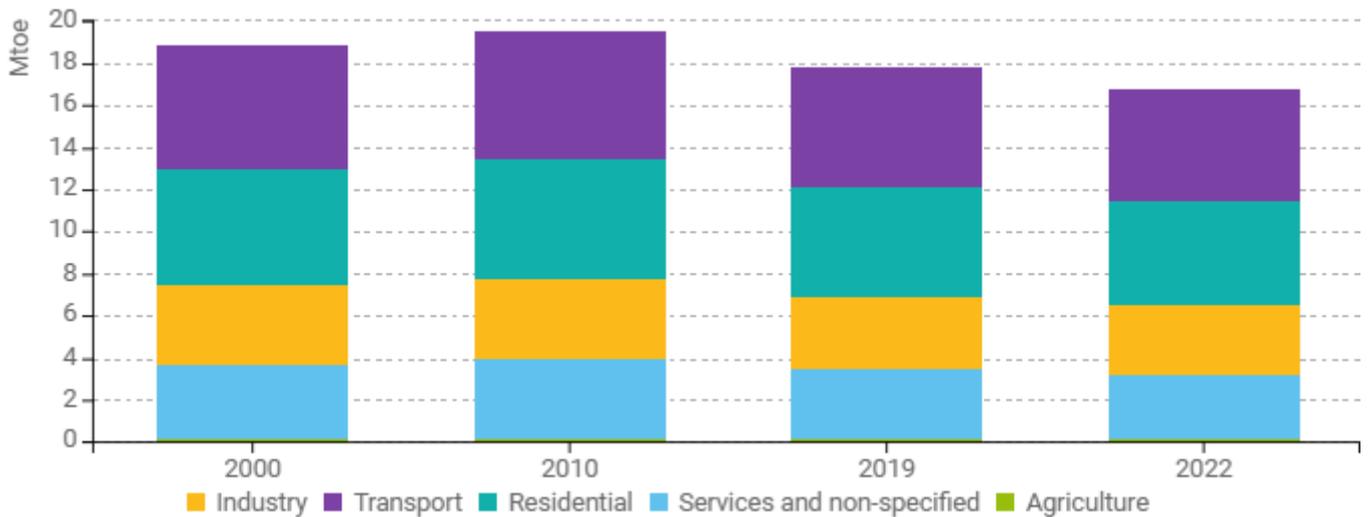


# Energy efficiency trends and policies

## Overview

From 2000 to 2022, Switzerland’s total final energy demand decreased from 18.8 to 16.8 Mtoe (i.e., by 11% or by 0.5% p.a. on average). The transport sector remained the largest consumer of final energy (32%), closely followed by the residential sector (30%). The third and fourth rank are taken by the industry sector (20%) and the service sector (18%). These shares refer to 2022 and have hardly changed since the year 2000, however with a slight upward trend for transport and the residential sector and, in turn, a slightly decreasing share for industry and the service sector. The final energy share of agriculture remains below 1%.

Figure 1: Final energy consumption by sector (with climatic corrections)

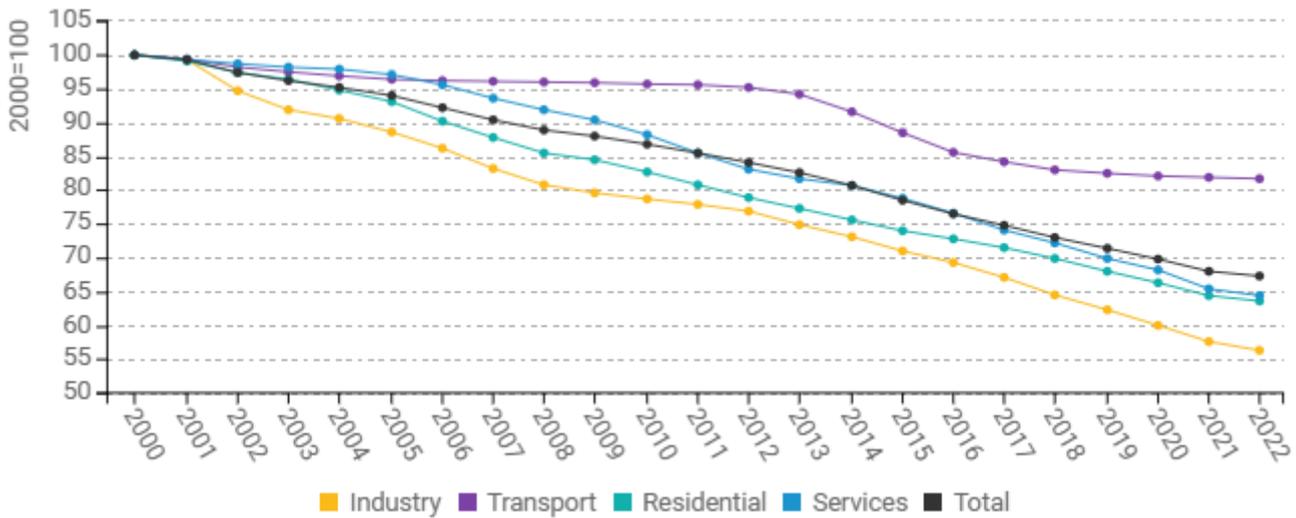


Source: ODYSSEE

Overall nation-wide energy efficiency of Switzerland improved at the rate of 1.8% p.a., as measured by the ODEX from 2000 to 2022 (33% total improvement in this period). The energy efficiency of the industry sector improved at a rate of 2.6% p.a., making it the fastest improving sector in Switzerland. Energy efficiency in buildings (service sector and households) improved by very respectable rates of 2.0% p.a., whereas the transport sector improved its energy efficiency only by 0.9% p.a.



Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

In May 2017, the Swiss electorate approved the Federal Energy Act to advance the energy transition by adopting new and modifying existing measures to reduce consumption, increase efficiency, and promote renewables. It was the first step under the Energy Strategy 2050. Since then, the Act has undergone several revisions. In 2021, investment contributions were expanded to include all renewables, such as wind and geothermal. In 2022, urgent measures to address winter power supply were introduced, mandating solar systems for large new buildings and prioritizing alpine PV projects. In 2024, the Federal Act on a Secure Electricity Supply set new renewable and hydroelectricity targets for 2035 and 2050, as well as new reference values for energy and electricity consumption. Additionally, a new Climate Protection Act was adopted in 2023, establishing the net-zero target for 2050, emissions reduction paths, and sector-specific goals for buildings, transport, and industry, with a requirement and support for businesses to achieve net-zero emissions. The revised CO2 Act of 2024 set climate targets and specific measures through 2030, with the Climate Protection and CO2 Ordinances operationalized in January 2025. These initiatives align Switzerland’s long-term climate policy with the Paris Agreement.

Table 1: Sample of cross-cutting measures

Measures	NECP measures	Description	Expected savings
<a href="#">CO2 Levy</a>	No	The CO2 tax is levied on the use of thermal fossil fuels (for heating and processes) but not on motor fuels. The rate is fixed since 2022 at 120 CHF/t CO2. One third of the revenue (max. CHF 450 million per year) is used to subsidize the energy-oriented refurbishment of buildings; CHF 25 million per year goes into a technology fund for the development of new low-emission technologies; the rest is redistributed to households and companies.	Expected annual reduction of 2250 ktCO2 by 2030.



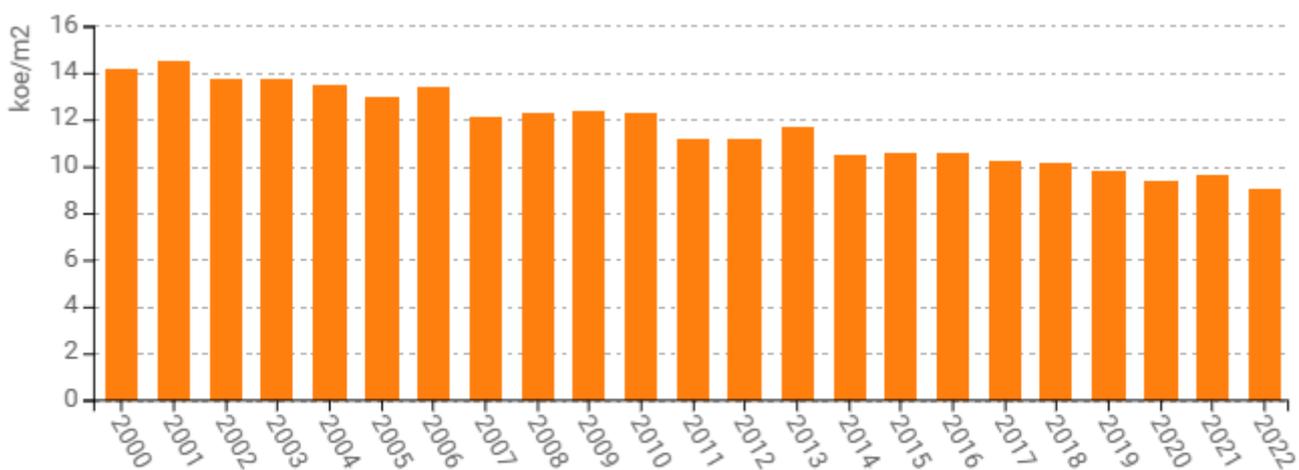
<a href="#">Promotion of Electricity from Renewable Energy Sources</a>	No	Producers of renewable electricity can claim financial support for the produced energy. Since 2018 the support scheme is more market-oriented and combines direct-marketing with a flexible premium. For (small) PV installations a one-off payment is in place. The revised Energy Act foresees an extension of the support measures and a focus on investment contributions.	Annual reduction of 505 ktCO <sub>2</sub> eq by 2025.
<a href="#">Energy Efficiency Requirements for Installations and Equipment</a>	No	Newly sold installations and equipment must meet minimum requirements with respect to energy efficiency. As a rule, the minimum standards in Switzerland are aligned with the regulations of the European Union.	Low impact.

Source: MURE

### Buildings

For space heating of households, final energy consumption per m<sup>2</sup> decreased very significantly, i.e. by 36% from 2000 to 2022 or by 2.0% p.a. In comparison, the unit consumption for water heating per dwelling decreased at a clearly lower rate (by 1.2%). The unit consumption for cooking slightly decreased (by 0.4% p.a.), while it remained unchanged for electric appliances (with lighting). In 2022, space heating accounted for 65% of the residential sector's final energy demand (with climate correction), electric appliances for 16%, water heating for 14% and cooking for 4%. While final energy demand for space heating (climate corrected) decreased by 0.7% p.a. from 2000 to 2022, final energy demand of electric appliances increased by 1.2% p.a. over the same period. Final energy demand for water heating remained unchanged and cooking increased by 0.8% p.a.. In total, residential final energy demand decreased slightly by 0.3% p.a. from 2000 to 2022 primarily due to improved energy efficiency of space heating.

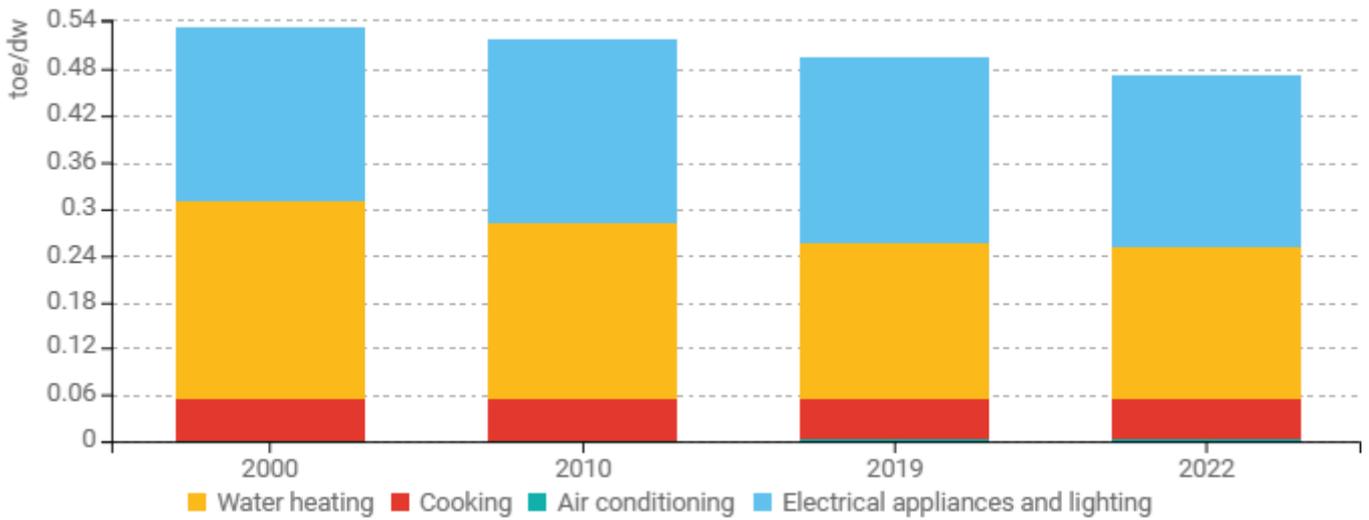
**Figure 3: Energy consumption of household space heating per m<sup>2</sup> (with climatic corrections)**



Source: ODYSSEE



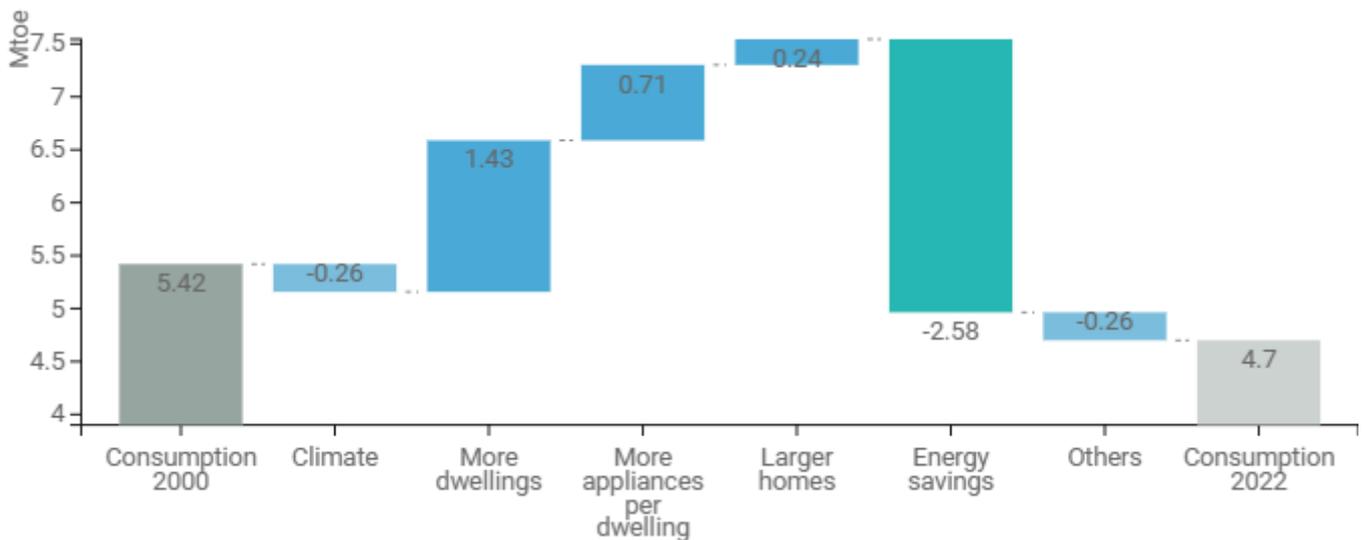
Figure 4: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

The final energy consumption of residential buildings was by 0.7 Mtoe lower in 2022 than in 2000. More dwellings (increase by 1.43 Mtoe) and lifestyles (0.71 Mtoe for “more appliances per dwelling” and 0.24 Mtoe for “larger homes”) led to higher energy consumption (by 2.38 Mtoe). This growth was only slightly overcompensated by energy savings (2.58 Mtoe). Thanks to the warmer climate (reduction by 0.26 Mtoe) and some other effects (likewise leading to a further reduction by 0.26 Mtoe) the total decrease of final energy consumption was somewhat more meaningful (0.7 Mtoe, as mentioned above).

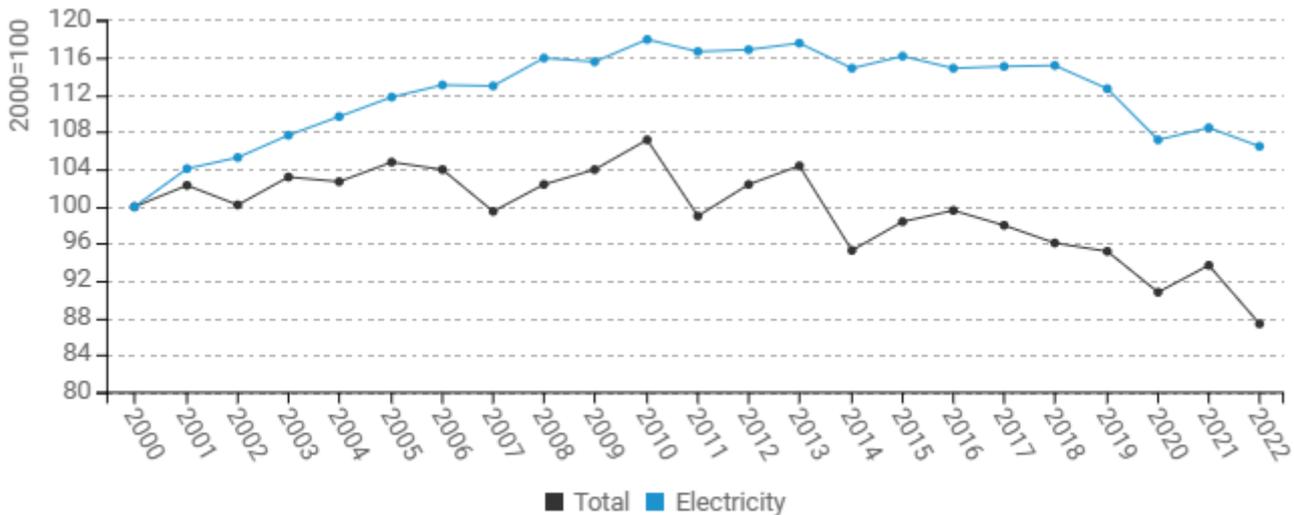
Figure 5: Main drivers of the energy consumption variation in households



Source: ODYSSEE

Final energy consumption per floor area for the service sector decreased by 13% in total or 0.6% p.a. on average from 2000 to 2022. On the other hand, electricity consumption per area increased by 6 % p.a. or 0.3% p.a. over the same period.

**Figure 6: Energy and electricity consumption per m<sup>2</sup> in services (with climatic corrections)**



Source: ODYSSEE

Buildings account for about 44% of Switzerland's total energy consumption and a third of CO<sub>2</sub> emissions. To address this, the Federal Government and cantons collaborate on the buildings program, promoting energy-efficient refurbishments, renewable energy investments, waste heat recovery, and optimized building services technology. Building owners can apply for subsidies, benefiting from financial support, lower heating costs, and higher property value. Cantonal model regulations (German: MuKE n - Mustervorschriften der Kantone im Energiebereich; French: MoPEC - Modèle de prescriptions énergétiques des cantons) set minimum energy standards for new buildings, aiming to harmonize cantonal legislation across Switzerland. However, adoption varies by canton, sometimes delayed by referenda. The 2014 regulations were expected to be fully implemented by 2020, with updated regulations to be introduced in 2025. In 2022, the Conference of Cantonal Energy Directors adopted ten energy-strategic guidelines and the 2050+ buildings policy, reaffirming the net-zero target. Key measures include mandating renewable heating for new buildings and systems, expanding district heating networks, and dismantling gas grids or transitioning them to green hydrogen. Finally, a CO<sub>2</sub> levy on thermal fossil fuels, set at 120 CHF/tCO<sub>2</sub> since 2022, incentivizes switching to renewables. One-third of the revenue funds the buildings program, further supporting Switzerland's energy transition.



**Table 2: Sample of policies and measures implemented in the building sector**

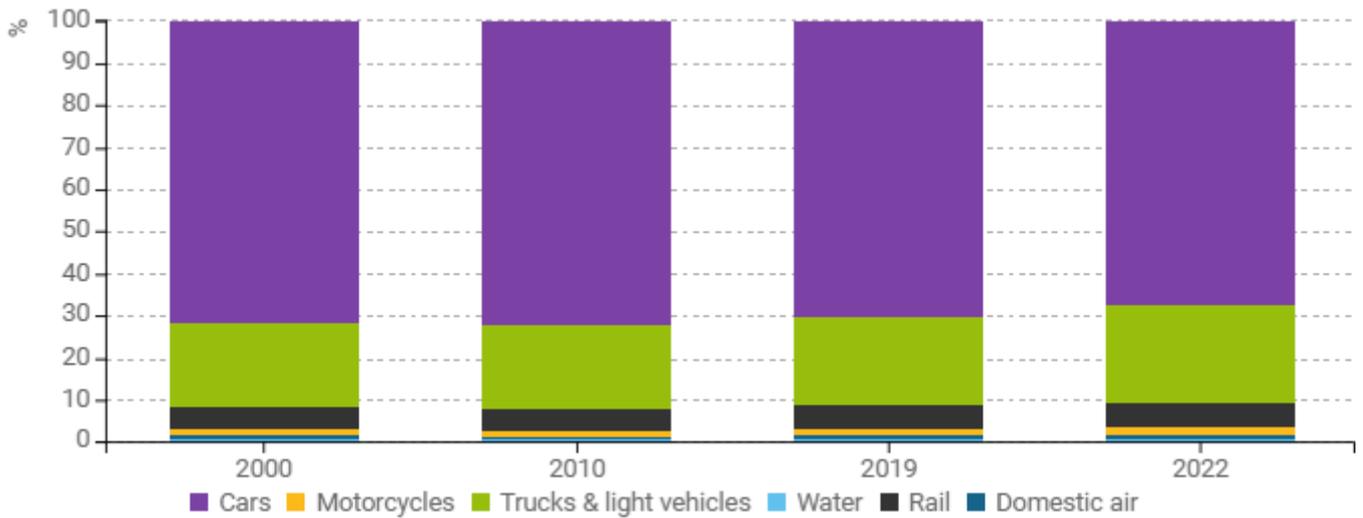
Measures	NECP measures	Description	Expected savings
<a href="#">Buildings Program</a>	No	The Buildings Program supports energy-saving measures of buildings with federal and cantonal funds. The federal fund is financed by one third of the receipts from the CO2 levy. 60% of the payments are used for insulation measures.	7.9 PJ in year 2024 and 7.15 PJ in 2030.
<a href="#">Cantonal Energy Policies</a>	No	According to the Federal Constitution, the Swiss cantons are responsible for defining standards that lead to the reduction of energy consumption and CO2 emissions in both new and old buildings as well as for large-scale energy consumers. So-called model regulations of the cantons in the energy sector (Mustervorschriften der Kantone im Energiebereich "MuKE") harmonize the cantonal building codes throughout Switzerland. They were first established in 1992 and have been successively developed further since.	Estimated reduction over 6% of energy consumption between 2016-2020 (over 12% for CO2 emissions).

Source: MURE

## Transport

Total final energy use for transport was at the same level in 2022 as in the year 2020, after having reached higher levels (by up to 17%) in intermediate years. Road transport continued to represent the lion's share of the sector's final energy consumption (93% in 2000 and 92% in 2022). Cars, which are responsible for by far most of road transportation energy and for its increase in intermediate years, slightly decreased their energy demand from 2000 to 2022. In contrast, the energy demand of all other transport modes except for domestic air transport (with a very small share) slightly increased from 2000 to 2022.

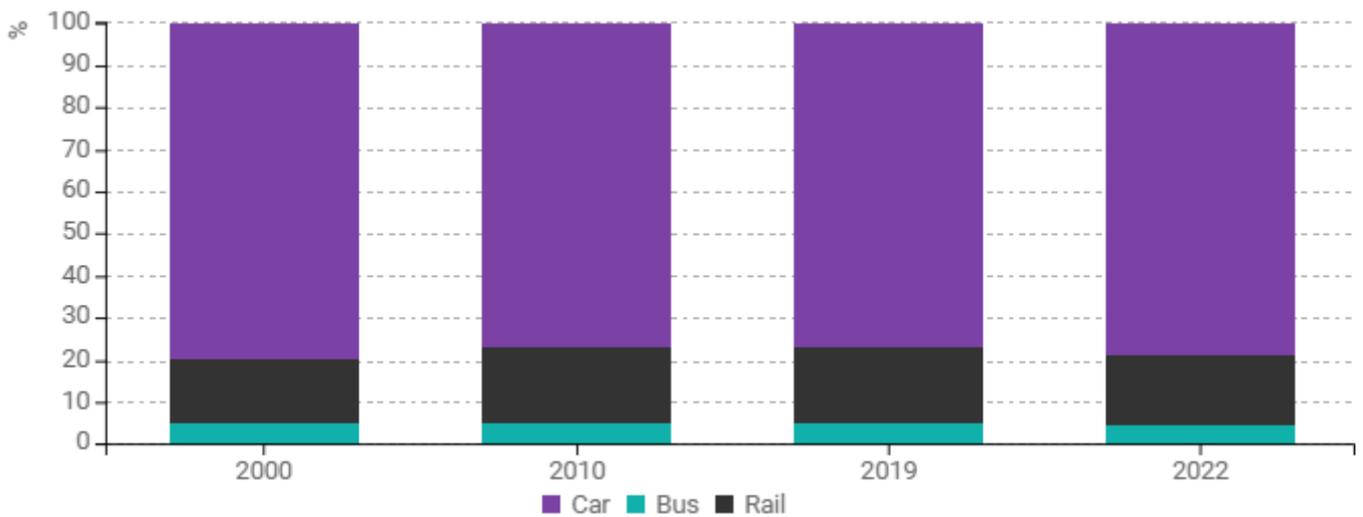
Figure 7: Transport energy consumption by mode



Source: ODYSSEE

Across all transport modes, passenger traffic (in person-kilometers) grew by significant 31% from 2000 to 2022. Transport with passenger cars (+29% or +1.2% p.a.) grew in line with the overall average, while transport in buses grew less (+19%, +0.8% p.a.), whereas transport in trains (+45% or +1.7% p.a.) grew by more than the overall average.

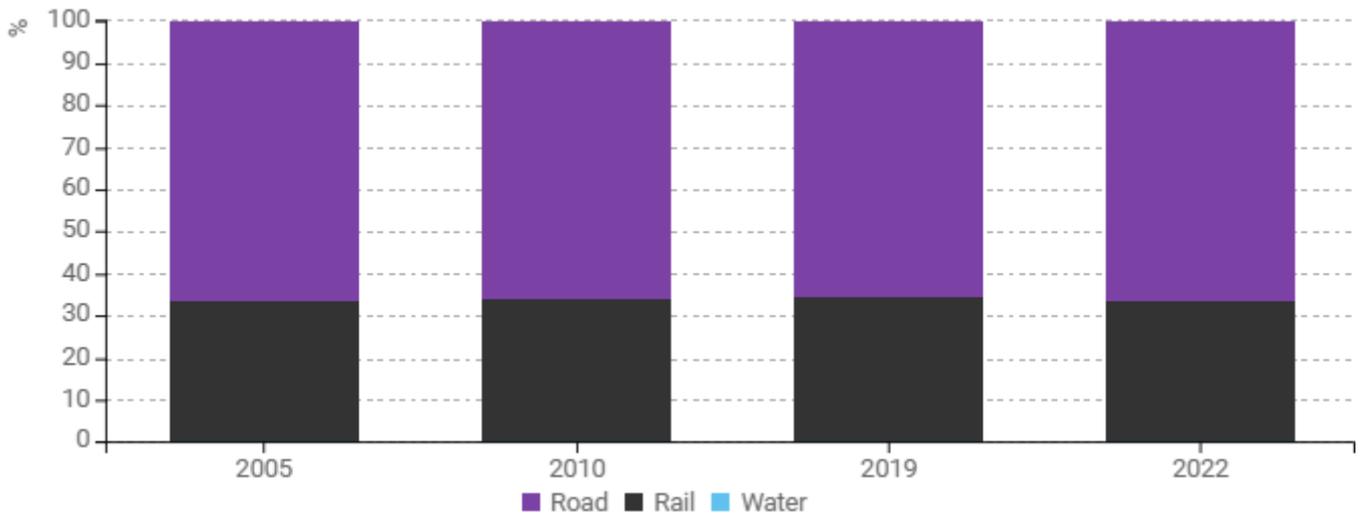
Figure 8: Modal split of inland passenger traffic



Source: ODYSSEE

The total freight traffic (in tonne-kilometers) grew very moderately by 5% from 2005 to 2022 (equivalent to +0.3% p.a.; no data are available for the period 2000-2004). Freight by road and by trains grew similarly (by 6% and 4% respectively) from 2005 to 2022, whereas freight on rivers decreased (by 13%).

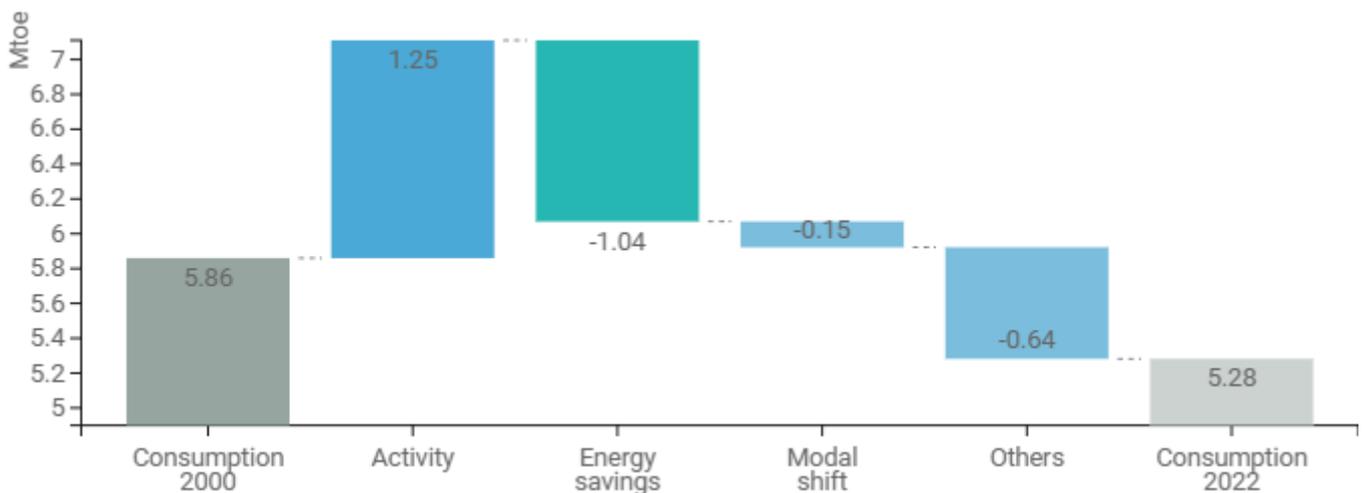
Figure 9: Modal split of inland freight traffic



Source: ODYSSEE

Total final energy demand of the transport sector decreased by 10% from 2000 to 2022 (-0.58 Mtoe). On the one hand, transport activity rose significantly, equivalent to an increase of final energy demand by 21%. On the other hand, this increase was overcompensated by energy savings (-18%), modal shift (-3%) and other effects (higher load factors) (-11%).

Figure 10: Main drivers of the energy consumption variation in transport



Source: ODYSSEE

Various measures aim to reduce CO<sub>2</sub> emissions and address fuel use externalities in transport. These include a mineral oil tax funding transport infrastructure and a heavy vehicle fee internalizing road transport costs. Both measures encourage fuel savings. While there is no CO<sub>2</sub> tax on transport emissions, fuel importers must offset a portion of their emissions through GHG reduction projects. CO<sub>2</sub> standards for new road vehicles align with EU

policy to promote a cleaner fleet. Additional measures include energy labels for vehicles and tires, informing buyers on fuel efficiency, and speed limits, which also lower fuel consumption. In aviation, emissions are addressed via the emissions trading system (since 2020) and blending quotas for sustainable fuels introduced under the 2025 CO2 Act revision.

**Table 3: Sample of policies and measures implemented in the transport sector**

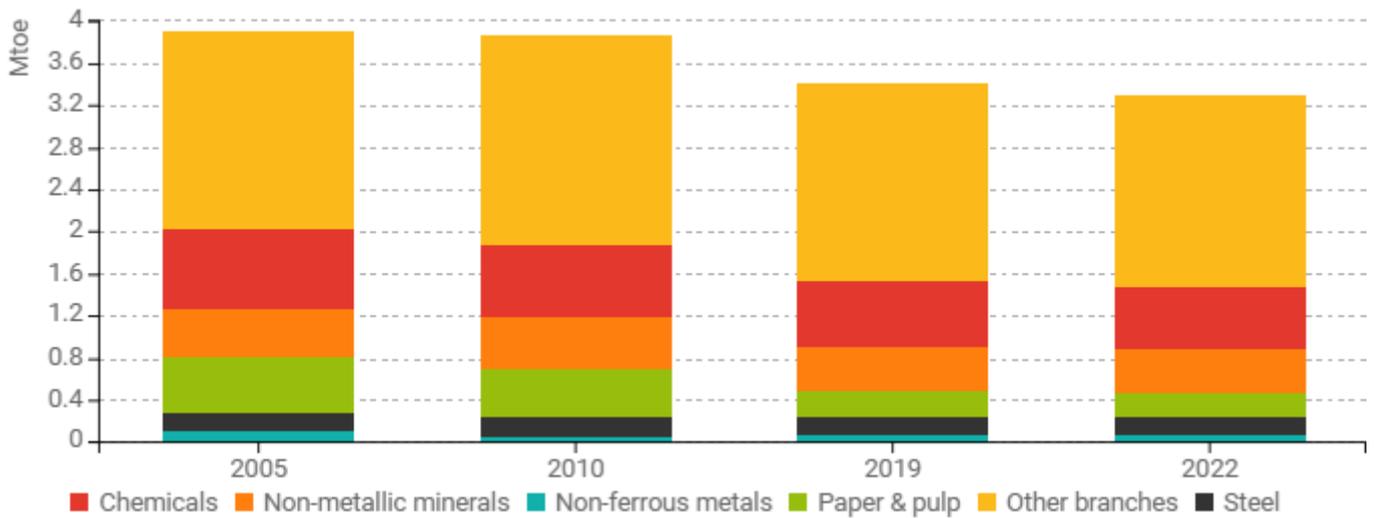
Measures	NECP measures	Description	Expected savings, impact evaluation
<a href="#">Heavy vehicle fee</a>	No	The heavy vehicle fee is a performance-related charge per ton-kilometer levied on domestic and foreign heavy vehicles. The rate depends on the vehicle's emission category and aims to internalize external cost. The yearly revenues amount to 1'600 million CHF.	From 2020 onwards: Estimated reductions of 100 ktCO <sub>2</sub> eq per year
<a href="#">CO2 Regulations for Vehicles</a>	No	In July 2012, Switzerland adopted the CO <sub>2</sub> emission regulations for new vehicles of the EU. From 2020 onwards the fleet average of new passenger cars (light commercial vehicles) may not exceed a maximum of 95 (147) grams of CO <sub>2</sub> per kilometer. From 2025 onwards, stricter standards, as well as standards for heavy vehicles, will be introduced. For each gram above the threshold a penalty is charged.	Estimated annual reduction of 550 ktCO <sub>2</sub> eq in 2025
<a href="#">Compensation for CO2 Emissions</a>	No	The CO <sub>2</sub> law requires importers of fossil fuels (mineral oil companies that are responsible for releasing fossil motor fuels for consumption) to compensate for their CO <sub>2</sub> emissions partially. Until 2020 the compensation had to take place domestically. Since 2021 the share of compensation increased but allows for it to be partly realized abroad.	Estimated annual reduction of 518 ktCO <sub>2</sub> eq in 2025

Source: MURE

## Industry

Among the energy-intensive branches, only the paper and pulp industry's share of final energy consumption decreased significantly relative to the total industry's demand, i.e. from 13.4% in 2005 to 6.9% in 2022. In contrast, the final energy shares of metals, cement and chemicals hardly changed (by less than one percent point). The total share of all other branches (i.e., non-energy intensive branches) increased from 48% in 2005 to 55% in 2022.

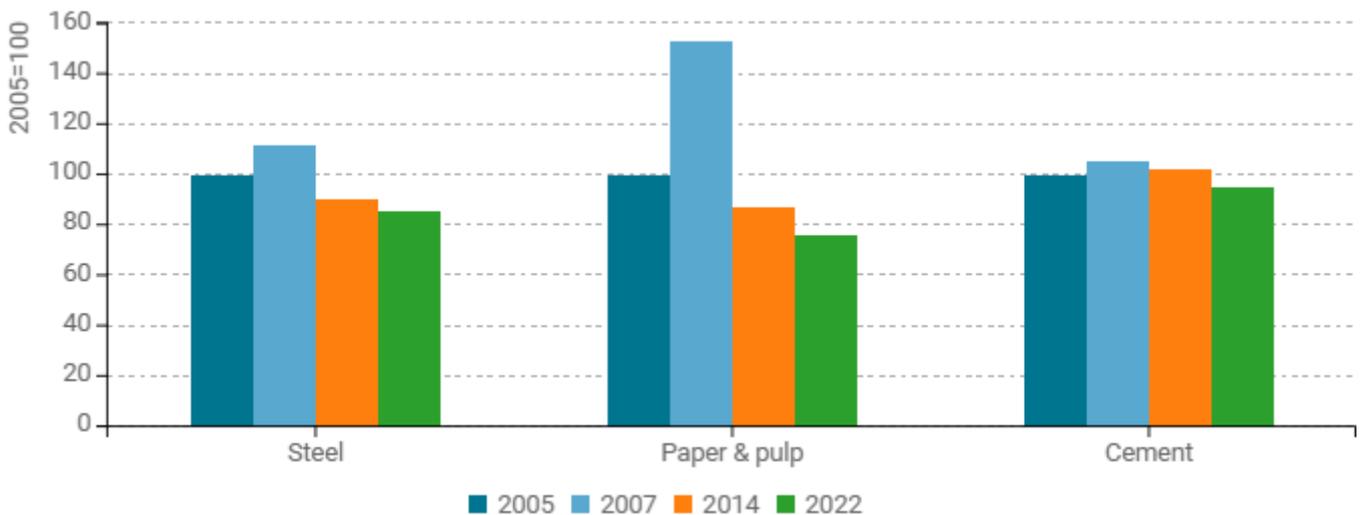
Figure 11: Final energy consumption of industry by branch



Source: ODYSSEE

Among the selected energy-intensive products (steel, cement and paper), the unit consumption (final energy per tonne) of paper improved most markedly (by 25% from 2005 to 2022, equivalent to 1.6% p.a.), followed by crude steel production (by 15% from 2005 to 2022, equivalent to 0.9% p.a.) and finally the production of cement (by 5% from 2005 to 2022, equivalent to 0.3% p.a.).

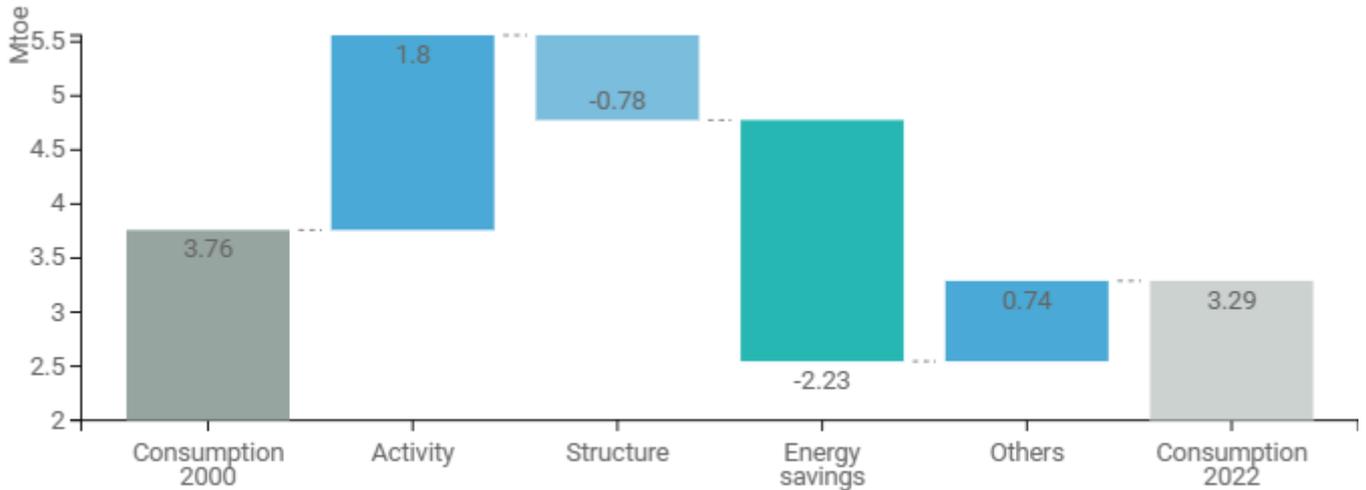
Figure 12: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

Despite overall growth in the activity level of industry, which increased consumption by 1.8 Mtoe in the period 2000 to 2022, the combined effect of energy savings (-2.23 Mtoe) and structural changes towards less energy-intensive manufacturing (-0.78 Mtoe) caused the total final energy demand of the industry sector to drop by 0.47 Mtoe or 13% over the total period.

Figure 13: Main drivers of the energy consumption variation in industry



Source: ODYSSEE

The central climate policy in the industry sector is the CO<sub>2</sub> levy on fossil thermal fuels, fixed at 120 CHF/tCO<sub>2</sub> since 2022. Large and GHG-intensive companies must participate in the emissions trading system which is linked to the EU ETS since 2020. These companies are exempted from the CO<sub>2</sub> levy. Companies outside the ETS can commit to reduce their GHG emissions by entering into an emissions reduction target agreement; this allows them to be exempted from the CO<sub>2</sub> levy.

Table 4: Sample of policies and measures implemented in the industry sector

Measures	NECP measures	Description	Expected savings
<a href="#">Competitive Tenders for Energy Efficiency</a>	No	Competitive tenders take place annually and auctions are held for measures that aim to enhance energy- and especially electricity-efficiency and are not yet economic viable. Projects and programs are selected according to their cost-effectiveness. From the surcharge on power consumption 0.001 CHF/kWh is reserved to finance these measures.	4.01 PJ in 2025
<a href="#">Emissions Trading System</a>	No	The Swiss emissions trading system (CH ETS) was introduced in 2008. Currently, around 96 greenhouse gas intensive industrial plants that cause approximately 11% of domestic emissions participate. Since 2020, it is linked with the EU ETS and includes aviation within the European Economic Area (6 airlines).	Estimated annual reductions of 510 ktCO <sub>2</sub> eq in 2025

<a href="#">Emission Reduction Target Agreements</a>	No	GHG-intensive companies exposed to international competition and outside of the ETS can be exempted from the CO2 levy (and the net surcharge or Cantonal large-emitter regulation) if they commit to reduce their emissions based on an emissions reduction target agreement.	Estimated annual reduction of 370 ktCO <sub>2</sub> eq in 2020
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Source: MURE

