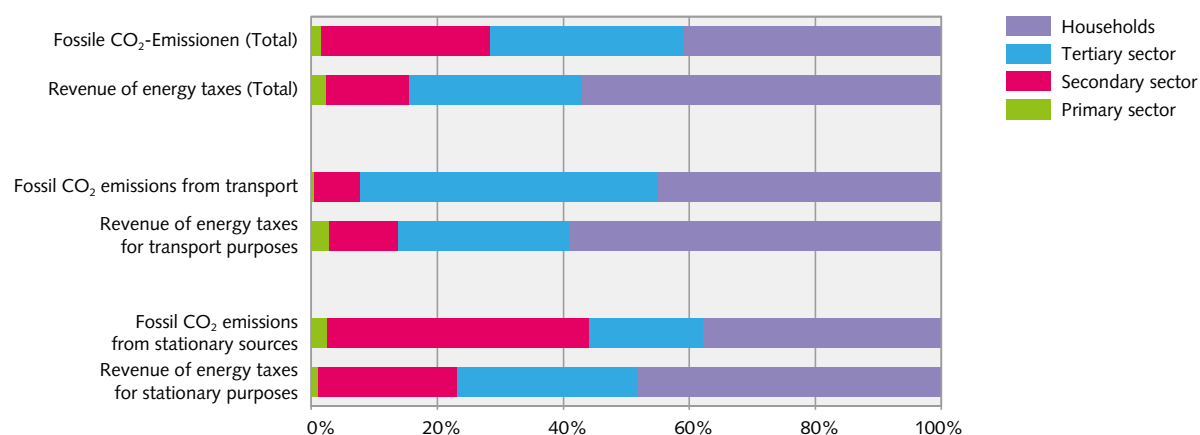


Sources: FSO – Environmental Accounts, National accounts, Structural business statistics STATENT

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## Comparison between greenhouse gas emissions and taxes revenue on energy by economic player in 2012

G 16



Source: FSO – Environmental Accounts

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# Note on methodology

## Air emission accounts

The air emission accounts consider emissions from all resident units (companies and households), irrespective of where the emissions took place (domestic perspective). This perspective differs from that of the greenhouse gas inventory under the Kyoto Protocol, and the inventory of air pollutants of the EEC-UN Convention on Long-Range Transboundary Air Pollution (CLRTAP), which considers emissions from a territorial perspective, in other words, it includes emissions generated within the country's borders (with the exception of fuel tourism for the greenhouse gas inventory).

In order to produce air emission accounts, the data from these inventories therefore have to be adjusted accordingly: emissions generated abroad by businesses and households resident in Switzerland have to be added, while those linked to non-resident businesses and households have to be subtracted.

CO<sub>2</sub> emissions from the combustion of biomass are not taken into account in the emissions inventory totals under the Kyoto Protocol as they are considered carbon neutral. Indeed, it is acknowledged that these emissions are part of a balanced cycle and will end up being re-captured in the growth of new vegetation in the near future (<100 years). Emissions from the combustion of biomass should be included in air emission accounts, however, in order to maintain compatibility with other accounts (energy, materials) which do take into account the use of biomass. Similarly, emissions from aviation are not, or only partially, included in data inventories and should therefore be added to air emission accounts.

The data from air emission accounts are also classified differently from those taken from inventories. While emissions are classified according to their source in the inventories, they are classified by economic player in the accounts, in line with the General Classification of Economic Activities (NOGA).

The air emission accounts are based on the Eurostat manual *Air Emission Accounts* (AEA).

## Environmentally related taxes accounts

The environmentally related taxes accounts provide information on revenues from these taxes by economic player. Environmentally related taxes are compulsory payments to the government without individual counterpart whereby the tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment (e.g. one litre of fuel or one gram of CO<sub>2</sub> emissions). It doesn't matter whether such taxes were introduced to protect the environment, to generate revenues which can be used for environmental protection or for another fiscal purpose. Environmentally related taxes cause the prices of goods and services that are harmful to the environment to rise and therefore encourage consumers and producers to consider the impact of their decisions, in line with the "polluter pays" principle.

In terms of national and international comparability, only taxes considered as such by the national accounts are taken into consideration, and not other types of environmental tax levies, such as usage fees paid in exchange for an individual service from the government (e. g. municipal usage fees for management of wastewater and waste). Environmental tax revenues are calculated net of VAT, but include the administrative costs linked to collection. Any potential tax refunds, cuts or exemptions from which some businesses benefit are taken into account.

Internationally, environmentally related taxes can be split into four categories: tax on energy, transport, emissions and resources (the latter category does not exist in Switzerland) (T 1 page 11).

The environmental tax accounts are based on the Eurostat manual *Environmental Taxes*.

## Links

FSO Environmental accounts:

[www.statistique.admin.ch](http://www.statistique.admin.ch) → Topics → Territory and environment → Environmental accounting

Eurostat environmental accounts:

[epp.eurostat.ec.europa.eu](http://epp.eurostat.ec.europa.eu) → Statistics → Environment → Environmental accounts

System of Environmental-Economic Accounting (SEEA):

[unstats.un.org](http://unstats.un.org) → Economic Statistics → Environmental Accounting

Article on environmental tax levies published by the Swiss Federal Tax Administration (available in French only): [www.estv.admin.ch](http://www.estv.admin.ch) → Documentation → Publications → Autres publications → Recueil informations fiscales → Prélèvements fiscaux liés à l'environnement