EUROPEAN
COMMISSION

Brussels, 30.11.2016
SWD(2016) 420 final

PART 6/13

COMMISSION STAFF WORKING DOCUMENT
Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Energy prices and costs in Europe

{COM(2016) 769 final}

Contents

7 Energy subsidies

Subsidies in the energy market may fundamentally impact energy prices and costs for both household and business customers, and therefore they impact energy affordability for households and the competitiveness of the economy as a whole. Fossil fuel subsidies make the energy transition more difficult, as they reduce the effectiveness of price signals of emission trading and crowd-out investments from low-carbon innovative technologies In order to understand the nature of government interventions (otherwise calling, government subsidies) in the energy market the European Commission initiated a study on energy costs and subsidies[1] in 2014 to explore the relationship between pure energy generation costs, external costs of the energy sector and existing subsidies in the EU-28.

In the current report on energy prices and costs in the EU we intend to touch upon subsidies primarily from the point of view of their impact on energy prices and costs for households and different economic sectors, and for this reason we intend to use the results of the 2014 study on energy costs and subsidies, other studies or reports in this domain and the results of the data collection on tax and levy reductions or exemptions impacting energy retail prices in the EU Member States.

Main findings[2]

- Energy subsidies significantly impact the EU energy sector and markets; a study prepared in 2014 on energy costs and subsidies in the EU estimated the annual amount of energy subsidies[3] at €113 bn.

- Renewable energy sources had a significant share in energy production subsidies (€41 bn in 2012), followed by direct fossil fuel subsidies (€17.2 bn) and nuclear energy (€ 14bn). Subsidies to energy consumption, in the form of energy demand and savings subsidies amounted to € 36bn (€27 bn for energy demand and €9 bn for energy savings) in 2012.

- However, if external costs in the energy sector are also taken into account, the total subsidy to the energy sector in the EU amounted to € 328[4] bn in the EU. The bulk of this difference can primarily be attributed to fossil fuels: (€161 bn with external costs vs. €17.2 bn without external costs), as compared to €50 bn for RES, €28 bn to nuclear and €36bn for demand side subsidies.

- Looking at the types of different subsidies, production subsidies have the highest share in the energy sector, followed by support to energy demand, investments and energy savings, while R&D related support has only a minor share.

- Different studies follow diverse methods and give different estimations on subsidies for fossil fuels; global subsidy numbers show that fossil fuel subsidies in the EU have

[1] https://ec.europa.eu/energy/sites/ener/files/documents/ECOFYS%202014%20Subsidies%20and%20costs%20of%20EU%20energy_11_Nov.pdf

[2] Unless otherwise stated, numbers and results in this chapter are coming from the 2014 Energy costs and subsidies in the EU report

[3] This number refers to 2012 (as this was the latest period covered in the study). If subsidies from the legacy of historical investments are also included this increases total subsidies to €122 bn. These legacy subsidies are also included in the technology subsidy estimates below.

[4] On top of the aforementioned subsidies this total amount includes the external costs of industrial fuels (€38 bn) and direct historic subsidies (€9 bn)

less importance than in other parts of the world, mainly in the emerging economies, and/or oil-producing countries.

- In the EU energy sector many forms of fossil fuel subsidy exist, including mining related subsidies, fuel tax exemptions for electricity and heat generation, priority dispatch to electricity generated from indigenous fuel sources or capacity payment mechanisms.

- In 2012 subsidies to coal and gas amounted to €17 bn, including €5.7 bn in investment grants, €3 bn in fuel tax exemptions, €3 bn in feed-in tariffs and €1.5 bn in support to electricity production, €1.3 bn to decommissioning and waste disposal and subsidies came from the legacy of historical investment subsidies (€0.9 bn). If energy demand subsidies (the combined share of coal and gas in electricity and heat generation[5]) are proportionally assigned to fossil fuel subsidies, approximately an additional €12 bn could be allocated to fossil fuels in 2012.

- Although the 2014 study on energy costs and subsidies did not analyse the transport sector, a reference is made to an OECD study[6], suggesting that fossil fuel subsidies in the transport sector amounted to € 24.7 bn. Taking the transport sector into account, fossil fuel subsidies amounted to €41.9 bn in 2012 in the EU.

- In 2012 subsidies in the form of free emission allowances (ETS) to the energy sector amounted to €13.7 bn[7].

- In order to preserve the competitiveness of different industrial sectors, EU Member States may provide reductions and exemptions from paying applicable energy taxes and levies, differing by economic sector, by applied process, by total energy consumption, by the level of grid connection, by energy (cost) intensity and by geographical location within each country, as the brief overview on electricity taxes and levies proves at the end of this chapter.

7.1 Categories of subsidies in the energy sector

The aforementioned 2014 study on energy costs and subsidies in the EU applied a broad definition of subsidies, following the logic of other international institutions, such as OECD or IMF, being active in analysing and quantifying subsidies in the energy sector. Subsidies have been classified under the following five categories:

Direct transfer of funds, also referred to as direct subsidies: Direct transfer of funds includes direct government payments such as capital grants, production support, etc. These are the most transparent and straightforward types of subsidy and refer to what people commonly understand by the term ‘subsidy’. These direct subsidies are most often ‘visible', they can be easily quantified and can usually be found in public accounts.

Government tax and other government revenue foregone: Revenue foregone refers to (tax) expenditures, i.e. revenue foregone due to a reduction in the (tax) liabilities of particular groups or of specific activities. It requires a benchmark tax structure, which is applied in order

[5] See more in footnote14.

[6] http://www.oecd-ilibrary.org/docserver/download/2215011e.pdf?expires=1479466742&id=id&accname=oid031827&checksum=9A9FEFF81BF6B6EE9B7C8CFCAA41D2FD

[7] Since 2013, as Phase 3 of the ETS system was introduced, resulting in decreasing free emission allowances to the energy sector, this type of subsidy has decreased.

to evaluate the value of tax and duty exemptions, tax allowances and investment tax deductions[8].

Transfer of risk to Government: This refers to the transfer of risk from market players (e.g. energy producers) to governments, for example, loan guarantees, government participation in the equity of a project or company, government acting as an insurer of the last resort -.in case of accidents or environmental disasters, etc.

Income or price support (induced transfer of funds). Induced transfers refer to government support that is (indirectly) provided to consumers or producers to keep the end-price of an energy good or service lower or higher than its actual market price, often through some sort of price support or price regulation.

Non-financial measures: Non-financial support measures relate to mandates, obligations and (voluntary) agreements that have been settled between the government and producers and consumers of energy. These measures, although not directly involving a transfer of money, will have an effect on energy prices as they usually result in financial decisions that they might not otherwise have made.

7.1.1 Subsidies at EU level

The aim of the energy costs and subsidies study was to provide an overview of energy subsidies in all the twenty-eight EU Member States, covering all major generation technologies in the energy sector for the most recent years and in historic perspective as well. It is important to remember that this study has only covered the energy sector, and other sectors where the consumption of energy carriers is significant, such as transport, have been excluded, which has implication on comparing the main findings of the study with other sources (e.g.: studies of other international institutions, including numbers on crude oil and petroleum product subsidies).

The study has estimated government interventions at €113.1 bn in 2012 in the EU as a whole. If historical subsidies (support in the past still impacting the current energy markets) are also taken into account, the amount of the annual energy subsidy for the energy market was €122 bn in 2012.

Some international institutions, such as the IMF, make distinction between *pre-tax subsidies*, and *post-tax subsidies*, also including estimated external costs in the energy sector as well.

If the external costs of energy production are also considered as subsidies, the numbers grow enormously; by an *additional €86.2 bn for coal, €53.8 bn for gas, €14.9 bn for nuclear and €8.8 bn for renewables*, topping up the post-tax subsidies in the EU energy sector to € 328 bn in 2012 (see footnote 152). These figures point to similar conclusions as IMF's findings, which estimate post tax subsidies at around €300 bn in the EU.

The study attempted to quantify both subsidies for energy supply (which can be attributed to different electricity and heat generation technologies) and subsidies for energy demand (where technology attribution was not possible[9]). If we look at subsidies at the supply side of the energy industry, they amounted to €62.1 bn[10] in 2012. Renewables (solar, wind, biomass

[8] The definition of as benchmark tax structure is important for the overall result and is not straight forward as differential tax provisions be based on e.g. social, competitive, environmental or other motives

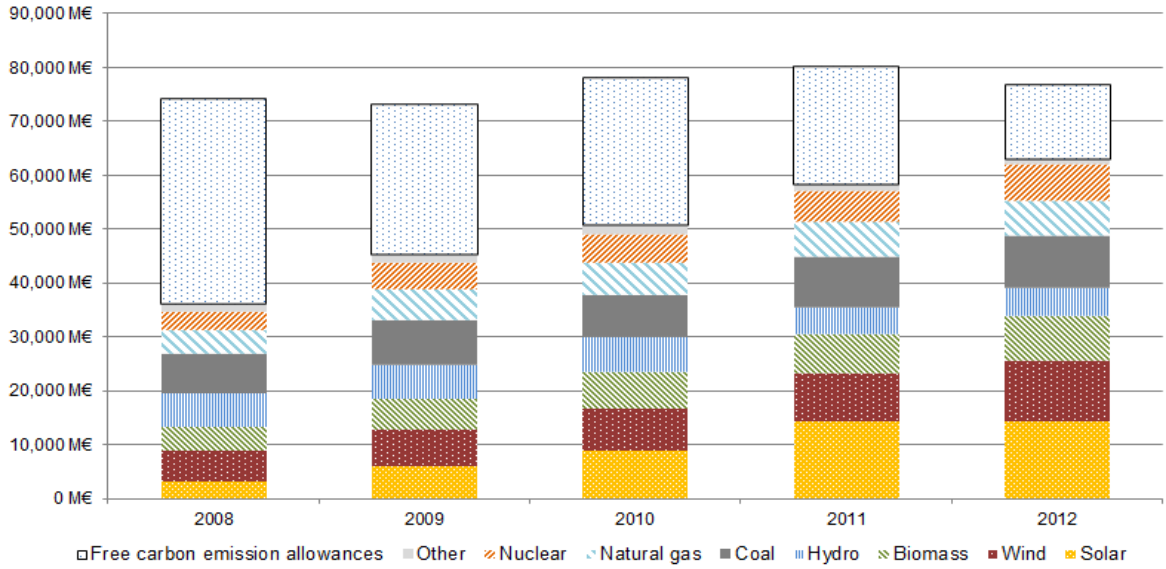
[9] However, in general support to energy demand tends to support individual fuels in proportion to their place in the fuel mix

[10] These numbers do not include the impact of historic subsidies, as for the production side subsidy ananlysis they are not relevant

and hydro) had the largest chunk, €39.2 bn, followed by direct fossil fuel subsidies (€17.2 bn) and nuclear energy (€6.5 bn).

As Figure 227 shows, between 2008 and 2012 the *increase in overall supply side subsidies in the EU-28 was primarily owing to increasing subsidising of renewable energy sources*, while fossil and nuclear subsidies did not change significantly[11].

Figure 227 – **Evolution of production side subsidies relating to different energy generation sources (2012 prices, in million EUR)**

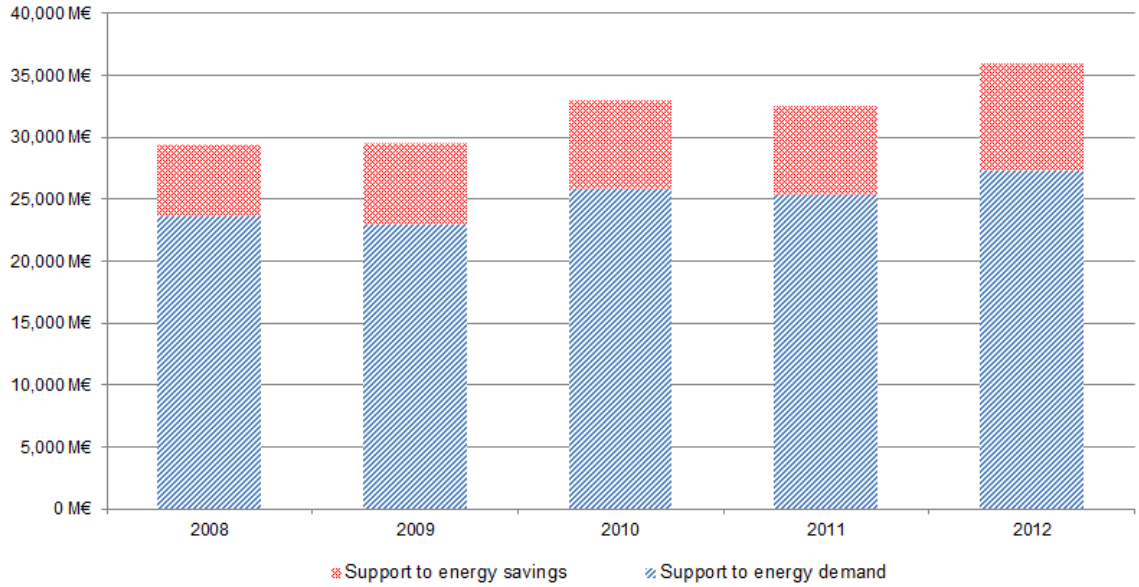


Source: Subsidies and costs of EU energy- Ecofys

Looking at the demand side energy subsidies (**Figure 228**), it seems that the combined volume of *energy demand and energy savings subsidies* showed a *gradual increase between 2008 and 2012, growing from less than €30 bn to slightly more than €36 bn*. The bulk of consumption side subsidies related to support to energy demand, while energy savings had lower share, though they showed measurable increase over this period.

[11] If decreasing subsidies for free emission allowances, albeit as a result of decreasing carbon market prices, are completely allocated to fossil fuel subsidies, as renewables and nuclear generation did not have significance in emissions, subsidies to fossil fuel based electricity and heat generation decreased between 2008 and 2012.

Figure 228 - **Evolution of energy demand and savings subsidies (2012 prices, in million EUR)**



Source: Subsidies and costs of EU energy- Ecofys

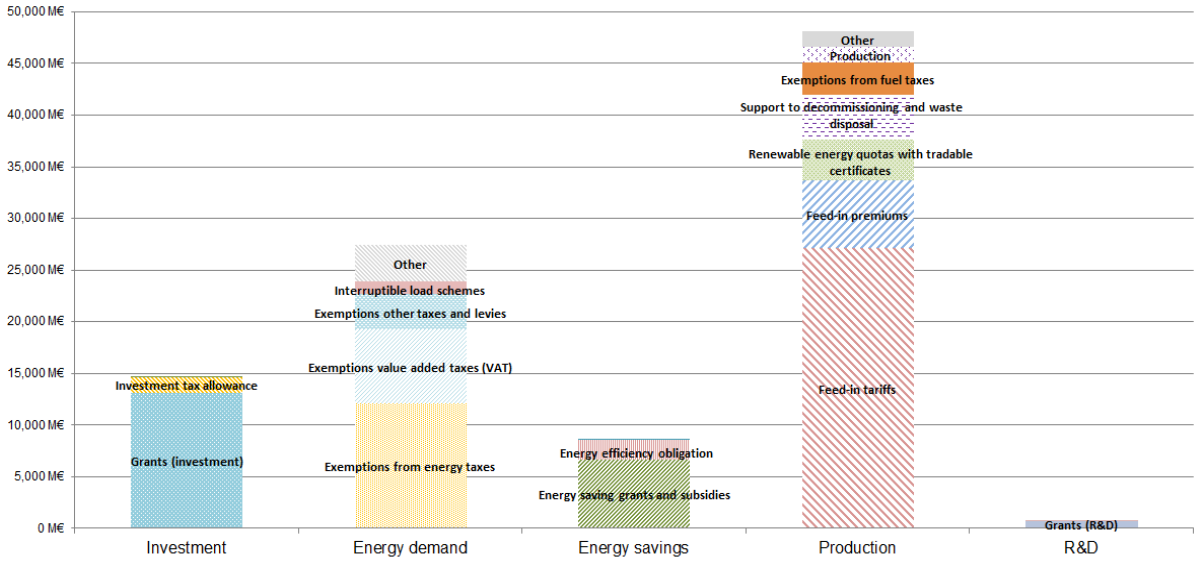
Figure 229 shows how subsidies have been spent on different activities in the energy sector in 2012. As it is presented on the chart, the biggest chunk of overall energy subsidies related *to support for energy production* (€48.1 bn in 2012), mainly in the form of *feed-in tariffs, feed-in premiums and renewable energy quotas with tradable certificates*, all of them primarily relating to renewable electricity and heat generation. Support to *decommissioning and waste* was primarily linked to fossil fuels and nuclear, while *fuel tax exemptions* could be linked to electricity generation from all energy sources[12].

The second biggest group, *energy demand subsidy* forms, amounting to €27.3 bn altogether, mainly comprised of energy consumption support measures in the form of *exemptions from energy taxes, levies and VAT*. Interruptible load schemes also belong to this category group.

Investments in the energy sector were mainly subsidised in the form of *investment grants* and *investment tax allowances*, amounting to €14.7 bn in 2012 altogether. *Energy saving supports* (€8.6 bn in 2012) appeared in the form of *grants and subsidies and energy efficiency obligation*. Support for energy *research and development (R&D)* only amounted to €0.7 bn[13] in 2012, mainly in the form of grants and tax credits.

[12] Tax exemptions to fuels used as inputs to produce electricity are applied in line with the principle of avoiding double taxation (as electricity taxes are imposed on electricity, the final product).
[13] R&D subsidies include national level and EU Framework Programme (FP7) subsidies

Figure 229 – **Different forms of subsidies for different activities in the energy sector in 2012 (million EUR)**



Source: Subsidies and costs of EU energy- Ecofys

7.1.2 Focus on direct fossil fuel subsidies in the EU

During the last few years, on the top of various EU policy strategies, documents and ongoing initiatives, including several Council conclusions, many international institutions (e.g.: G7, G20, OECD, IMF, etc.) identified phasing out fossil fuel subsidies as key issue in the global energy markets. Fossil fuel subsidies fall under environmentally harmful subsidies, as they hamper to attain global climate objectives and they result in distortions in energy markets having negative implications on environment and sustainable economic development. In particular, fossil fuel subsidies have a negative impact on the innovation in clean energy technologies.

In the study on energy costs and subsidies ordered by the European Commission in 2014 fossil fuel subsidies refer to all subsidies, either on the supply or demand side, for electricity and heat generation from solid fuels (including coal, lignite, anthracite, peat, etc.), crude oil and petroleum products, and natural gas. It is important to note that the transport sector was not in the scope of the study, implying that subsidies to crude oil and petroleum products may substantially differ from the numbers in other studies also covering this domain.

In the EU direct or indirect fossil fuel subsidies *excluding the transport sector* are still significant and might take various forms:

- Energy demand subsidies (as it has already been mentioned, in 2012 they were estimated at €27bn[14]), in the form of *(fuel) tax exemptions and reductions*, *preferential VAT rates*, *regulated fuel/electricity prices (below cost)* for both households and for industries), power generation subsidised through investment grants, feed in tariffs and premiums and fuel tax exemptions, colliery decontamination grants.

[14] It must be noted that not all energy demand subsidies can be linked to fossil fuels, however, as in the energy costs and subsidies study energy demand subsidies have not been broken down to generation technologies, it can be assumed that the share of fossil fuel subsidies within energy demand measures is similar to the share of fossil fuels in the generation mix. In 2014 the combined share of fossil fuels (practically coal and gas) in electricity and heat generation was 45%, and the total energy demand subsidy was €27 billion, which gives a proportional amount of €12.1 bn to fossil fuel subsidies from the energy demand side.

- Adding together financial subsidies, direct historic subsidies and external costs (post-tax subsidy approach) results in a *total of €161 bn for fossil fuel subsidies in the EU in 2012*.
- Under the Energy Taxation Directive (2003/96/EC), *some fuels when used for heating* are permitted zero minimum levels of taxation. Furthermore, the rates for energy products not only vary largely between Members States but also benefit from diverse reductions or exemptions with little degree of harmonisation across the EU.
- *Mining related coal subsidies* are permitted by Council Decision 2010/787/EU[15] in order to address the regional and social consequences of mines closure. Under this regulation, closure aid (operating aid to cover losses) may be provided to uncompetitive coal production units due to close by the end of 2018 and related "exceptional costs" arising or having arisen from the closure of coal production..
- *Indirect subsidy of providing priority dispatch for electricity generated from "indigenous* primary energy fuel sources"[16] on grounds of security of supply.
- *Capacity mechanisms often provide subsidies to fossil fuel power plants* to ensure generation adequacy[17].The up-front costs of capacity mechanisms may be offset to some extent by a reduction in average wholesale prices if the capacity mechanisms imply that there are fewer occasions of scarcity with high electricity prices than would have been the case in the absence of the capacity mechanisms, but this effect is difficult to calculate.

7.2 International comparison of fossil fuel subsidies

As there were a number of studies prepared during the last few years on fossil fuel subsidies, it is reasonable to compare the results of the 2014 energy costs and subsidies study with these other sources, bearing in mind the comparison limitations, owing to different methodologies and/or different geographical and energy products coverage.

- A European Commission study[18] only examining fossil fuel tax related subsidies but *including the transport sector* found subsidies amounting to €40 bn annually.
- The IMF[19] estimated *global pre-tax energy subsidies* (including petroleum, natural gas, coal and electricity) in 2015 at $333 bn (€300 bn – amounting to around 0.4% of the global GDP) after reaching $490 bn (€369 bn) in 2013. Lower subsidies in 2015 are in strong correlation with decreasing the international energy prices.
- If the external costs of energy production are taken into account, we arrive at *post-tax* subsidies, at a number being higher by several magnitudes, an estimated $5.3 trillion (€4.8 trillion) in 2015, equalling 6.5% of the global GDP.

[15] Council Decision 2010/787/EU on State aid to facilitate the closure of uncompetitive coal mines.
[16] Up to 15% of the primary energy necessary to produce the electricity consumed in the Member State concerned (Art.15(4) of Directive 2009/72/EC).
[17] In the EC Generation Adequacy guidance document an estimation of the sum of annual expenditure in some EU Member States (Greece, Ireland, Italy, Spain, Sweden and Finland) is provided amounting to € 1.3 bn a year.
[18] http://ec.europa.eu/environment/enveco/taxation/pdf/201412ffs_final_report.pdf Including Direct budgetary support to energy users less than €1bn per year, direct support to producers less than €5bn, tax expenditure in excise taxes of almost €28bn, VAT reductions include €4bn in the UK and €1bn in Italy.
[19] https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf

- Fossil fuel subsidies in the aforementioned IMF study, including external costs, reach an estimated €300 bn in the EU and Russia, €250 bn in India, €630 bn in the United States and €2,050 bn in China.
- The IEA estimated global fossil fuel subsidies[20] at $548 bn (€412 bn) in 2013 for 40 countries included in its 2014 edition of the World Energy Outlook. The top twenty-five countries in subsidising fossil fuels are all outside the EU[21].
- In turn, the OECD estimated fossil fuel subsidies (for the OECD member countries) at between $160-200 bn (€115-125 bn) annually over the period 2010-2014[22].
- Although developing countries are responsible for the lion's share of global fossil fuel subsidies, the advanced economies account for about one-quarter of the IMF's estimate (the €4.8 trillion), out of which the European Union for some €300 bn.
- This amount is relatively modest compared to the continent's economic weight and energy consumption and can be explained by relatively efficient taxation which tends to better take into account the negative effects of fossil fuel combustion and the fact that European economies have almost completely phased out generalised fossil fuel subsidies. However, to putting it in another context, this amount is roughly as much as the worldwide clean energy investment in 2015[23].
- As energy poverty is rather a social issue, it could be more efficiently addressed with targeted social measures (instead of subsidies through reduced retail prices or taxes for households) while maintaining the right price signals and incentives for energy efficiency.
- In conclusion, while there are many uncertainties and controversies about measuring fossil fuel subsidies and the results strongly depend on the valuation method, there is ample evidence that European support for fossil fuels is still sizeable that does not give incentives to transition to low-carbon competitive economy.

7.3 Ad-hoc data on reductions and exemptions of electricity and gas taxes and levies

EU Member States' governments seek to maintain the competitiveness of their national industries by limiting the burden of taxes and levies on industrial energy retail prices.. Taxes and levies differ by sector, by applied process, by *total consumption*, by *level of grid connection*, by *energy (cost) intensity.* In the case of some countries (e.g.: federal states) the *geographical location (regions) within the country* can also play a role[24].

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[20] http://www.oecd-library.org/docserver/download/6114031ec011.pdf?expires=1461084656&id=id&accname=oid031827&checksum=12F571270E33482CF12EF7226D88CE98

[21] This analysis focuses solely on countries with fixed price regimes that set fossil fuel prices below international market levels. This is then not representative of OECD countries.

[22] OECD Companion to the Inventory of Support measures for Fossil Fuel 2015

[23] Bloomberg New Energy Finance, January 2016; available at: http://about.bnef.com/content/uploads/sites/4/2016/01/Clean_Energy_Investment_Factpack.pdf

[24] The data on state interventions seeking to limit taxes and levies is presented in this section for informative purposes without any prejudice of the compatibility of these interventions with competition rules

Table 24 provides an overview of criteria by which EU Member States differentiate taxes and levies on electricity. Table 25 shows the criteria for taxes and levies on natural gas[25].

Table 24. Criteria for reductions and exemptions in taxes and levies on electricity

Country	Defined process	Consumption level	Capacity (peak load)	Level of grid connection
Austria	Electricity tax RES			CHP support RES support
Belgium	RES support (W)	Federal contribution surcharge green certificates RES and CHP support (F) Grid connection fee (W)		Electricity tax RES and CHP support (F) Rational use of energy (F) RES support (W) Occupation of public domain (W)
Denmark	Electricity tax CO_2 tax	Electricity tax CO_2 tax Electricity distribution contribution		
Estonia	Electricity tax			
Finland	Excise duty		Excise duty	
France		Regional and municipality taxes	National, regional and municipality taxes	Social tariff payments
Germany	Electricity tax	Offshore levy Grid fee compensation levy CHP support RES support Concession fee		
Greece	PSO	RES support Public Service Obligation		Electricity tax RES support Public Service Obligation
Ireland	Electricity tax		PSO	
Italy	All levies	All levies Excise duty	All levies	All levies
Lithuania	Excise duty			
Luxembourg	Energy tax	Energy consumption tax		Compensation
Netherlands		RES support Excise duty		
Poland		Security of Supply		Security of Supply
Portugal		Access tariff		Access tariff
Slovakia	Excise duty			
Slovenia	RES and CHP support		RES / CHP support	RES / CHP support
Spain	Electricity tax		Access tariff	Access tariff
Sweden	RES certificates Electricity tax			
United Kingdom		Climate Change Levy		

Source: Ad-hoc data collection done by Ecofys, 2016. In the case of Belgium W refers to the Wallonia region while F stands for the Flemish region

Energy consumption for defined *energy-intensive processes can be exempt from taxes and levies in several countries*, i.e. consumption in metallurgical, mineralogical or specific chemical processes. Reasons for these exemptions include *protecting competitiveness, due to the limited potential for further energy efficiency gains* or changes in energy carriers.

The rates of many state-regulated energy price elements are graded, stepped or contain fixed base amounts. Thus companies with high consumption levels pay, on average, less per unit of energy. Graded tariffs are often provided for levies, e.g. to support renewable energy sources. In these schemes, *consumers pay high tariffs for the first units of electricity consumption and lower tariffs for electricity units exceeding defined thresholds*. Austria and France additionally introduced caps in their policies. In this case, payments for energy policy support are fixed to a maximum amount in Euro per company.

Some European Member States apply the same logic to units of capacity. In this case, rates of *state-regulated price elements depend on connected capacity or peak load* of a year or month. In general, companies with large capacities pay less per unit of energy.

[25]. It must be noted here that the results in this and the next table are based on an ad-hoc data collection, implying that the list of measures presented here might not be complete.

In several European countries, costs for policies are added to the grid fees with differences for consumers connected to the transmission and distribution grids. In Spain and in Portugal, for example, "*access tariffs" in electricity include not only the costs for managing the network, but also costs for renewable energy support, and capacity payments*. Several other countries, like Italy, Slovenia, Belgium, Greece, and Poland apply specific policy financing tariffs depending on the grid level of connection in electricity.

Table 25. Criteria for reductions and exemptions in taxes and levies on gas

Country	Defined process	Consumption level	Level of grid connection
Austria	Gas tax		
Belgium	Gas tax	Federal contribution Grid connection fee (W)	
Bulgaria	Excise duty		
Croatia	Excise duty		
Cyprus			
Czech Republic	Natural gas tax		
Denmark	Natural gas tax NOx tax		
Estonia	Natural gas tax		
Finland			
France	Natural gas tax		Social tariff payments
Germany	Natural gas tax	Concession fee	
Greece	Natural gas tax	Customs tax	
Hungary	Natural gas tax		
Ireland	Carbon tax		
Italy	Excise duty	Excise duty	
Latvia	Excise duty		
Lithuania	Excise duty		
Luxembourg	Excise duty	Energy consumption tax	
Malta	Excise duty		
Netherlands		RES support Excise duty	
Poland	Excise duty		
Portugal	Special tax	Subsoil occupation tax	
Romania	Excise duty		
Slovakia	Excise duty		
Slovenia	Excise duty		
Spain	Hydrocarbons tax		
Sweden	RES certificates Electricity tax Natural gas tax		
United Kingdom	Fuel duty	Smart metering Climate Change Levy	

Source: Ad-hoc data collection done by Ecofys, 2016. In the case of Belgium W refers to the Wallonian region while F stands for the Flemish region

7.4 Data on state aid expenditures (2008-2014)

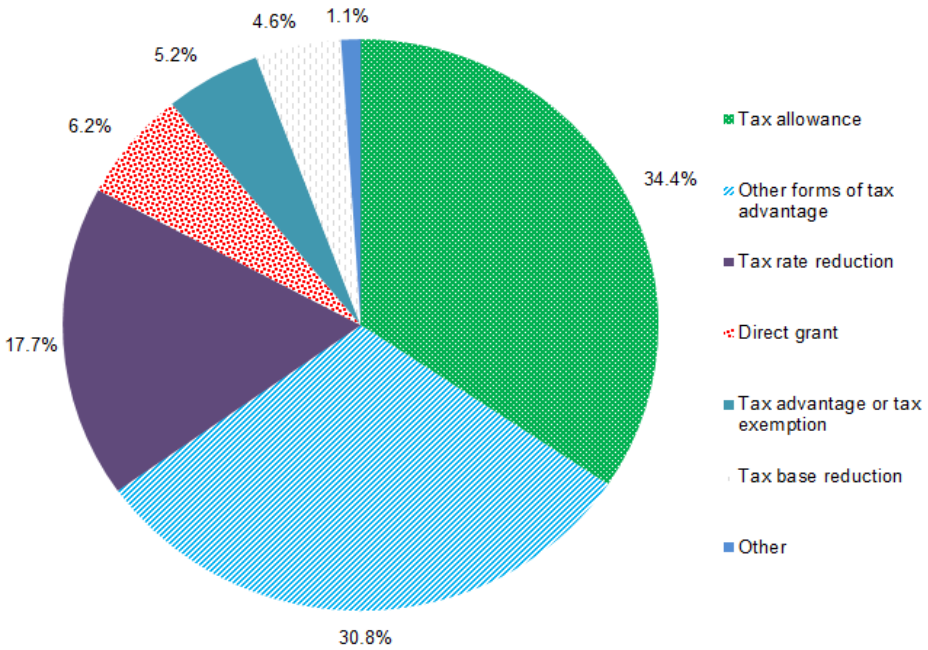
From the database of Directorate General for Competition of the European Commission detailed data can be drawn on tax and fiscal measures related state aid expenditures in energy and environmental protection for most of the EU Member States. This data can serve to complement the discussion on subsidies in the energy sector in this report. It must also be noted that these data on state aid expenditures do not purely refer to the energy sector and the dataset is not complete at EU level, as there are several Member States having not reported any cases, therefore it is not possible to provide EU aggregate data.

As the next chart (Figure 230) shows, between 2008 and 2014 there were many forms of energy and environmental protection related state-aid expenditures applied in the EU Member States[26].

The largest share of state aid expenditures could be attributed to *tax allowances*, mainly comprising of tax reductions or tax exemptions, for example for renewable energy generation or energy savings measures.

Other forms of tax advantage (e.g.: fuel purchase tax returns, biofuel tax reductions, climate change levy, etc.) was the second largest group of state-aid related energy expenditures between 2008 and 2014.

Figure 230 – **Distribution of state aid related expenditures between 2008 and 2014 in the EU**



Source: European Commission own calculations - No data available for FR, GR, HR, LU and MT

Tax rate reductions (e.g.: reduced taxes on combined heat and electricity generation, relief from waste water tax or modification or CO_2 tax for some industries) were the third biggest

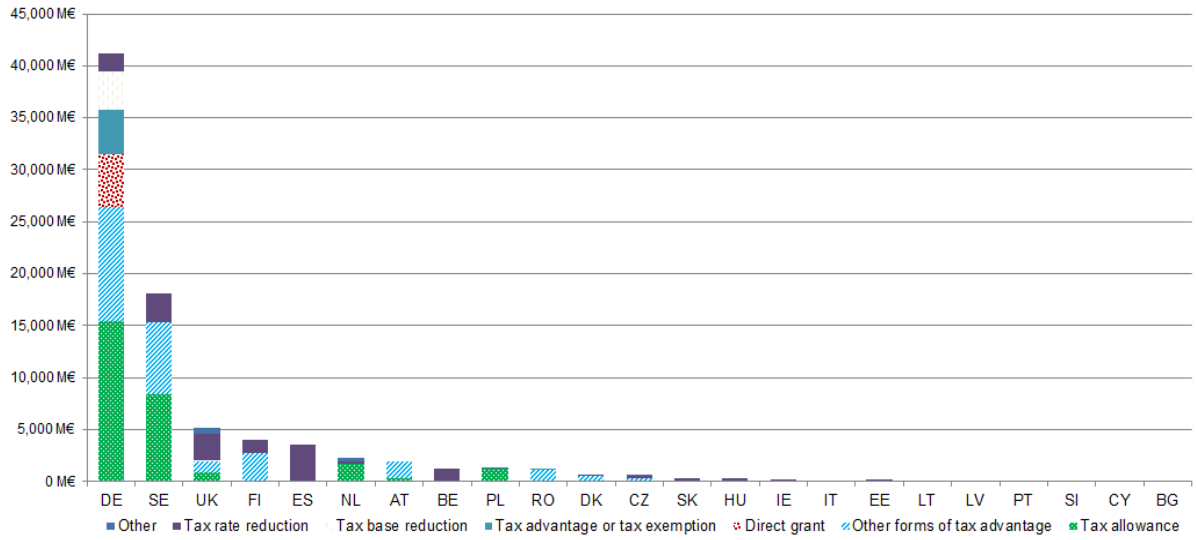
[26] The chart shows the distribution of cumulative state aid expenditures, as measured in € 2015. From the point of view of this report there would not be too much value added of differentiation between energy state aids under General Block Exemption Rules and of those that did not fall in this category, so each chart in this subchapter represent state aids, irrespective of the notification practice.

group of state-aid related energy expenditures. Most of the tax rate reductions related to individual notification basis to the Commission.

Direct grants were given mainly in the form of support for energy intensive industries. *Tax advantages or exemptions* were also given for various energy intensive industries in order to preserve their competitiveness in the EU single market. *Tax base reductions* were given in the form of, for example, energy savings allowances or non-application of lower depreciation rates for renewable assets.

Figure 231 shows the cumulative state-aid expenditure in each Member State for the period of 2008-20014, expressed in million euros at 2015 prices. Most of the registered state-aid were given in Germany (in the form of tax allowances, tax advantages, direct grants and tax base or rate reductions), Sweden (tax allowances, tax advantages or tax rate reductions), the UK (tax rate reductions), Finland (mainly tax advantages) and Spain (mainly in the form of tax rate reductions).The amount of state-aid expenditures was lower in the Netherlands, Austria, Belgium, Poland and Romania. In the other remaining Member States, presented on **Figure 231** the amount of state-aid expenditures was of less significance**.**

Figure 231 - **Cumulative sum of state-aid related expenditures in energy in the EU Member States, for the period of 2008-2014, measured in €2015**

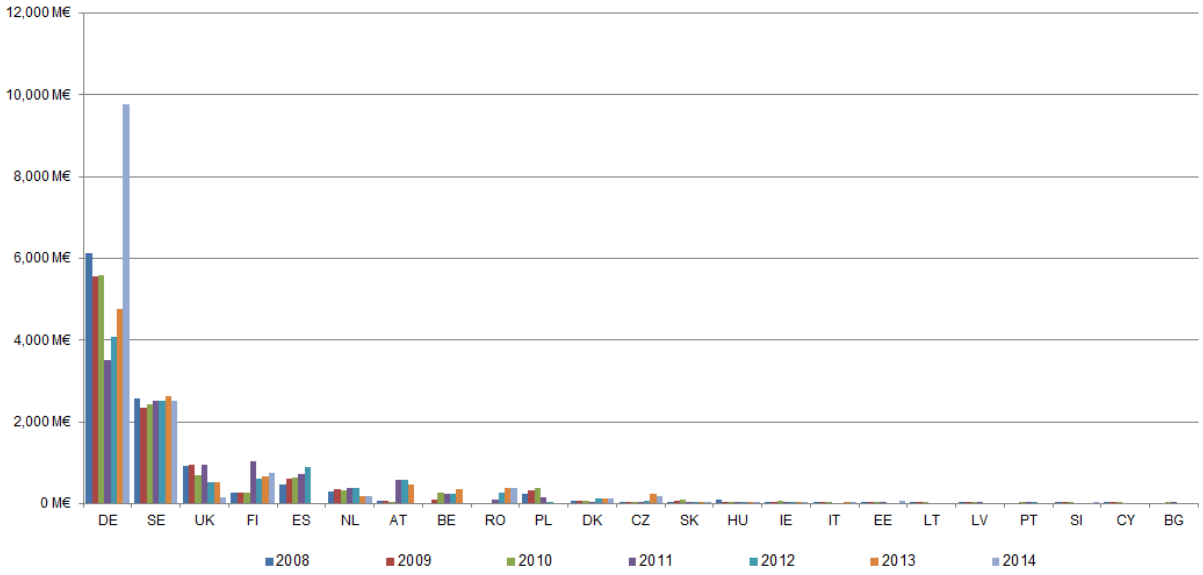


Source: European Commission – own calculations - No data available for FR, GR, HR, LU and MT

Looking at the evolution of the overall actual state-aid expenditures between 2008 and 2014 on **Figure 232**, we can see that given the importance of individual Commission decisions in some cases, the amount of state-aid expenditures can vary significantly from one year to another.

In Germany the annual state aid expenditure varied between €4.1 bn and €9.8 bn between 2008 and 2014, however this latter number in 2014 represented an outstandingly high value. In other Member States the annual variation in state-aid expenditures was much lower. In Sweden the annual amount of expenditures varied around €2.5bn, while in the UK it showed a decreasing trend (from €950 million in 2008 to €140 million in 2014). In Finland and Spain the annual average of state-aid expenditures was around €500-600 million, while in the remaining countries presented on **Figure 232** this was even lower.

Figure 232 - **Annual state aid related expenditures in energy and environmental protection in the EU Member States, between 2008 and 2014**



Source: European Commission- own calculations - No data available for FR, GR, HR, LU and MT

8 The role of energy for government revenues and inflation

8.1 Government revenues from the energy sector

Main findings

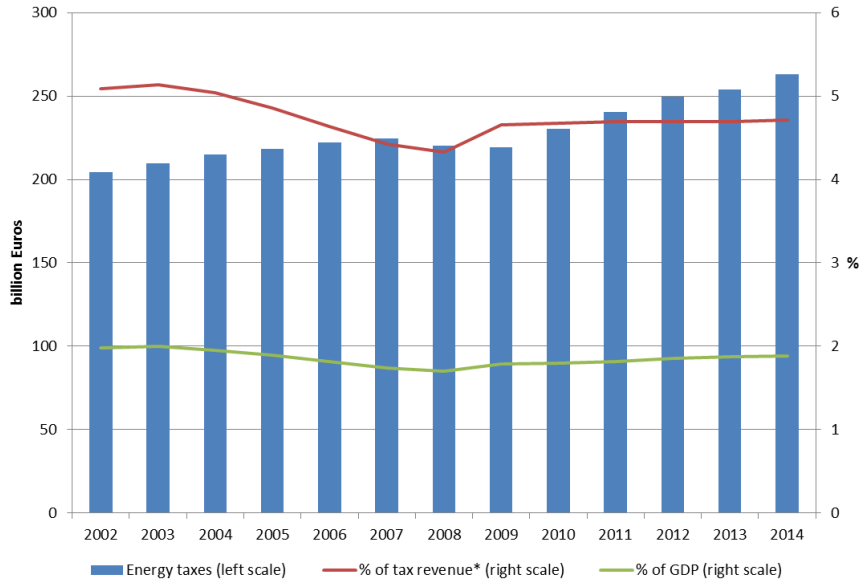
- In 2014, energy taxes collected by EU Member States amounted to EUR 263 billion, equivalent to 1.88% of EU GDP. As a percentage of GDP, energy tax revenue has been relatively stable in the last 5 years. Member States with a lower GDP/capita typically have a higher share of energy taxes from both total tax revenue and from GDP.
- Excise duties constitute the largest part of energy taxes, amounting to around EUR 227 billion in 2015. In real terms, excise duty revenues slightly decreased between 2008 and 2015. In 2015, 86% of this revenue was coming from excise duty imposed on petroleum products.
- For the main petroleum products, the nominal excise duty revenue is gradually growing, driven by increasing excise duty rates. However, in the last few years this was offset by lower VAT revenue driven by falling oil and oil product prices. As a result, the nominal tax revenue from petroleum products has been relatively stable but in real terms the tax revenue decreased.

Energy taxes

Taxes and duties imposed on energy products are an important source of government revenue in EU Member States. In 2014, energy taxes[27] collected by EU Member States amounted to 263 billion euros. This was equivalent to 1.88% of EU GDP and 4.71% of total revenues from taxes and social contributions (including imputed social contributions).

While nominal energy tax revenues increased by 20% between 2009 and 2014 (on average by 3.7%/year), as a percentage of GDP and tax revenue they remained relatively stable, showing only a slight increase in this period.

Figure 233 - **Energy taxes in the EU**

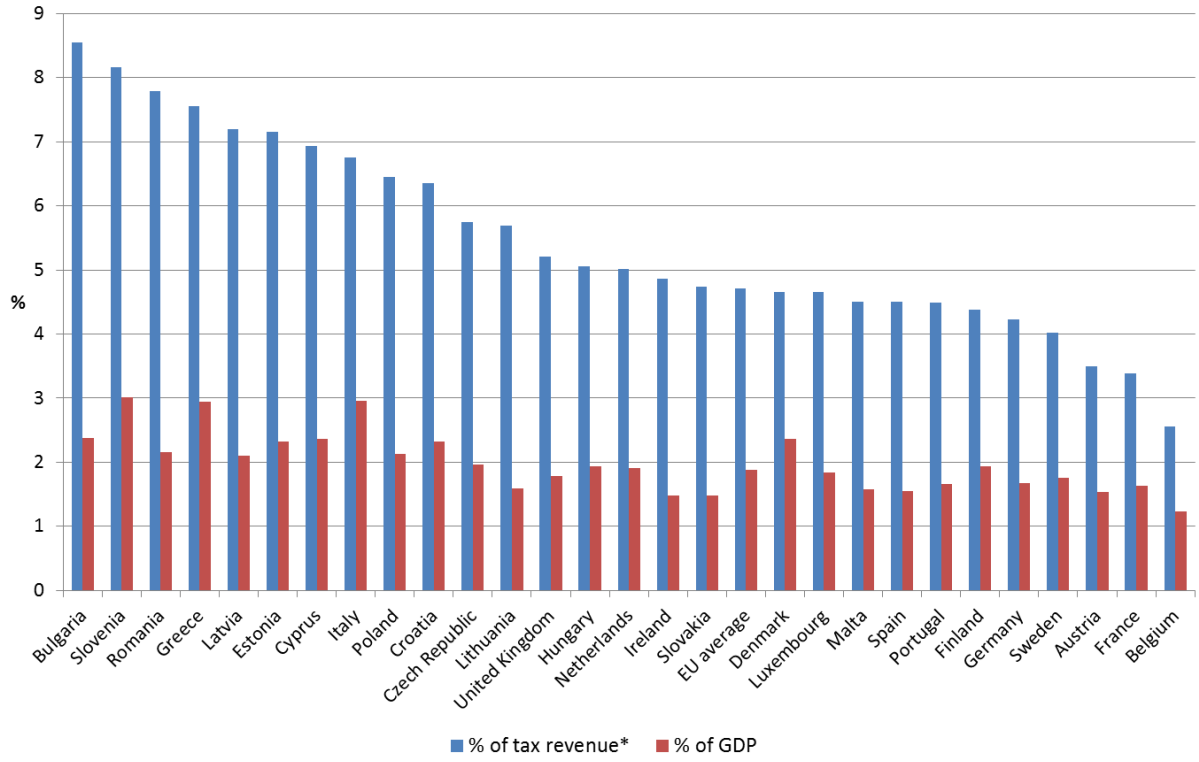


Source: Eurostat (data series env_ac_tax)
*percentage of total revenues from taxes and social contributions (including imputed social contributions)

Looking at individual Member States, the role of energy taxes in government revenues shows a significant variety: in 2014, energy taxes in Bulgaria made up 9.5% of total revenues from taxes and social contributions (including imputed social contributions) while this share was only 2.5% in Belgium. Typically, Member States with a lower GDP/capita have a higher share of energy taxes from both total tax revenue and from GDP.

Figure 234 - **Energy taxes as a percentage of tax revenue and of GDP in 2014**

[27] Energy-related environmental taxes as defined by Regulation (EU) N° 691/2011 on European environmental economic accounts; does not include VAT imposed on energy products



Source: Eurostat (data series env_ac_tax)
*percentage of total revenues from taxes and social contributions (including imputed social contributions)

Excise duties

Excise duties constitute the largest part of energy taxes.

Excise duties are indirect taxes imposed on the sale or use of specific products, typically alcohol, tobacco and energy products. All revenue from excise duties goes to the budgets of Member States. Excise duties are set in absolute values, i.e. as a fixed amount per quantity of the product (e.g. per litre/kg/GJ/MWh). Accordingly, assuming that the rates don't change, the revenue will depend on the consumption of the specific product. In contrast, price changes should not impact revenues (at least not directly).

Current EU rules for taxing energy products are laid down in Council Directive 2003/96/EC[28] (the Energy Tax Directive), which entered into force on 1 January 2004. The Directive covers petroleum products (gasoline, gasoil, kerosene, LPG, heavy fuel oil), natural gas, coal, coke and electricity. In addition to establishing a common EU framework for taxing energy products, the Directive sets minimum excise duty rates.

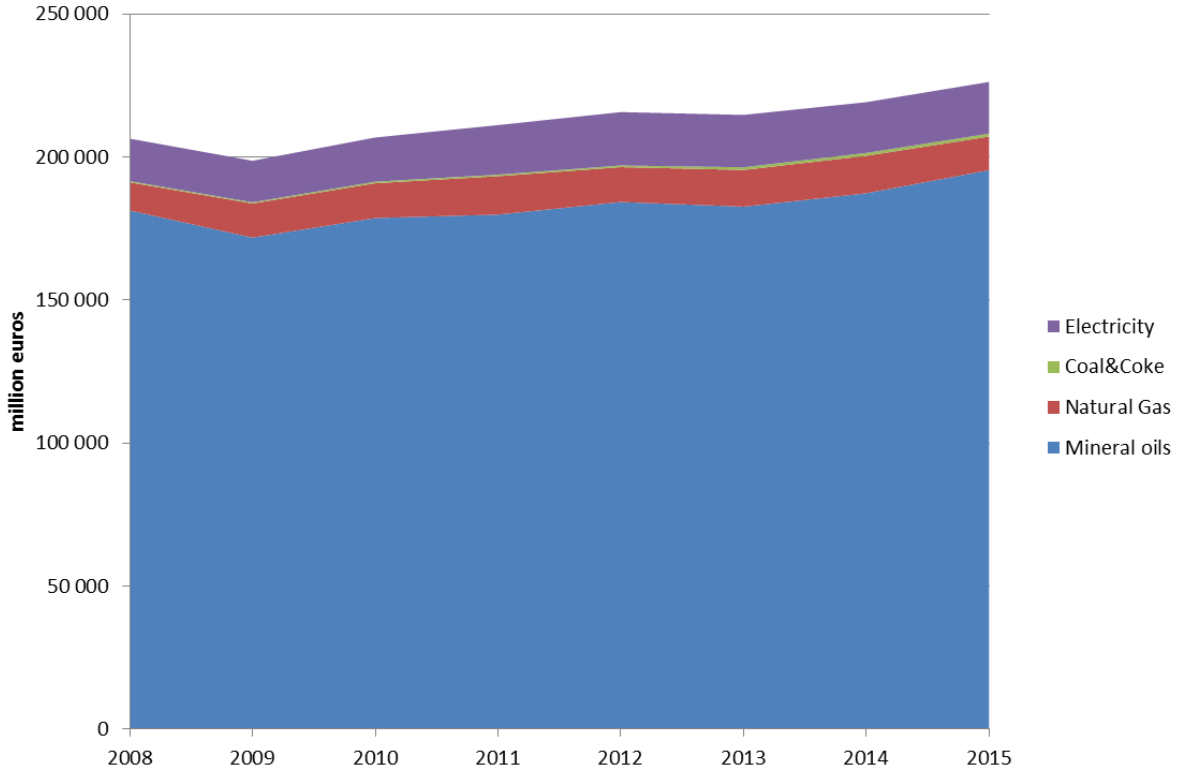
The Commission's Taxation and Customs Union Directorate-General (TAXUD) regularly publishes the excise duty rates applicable in EU Member States[29] and the revenue from excise duties[30].

[28] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:283:0051:0070:EN:PDF

[29] http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties-part_ii_energy_products_en.pdf includes the excise duty rates for energy products applicable on 1 July 2016

As far as revenues are concerned, the latest available data relate to 2015. According to these data, excise duty revenues amounted to EUR 227 billion in 2015.[31] From 2009, total revenue shows an increasing trend (with a minimal decrease in 2013) but the growth falls short of inflation.

Figure 235 - Excise duty revenues from energy consumption



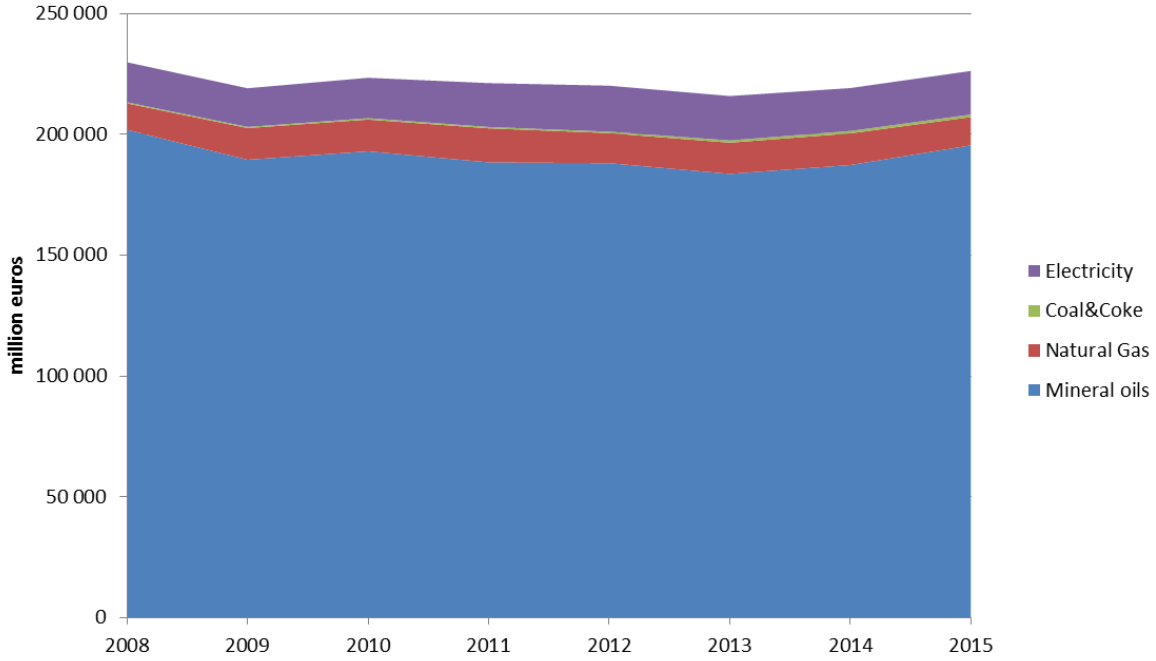
Source: DG Taxation and Customs Union
2015 data is not available for Latvia and the Netherlands; for these countries, 2014 figures were used.

If adjusted for inflation, excise duty revenues have slightly decreased between 2008 and 2014: measured in 2015 euros, they amounted to EUR 230 billion in 2008 and EUR 227 billion in 2015. In the last 2 years, however, there has been an increase.

[30] http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties_energy_products_en.pdf includes the revenue by Member State and by energy product in the period 2008-2015.

[31] 2015 data is not available for Latvia and the Netherlands; for these countries, 2014 figures were used.

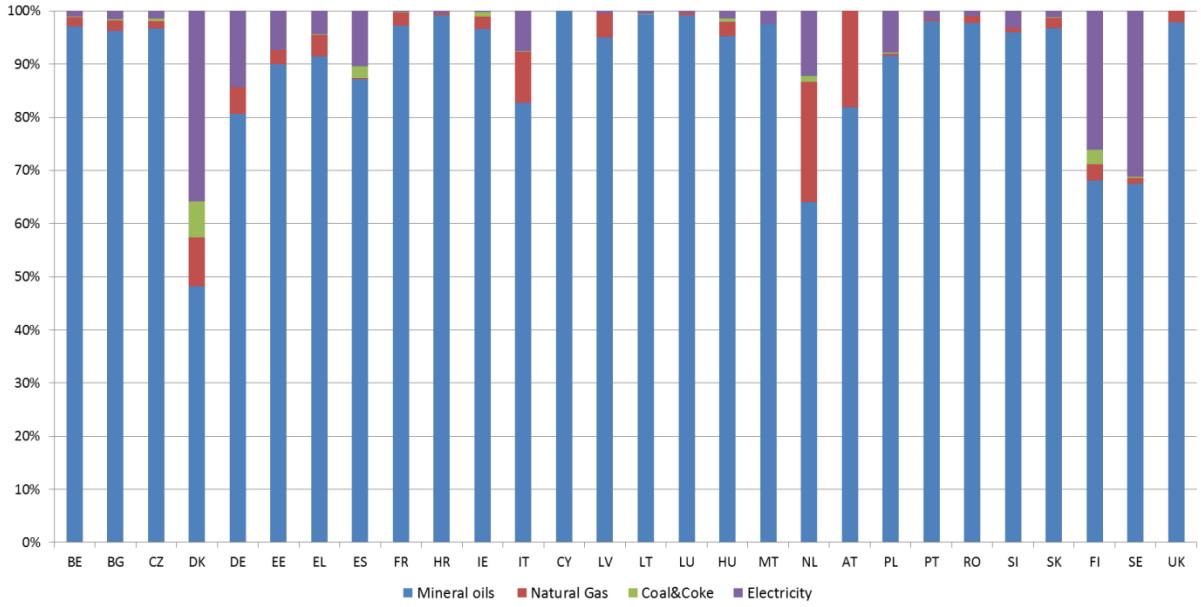
Figure 236 - **Exercise duty revenues from energy consumption, adjusted for inflation (in 2015 Euros)**



Source: DG Taxation and Customs Union, adjusted by HICP
2015 data is not available for Latvia and the Netherlands; for these countries, 2014 figures were used.

Petroleum products make up by far the largest share of the tax revenues: 86.4% in 2015, followed by electricity (8.0%), gas (5.2%) and coal (0.5%). Petroleum products make up more than 60% of the excise duty revenue in all Member States except Denmark; in 20 Member States they make up more than 90%.

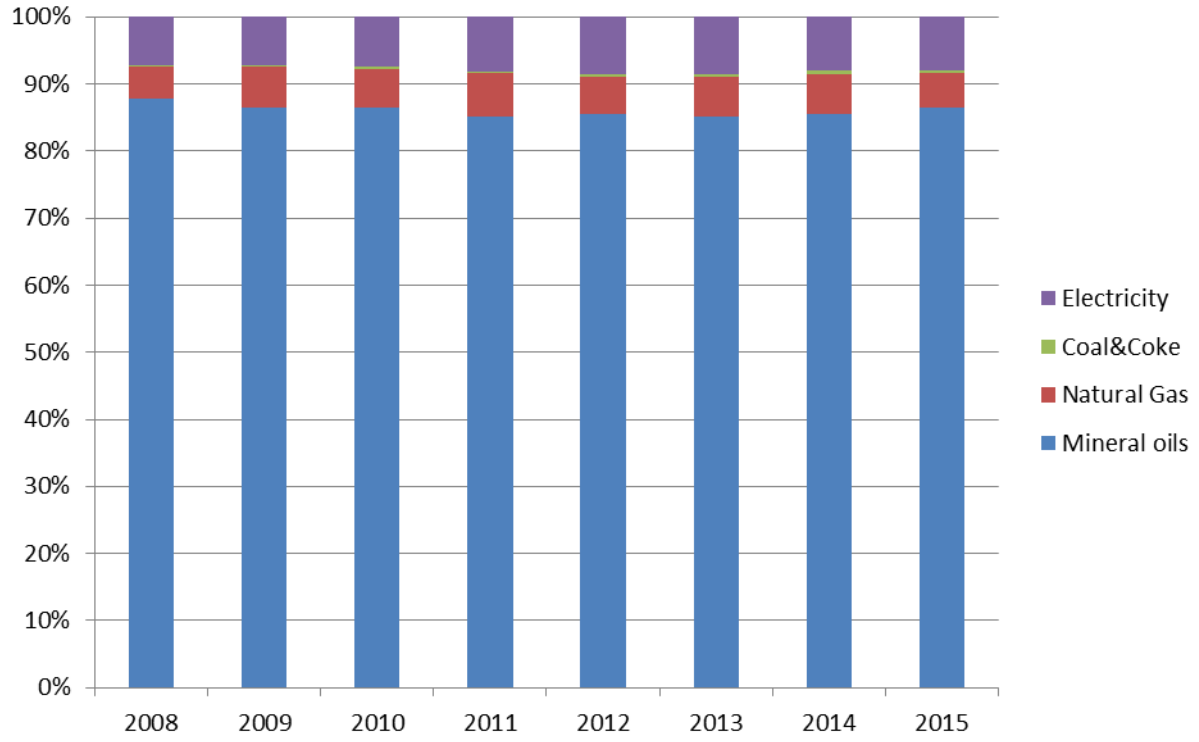
Figure 237 - **The share of excise duty revenues based on energy source, 2015**



Source: DG Taxation and Customs Union
2015 data is not available for Latvia and the Netherlands; for these countries, 2014 figures were used.

The share of oil products from total revenues is slightly decreasing (from 87.8% in 2008 to 86.4% in 2014) while the share of other fuels increase. Between 2009 and 2015, revenues from taxes on oil products increased by 7.8%, on gas by 19.5%, on electricity by 21.6% and on coal by 143.4%. In this 6-year period, inflation measured by the Harmonised Index of Consumer Prices (HICP) was 11.3%.

Figure 238 - **The share of excise duty revenues from energy consumption**



Source: DG Taxation and Customs Union
2015 data is not available for Latvia and the Netherlands; for these countries, 2014 figures were used.

In case of oil products, all Member States impose high excise duty rates which is not surprising, given that the energy tax directive sets relatively high minimum levels. In case of the other fuels, however, minimum tax rates set by the directive are relatively low and there seems to be big differences across Member States. Germany collects the most taxes on petroleum products and electricity, Italy on gas and Denmark on coal.

Value added tax (VAT)

The VAT is a general consumption tax assessed on the value added to goods and services. It applies to practically all goods and services (including energy products) that are bought and sold for use or consumption in the EU. The VAT is borne ultimately by the final consumer; companies can reclaim the VAT they pay on the products and services they use as an input. VAT is charged as a percentage of the price which means that an increase of the price will entail an increase in the tax revenue and vice versa.

The VAT Directive (2006/112/EC) requires that the standard VAT rate must be at least 15% and Member States can apply one or two reduced rates of at least 5% but only to goods or services listed in Annex III of the Directive (energy products are not in the list). In addition, there are multiple exceptions to the basic rules (usually with conditions/deadlines), including

- possibility of reduced rates for goods and services other than those listed in the directive (e.g. Article 102 allows the use of reduced rate to the supply of natural gas, electricity and district heating, "provided that no risk of distortion of competition thereby arises");
- several country-specific exceptions, including the permission to use "super reduced" rates under 5% (including zero rates).

Several Member States apply reduced VAT rates for certain energy products, mainly for electricity, gas, heating oil, district heating and firewood. DG TAXUD regularly publishes the VAT rates applied by Member States for different product groups/services.[32]

Unlike for excise duties, there is no publicly available data for VAT revenues by product group.

Tax revenues from petroleum products

Petroleum products, especially motor fuels, are the main source of tax revenue from the energy sector for government budgets: taxes on fuels (including VAT) make up on average 7% of Member States' tax revenue.[33] Therefore, we look in more detail into the development of excise duty and VAT revenue from the main petroleum products. This analysis is facilitated by Council Decision on Crude Oil Supply Costs and the Consumer Prices of Petroleum Products (1999/280/EC)[34] which requires Member States to report to the Commission the retail prices of petroleum products on a weekly basis. Member States also have to report any changes in the tax rates (VAT, excise duty, other indirect taxes) applicable to these products. The reported data are published on the website of DG Energy.[35]

Our analysis covers the three main petroleum products sold in the retail sector: gasoline (Euro-super 95), diesel (automotive gas oil) and heating oil (heating gas oil). For most Member States, the analysis covers the years 2005-2015, except Bulgaria (2008-2015), Croatia (2013-2015) and Romania (2008-2013).

For each year and each Member State, an average price was calculated as an arithmetic average of the weekly prices. The EU average price was then calculated as the weighted average of these. In the absence of 2015 annual consumption figures, for 2015 we used the 2014 consumption data as the weight.

In case of gasoline, we see a gradual increase of the average excise duty rate but this increase stayed below inflation: in 2005 the average rate was 57 eurocent/litre, by 2015 it increased to 64 eurocent/litre (an increase of 13% in 10 years). The average VAT rate also increased during this period, from 18.8% in 2005 to 21.0% in 2015.

In the last few years, in line with the decreasing oil prices, the average retail price of gasoline decreased. However, because of the fixed (or, in case of several member States, increasing) excise duty rates, the tax component gradually increased, from 55% in 2012 to 63% in 2015. In absolute terms, the tax component decreased, but only marginally, from 90 eurocent/litre in 2012 to 88 eurocent/litre in 2015.

Figure 239 - **Gasoline price components in the EU**

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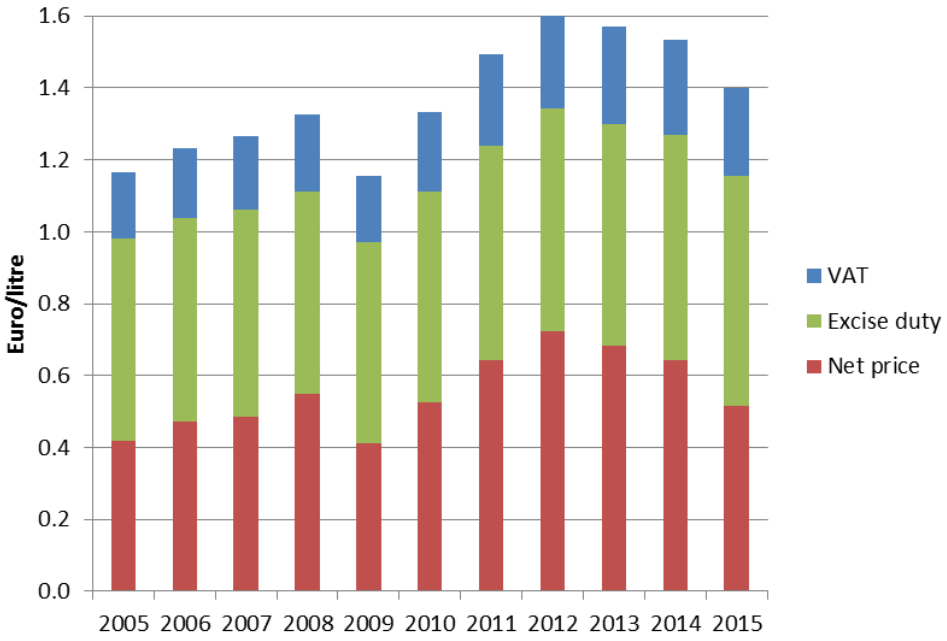
[32] http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf includes the VAT rates applicable on 1 January 2016; energy products are on page 12.

[33] https://www.fuelseurope.eu/uploads/Modules/Dataroom/graphs_fuels_europe-_2016_web-(30).jpg

[34] https://ec.europa.eu/energy/sites/ener/files/documents/1999-280_council_decision.pdf

[35] https://ec.europa.eu/energy/en/statistics/weekly-oil-bulletin

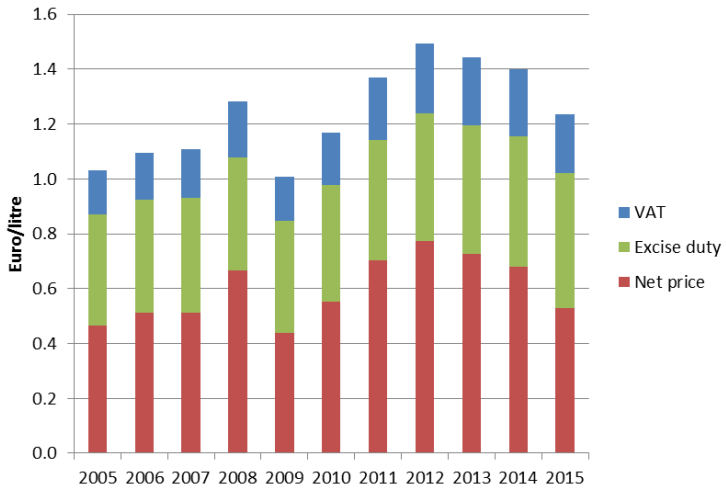


Source: DG Energy calculation

In case of diesel, the trends are similar. The main difference is that for most Member States the excise duty rates are lower than for gasoline although there is some approximation. Between 2005 and 2015, the average excise duty rate increased from 41 eurocent/litre to 49 eurocent/litre (an increase of 21% which is in line with the inflation in this period). In the same period, the average VAT rate increased from 18.6% in 2005 to 20.9% in 2015.[36]

The average retail price of diesel also decreased since 2012, with the tax component increasing from 48% in 2012 to 57% in 2015. In absolute terms, the tax component decreased marginally, from 72 eurocent/litre in 2012 to 71 eurocent/litre in 2015.

Figure 240 - **Diesel price components in the EU**



Source: DG Energy calculation

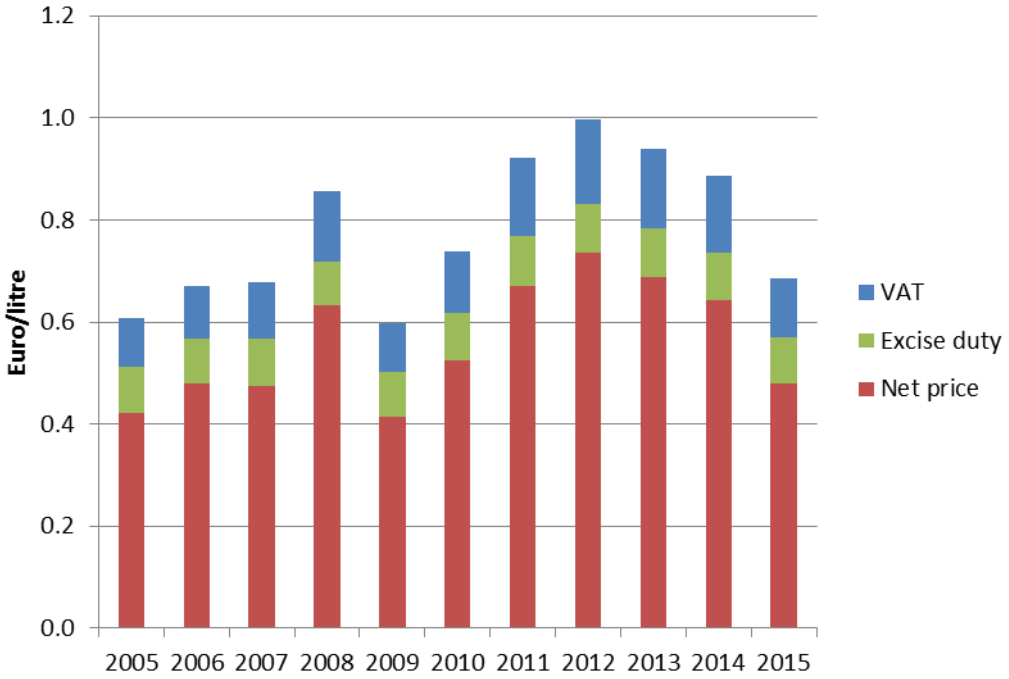
For heating oil, most Member States impose significantly lower excise duty rates than for motor fuels. (Ireland, Luxembourg, Portugal and the UK also apply a lower VAT rate). This results in a lower tax component and a bigger volatility of the final consumer price.

[36] All Member States use the same VAT rate for gasoline and diesel; the difference average tax rate stems from the different weights used.

Between 2005 and 2015, the average excise duty rate for heating oil increased from 9.0 eurocent/litre to 9.6 eurocent/litre (an increase of 7%, well below inflation). In the same period, the average VAT rate increased from 18.6% in 2005 to 20.2% in 2015.

The average retail price of heating oil significantly decreased since 2012, with the tax component increasing from 26% in 2012 to 31% in 2015. In absolute terms, the tax component decreased from 26 eurocent/litre in 2012 to 21 eurocent/litre in 2015.

Figure 241 - **Heating oil price components in the EU**



Source: DG Energy calculation

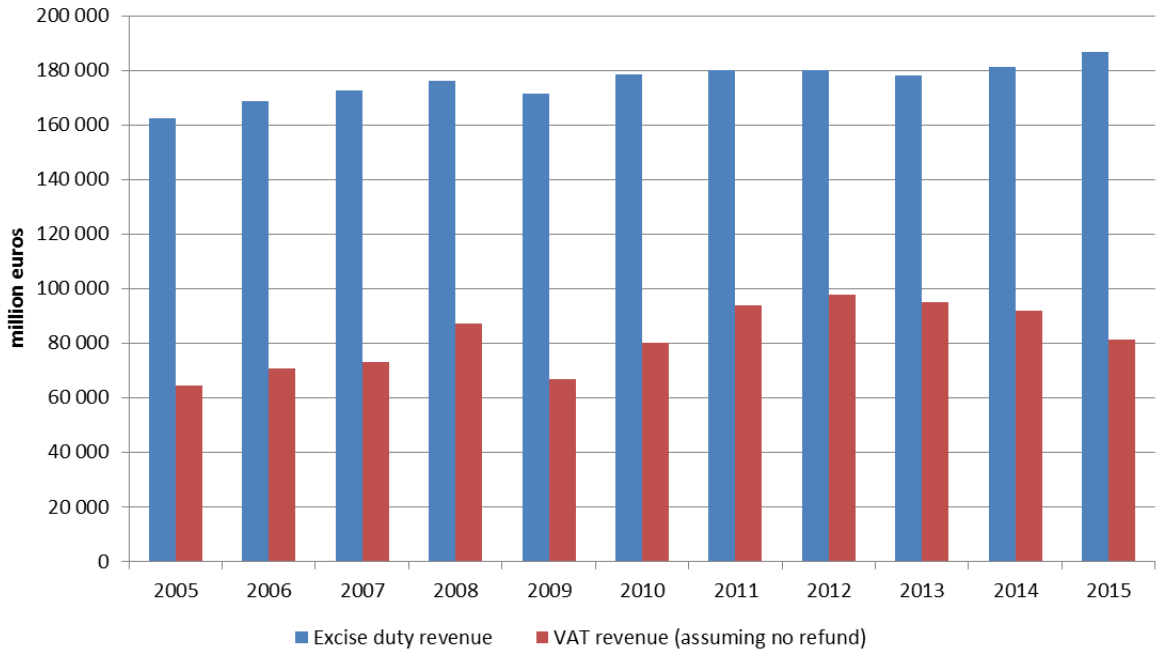
Based on the development of consumption, consumer prices and their components, we estimated the tax revenues collected by Member States. It is important to underline that most enterprises can reclaim the VAT they pay, so the calculated VAT revenue is a theoretical maximum; the actual VAT revenue collected by Member States must me significantly lower.

The estimated revenue from excise duties gradually increased between 2005 and 2015. Although the combined consumption of the three product groups show a declining trend since 2008, this was largely offset by the increase of the average excise duty rates. If adjusted for inflation, however, excise duty revenues slightly decreased in this period.

As the VAT is an ad valorem tax, the estimated (theoretical) VAT revenue is fluctuating in line with the net price. Accordingly, it decreased in recent years, from 98 billion euros in 2012 to 81 billion euros in 2015 (a decrease of 17%). In the same period, the estimated excise duty revenue increased from 180 billion euros to 187 billion euros (an increase of 4%).

Assuming that roughly half of the VAT is reclaimed (i.e. the actual VAT revenue is half of the theoretical value depicted on the below graph), the increase of excise duty more or less offsets the decrease of the VAT revenue in recent years, resulting in a relatively stable tax revenue from petroleum products. Of course, when adjusted for inflation, this means the value of the tax revenue has slightly decreased.

Figure 242 - **Estimated tax revenue from gasoline, diesel and heating oil**

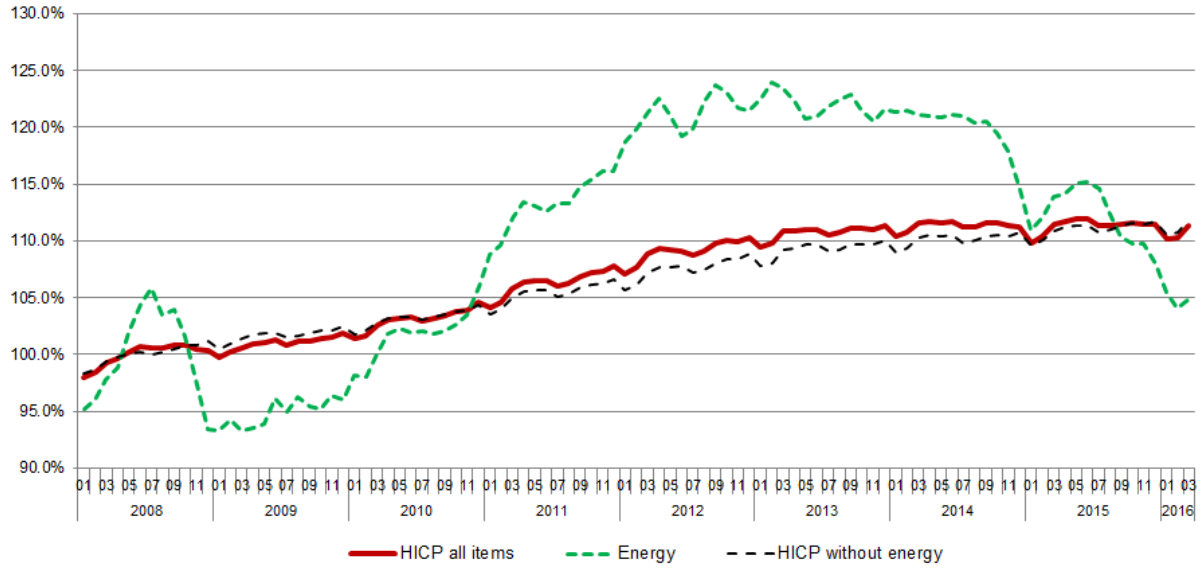


Source: DG Energy calculation

8.2 Energy and inflation

Retail energy prices might significantly impact the evolution of the overall inflation rate in many EU Member States and at EU level as well, as energy has important share in the consumer prices indices and energy prices show a high degree of volatility over time. The next chart (Figure 243) shows the evolution of the Harmonised Index of Consumer Prices (HICP), the energy component of the HICP index, and HICP without energy in the EU-28.

Figure 243 – **Monthly evolution of the HICP index, its energy component and the HICP without energy, average of 2008=100**



Source: Eurostat

At EU level energy prices (Eurostat's *Energy* category includes *electricity, gas, solid and liquid fuels for heating, heat energy and fuels and lubricants for passenger cars*) showed higher volatility than the headline inflation. In parallel with the developments on fossil fuel markets (crude oil and petroleum products, coal and natural gas), after the peak in mid-2008 a steep fall occurred in the EU energy price index during the first months of the 2008/2009 economic crisis. As of the second half of 2009, as energy commodities recovered in the international markets, the EU energy price index also started to rise, and in 2012/2013 it was about 20% higher than the 2008 average. As of the second half of 2014, the energy price index started to fall and by the first quarter of 2016 it went back to the ranges seen for the last time at the end of 2010.

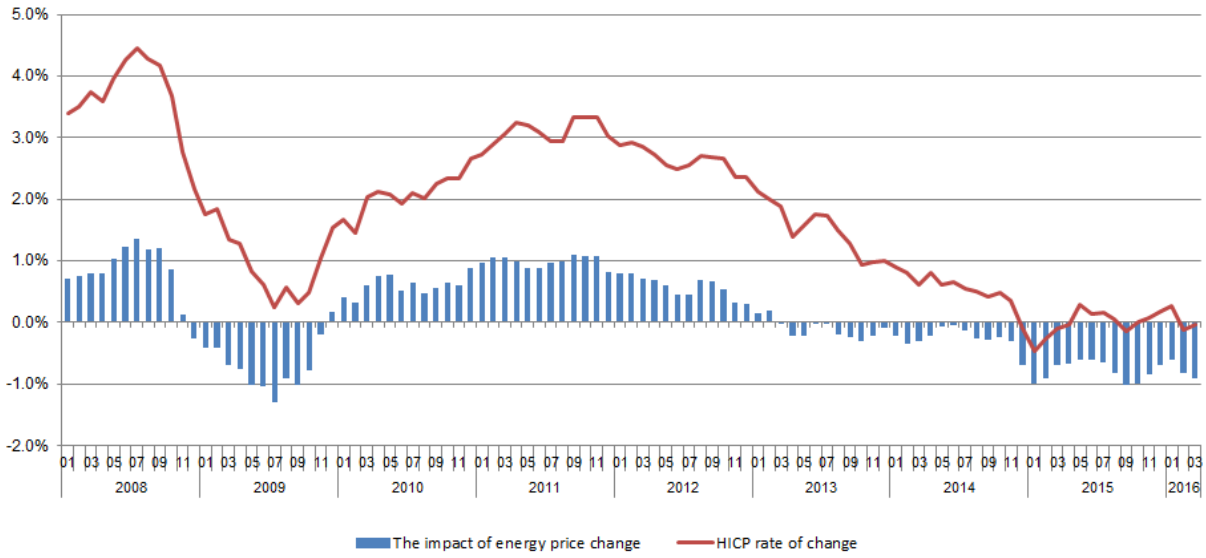
Meanwhile, the headline EU-28 HICP inflation rate evolved with low volatility over the last eight years, and in the first quarter of 2016 consumer prices in the EU stood 10% higher than in 2008 on average; implying a quite moderate (1.5%) average annual inflation rate for the 2008-2016 Q1 period.

The consumer price index excluding energy products (HICP without energy) followed closely the evolution of the HICP headline index, if we look at a fix-based (taking the average of 2008 as index base) indices. However, if we look in each month at how energy products impacted the year-on-year price variations, we can see significant differences over time, as Figure 244 shows.

In mid-2008 and in 2011 there were a few months, when increase in energy price added more than one percentage point to the overall (year-on-year) inflation rate at EU level. On the other hand, in mid-2009 and in 2015 there were some months, when decrease in energy price resulted in a one percentage point lowering impact on the HICP at EU level.

Consequently, we can say that though energy prices follow closely the HICP consumer price index on longer term, they can significantly impact the evolution of year-on-year inflation rates, and in some short time periods the evolution of energy prices can explain a significant part of the actual inflation rate at EU level.

Figure 244 – **Impact of energy prices on the year-on year inflation rate in the EU**



Source: Eurostat