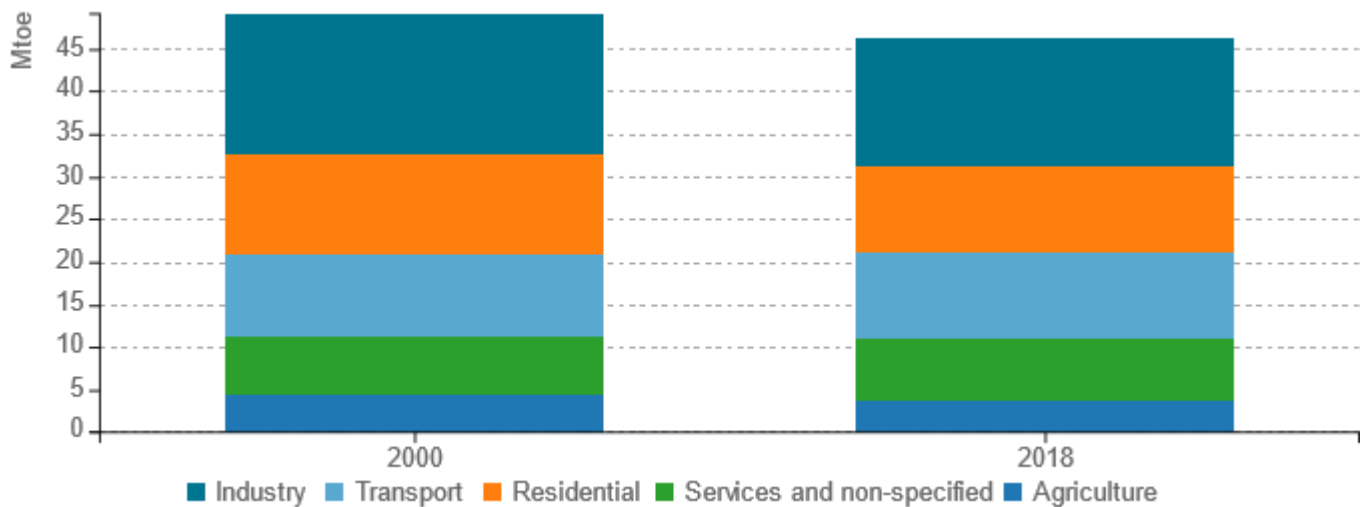


Energy efficiency trends and policies

Overview

The final energy consumption in 2018, corrected for temperature variations, was 46.3 Mtoe. The effect of the economic crisis of 2008 is still clearly visible in industry. The consumption of industry has never returned to the pre-2008 level. The transport sector has the second largest energy consumption, even without international aviation that is not included. Transport energy consumption also peaked around 2008, and after a declining trend until 2015, is almost back at the level of 2008. Energy consumption in services has been declining between 2010 and 2014 but has remained stable since then. The same trend is visible in the residential sector.

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

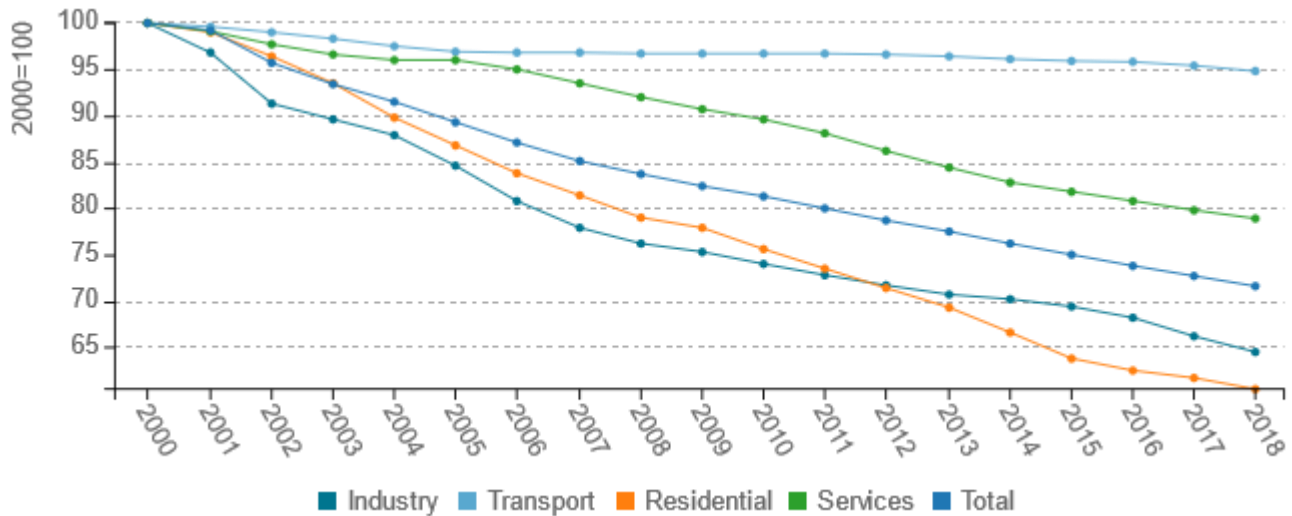


Source: ODYSSEE

Efficiency for total final energy consumption, as measured by the so-called technical ODEX, has improved by around 1.8% per year since 2000. Smaller than average gains have been registered in transport (0.3% per year) and services (1.3% per year). Larger gains of 2.8% per year occurred in the residential sector and in industry, where efficiency improved by 2.4% per year. The slowdown of efficiency improvements from 2008 until 2015 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 2015.



Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

The Dutch Climate Act adopted in 2019 sets greenhouse gas emission reductions targets of 49% in 2030 and of 95% by 2050 compared to 1990. In order to meet the 2030 target, the government proposed policies in June 2019, based on the National Climate Agreement which was negotiated by many national stakeholders and builds on the 2013 Energy Agreement. The Climate agreement contains a large set of policy measures (both new and adjustments of existing policies) and actions by stakeholders in the energy sector, industry, the built environment sector, agriculture and land use and the transport sector. Although there are no specific targets on energy efficiency, many of the proposed CO2 mitigation measures also stimulate energy efficiency. Apart from national policies, EU policies like Ecodesign (for minimum efficiency standards for appliances), the building directive EPBD and efficiency standards for cars also have a large effect on energy savings in the Netherlands.

Table 1: Sample of cross-cutting measures

Measures	NEEAP measures	Description	Expected savings, impact evaluation	More information available
National Climate Agreement	yes	Agreements about policy measures and stakeholder actions to reduce greenhouse gas emissions with 49% by 2030.	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4015
EIA (Energy Investment Allowance)	yes	A fiscal measure that offers the opportunity to deduct investments in designated innovative energy-efficient equipment from taxes imposed on fiscal profits	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/280



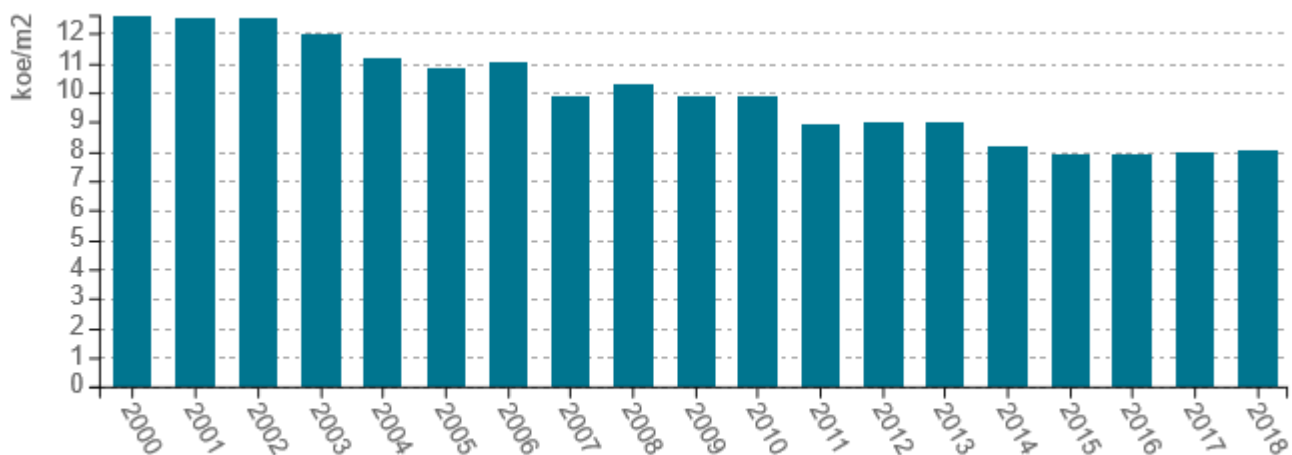
Energy taxes and surcharges	yes	The energy tax is levied on electricity and natural gas. The tariff depends on the level of energy consumption of a customer (degressive tariff structure). In 2013 a surcharge system (ODE) was introduced in order to cover expenditures resulting from the sustainable energy production scheme/actions.	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/282
-----------------------------	-----	---	-------------	---

Source: MURE

Buildings

The energy used for space heating in households (per m²) has gone steadily down and is now 36% lower 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 stable due to higher ownership of electrical appliances that more than compensated the increased efficiency of electrical appliances.

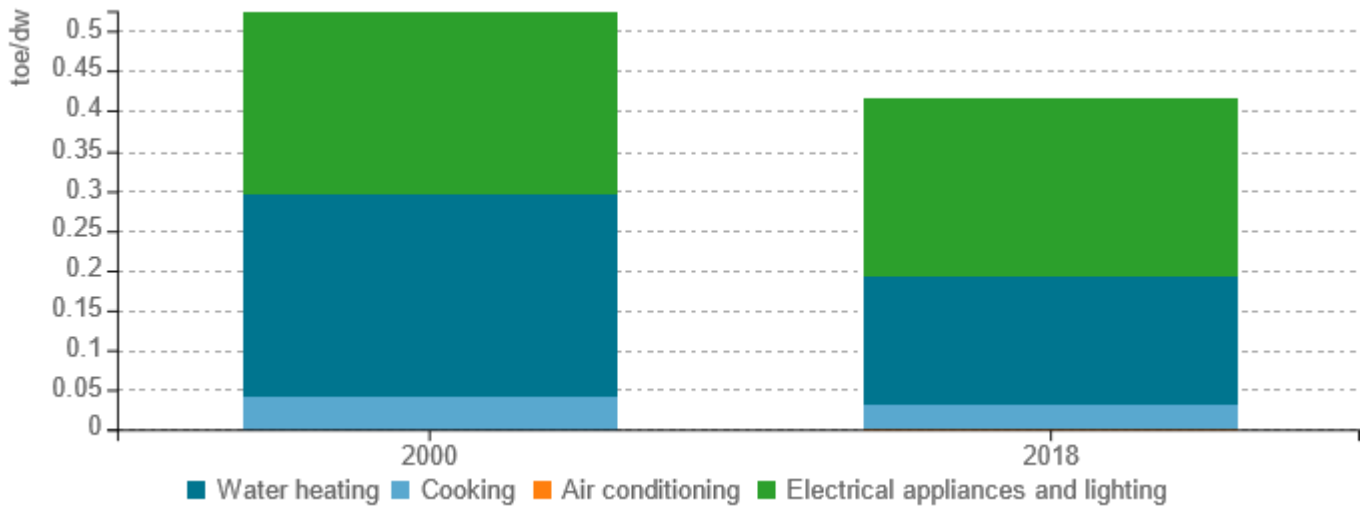
Figure 3: Energy consumption of space heating per m² (normal climate)



Source: ODYSSEE



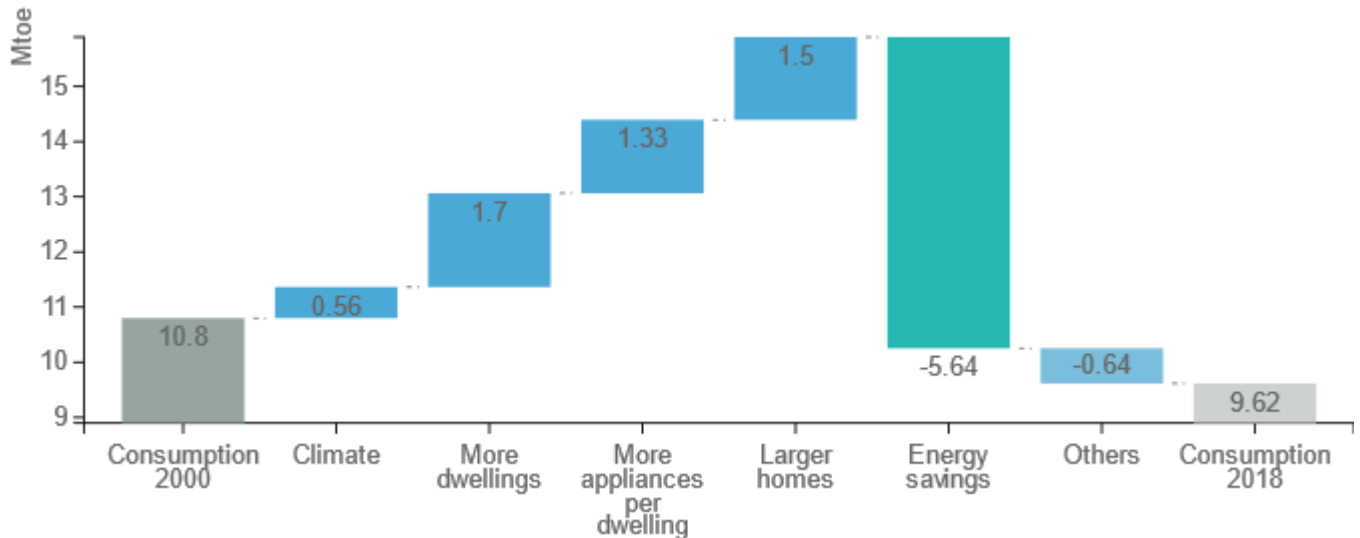
Figure 4: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

The reduction in energy consumption of households (-1.2 Mtoe from 2000 to 2018, or -11%) 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 (4.5 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 5.6 Mtoe. 'Climate' had an increasing effect because 2018 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

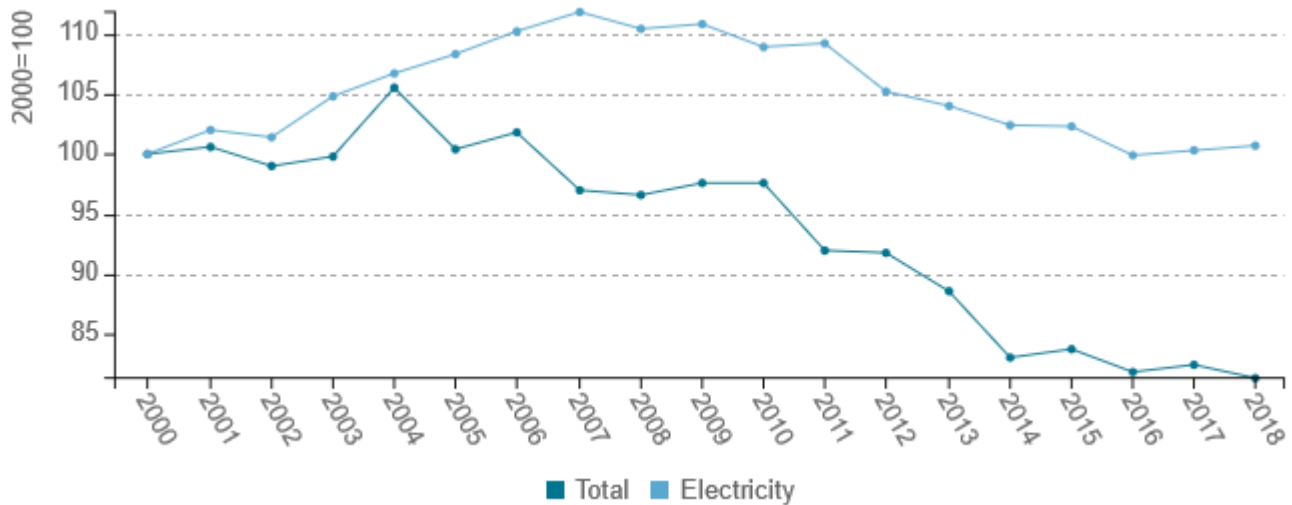


Source: ODYSSEE

Service sector energy consumption per m² has decreased by 1.1% 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 the Climate Agreement, the parties agreed to reduce emissions by buildings by 3.4 Mt CO₂-eq. in 2030 compared to the reference scenario. Measures have been proposed in order to renovate 50,000 dwellings annually by 2021 and up to 200,000 dwellings before 2030. Local governments will lead this with a neighbourhood or ‘block-by-block’ approach. Financing possibilities will be improved as well, such as the possibility to couple loans to buildings and the creation of a revolving fund for heat measures (‘warmtefonds’). 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	More information available
Energy performance standards	Increased energy performance over years in the Building Decree. New buildings need to be nearly energy neutral as of 2020 (2018 for central government buildings). As of July 2018, connection to the gas grid is no longer allowed in principle when awarding building permits for new dwellings.	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/839
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	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/278

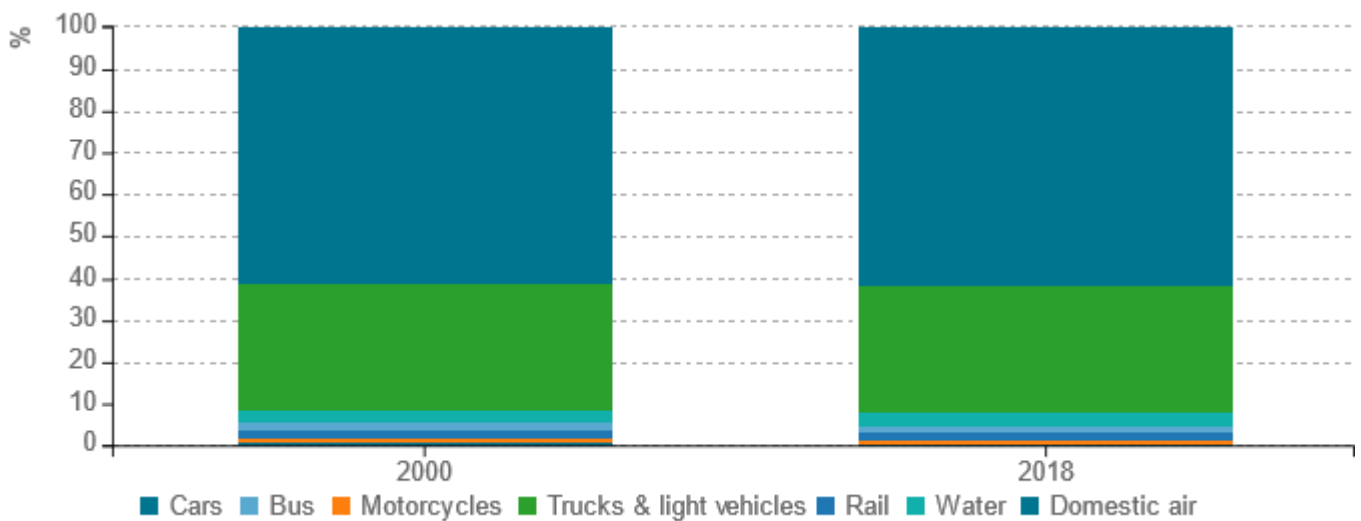
Changes to the Home Evaluation System	The energy label of social housing dwellings has an impact on the (maximum) rent	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/835
---------------------------------------	--	-------------	---

Source: MURE

Transport

The shares of the two modes of transport with the largest energy use, cars (62%) and trucks & light vehicles (30%), have remained quite stable over time (see Figure 7). The energy share of transport by water grew from 2.6% to 3.2%, domestic air decreased from 1% to 0.4%.

Figure 7: Transport energy consumption by mode

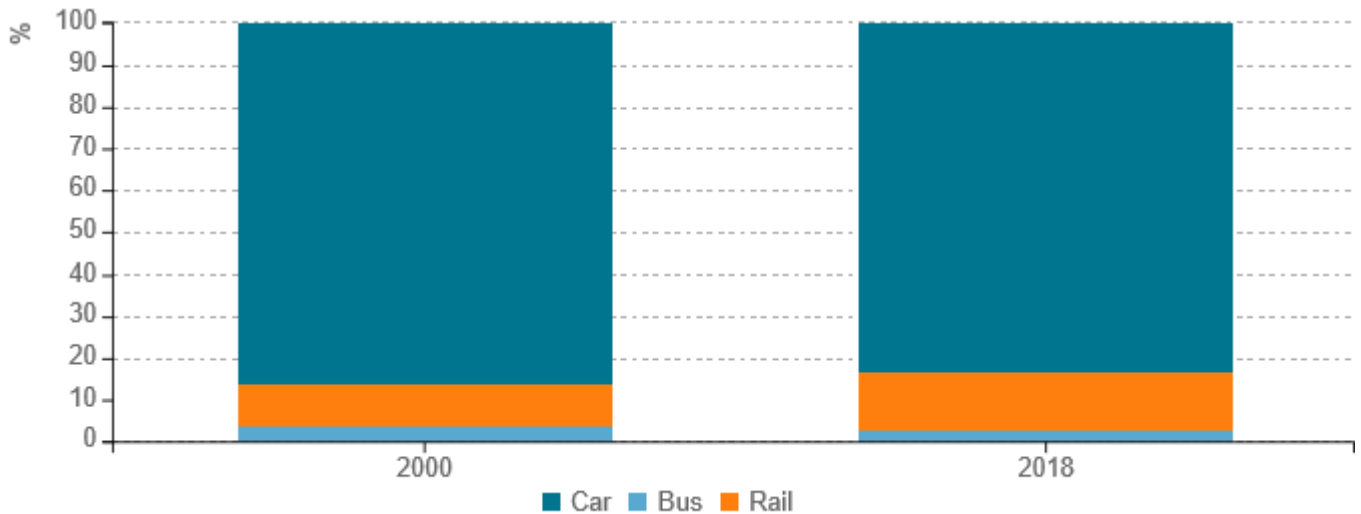


Source: ODYSSEE



Some changes in the shares of different modes of passenger transport are visible, see Figure 8. The traffic by car (measured in passenger-km) decreased from 86% to 83.4% (in total passenger traffic), rail increased from 10.3% to 13.8%, and bus decreased from 3.7% to 2.8%.

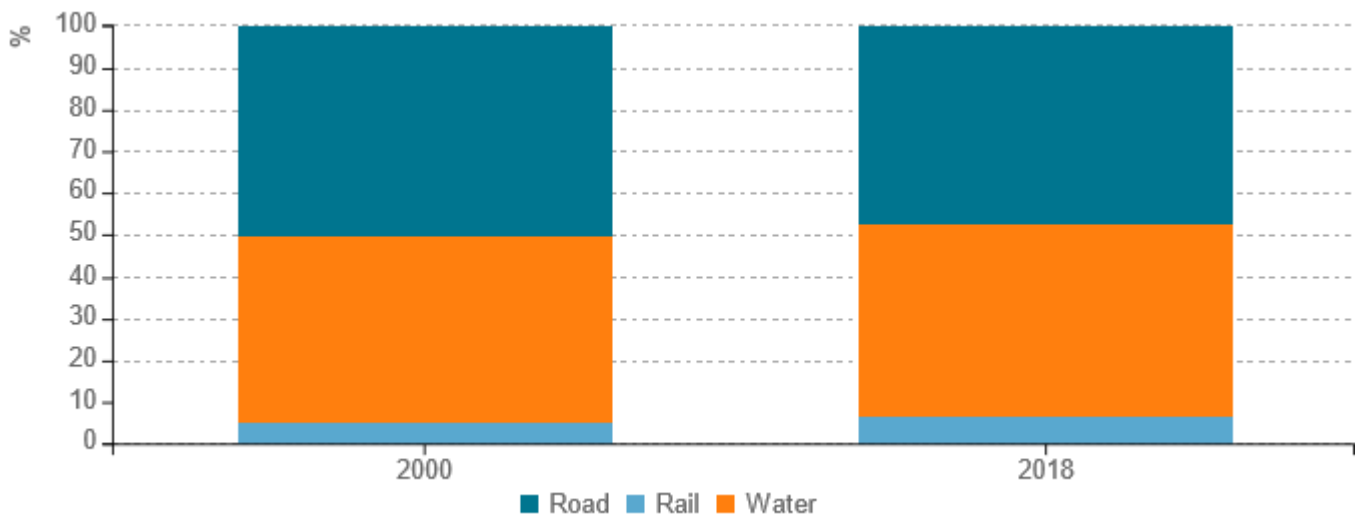
Figure 8: Modal split of inland passenger traffic



Source: ODYSSEE

Road traffic decreased from 50 to 48% (in total freight traffic), domestic water transport increased from 45 to 46% and rail transport from 5 to 7% of the total inland freight traffic (see Figure 9).

Figure 9: Modal split of inland freight traffic

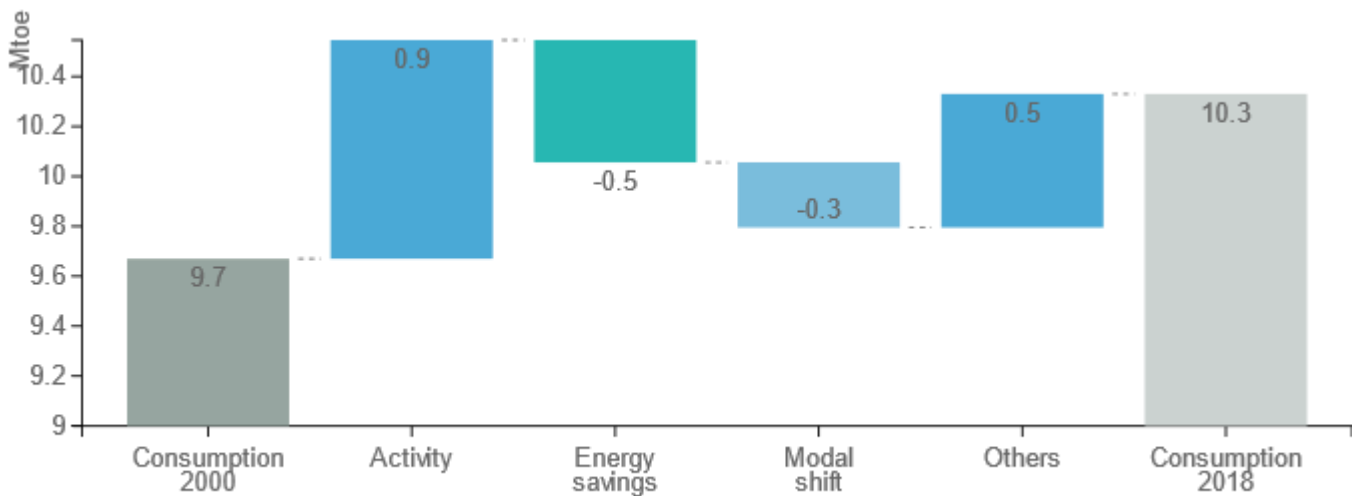


Source: ODYSSEE



Energy consumption of transport increased by 7.5% between 2000 and 2018 (Figure 10). Different developments explain this. The increasing traffic of passengers and freight contributed to increase the consumption by 0.9 Mtoe. This trend was partly counterbalanced by energy savings (-0.5 Mtoe) and modal shift (-0.3 Mtoe) with a shift from cars to public transport and from trucks to rail and water transport for freight. There have also been unknown increasing structural effects ('Others').

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



Source: ODYSSEE

The Climate Agreement contains new ambitions and measures for the period up to 2030, relating to sustainable fuels, non-emission vehicles (100% of newly sold cars by 2030), switching to more sustainable modalities (e.g. from car to bicycle) and sustainable logistics (e.g. introduction of a kilometre tariff for trucks, zero-emission zones in cities and an aviation tax). The most important measures for the transport sector are described in the table below.

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

Measures	Description	Expected savings, impact evaluation	More information available
Fiscal and taxation measures	Motor Vehicle Tax/Private Car and Motorcycle Tax, CO2 differentiation, fiscal benefits for zero emission lease cars	Medium impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/2318
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	Medium impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4016



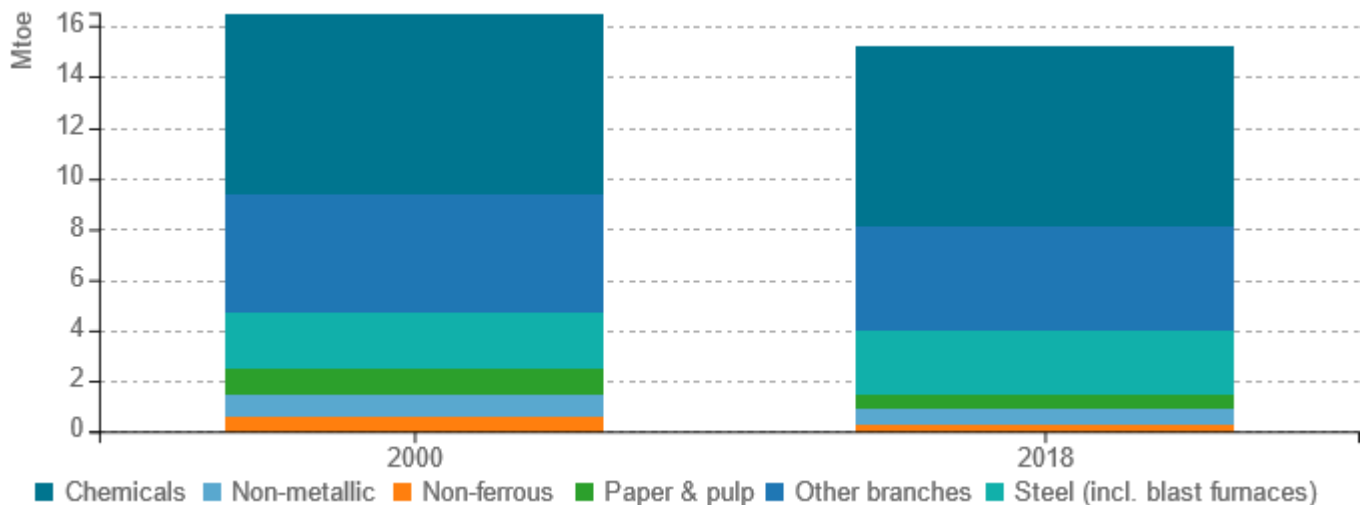
	infrastructure will not form an obstacle in deployment of electric transport. The agenda includes actions on infrastructure coverage, strategic extension (before actual demand emerges), accessible information on locations and tariffs, smart charging infrastructure etc.		
EU CO2 emissions performance standards	CO2 emission performance standards for new passenger cars and light commercial vehicles.	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/2327
Heavy goods 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	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4013

Source: MURE

Industry

The main energy consumers in the manufacturing industry are chemicals (50%), steel (17%) and food industry (15%), see Figure 11. The food industry is part of 'Other branches'.

Figure 11: Final energy consumption of industry by branch

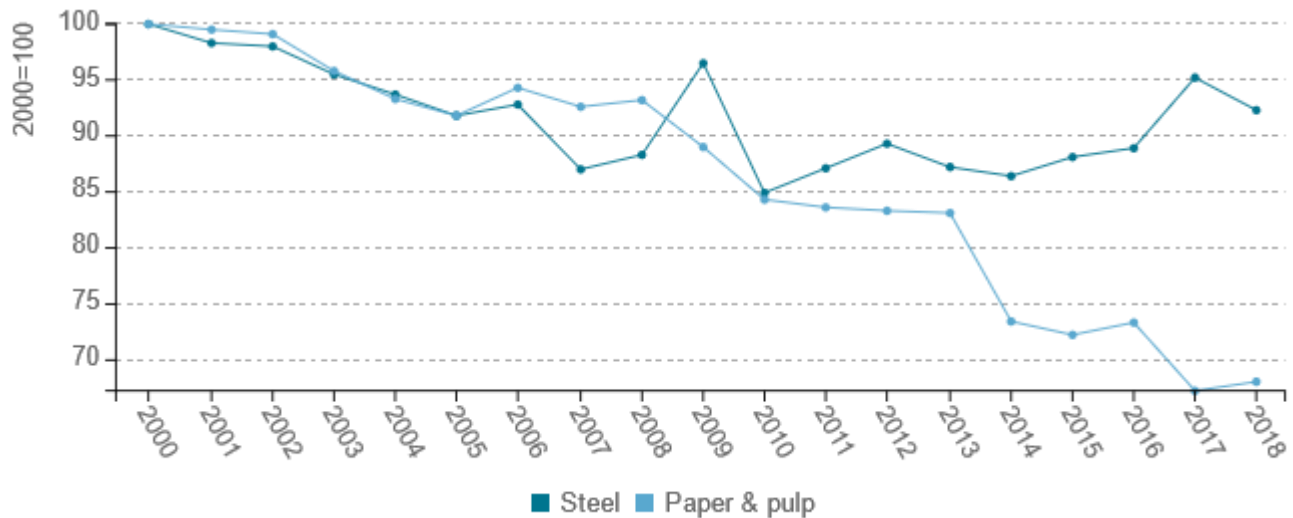


Source: ODYSSEE



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 2.1%/year.

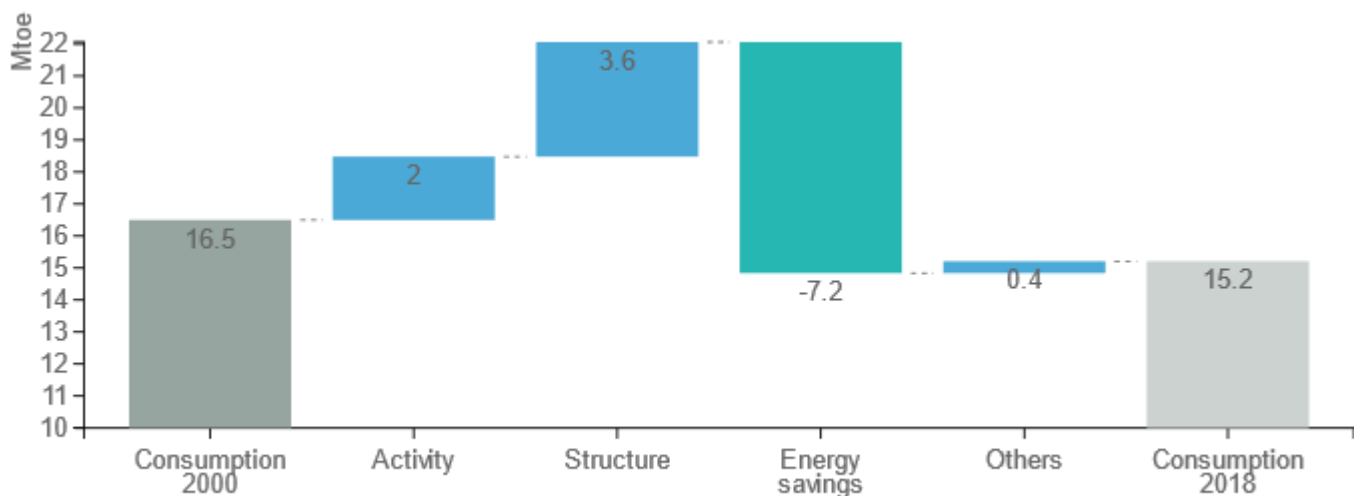
Figure 12: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

Energy consumption of industry has been decreasing by almost 0.5%/year (-1.3 Mtoe) since 2000 mainly due to energy savings (-7.2 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 (5.2 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



Up to 2020 the long-term voluntary "LTA and LEE" covenants were the main policy measures, besides the EU ETS. These covenants have ended in 2021. As a replacement, a CO2 surcharge has been introduced for the industry. At the same time, the possibilities to subsidise emission reductions in the industrial sector will be expanded (through the SDE++). High impact measures for industry are described in the table below. Fiscal benefits are also important instruments to stimulate energy efficiency by industry.

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

Measures	Description	Expected savings, impact evaluation	More information available
CO2 surcharge for industry	A surcharge for CO2 emissions is introduced, starting in 2021 at €30 per tonne CO2 and increasing to €125–150 per tonne by 2030. The national tax includes the EUA price in the EU ETS.	High impact	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4017
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	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/280
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	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/4106

Source: MURE

