



April 2016

Executive summary

Green Economy: Indicators for Progress Measurement

Indicators for current focus areas in Switzerland and based on the OECD's green growth indicators



Abstracts

This publication demonstrates Switzerland's progress in the direction of a green economy using indicators. A small set of selected indicators (green economy indicator set) illustrates the footprints produced by Switzerland as a whole, and the progress attained in the "consumption and production" and "waste and raw materials" sectors in particular. A comprehensive set of indicators based on the OECD's green growth indicators (GGI 2014) is also presented.

Les progrès de la Suisse dans la transition vers une économie verte sont présentés à l'aide d'indicateurs. Un ensemble restreint d'indicateurs (ensemble d'indicateurs économie verte) illustre l'empreinte environnementale globale de la Suisse, de même que les progrès réalisés dans les domaines « consommation et production » et « déchets et matières premières ». De plus, un second ensemble d'indicateurs est présenté, plus complet et se référant aux indicateurs de croissance verte de l'OCDE (2014).

Die Fortschritte der Schweiz in Richtung Grüne Wirtschaft werden anhand von Indikatoren aufgezeigt. Ein kleines Set ausgewählter Indikatoren (Indikatorenset Grüne Wirtschaft) beleuchtet die Fussabdrücke der Schweiz als Ganzes wie auch die Bereiche «Konsum und Produktion» sowie «Abfälle und Rohstoffe». Darüber hinaus wird eine umfangreiche Sammlung von Indikatoren vorgelegt, basierend auf den Green Growth Indikatoren (GGI 2014) der OECD.

Keywords

green economy, green growth indicators, consumption perspective, production perspective, companies, greenhouse gas footprint, biodiversity footprint, material footprint, environmental indicators, progress monitoring, resource efficiency, resource conservation

Mots clés

Économie verte, indicateurs de croissance verte, vu sous l'angle de la consommation, vu sous l'angle de la production, entreprises, empreinte gaz à effet de serre, empreinte biodiversité, empreinte matérielle, indicateurs environnementaux, progrès mesurés, efficacité dans l'utilisation des ressources, préservation des ressources

Schlüsselwörter

Grüne Wirtschaft, Green Growth Indicators, Konsum-Perspektive, Produktions-Perspektive, Unternehmen, Treibhausgas-Fussabdruck, Biodiversitäts-Fussabdruck, Material-Fussabdruck, Umwelt-Indikatoren, Fortschrittsmessung, Ressourceneffizienz, Ressourcenschonung

Foreword

We only have one Earth. Its natural resources are finite and, for this reason, they should be conserved and used more efficiently. The survival of future generations relies on this. Improving resource efficiency is important for the performance of the economy. The transformation in the direction of a green economy is a global task for our generation.

Where does Switzerland stand in this process? It is important to monitor progress using indicators and this is the purpose of this report. It is aimed at decision-makers and experts in the fields of environmental and economic policy. To do justice to the complexity of the topic, different indicators must be used to evaluate it. Both the green economy and the monitoring of its progress are dynamic processes. For this reason, the indicator set must be developed on an ongoing basis in close cooperation with international organisations like the OECD, EU and UNEP. Switzerland is actively involved in these processes and has contributions to make in the area of footprint indicators and the concept of planetary boundaries, for example.

The indicators presented in this publication paint an ambivalent picture: on the one hand, clear progress can be observed in relation to efficiency, and economic performance is growing faster than environmental impacts. On the other hand, however, we are still a considerable distance away from achieving a level of resource use that can be sustained by nature. Switzerland's very high standards as a production location (domestic perspective) contrast with the high and increasing environmental impacts it generates abroad through its consumption. Action requirement arises along the entire value-added chain of consumed goods and services (in Switzerland and abroad). The challenges are considerable. However, they also offer opportunities for Switzerland to conserve resources while also improving its competitiveness. It is important to identify these opportunities through a dialogue between business, science, society and the public authorities.

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Executive summary

Is Switzerland moving in a direction that can be sustained by our planet? Are households, companies and the public sector making a greater effort to conserve resources? Are consumption and production but also trade becoming more ecological? With a view to contributing to finding answers to these questions, this report uses a range of indicators to demonstrate the progress achieved in the transition to a green economy. Suitable indicators are required to enable political decision-makers to obtain a quick overview of the extent to which targets are being reached (BAFU 2013).

Switzerland understands a green economy as one based on an approach to business and consumption that conserves resources, which

- takes the scarcity of limited resources and
- regeneration capacity of renewable resources into account,
- improves resource efficiency,
- and hence boosts the performance of the economy and general welfare.

The economy encompasses production, consumption and trade (Bundesrat 2014, Botschaft 14.019).

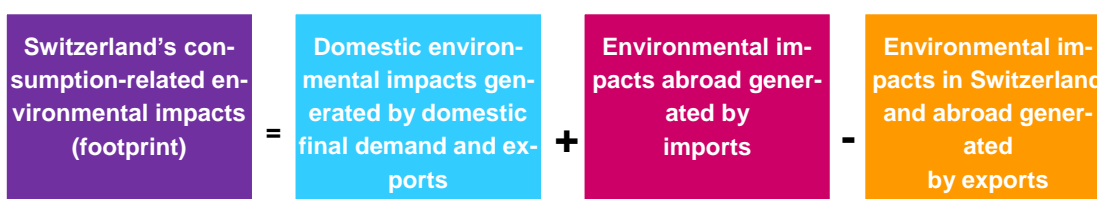
This report uses different indicators to demonstrate the progress achieved by Switzerland in the area of the green economy. It represents a contribution to the fulfilment of measure 23 of the Green Economy Action Plan (Definition of targets and reporting), which was commissioned by the Federal Council in 2013. The progress made in improving resource efficiency and achieving a long-term reduction in resource consumption to a level that can be sustained by nature shall be measured regularly and assessed. A set of selected indicators (hereafter referred to as the “green economy indicator set”) has been identified for this purpose. Other indicators were applied on the basis of the OECD’s green growth indicators (OECD 2014) with adaptations to conditions in Switzerland. Where possible an international comparison was carried out in cases in which the green growth indicators were applied. The indicators for measuring the progress of the green economy shall be further developed on an ongoing basis (cf., for example, EEA 2016).

Footprint perspective

The Federal Council's measures for the development of the green economy focus on areas that are not adequately covered by the existing policy fields. This includes the consideration of the entire value-added chain. Hence the measurement of the progress of the green economy is reliant on a new type of indicator, i.e. indicators based on the so-called footprint perspective. This perspective takes all of the environmental impacts generated by consumption into account: it covers the entire value-added chain that precedes domestic final demand (extraction, production, transport etc. as well as the use and disposal phases of goods and services). In addition to the resources consumed and emissions generated in Switzerland, those consumed and generated abroad through the import of goods and services are also included in the calculations. As opposed to this, the environmental impacts caused by exported goods and services are not included as these are not attributable to domestic final demand¹. The impacts of imported and exported goods and services must be estimated using models and assumptions. Figure 1 illustrates the system boundaries of the footprint perspective.

The consideration of environmental impacts along the entire product lifecycle is particularly relevant in a globalised economy. Because Switzerland has strong economic ties at international level, considerably more than half of the environmental impacts generated by domestic final demand arise abroad.

Fig. 1: Calculation of consumption-related environmental impacts (footprint perspective)



Source: Following Frischknecht et al. (2014).

How can the level of a particular footprint be assessed? Because political targets have not yet been defined from the footprint perspective, assessments are based on international comparisons or premises. In the case of the greenhouse gas and biodiversity footprints, Dao et al. (2015) assume a global perspective and work on the principle that former, current and future generations have similar rights to resources. These premises can also be formulated as follows:

- It is not assumed that any individual countries have preferential rights to environmental resources that have the character of global public goods (e.g. climate stability, global aspects of biodiversity).
- Today's generation shows fairness towards future generations. For this reason it is important that the condition of global ecosystems remains within a range that is beneficial for humanity ("safe operating space"). This means that the planetary boundaries should not be exceeded.

Based on these premises, it emerges that Switzerland's consumption (when extrapolated to the global population) is far in excess of a level that can be sustained by our planet (Dao et al. 2015). This finding is confirmed independently of the applied footprint methodology.

¹ Final demand includes the consumer spending of private households and the state and macroeconomic gross investments.

Green economy indicator set

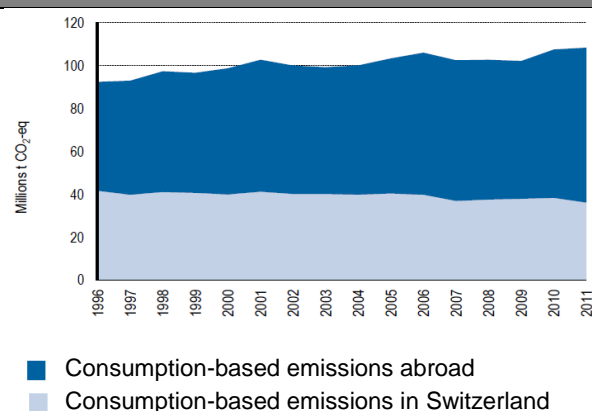
The green economy indicator set contains footprint indicators for key environmental sectors and indicators for the current focus areas of the green economy. The indicators are presented in detail in Chapter 3 of the report. A more comprehensive set of indicators based on the OECD's green growth indicators (OECD 2014) can be found in Chapter 4.

As the indicators show, the positive trend in developments relating to resource efficiency (relationship between economic development and environmental impacts) contrasts with the footprint indicators, whose values remain high.

Environmental impacts from the footprint perspective

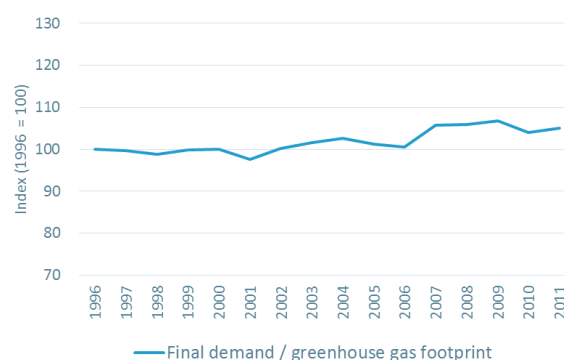
1.a Greenhouse gas footprint

In 2011, consumption in Switzerland generated greenhouse gas emissions totalling 13.6 tonnes of CO₂ equivalents per capita (or a total of 108 million tonnes). This is far in excess of a level that can be accommodated by the planetary boundaries (1 tonne according to ETHZ 2008, 0.6 tonnes according to Dao. et. al. 2015). It is comparatively high in the international context (Tukker et al. 2014) and increased by 17% between 1996 and 2011. Around two thirds of the associated impacts now arise abroad (Frischknecht et al. 2014).



1.b Efficiency associated with the greenhouse gas footprint

Consumption-related greenhouse-gas efficiency² improved by around 5% in the period between 1996 and 2011.³



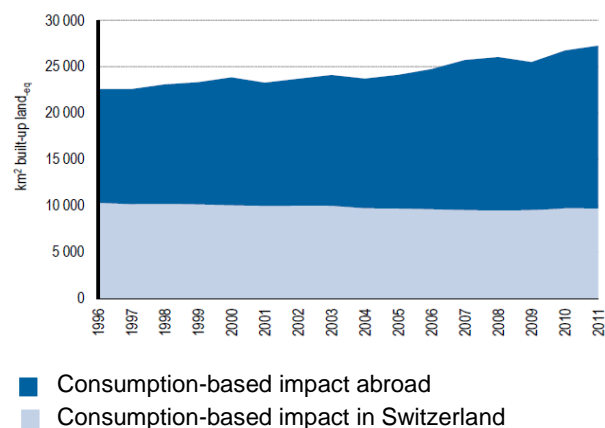
² Defined as domestic final demand in CHF at constant prices (2005) divided by the greenhouse gas footprint in t CO₂-eq. Because the footprint perspective reflects the environmental impact of domestic final demand, this is also a suitable comparative parameter for the efficiency of footprints. Final demand is strongly correlated with gross domestic product (GDP), which is used for the calculation of most of the other indicators of resource efficiency.

³ The domestic final demand at 2005 prices was calculated using data on final demand at current prices and at the previous year's prices from the official national accounts, cf. Frischknecht et al. (2014). The national accounts data relate to the status prior to the 2014 revision.

2.a Biodiversity footprint

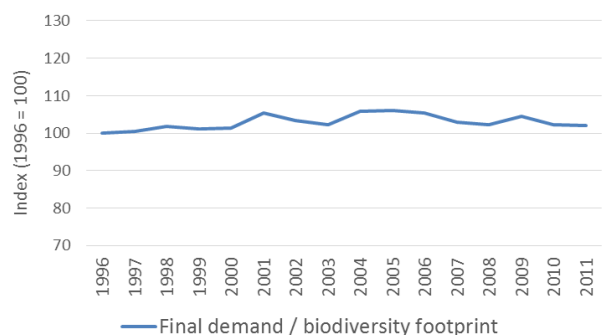
The production of the goods for which demand exists in Switzerland involves types of land use that can impair biodiversity.

The biodiversity footprint is far in excess of a level that can be accommodated by the planetary boundaries (Dao. et. al. 2015). It increased significantly in recent years (rising impacts abroad). This indicator is of a pilot nature (Frischknecht et al. 2014). With biodiversity, the fact that biodiversity losses cannot be easily replaced or compensated must be taken into account.



2.b Efficiency associated with the biodiversity footprint

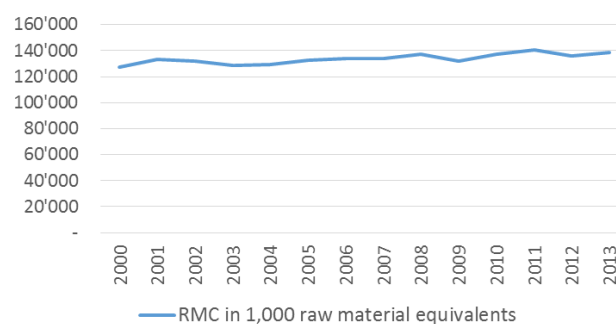
Consumption-related biodiversity efficiency⁴ improved by around 2% in the period between 1996 and 2011 (own calculations, based on Frischknecht et al. 2014).



⁴ Economic final demand divided by the biodiversity footprint.

3.a Material footprint

The material footprint (raw material consumption, RMC) indicates the total volume of raw materials extracted in Switzerland or abroad to cover the final demand for goods and services in Switzerland. It includes all materials extracted from nature, excluding water and air. The material footprint in 2013 was around 139 million tonnes. At 17 tonnes per capita it exceeds the European average (14 tonnes per capita; EU 27) in 2013.⁵ It increased by around 9% between 2000 and 2013 (Federal Statistical Office FSO).⁶



3.b Efficiency associated with the material footprint

Against a background of strongly fluctuating trends, consumption-related material efficiency⁷ rose by 16% between 2000 and 2013 (FSO)⁸.



⁵ http://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_-_flows_in_raw_material_equivalents

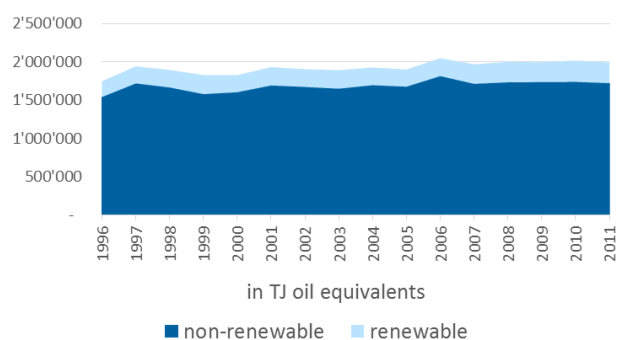
⁶ <http://www.bfs.admin.ch/bfs/portal/de/index/themen/02/06/ind17.indicator.1300110.13001.html>

⁷ Measured as gross domestic product divided by the material footprint (GDP/RMC). For reasons of international comparability, GDP is used instead of economic final demand in the calculations here. The two parameters are strongly correlated.

⁸ <http://www.bfs.admin.ch/bfs/portal/de/index/themen/02/06/ind17.indicator.1300110.13001.html>,

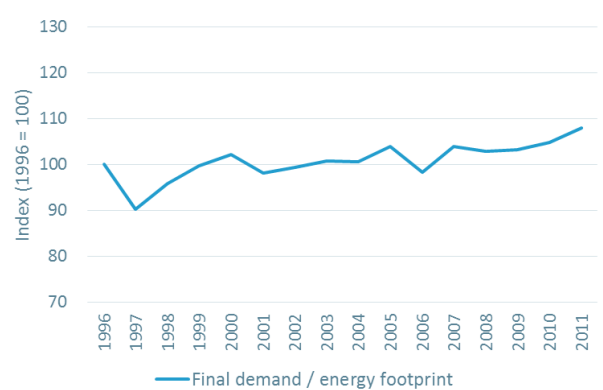
4.a Energy footprint

The primary energy requirement generated by Swiss consumption at home and abroad (energy footprint) corresponds to over 8,000 watts per capita. It increased by around 14% between 1996 and 2011 (Frischknecht et al. 2014).



4.b Efficiency associated with the energy footprint

In a context characterised by fluctuating developments, consumption-related energy efficiency⁹ improved by around 9% in the period between 1996 and 2011 (own calculations, based on Frischknecht et al. 2014).



⁹ Economic final demand divided by the energy footprint.

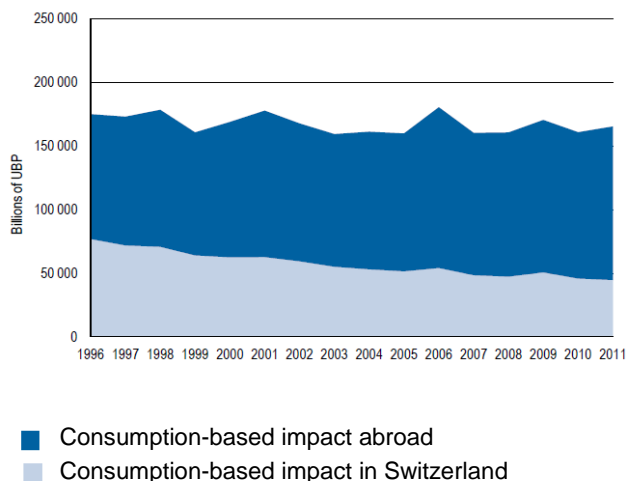
Digression: Total environmental impact from the footprint perspective

An important question is how the environmental footprint develops across all of the relevant environmental sectors. This kind of overview requires the weighting of these environmental sectors. One of the possibilities available here is a weighting based on the difference between today's environmental situation and existing environmental targets (ecological scarcity method, ecopoints).

Total environmental impact of consumption

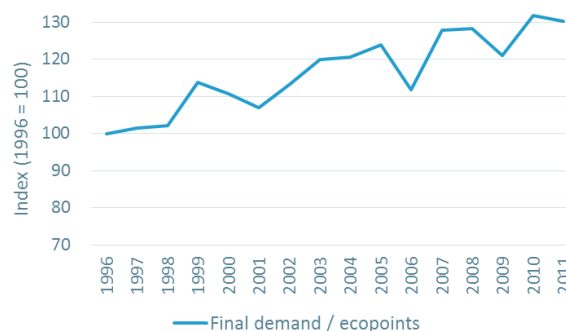
Thanks to the fall in emissions of air pollutants and ozone-depleting substances, in particular, there was a slight decrease in Switzerland's consumption-related total environmental impact between 1996 and 2011 (in ecopoints UBP 2013). The proportion of the impacts generated abroad by Switzerland increased to over 70% over the same period.

According to Frischknecht et al. (2014) the total environmental impact that could be sustained by nature is much lower than the current value.



Efficiency associated with the total environmental impact

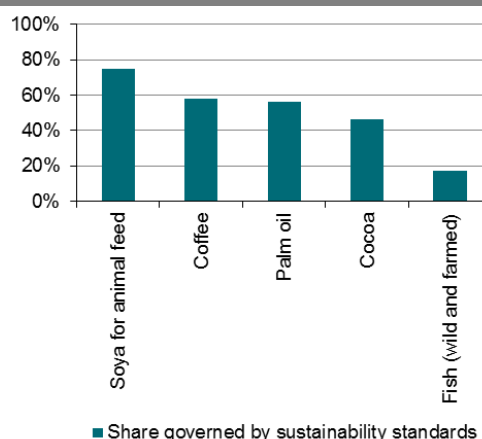
When the above-described total environmental impact is related to economic development, a sharply increasing trend in efficiency emerges for the period 1996 to 2011 (Frischknecht et al. 2014).



Consumption and production

5 Percentage of foodstuff and feed consumption governed by sustainability standards

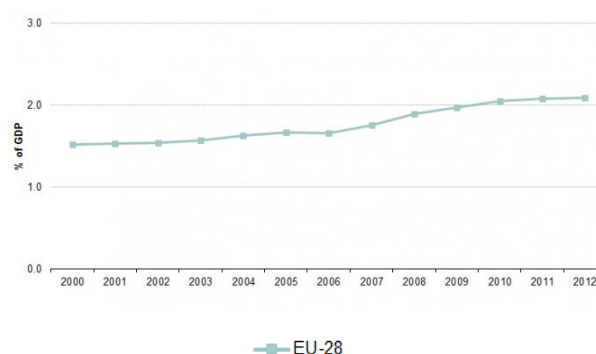
In 2012/213, the estimated percentages of the volumes of foodstuffs and feed consumed that were governed by sustainability standards was around 58% for coffee, 56% for palm oil, 47% for cocoa and 75% for soya for animal feed (excluding finished feed). The shares for farmed and wild fish are significantly lower (almost 18%). This indicator does not include company sustainability programmes (Dubach et al. 2015).¹⁰



6 Environmental goods and services in the EU 28

The trend in the percentage of European gross domestic product accounted for by goods and services that protect the environment (environmental goods and services sector, EGSS) in the EU 28 is an upward one and is estimated at around 2% for 2012 (Eurostat, 2015).

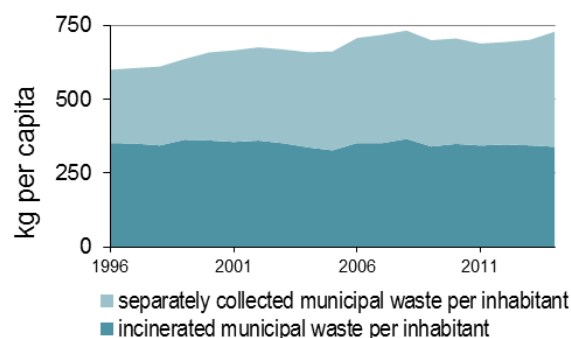
There are no corresponding data available for Switzerland yet; pilot calculations commissioned by the Swiss Federal Statistical Office are currently being carried out.



Raw materials and waste (circular economy)

7. Municipal waste and recycling

In 2014 the volume of waste generated per capita and year was 729 kg, which is 129 kg more than in 1996 and around 200 kg more than the OECD average. The separately collected fractions of municipal waste increased to 54%. Although the environmental pollution arising from waste incineration is limited, high volumes of waste are associated with resource consumption and greenhouse gas emissions. Switzerland's per capita volume of waste is high in the international context. While this is related to the country's prosperity and lifestyle, it also reflects the more comprehensive statistical recording of municipal waste in Switzerland compared to other countries.



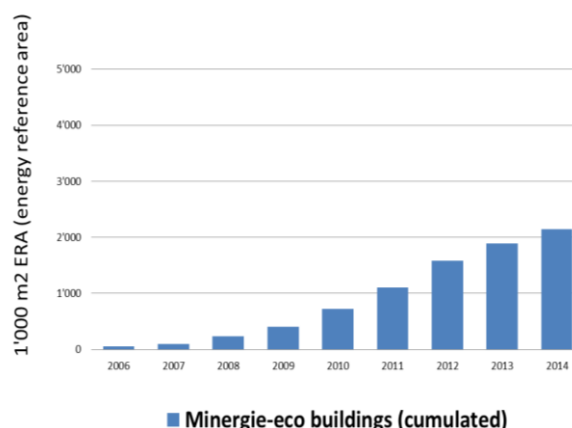
¹⁰ The market shares were estimated on the basis of publicly accessible data and interviews with experts. A broad spectrum of standards was taken into consideration (including Fair Trade). The percentages should be interpreted as approximate values. The selection of raw materials and percentages presented here are based on Dubach et al. (2015).

8 Ecology in the buildings sector

The MINERGIE® family of standards applies voluntary requirements for the energy consumption of buildings. The additional ecological requirements (“eco”) cover other aspects like resource conservation and low environmental impacts over the entire lifecycle of the building. For example, the environmental impacts generated during the extraction, processing and dismantling or disposal of materials are taken into account. The grey energy of the building materials and use of recycled building materials are also considered.

This indicator provides an insight into the progress made in the area of waste and raw materials in the key sector of material cycles and buildings.

The percentage is increasing, however at around 2 million m² energy reference area (ERA) it is still negligible (total building area: 418 Mio. m²) (source: Minergie 2014).



Summary

It has been possible to achieve a significant increase in the resource efficiency of consumption in recent years. This is clear from the indicators for total environmental efficiency, material and energy footprint efficiency, biodiversity footprint efficiency, and greenhouse gas footprint efficiency. The environmental impacts generated within Switzerland have also declined in recent years, cf. the “Environment Switzerland 2015” report (Swiss Federal Council 2015).

However, due to increasing consumption, the footprint indicators remain high and continue to increase in key environmental sectors like climate and biodiversity. A relative but not absolute decoupling of economic growth¹¹ and resource consumption has been achieved in these sectors up to now.

It is only possible to establish patterns of consumption and production that can be sustained by our planet, if we succeed in improving resource conservation significantly at global level. An increasing proportion of environmental impacts are generated abroad. This is demonstrated by the greenhouse gas footprint, in particular, but also by the biodiversity footprint and the total environmental impacts. Significantly more than half of the consumption-related environmental impacts now arise abroad. Due to the high level of impacts generated by consumption, it has a major leverage effect (demand side of the economy) as does the international involvement of the state and companies. The transformation to a green economy is a global generational task.

¹¹ Or the accompanying growth in final demand