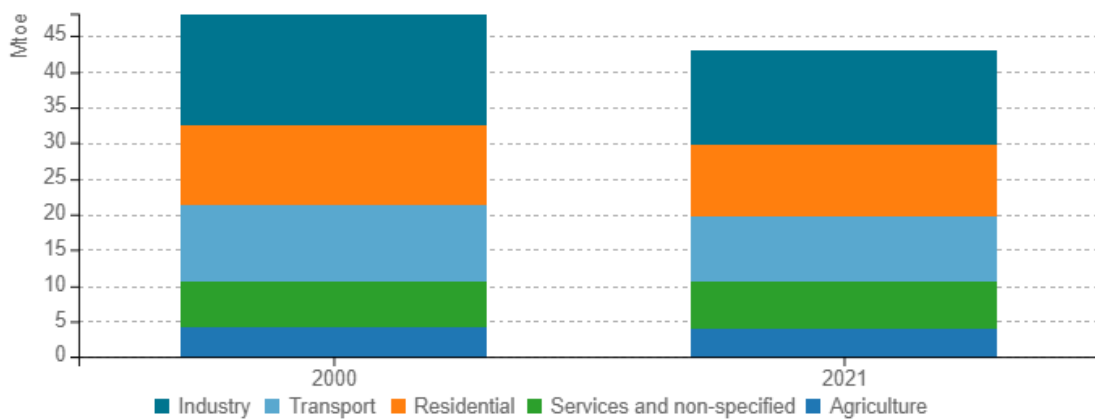


Energy efficiency trends and policies

Overview

Final energy consumption in 2021, corrected for temperature variations, was 43 Mtoe. The consumption of industry has never returned to the pre-crisis of 2008 level. From 2003 until 2020, the first year of the covid epidemic, the transport sector had the second largest energy consumption, even without international aviation that is not included. Transport energy consumption peaked in 2008, and after a declining trend until 2014, increased again until 2019. As of 2020, the residential sector again had the second largest energy consumption. Energy consumption in services peaked around 2010, and has remained relatively stable since then, as has the consumption in agriculture.

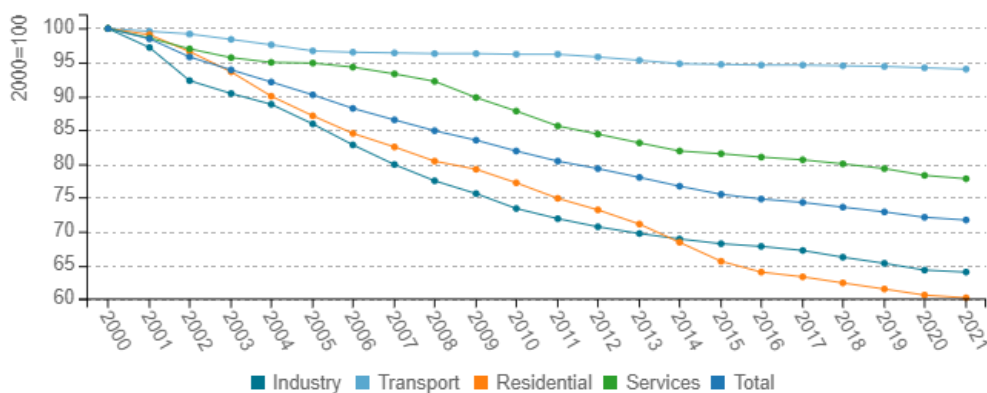
Figure 1: Final energy consumption by sector (normal climate)



Source: ODYSSEE

Efficiency for total final energy consumption, as measured by the so-called technical ODEX, has improved by around 1.6% per year since 2000. Smaller than average gains have been registered in transport (0.3% per year) and services (1.2% per year). Larger gains of 2.4% per year occurred in the residential sector and in industry, where efficiency improved by 2.1% per year. The slowdown of efficiency improvements from 2008 until 2016 in industry may have been due to lower investments in new equipment since the crisis and due to a lower utilization rate of production capacity. A speed-up in efficiency in industry is visible after 2016.

Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

The ODYSSEE-MURE project is co-funded by the European Union.

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The Netherlands aims to be part of a climate-neutral Europe in 2050. In order to achieve climate-neutrality in 2050, the Dutch national interim target for 2030 has been tightened to at least a 55% net greenhouse gas reduction in 2030 compared to 1990. To ensure that this target is achieved, it has been agreed to focus policy on a higher target of approximately 60% in 2030. This policy is elaborated in the Climate Policy Program that was published in June 2022 and the additional policy package that the cabinet agreed on in April 2023 ("Voorjaarsbesluitvorming Klimaat"). Many of the current and proposed greenhouse gas mitigation measures will stimulate energy efficiency. However, for the Netherlands, energy efficiency will also be directly addressed through the implementation of the revised EU Energy Efficiency Directive (EED). As part of the Fit for 55 agreement, the EED makes it binding for EU countries to collectively ensure an additional 11.7% reduction in energy consumption by 2030, compared to the 2020 reference scenario projections. The Dutch government is developing indicative sectoral target values for energy savings in order to fulfil its national contribution towards this goal. Some general measures with high impact are described in the table below.

Table 1: Sample of cross-cutting measures

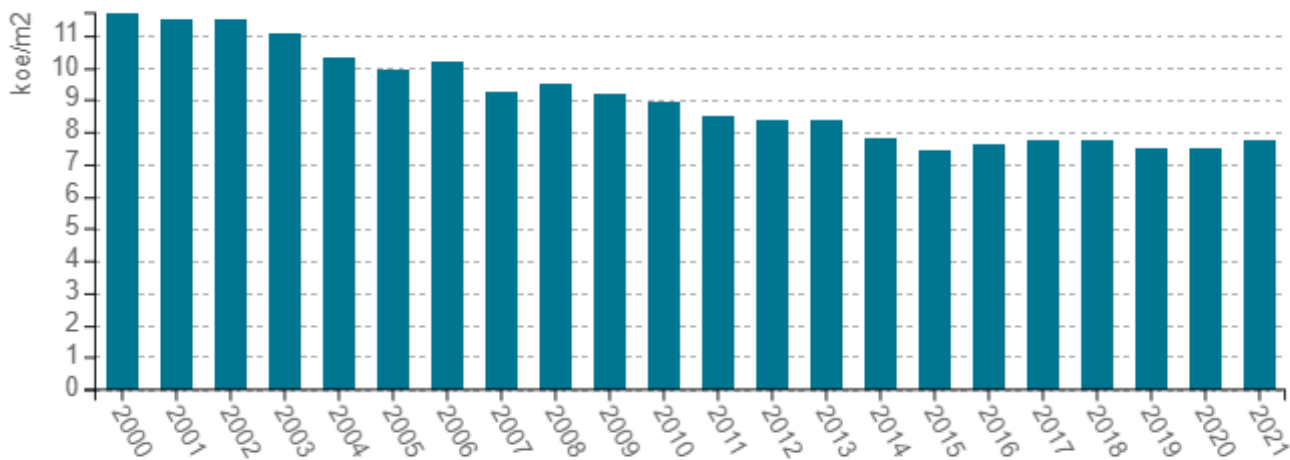
Measures	NECP measures	Description	Expected savings, impact evaluation
Climate Policy Program (NL: Beleidsprogramma Klimaat)	yes	This policy program contains the main lines of climate policy including 2030 – aimed at realisation of the targets from the Climate Act.	High impact
Energy taxes and surcharges	yes	The energy tax is levied on electricity and natural gas, and the level depends on the level of energy consumption of a customer (degressive tariff structure).	High impact
EIA: Energy Investment Allowance (NL: Energie-investeringsaftrek)	yes	Deduction scheme from fiscal profits to promote investments in new energy efficient technologies.	High Impact

Source: MURE

Buildings

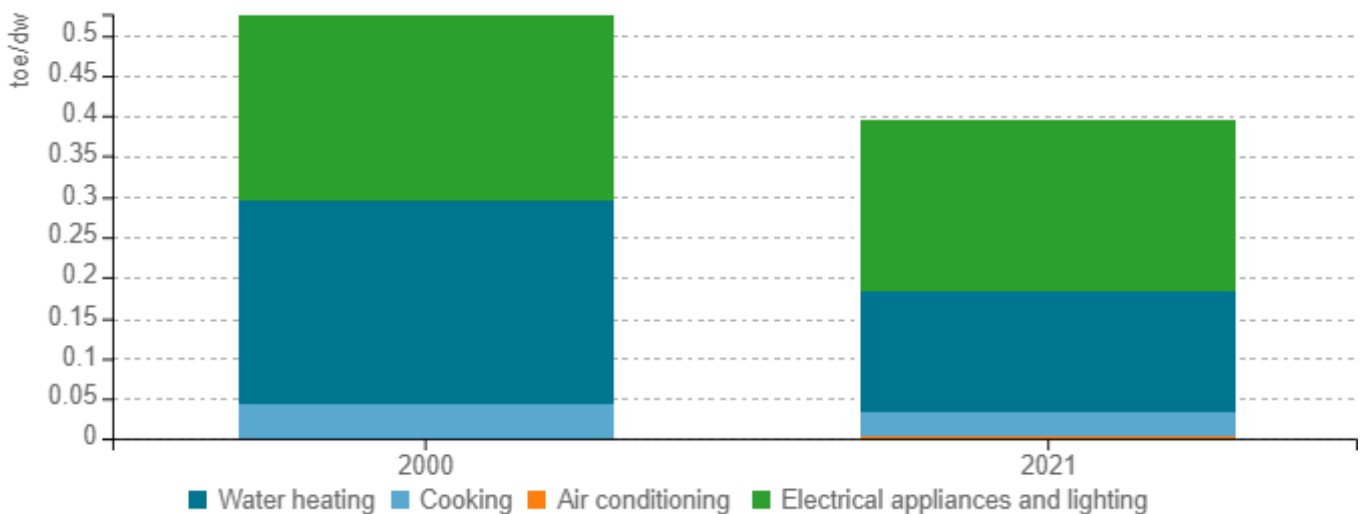
The energy used for space heating in households (per m²) has decreased until 2015 and was 34% lower in 2021 than in 2000. A large part is due to better insulation and more high efficiency condensing boilers. As shown in Figure 4, energy used for water heating has also gone down considerably, due to the same condensing boilers that combine space heating and water heating. Cooking used less energy due to a shift from gas to electrical stoves. Only electricity use remained relatively stable due to higher ownership of electrical appliances that almost compensated the increased efficiency of electrical appliances.

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



Source: ODYSSEE

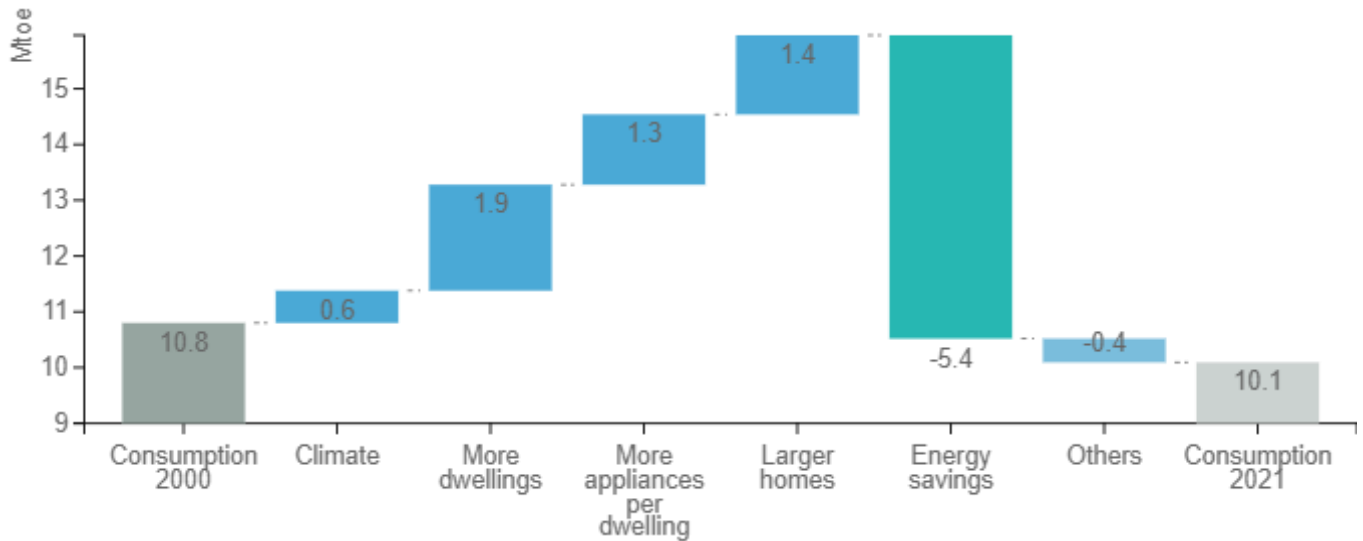
Figure 4: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

The reduction in energy consumption of households (-0.7 Mtoe from 2000 to 2021, or -6.5%) can be split into different effects (see Figure 5). More dwellings and changes in lifestyles (more electrical appliances and larger homes) as a whole had an important increasing effect on energy consumption (4.6 Mtoe). These effects are more than compensated by technical energy savings like insulation and high efficiency boilers which resulted in a decrease the energy consumption by 5.4 Mtoe. 'Climate' had an increasing effect because 2021 was slightly colder than 2000. The decrease in 'Others' is due to changes in behaviour.

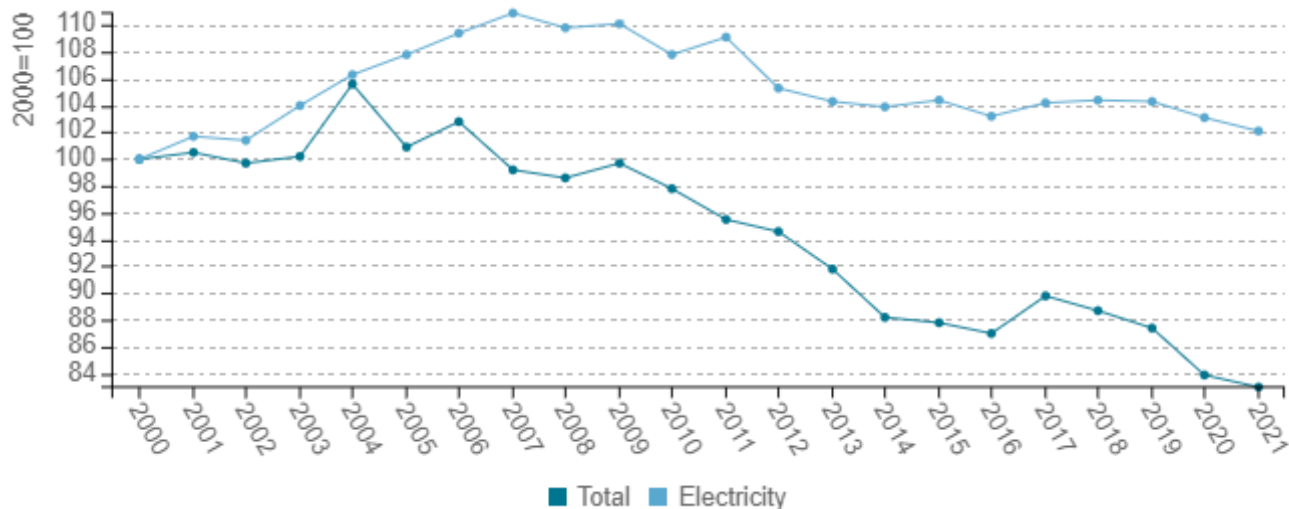
Figure 5: Main drivers of the energy consumption variation of households



Source: ODYSSEE

Service sector energy consumption per m² has decreased by 0.9% per year on average since 2000 because of more efficient heating and better insulation of buildings, see Figure 6. Electricity consumption per m² grew until 2007 due to more electronic equipment, but decreased since then due to efficiency gains and is now almost back at the level of 2000.

Figure 6: Energy and electricity consumption per m² (normal climate)



Source: ODYSSEE



In line with the Netherlands' broader energy and climate policy, the sustainability of the built environment is primarily focused on CO₂ reduction. The current target for the built environment, agreed to as part of a policy package in April 2023 ("Voorjaarsbesluitvorming Klimaat") is an emission ceiling of 13.2 Mt of CO₂-equivalents in 2030. The core of the Dutch approach in the built environment is reducing energy demand through behaviour, insulation and hybrid heat pumps, and developing sustainable heat sources to meet the remaining demand. This happens via multiple tracks simultaneously: both through an area-oriented approach via municipalities (based on heat transition visions, district implementation plans, and energy fix teams in response to energy poverty) and with policy for individual homes and buildings (on topics such as energy labelling, nearly zero-emission buildings, public building renovation). Some measures with high impact in the built environment are described in the table below.

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

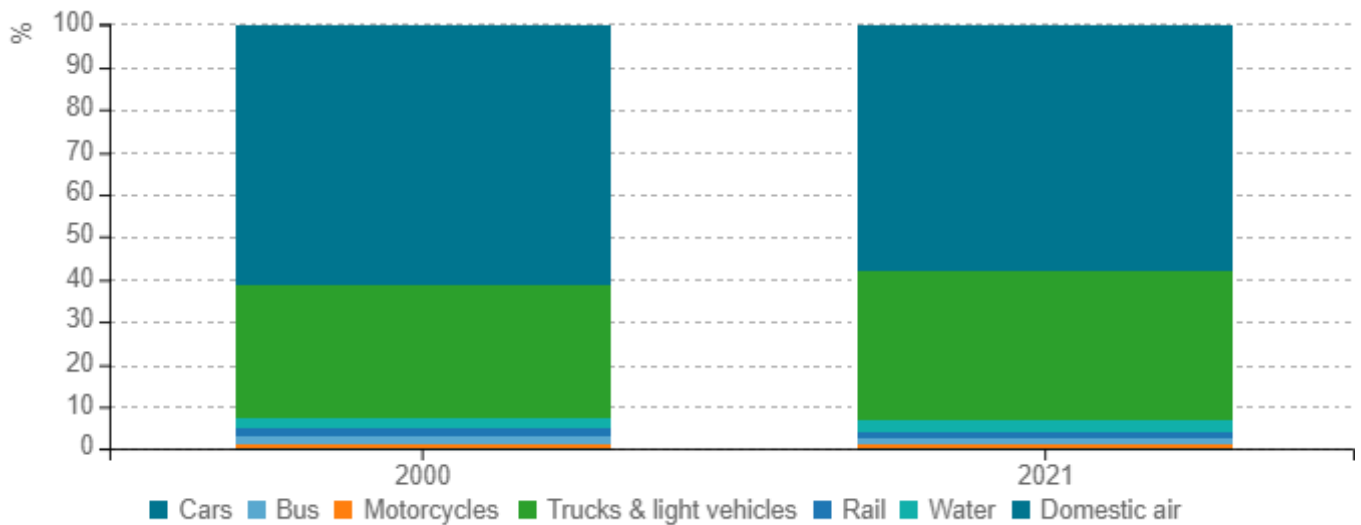
Measures	Description	Expected savings, impact evaluation
Energy performance - BENG	Starting 1 January 2021, for all new construction, both residential and non-residential, permit applications must comply with the requirements for Bijna Energieneutrale Gebouwen (BENG - Nearly Zero Energy Buildings).	High impact
Mandatory reporting on taken energy savings measures (Informatieplicht)	As from July 2019, companies need to report on which energy savings measures they have implemented. They must continue to do so every four years.	High impact
Investment Subsidy for Sustainable Energy (ISDE) (NL: Investeringssubsidie Duurzame Energie)	Households and small commercial users can apply for an allowance for the purchase of heat pumps, biomass boilers, solar water heaters, pellet stoves and small wood-fired boilers.	High impact

Source: MURE

Transport

The share in energy consumption of cars decreased from 61% to 58% between 2000 and 2021, while the share of trucks and light vehicles grew from 31% to 35% (see Figure 7). The energy share of transport by water remained stable at 2.6%, domestic air is very small with 0.1%.

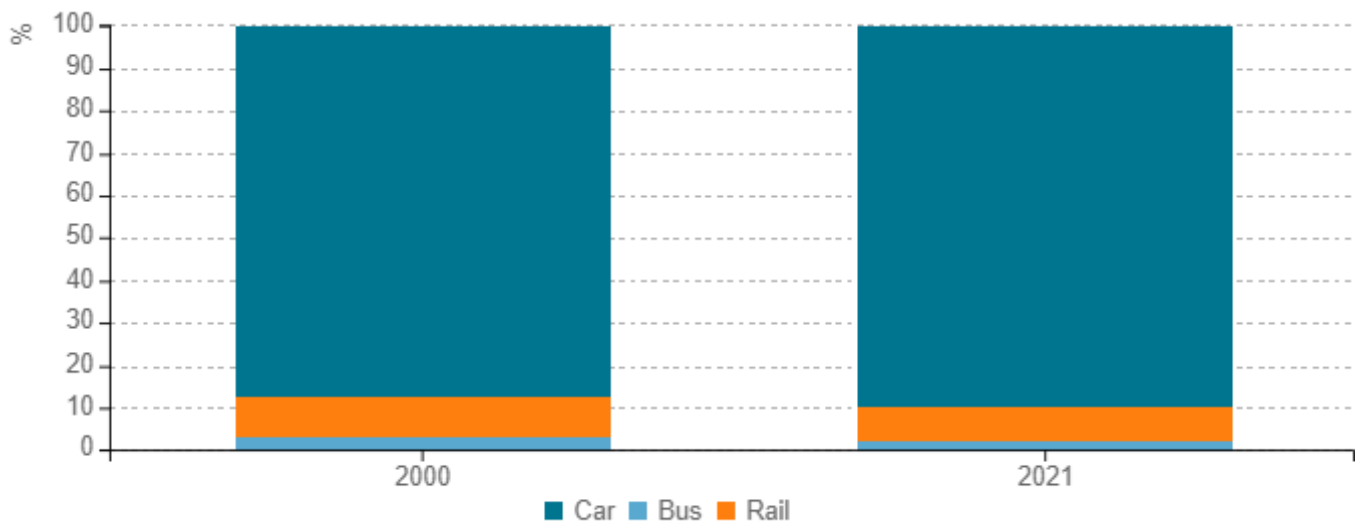
Figure 7: Transport energy consumption by mode



Source: ODYSSEE

Some changes in the shares of different modes of passenger transport are visible, see Figure 8, but 2021 figures were heavily influenced by Covid. Traffic by car (in passenger-km) changed from 85% in 2019 to 90% in 2021, rail from 12% to 8%, and bus from 3% to 2%.

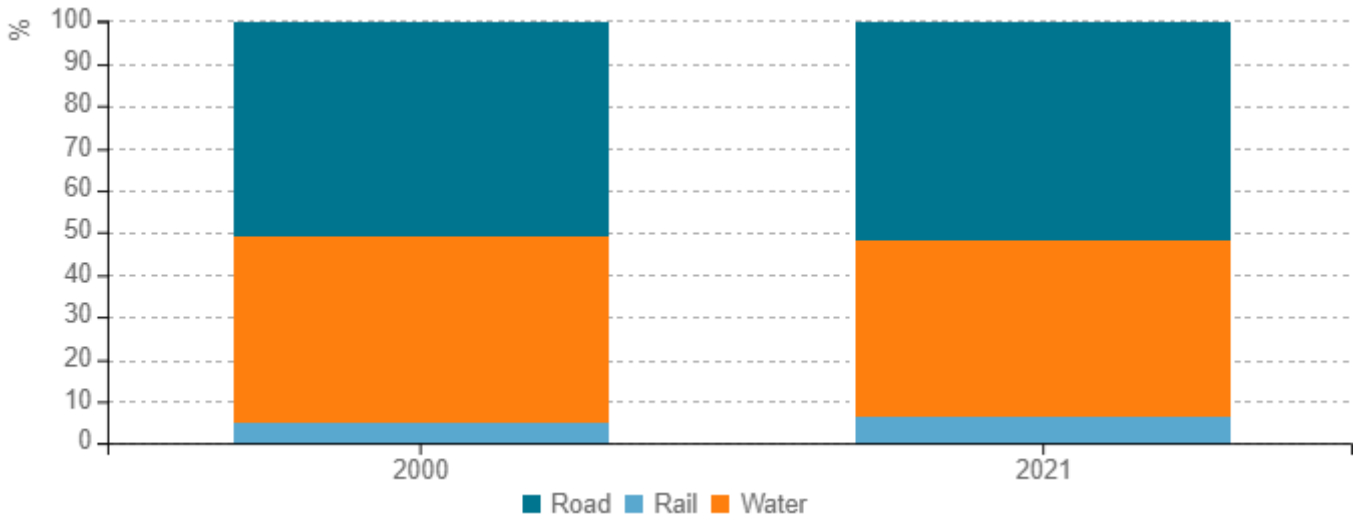
Figure 8: Modal split of inland passenger traffic



Source: ODYSSEE

Road traffic in total freight traffic increased from 51% to 52%, domestic water transport decreased from 44 to 42% and rail transport increased from 5 to 6% of total inland freight traffic (see Figure 9).

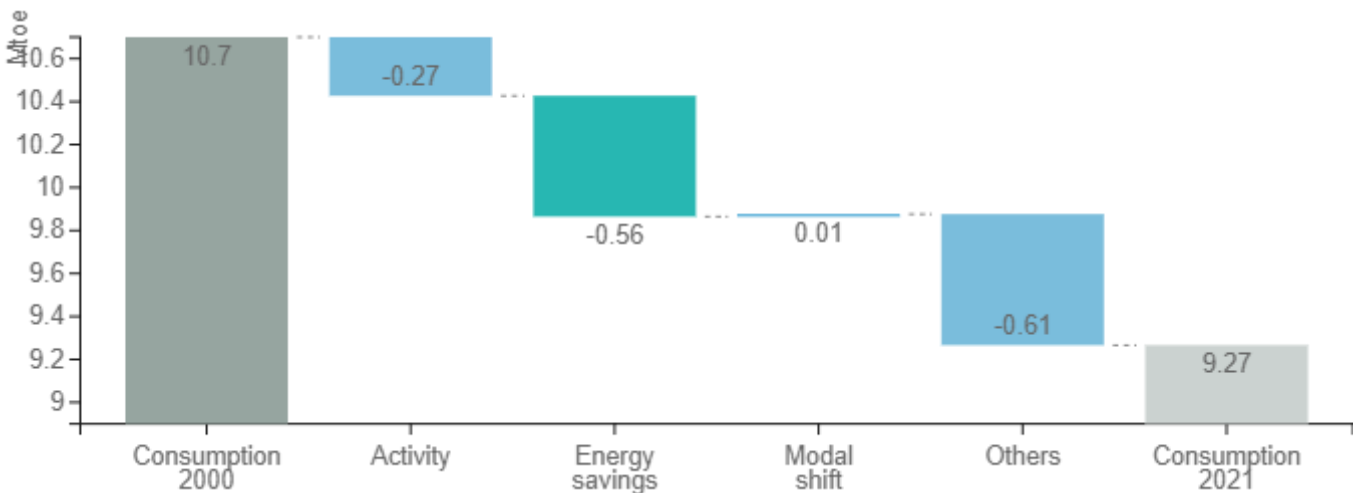
Figure 9: Modal split of inland freight traffic



Source: ODYSSEE

Energy consumption of transport decreased by 13% between 2000 and 2021 (Figure 10). Different developments explain this. The decreasing traffic of passengers and freight contributed to lowering the consumption by 0.27 Mtoe. This trend was reinforced by energy savings (-0.56 Mtoe). There was hardly any modal shift (0.01 Mtoe) comparing 2000 to 2021. There have been quite substantial unknown decreasing structural effects ('Others').

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



Source: ODYSSEE

The Netherlands' sustainable mobility policy is based on four pillars: 1) sustainable passenger mobility, 2) electric passenger cars, 3) logistics, 4) use of sustainable fuels. The current target for the sector, agreed to in April 2023 ("Voorjaarsbesluitvorming Klimaat") is an emission ceiling of 21,0 Mt of CO₂-equivalents in 2030. Resources have been made available for charging infrastructure and policies to incentivise private use of electric passenger cars. Activities within the logistics pillar include zero-emission zones for city logistics and subsidies for zero-emission road transport for company cars, trucks, construction vehicles and public transportation. The use of biofuels in road traffic will be increased for use by transport modes with few alternatives, such as heavy road transport. Some measures with high impact in the transport sector are described below.

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

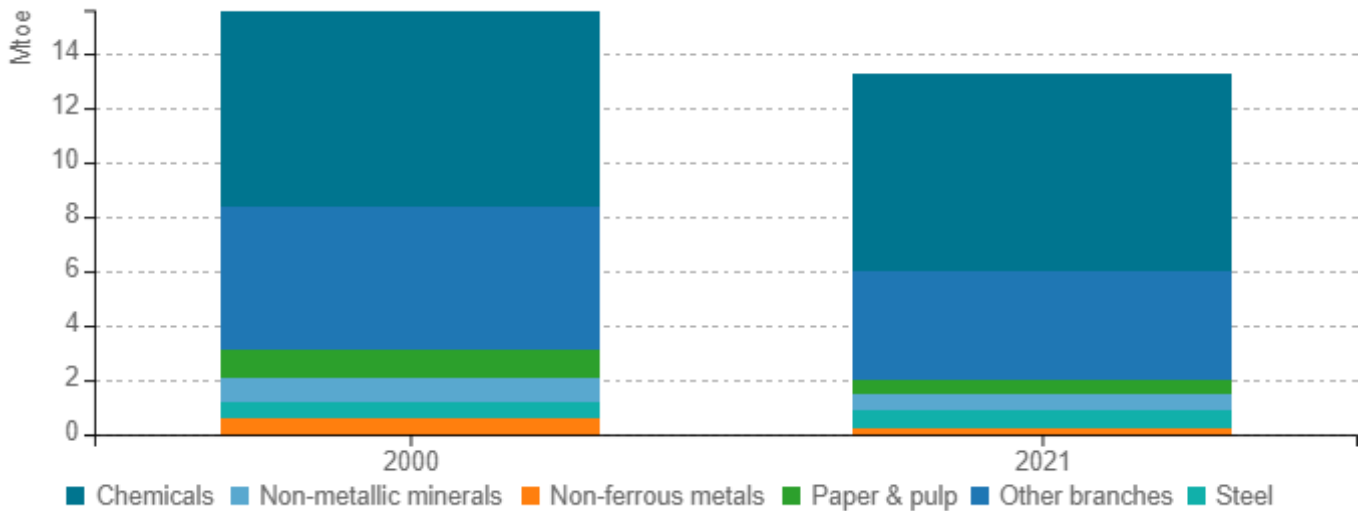
Measures	Description	Expected savings, impact evaluation
Fiscal and taxation measures	Motor Vehicle Tax/Private Car and Motorcycle Tax, CO ₂ differentiation, fiscal benefits for zero emission lease cars	Medium impact
National Agenda on charging infrastructure	The NAL (Nationale Agenda Laadinfrastructuur) is a multi-year policy agenda, supported by a broad coalition of parties, formulating ambitions and planned actions. The ambition is that the charging infrastructure will not form an obstacle in deployment of electric transport. The agenda includes actions on infrastructure coverage, strategic extension (before actual demand emerges), accessible information on locations and tariffs, smart charging infrastructure etc.	Medium impact
EU CO₂ emissions performance standards	CO ₂ emission performance standards for new passenger cars and light commercial vehicles.	High impact
Heavy-duty vehicle charge	As of 2023 the government intends to introduce a levy on truck traffic. This will be applied to Dutch and foreign trucks of more than 3500 kg. It will be based on the distance travelled and on which roads are used. The revenues will be used for innovation towards more sustainable road traffic. Relevant parties will be involved in decisions on re-investing the revenues.	Medium impact
Subsidy scheme electric passenger cars (SEPP)	SEPP includes subsidy options for consumers that want to buy full electric passenger cars	Medium impact
Subsidy Scheme Zero Emission Company Cars (SEBA)	The Subsidy Scheme Zero Emission Company Cars (SEBA) offers subsidies for purchase or financial lease of new zero emission vehicles for entrepreneurs and non-profit organisations.	Medium impact

Source: MURE

Industry

The decrease in energy consumption in industry between 2000 and 2021 was mainly due to "Other branches" (which includes a sizable food industry). There was a large relative decrease in energy consumption in the paper and pulp, non-metallic minerals and non-ferrous metals industry.

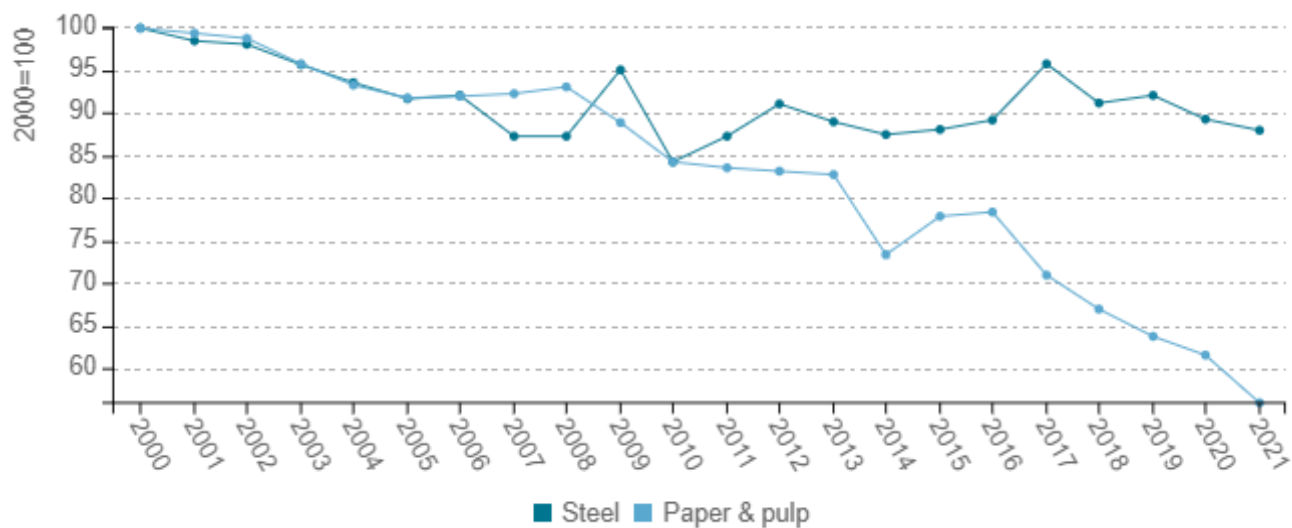
Figure 11: Final energy consumption of industry by branch



Source: ODYSSEE

After steady improvement (2% per year on average from 2000 until 2007), the steel industry efficiency decreased considerably in 2009. This was due to lower production and equipment utilization. After 2010 efficiency decreased again, possibly due to higher quality steel which requires more energy to produce. In the paper industry the average efficiency improvement since 2000 has been 2.7%/year.

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

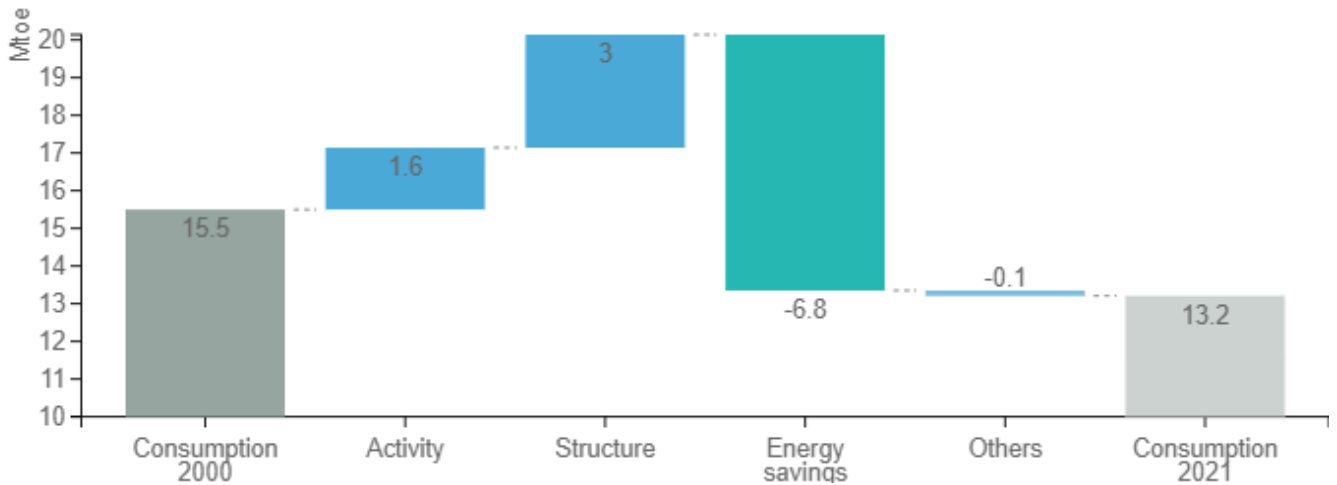


Source: ODYSSEE



Energy consumption by industry has been decreasing by almost 0.8%/year (-2.3 Mtoe) since 2000 mainly due to energy savings (-6.8 Mtoe). Technical improvements in industry have meanwhile been partially offset by the growth in activity and structural changes which led to an increase the consumption (4.6 Mtoe). As a result, the decrease of energy consumption has been limited despite the considerable energy savings.

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



Source: ODYSSEE

The emission ceiling target for the industry sector, agreed to in April 2023 ("Voorjaarsbesluitvorming Klimaat") is 29,6 Mt of CO₂-equivalents in 2030. Companies are subject to the energy saving obligation (NL: "Energiebesparingsplicht") which obliges companies with an annual energy consumption of 50,000 kWh of electricity or 25,000 m³ of natural gas to take all energy-saving measures with a seven-year payback period. The Netherlands has also introduced a national CO₂ tax for industry that can exceed the ETS price.

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

Measures	Description	Expected savings, impact evaluation
CO₂ surcharge for industry	A surcharge for CO ₂ emissions is introduced, starting in 2021 at €30 per tonne CO ₂ and increasing to €125–150 per tonne by 2030. The national tax includes the EUA price in the EU ETS.	High impact
EIA and MIA/VAMIL Environmental investment allowance (EIA) and Arbitrary depreciation of environmental investment schemes (MIA/VAMIL)	Investments in new environmental technologies can be subtracted from fiscal profits.	High impact

SDE++ (Sustainable energy production and CO2-reduction Subsidy Scheme)	Subsidy scheme that finances part of the costs (per unit renewable energy production or CO2-emission reduction) that is above market prices. Since 2020, CO2-mitigation measures are added as eligible measures.	High impact
Energy saving obligation (NL: Energiebesparingsplicht)	Obligation which obliges companies with an annual energy consumption of 50,000 kWh of electricity or 25,000 m3 of natural gas to take all energy-saving measures with a seven-year payback period.	High impact

Source: MURE

