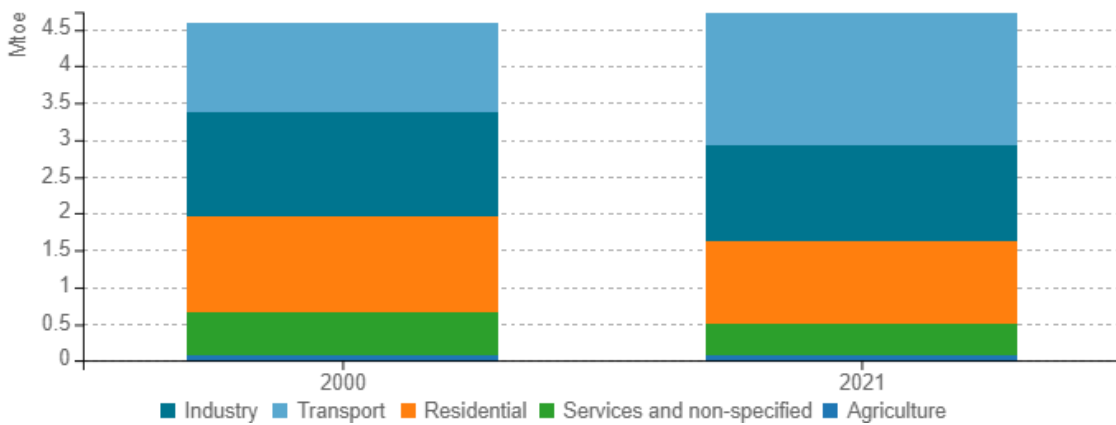


Energy efficiency trends and policies

Overview

The final energy consumption (climate corrected) of Slovenia increased by 3.1% (+0.14 Mtoe) or 0.1%/year in the period 2000-2021. The largest increase was between 2000 and 2008, by 19.3% (0.88 Mtoe), followed by a decrease of 13.6% (-0.74 Mtoe) between 2008 and 2014. The variation in total final energy consumption was -8.9% in 2020 and +5.8% in 2021. In the observed period (2000-2021), transport had the highest increase in energy consumption, by 48.5% (0.59 Mtoe), while the energy consumption in industry decreased by -9.3% (-0.13 Mtoe), in households (with climatic correction) by -12.2% (-0.16 Mtoe) and in service (with climatic correction) by 26.4% (-0.15 Mtoe).

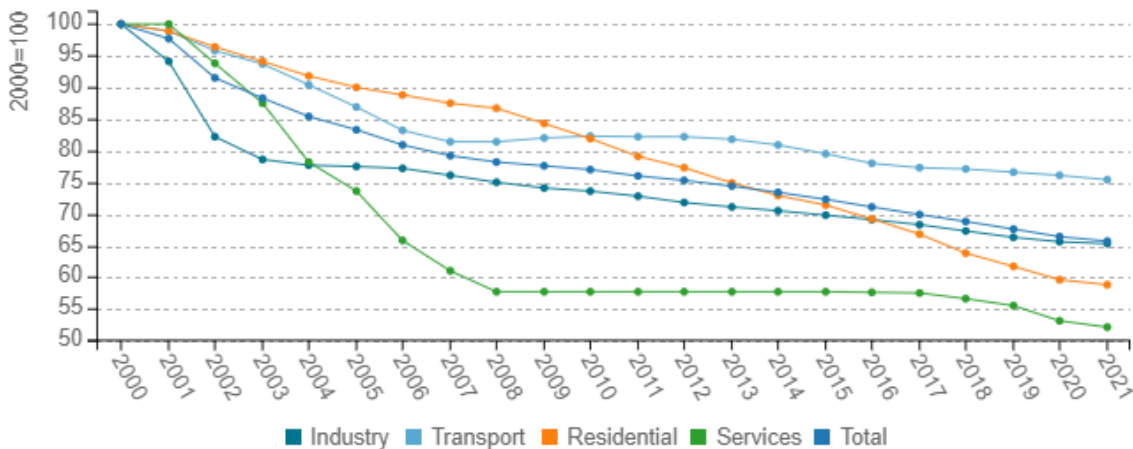
Figure 1: Final energy consumption by sector (normal climate)



Source: ODYSSEE

Energy efficiency for total final consumers, as measured by technical energy efficiency index “ODEX”, improved by an average of 2.0%/year in the period from 2000 to 2021 or for 34% in the whole period. The energy efficiency improvement in industry reached 2.0%/year (or 35% in the whole period) but the most improvement by 2.5%/year (or 41%) was in the household sector. Transport (excluding international air transport) was the sector with the lowest energy efficiency improvement, by 1.3%/year (or 25% in the whole period). Efficiency improvement in the service sector must be approached with caution, since data is not very reliable.

Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE



The target of National Energy Efficiency Action Plans (NEEAPs) was to limit final energy consumption below 5.118 Mtoe and primary energy consumption below 7.125 Mtoe in 2020. Slovenia National Energy and Climate Plan (NECP) adopted in February 2020, setting targets for 2030. NECP sets a target that Slovenia has to achieve 35% energy efficiency improvement by 2030 compared to PRIMES reference scenario 2007. These means that final energy consumption in 2030 must not exceed 4426 Mtoe. In 2020, the Slovenian government adopted the Energy Efficiency Act (ZURE). The Energy Efficiency Act regulates the areas previously regulated by the Energy Act (EZ-1) and aligns the country with the new rules of the European Union. The Energy Efficiency Act contains measures to improve energy efficiency in order to achieve the goals of the energy efficiency policy in all sectors.

Table 1: Sample of cross-cutting measures

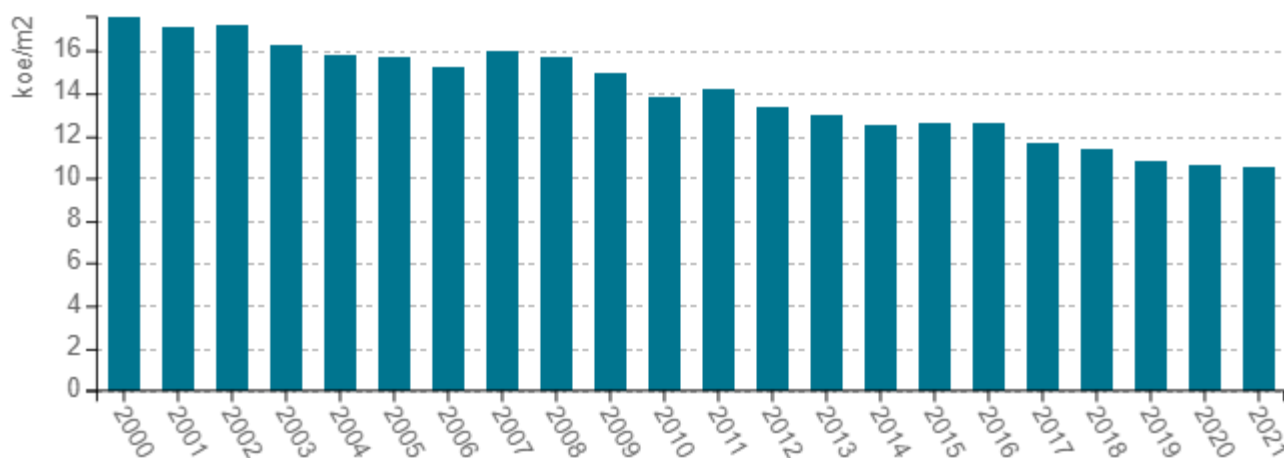
Measures	NECP measures	Description	Expected savings, impact evaluation
Energy efficiency obligation scheme	yes	Energy suppliers are obliged to achieve energy savings at final consumers. They are preparing sets of measures that final consumers can apply and provide financial incentives	High
Ecological Fund - Eco-Fund	yes	Eco Fund is a financial institution, established to support the environmental and energy efficiency investments in all sectors.	High
Information and rise of targeted public awareness and training for professionals	yes	Raising awareness is crucial to be able to achieve ambitious targets. Broad spectre of target groups requires specific approaches. A very important point is the training of professionals, staff of ministries, etc.	Medium

Source: MURE, NECP, NEEAP

Buildings

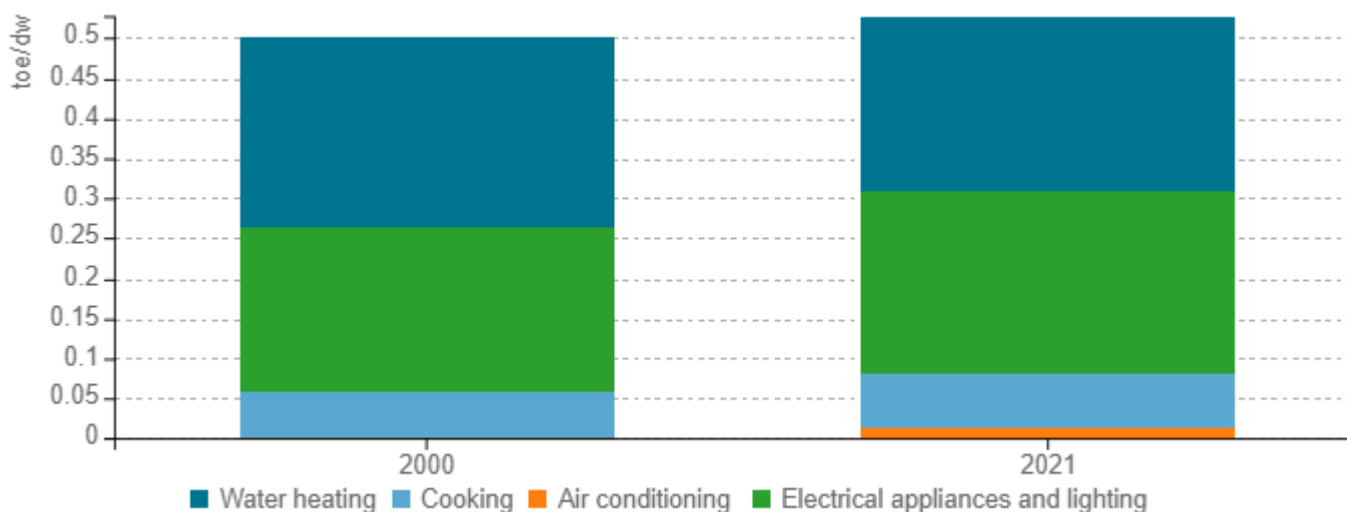
In the residential sector, the unit consumption for space heating, measured in energy per square meter of floor area of the housing stock, decreased by 40% between 2000 and 2021. This reduction has been consistent throughout the entire period with minor fluctuations. The average yearly decrease amounted to 2.4%. The decline in specific energy consumption can be attributed to the enhancement of building performance through the implementation of various measures. Among these measures, subsidies from the public fund Ecofund for additional insulation of buildings, replacement of building furniture, and replacement of heating appliances stand out as the most significant contributors.

Figure 3: Energy consumption of space heating per m2 (normal climate)



Source: ODYSSEE

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

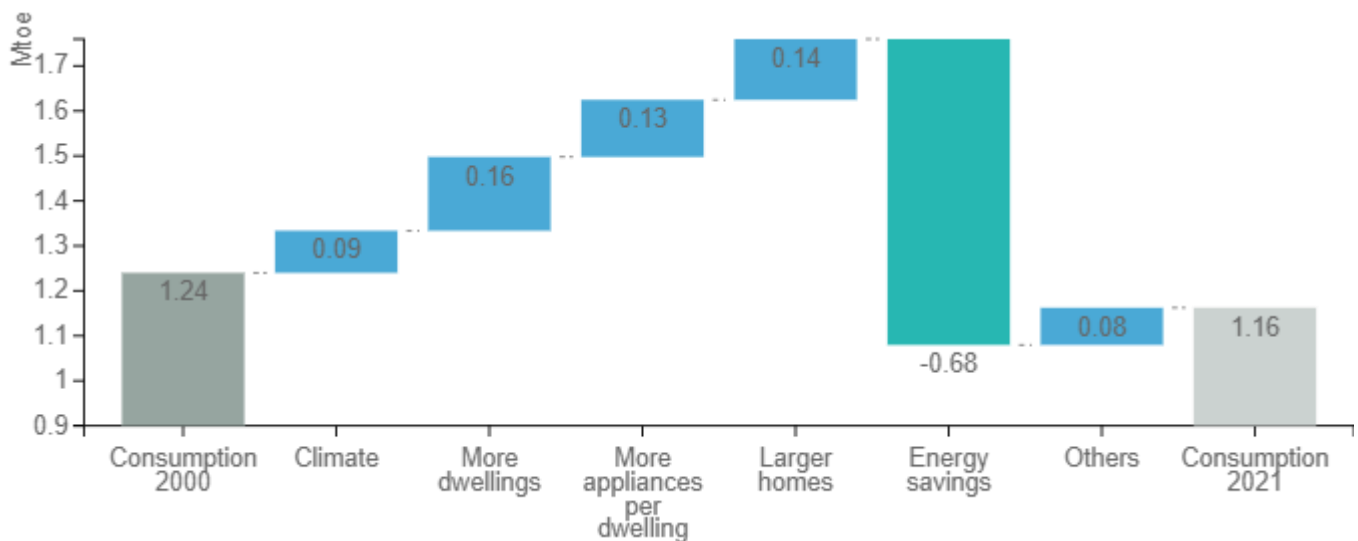


Source: ODYSSEE



Final residential energy consumption in 2021 without climatic correction was 6 % lower compared to 2000, considering climatic corrections it was 12 % lower. Over the period, increase in the number and size of dwellings and in the number of appliances contributed to raise of energy consumption by 0.43 Mtoe. At the same time, energy efficiency improved, which enabled energy savings to overpass the increasing effects (-0.68 Mtoe). Improved energy efficiency is due to improved technical performance of buildings and appliances and also behavioural changes. Behavioural changes happened due to economic factors (higher energy prices, pricing based on actual consumption, etc.), awareness raising campaigns and availability of free expert counsels. There was also minimal effect of other factors (0,08 Mtoe).

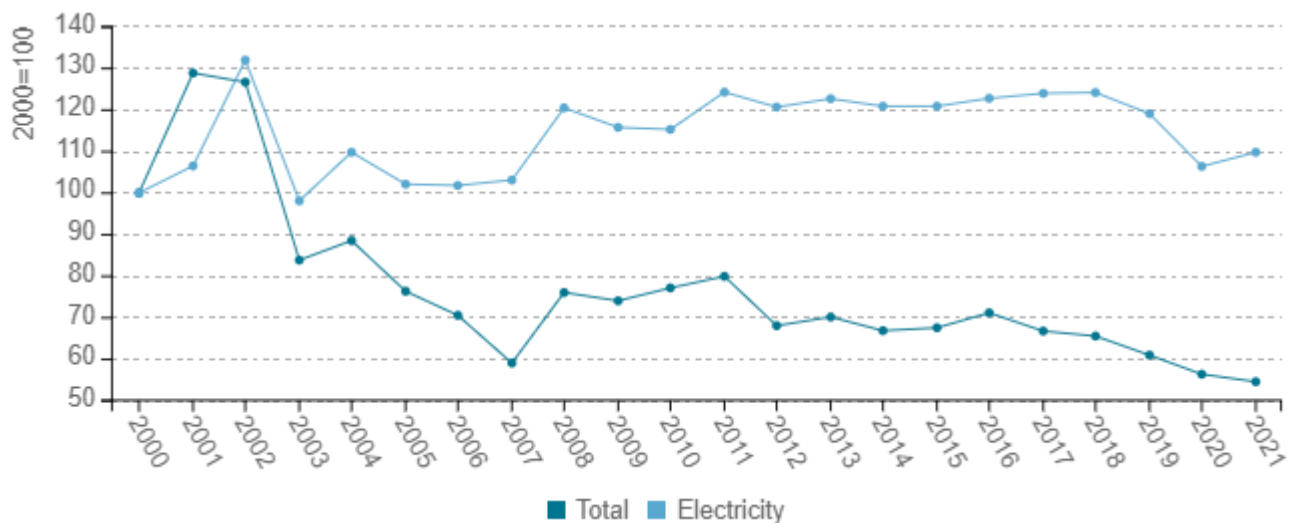
Figure 5: Main drivers of the energy consumption variation of households



Source: ODYSSEE

In the service sector, the consumption per employee was quite volatile before 2008. After 2008, it has been rather constant with downward trend in the last years. However, we have to be prudent with the conclusions about energy consumption trends in this sector since the data on energy consumption is calculated as a residual. For electricity effect of COVID can clearly be seen.

Figure 6: Energy and electricity consumption per employee (normal climate)



Source: ODYSSEE



Measures from the NEEAP were upgraded in the NECP and especially in the long-term renovation strategy. Subsidies and soft loans are available for private homeowners who wish to improve the energy performance of their homes through better insulation, installation of heat recovery ventilation and investment in renewable energy sources. Special attention is given to multifamily houses, by the preparation of new instruments to gain consensus for renovation, by subsidizing renovation for socially vulnerable people at 100% and by setting up guaranty scheme. Construction of new very efficient houses and flats is also subsidised. Building Regulations set statutory minimum energy performance requirements for new buildings and substantial changes in existing buildings are in place. Regulation has been tightened in 2022. Financial programmes for energy renovation of buildings in public sector are in place and combined with energy contracting schemes. Energy management is being setup in public sector. The NECP sets the goal to reduce energy use in buildings by at least 20% in 2030 compared to 2005.

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

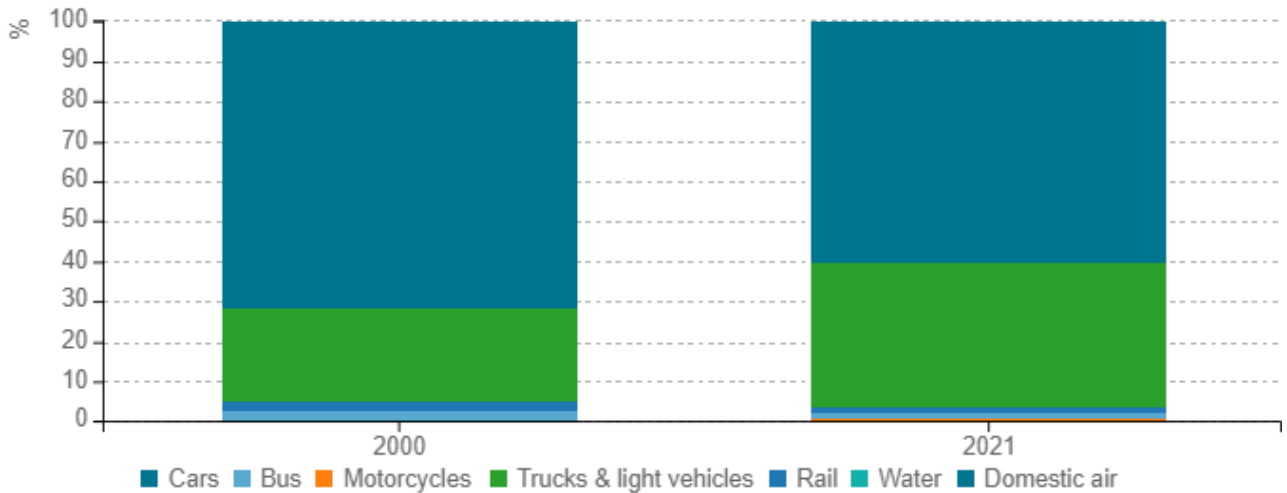
Measures	Description	Expected savings, impact evaluation
Energy efficient heating systems	Financial incentives to replace old and inefficient heating systems with high energy efficient ones, as well as for use of renewable sources and optimization of heating system operations. Measure is also financed through energy contracting.	high
Efficient use of energy in buildings	Technical requirements for thermal insulation, heating, cooling, ventilation, preparation of hot water and lighting in buildings.	high
Energy-efficient renovation and sustainable construction of residential buildings	Financial stimulation (incentives) designed to support the investment in energy renovation of old buildings and construction of new ones with higher efficiency than the standard energy efficient building. Measure is also financed through energy contracting.	high
Third party financing and contracting for efficient energy supply	Third party financing and contracting for renovation of buildings in public and non public service buildings	high

Source: MURE

Transport

Overall transport energy demand in Slovenia has seen periods of dramatic growth and contraction between 2000 and 2021, as transport activity is highly sensitive to economic growth. The amount of fuels sold in Slovenia is also very sensitive to transit transport and fuel prices. Road freight increased heavily resulting in increased share in total consumption. The largest share of energy consumption belongs to cars (60% in 2021).

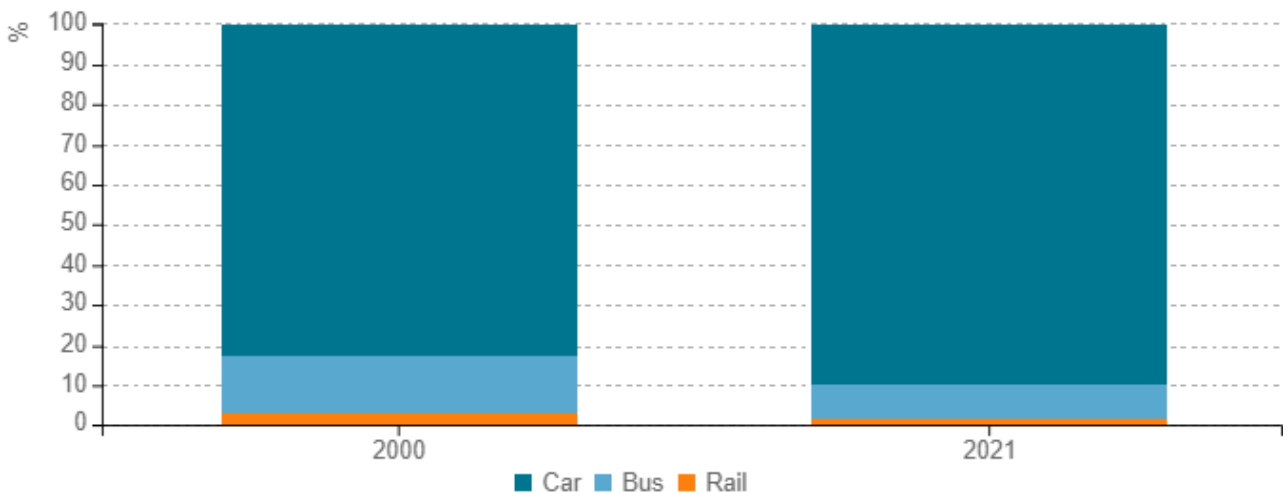
Figure 7: Transport energy consumption by mode



Source: ODYSSEE

Private cars remain the dominant passenger transport mode (with 90% in 2021), reflecting Slovenia’s dispersed settlement patterns, investments mainly in road infrastructure and weak public transport. Despite improved implementation of measures to support use of public transport in the last years, the use of public transport in 2021 was much lower than in 2000. Investments in rail have also increased in recent years, a lot of emphasis is also given to management of road public transport and cycling but the numbers are slowly showing changes in transport patterns in Slovenia.

Figure 8: Modal split of inland passenger traffic

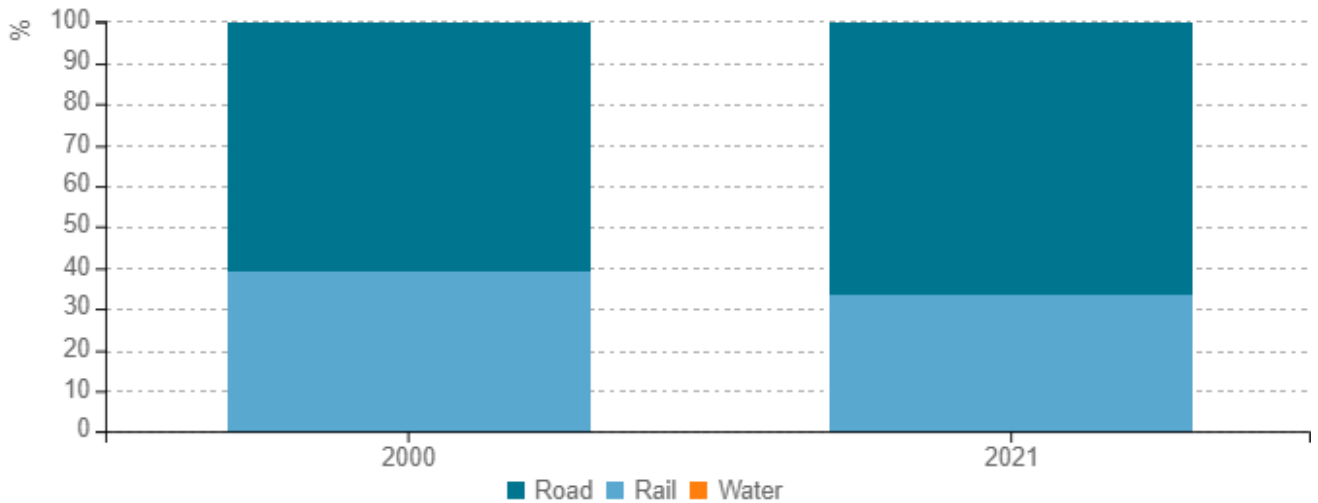


Source: ODYSSEE



Freight transport is also dominated by road. Its share increased from 61% to 66%, while volumes more than doubled. Slovenia is an export-oriented country with good transport connections to EU countries and favourable geographic location also due to port on Adriatic Sea. Road infrastructure has been greatly improved in the past, while improvements in rail infrastructure have started to gain momentum in the recent years.

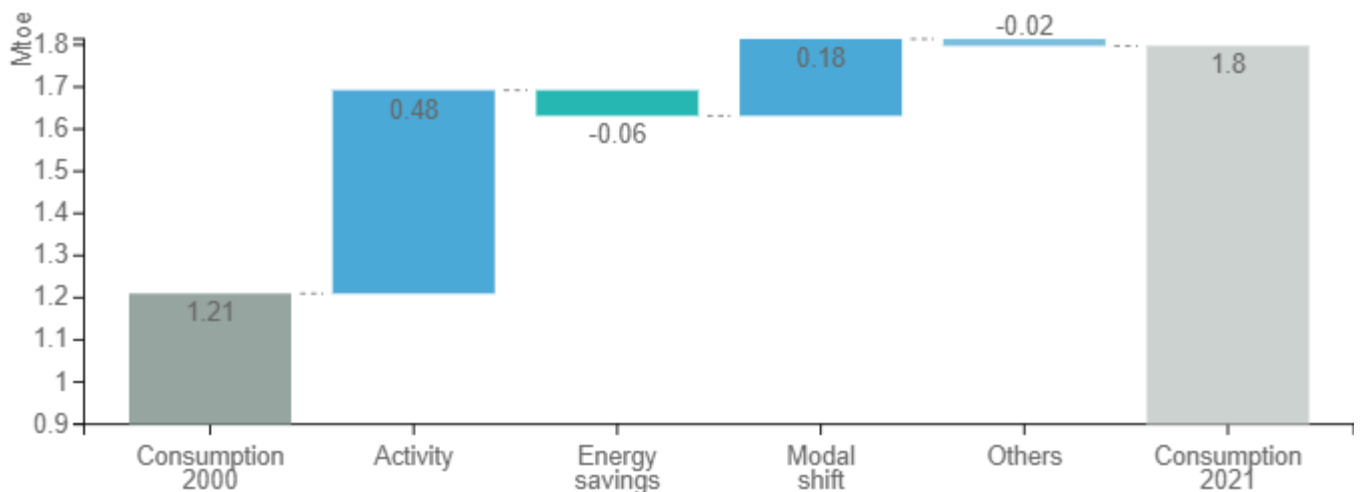
Figure 9: Modal split of inland freight traffic



Source: ODYSSEE

Total transport energy use was 49% higher in 2021 compared to 2000. The energy use in 2021 still reflects the impact of COVID-19, which significantly affected consumption in 2020. The peak energy use occurred in 2008, reaching a level 68% higher than that of 2000. The primary driver behind the increase in energy use is activity, encompassing the growth of domestic transport and the rise in transit transport due to EU enlargements, contribution of which is affected by prices of fuel. Additionally, a significant contribution to the increase in energy use comes from modal shift, characterized by the increasing shares of personal cars in passenger transport and road freight transport. Two factors have contributed to a decrease in energy use: energy savings and others, albeit their impact was relatively small. Despite technological improvements leading to increased energy efficiency of passenger cars, the increased power and mass of vehicles outweighed these gains, resulting in a minimal reduction of energy use by energy savings.

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



Source: ODYSSEE



Support to public transport including investments in railway infrastructure and trains and improvement of public transport management represents a very important policy package targeting to overturn negative trend in public transport and increase its use. NECP focuses on rail infrastructure for rail freight and passenger transport, to improve position of rail transport compared to road. The largest benefits on energy efficiency are expected from increased energy efficiency of vehicles, through technological improvement of vehicles with internal combustion engines and penetration of new technologies especially electric vehicles. This is supported by car taxation based on CO2 emissions, subsidies for vehicles without emissions, subsidies for charging infrastructure, EU regulation on specific CO2 emission of vehicles. Support for active mobility (walking and cycling) is also included in the measures in the transport sector.

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

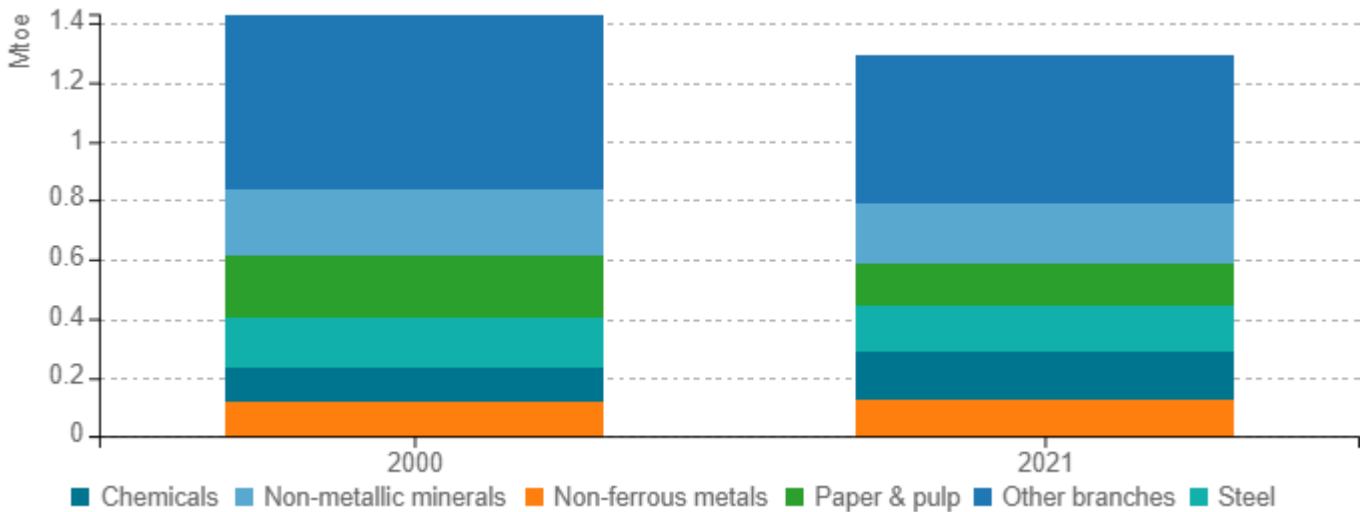
Measures	Description	Expected savings, impact evaluation
Promotion of public transport	Subsidies for public transport, Integrated ticket and timetables for different means of public transport, subsidies for public transport infrastructure.	Medium
Sustainable freight transport	The aim of measures is to limit the growth of road freight transit and secure a transition to rail freight transport to the greatest possible extent. The instruments include: (1) financial incentives for the establishment of intermodality and an increase in rail freight transport, (2) fiscal instruments for road freight transport	Medium
Improvement of efficiency of passenger transport	Regulation on labelling of cars and tyres, subsidies for low CO2 cars, educational activities, green public procurement, promotion of non-motorized forms of transport	High

Source: MURE

Industry

The total final energy consumption of the industry sector has decreased by -0.13 Mtoe (-9.3%, -0.5%/year) between 2000 and 2021. The largest decrease of energy consumption was in the paper and pulp industry due to the stopping of pulp production. Energy consumption in chemical industry increased by 44% (or 0.05 Mtoe) in this period and increased by 3% in non-ferrous metals industry. It decreased in all other branches.

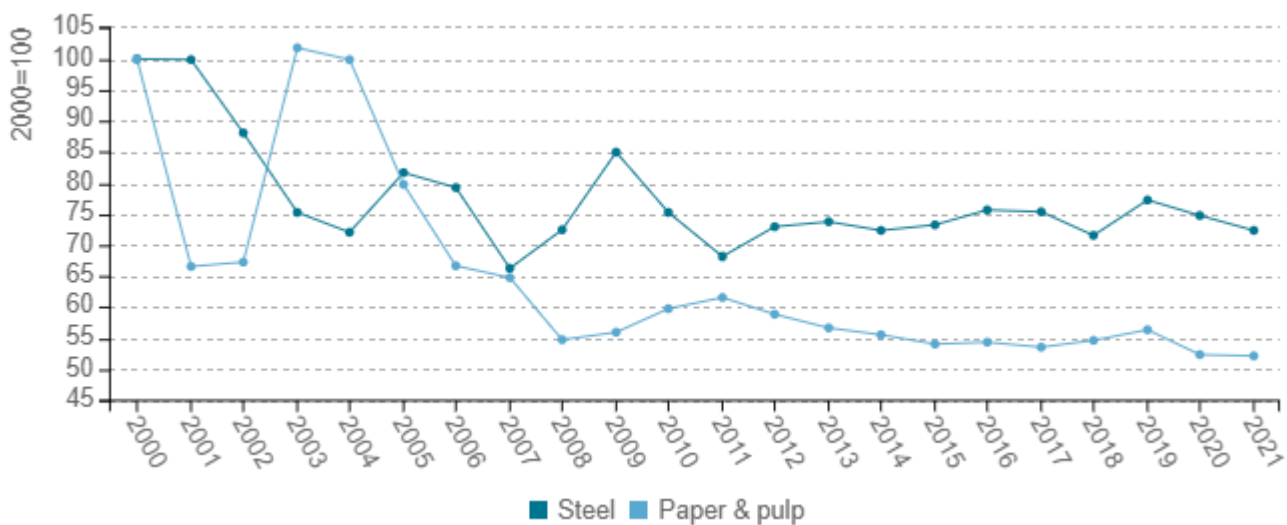
Figure 11: Final energy consumption of industry by branch



Source: ODYSSEE

In the period 2000-2021, specific energy consumption in steel production decreased by -28% or -1.5%/year, while in the paper and pulp production it decreased by -52% or -3.4%/year. Specific energy consumption in 2021 compared to 2020 decreased by -3.1% in steel production and by -7.7% in paper and pulp production.

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

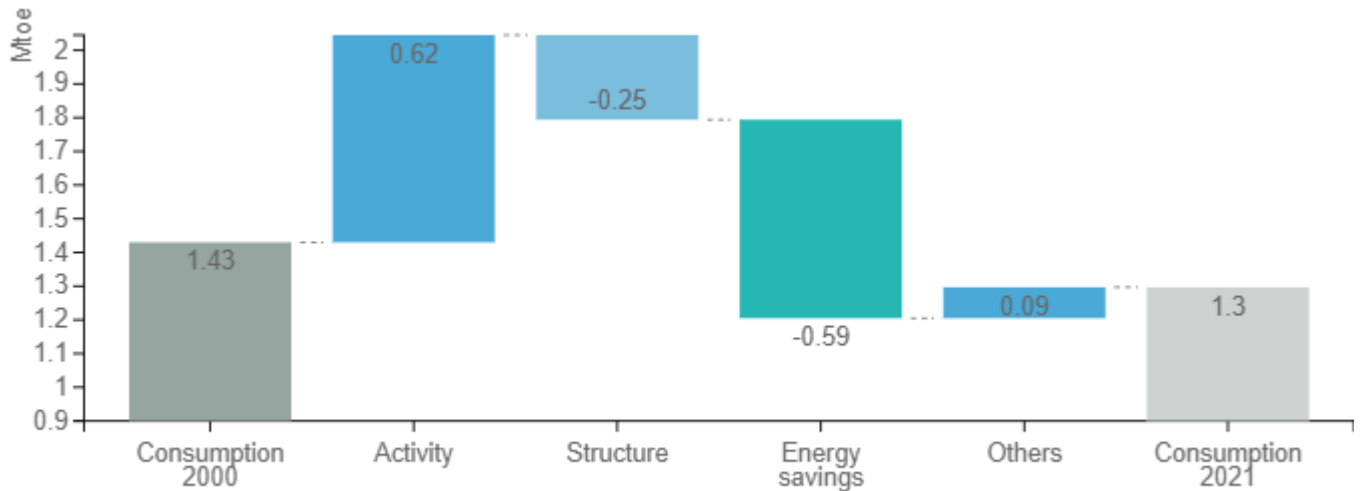


Source: ODYSSEE



Energy consumption in industry decreased by 0.13 Mtoe between 2000 and 2021, mainly because of energy savings (by -0.59 Mtoe) from the successful implementation of energy efficiency measures, and structure change (by -0.25 Mtoe), due to ceasing of some energy intensive production (e.g. pulp). On the other side, the activity increase contributed to increase in consumption by 0.62 Mtoe. In addition, the increase in consumption by 0.09 Mtoe was due to other causes.

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



Source: ODYSSEE

Stimulation of energy efficiency in industry is one of the measures of Slovenian industrial policy for the development and raising of the competitiveness in industry. A legal framework was adopted to promote the efficient use of energy for industrial enterprises under EU-ETS. Financial incentives for industrial Non-ETS companies has been included in all NEEAPs (2008-2020) and the operational program for reduction of GHG emission. The implementation and improvement of energy efficiency measures in industry continue in the adopted NECP until 2030.

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

Measures	Description	Expected savings, impact evaluation
Efficient electricity consumption	Stimulation of improvement of the efficient use of electricity in industry.	high
Energy management systems in industry	Financial incentives to introduce energy management systems in industrial companies: energy audits, the implementation of energy management systems and preparation of feasibility studies for investment in energy efficiency and RES	medium

Source: MURE

