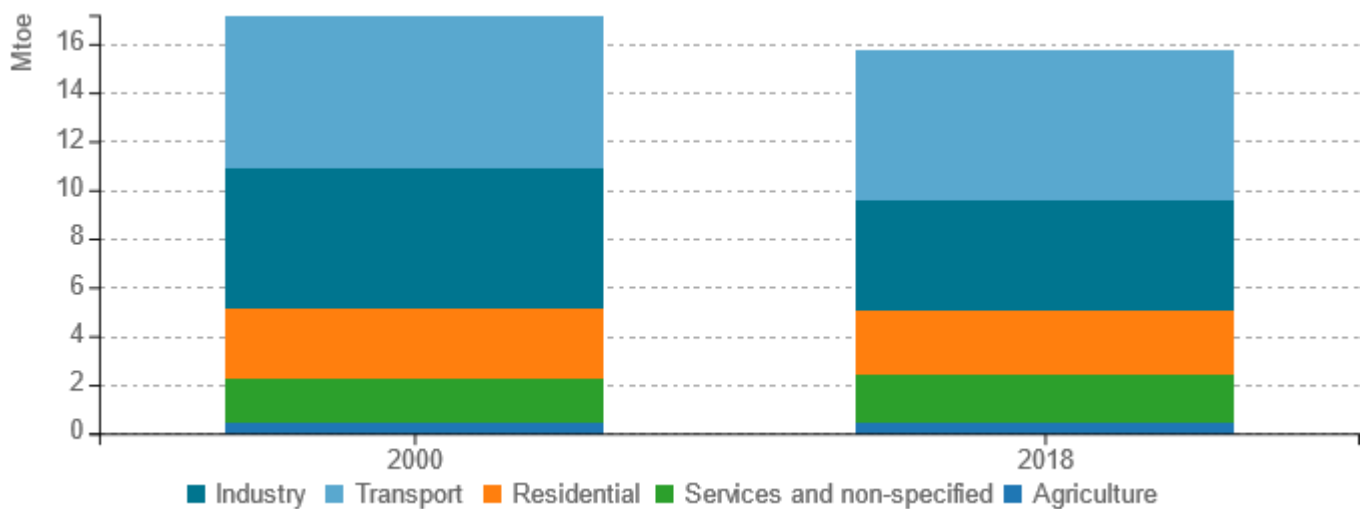


Energy efficiency trends and policies

Overview

In 2018, final energy consumption in Portugal was 15.8 Mtoe, 8.1% lower than in 2000. The transport sector was the largest energy consumer, corresponding to 39% of final energy consumption in 2018, followed by the industry sector, with 29%, the buildings sector with 17% and the services sector with 12%. The industry and buildings sectors reduced their energy consumption by 20% and 10%, respectively, between 2000 and 2018. In the transport sector, a reduction of 2% was achieved. In the same period, the agriculture, fishing and forest sector, with a share of only 3%, reduced its final energy consumption by 1%. (ODYSSEE)

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

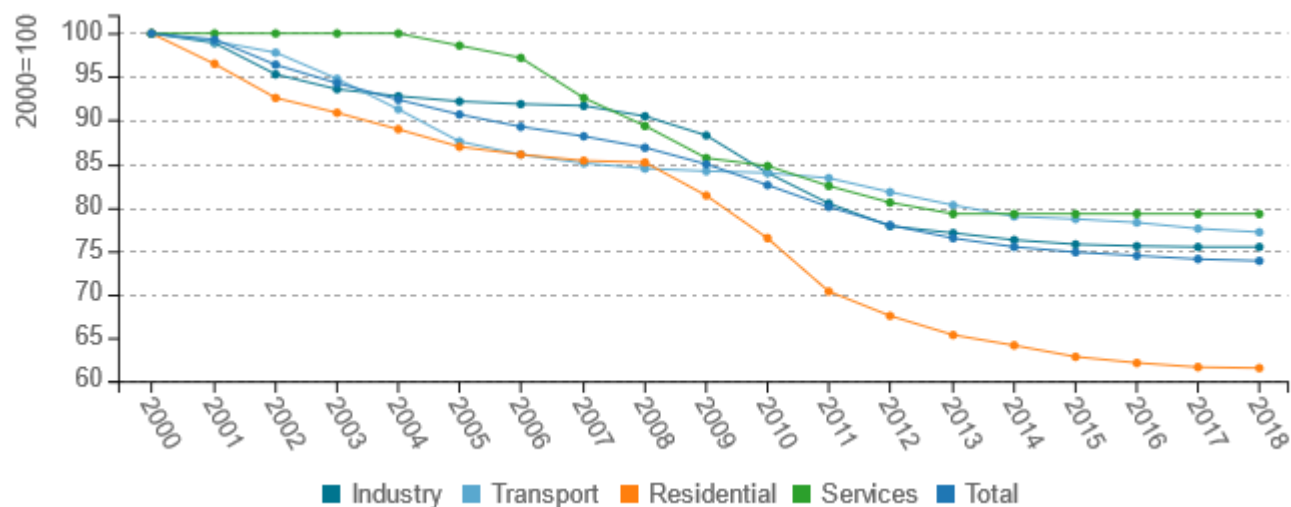


Source: ODYSSEE

The technical energy efficiency index of the economy (ODEX) decreased by 26% in the period between 2000 and 2018, with an average annual decrease of approximately 1.7%. In the same period, and although all sectors contributed to this improvement, the residential sector was the sector with the highest efficiency progress (2.7%/year). The sectors of industry, transport and services followed a similar trend to the global ODEX, with an annual improvement of 1.5%, 1.4% and 1.3%, respectively, in the period between 2000 and 2018.



Figure 2: Technical Energy Efficiency Index



Source: ODYSSEE

In its second National Energy Efficiency Action Plan (NEEAP), Portugal intends to reduce primary energy consumption to 22.5 Mtoe in 2020. The NEEAP encompasses specific sectors: transport, residential, tertiary, industry, public administration, agriculture and also behaviours, in programmes, taxes, incentives and financing. In Public Administration, in addition to the Energy Efficiency Program in Public Administration (ECO.AP), other goals were set up, such as the purchase of more efficient vehicles and public street lighting. In industry, the Management System of Intensive Consumption of Energy is applied to all companies and facilities with a consumption over 500 toe/year, imposing binding energy audits. Concerning buildings, a more ambitious requirements to either thermal envelope or technical systems (heating/cooling/DWH/lighting/elevators) were settled, aiming to achieve nearly zero energy buildings. In transport, programs aimed to encouraging the renewal of road vehicles plus its efficient use were implemented; urban mobility through incentives for public transport use and energy efficiency in transport system through the Management Regulations of Energy Consumption. The estimated intermediate targets for 2016 were achieved with the reduction of consumption of 1.5 Mtoe (54% of the 2020 goals). The final version of the National Integrated Energy and Climate Plan (NECP) 2021-2030 was legally approved and published on July 10, 2020.

Table 1: Sample of cross-cutting measures

Measures	NEEAP measures	Description	Expected savings, impact evaluation	More information available
Energy Efficiency in Public Administration (ECO.AP)	yes	Promotion of Energy Performance Contracting, aiming to achieve a level of energy efficiency of around 30% by 2020 in the Public Administration.	n.a.	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/319

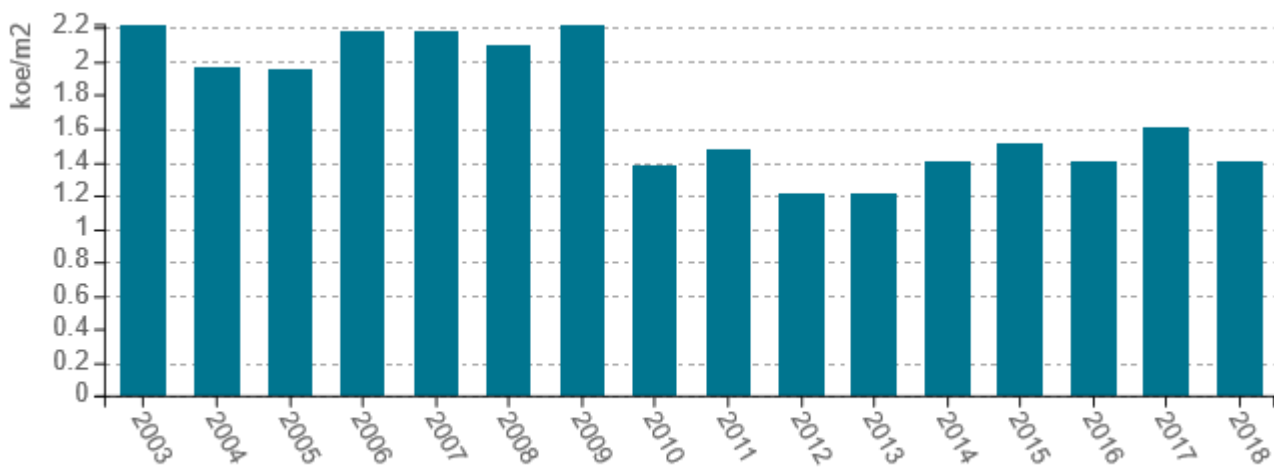
Energy Efficiency Fund (EEF)	yes	Constitutes a financial instrument capable of financing the programs and measures provided in the National Energy Efficiency Action Plan (NEEAP) in all its lines of action, that are fundamental for Portugal to achieve the goals set out related to efficient energy end-use and energy services.	Medium	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/318
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Source: MURE

Buildings

The residential sector in 2018 represented around 17% of energy consumption (2.65 Mtoe). Regarding space heating needs, consumption per square meter decreased by 36% compared to 2003, from 2.22 koe to 1.41 koe. As for the final energy consumption per dwelling except space heating, cooking represents the largest share of energy consumption of 51%, even though since 2000 this consumption has decreased by 29%. The final energy consumption of electrical and lighting equipment and water heating represent 25% and 23%, respectively. The final energy consumption for air conditioning is marginal, representing 1%. (ODYSSEE)

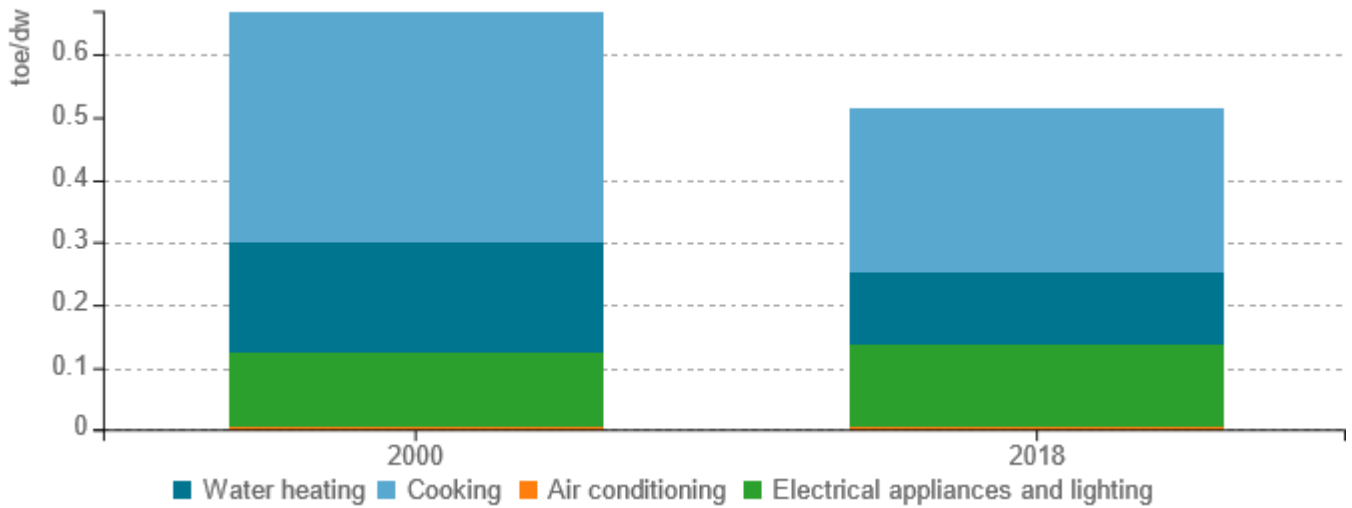
Figure 3: Energy consumption of space heating per m2 (normal climate)



Source: ODYSSEE



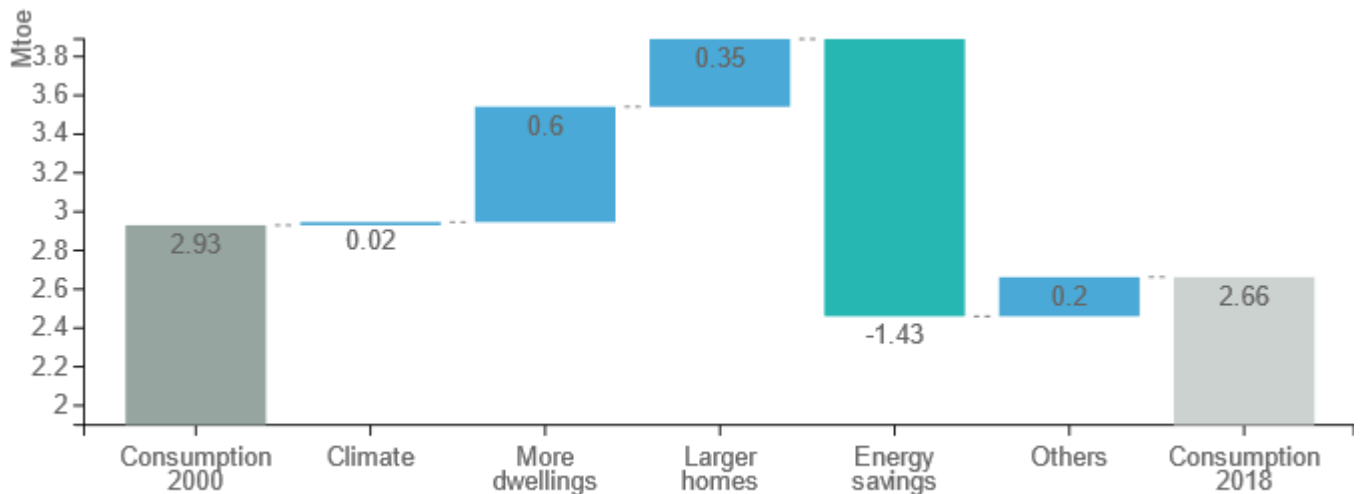
Figure 4: Energy consumption per dwelling by end-use (except space heating)



Source: ODYSSEE

Final energy consumption in the residential sector was 10% lower in 2018, compared to 2000. This is mainly due to technical energy savings (1.43 Mtoe), which contributes to this decrease. However, factors such as larger homes (0.35 Mtoe), more dwellings (0.6 Mtoe), other factors (0.2 Mtoe) and the climate (0.02 Mtoe) contributed to the increase in energy consumption. (ODYSSEE)

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

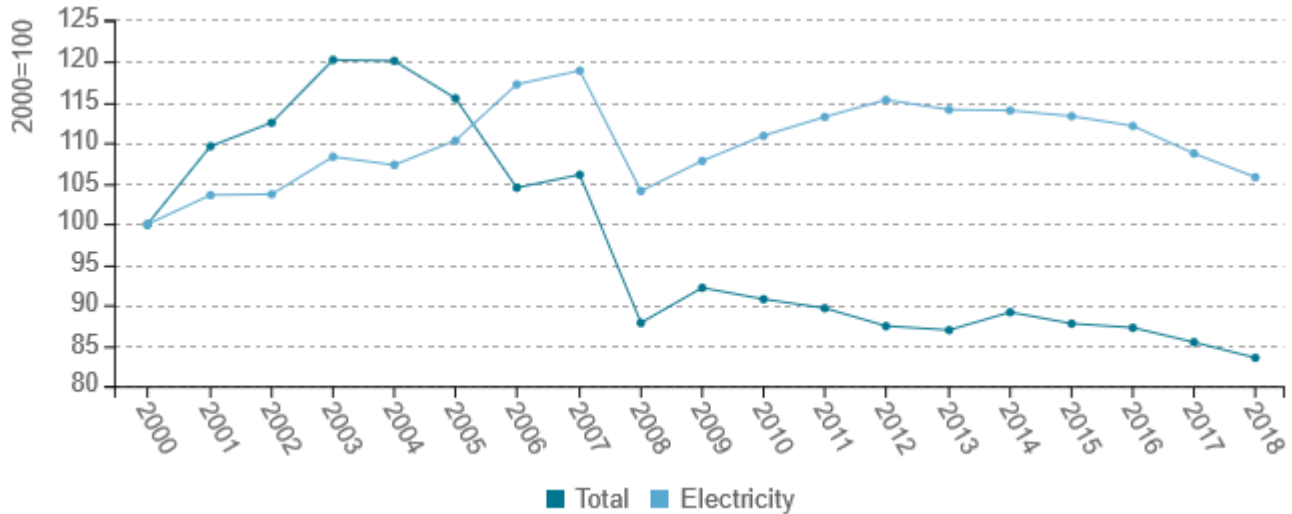


Source: ODYSSEE

In the service building sector, final energy consumption per employee in 2018 decreased by 2.2 % compared to 2017, this decreasing trend has occurred since 2015. As for the consumption of electricity per employee, consumption declined by 2.7%, following the trend of energy consumption mentioned above. (ODYSSEE)



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



Source: ODYSSEE

The first legal instrument on building codes for residential sector that laid down minimum energy requirements entered in force in 1991, while for the tertiary sector the first legal instrument aiming to establish rules for the HVAC systems dimensioning in buildings was implemented in 1998. Since then, the referred legislation was updated twice: firstly in 2006, pursuing the adoption of the European Directive nº 2002/91/CE (EPBD), and secondly in 2013, to adapt to the recast of the EPBD directive (Directive nº 2010/31/UE). Over the last years new buildings are increasing their energy performance aiming to reach nearly zero energy goals. The renovation of existing buildings presents an important challenge in energy efficiency potential. Several incentives and financing schemes have been implemented (e.g. Energy Efficiency Fund) financing insulation, windows, renewable systems and efficient equipment’s acquisition. In 2017 the financial instrument for the rehabilitation and urban revitalization, IFRRU 2020, was launched and aims to support investments in urban rehabilitation, which covers the entire national territory and allows the implementation of energy efficiency solutions. The draft NECP 2021-2030 foresees lines of action within the strategic objective of prioritizing energy efficiency.

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

Measures	Description	Impact evaluation	More information available
Residential buildings codes	Imposes minimum energy requirements to both new and renovated residential buildings.	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/901
Services buildings codes	Imposes minimum energy requirements to both new and renovated non-residential buildings.	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/1819

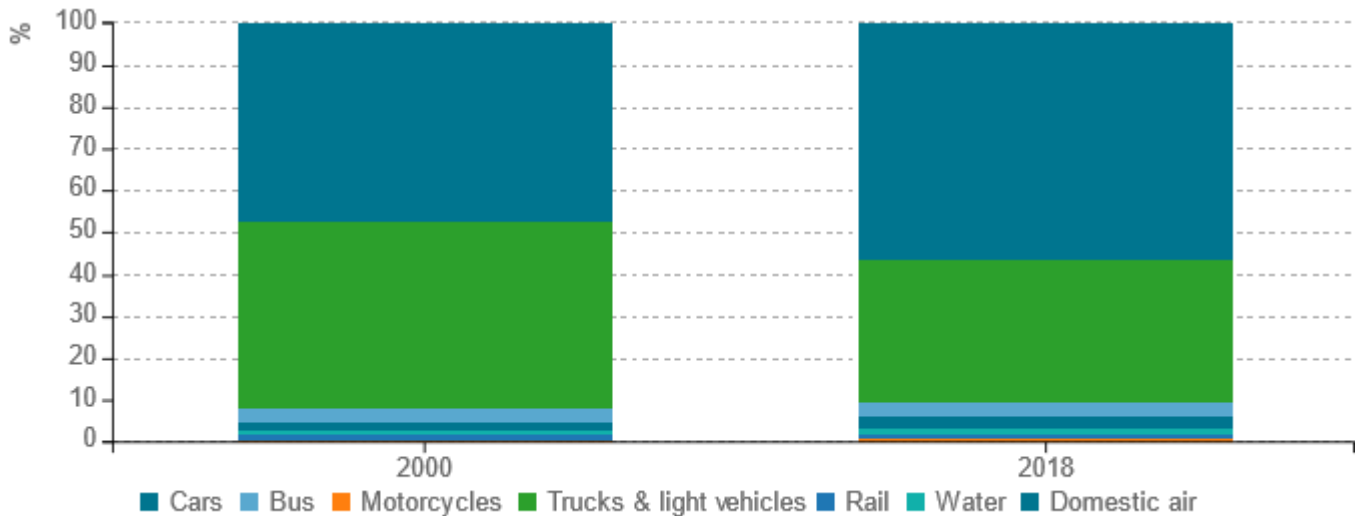
Source: MURE



Transport

In 2018, the transport sector accounted for about 39% of final energy consumption (6.1 Mtoe). Road transport was responsible for about 94.6% of this consumption, domestic air transport for about 3.1% and rail and water transport for around 2.3% (together). Considering energy consumption in road transport, cars accounted for 60% of total energy consumption, while trucks and light vehicles accounted for 36%, and buses and motorcycles for 3% and 1%, respectively (ODYSSEE).

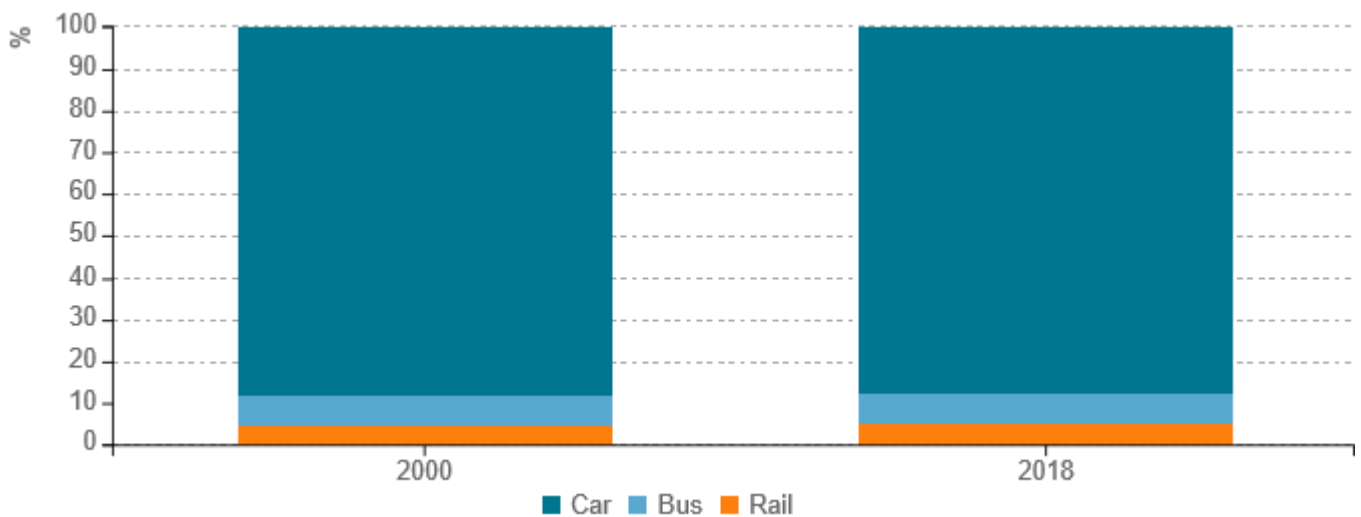
Figure 7: Transport energy consumption by mode



Source: ODYSSEE

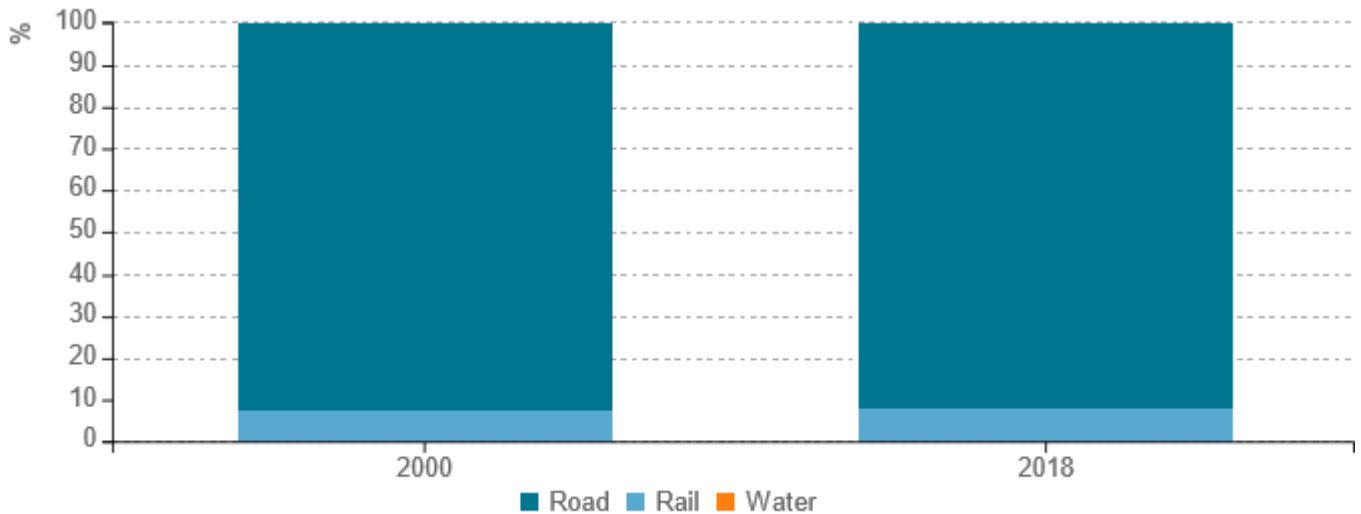
The main type of transport of passenger is still cars with a share of 87.6% for 2018. The bus and rail have a low share in the inland passenger traffic (7.3% and 5.1% respectively in 2018). Between 2000 and 2018 the tendencies have been almost constant with a slight decrease in cars of 0.73 points and a slight increase in bus and rail with 0.36 points and 0.38 points, respectively. (ODYSSEE)

Figure 8: Modal split of inland passenger traffic



Modal split in freight transport has remained constant over the years. For 2018 road transport continues to be the most used with a percentage of 92.2% and a slight reduction of 0.46 points between 2000 and 2018. Meanwhile, rail transport has a little expression with a percentage of 7.8%. (ODYSSEE)

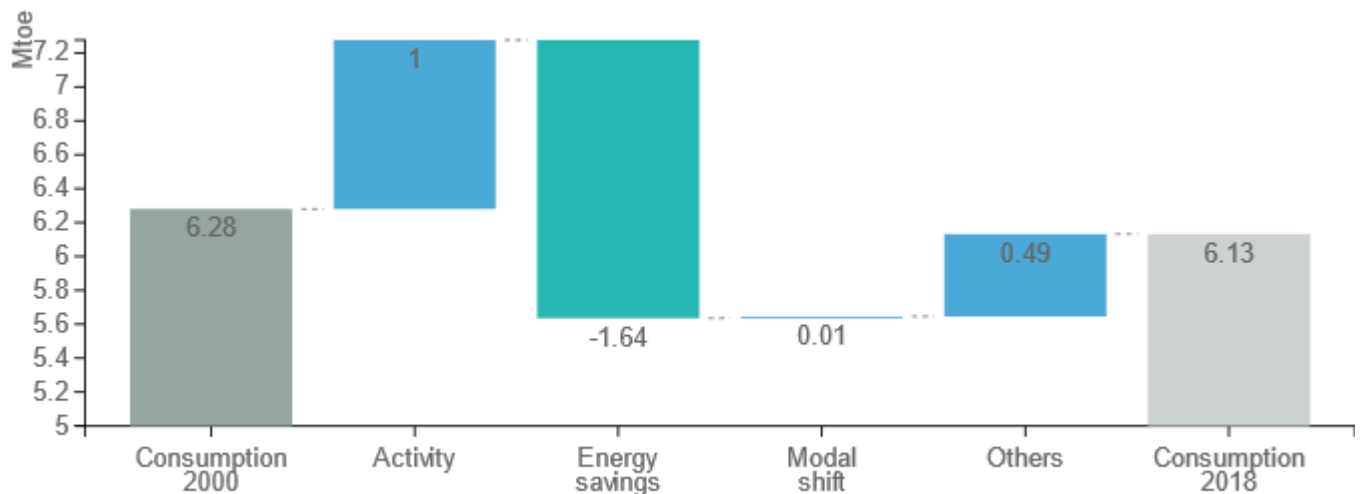
Figure 9: Modal split of inland freight traffic



Source: ODYSSEE

Since 2000, the demand for energy in the transport sector has decreased by 0.15 Mtoe, thanks to the energy savings resulting from the effects of technology (which contributed to reduce consumption by 1.6 Mtoe). All the other factors pushed up energy consumption of transport, the main factor being the effect of the activity (increase in traffic) by +1 Mtoe, together with other unspecified effects (+0.5 Mtoe) (ODYSSEE). Overall, fuel consumption in road transport grew 1.3% in 2018, more than in 2017 (+ 1.2%), reaching 5.8 Mtoe. (DGEG)

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



Source: ODYSSEE



The main measures to improve energy efficiency in the transport sector are included under NEEAP 2, which are still ongoing until NEEAP 3 is approved. Green Taxation that focuses on a review of the private vehicle tax regime as well as the incentives to encourage public transportation use in detriment of individual transportation, particularly in urban areas (development of public transportation infrastructures, associated with better offer and services) and the application of the Regulation for Energy Management in the Transport Sector are some of the more successful NEEAP measures. The transport sector detains the major contribution of the final energy consumption in Portugal, making them a high priority area to address in the NEEAP. The draft NECP 2021-2030 foresees lines of action within the strategic objective of prioritizing energy efficiency.

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

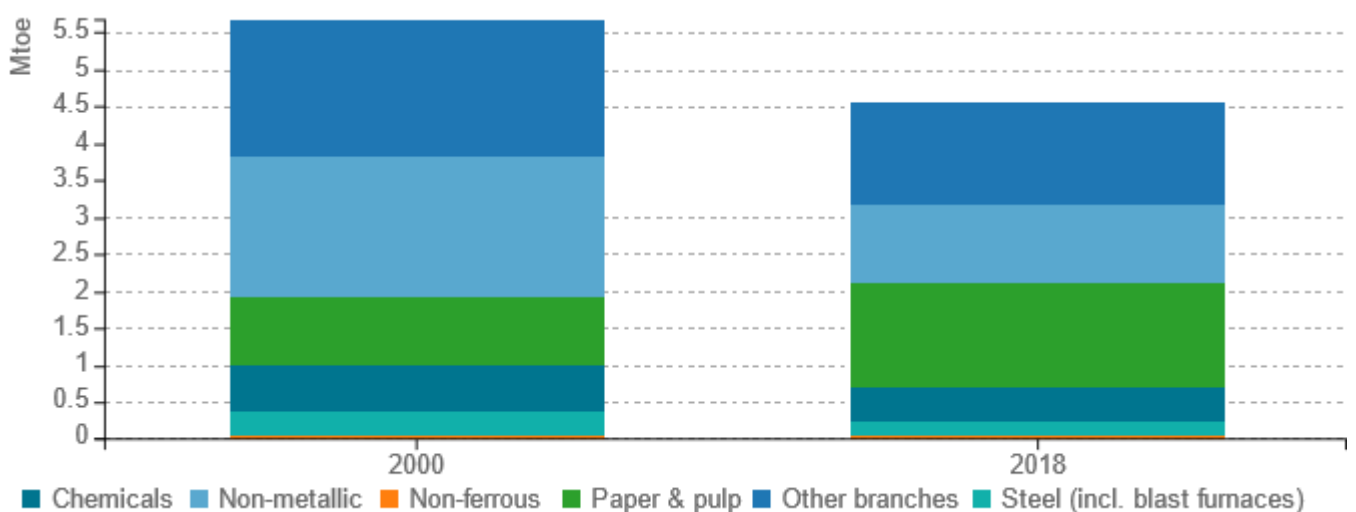
Measures	Description	Expected savings, impact evaluation	More information available
National Action Plan for Energy Efficiency	Sets several guidelines for energy efficiency which are organized to promote private transport energy efficiency, the use of public transport and energy efficiency within passengers and freight transport operators	High	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/317

Source: MURE

Industry

In 2018, the Industry sector represented around 29% of final energy consumption (4.6 Mtoe; 1.1 Mtoe less than in 2000). The paper and pulp industry was responsible for 31% of this consumption, with an increase of 50% over the year 2000. Non-metallic and chemicals industry represent 23% and 10%, respectively, in 2018. The industry that most decreased in terms of final energy consumption compared to 2000 was the non-metallic industry with a decrease of 45% (DGEG, ODYSSEE).

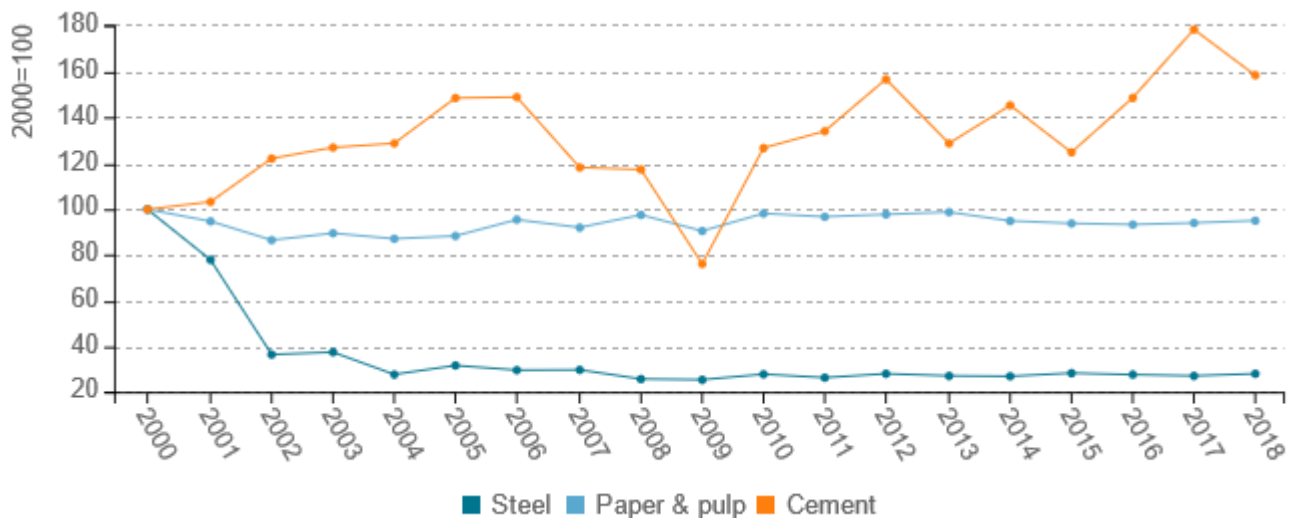
Figure 11: Final energy consumption of industry by branch



Source: ODYSSEE

Within the energy-intensive industries, the steel production industry remains the most representative, however, in 2018 it decreased by 11% (1.6 toe/t) compared to 2017, being the first year of breaks after two consecutive years of growth. However, the cement and paper and pulp industry increased their consumption by 3% and 1%, respectively, despite the slight growth these industries have maintained their trend since 2002. (ODYSSEE)

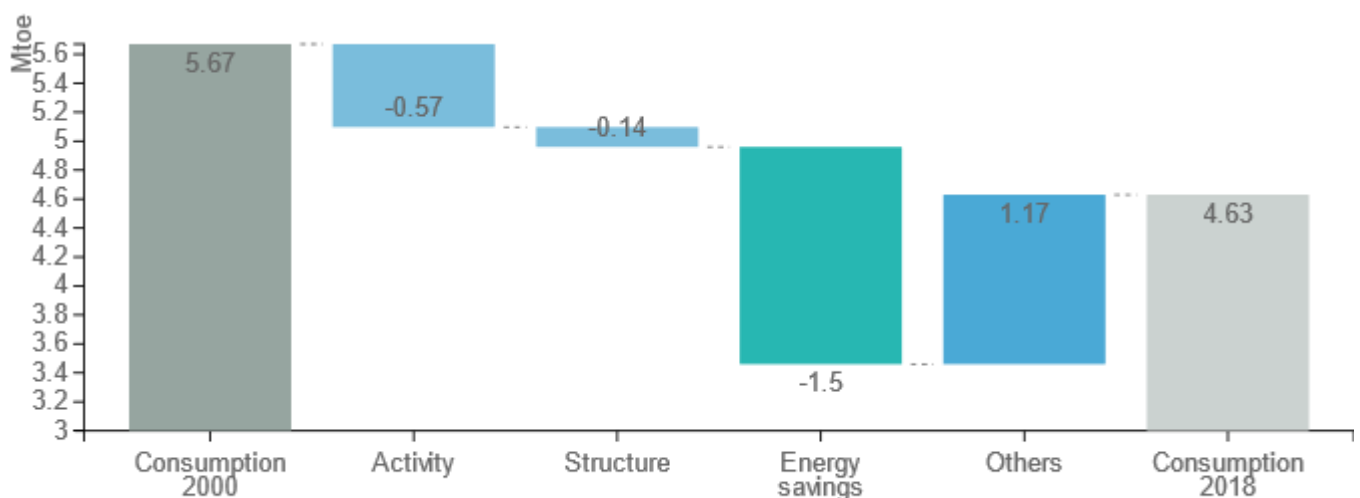
Figure 12: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

Since 2000, the three main factors that have contributed to the decrease in final energy consumption in the industrial sector have been energy savings resulting from the effects of technology (1.5 Mtoe), the reduction in industrial activity (0.57 Mtoe) and the structural effect with a reduction of 0.14 Mtoe. The other unspecified effects had the opposite effect and increased consumption by 1.17 Mtoe. (ODYSSEE)

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



Source: ODYSSEE



The Intensive Energy Consumption Management System (SGCIE) which replaced the prior Regulation on Management of Energy Consumption, established an energy consumption management and monitoring system for companies and facilities with intensive energy consumption of energy (over 500 toe/year). Under this mandatory regulation energy intensive facilities were extended to SMEs, broadening the scope of the previous regulation.

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

Measures	Description	Expected savings, impact evaluation	More information available
Intensive Energy Consumption Management System (SGCIE)	Promote the increase of energy efficiency through the modification of production processes, the introduction of new technologies and the behaviours changes. The SGCIE applies for all companies and facilities (also named “Operators”) that have an annual consumption over 500 toe/year, imposing binding energy audits, with a 8-year periodicity.	Medium	https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/1303

Source: MURE

