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2 Territory and environment

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Greenhouse gas emissions by economic player

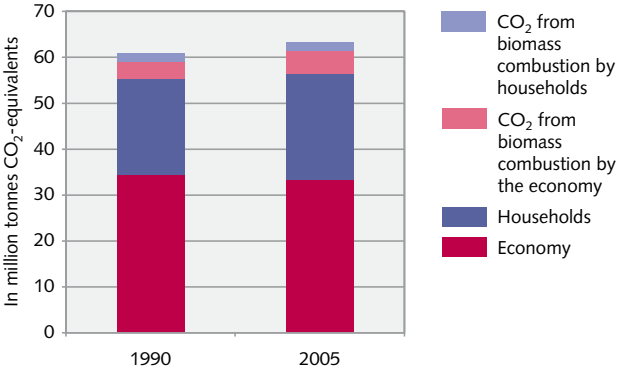
Efficiency gains in the economy

Because the economy grew faster than the emissions, a relative decoupling between economic growth and greenhouse emissions occurred between 1990 and 2005.

Such a decoupling between economic development and pressures on the environment is a key objective of Switzerland's Sustainable Development Strategy. Decoupling is said to be *absolute* when pressures on the environment are decreasing while the economy is increasing and it is said to be *relative* when such pressures are increasing but at a lower rate than the economy. In the case of the greenhouse gas, according to the method used here, Switzerland's emissions grew by 3.6% between 1990 and 2005, increasing from 61 to 63.2 million tonnes CO_2 equivalents (see Figure G1).

More than 80% of this growth of 2.2 million tonnes was caused by households, whose transport emissions increased by more than 1.8 million tonnes (+20%) in 15 years. The balance of 0.4 million tonnes is attributable to the economy, whose emissions increased by 1% during this period, while the gross domestic product (GDP) increased by 18.7% in real terms[1]. Consequently, a *relative* decoupling occurred between 1990 and 2005. Thus, the efficiency of the production system improved, its emissions having declined in 15 years from 101 to 86 grams CO_2 equivalents per unit of value added.

Greenhouse gas emissions (CO_2, N_2O, CH_4) from the economy and households **G 1**



Source: FSO

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Another look at the same emissions

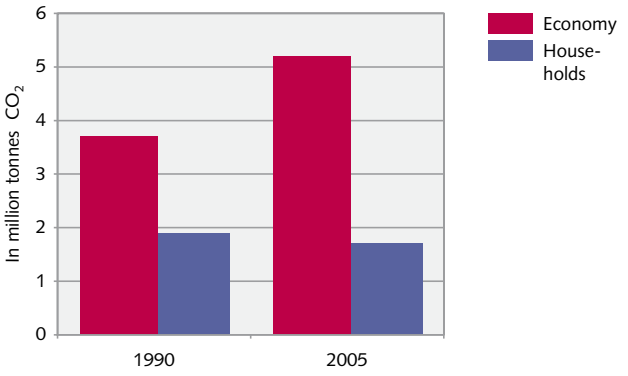
The tool used here to account for greenhouse gas emissions is NAMEA *(National Accounting Matrix including Environmental Accounts)*. As a result of adjustments made to ensure their consistency with the data in the national accounts, the results differ from those found in the Swiss law on CO_2 emissions and in the greenhouse gas inventory in the Kyoto Protocol. These discrepancies stem in particular from the fact that NAMEA takes account of all emissions generated by economic activities, including those from the combustion of biomass and air transport. Moreover, emissions generated abroad by enterprises and households resident in Switzerland are also included, while those generated in Switzerland by enterprises and households that are not resident in Switzerland are excluded. Because nature is not an economic actor as defined in the national accounts, nature's emissions and absorption are excluded.

[1] i.e. at the previous year's price, reference year 2000.

Biomass, energy with the wind in the sails

Considered neutral in relation to the greenhouse effect under the Kyoto Protocol, CO_2 emissions from the combustion of biomass are not included in emission figures to evaluate the Kyoto targets. They amounted to 6.9 million tonnes in 2005, i.e. 23% more than in 1990 (Figure G2). Thus, in 2005 the combustion of biomass generated nearly 12.3% of total CO_2 emissions, compared with 10.6% in 1990. A growing share of CO_2 emissions therefore stemmed from a renewable instead of a fossil energy source. This trend was attributable to the economy, whose biomass emissions grew by more than 40% in 15 years. In households, however, biomass emissions decreased by 11%. Thus, the increased used of wood pellet heaters did not offset the decrease in the use of fireplaces and other traditional wood heaters.

CO_2 emissions from biomass combustion **G 2**



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More efficient heaters

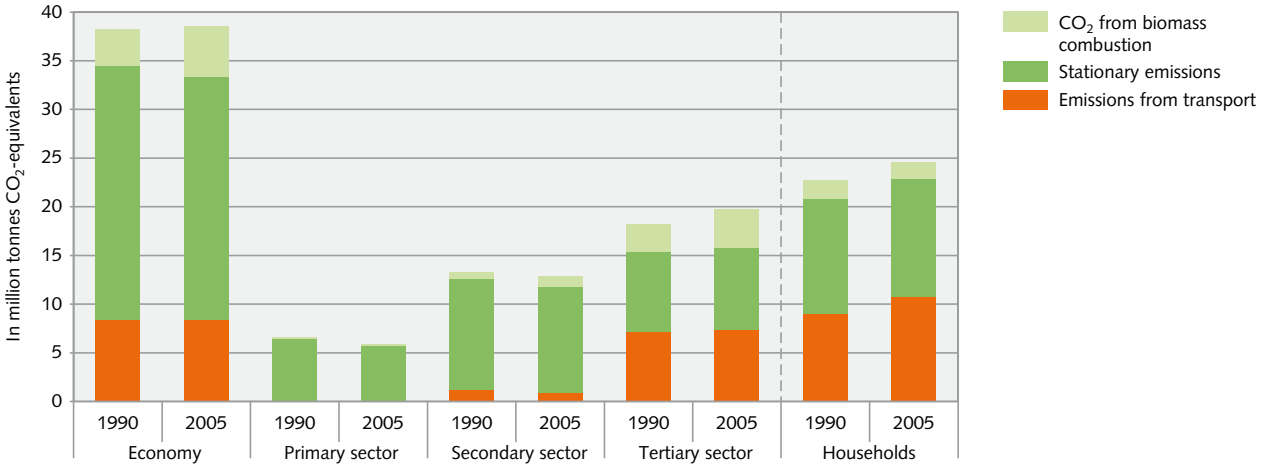
Between 1990 and 2005, improvements in technology and building insulation made it possible to contain greenhouse emissions due to household heating (Figure G3). In fact, these stationary emissions stabilised at 13.8 million tonnes CO_2 equivalents despite an increase of nearly 10.5% in the Swiss resident population during this period. They represented 56% of household emissions in 2005, down from 61% in 1990.

More mobility, more emissions

In 2005, emissions from transport totalled 19.2 million tonnes CO_2 equivalents, representing 30% of Switzerland's total greenhouse gas emissions. Their increase of 10% compared with 1990 is entirely attributable to households, whose transport emissions rose from 9 to 10.8 million tonnes CO_2 equivalents (+20%) in 15 years. This growth was due, on the one hand, to population increase and, on the other, to the increasing use of cars, which more than offset the progress made by the automotive industry with respect to fuel consumption.

The economy's transport emissions remained stable and totalled 8.4 million tonnes CO_2 equivalents in 2005, as they had in 1990, i.e. 22% of the economy's total emissions. In 2005, the transport services sector accounted for 72% of the economy's total emissions and the remaining 28% were generated by transport activities in other sectors.

Greenhouse gas emissions (CO_2, N_2O, CH_4) and share related to transport, by economic player **G 3**



Source: FSO

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Efficiency gains in the economy

An analysis of the evolution of the Swiss economy by economic sector reveals significant variations, particularly as a result of structural changes and technological progress.

Thus, in the tertiary sector, which generated half of the economy's emissions and nearly three quarters of its value added in 2005, a *relative* decoupling occurred between 1990 and 2005 (Figure G4). In fact, the emissions did not decline in absolute values, but they grew at a slower rate (+8.1%) than the value added (+20.5%). Consequently, in 15 years, the tertiary sector's efficiency grew by 11.5%, its emissions having declined from 74 to 66 grams CO_2 equivalents per unit of value added.

On the other hand, an *absolute* decoupling occurred in the secondary sector, which generated one third of the economy's emissions, compared with just over a quarter of its value added. In fact, emissions decreased (-3.4%) while the value added increased (+11.2%). This decrease is the result of technological progress and structural changes in the secondary sector which benefited dynamic branches that produce lower emission levels, such as the chemical, pharmaceutical and watch industries, as well as the precision machinery and instruments industry. In 15 years, the secondary sector's efficiency grew by 15.1%, its emissions having declined from 127 to 111 grams CO_2 equivalents per unit of value added.

In the primary sector, which generated slightly under one sixth of the economy's emissions and 1.3% of its value added in 2005, emissions dropped by 9.9%, essentially due to the fall in the number of cattle and pigs and the reduction in the use of fertiliser.

A *relative* decoupling occurred in relation to the production of the primary sector, which declined by 3.4%. In 15 years, the primary sector's efficiency grew by 7.2%, its emissions having fallen from 463 to 432 grams CO_2 equivalents per unit of production value. On the other hand, no decoupling occurred in this sector between emissions and value added, because the former fell more than the latter.

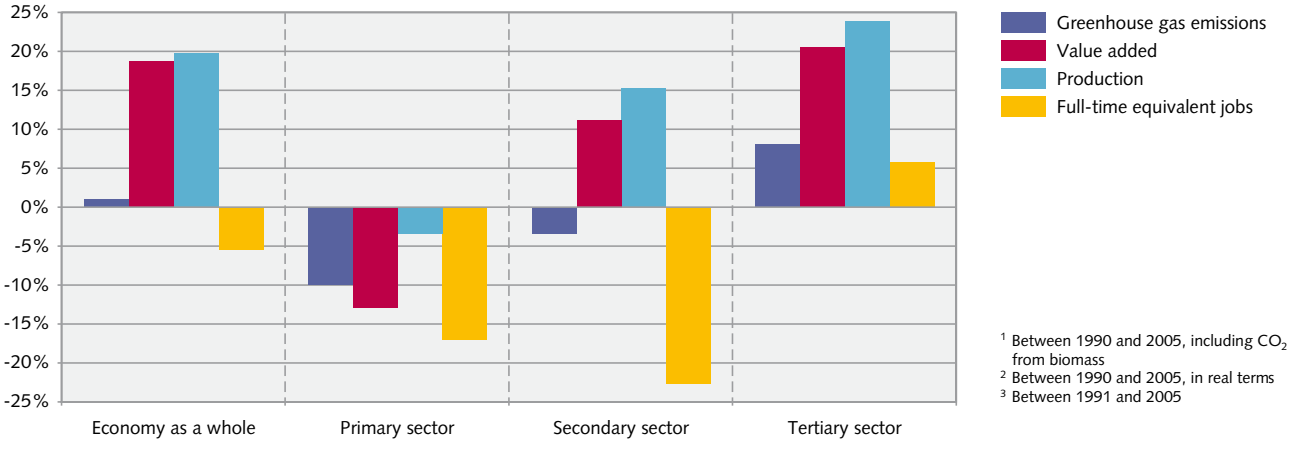
Switzerland's tertiarisation to the detriment of other countries

Strictly speaking, monitoring greenhouse gas emissions is incomplete without taking account of emissions related to imports and exports.

According to a study by the Federal Office for the Environment, in 2004 imports resulted in the emission of approximately 68.4 million tonnes CO_2 equivalents abroad and exports generated 28.7 million tonnes in Switzerland. Consequently, foreign trade-related grey emissions totalled 40 million tonnes. They increased by the same amount Switzerland's direct emissions, here estimated to have been 63.2 million tonnes in 2005.

The more than 45% increase in our imports of finished goods, which went from 11.6 to 16.9 million tonnes between 1990 and 2005, as well as the industrial delocalisation to countries with lower energy efficiency can, therefore, not be ignored when drawing up the global balance sheet of the tertiarisation of Switzerland's economy.

Evolution of greenhouse gas emissions[1] (CO_2, N_2O, CH_4), value added[2], production[2] and employment[3] **G 4**



[1] Between 1990 and 2005, including CO_2 from biomass
[2] Between 1990 and 2005, in real terms
[3] Between 1991 and 2005

Source: FSO

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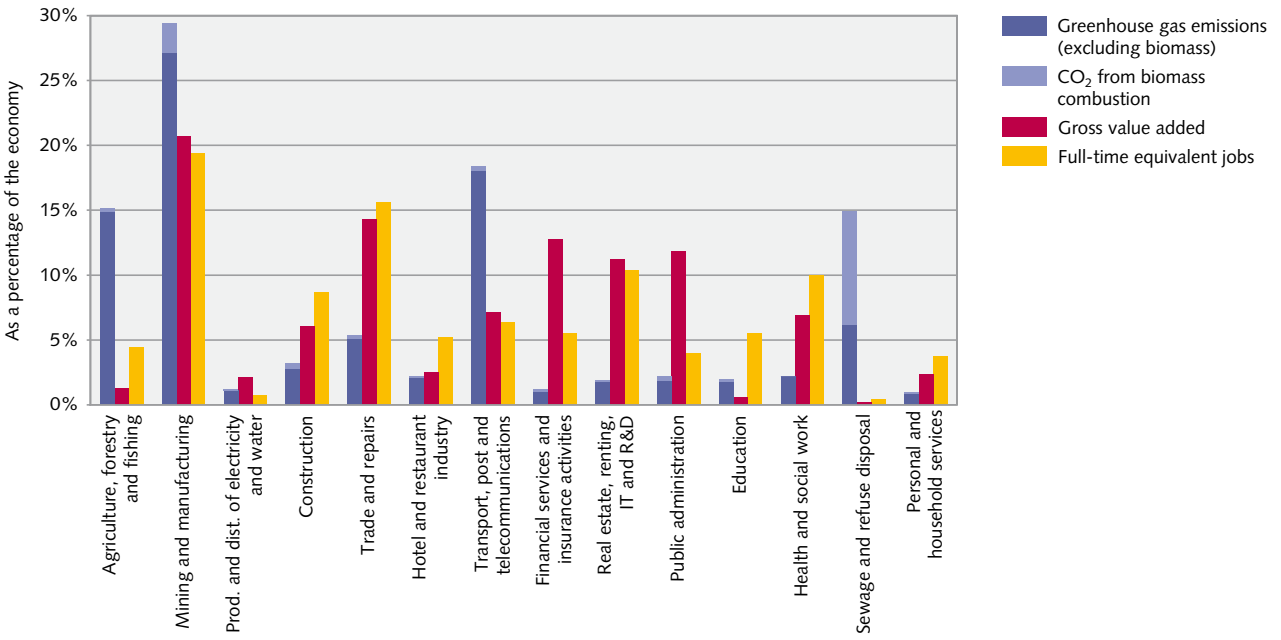
Economic and environmental profile in 2005 **G 5**



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NAMEA

NAMEA, acronym for *National Accounting Matrix including Environmental Accounts*, is a statistical tool developed by Eurostat. It makes it possible to combine, by branch, data from the national accounts, such as value added, with environmental data, such as greenhouse gas emissions (Figure G5). However, as a result of adjustments to ensure consistency with national accounts, the results differ from those found in the Swiss law on CO_2 emissions and in the greenhouse gas inventory in the Kyoto Protocol. Combined with input-output tables (IOTs), this tool is an essential basis for conducting integrated analyses, modelling and economic and environmental forecasts. It can also contribute to the formulation of legislation and environmental policies.

Progress to date and prospects for the future

A NAMEA for greenhouse gas emissions was compiled on a pilot basis for 2002 and published three years ago. Since then, significant improvements of certain statistics have been made, particularly as regards energy consumption by branch and IOTs. The results presented here refer to the NAMEA for greenhouse gas emissions in 2005, which was compiled with the support of the Federal Office for the Environment (FOEN) and the Swiss Federal Office of Energy (SFOE). Based on this, the FSO plans to produce an annual NAMEA for greenhouse gas emissions as of 2010, to draw up a time series from 2000 and to extend this tool to include energy, energy taxes and material flows.

Environmental accounting

Environmental accounting is an ecological extension of national accounts. It aims to improve our understanding and policy consideration of growing interactions between the economic and environmental spheres. The FSO's elaboration of environmental accounts is based on the development of the NAMEA, the material flow accounts and the economic-environmental accounts.

Additional information available on the Internet

Environmental accounting (in French and in German):
www.bfs.admin.ch/bfs/portal/fr/index/themen/02/05.html

NAMEA type accounts (in French and in German):
www.bfs.admin.ch/bfs/portal/fr/index/themen/02/05/blank/dos/04.html

Input-output tables (IOTs) (in French and in German):
www.bfs.admin.ch/bfs/portal/fr/index/themen/04/02/01/dos/02.html

Switzerland's grey greenhouse gas emissions 1990–2004 (in German):
http://www.bafu.admin.ch/publikationen/publikation/00048/index.html?lang=fr

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