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Review of Energy Subsidies in the Context of Energy Sector Reforms in Ukraine

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Foreword

Since the first comprehensive analysis of fossil-fuel subsidies in Ukraine carried out by the OECD in 2018 (see “Inventory of Energy Subsidies in the EU’s Eastern Partnership Countries”), the government of Ukraine has undertaken considerable reforms in the energy sector, which reshaped the energy subsidy landscape. This study evaluates the progress of fossil-fuel subsidy reform between its launch in 2016 and 2021 using the “bottom-up”, inventory, approach. The analysis covers: budgetary transfers, government revenue foregone (or tax expenditure), induced transfers in the form of cross-subsidies or below-market tariffs and transfer of risk to government.

This work reflects the state of affairs before Russia launched its war of aggression in Ukraine in February 2022 and the report takes no account of changes in financing or in the operation of the energy sector since.

The scope of the study includes fossil-fuels subsidies to production and consumption, particularly, for natural gas, coal and electricity generated from fossil fuels while support for energy efficiency and renewables is considered for comparative purposes. Although subsidies in the district heating sector are not explicitly analysed, several important measures related to natural gas consumption and linked to heat production are covered in the assessment of the natural gas sector. Analysis of state support measures for nuclear and large hydropower is out of the scope of this study.

The analysis is based on official government sources accessible in the public domain collected for the 2021 OECD report on Fossil-Fuel Subsidies in the EU’s Eastern Partner Countries: Estimates and Recent Policy Developments. The main sources comprise budget execution reports of the State Treasury Service of Ukraine, estimates of tax revenue foregone by the Ministry of Finance and the annual reports of the National Energy and Utilities Regulatory Commission. The end date for most reported data is 2020 unless indicated otherwise, with provisional data for 2021 also provided. In this study, the term “subsidy” and “state support” are used as synonyms.

The report is structured as follows:

- The first chapter presents an in-depth discussion of all fossil-fuel subsidy schemes identified and quantified during the analysis. Detailed subsidy estimates for individual schemes are provided in the Annexes at the end of the report.
- Energy pricing and taxation policies are discussed in the second chapter. These policies lie at the heart of subsidy debate as they represent a major channel for allocating fossil-fuel subsidies.
- The third chapter provides a review and background information of the energy sector including key energy sector indicators, institutional and legal setup. Energy sector reforms in Ukraine, which are closely linked with energy security issues, have taken place in a very dynamic and often difficult context and are also discussed in this chapter.

All reforms discussed in this report reflect the situation as of September 2021.

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OECD Environment Directorate. Mark Mateo (OECD Environment Directorate) gave valuable comments and advice on subsidy quantification and Krzysztof Michalak (Acting Head of GGGR Division, OECD Environment Directorate) reviewed the report and provided guidance on its completion. Gabriela Miranda and William Tompson (OECD, Global Relations Cooperation Directorate), Talya Vatman (International Energy Agency) and Borys Dodonov (Consultant) provided insightful feedback to the report. Jonathan Wright provided administrative support to the project. All these contributions are gratefully acknowledged.

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Abbreviations and acronyms

bcm	Billion cubic meters
CCGT	Combined-cycle gas turbine (plant)
CHP	Combined heat and power
EaP	EU's Eastern Partnership
ENTSO-E	European Network of Transmission System Operators
EFF	Extended Fund Facility
EU	European Union
FIT	Feed-in tariff
IMF	International Monetary Fund
Gcal	Gigacalorie
GHG	Greenhouse gas
GDP	Gross domestic product
IPPU	Industrial Processes and Product Use
kV	kiloVolt
LPG	Liquefied petroleum gas
LULUCF	Land use, land-use change and forestry
mln	Million
mtoe	Million tonnes of oil equivalent
MWh	Megawatt hour
NDC	Nationally Determined Contribution

NEURC	National Energy and Utilities Regulatory Commission
NJSC	National joint stock company
PJ	Petajoule
PPP	Purchasing Power Parity
PSO	Public Service Obligation
RAB	Regulatory Asset Base
SCMA	Subsidies and Countervailing Measures Agreement
TES	Total energy supply
TFC	Total final consumption
TKEs	Teplokomunenerhos (local heat supply companies)
toe	Tonnes of oil equivalent
TPP	Thermal power plant
TWh	Terawatt hour
UAH	Ukrainian Hryvnia
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VAT	Value-added tax
yoy	Year over year

Executive summary

Faced with internal and international economic headwinds, since 2014, Ukraine has had serious difficulties in maintaining costly energy subsidies. As a result, Ukraine launched important energy sector reforms which involved discussions with international organisations, including the International Monetary Fund (IMF), the European Union (EU) and the OECD, and an agreement on an economic reform package to bring utility prices closer to market levels. More recent reforms of 2016-19 focused on designing new markets for the natural gas and electricity sectors in an attempt to bring them in line with the EU's Third Energy Package which, among others, required unbundling of energy production and supply and better regulated competition in the sector with the purpose of optimising energy prices for consumers.

These reform processes were subjected to further challenges by the COVID-19 pandemic in 2020-21, which necessitated extensive support to firms and households struggling to cope with the pandemic shock.

Since the data here cover the period to 2020 and where possible to September 2021, the analysis does not capture the impact of Russia's full-scale invasion of Ukraine in February 2022, not least Russia's occupation of many critical energy infrastructure facilities and its targeting of energy infrastructure across unoccupied and liberated territories, and it only partially addresses the implications of the COVID shock.

State support for the fossil-fuel sector

OECD analysis shows that over the period 2010-2020 state support for both production and consumption of fossil fuels (coal, natural gas and electricity) in Ukraine significantly declined. Subsidies peaked in 2014 when they reached UAH 202.8 billion (USD 17 billion) to go down to UAH 153.2 billion (USD 7 billion) a year later. After a second peak in 2018, at about UAH 217.4 billion (USD 8 billion), subsidies started to decrease and towards the end of the period (2019-2020) they stabilised at UAH 83-86 billion (about USD 3-3.3 billion). The provisional estimate of support for fossil fuels in 2021 is UAH 44.9 billion (USD 1.6 billion), much lower than previous years.

The two subsidy peaks were also related to changes in international energy prices and particularly the price of natural gas. The 2014 peak was preceded by an increase in natural gas prices in international markets in 2012-13 and the 2018 peak occurred at the time when gas prices increased significantly again. In both cases, the government had to take measures to protect vulnerable households and businesses. While during the 2014 peak universal subsidies were dominant, during the 2017-18 peak they were replaced by well designed means-tested targeted support for poor households.

During the period under review, Ukraine had in place **35 fossil-fuel subsidy schemes** in the energy sector. Of these, 24 were direct budget transfers, seven were tax expenditures (i.e. tax breaks and tax advantages), three were induced transfers (i.e. price support for poor households provided though regulated tariffs or cross-subsidies) and one was a risk transfer to government (increasing statutory capital of Naftogaz, the largest state-owned energy company in Ukraine, by issuing state bonds to cover its deficit, a scheme closed in 2015). Consumers of fossil fuels were the main beneficiaries of this support and the **largest amount of support was provided in the form of induced transfers to residential consumers**.

Subsidies for **gas consumption** dominated the whole period but were considerably reduced between 2014 and 2018, going down from UAH 146 billion (USD 12.3 billion) to UAH 92 billion (USD 3.4 billion), respectively. A general declining trend in state support for **coal production** could be observed starting in 2013, when coal subsidies reached their highest value – UAH 15.5 billion (USD 1.9 billion). This decline can be explained by the temporary loss of the occupied territory of the Donbas region, where most of the state-owned coal mines are located, rather than reforms in the sector. Cross-subsidies in the **electricity sector** (using subsidy certificates) amounted to more than UAH 45 billion in both 2016 (USD 1.8 billion) and 2018 (USD 1.7 billion). To compensate for losses in supplying electricity to households at tariffs below cost-recovery levels, electricity supply companies could apply for subsidy certificates through the National Energy and Utilities Regulatory Commission (the Regulator), and the value of these certificates was incorporated into the wholesale electricity market price.

One of the key features of the fossil-fuel subsidy reform during the period under review was a considerable reduction of "blanket" (or universal, untargeted) fossil-fuel subsidies. Instead, utility tariffs were raised while the amount of targeted subsidies and benefits for households increased in order to provide support for the poorer groups of society. Starting from 2015, the amount of funds spent on direct transfers for low-income households sharply expanded as the government was increasing utility tariffs for consumers and partly re-channelling support measures from compensating losses of energy companies to direct support of vulnerable groups. **Targeted subsidies** to poor households grew to **UAH 72-73 billion** (USD 2.7 billion) in 2017-18 at the peak of fossil-fuel subsidy reform.

Excluding targeted subsidies for households, state support for fossil fuels peaked at UAH 197 billion (USD 16.6 billion) in 2014 though the value in 2018 was also very high, almost UAH 145 billion (USD 5.3 billion). This was largely due to cross-subsidies in the electricity sector and the requirement that domestic gas producers should sell gas to domestic consumers at regulated, below-market, prices under a Public Service Obligation (PSO) regime.

State support to energy efficiency and renewables

Alongside reforming fossil-fuel subsidies, Ukraine made efforts to provide "environmentally positive" subsidies as well such as state support for energy-efficiency measures and renewable energy sources. The two main energy-efficiency support measures included budget financing allocated for the Energy Efficiency Fund and for the "Warm" Loans Energy-Efficiency Programme. However, these efforts were rather limited. Sizable budget support for energy efficiency was allocated only in 2018-19 at UAH 1.9 billion (USD 70 million) and UAH 1.8 billion (USD 74 million), respectively. Budget spending was constrained in 2020 and 2021, the years of the COVID-19 pandemic. It will be important to scale up the implementation of energy-efficiency measures in the buildings sector and envisage sufficient support for the above-mentioned state programmes in the coming years, as they have proven to be very effective.

As electricity production from renewable energy sources has been growing rapidly over the past years, the amount of support directed to renewables in the form of feed-in-tariffs increased by more than 11 times since 2012 up to UAH 39 billion (USD 1.4 billion) in 2020. Recently, the sector faced serious challenges due to the decision of the government to revise and re-negotiate the green tariff for renewable energy suppliers. Given the significant potential of Ukraine to generate clean energy, the government should ensure stable and reliable investment climate in the sector in order to support the country's ambitious national and international climate-related commitments but also as a way to improve national energy security.

Recent energy market reforms and implication for fossil-fuel subsidies

Natural gas and electricity market reforms

Even though many old subsidy schemes were phased out during the period 2015-2020, new instruments of implicit consumer support were introduced. One such example is the public service obligations (PSOs) mechanism introduced in the electricity and natural gas markets. To ease the transition to the new markets, Ukraine sought to prevent a steep increase of electricity tariffs for consumers (primarily households) by imposing PSOs on Energoatom and Ukrhydroenergo, two important energy producers in Ukraine (nuclear and hydro generation, respectively).

The PSO mechanism was initially introduced as a temporary measure in the **electricity market** but was extended several times. Over time, it has become obvious that the PSO regime imposed on selected energy suppliers distorts the electricity market and contributes to deteriorating the financial state of Energoatom and Ukrhydroenergo. This mechanism is also not very efficient and undermines the incentives for energy-efficiency improvements at the household level.

It took years for Ukraine to transit to a full market-based pricing at the wholesale and retail **gas market** and reduce subsidies. However, the huge debts of the regional gas supply and district heating companies still pose challenges that need to be resolved.

In order to alleviate the burden of high gas and electricity bills on vulnerable people, the government scaled up its household assistance programme - the **Housing and Utilities Subsidy Programme** which has become one of the largest social assistance programmes in Ukraine. The design of the programme has been improved several times since its introduction. Over the period 2017-19, the government implemented important amendments to procedures for the allocation of subsidies and benefits to eligible households to incentivise energy saving, improve targeting and accountability and by doing so to contain the cost of targeted subsidies. These steps allowed to cut budget spending on targeted subsidies by about two times in 2020-21 compared to 2017-18 levels.

The programme is well-suited to absorb a higher number of recipients and/or increase payments to current beneficiaries due to the phase-out of implicit subsidies in the electricity sector. However, political will is needed to approve a step-wise increase of electricity prices for households to a full cost-recovery level and abandon the PSO mechanism.

Coal sector reforms

Various strategic documents and state programmes of Ukraine have included plans for a gradual phase-out of subsidies in the coal sector and decommissioning of unprofitable mines accompanied by social programmes for ex-miners. However, much-needed reforms have been constantly postponed and state programmes underfinanced. To keep the coal sector afloat, the government designed various state support programmes, which date back to the 2000s.

During the period 2016-2020, a number of state support measures in the coal sector were phased out while the total value of allocated budget funds increased by almost three times to UAH 5.7 billion (USD 211 million) in 2020. In relative terms, budget outlays on the coal sector accounted for about 0.3%-0.4% of total budget spending over the period 2015-20. Despite considerable budget support to state-owned coal mines, the coal sector has accumulated considerable tax and electricity arrears, which can be considered as implicit support measures to coal mines and such arrears exceed budget spending. As a result, the government has started discussing the write-off of tax debts of state-owned coal mines.

Nevertheless, recent policy developments provide some optimism that government plans for the coal sector transformation developed in cooperation with, and supported by, international partners will be more successful than previous attempts.

The most recent policy and regulatory developments show strong commitment to further reform. As mentioned earlier, the provisional estimate of support for fossil fuels in 2021 is much lower than previous years. However, the situation may change again as new subsidy schemes can be introduced or existing ones increased with budget amendments or through other mechanisms. The key uncertainty factor is the approach the government will take to settle the huge arrears in the energy sector.

Conclusions

Over the past years, Ukraine launched difficult but important reforms in the energy sector and phased out many subsidy schemes. Most importantly, universal fossil-fuel subsidies were largely eliminated and much better targeted support programmes were strengthened. At the same time, however, new instruments of implicit consumer support were also introduced. Cross-subsidies under the PSO regime in the electricity sector and huge indebtedness in the gas sector are among the major challenges of the energy sector that are yet to be addressed.

As Ukraine struggles with the Russian invasion and seeks to sustain its energy sector and prepare for post-war recovery, it should avoid introducing new subsidy schemes or turning those now in place into a long-term structural feature of the economy. Measures put in place to support households and firms in wartime should be designed and targeted to encourage energy saving rather than consumption, lest attempts to mitigate the impact of the war end up making the energy situation worse.

Reforming consumer subsidies in the energy sector and setting economically justified and socially acceptable energy tariffs which also ensure cost-recovery and financial sustainability of electricity suppliers is a challenging and politically sensitive issue which requires political will and the concerted efforts and agreement of the whole of the government, as well as the major actors in the market. In addition, such reforms need to be well designed and technically justified to be politically acceptable, clearly identifying potential winners and losers of the reform and possible risk mitigation options. Striking the balance between the positive economic and environmental effects of raising energy prices and the risk of increased affordability challenges is a key policy concern for Ukrainian decision-makers.

1 State support in the energy sector in Ukraine

This chapter summarises the main findings of the analysis of state support provided to fossil-fuel producers and consumers in Ukraine prior to Russia's full-scale invasion in February 2022. The data cover the period through 2020 and in some cases include estimates for 2021, so the impact of the COVID-19 pandemic may not be fully reflected, and post-February 2022 changes in the energy sector following the war cannot be considered at all. The chapter briefly introduces the methodology used to identify and estimate fossil-fuel subsidies. It also discusses some of the major fossil-fuel subsidy reforms that have been implemented in Ukraine since the first assessment of energy subsidies carried out by the OECD. For comparative purposes, the chapter also analyses government support for energy-efficiency and renewable energy sources in Ukraine.

Overview of the state support in the energy sector

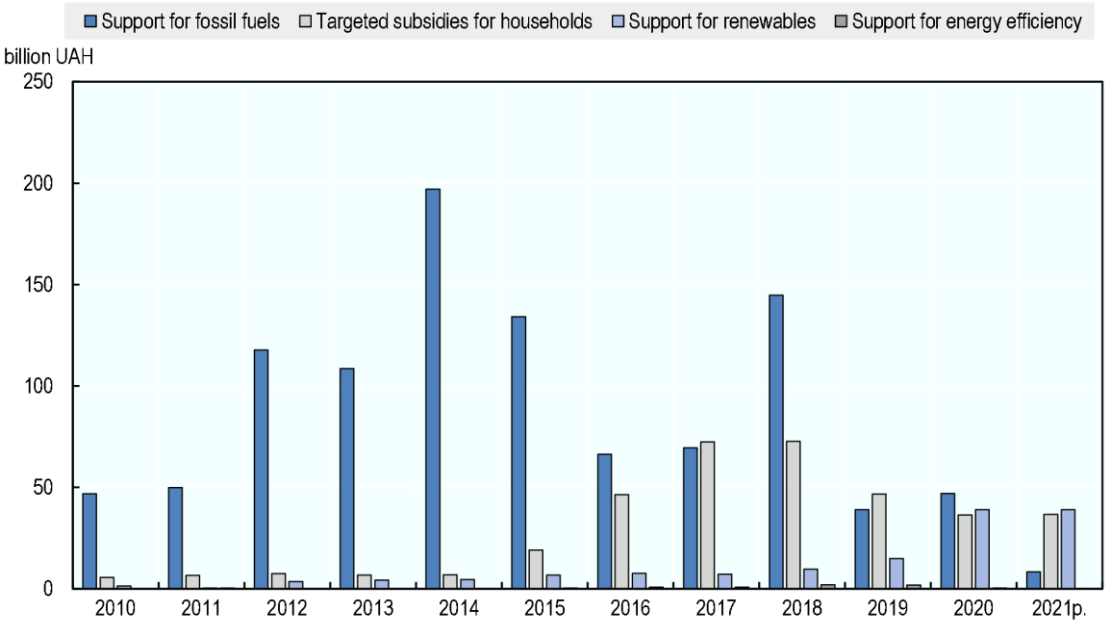
Since the publication of the first OECD comprehensive bottom-up analysis of fossil-fuel subsidies in Ukraine (OECD, 2018[1]), the government undertook considerable reforms in the energy sector, which, among others, reshaped the energy subsidies landscape. Figure 1.1 illustrates the evolution of state support directed towards production and consumption of fossil fuels, targeted subsidies for households, support for renewables and energy efficiency (underlying data are provided in Annex A and Annex C). State support for fossil fuels covers various types of subsidies stimulating either production or consumption of such fuels and these are described in more detail in the next section. In addition, Box 1.2 provides a brief description of the methodology used in this analysis to estimate fossil-fuel subsidies in Ukraine. Most of the energy used for utility services consumed by households also falls in the category of "fossil fuels". However, targeted subsidies for households are illustrated as a separate group as this type of support is more efficient and is considered acceptable as a form of social assistance to low-income households. Generally, targeted subsidies to households cover all utility payments including electricity, natural gas, heat, water supply and sewerage services, maintenance of the building, waste management, that is they consist of an energy and non-energy component. At the time of drafting this report, data for disaggregation of this measure between energy and non-energy consumption were unavailable in the public domain. However, energy consumption clearly accounts for the largest share of household utility bills.

Energy subsidisation practices changed significantly after 2014, when Ukraine underwent major political transformation. Most of the reform measures concerned the considerable reduction of subsidies to consumers of natural gas and bringing gas prices close to the international market price. One of the main reasons for this decision was the fact that in April 2014, Russia cancelled the discount at which it was selling gas to Ukraine and the government found it difficult to continue subsidising gas consumption for the population.

In order to alleviate the burden of high gas and electricity bills on vulnerable people, between 2014 and 2021, the government considerably reduced "blanket", or universal fossil-fuel subsidies and instead scaled-up social programmes to provide targeted subsidies and benefits for low-income households while concurrently raising utility tariffs to bring them closer to cost-recovery levels. This process was not easy or straightforward and saw ups and downs as policy-makers had difficult choices to make. Altogether, however, subsidies have been declining and targeted support for poor households increased and further rationalised.

State support for fossil fuels peaked at UAH 197 billion in 2014 though the value in 2018 was also very high (almost UAH 145 billion) largely due to cross-subsidies in the electricity sector and requirement to domestic gas producers to sell gas at regulated, below-market prices under the Public Service Obligations (PSO) regime.

Figure 1.1. State support in the energy sector, bln UAH, 2010-2021



Notes:
1. p. – provisional data. For illustrative purposes, the value of support for renewables in 2021 is assumed to be at least at the same level as in 2020.
2. Targeted subsidies to households cover all utility payments including electricity, natural gas, heat, water supply and sewerage services, maintenance of the building, waste management and do not include any state support for energy-efficiency measures implemented by households.
3. All estimates are in nominal prices. Using nominal prices allows having consistency with raw national data and facilitates cross-checking with figures as they are originally published in the national budgets.
Source: Prepared based on previous estimates of fossil-fuel subsidies in the EaP countries published in the (OECD, 2018[1]) report, (Ministry of Finance of Ukraine, 2020[2]), (Ministry of Finance of Ukraine, 2018[3]), (Ministry of Finance of Ukraine, 2017[4]) (Ministry of Finance of Ukraine, 2014[5]), (Ministry of Finance of Ukraine, 2013[6]), (Ministry of Finance of Ukraine, 2010[7]), (NERC, 2014[8]), (NEURC, 2021[9]), (NEURC, 2020[10]), (NEURC, 2019[11]), (NEURC, 2018[12]), (NEURC, 2017[13]), (NEURC, 2015[14]), (State Treasury Service of Ukraine, 2021[15]).

In 2017 and 2019, in particular, the amount of targeted subsidies for households slightly exceeded the value of "blanket" fossil-fuel subsidies. However, it should be noted that subsidy estimates are not directly comparable from year to year as in certain years utility providers and Naftogaz (the largest national oil and gas company of Ukraine) were receiving compensations in one year for providing services at below-market prices for a period of several years. For example, in 2020, Naftogaz received compensation for the difference between the import price for natural gas and its sale for heat generation for households for the period of 2015-19. Such practices distort the trends of fossil-fuel subsidies allocated from year to year.

As electricity production from renewable energy sources has been growing rapidly, the amount of support directed to renewables increased by more than 11 times since 2012 up to UAH 39 billion in 2020. At the same time, state support for energy efficiency remains marginal compared to subsidies in other sectors and is hardly visible in Figure 1.1. In 2018 and 2019, about UAH 1.9 billion and UAH 1.8 billion, respectively, was allocated from the budget to support the Energy Efficiency Fund and the "Warm" loans energy-efficiency programme (for more information, see the section on State support for energy-efficiency buildings retrofits. In 2020-21, funding of these programmes was decreased drastically partly due to the COVID-19 pandemic.

The provisional estimate of support for fossil fuels in 2021 is UAH 8.3 billion, which is almost six times lower than in the previous year. However, it is difficult to say how the situation will evolve in the future. Due

to the war, future support could both increase, as new subsidies could be introduced or existing ones increased, or decrease, due to the fact that many people have left Ukraine, at least temporarily, and fewer consumers may need support. In addition, a key uncertainty factor is the approach the government will take to settle huge arrears in the energy sector.

Box 1.1. Methodology for quantifying subsidies in the energy sector

Similar to the (OECD, 2018[1]) study, this report also uses the bottom-up approach to quantify subsidies in the energy sector. The analysis covers budgetary transfers, government revenue foregone or tax expenditure, induced transfers in the form of cross-subsidies or below market tariffs and transfer of risk to the government. The scope of the study is rather wide as it covers production and consumption support measures for fossil fuels, particularly, natural gas, coal and electricity generated from fossil fuels while support for energy efficiency and renewables is considered for comparative purposes only. Subsidies to the district heating sector are not analysed explicitly. However, several very important measures related to natural gas consumption, which is the main fuel source of the country's district heating system, are covered in the analysis of state support in the natural gas sector (see section on State support measures in the natural gas sector below). Analysis of state support measures for nuclear and large hydropower systems are out of scope of this study.

In most cases, subsidy estimates are taken at face value from government sources. The price-gap method is used to estimate revenue foregone for domestic gas producers required to sell gas at regulated, below-market prices, and induced transfers for producers of electricity generated from renewable energy sources and provided via feed-in-tariff. Induced transfers (also referred to as price support mechanisms) are the result of tariff and price regulation and often do not reflect the full cost of energy production and transportation services.

In this study, the term "subsidy" and "state support" are used as synonyms. More detailed discussion on subsidy definition and quantification methodologies is available in the (OECD, 2018[1]) report.

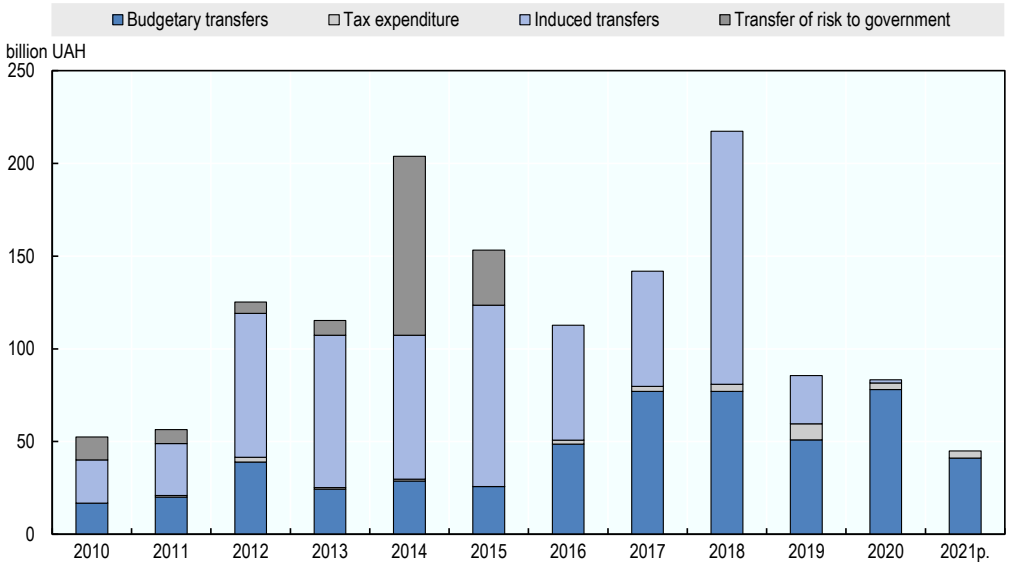
Source: Authors' compilation.

Figure 1.2 and Figure 1.3 illustrate the evolution of fossil-fuel subsidies in Ukraine over the period 2010-2021 while detailed data in UAH and USD values[1] is presented in Annex B. Figure 1.2 shows that the largest amount of support is provided in the form of induced transfers, represented by cross-subsidies in the electricity sector and opportunity cost to domestic gas producers obliged to sell gas at regulated prices, which cumulatively amounted to UAH 136.4 billion (USD 5 billion) in 2018. This figure is comparable to the estimates of fossil-fuel consumption subsidies in the electricity and natural gas sectors of Ukraine produced by the International Energy Agency (IEA) (see Box 1.3). Risk transfer to government is represented by one measure – recapitalisation of NJSC "Naftogaz" via the mechanism of issuing state bonds, whose value peaked in 2014 but this measure was terminated in 2016. The group of budget transfers cover a plethora of budget spending including support to inefficient state-owned coal mines (see section on State support measures in the coal sector below, compensation of losses of Naftogaz and heat generating companies as well as targeted support to low-income households. Notably, spending on the latter group increased considerably since the start of reform in 2016 (see Housing and utility subsidies and benefits for households), which is also illustrated in Figure 1.3.

State support in the form of tax revenue foregone (or tax expenditure) has been rather limited. Seven relevant measures are reported and estimated by the (Ministry of Finance of Ukraine, 2020[2]) over the period under review. Of these, only two measures, particularly, value-added tax (VAT) relief for the supply of coal and/or products of its enrichment on the customs territory of Ukraine and lowering the excise tax rate for operations related to the sale of aviation gasoline and fuel for jet engines, were in operation as of

2021 (see Annex B). Subsidies due to this group of measures were the largest in 2019 constituting about UAH 8.7 billion.

Figure 1.2. State support to fossil fuels by type of measure, UAH bln, 2010-2021



Note: p. – provisional data.
Source: Prepared based on previous estimates of fossil-fuel subsidies in the EaP countries published in the (OECD, 2018[1]) report, (Ministry of Finance of Ukraine, 2020[2]), (Ministry of Finance of Ukraine, 2018[3]), (Ministry of Finance of Ukraine, 2017[4]) (Ministry of Finance of Ukraine, 2014[5]), (Ministry of Finance of Ukraine, 2013[6]), (Ministry of Finance of Ukraine, 2010[7]), (NERC, 2014[8]), (NEURC, 2021[9]), (NEURC, 2020[10]), (NEURC, 2019[11]), (NEURC, 2018[12]), (NEURC, 2017[13]), (NEURC, 2015[14]), (State Treasury Service of Ukraine, 2021[15]).

In 2019, the government phased out two tax expenditure schemes in the energy sector: (i) excise tax relief for operations on the sale of liquefied petroleum gas (LPG) at specialised auctions for the needs of households and (ii) corporate income tax credit for the amount of excise tax levied on heavy distillates (gasoil) used in transport vehicles. At the same time, the government introduced a lowering of excise tax rates on aviation gasoline and fuel for use by jet engines either produced or imported in Ukraine, which resulted in UAH 5 billion in revenue foregone for the budget in the given year and about UAH 2 billion annually in subsequent years (Ministry of Finance of Ukraine, 2020[2]).

Figure 1.3 illustrates a breakdown of fossil-fuel subsidies by type of fuel. Subsidies for gas consumption and, to a lesser extent, transportation dominate the whole period peaking at UAH 146 billion and UAH 92 billion in 2014 and 2018, respectively. A general declining trend in state support for coal production has been observed since 2013, when coal subsidies reached the highest value – UAH 15.5 billion. Caution must be observed in interpreting this trend however, as Kyiv lost control over the temporarily occupied territory of the Donbas region during this period, where most of the state-owned coal mines are located, rather than by reforms in the sector. Cross-subsidies in the electricity sector (through subsidy certificates) amounted to UAH 45.3 billion in 2018 but were phased-out since July 2019 with the launch of the wholesale electricity market. Instead, the government introduced a different instrument to subsidise low tariffs for households through public service obligations (PSO) imposed on producers of electricity from nuclear power plants (NPPs) and larger hydropower plants (see more on this in the chapter of the Review of the energy sector of Ukraine.

Box 1.2. Public service obligations in the natural gas and electricity sectors in Ukraine

In 2015, Ukraine launched a comprehensive energy pricing reform which aimed, among others, to liberalise prices in the wholesale and retail natural gas and electricity markets. This reform helped to reduce the amount of subsidies in the energy sector but it also increased tariffs for end users. In order to limit tariff increases for households, the government established a new mechanism of implicit subsidies - public service obligations (PSOs) - which assigned responsibilities to specified PSO companies to supply gas and electricity at below-market prices.

The wholesale gas market was divided into two segments: unregulated and regulated market. The unregulated segment operated with free pricing and covered budgetary institutions, industry and other commercial users. The regulated PSO segment covered a certain group of consumers, such as residential, district heating companies, religious establishments. Under the PSO regime, for example, Naftogaz was required to buy gas from local producers and/or import it and sell it to households and district heating companies at lower regulated tariffs. This resulted in further market distortions.

A similar PSO regime was introduced in the electricity market with the purpose of keeping tariffs for households low. In the electricity market, PSOs were imposed on producers of electricity at nuclear power plants (NPPs) and larger hydropower plants which had to sell electricity at lower prices than the prevailing market level, relative to other electricity producers. As a result, this created significant financial difficulties to state-owned companies such as Energoatom and Ukrhydroenergo.

In both the natural gas and electricity markets, the PSO mechanism was introduced as a temporary measure at the end of 2015 and 2019, respectively, but since then it was extended and further modified several times. However, this mechanism was abolished for residential consumers in August 2020 and for district heating companies in May 2021.

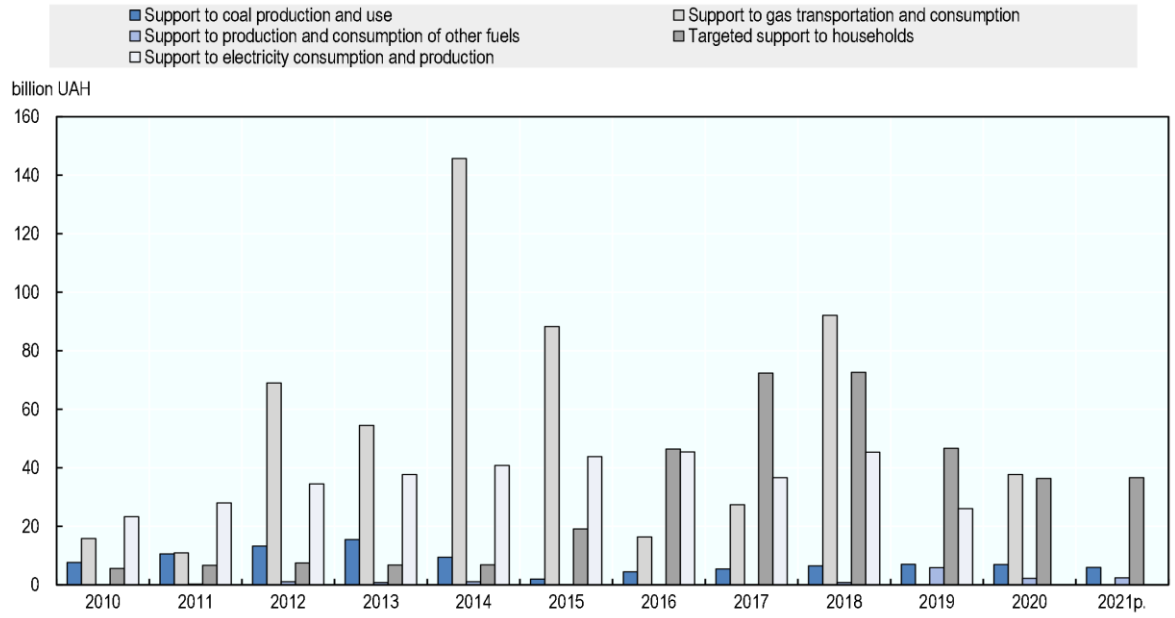
This type of “blanket” subsidy to shield all households regardless of their income is very inefficient and distorts the markets. Experience from other countries have shown that targeted means-tested subsidies for low-income households is the most appropriate mechanism to protect vulnerable groups of households from considerable price increases.

While the European Union has recognised that PSOs are legitimate policy tools to provide services of general economic interest, the EU insists that PSOs should be used in exceptional, clearly defined, cases and for a limited period of time (Energy Community, 2020[16]).

Source: (Cabinet of Ministers, 2015[17]), (Cabinet of Ministers, 2019[18]), (Parliament of Ukraine, 2015[19]), (Parliament of Ukraine, 2017[20]), (Parliament of Ukraine, 2015[19]), (Parliament of Ukraine, 2017[21]), (Energy Community, 2020[16]).

Targeted subsidies for households are provided as a separate category as they benefit the consumption of different fuels providing partial compensation for utility bill costs and also illustrate the course of subsidy reform. As of 2015, the amount of funds spent on direct transfers for low-income households grew sharply as the government started increasing utility tariffs for consumers and partly re-channelled support measures from compensating losses of energy companies to direct support of vulnerable groups (see section on Housing and utility subsidies and benefits for households below). Targeted subsidies increased up to UAH 72-73 billion in 2017-18 on the peak of fossil-fuel subsidies reform. A more detailed discussion of specific state support measures follows further below.

Figure 1.3. State support for fossil fuels by fuel type, UAH bln, 2010-2021



Note: p. – provisional data.

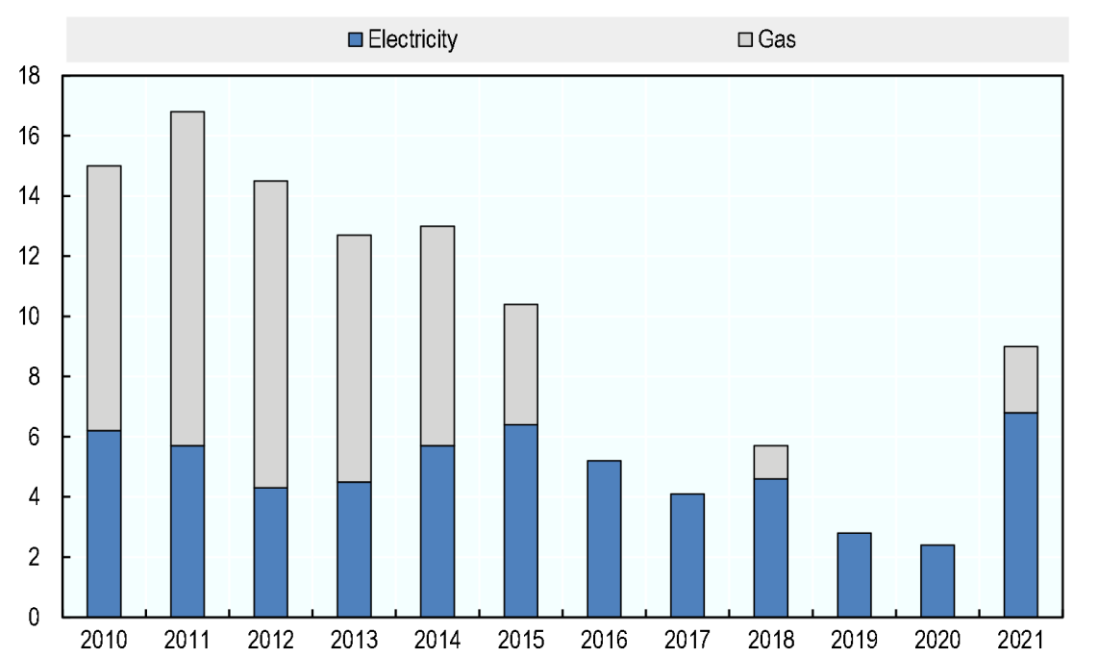
Source: Prepared based on previous estimates of fossil-fuel subsidies in the EaP countries published in the (OECD, 2018[1]) report, data collected for (OECD, 2021[21]), (Ministry of Finance of Ukraine, 2020[2]), (Ministry of Finance of Ukraine, 2018[3]), (Ministry of Finance of Ukraine, 2017[4]), (Ministry of Finance of Ukraine, 2014[5]), (Ministry of Finance of Ukraine, 2013[6]), (Ministry of Finance of Ukraine, 2010[7]), (NERC, 2014[8]) (NEURC, 2021[9]), (NEURC, 2020[10]), (NEURC, 2019[11]), (NEURC, 2018[12]), (NEURC, 2017[13]), (NEURC, 2015[14]), (State Treasury Service of Ukraine, 2021[15]).

Box 1.3. IEA's estimates of fossil-fuel consumption subsidies in Ukraine

IEA's price-gap approach quantifies subsidies to end-consumers of fossil fuels and electricity by comparing average domestic end-user prices with international market reference prices. In the case of Ukraine, a net energy importer, subsidies in the gas sector are estimated based on the import gas price at the nearest international hub plus transportation and distribution costs and value-added tax (VAT). Quantification of fossil-fuel subsidies, embedded in electricity, for countries where electricity is not widely traded across borders (as is the case of Ukraine), is based on the annual weighted average-cost pricing in a given country. The reference price for electricity incorporates production, transmission and distribution costs (no allowance for building new capacities is included) and is at the levelised cost of a combined-cycle gas turbine (CCGT) plant to prevent overestimation.

Figure 1.4 illustrates the most recent IEA's estimates of fossil-fuel subsidies in Ukraine. Subsidies to gas consumers and electricity in total amounted to USD 16.8 billion in 2011 with subsidies to gas consumers accounting for more than two-thirds of the total. Until 2015, a considerable decrease in gas subsidies was largely determined by the fluctuations of international market prices used as a benchmark for estimates. Since 2016, Ukraine's government has partially liberalised gas prices at the domestic market, which effectively removed consumer subsidies for two years. However, failure to revise domestic market prices in line with the moves on the international market resulted in the re-emergence of consumer subsidies in the gas sector at the level of USD 1.1 billion in 2018. During 2019-2020, the regulated gas price was approved at a full-import parity level and was correspondingly adjusted each month. As a result, the price-gap approach did not detect any gas consumer subsidies over this period.

Figure 1.4. IEA's estimates of consumer subsidies in Ukraine, 2021, real 2021 USD million



Source: Prepared based on (IEA, 2022[22]) data.

A step-wise increase in electricity prices for households over the last years helped to cut subsidies by more than two times between 2015 and 2019 but the estimate for 2021 shows a significant increase of up to almost USD 7 billion.

Considering that the prices for oil and oil products are liberalised in Ukraine, the IEA does not identify any subsidies in the oil sector. Figure 1.4 also shows that there are no consumer subsidies in the coal sector because the price-gap approach captures only those government interventions that impact the price for end-users. However, there are producer subsidies to state-owned coal mines in Ukraine, which are discussed in detail in the section on State support measures in the coal sector.

According to the IEA, the average subsidisation rate for all fuels was 31% in 2021 which is much higher than in 2019 when the rate was 10%. This means that end-consumers in Ukraine pay about 70% of market energy prices. Despite this increase, this is still the best indicator among the post-soviet countries for which estimates are available. In 2021, the share of consumer subsidies equalled 5.1% of GDP, which is more than three times higher than in 2019 (IEA, 2022[22]).

State support to production and consumption of fossil fuels

State support measures in the natural gas sector

The previous assessment of fossil-fuel subsidies in Ukraine presented in (OECD, 2018[1]) revealed the largest subsidies in natural gas, which peaked at UAH 145.7 billion (USD 12.3 billion) in 2014. As gas, heat and other utility services were traditionally supplied to households at well below cost-recovery levels, the government developed various support schemes to compensate utility providers for losses accumulated due to inefficient energy pricing policy. Subsidies were provided in the form of direct budgetary transfers (e.g., to compensate losses of Naftogaz) or indirectly covered by local budgets which received inter-budgetary transfers (subventions) from the national budget (see Annex D).

Furthermore, the Cabinet of Ministers used a complex mechanism to recapitalise Naftogaz by issuing state bonds. For this purpose, over the period 2012-15, the Ministry of Finance issued state bonds at the total value of UAH 142.1 billion with a 3- to 10-year maturity period at a 9.95%-14.5% annual interest rate (OECD, 2018[1]), This practice was discontinued in 2016.

Another form of implicit but large support measure for gas consumers was a requirement for state-owned domestic gas producers (with 50% or more shares in state ownership) to sell gas to households at regulated tariffs, at rates considerably below the gas import prices. In particular, upstream companies such as PJSC “Ukrgasvydobuvannia” and PJSC “Chornomornaftogaz” were required to sell gas at about USD 45 USD per mcm (weighted average estimate) while the European Union gas market rate was over USD 400 per mcm in 2012-13. The estimated opportunity cost for domestic gas producers increased from UAH 43 billion in 2012 to UAH 54 billion in 2015, while the subsidy value in USD terms decreased from USD 5 billion to USD 2 billion over the same period (OECD, 2018[1]).

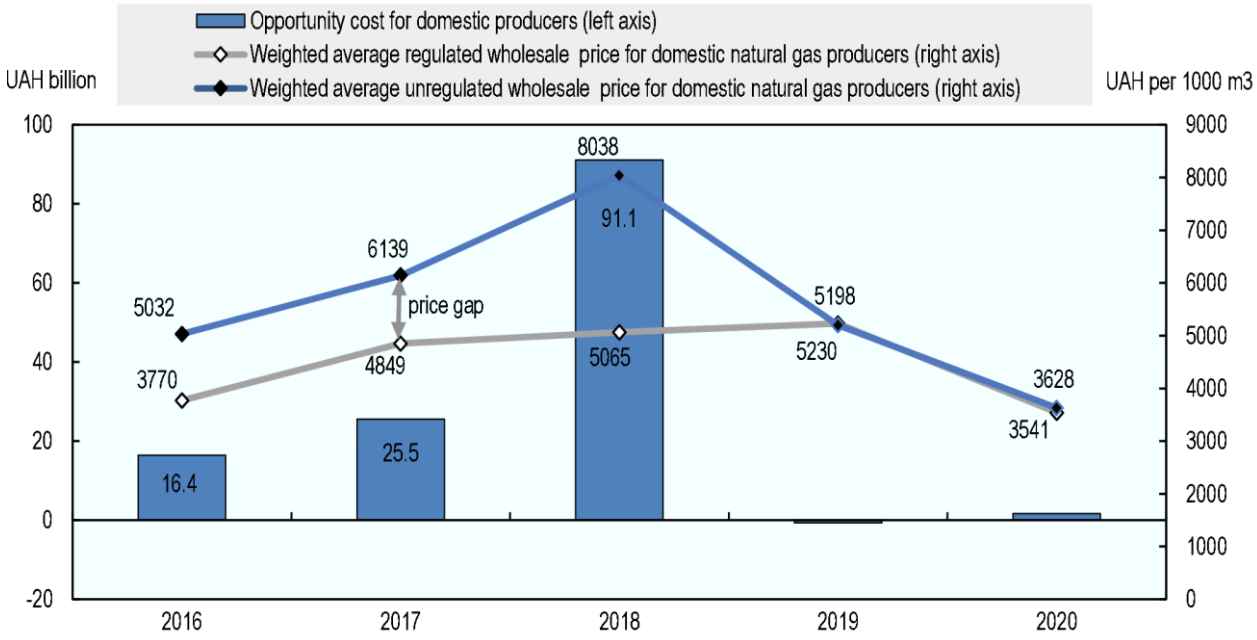
The energy pricing reform, which started in 2015, helped to reduce the amount of subsidies in the natural gas sector. However, the introduction of public service obligations (PSOs) established a new mechanism of implicit subsidies for the preferential groups of end-consumers by assigning obligations for the PSO companies to supply gas at below-market prices.

The PSO mechanism was introduced as a temporary measure at the end of 2015 but it was effective till 20 May 2021. Over this period, PSO companies incurred losses due to supplying gas for preferential consumer groups at the below-market price. (Naftogaz Group, 2018) estimated PSO-related losses for the period 1 October 2015 - 31 December 2017 at more than UAH 111 billion, which includes foregone revenue for PJSC “Ukrgasvydobuvannia” for selling produced gas at below-market prices at UAH 74.8 billion, related bad debt reserve at UAH 24.1 billion and UAH 12.1 billion of other related losses.

The price gap method was used to estimate the opportunity cost for PJSC “Ukrgasvydobuvannia” and PJSC “Chornomornaftogaz” for selling produced gas at regulated, below-market, prices under the PSO regime. Figure 1.5 illustrates the application of the price-gap method based on the comparison between the regulated and unregulated price for domestic producers, which is then multiplied by the amount of

supplied gas. The gap between the weighted average regulated gas price for domestic gas producers, particularly, PJSC "Ukrgasvydobuvannia" and PJSC "Chornomornaftogaz", and unregulated wholesale price for other domestic producers (not covered by the PSO) widened by 2018 and constituted UAH 2 973 per 1 000 m^3. This explains why the opportunity cost for the domestic producer, which is an implicit subsidy for end-consumers, reached more than UAH 91 billion. Notably, a record amount of gas for the needs of PSO consumers was supplied in 2018 – 31 billion m^3 (taking into account the volume of natural gas supplied from underground gas storage facilities), while usually, this amount constitutes about 20 billion m^3. In 2019, the weighted average regulated price slightly exceeded the unregulated price, which is explained by a considerable reduction of natural gas prices at the European market, which resulted in a negative subsidy estimate. On 20 May 2021 the government phased out the PSO regime, as a result, this implicit subsidy on the gas market was eliminated.

Figure 1.5. Opportunity cost for domestic natural gas producers, UAH bln, 2016-2020



Note: To estimate the price-gap and related gas subsidies, the unregulated wholesale natural gas price has been used as a proxy for the market reference price. While in a truly competitive market (which Ukraine is not) the full-import parity price (the price at the nearest hub adjusted for transportation costs to the country's border, Gas Transmission System entry fee and transportation and distribution costs inside Ukraine) should be used as a market reference price, due to data constraints this approach was not possible to apply fully.
Source: Authors' estimates based on data from the Regulator reports (NEURC, 2021[9]), (NEURC, 2020[10]), (NEURC, 2019[11]), (NEURC, 2018[12]), (NEURC, 2017[13]).

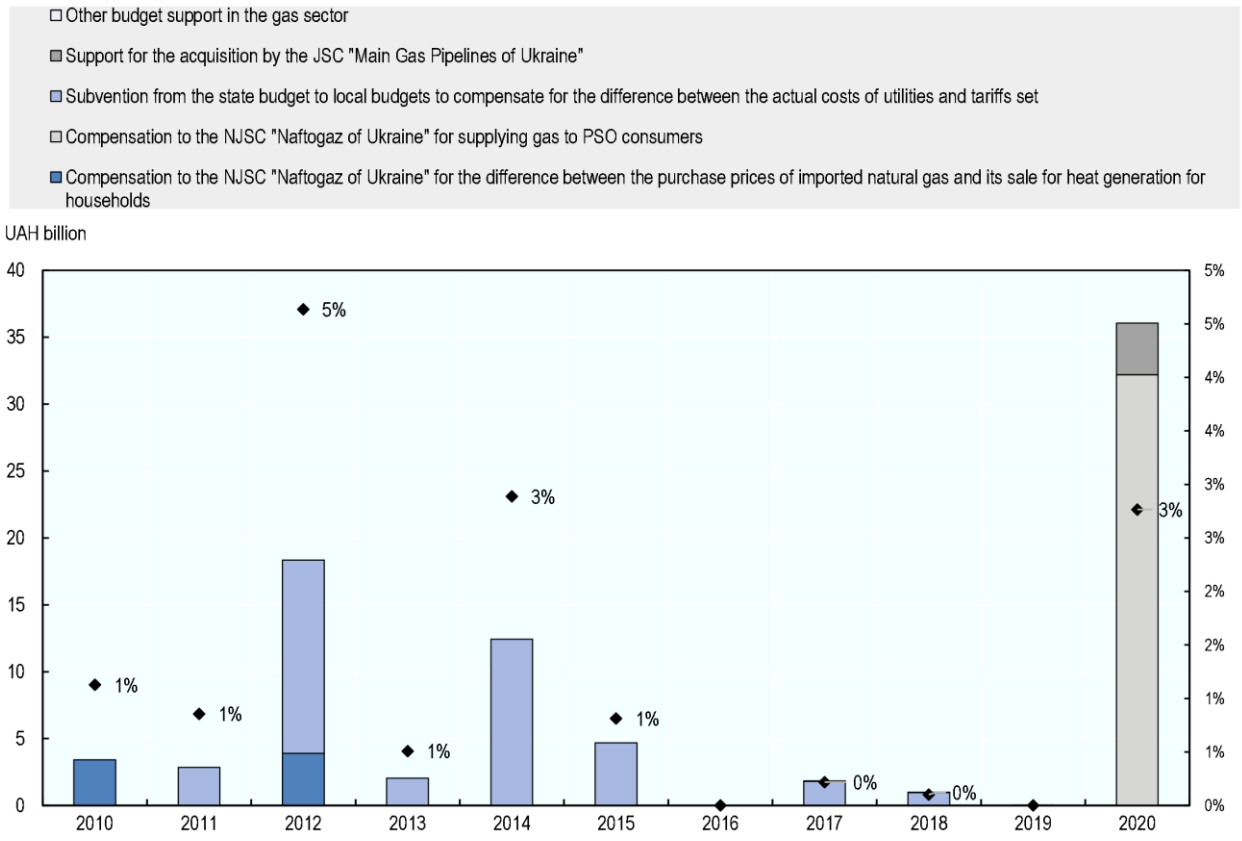
According to the Law on the Natural Gas Market, companies, which are assigned to perform PSO by the state have the right to receive compensation for economically justified costs incurred, less income received while selling natural gas under the PSO, and taking into account the allowable level of profit. However, procedures for estimating the amount of compensation were not defined until recently. In December 2020, the Cabinet of Ministers approved Resolution No. 1 194, which defined procedures for providing compensation to Naftogaz (Cabinet of Ministers, 2020[23]). In the same month, the government paid Naftogaz a UAH 32.2 billion from the state budget to compensate it for the supply of imported natural gas under the PSO regime over the period 2015-19. This decision helped to settle historical debt problems, particularly, settling the debt of Naftogaz to Ukrnafta for gas obtained in 2006 while Ukrnafta settled tax debt to the state. Overall, the government received a tax revenue exceeding the sum of compensation by

UAH 10.3 billion (Naftogaz Group, 2021[24]). At the same time, the opportunity cost to PJSC “Ukrgasvydobuvannia” and PJSC “Chornomornaftogaz” was not compensated as the Law on the Natural Gas Market provides for the compensation of losses rather than for revenue foregone.

Further, deficiencies of the PSO mechanism resulted in heavy indebtedness of the counterparts of the Naftogaz (responsible for supplying gas to households and religious organisations as well as generating heat) receiving gas at regulated tariffs. As of the end of 2020, regional gas supply companies owed Naftogaz UAH 23.5 billion for supplied gas, while the debt of district heating companies amounted to UAH 40.9 billion, other gas consumers under the PSO regime owed Naftogaz UAH 1.4 billion. Recognising that a large share of this bad debt would never be paid, Naftogaz welcomed government efforts to develop the legislative base for the restructuring of this debt rather than writing it off (Naftogaz Group, 2021[24]).

Figure 1.6 illustrates the evolution of budget support in the natural gas sector and the share of subsidies in total expenditure of the state budget. Over the period 2010-15 two budget programmes were effective in the sector – “Compensating NJSC "Naftogaz of Ukraine" for the difference between the purchase prices of imported natural gas and its sale for heat generation for households” and “Subvention (inter-budgetary transfer) from the state budget to local budgets to compensate for the difference between actual costs of utilities and tariffs set”, which are described in more detail in the (OECD, 2018[1]) report. In 2012, budget spending in the natural gas sector reached UAH 18.3 billion constituting 5% of total budget expenditure. No budget spending was allocated to the sector in 2016. Over the period 2017-19, budget funds were also spent on the liquidation of emergency at the main gas pipeline “Luhansk - Lysychansk – Rubezhnoye”, support for PJSC "Mahistralni Gazoprovody Ukrainy", transfer to Smilakomunteploenergo to prevent an emergency in the Smila town due to the financial inability of the enterprise to pay for natural gas (see Annex B). The bar for 2020 reflects a UAH 32.2 billion compensation to Naftogaz paid from the budget. However, it should be emphasised that it was provided for undertaking special responsibilities in the gas market over the period 2015-19. In 2020, the government has also allocated UAH 3.9 billion from the state budget for ensuring the acquisition by JSC "Main Gas Pipelines of Ukraine" from JSC "Ukrtransgaz".

Figure 1.6. Budget support in the natural gas sector and as a share of total budget expenditure, UAH bln, 2010-2020



Source: Prepared based on data from the (State Treasury Service of Ukraine, 2021[15]).

When the government increased gas prices to market levels (based on import parity) in May 2016, the (Ministry of Economic Development and Trade of Ukraine, 2016[25]) claimed that there would be no need for direct and indirect compensations of losses of NJSC “Naftogaz” and heat generating companies. However, the revision of gas prices for certain groups of consumers was not keeping up with price increases at the international market resulting in the re-emergence of direct and indirect subsidies in the natural gas sector. In reality, it took about five years for Ukraine to transit to market-based pricing at the wholesale and retail gas market, while huge debts of the regional gas supply companies and district heating companies pose another challenge that needs to be resolved. Although the PSO regime in the natural gas market is phased out since the end of May 2020 according to the Cabinet of Ministers Resolution No. 867, there is a risk that state regulation of gas prices may be reintroduced in one or another way as price setting at the gas market is still very politicised. The more effectively the retail gas market will function, the lower this risk. The proper operation of the targeted subsidy programme (for more details, see section on Housing and utility subsidies and benefits for households) to support low-income households is another important precondition to secure the achievements of the gas market reform.

State support measures in the coal sector

The coal sector has been playing a prominent role in Ukraine’s economy and was among the largest job providers in the country for decades. However, coal seams have gradually been depleted moving coal extraction deeper into the ground. This dramatically increased production costs and led to a steep reduction

of coal production from almost 87 mtoe in 1990 to 36 mtoe in 2000 and the closure of many coal mines in the country (IEA, 2021[26]).

In the process of coal sector restructuring over the last two decades, the majority of profitable mines were privatised while loss-making mines were left in state ownership. The exceptionally difficult geological conditions of most state-owned coal mines resulted in very high production costs per tonne of extracted coal in the country. In 2005, state-owned mines spent, on average, UAH 274 per 1 tonne of marketable coal while the sale price of the latter was UAH 219. In 2013, sale prices for coal covered only 36% of production costs (UAH 1 352/t) (NISS, 2014[27]). Over the period 2015-19, losses of state-owned mines reached UAH 1 630 per tonne of coal while in the first half of 2020 losses amounted to a record UAH 2 100 per tonne of sold coal (Cabinet of Ministers, 2020[28]).

To keep the coal sector afloat, the government designed various state support programmes, which date back to the 2000's (see Annex B, Annex E, Annex F). Figure 1.7 illustrates the evolution of budget support measures in the coal sector. The largest amount of funds was allocated under the state programme for partial compensation of production costs (see Annex E). Although the total number of state-owned mines decreased from 145 in 2005 to 82 in 2013 and their output dropped from 46.1 million t to 24.1 million tonne over the same period, the amount of budget outlays increased from UAH 0.9 billion in 2005 to UAH 13.3 billion in 2013 (NISS, 2014[27]), (State Treasury Service of Ukraine, 2021[15]).

Overall, the total amount of direct budget spending on the coal sector peaked in 2013 at UAH 15.3 billion, which constituted 3.8% of total budget outlays (Figure 1.7). In 2014-15, budget subsidies for unprofitable state-owned coal mines were significantly reduced due to the fact that Ukraine lost control over the temporarily occupied territory of the Donbas region, where most of the state-owned coal mines are located. As of July 2018, Ukraine's government controlled only 33 state-owned coal mines while the rest 69 mines are located in the temporarily uncontrolled territory (Secretariat of the Cabinet of Ministers, 2018[29]).

In 2015, the amount of state support to cover losses of state-owned mines diminished to UAH 1.2 billion (State Treasury Service of Ukraine, 2021[15]). The programme was phased out in 2019 but compensation of losses to coal mining enterprises is now provided through the coal sector restructuring programme (see Annex F) Budget outlays were also spent on programmes for the technical re-equipment of coal mines, funding of safety and rescue measures. Over the last couple of years, a considerable increase in budget spending on the coal sector restructuring programme has been observed and this spending amounted to over UAH 5 billion in 2020. In addition to regular budget support to the coal sector, the government had funded *ad hoc* measures to bail out state-owned coal mines to cover arrears for consumed electricity or wages for miners.

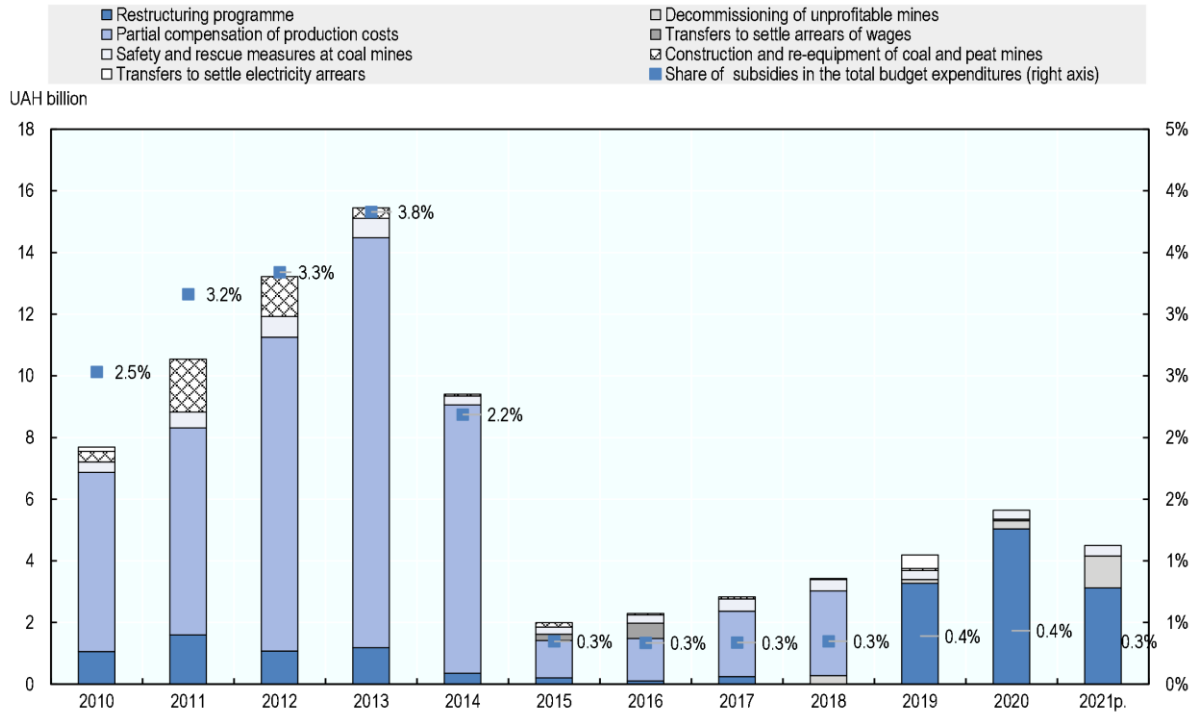
In addition, the government was also spending budget funds for the construction of a new coal mine No.10 "Novovolynska". In total, about UAH 363 million of budget funds were spent on this construction project for the period 2015-19. The construction project was not completed at the time of writing this report but all works have been frozen since 2020. However, the government has to allocate funds (under the restructuring programme) to maintain this entity in safe conditions. Considering global decarbonisation trends, public investment in the construction of new coal mining facilities seems to be rather short-sighted as coal mines could become stranded assets in the coming decades.

In addition, funding of the capital expenditure (e.g., technical re-equipment, repair works) of state-owned coal mines along with other measures is envisioned under the budget programme "Support for the Implementation of the Energy Strategy of Ukraine" (Ministry of Energy and Environmental Protection of Ukraine, 2019[30]). However, this programme has been constantly underfinanced. Of UAH 184 million only about UAH 22 million was allocated under this programme in 2019 and no information is available what exactly these resources were spent on (State Treasury Service of Ukraine, 2021[15]). For this reason, this measure is not included in total subsidy estimates for the coal sector (State Treasury Service of Ukraine, 2021[15]).

Over the period 2016-2020, a number of state support measures in the coal sector were phased out while the total value of allocated budget funds increased by almost three times to UAH 5.7 billion in 2020. In relative terms, budget outlays on the coal sector account for about 0.3%-0.4% of total budget spending over the period 2015-20 (Figure 1.7). As of the beginning of 2021, three budget programmes in the coal sector are effective and UAH 4.5 billion is planned to be spent to support state-owned coal mines in a given year (see Annex B).

Analysis of the effectiveness of budget programmes in the coal sector conducted by (DiXi Group, 2020[31]) over the period 2015-19 revealed that the amount and use of budget funds did not fully correspond with the effective state programmes on the coal sector restructuring and other relevant strategic documents. The targets set in government documents were often not achieved. Most of the funding was allocated to settle arrears of wages to miners.

Figure 1.7. Budget support measures in the coal sector and as a share of total budget spending, UAH bln, 2010-2021



Note: p. – provisional data.
Source: Prepared based on data from the (State Treasury Service of Ukraine, 2021[15]).

The government of Ukraine is also using budget funds to repay a loan to the JSC Lysychanskvuhillya coal mine extended by the China Development Bank under state guarantees back in 2011. Over the period 2015-2020, guarantee payments in total amounted to about UAH 2.8 billion. As of 1 April 2021, the amount of overdue debt of JSC Lysychanskvuhillya to the state for the loan repayment is more than UAH 3 billion (about USD 113 million), which includes about UAH 5 million of fees for the provision of the state guarantees. Additionally, JSC Lysychanskvuhillya is required to pay the state penalty accrued on overdue debt worth UAH 1.6 billion. It is not likely that the company will fully pay its debts to the state due to its poor financial state. If the company is recognised as bankrupt, the government will be able to sell its assets to compensate for the company's liabilities to the state in full or at least partially. Uncompensated liabilities will have to be written off, which is a mechanism of implicit state support. It is not known whether the

company's assets will cover all liabilities to the state, hence, the subsidy element in the company's debt to the state is unclear and cannot be transparently estimated. For this reason, this measure is not included in the total estimate of state support in the coal sector.

Further to budget spending, one measure of tax revenue foregone is identified, particularly, VAT relief for supply of coal and/or products of its enrichment on the customs territory of Ukraine. Initially, this was introduced as a temporary measure for the period from 2016 till July 2017 but it was later extended several times and is now effective until 2022. The (Ministry of Finance of Ukraine, 2020[2]) estimates revenue foregone due to such measure at UAH 1.3 billion in 2020 and UAH 1.4 billion in 2021. For 2016-2021, the cumulative revenue foregone for the state budget is estimated at UAH 13.3 billion.

Despite considerable budget support of state-owned coal mines, the coal sector has accumulated considerable tax and electricity arrears, which can be considered as implicit support measures to coal mines and such arrears exceed budget spending. According to the (Ministry of Energy and Coal Industry of Ukraine, 2019[32]), tax arrears of state-owned coal mines amounted to more than UAH 8.2 billion and electricity arrears to more than UAH 8.3 billion as of June 2019. It is not likely that state-owned coal mines will be able to pay all these debts due to their critical financial state. At the same time, the approved Law No. 2 021-VIII of 13 April 2017 on the Restoration of the Solvency of the State Coal Mining Enterprises envisions suspension of enforcement proceedings and measures of enforcement of decisions on state-owned coal mining enterprises by 1 January 2020. Further, arrests and prohibitions on the alienation of property in such enforcement proceedings have been lifted and bankruptcy cases of state-owned coal mining companies are not initiated until 1 January 2022. Thus, the government has no legal basis to settle tax arrears of state-owned coal mines by initiating bankruptcy cases and selling out their assets in the near future. In addition, the write-off of tax debts of state-owned coal mines is currently being discussed. In particular, the draft Concept for the Reforming of the Coal Industry for the Period 2020-24 envisions the development of amendments to the Tax Code to enable write-off of tax arrears of state-owned coal mining enterprises (Cabinet of Ministers, 2020[28]).

A study by the Energy Community (Miljević, 2020[33]) analysed direct subsidies to coal and lignite electricity production in the Energy Community Contracting Parties over the period 2018-19. The study confirmed that of all EU's Eastern Partnership members of the Energy Community (Georgia, Moldova and Ukraine) only Ukraine provides subsidies to electricity generated from coal. While data on direct budgetary support that come from the budget execution reports of the Treasury of Ukraine are consistent in both reports, the Energy Community analysis is broader and includes estimates on, among others, low-interest loans and loan guarantees extended to electricity producers by the state. Subsidies provided in this way constitute transfer of risk to government and a longer-term liability to the state and are not covered by the OECD study. The Energy Community analysis shows a significant increase in subsidies for coal-fired electricity in Ukraine in 2019 (about 60%) compared to 2018 (OECD, 2021[21]).

Over the years, various strategic documents and state programmes of Ukraine's government have included plans for a gradual phase-out of subsidies in the coal sector and decommissioning of unprofitable mines accompanied by social programmes for ex-miners. Much needed reforms in the coal sector have been constantly postponed and state programmes underfinanced. However, recent policy developments provide some optimism that government plans for the coal sector transformation developed in cooperation with and supported by international partners will be more successful than previous programmes and other strategic documents in the sector[2].

In August 2017, the Cabinet of Ministers of Ukraine approved a new Energy Strategy of Ukraine for the period till 2035 "Security, Energy Efficiency, Competitiveness", which sets the target for the phase-out of the state regulation and subsidies covering operating costs of coal mining enterprises. The Strategy sets targets for the coal sector restructuring, preparation of promising state mines for privatisation and liquidation/conservation of unprofitable state mines and reform of state support in the sector, which should be focused on occupational safety, environmental protection and sector restructuring. The Strategy further

states that liquidation/conservation of unprofitable state mines need to be completed by 2025 and a social and environmental mitigation plan will be developed for each facility based on best international practices (Cabinet of Ministers, 2017[34])

In May 2020, the government established a Coordination Centre on Transformation of Coal Regions of Ukraine, which is an advisory body comprising of the representatives of relevant government agencies, Parliamentary committees, regional administrations, labour unions and experts from the private and public sectors and is chaired by the Prime Minister of Ukraine (Cabinet of Ministers, 2020[35]). The first meeting of the Centre took place in early October 2020. At the meeting, the government presented the Concept of the National Programme for the Transformation of Coal Regions of Ukraine until 2027 and the draft Concept for the Reforming of the Coal Industry for the Period 2020-24. The first concept introduces the key principles for regional transformation, incentives to attract investments in coal-mining regions and presents three pilot projects for the transformation of coal-mining towns (Ministry for Communities and Territories Development of Ukraine, 2020[36]). The second concept outlines the pathway for the coal sector transformation by combining the process of privatisation and integration of state-owned mines into PJSC Centrenergo. This approach envisions the division of mines into three groups taking into account financial and geological factors. The first group planned for integration with PJSC Centrenergo has to provide a stable resource base for the company. The second one incorporates mines producing steam and coking coal, which have other markets for the sale of their produce. These mines will be either privatised or closed. The third group includes mines, which will be offered for privatisation as integral property complexes that can be used for other economic activities (Cabinet of Ministers, 2020[28]).

Civil society is also making efforts to support the just transition of the coal sector. In May 2019, representatives of local authorities and civil society of the Donetsk region signed a Memorandum on Partnership and established the Platform on sustainable development of coal mining towns of the Donetsk region. The platform is established to support the socio-economic development of the region and the transformation of the town's image, reduction of GHG emissions and welfare improvement of local communities. These objectives are planned to be achieved by implementing incentives for the development of innovative enterprises, diversification of the economy, implementation of advanced energy-efficient technologies, further development of social programmes to support those in need due to structural changes of the economy, improvement of environmental safety and infrastructure management in towns, introduction of social innovations (Ecoaction, 2019[37]). As of May 2021, the platform incorporates nine towns: Bilozers'ke, Dobropillia, Myrnohrad, Novodonets'ke, Novohrodivka, Pokrovsk, Selydoveand, Vuhledar, Toretsk.

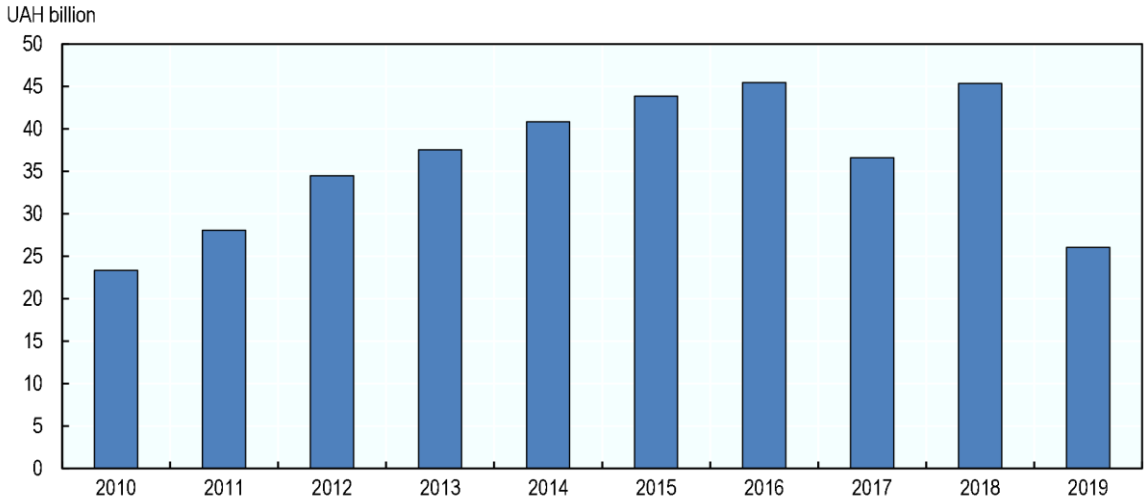
State support measures in the electricity sector

To contain the growth of electricity tariffs for households and other preferential groups of consumers, the government introduced cross-subsidies in the electricity sector back in the 2000s (see Annex I). The difference between regulated tariffs for households and other preferential consumers, on the one hand, and electricity production costs, on the other, was compensated by higher tariffs for non-residential consumers. In 2014, tariffs (particularly, for industry, railway and state-funded institutions) were on average higher by 26% which allowed to provide for subsidies for households and several other beneficiary consumer groups. At the same time, the end price for households covered only 21% of the cost of generation, transmission and supply of electricity at the beginning of 2015 (NEURC, 2015[38]) Figure 1.8 illustrates that over the period 2010-16 the total value of cross-subsidies increased almost twice and peaked at UAH 45.5 billion. In USD values, the value of subsidy certificates peaked at USD 4.7 billion in 2013 (see Annex B).

Electricity suppliers were compensated for providing services at regulated tariffs for up to 10 categories of consumers via so-called subsidy certificates. Subsidy certificates were basically used to cross-subsidise electricity prices from non-residential to residential consumers and the certificates' value was embedded in the wholesale electricity price. In 2015, the share of subsidy certificates reached almost 31% of the

wholesale electricity price (NEURC, 2016[39]). More than 90% of the subsidy certificates value was allocated to compensate for electricity supply at below-cost recovery tariffs to households, the remaining sum covered subsidies for consumers paying the differentiated tariff, electric municipal transport, street lighting, companies implementing innovative projects. Over time, the Regulator had reduced the number of beneficiary consumer groups to limit the amount of cross-subsidies. For example, before 2010, ore-mining and chemical enterprises used to benefit from preferential tariffs (NERC, 2014[8]). In 2015-16, the NEURC cancelled preferential tariffs to coal mining enterprises and economic entities that implement innovative projects as well as for urban electric municipal transport and street lighting (NEURC, 2016[40]), (NEURC, 2017[13]). These measures coupled with step-wise increases of electricity tariffs for households over the period 2015-17 helped to decrease the amount of cross-subsidies in 2017 to UAH 37 billion. However, since 2018, the gap between production costs and household electricity tariffs has widened further resulting in renewed growth of cross-subsidies almost to the same level as in 2016. In 2018, the value of subsidy certificates constituted 21.9% of wholesale electricity prices and cross-subsidies benefitted 5 consumer groups. In the first half of 2019, the value of cross-subsidies constituted UAH 26 billion and the share of subsidy certificates reached 22.3% (NEURC, 2020[10]).

Figure 1.8. Cross-subsidisation in the electricity sector through subsidy certificates, UAH bln, 2010-19



Source: Prepared based on data from the Regulator reports: (NERC, 2014[8]), (NEURC, 2015[14]), (NEURC, 2020[10]).

Similar to subsidies in the coal sector, the government declared the phase-out of cross-subsidies in the electricity sector for many years but politically unpopular decisions have been constantly postponed. The new Energy Strategy of Ukraine for the period till 2035 “Security, Energy Efficiency, Competitiveness” envisions elimination of cross-subsidisation between consumers and bringing prices for households to market levels (Cabinet of Ministers, 2017[34]). Phase-out of cross-subsidisation in the electricity market is also envisioned in Law No. 2 019-VIII of 13 April 2017 on the Electricity Market (Parliament of Ukraine, 2017[41]). In particular, Article 3 of the Law states that prices and tariffs on the electricity market regulated by the state must not allow for cross-subsidisation between different users. The Law further states that the Regulator should ensure the elimination of cross-subsidisation between different categories of consumers before the launch of the new electricity market.

The wholesale electricity market was launched on 1 July 2019 and cross-subsidisation between different consumer groups through subsidy certificates was phase-out. Instead, the government introduced a different instrument for subsidising low tariffs for households through public service obligations (PSO)

imposed on producers of electricity from nuclear power (NPPs) and larger hydropower plants (for more details, see section on Electricity in the chapter on Energy pricing and taxation policy as a source of fossil-fuel subsidies in Ukraine.

The PSO mechanism was introduced as a temporary measure during the transition period to a fully liberalised electricity market to prevent a steep increase of electricity tariffs for households. However, it has further deteriorated the difficult financial state of the Energoatom and Ukrhydroenergo and distorts the electricity market. In addition, this type of "blanket" subsidy to shield all households regardless of their income is very inefficient and undermines incentives for energy-efficiency improvements at the level of the household. Experience from other countries shows that means-tested targeted subsidies for low-income households is the most efficient and appropriate mechanism to protect vulnerable groups of households from a considerable increase of electricity prices. The Housing and Utilities Subsidy Programme has been recently reformed (see section on Housing and utility subsidies and benefits for households below) and is well-suited to absorb a higher number of recipients and/or increase payments to current beneficiaries due to the phase out of implicit subsidies in the electricity sector. Political will is needed to approve a step-wise increase of electricity prices for households to a full cost-recovering level and abandon the PSO mechanism.

Housing and utility subsidies and benefits for households

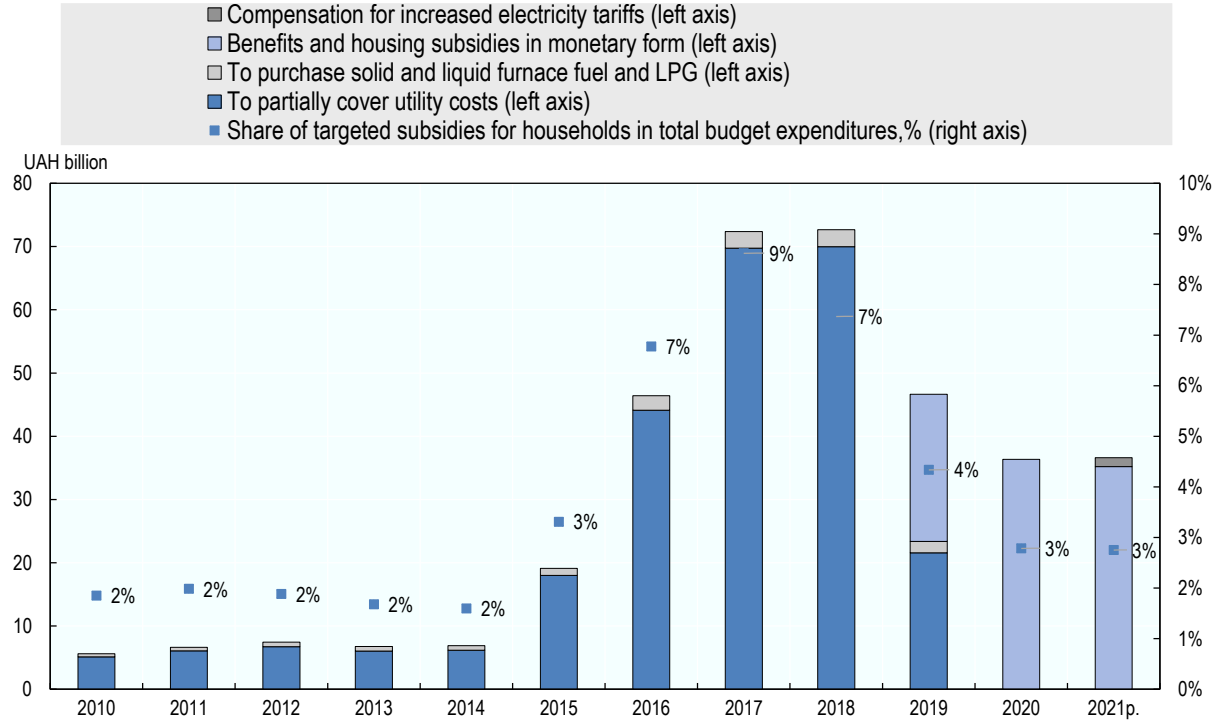
Targeted subsidies to vulnerable groups have been provided in Ukraine since the early 1990s as a social protection measure for low-income families in the form of support for the payment of housing and communal services. Low-income households are eligible for partial compensation of utility payments according to the procedures defined in the Cabinet of Ministers Resolution No. 848 of 21 October 1995 (with amendments). The amount of the granted subsidy is estimated on a case-by-case basis taking into account the average household income where utility cost should not be higher than 20% of the average monthly total household income (Cabinet of Ministers, 1998[42]).

In addition to housing subsidies for low-income households, there have been many preferential categories of consumers, who could apply for quite a substantial discount on utility payments (from 25% to 100%) within normative consumption amounts. The legal underpinnings of such benefits are spread over a large body of legislation. These benefits are granted, for example, to war veterans; military personnel with disabilities resulting from their service; citizens affected by the Chernobyl disaster; former prisoners of concentration camps; retired workers of the Security Service of Ukraine; families with three or more kids (for a full list see Article 87, p. 9 of the Budget Code) (Parliament of Ukraine, 2010[43]). Until mid-2015, all these consumers were eligible for discounts on utility payments regardless of their actual income. In July 2015 the procedures for the provision of benefits were amended and now the average monthly household income has been taken into account for most categories of beneficiaries (Cabinet of Ministers, 2015[44]). Nevertheless, there are still quite a few categories that are not required to submit their income declarations in applying for a discount on utility payments (104.ua, 2019[45]). The benefits for the payment of housing and communal services are assigned by the local social protection bodies in line with the procedures and requirements defined by the Resolution of the Cabinet of Ministers No. 373 of 17 April 2019 (Cabinet of Ministers, 2019[46]).

Figure 1.9. illustrates the evolution of budget spending on target subsidies and benefits for households. Considering that utility tariffs were kept at very low levels (well below cost-recovery) for years and the procedure of application for targeted support was quite complicated, the number of subsidy beneficiaries was not large in the 2000s. Further, over the period 2010-14, the number of housing and utility subsidy recipients decreased by almost 257 thousand to 1.5 million households. The number of households receiving subsidies for the purchase of LPG and furnace fuels decreased by about 86 thousand to 242 thousand in 2014 (State Statistics Service of Ukraine, 2019[47]).

Prior to 2015, the share of direct subsidies and benefits allocated to eligible households was not large – in the range of UAH 6-7 billion, which constituted approximately 2% of total budget expenditure. At the same time, indirect "blanket" subsidies to all households, regardless of their income, were very high (see section on Overview of the state support in the energy sector). In 2015, end-tariffs were increased considerably, which resulted in more than a three-time increase in the total number of subsidy recipients (approximately 6 million) (State Statistics Service of Ukraine, 2019[47]). The government has also simplified the procedures for the allocation of subsidies, particularly, the number of documents required for the submission was reduced and several eligibility requirements were cancelled. As a result, the amount of funds allocated for targeted subsidies to low-income households and benefits to certain categories of consumers increased several times to approximately UAH 19 billion (State Treasury Service of Ukraine, 2021[15]).

Figure 1.9. Budget spending on housing subsidies and benefits for households and their share budget expenditure, UAH bln, 2010-2021



Note: p. – provisional data.
Source: Prepared based on data of the (State Treasury Service of Ukraine, 2021[15]).

At the end of April 2016, Ukraine's government embarked on a gas pricing reform and increased gas tariff for households to market levels. This translated into almost a two-time increase in prices households had to pay for central heating and hot water supply, depending on the region and the particular fuel mix used in generation. To mitigate the negative effects on low-income households, budget spending on targeted subsidies to support vulnerable groups was increased substantially. At the peak of the reform in 2017, the total number of subsidies and benefitting recipients reached 9.6 million, which was about 64% of all households (State Statistics Service of Ukraine, 2018[48]), (State Statistics Service of Ukraine, 2019[47]). In 2017, government spending to support these categories of households reached 9% (UAH 72.4 billion) of total budget outlays.

Over the period 2017-19, the government implemented important amendments to procedures for the allocation of subsidies and benefits to eligible households to incentivise energy saving, improve targeting

and accountability and by doing so to contain the cost of targeted subsidies. In particular, an energy-saving incentive during the heating season was introduced in 2017. It allowed households to receive the unused amount of the subsidy (allocated based on normative consumption of gas and electricity for heating) due to lower consumption of gas and electricity for heating to cover other household needs. In 2018, eligibility criteria to receive housing and utility subsidies became more stringent. For example, owners of apartments larger than 120 square meters or private houses larger than 200 square meters were no longer eligible for subsidies. Further, normative consumption of energy resources (used for the estimation of the number of subsidies) was reduced (DiXi Group, 2019[49]). These measures allowed to reduce the overall number of subsidy recipients to 7 million households in 2018 (State Statistics Service of Ukraine, 2019[47]) while the value of two dedicated budget programmes slightly increased to UAH 72.7 billion. In 2019, the number of subsidy beneficiaries decreased further to 5.9 million (State Statistics Service of Ukraine, 2020[50]). In February 2019, another amendment was introduced to the subsidy programme to address the issue of payment discipline for utility bills. According to the new procedure, no subsidy is provided if the applicant has arrears on utility bills larger than one month (later amended to three months). This provision helped to improve the payment discipline among subsidy recipients (USAID, 2020[51]).

Until 2019, targeted subsidies and benefits for the payment of utilities and housing services were provided through two budget programmes. One programme envisioned the subvension (inter-budgetary transfer) from the state budget to local budgets for the provision of housing subsidies and benefits to certain categories of consumers. The beneficiaries of this programme were receiving discounts on their utility bills while the difference was compensated to utility providers (see Annex G for more detailed description). Under the second programme, the subvention from the national budget to local budgets was mandated for the provision of benefits and housing subsidies for purchasing of solid and liquid household furnace fuel and LPG (see Annex H for more detailed description).

In 2019, a new phase of the housing and utility subsidies reform started with the approval of the Cabinet of Ministers Resolution No. 1 176 of 27 December 2018 (Cabinet of Ministers, 2018[52]). Ukraine's government implemented the so-called "monetisation" of subsidies at the level of end-consumers. Unlike the previous mechanism under which compensation for the discounts in utility bills was provided to utility suppliers, the new mechanism allowed beneficiaries to receive state support directly either in cash or on accounts opened in banks approved by the Cabinet of Ministers. Designated bank accounts apply special use mode so that available funds are first spent on utility bills. If households cut on energy consumption, they can spend the unused amount of subsidy at the end of the heating season at their discretion (DiXi Group, 2019[49]).

In addition to housing and utility subsidies and benefits, the government has planned additional funds at UAH 1.4 billion in the 2021 budget to compensate for cancelling a reduced electricity tariff (0.9 UAH/kWh) for the first 100 kWh consumed as well as other reduced electricity tariffs for certain categories of consumers (State Treasury Service of Ukraine, 2021[15]). This measure was introduced to strengthen the social protection of certain categories of electricity consumers during the COVID-19 pandemic. Compensation will be provided to households living in apartments and houses equipped with electric heating as well as large families and family-type orphanages. Only those households which are not receiving support under the housing and utility subsidies programme are eligible to apply for compensation (Cabinet of Ministers, 2021[53]).

All the above-mentioned reforms allowed to cut budget spending on targeted subsidies by about two times in 2020-21 compared to 2017-18 levels (Figure 1.9). In 2020, the procedures for applying for housing subsidies were simplified and additional compensation to low-income households for the cost of utilities was introduced within a package of social protection measures, approved by the government to mitigate the effects of quarantine due to the COVID-19 pandemic (Cabinet of Ministers, 2020[54]).

Box 1.4. Ukraine's government COVID-19 response measures in the energy sector

In December 2020, the Cabinet of Ministers approved Resolution No. 1 236 On the Establishment of Quarantine and the Introduction of Restrictive Anti-Epidemic Measures to Prevent the Spread of Acute Respiratory Disease COVID-19 Caused by Coronavirus SARS-CoV-2 in Ukraine, which included a cap on gas prices for households for the period of quarantine but not later than 31 March 2021. In May 2021, the Cabinet of Ministers approved amendments to Resolution № 1 236, which introduced a cap on trade margin for diesel and petrol for the period of quarantine due to Covid-19 as these fuels were recognised as socially important goods (Cabinet of Ministers, 2020[28]).

Revision of the 2020 Budget spending to accumulate resources for the COVID-19 fund resulted in considerable amendments to budget programmes in the energy sector. Spending on the "Warm" loans energy-efficiency programme was reduced considerably while support for the operations of the Energy Efficiency Fund (EEF) was completely cancelled and UAH 1.6 billion initially planned for the EFF was reallocated to the COVID-19 Fund (State Treasury Service of Ukraine, 2021[15]). However, an overall spending on subsidies for state-owned coal mines was increased (OECD, 2021[21]).

Further, the procedures for applying for housing subsidies were simplified and additional compensation to low-income households for the cost of utilities was introduced within a package of social protection measures, approved by the government to mitigate the effects of quarantine due to the COVID-19 pandemic (Cabinet of Ministers, 2020[28]).

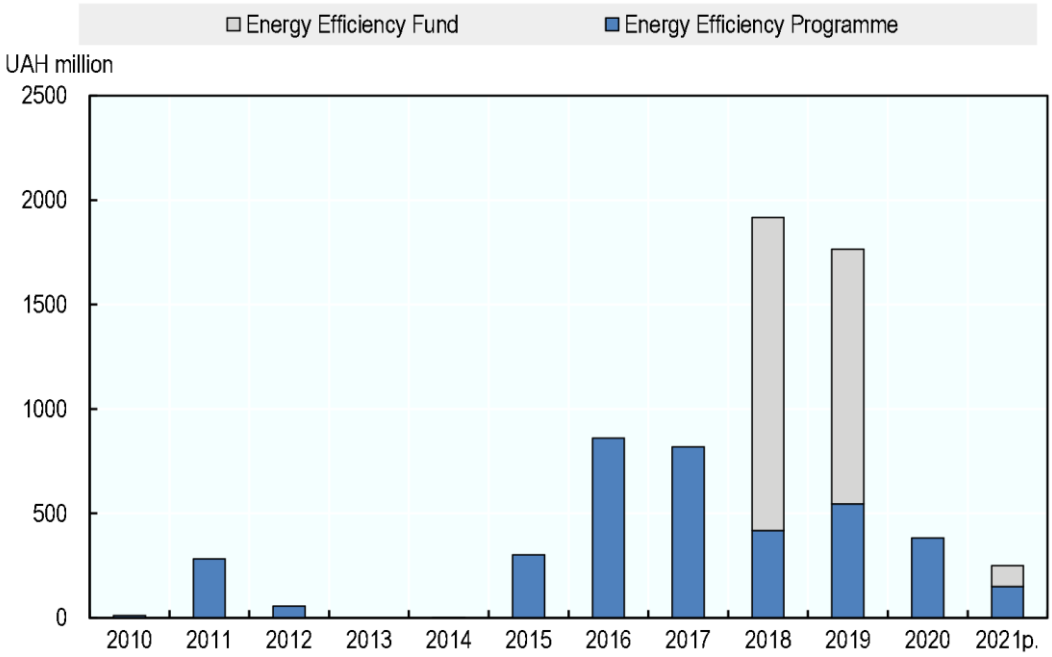
Source Authors' compilation.

State support for energy-efficiency buildings retrofits

Sate support for energy-efficiency measures has been quite limited until recently (Figure 1.10). Although the State Targeted Economic Programme on Energy Efficiency and Development of Renewable Energy Sources for 2010-21 was approved in 2010 it did not work effectively and was constantly underfinanced. In October 2014, the State Agency on Energy Efficiency and Energy Saving of Ukraine modernised the programme and introduced incentives for the implementation of energy-efficiency measures at the level of the household. Since then, the programme has been known as the "Warm" loans programme.

The programme envisions the reimbursement of 20% of the loan principal (but not more than UAH 12 thousand) for the purchase of the non-electric and non-gas boilers (primarily solid biomass) and related equipment, 35% - for the purchase of energy efficient equipment/materials for individuals - owners of private homes (but not more than UAH 14 thousand), and 40% - for homeowners' associations (but not more than UAH 14 thousand per flat) (Cabinet of Ministers, 2011[55]).

Figure 1.10. State support to energy-efficiency measures, UAH mln, 2010-2021



Note: p. – provisional data.
Source: Prepared based on data of the (State Treasury Service of Ukraine, 2021[15]).

An assessment of the programme effectiveness carried out by the (State Agency on Energy Efficiency and Energy Saving of Ukraine, 2020[56]) in cooperation with international partners delivered good results. Over the period 2014-19, 740 thousand households benefited from the programme (some households applied 2-3 times). Cumulatively, they attracted UAH 7.4 billion of investments in energy-efficiency measures of which 40% was compensated by the state. Homeowners' associations, which implemented energy-efficiency measures under the programme, decreased heat consumption by 20%. Individual homeowners saved about 30% on gas bills for heating due to the implementation of energy-efficiency measures funded by the state.

Over the period 2015-20, about UAH 3.3 billion were allocated from the state budget to finance the "Warm" loans energy-efficiency programme. In the 2021 state budget, only UAH 150 million is planned for this programme, which is much lower than what was allocated in the previous years (State Treasury Service of Ukraine, 2021[15]).

Further, the government of Ukraine established the Energy Efficiency Fund (EEF) with the EEF Law approved in June 2017 (Parliament of Ukraine, 2017[57]). The Fund administers the programme "Energodim" on energy-efficiency retrofits of multi-storey buildings and is designed to support homeowners' associations. The programme envisions the reimbursement of 70% of costs on the facade renovation and the modernisation of the internal systems of the building. The Fund is financed from the state budget and is also co-sponsored by the European Union and the German government, while the International Finance Corporation (IFC), German Development Agency (GIZ) and United Nations Development Programme (UNDP) provide technical support.

The Fund became operational in 2018 and until the end of 2020 it accumulated more than 650 projects in its portfolio worth UAH 5.2 billion, which will benefit approximately 58 thousand households. The implementation of these projects is estimated to bring more than 291 GWh of energy-saving and deliver 76.7 thousand tonnes of CO_2 reductions annually (Energy Efficiency Fund, 2021[58]).

Ukraine's government allocated considerable finance to the Fund in 2018 and 2019 while no budget resources were allocated in 2020 and only UAH 100 million is envisioned in the 2021 state budget (Figure 1.10).

Overall, sizable budget support of energy-efficiency measures was allocated only in 2018-2019. Budget spending was constrained in 2020 and 2021, the years of the COVID-19 pandemic. However, it is important to scale up the implementation of energy-efficiency measures in the buildings sector and envision a sufficient amount of support for the above-mentioned state programmes in the coming years, as they have proven to be effective.

State support to producers of electricity from renewable energy sources

Ukraine introduced "green" feed-in tariffs (FITs) to support electricity production from renewable energy sources back in 2009 for the period until 2030. FITs have been applied to small hydro, wind, bio and solar energy projects and served as the main policy incentive to stimulate renewables development (Parliament of Ukraine, 2008[59]). FITs have been set based on the retail tariff for consumers of the second voltage class, as of January 2009, multiplied by the "green" coefficient approved for each type of renewable energy with an added premium for using equipment produced in Ukraine. Initially, tariffs were set at a very high level but were subdequently decreased with several rounds of amendments to key laws (DiXi Group, 2021[60]), FITs have boosted electricity production from renewables from just 51.8 million kWh in 2009 to over 10.2 billion kWh in 2020 accounting for 7.3% of total electricity generation in 2020 (NEURC, 2015[14]), (NEURC, 2021[9]).

Incentive tariff for heat energy producers for renewable sources for the needs of public institutions and households was introduced in 2017 with the approval of Law No. 1 959-VIII (Parliament of Ukraine, 2017[41]). Unlike FITs, this incentive tariff is set at the level of 90% from the weighted average tariff for heat-generating companies using natural gas.

The Energy Strategy of Ukraine till 2035 sets ambitious targets for increasing the share of renewables in total energy supply at 12% and at least 25% by 2025 and 2035, respectively (Cabinet of Ministers, 2017[34]). However, the financing options for considerable renewables expansion were not properly planned especially under the new model of the electricity market. This led to an accumulation of huge debts to investors in renewable energy already in 2020. To reduce the cost of renewables support, the government initiated negotiations with renewable energy investors on the voluntary restructuring of "green" tariffs through the mediation of the Energy Community Secretariat. On 10 June 2020, a Memorandum of understanding on the settlement of problematic issues in the field of renewable energy in Ukraine was signed by key parties (DiXi Group, 2021[60]). The provisions of the Memorandum were reflected in Law 810-IX, which envisions a decrease of FITs for wind and solar power plants by 7.5% and 15%, respectively, the introduction of the responsibility for imbalances, settlement of debts, and others. (Parliament of Ukraine, 2020[61]).

Further, to increase competition in the renewables market, an auction mechanism for large renewable energy installations was introduced with Law of Ukraine No. 2 712-VIII in 2019. According to the Law, wind and solar installations with installed capacity larger than 5 MW and 1 MW, respectively, are obliged to participate in auctions for the allocation of support quotas, while small producers can participate voluntarily. Small installations at the level of households with a capacity not higher than 50 kW are still eligible for green tariffs by 2029 (Parliament of Ukraine, 2019[62]). As of June 2021, the auction mechanism was still at the preparatory phase.

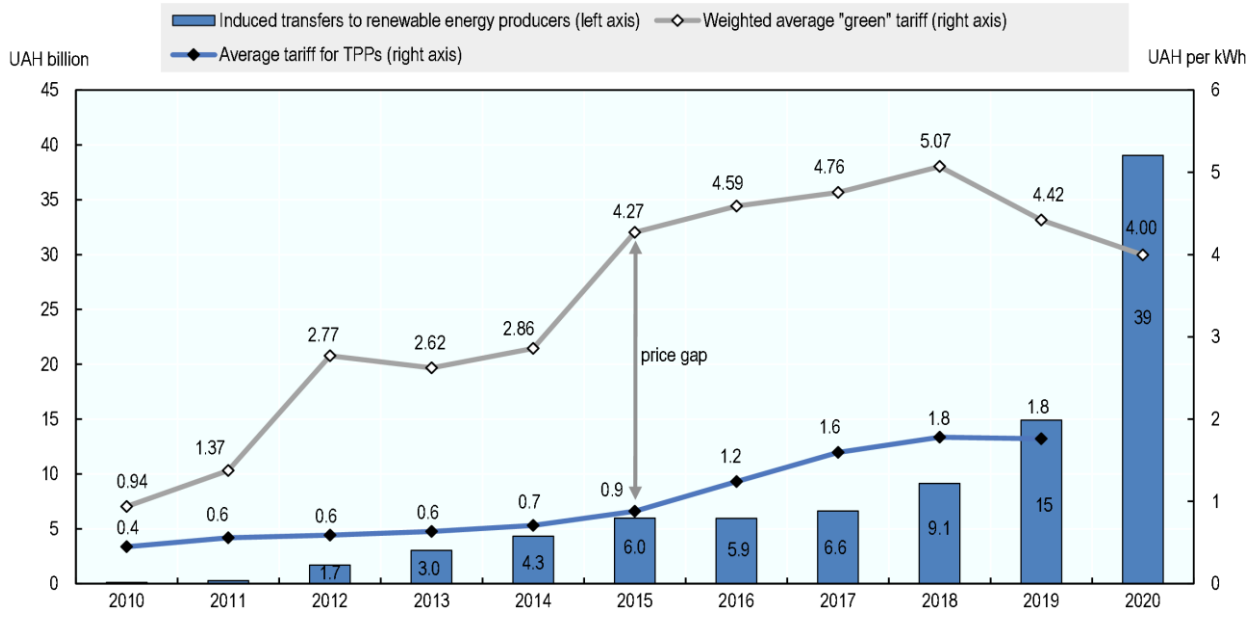
Figure 1.11 illustrates state support to renewable energy producers provided via FITs estimated using the price-gap method, which is based on a comparison of stimulating FITs and tariff for Thermal Power Plants (TPPs) (see Annex J for more details). The largest price gap was observed in 2015 at UAH 3.39 per kWh. The value of weighted average FIT peaked at UAH 5.07 per kWh in 2018 and has gone down since then.

As the renewables sector has been growing rapidly, the total amount of induced transfers to it increased from UAH 119 million in 2010 to almost UAH 15 billion in 2019.

As the new electricity market was launched in July 2019, the mechanism for financing FITs has changed as well. The Guaranteed Buyer and universal services providers are now responsible for the purchase of renewable electricity fulfilling the Public Service Obligations for ensuring an increase in the share of electricity production from renewable energy. In turn, they receive compensation from Ukrenergo, the transmission system operator, as the cost of support to renewable energy producers is embedded in the electricity transmission tariff (NEURC, 2021[9]).

Thus, the value of induced transfers via FITs in 2020 is the sum of service cost for support of renewable energy producers of the Guaranteed Buyer and universal services providers. A considerable increase of the value of support to renewable energy producers up to UAH 39 billion in 2020 can be explained by the almost two-times increase of electricity production from renewable sources and also the additional costs of the services provided by the Guaranteed Buyer. In particular, the cost of services for increasing the share of renewables is estimated as the difference between the electricity purchased from renewable energy producers under FITs and the cost of electricity sold at the day-ahead, intra-day markets and under bilateral contracts. Additionally, it covers the cost of settling imbalances of electricity producers and consumers included in the balancing group of the Guaranteed Buyer, as well as the administrative costs of the Guaranteed Buyer (NEURC, 2021[9]).

Figure 1.11 Induced transfers to renewable energy producers via FITs, UAH bln, 2010-2020



Source: Authors' estimates based on data from the regulator reports: (NERC, 2014[8]), (NEURC, 2021[9]), (NEURC, 2020[10]), (NEURC, 2019[11]).

Renewable energy producers have been also benefitting from several tax benefits. The key tax benefits are listed in Annex C. The largest tax revenue foregone due to tax benefits provided for renewables were estimated by the Ministry of Finance at UAH 1.8 billion and UAH 1.7 billion in 2012 and 2016, respectively. Corporate profit tax exemptions were cancelled in 2015. Zero excise tax rate for bioethanol used for the production of biofuel and bioethanol-gasoline fuel blends and VAT and import duty exemptions with respect to import operations of materials and equipment for the production of renewable energy sources, electricity generation from renewables sources as well as energy-saving equipment (if identical goods are not

produced in Ukraine) are still valid (Parliament of Ukraine, 2012[63]). However, estimates of the revenue foregone for recent years are not available.

Over the last few years, Ukraine managed to initiate significant energy sector reforms and phased out many old subsidy schemes. However, new instruments of implicit consumer support were also introduced. Cross-subsidies under the PSO regime in the electricity sector and huge indebtedness in the gas sector are among the major challenges of the energy sector that are yet to be addressed. Completion and sustaining results of reforms in the electricity and natural gas markets is not a trivial matter and will require a strong political will to implement unpopular decisions. In the backdrop of the COVID-19 pandemic and rising energy prices and as the economy starts to recover, Ukraine should resist introducing new subsidy schemes or even turning them into a long-term structural feature of the economy as this may lead to further market distortions.

Notes

[1] It also has to be mentioned that from January 2015 onwards the national currency of Ukraine depreciated significantly against the USD. Hence, the change in the support levels expressed in the UAH and USD is not comparable.

[2] Consult report by (DiXi Group, 2020[31]) for the overview of implementation results of state programmes and strategic documents in the coal sector.

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2 Energy pricing and taxation policy as a source of fossil-fuel subsidies in Ukraine

This chapter focuses on the main energy pricing and energy taxation policies in Ukraine which give rise to a number of fossil-fuel subsidies particularly in the form of tax expenditure. These policies lie at the heart of subsidy discussion as they are among the main channels for providing government support to the energy sector. The analysis reflects the policies prior to Russia's full-scale invasion in February 2022.

Energy pricing policy

Over 2016-20, pricing policy in the energy sector underwent considerable changes and revisions in a gradual transition towards fully liberalised market prices. Table 2.1 summarises the key pricing features in the energy sector as of the beginning of 2021 while further details on natural gas, heat and electricity pricing are provided further below in the text. The oil market is liberalised but the government introduced a cap on trade margin for diesel and petrol for the period of quarantine due to COVID-19 in May 2021 amending the Cabinet of Ministers Resolution № 1 236 (Cabinet of Ministers, 2020[1]). Prices for coal and coal products are not regulated because coal-mining enterprises are not considered to be natural monopolies (Parliament of Ukraine, 2000[2]).

Table 2.1. Pricing policies

Energy carrier	Pricing policy	Price levels
Natural gas	Tariff for natural gas transportation services for entry points and exit points is defined following the Regulatory Asset Base (RAB) methodology. The tariff for natural gas distribution services and tariffs for services for natural gas injection, storage and extraction from gas storage facilities are set according to the "cost-plus" methodology. Prices at the wholesale and retail markets are liberalised.	In 2020, the weighted average retail price of natural gas for households was UAH 4 827 per 1 000 m^3 (excluding VAT, transportation and distribution tariffs) and for non-household consumers - UAH 4 263 per 1 000 m^3 (excluding VAT, transportation and distribution tariffs).
Electricity	The tariff for electricity transmission services and dispatch management services is set by the Regulator according to the "cost-plus" methodology. From January 2021, the tariff for electricity distribution services is set according to the RAB methodology for the majority of the distribution system operators. Prices for residential consumers are set by the Cabinet of Ministers under the Public Service Obligations regime. Prices for other consumers are liberalised.	As of June 2021, the fixed price for residential consumers is UAH 1.68 per kWh (including VAT). Lowering coefficients are applied if an electricity consumption meter by time zones is installed. Prices for other consumers are defined in bilateral agreements across producers, suppliers and consumers.
Heat	Responsibilities on tariff setting for production, transportation and supply are divided between the Regulator (NEURC) and local authorities. A 'cost-plus' methodology is used but full cost recovery is often not achieved. Incentive-based elements in tariff-setting methodologies are gradually introduced.	Weighted average heat tariffs (without VAT) of the Regulator licensees as of 1 December 2020: UAH 1 143 per Gcal for households, UAH 1 407 per Gcal for state-funded institutions, UAH 1 334 per Gcal for other consumers.
Liquid petroleum products	Prices of oil products are liberalised but the government capped trade margins for diesel and petrol for the period of quarantine due to COVID-19.	
Coal	Prices for coal and coal products are not regulated.	

Source: Authors' compilation based on the Regulator report (NEURC, 2021[3]).

Natural Gas

Prior to 1 October 2015, natural gas prices for all consumer groups as well as tariffs on its transportation, distribution, storage and supply were subject to state regulation. End-user gas prices covered the weighted average price of gas as a commodity (purchased from state-owned domestic producers), operational costs, special surcharge, transportation and supply tariffs and value-added tax (VAT). The marginal (highest) prices for industrial consumers and publicly-funded institutions were defined based on the prices of imported gas and costs incurred by Naftogaz and were revised regularly (NEURC, 2015[4])

Ukraine started reforms in the gas sector back in 2015 with the approval of Law 329-VIII of 9 April 2015 on the Natural Gas Market (Parliament of Ukraine, 2015[5]). The Law envisions regulation of monopolistic markets (transportation, distribution, storage, services of liquefied natural gas installation) while liberalising wholesale and retail gas market including prices for all gas consumers. The Energy Strategy of Ukraine for the period till 2035 also indicates ensuring competition in all segments of wholesale and retail supply

of natural gas (including for household consumers and heat producers) and establishment of market prices for all categories of consumers among key tasks (Cabinet of Ministers, 2017[6])

At the same time, Article 11 of the Law on the Natural Gas Market envisions that the Cabinet of Ministers can assign special responsibilities to the gas market players for the sake of general public interest, i.e., public service obligations (PSOs). The Law defines a list of conditions for assigning special responsibilities such as:

1. national security as well as security of natural gas supply

Chapter 1 stability, proper quality and accessibility of energy resources

2. environment protection including energy efficiency, increasing the share of energy from renewables and reducing the GHG emissions

Chapter 2 protection of health, life and property of the households.

It is further stated in the Law that such responsibilities should be clearly defined, transparent, non-discriminatory, should be assigned for a defined period and as a temporary measure. Gas prices for business and other consumer groups not covered under the PSO regime were fully liberalised.

The Cabinet of Ministers introduced PSO in the natural gas market with the approval of resolution No. 758 of 1 October 2015, which aimed to ensure natural gas supply (including gas for heat and hot water supply) for the needs of households and religious organisations at regulated, below-market prices. In particular, the Cabinet of Ministers obliged the domestic gas producer PJSC “Ukrgasvydobyvannia” to sell produced gas to Naftogaz for accumulation of natural gas for the needs of households, religious organisations and municipal heat-generating entities at a regulated price. In case the amount of gas purchased from the “Ukrgasvydobyvannia” was not sufficient to cover the needs of PSO consumers, Naftogaz was required to cover the deficit from other sources including gas imports (Cabinet of Ministers, 2015[7]).

The PSO was initially introduced for the period 1 October 2015 - 1 April 2017 but this period was later extended several times and procedures for the operations of the PSO mechanism were amended. A new Resolution No. 867 regulating the PSO regime at the gas market was approved by the Cabinet of Ministers on 19 October 2018. It extended the PSO to another domestic gas producer - PJSC "Chornomornaftogaz" and determined assignment of PSOs for gas supply for the needs of households and religious organisations for the period up until 1 August 2020 and for heat producers until 20 May 2021 (Cabinet of Ministers, 2018[8]). Before 2019, the natural gas price for the PSO consumers was considerably lower than the prices at the unregulated segment of the market (Figure 2.1). However, in 2019, the gap has narrowed due to the steep fall of natural gas prices in the European market and the strengthening of the hryvnia exchange rate against foreign currencies (NEURC, 2020[9]).

The retail price of natural gas for households and religious organisations was liberalised on 1 August 2020. However, the government has capped the gas price for these consumer groups at UAH 6.99 per 1 cubic meter (including VAT and transportation fees) throughout the quarantine due to the COVID-19 pandemic but not later than 31 March 2021 (Cabinet of Ministers, 2020[1]). As this cap restriction was lifted, the NEURC obliged suppliers to prepare a commercial offer to households on gas prices, which will be fixed for the whole year, to protect households from fluctuations of prices on the gas market (NEURC, 2021[10])

As of the beginning of 2021, the Regulator is responsible only for setting tariffs for the monopolistic segment of the market. In particular, the tariff for natural gas transportation services for entry points and exit points is defined following the Regulatory Asset Base (RAB) methodology, which is based on the estimation of the reference price accounting capacity weighted distance in line with the EC Regulation (EU) 2017/460. The tariff for natural gas distribution services as well as tariffs for services for natural gas injection, storage and extraction from gas storage facilities are set according to the "cost-plus" methodology (NEURC, 2021[3]).

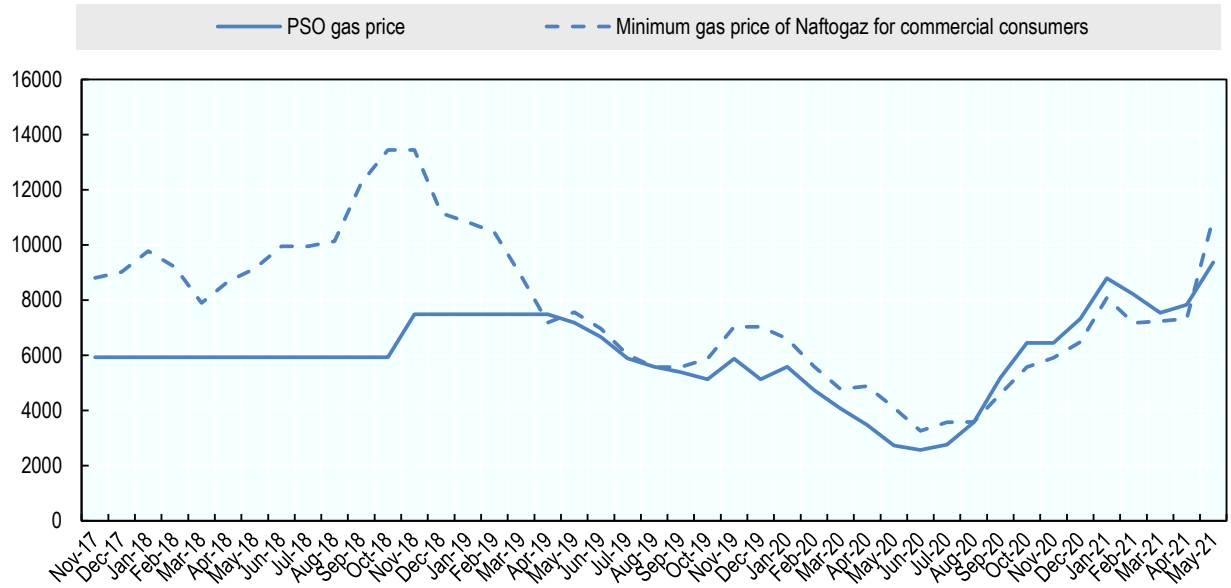
Heat

According to the Law on Heat Supply, responsibilities for tariff setting for thermal energy (heat), its production, transportation and supply are divided between the Regulator (NEURC) and local authorities (Parliament of Ukraine, 2005[11]). Until July 2021, the NEURC was responsible for setting tariffs for heat producers, which were its licensees, according to procedures elaborated in NEURC Resolutions No. 1 174 (NEURC, 2016[12]) and No. 528 (NEURC, 2019[13]).The Regulator licensed heat production at Ukraine's 26 largest district heating companies (CHPs, TPPs, nuclear power plants, co-generation units and large heat producers (over 170 Gcal annually) supplying heat to the level of building-level meters in the company's network over 90% (NEURC, 2017[14]). Local authorities were setting heat tariffs for producers, which are licensed by regional state administrations (other heat producers not licensed by NEURC), according to the methodology developed by the Ministry for Communities and Territories Development and approved by the (Cabinet of Ministers, 2011[15]). Since July 2021, however, the NEURC responsibility to regulate the tariffs of large heat producers has been transferred to local-level authorities (NEURC, 2021[3]).

The Regulator constantly works on the improvement of the methodology and tariff setting procedures. (NEURC, 2021[3]) report states that the application of the normative method with incentive-based elements has enabled the setting of economically justified tariffs by consumer groups for the first time in 2020.

District heating companies calculate their costs and submit their estimates for approval to the regulator or local authorities. End-user prices depend on the cost structure (including primary fuel used) of a particular heat supply company and vary from region to region. Fuel component accounts for 70-80% of the heat tariffs of the NEURC licensees (NEURC, 2021[3]). Natural gas is a primary fuel for the district heat companies in Ukraine. Hence, tariffs for heat production are closely linked to natural gas pricing. Since the PSO mechanism was introduced back in October 2015, Naftogaz was obliged to supply natural gas to district heating companies at prices considerably below the market level most of the time. Figure 2.1 illustrates a comparison of the regulated PSO gas price for district heating companies supplying heat to households and the commercial gas price of Naftogaz for the industry.

Figure 2.1. Comparison of the gas price of Naftogaz for commercial consumers and the PSO gas price for district heating companies, UAH per 1 000 m³



Source: Prepared by authors based on (Naftogaz Group, 2021[16]) data.

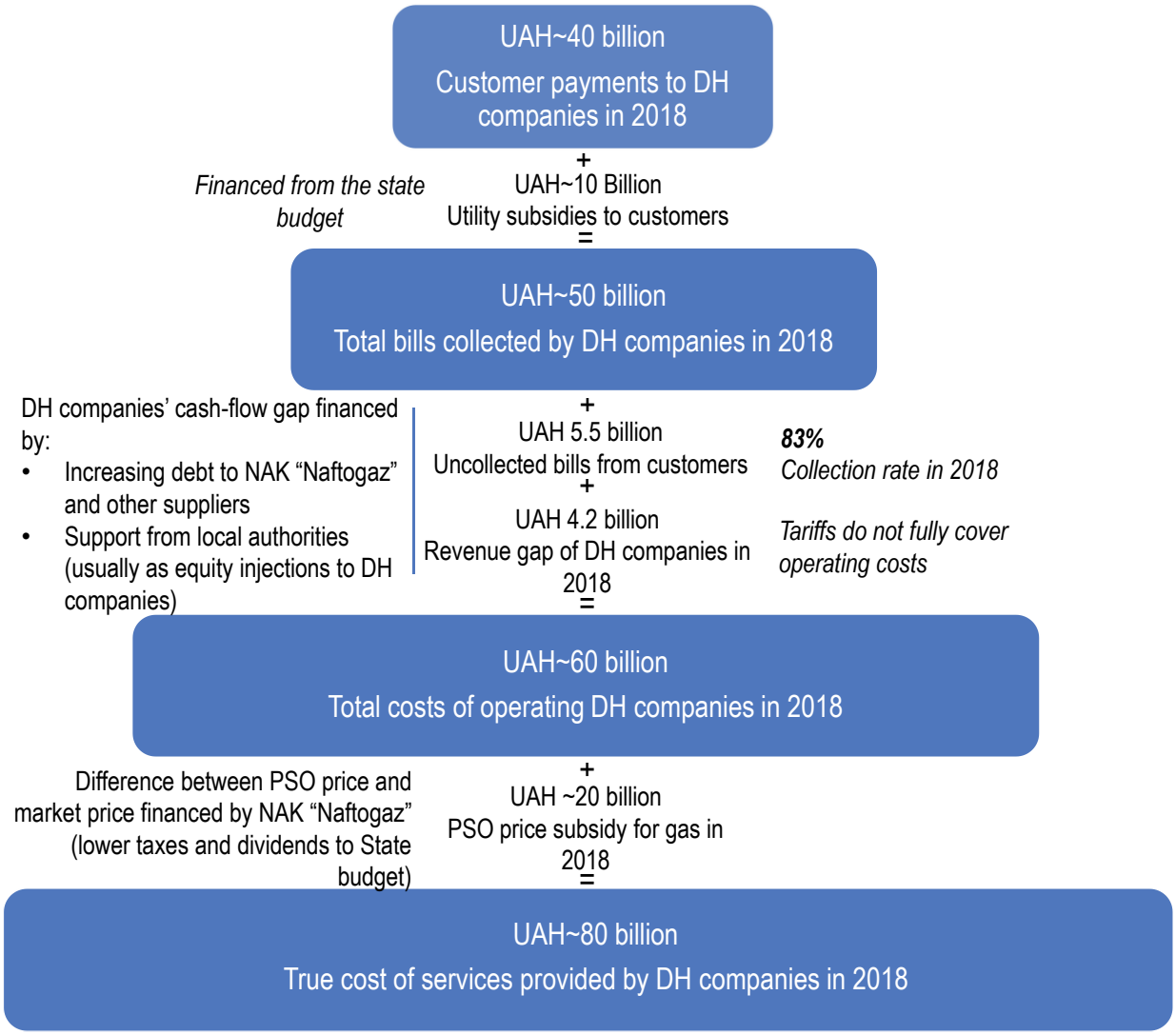
The widest gap between the regulated natural gas price for the PSO consumers and minimum commercial prices for the industry was observed in October 2018 (Figure 2.1). For the period from 1 April 2017 to 31 October 2018 the natural gas price for households as well as producers of heat and hot water for the needs of households was set at UAH 5 930.4 per 1 000 m^3 (including VAT but not including transportation and distribution costs). At the same time, the minimum gas price of Naftogaz for commercial consumers amounted to UAH 13 439 per 1000 m^3 (Naftogaz Group, 2021[16]). As the PSO mechanism was phased out on 20 May 2021, heat producers have purchased natural gas on commercial terms since then.

According to Article 12 of the Law of Ukraine "On Prices and Pricing", regulated by the state, prices must be economically justified and reflect all production and sale costs and allow for profit. It is further stated in the Law that the establishment of prices below economically justified level by the Cabinet of Ministers and local authorities without envisioning sufficient compensation from budgets is not acceptable and can be challenged in courts It is also stated in the Law on Heat Supply that heat tariffs must cover all economically justified costs for the production, transportation and supply of thermal energy (Parliament of Ukraine, 2005[17]).

However, in reality, a large share of operational and capital costs incurred by the district heating companies are not fully covered in many cities regardless of the tariff setting institution, which is the main reason for the critical financial situation of district heating companies. This is happening due to multiple deficiencies in the tariff setting procedures, particularly, the considerable delay with the pass-through of the natural gas prices increase into heat tariffs (this process can take months). Another reason for the large losses of district heating companies is that tariffs are estimated based on normative demand rather than on the actual amount of thermal energy supplied, i.e., costs are calculated per expected sale volume, which is based on inflated norms. This leads to the situation when the revenue received by district heating companies is much lower than what has been estimated with a gap of 19% in some cases (USAID, 2020[18]).

Figure 2.2 illustrates an expert estimate of the “true cost” of district heating and hot water supply services in 2018. Underestimated heat tariffs and low bill collection rates result in a situation that consumers paid UAH 40 billion for heat and hot water supply services, which is only 50% of the “true cost” of provided services. The difference was covered either in the form of budget transfers or through implicit subsidies, such as equity injection to district heating companies by local authorities and regulated price under the PSO mechanism. This resulted in lower profits of Naftogaz and, thus, lower tax revenue and dividends to the state budget. Analysis of several of these schemes is covered in the section on State support measures in the natural gas sector.

Figure 2.2. Estimate of the "true cost" of district heating and hot water supply services in 2018



Source: Adopted from (USAID, 2020[18]).

Electricity

Reforms in the electricity market started with the approval of Law No. 2 019-VIII of 13 April 2017, which is fully compliant with the EU's Third Energy Package and provides a legal basis for the complete transformation of the market structure and its operation. The new electricity market was implemented in two phases: the retail market was launched in January 2019 and the wholesale market in July 2019. The wholesale market is comprised of several separate segments: balancing and ancillary service markets, day-ahead and intra-day markets and market of bilateral contracts (Parliament of Ukraine, 2017[19]).

Similarly to the gas market, the Law on Electricity Market envisions that special responsibilities, i.e., public service obligations (PSOs), can be assigned to market players for the sake of public interest and sustainable long-term development of the electricity sector and ensuring the competitiveness of the national economy. Article 62 of the Law defines the following PSOs, which can be imposed on market players:

1. ensuring an increase in the share of electricity production from renewable energy sources

2. performing the functions of a universal service provider
3. performing the functions of the supplier of "last resort"
4. provision of services to ensure the development of generating capacity
5. increasing the efficiency of combined heat and power production (Parliament of Ukraine, 2017[19]).

However, Article 62 of the Law also states that the Cabinet of Ministers can assign other special responsibilities to market players for the sake of public interest in compliance with provisions of the Law. As the wholesale market was launched on 1 July 2019, the government imposed PSOs on certain market players to ensure the accessibility of electricity for households. In particular, the (Cabinet of Ministers, 2019[20]) approved Resolution No. 483 of 5 June 2019 on the Approval of Regulation for on Assignment of Special Duties on Participants of the Electricity Market to Secure General Public Interests in the Course of Functioning of the Electricity Market. This Regulation requires the National Nuclear Energy Generating Company “Energoatom” and the Private Joint-Stock Company "Ukrhydroenergo" to sell a large share of their output for the needs of households at a very low regulated price. This was considered a temporary measure during a transition period to a new market to prevent the considerable increase of electricity prices for households. PSOs were initially planned for the period 1 July 2019 - 31 December 2020 but the duration of this mechanism was extended several times till the end of July 2021.

The National Energy and Utilities Regulatory Commission regulates activities of natural monopolies, i.e., entities providing electricity transmission and distribution services, and partially related markets, particularly, production and supply of electricity by establishment rules for purchase and sale of electricity on the electricity market and defining contractual relations in the retail market. The tariff for electricity transmission services and dispatch management services is set according to the "cost-plus" methodology. as of January 2021, the tariff for electricity distribution services is set according to the RAB methodology for most distribution system operators (NEURC, 2021[3]).

According to Article 72 of the Law "On the Electricity Market", electricity prices have been liberalised since January 2019 except for electricity supplied by the universal service providers and by the supplier of the last resort. Universal service providers sell electricity only to residential and non-residential consumers, while the supplier of the last resort (State Foreign Trade Company “Ukrinterenergo”) sells electricity to any consumers for the period of up to 90 days in case of bankruptcy, liquidation of the previous electricity supplier or other reasons of electricity supply failures (Parliament of Ukraine, 2017[19]).

Electricity prices of the universal service providers are defined according to the NEURC methodology and take into account the wholesale electricity price, the tariff for the supplier of universal services, tariffs for the services of the transmission system and distribution system operator and the operator according to agreements on the provision of relevant services. Universal service providers supply electricity to residential consumers at fixed prices set by the Cabinet Ministers under the PSOs regime. As of June 2021, the fixed price for residential consumers is UAH 1.68 per kWh (including VAT). Lowering coefficients are applied if an electricity consumption meter by time zones is installed. By the end of December 2020, there was a reduced electricity tariff (UAH 0.9 per kWh) for households for the first 100 kWh consumed, but it was cancelled by the Cabinet of Ministers in January 2021.

Taxation policy

The 2015 tax reform reduced the previously large number of taxes and charges to just 7 at the national level (corporate profit tax, personal income tax, VAT, excise tax, environmental tax, resource rent and customs duty) and 4 at the local level (property tax, unified tax, parking charge, tourist charge). The Tax Code of Ukraine contains a special chapter on the taxation regime under Production Sharing Agreement (PSA), which envisions tax incentives for investors under PSAs. However, this mechanism was not actively used in Ukraine until recently. In 2019, the government of Ukraine conducted tenders for extraction of hydrocarbons under PSA conditions and signed PSAs for seven sites at the end of 2020 (Cabinet of Ministers, 2020[21]).

A tax on CO_2 emissions was introduced in Ukraine as an environmental tax on air pollution from stationary sources (mainly industry and power sector) back in 2011. The tax was initially introduced at a very low rate of UAH 0.2 per tonne of CO_2. It was later increased several times and reached UAH 0.41 per tonne of CO_2 in 2018 (Parliament of Ukraine, 2010[22]). According to the (World Bank, 2020[23]) estimates, the tax is covering about 70% of the country's emissions sources. Starting from 1 January 2019, the tax rate was increased by more than 24 times up to UAH 10 per tonne of CO_2 (about EUR 0.3 per tonne), which is still one of the lowest rates among European countries (Asen, 2020[24]). At the same time, an emission threshold was introduced – the tax is now applicable to installations with an annual CO_2. emissions above 500 tonnes. The tax is generating about USD 48 million of revenues for the state budget annually (World Bank, 2020[23]). Further increase of the tax and reform of its administration is currently being discussed in the government.

In addition to the carbon tax, Ukraine's government has also been developing the national GHG emissions trading scheme in compliance with the EU-Ukraine Association Agreement (particularly, implementation of Directive 2003/87/EC) and has set the basis for the Monitoring, Reporting and Verification (MRV) system with a Law of Ukraine No. 377-IX of 12 December 2019 (Parliament of Ukraine, 2019[25]).

Table 2.2 provides a schematic illustration of how energy is taxed in Ukraine. The Tax Code of Ukraine provides a number of tax benefits and exemptions, which are described in detail in the chapter on state support to the energy sector.

Table 2.2. Taxation of energy

Activity subject to taxation	Baseline tax system: VAT, corporate profit tax, personal income tax, environmental tax, customs duty (national level) and property tax (local level)	Resource rent	Excise	Carbon Tax
Companies extracting and refining oil and gas	Applicable as appropriate	Rent differentiated depending on the depth of deposits and corrective coefficient applied in certain cases	Applicable as appropriate	Applicable to installations with annual CO_2 emissions above 500 tonnes
Companies extracting coal	Applicable as appropriate	Rent differentiated depending on the coal type corrective coefficient applied in certain cases	n.a.	Applicable to installations with annual CO_2 emissions above 500 tonnes
Consumers of liquid petroleum products and LPG	Applicable as appropriate	n.a.	Excise tax differentiated depending on the product	n.a.
Companies generating electricity	Applicable as appropriate	n.a.	n.a.	Applicable to installations with annual CO_2 emissions above 500 tonnes
Consumers of electricity	Applicable as appropriate	n.a.	Applicable as appropriate	

Note:* n.a. – Not applicable.
Source: Adopted from (OECD, 2018[26]) report and updated based on recent amendments to the Tax Code of Ukraine (Parliament of Ukraine, 2010[22]).

Both energy pricing and energy taxation policies in Ukraine have been reformed significantly over the past years. Since 2014, Ukrainian governments have made a lot of efforts to bring the legislation in line with the EU energy *aquis*. Pricing policies, including pricing methodologies, tariff structures and regulatory procedures, continue to evolve not without difficulties. It is worth mentioning though that despite these

challenges, Ukraine is one of the countries in the region with the best monitoring and reporting practices and the Regulator regularly publishes detailed reports, information on the budget execution and estimates of the tax revenue foregone including in the energy sector.

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3 Review of the energy sector of Ukraine

This chapter provides an overview of the energy sector of Ukraine. It discusses issues related to energy demand and supply and provides key sector indicators which describe the main trends. The chapter starts off with a brief discussion of the current macroeconomic situation in the country which underpins recent development of the energy sector. The analysis reflects energy sector reforms prior to Russia's full-scale invasion in February 2022.

Macroeconomic situation

Ukraine is a country with the second largest territory in Europe (603.628 km^2) and a population of about 42 million people. Its location at the crossroads of the European Union (EU), the Russian Federation (hereafter "Russia"), the Black Sea and Caspian regions and its developed gas transport infrastructure has made it an important and the largest natural gas transit in the world playing a key role for Russian gas supplies to European markets. The country is well endowed with mineral resources such as oil, natural gas, coal and uranium and has a large renewable energy potential. Ukraine's energy market is one of the largest in Europe and operates huge gas storage capacities, which equates to nearly a third of the total EU-28 capacity (IEA, 2015[1]), (OECD, 2019[2]), (World Bank, 2021[3]).

Following the collapse of the Soviet Union, Ukraine's economy faced a severe crisis. In the 1990s, Ukraine's GDP was shrinking and in 1994, in particular, it decreased by as much as 22% year-on-year (yoy). The economy started to recover in the year 2000 with the highest annual GDP growth at 12% experienced in 2004 but suffered again from the global economic depression in 2009 (-15% GDP drop) and recovered only in 2013. However, in 2013-14 Ukraine faced a multidimensional crisis. Soon after the Euromaidan protests, Russia seized Crimea and occupied part of the Donbas region. This led to a GDP contraction of almost 10% in 2015 (yoy) and resulted in coal supply disruptions (OECD, 2019[4]), (World Bank, 2021[5]).

In 2014, the EU-Ukraine Association Agreement was signed (effective as of September 2017), which strengthened the reform agenda and supported the economic recovery of Ukraine (Parliament of Ukraine, 2014[6]). In 2014-19, Ukraine achieved considerable progress in advancing institutional and economic reforms including significant fiscal consolidation, moving to a flexible exchange rate, revising energy tariffs and undertaking other important reforms in the energy sector, strengthening social assistance, deregulation of business, decentralisation of powers and funds, improving transparency of public procurement, stabilising the banking sector, establishing anti-corruption agencies, progressing with health and pension reforms (World Bank, 2021[3]).

In 2018-19, economic growth restored to 3.4%-3.2% (yoy). However, the COVID-19 pandemic posed another challenge to Ukraine's economy and the healthcare system. The economic downturn turned to be relatively mild with a decline of 4.5% of GDP in 2020 (yoy) compared to a 6.5% contraction in the first half of the year. However, Ukraine is among the countries, which was hit the hardest in Europe in terms of health impact. The COVID-19 crisis also eroded government commitments to reforms with rollback observed in several sectors (see Box 1.4 for measures relevant in the energy sector). The government adopted a National COVID-19 Vaccination Roadmap at the end of 2020 and a vaccination campaign was rolled out in February 2021. As a result of the pandemic, annual GDP growth drastically fell in 2020 (-3.8%) but it recovered again a year later and by the end of 2021 a modest GDP growth (3.4%) was recorded (World Bank, 2021[3]). The war launched by Russia has dramatically changed this situation, however. In January 2023, the Ministry of Economy of Ukraine published a preliminary estimate of the GDP decline in 2022 at 30.4% (Government Portal of Ukraine, 2023[7]).

Energy sector review

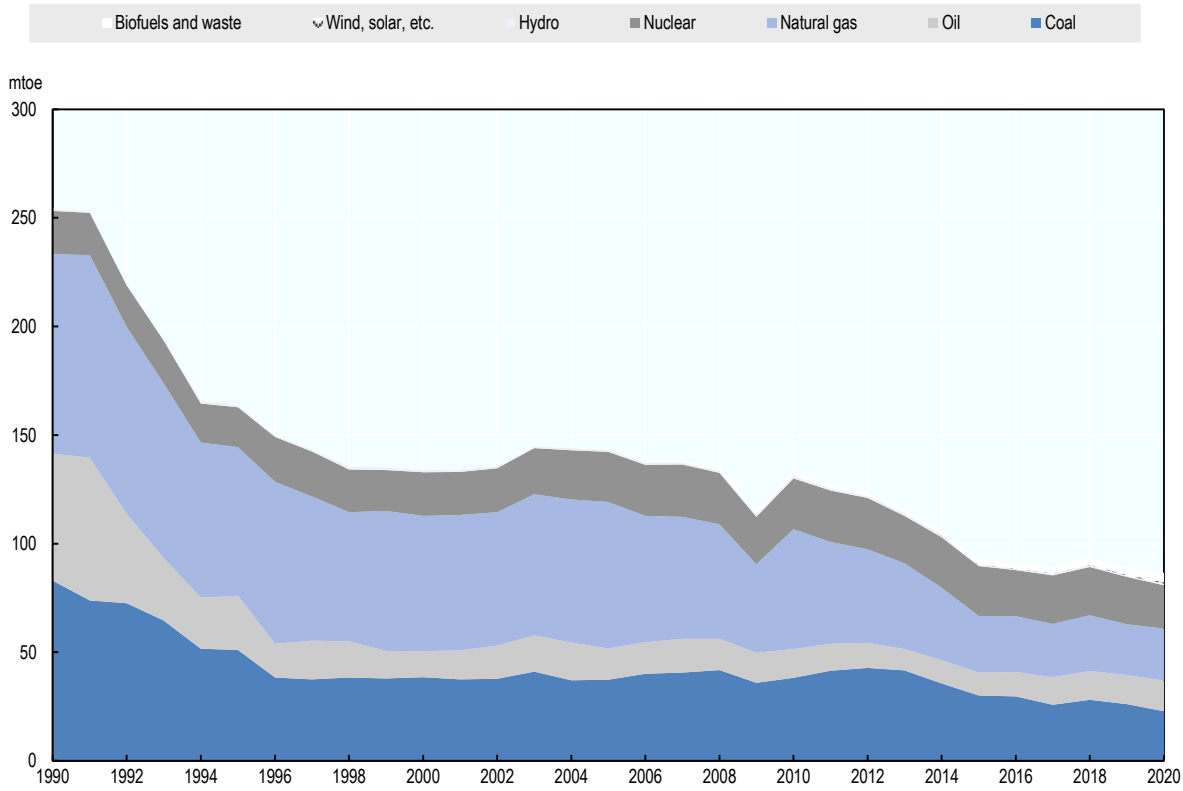
Key energy sector indicators

Energy supply

Total energy supply (TES) dropped by 46% between 1990 and 1998 (Figure 3.1.). It slightly increased only in 2003 and continued to decline since then due to restructuring of the economy, i.e., considerable

decline of manufacturing and increasing the share of services. In 2020, TES was at 86.5 mtoe, which is almost three times below 1990's levels (254 mtoe) (Figure 3.1.).

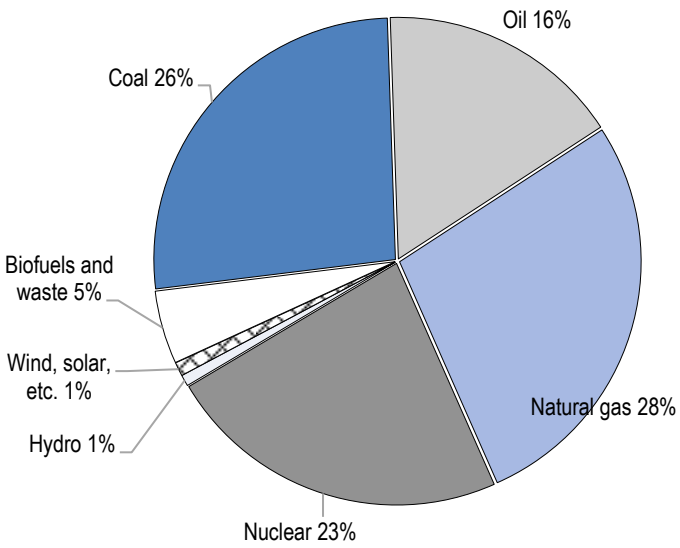
Figure 3.1. Total energy supply, mtoe, 1990-2020



Note: Data for 2019-2020 in the IEA dataset were reported in TJ. For consistency with previous years, these have been recalculated in mtoe using the IEA coefficient which can be found in the relevant IEA world energy balances documentation (IEA, 2022[8]).
Sources: Authors' compilation based on (IEA, 2022[9]).

As illustrated in Figure 3.1. , coal and natural gas historically have been the key TES sources and each accounted for about a third of supply in 1990. The share of natural gas increased to about 50% in 1996 while that of coal dropped to 26%. However, the economic downturn in 2009 and increased gas import prices stimulated policies aimed at the substitution of gas for coal increasing the share of gas up until 2013. However, the production of coal, the most critical domestic energy source for meeting internal demand, decreased by 21% in 2014 compared to the previous year (32 mln tonnes) due to the military operations in the Donbas region where the main coal deposits are located. As of 2020, natural gas and coal accounted for 28% and 26% of Ukraine's energy balance, respectively Figure 3.2. The contribution of nuclear energy in TES gradually expanded from 8% in the 1990s to 23% in 2020 while the share of oil and oil products shrank from 23% to 16% during the same period. The contribution of biofuels, hydro and other renewable energy sources increased up to 7% in 2020 (IEA, 2022[9]).

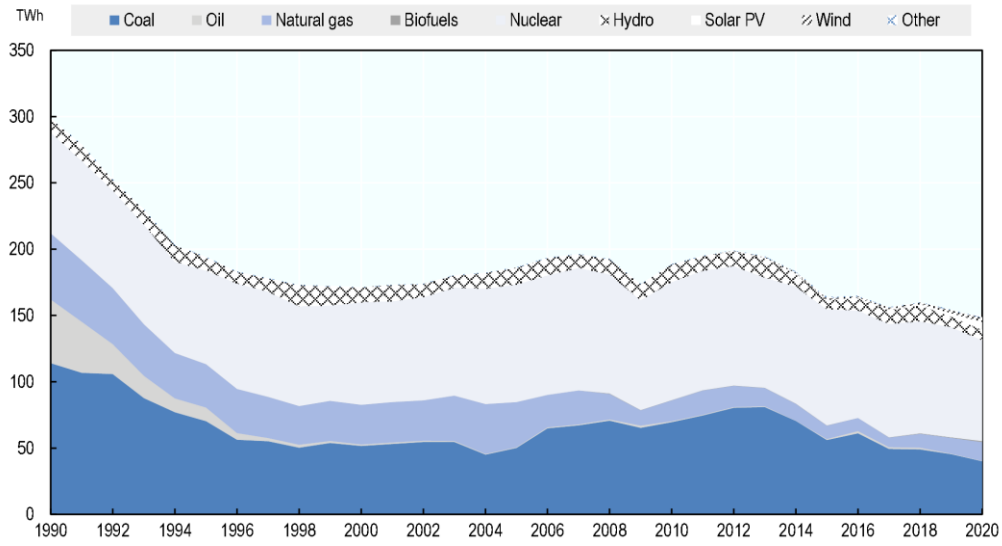
Figure 3.2. Primary energy supply by fuel, 2020



Sources: Authors' compilation based on (IEA, 2022[9]).

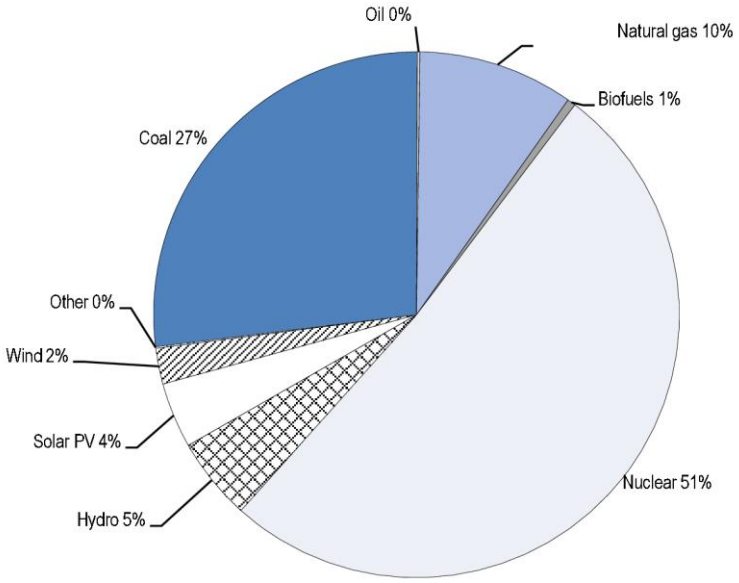
In 2020, total electricity production was at the level of 148 TWh, which equals about 50% of the 1990 levels. Though there was an upward trend in the period from 2001 to 2008, power generation continued to shrink since then (Figure 3.3). As of 2020, nuclear energy accounts for 51% of total electricity production in Ukraine while the share of coal-fired electricity is 27% (Figure 3.4). The share of hydropower increased to 7.5% by 2019 but it dropped to 5% in 2020. Overall, the contribution of renewables to power generation has increased considerably, with the share of renewables (including large hydro) reaching 12% in 2020. According to data of the (Ministry of Environmental Protection and Natural Resources of Ukraine, 2021[10]), as of February 2021, installed capacities of renewable power plants (excluding large hydro) have expanded from 0.8 GW in 2015 to 8.5 GW.

Figure 3.3. Electricity generation by source, TWh, 1990-2020



Sources: Authors' compilation based on (IEA, 2022[9]).

Figure 3.4. Electricity generation by fuel, GWh, 2020



Sources: Authors' compilation based on (IEA, 2022[9]).

The district heating network is widely developed in Ukraine and covers about 37% of households (USAID, 2020[11]). In 2020, heat production was at 388 PJ or 78% below the 1990 level. Natural gas is the main fuel for heat generation, accounting for over 70%, coal contributes about 13%. Although in absolute terms, the use of gas for heat production has diminished by 81% to 272 PJ since 1990, its share has decreased by about 15% (IEA, 2022[9]).. Biofuel use in heat generation has expanded by almost three times from 2013 to 33 PJ in 2020 and its share in total generation reached 8.5% in 2020. Considerable growth of the biomass use in recent years has become possible due to introducing an incentive tariff for heat generation from renewable sources at a level of 90% from the current tariff on heat generation from natural gas (Ministry of Environmental Protection and Natural Resources of Ukraine, 2021[10]).

Ukraine is a net energy importer but the share of net imports in TES decreased considerably, from 54% in 1991 to 34% in 2020 and it continues to decline due to reduced consumption. In 2013, Ukraine imported 27.5 bcm of gas, 92% of which came from Russia, while the rest was purchased from Germany, Hungary, Austria and Poland. However, the increasing use of reverse flow imports has changed the situation considerably: in 2014, Ukraine imported 5.1 bcm (26%) of natural gas from the European Union while imports from Russia declined to 14.3 bcm (74%) (IEA, 2015[1]). In 2015, gas imports were diversified further. More than ten European companies supplied 10.3 bcm while imports from Russia dropped to 6.1 bcm (Naftogaz Group, 2016[12]). In 2019, 76 companies imported gas to Ukraine from Slovakia, Hungary and Poland, no direct imports from Russia took place (Naftogaz Group, 2019[13]).

Over the period 2010-20, net crude oil imports declined by more than six times, to 1.2 mtoe. At the same time, imports of oil products have increased from around 6 to 10 mtoe while exports have shrunk by approximately 94 (IEA, 2022[9]).

Even though Ukraine is well endowed with coal reserves, it is a net importer of coal. In 2013, Ukraine produced 40.8 mtoe of coal domestically while net imports amounted to 2.9 mtoe. In 2014, Ukraine's government lost control over a part of the Donetsk and Luhansk regions where the majority of coal mines are located due to the occupation of these territories by Russia. As a result, domestic production dropped by more than half in 2015 and continued declining further down to 12.7 mtoe in 2020. At the same time, net coal imports have expanded to 11 mtoe in 2020 (IEA, 2022[9]).

Energy demand

In 2020, total final consumption (TFC) of energy was at 48 mtoe, industrial and residential sectors were dominant energy users accounting for about a third of TFC each. Over the period 2010 - 2020, contraction of energy use was observed in all sectors, with residential and industrial sectors declining the most, 43% and 36%, respectively. Natural gas dominates the fuel mix (28% of TFC) though in absolute terms its use declined more than twice from 2010 down to 13.8 mtoe in 2020. Over the same period, the role of electricity in final consumption expanded from 16% to 20%. Heat accounts for about 15% of final consumption, which is mainly consumed by industrial users and the residential sector. Oil products constitute 20% of final consumption being a primary fuel for the transport sector. Since 2010, the end-use of coal has shrunk by 27%to 6 mtoe, in 2020 being a primary energy carrier for the industry (IEA, 2022[9]).

Over the period 2010-2020, the energy intensity of GDP (PPP) declined by about 32% to 7.7 GJ/thousand 2015 USD. Despite this progress, Ukraine's economy consumes about three times the OECD average per unit of GDP (PPP) (IEA, 2022[9]).

Institutional and legal setup

Structure and ownership

Ukraine's energy sector has gone through several stages of reform and several rounds of privatisation since 1990. However, state-owned enterprises (SOEs) still dominate the energy market. State ownership rights over SOEs in the energy sector are distributed across the Cabinet of Ministers, the Ministry of Energy, the Ministry of Finance, and the Ministry of Environmental Protection and Natural Resources.

Oil and gas exploration activities are performed by the state company NJSC Nadra Ukrayiny which was established in 2000 by merging thirteen geological and specialised mining enterprises. The SOE is a shareholder in fully and partly state-owned subsidiary and daughter companies (IEA, 2012[14]).

Naftogaz and its subsidiaries (collectively referred to as the "Group") is the largest and arguably the most important SOE in the energy sector of Ukraine providing jobs for over 50 thousand employees. In 2020, Naftogaz Group paid over UAH 140 billion of taxes and dividends to the budget making it the largest taxpayer in Ukraine. Naftogaz Group is a vertically integrated company, which performs a full cycle of operations from exploration and exploitation of oil and gas to refining and supply of natural gas and liquefied petroleum gas (LPG) to consumers. The Group is a shareholder in various entities in the production, processing, supply, transportation and storage of natural gas, gas condensate and oil. The Group accounts for over 70% and 80% of gas and oil production in Ukraine, respectively (Naftogaz Group, 2021[15]).

In January 2020, unbundling of gas transmission activities from the gas supply and production operation of Naftogaz was completed and transportation functions were transferred to the independent gas transportation operator PJSC "Mahistralni Gazoprovody Ukrainy" (Main Gas Pipelines of Ukraine).

A private segment of the hydrocarbons sector is represented by more than 40 gas and oil producers, over 60 gas importers, over 300 private wholesale gas suppliers, retail natural gas supply companies and distribution system operators, Ukrtatnafta refinery and numerous gas stations (OECD, 2019[2]).

In the 1990s, coal extraction was carried out at about 300 mines. In 1991, 276 state-owned coal mines were producing 193 million tonnes of coal. Since then, profitable coal mines were privatised largely by DTEK Energy Group while unprofitable mines remain in state ownership and are heavily reliant on state subsidies. The largest coal deposits are located in the Donbas region, parts of which are severely affected by military activities leading to disruptions in coal production and supply. As of 2020, Ukraine's government controls only 33 state-owned coal mines employing 35 000 workers while the rest 69 mines are located in

the temporarily uncontrolled territory. In 2019, the production of thermal coal decreased to 24.9 million tonnes of which only 11% was extracted at state-owned coal mines (DiXi Group, 2020[16]), (IEA, 2015[1]), (Secretariat of the Cabinet of Ministers, 2018[17]).

In 2017, the Ministry of Energy and Coal Industry established a state-owned enterprise - the National Coal Company, which encompassed all state-owned mines (OECD, 2019[4]). In early 2020, another SOE was established Ukrvuhillya, which is supposed to become a coal market operator engaged in the purchase of coal from state-owned mines and its sale at the domestic and foreign markets. Ukrvuhillya *de facto* duplicates functions of heavily indebted SOE Derzhvuhlepostach, which is still operational (Romaniuk, 2020[18]).

SOEs account for most of the electricity produced in Ukraine. In particular, state-owned Energoatom operating four nuclear power plants comprised of fifteen units generate about a half of electricity produced. Hydro power plants owned by SOE Ukrhydroenergo deliver about 7-10% of electricity output and approximately 8% generated by coal-fired thermal power plants of the SOE Centrenergo. The privately-owned DTEK Group, the largest vertically integrated holding company, accounts for about 23% of electricity production through its thermal power plants (TPPs). DTEK Renewables is the key wind and solar energy producer while private SEC Biomass Ltd. and SALIX Energy are the largest biomass energy producers in Ukraine (OECD, 2019[4]).

A state company Ukrenergo has been operating an integrated power system and transmitting electricity through trunk grids from producers towards distributors. In view of implementing the Law on the Electricity Market, Ukrenergo was reorganised from a unitary enterprise to a joint-stock company with 100% state ownership so that it meets the requirements of a transmission system operator. It also acquired additional responsibilities for operating balancing and ancillary service markets, registering bilateral agreements, and serving as commercial metering administrator (OECD, 2019[4]).

Regional distribution and retail companies (oblenergos) were created in each administrative region in 1995 and there were several waves of their privatisation since then. Most of the oblenergos were privatised fully or partially but the government still holds shares in eight oblenergos through the State Property Fund of Ukraine. Previously, oblenergos were responsible for both supplying and distributing electricity. As required by the Law on the Electricity Market, oblenergos were unbundled into distribution system operators responsible for dispatching electricity to end-users and suppliers purchasing electricity from producers and selling it to end-users. As of mid-2019, there have been 32 distribution system operators and 528 have been licensed for electricity supply of which 25 universal service providers supplying electricity at regulated tariffs (IEA, 2015[1]), (OECD, 2019[4]).

As Ukraine transitioned away from a single buyer model of the electricity market, new SOEs were established to replace Energorynok (the previous wholesale market operator): the Market Operator and Guaranteed Buyer. The Market Operator is responsible for the monitoring of the day-ahead and intra-day electricity markets and organising the sale and purchase of electricity. The Guaranteed Buyer is the state-owned trader that buys electricity from producers under feed-in tariffs and sells this electricity on the organised day-ahead and intraday markets. The Guaranteed Buyer has special responsibilities, i.e., public service obligations (PSOs), for ensuring an increase in the share of electricity production from renewable energy sources and affordability of electricity for households, which are described in more detail in the section on State support to producers of electricity from renewable energy sources and the section Electricity (OECD, 2019[4]), (OECD, 2019[4]), (OECD, 2020[19]).

Ukraine has over 8 000 heat producing companies. About 22% of all heat is provided by about 250 combined heat and power (CHP) plants out of which five are very large while 200 are small industrial installations. Naftogaz has shares in both large and small CHP plants. The small ones are often controlled by regional electricity distribution companies or industrial companies. There are also around 1 600 district heating companies (teplokomunenergos - TKEs), which provide jobs to over 65 000 workers. TKEs operate

their own heat plants and district heating networks and are responsible for providing centralised heat and hot-water supply services. TKEs are owned and controlled by local governments. Heat-only plants deliver about 60% of all heat produced. Out of 35 000 heat-only boiler facilities, most have a production capacity lower than 3 Gcal/year, 60% are located in urban areas. A marginal amount of heat is generated by nuclear power plants (0.01%). Individual heating systems account for 10% of total heat produced (IEA, 2015[1]), (USAID, 2020[11]).

Governance

Governance of the energy sector in Ukraine is rather complex with functions and responsibilities spread over a large number of institutions and organisations. The Cabinet of Ministers, as the highest executive body, is responsible for coordination and supervision of government institutions subordinated to it. The Cabinet of Ministers is directly involved in shaping energy policy and price setting in the energy sector, particularly, through the mechanism of Public Service Obligations in the electricity and gas market[1] introduced *inter alia* to control electricity and gas prices for households (for more details, see earlier sections). It also performs an oversight over important SOEs in the energy sector, particularly, NJSC Naftogaz in the gas sector, the Market Operator and the Guaranteed Buyer in the electricity sector (OECD, 2019[4]).

At the end of August 2019, the Ministry of Energy and Coal Industry and Ministry of Ecology and Natural Resources were merged into one institution – Ministry of Energy and Environmental Protection. However, this decision did not prove to be viable and the newly created Ministry was disentangled into two separate agencies at the end of May 2020. The Ministry of Energy is responsible for general policy-setting in the energy sector and coordination across the government. It is also responsible for the management of over 300 entities (including state enterprises, institutions, organisations and associations) and governing over 120 SOEs such as Ukrhydroenergo, Energoatom, Ukrinterenergo (OECD, 2019[4]). The State Agency on Energy Efficiency and Energy Saving under the Ministry of Energy is specifically focused on the development and implementation of state policy in the field of energy efficiency and renewable energy.

The Ministry of Environmental Protection and Natural Resources is responsible for the formulation and implementation of environmental and climate policy, as well as geological and mining policy licensing of natural resource use through the State Geological and Subsurface Service. This Service is a shareholder of Nadra Ukrayiny and nine other SOEs operating in oil and gas exploration, which creates a potential conflict of interest (OECD, 2019[2]).

The Ministry of Finance defines taxation policy and state dividend policy, monitors the fiscal impact of state assets and approves state support to SOEs. It also executes oversight functions over Ukrenergo and Main Gas Pipelines of Ukraine (OECD, 2019[4]), (OECD, 2019[2]).

The National Energy and Utilities Regulatory Commission (regulator), a central regulatory body with a special status subordinated to the Cabinet of Ministers, is responsible for state regulation, monitoring and control over the activities of economic entities in the fields of energy and utilities. In particular, the regulator is responsible for ensuring the efficient functioning and development of energy and utility markets, supporting the integration of Ukraine's electricity and natural gas markets with the relevant markets of the Energy Community countries, implementation of pricing and tariff policy in the field of energy and utilities and protection of consumer rights, supporting the implementation of energy-efficiency and environmental protection measures as well as the increase in the share of renewables in energy production (NEURC, 2021[20]).

Two other regulatory and supervisory bodies in the energy sector are the State Nuclear Regulatory Inspectorate and the State Inspectorate on the Energy Supervision. The former agency is responsible for the formulation and implementation of state policy on nuclear safety while the latter executes monitoring and control functions over technical conditions of operation of power plants, heat installations and networks (OECD, 2020[19]).

Policy and legislative framework

Energy

A large body of Ukraine's legislation relevant to the energy sector has been considerably revised over the period 2016-21 to support the implementation of reforms in the energy sector in compliance with the Energy Charter Treaty[2] and the EU-Ukraine Association Agreement. Reforms have been aimed at increasing competitiveness, transparency and efficiency in the energy sector and resulted in considerable structural and organisational changes as well as revision of the tariff and pricing policy (see section on Energy pricing policy). Key legislative acts of Ukraine in the field of energy and climate policy are listed in Annex A.

In 2017, the Cabinet of Ministers of Ukraine approved a new Energy Strategy of Ukraine for the period till 2035 "Security, Energy Efficiency, Competitiveness", which outlines objectives and measures for transformation of the energy sector, particularly, coal sector restructuring, liberalisation of the electricity and natural gas markets, as well as integration with the EU energy market and sets targets for achieving 12% of renewables in total energy supply by 2025 and at least 25% by 2035 (Cabinet of Ministers, 2017[21]).

Reforms in the gas market started with the approval of the Law on Natural Gas Market back in 2015 (Parliament of Ukraine, 2015[22]). The law is fully compliant with the EU's Third Energy Package and envisages the liberalisation of the wholesale and retail gas market including prices for all gas consumers (NEURC, 2021[20]).

Adopted in 2017, the Law on the Electricity Market laid the foundation for liberalisation of the wholesale electricity market, establishment of bilateral, retail, and ancillary service markets in line with the requirements of the EU's Third Energy Package. As Ukraine's government set a target to join the European Network of Transmission System Operators (ENTSO-E), legal and technical norms of the law and supporting regulations have been developed in cooperation with the European counterparts (OECD, 2019[4]), (Parliament of Ukraine, 2017[23]).

To facilitate energy-efficiency improvements across the economy, several important laws were adopted in recent years. In particular, the Law on Energy Efficiency of Buildings implementing the Energy Performance of Buildings Directive 2010/31/EU and the Law on the Energy Efficiency Fund, which is designed to support energy-efficiency retrofits of multi-storey buildings (Parliament of Ukraine, 2017[24]).

The feed-in tariffs for electricity producers from renewable energy sources have been the main policy incentive to stimulate the sector's development introduced in 2009 (Parliament of Ukraine, 2008[25]). However, initially high tariffs were decreased which trigerred several rounds of amendments to key laws (DiXi Group, 2021[26]). Incentive tariff for producers of heat energy from renewable sources for the needs of public institutions and households was introduced in 2017 with the approval of Law No. 1 959-VIII (Parliament of Ukraine, 2017[27]). In 2019, Law of Ukraine No. 2 712-VIII established an auction mechanism for large renewable energy installations (Parliament of Ukraine, 2019[28]).

Climate

The climate policy of Ukraine is laid down in the Law on Basic Principles (Strategy) of State Ecological Policy (Parliament of Ukraine, 2019[29]), the Concept on Implementation of State Policy in the Field of Climate Change until 2030 as well as the Action Plan for its implementation (Cabinet of Ministers, 2016[30]), (Cabinet of Ministers, 2017[31]) and the Law on the Regulation of the Economic Activity with Ozone-Depleting Substances and Fluorinated GHGs (Parliament of Ukraine, 2019[32]). Approval of the Law on the Principles of Monitoring, Reporting and Verification of GHGs set the basis for the establishment of the national GHG emissions trading scheme in compliance with the EU-Ukraine Association Agreement (Parliament of Ukraine, 2019[33]).

In addition, a number of important legislative documents have been drafted and adopted, including, the second Nationally Determined Contribution (NDC) of Ukraine (adopted in July 2021), Strategy for Environmental Safety and Adaptation to Climate Change until 2030, National Energy Efficiency Action Plan till 2030, Integrated National Energy and Climate Plan.

Ukraine has also supported the European Green Deal, which aims to make Europe the first climate-neutral continent by 2050. In February 2020, Ukraine presented the draft Green Energy Transition Concept till 2050. Key targets in the Concept include a 70% renewable energy in electricity generation and decommissioning of all coal-fired TPPs by 2050. However, this draft was not submitted for consideration to the Cabinet of Ministers and the new Minister stated that the draft Concept needs to be revised (DiXi Group, 2020[16]).

On 3 March 2021, Ukraine's government declared a carbon neutrality target by 2060, which is enshrined in the National Economic Strategy for the period till 2030 (Cabinet of Ministers, 2021[34]), (Ministry of Environmental Protection and Natural Resources of Ukraine, 2021[35]). In this context, the second NDC envisions GHG emissions reductions by 65% in 2030 compared to the 1990 level. This is a considerable 25% scale-up of a mid-term climate ambition compared to commitments outlined in the first NDC which was approved back in 2015 (Ministry of Ecology and Natural Resources, 2015[36]).

Notes

[1] PSOs in the gas market were terminated on 20 May 2021.

[2] The Energy Charter Treaty establishes a framework for international co-operation between the European countries and other industrialised countries. This aims to develop the energy potential of Central and Eastern European countries and ensures security of energy supply for the European Union. To that end, countries would operate more open and competitive energy markets, while respecting the principles of sustainable development and sovereignty over energy resources. Key provisions concern protection of investment, trade in energy materials, and products, transit and dispute settlement.

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Annex A. Key legislative acts on energy and climate policy of Ukraine

Energy policy

1. Law of Ukraine No. 2 118-VIII of 22 June 2017 on Energy Efficiency of Buildings, https://zakon.rada.gov.ua/laws/show/2118-19#Text
2. Law of Ukraine No. 2 095-VIII of 8 June 2017 on the Energy Efficiency Fund, https://zakon.rada.gov.ua/laws/show/2095-19#Text
3. Law of Ukraine No. 2 019-VIII of 13 April 2017 on the Electricity Market, https://zakon.rada.gov.ua/laws/show/2019-19#Text
4. Law of Ukraine No. 1 959-VIII of 21 March 2017 On Amendments to the Law of Ukraine "On Heat Supply" to Stimulate the Production of Thermal Energy from Alternative Energy Sources, https://zakon.rada.gov.ua/laws/show/1959-19#Text
5. Law of Ukraine No. 329-VIII of 9 April 2015 on the Natural Gas Market, https://zakon.rada.gov.ua/laws/show/329-19#Text
6. Law of Ukraine No. 601-VI of 25 September 2008 on the Amendments to Certain Laws of Ukraine Regarding the Establishment of the "Green" Tariff, https://zakon.rada.gov.ua/laws/show/601-17#Text
7. Law of Ukraine No. 2 633-IV of 2 June 2005 on Heat Supply, https://zakon.rada.gov.ua/laws/show/2633-15#Text
8. Law of Ukraine No. 555-IV of 20 February 2003 on Alternative Energy Sources, https://zakon.rada.gov.ua/laws/show/555-15#Text

1. Order of the Cabinet of Ministers of Ukraine No. 605-p of 18 August 2017 on the Approval of the Energy Strategy of Ukraine for the Period till 2035 "Security, Energy Efficiency, Competitiveness", https://zakon.rada.gov.ua/laws/show/605-2017-%D1%80#Text

Chapter 1 Resolution of the Cabinet of Ministers No. 869 of 1 June 2011 On Ensuring a Unified Approach for Determining of Utility Tariffs, https://zakon.rada.gov.ua/laws/show/869-2011-%D0%BF#Text

2. Resolution of the Cabinet of Ministers No. 483 of 5 June 2019 on the Approval of Regulation on Assignment of Special Duties to Participants of the Electricity Market to Secure General Public Interests in the Course of Functioning of the Electricity Market, https://zakon.rada.gov.ua/laws/show/483-2019-%D0%BF#Text

Chapter 2 Resolution of the NEURC No. 528 of 31 March 2016 on the Approval of Procedures on Tariffs Setting for Thermal Energy, its Production, Transportation and Supply, https://zakon.rada.gov.ua/laws/show/z0993-16#Text

3. Resolution of the NEURC No. 1 174 of 25 June 2019 on the Approval of Procedure for Determining Tariffs for Thermal Energy, its Production, Transportation and Supply, https://www.nerc.gov.ua/index.php?id=42232

Climate policy

4. Resolution of the Cabinet of Ministers of Ukraine No. 179 of 3 March 2021 on the Approval of the National Economic Strategy for the Period till 2030, https://zakon.rada.gov.ua/laws/show/179-2021-%D0%BF#n25

Chapter 3 Law of Ukraine No. 2 697-VIII of 28 February 2019 on the Basic Principles (Strategy) of the State Ecological Policy of Ukraine for the Period till 2030, https://zakon.rada.gov.ua/laws/show/2697-19#Text

5. Law of Ukraine No. 377-IX of 12 December 2019 on the Principles of Monitoring, Reporting and Verification of Greenhouse Gas Emissions, https://zakon.rada.gov.ua/laws/show/377-20#Text

Chapter 4 Law of Ukraine No. 1 469-VIII of 14 July 2016 on the Ratification of the Paris Agreement, https://zakon.rada.gov.ua/laws/show/1469-19#Text

6. Order of the Cabinet of Ministers No. 932-p of 7 December 2016 on the Approval of the Concept of Implementation of the State Policy in the Field of Climate Change until 2030, https://zakon.rada.gov.ua/laws/show/932-2016-%D1%80#Text

Chapter 5 Order of the Cabinet of Ministers No. 878-p of 6 December 2017 on the Approval of the Action Plan for the Implementation of the Concept of Implementation of the State Policy in the Field of Climate Change until 2030, https://zakon.rada.gov.ua/laws/show/878-2017-%D1%80#Text

7. Law of Ukraine No. 376-IX of 12 December 2019 on the Regulation of the Economic Activity with Ozone-Depleting Substances and Fluorinated GHGs, https://zakon.rada.gov.ua/laws/show/376-20#Text

Annex B. State support to production and consumption of fossil fuels in Ukraine

Table A B.1. State support to production and consumption of fossil fuels in Ukraine, UAH million

Programme	Mechanism of support	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021p.
Restructuring of coal and peat industry	direct transfer	PSE	1 059	1 597	1 078	1 178	355	206	107	244	n.a.	3 269	5 039	3 125
Decommissioning of unprofitable coal and peat mining enterprises	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	281	128	265	1 032
Rescue measures at coal mining enterprises	direct transfer	PSE	275	378.6	414	430	288	234	263	288	290	289	290	340
Prevention and elimination of emergencies at coal mines	direct transfer	PSE	n.a.	1.1	n.a.	0.4	n.a.	n.a.	n.a.	10	82	n.a.	n.a.	n.a.
Liquidation of emergency at the main gas pipeline “Luhansk - Lysychansk – Rubezhnoye”	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	35	n.a.	n.a.	n.a.	n.a.
Liquidation of emergency at TPP "Vuhlehirska"	direct transfer	PSE	n.a.	n.a.	n.a.	111	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Partial compensation of production costs of finished marketable coal	direct transfer	PSE	5 807	6 710	10 172	13 302	8 705	1 212	1 373	2 122	1 072	n.a.	n.a.	n.a.
Improvement of safety measures at coal mining enterprises	direct transfer	PSE	70	134	260	197	3	n.a.	n.a.	99	n.a.	n.a.	n.a.	n.a.
Construction and technical re-equipment of coal and peat mining enterprises	direct transfer	PSE	337	1 719	1 293	343	54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Replenishment of current capital or increase of the statutory funds of coal mines to settle the arrears of wages	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	200	500	n.a.	n.a.	n.a.	n.a.	n.a.
Repayment for electricity arrears of state-owned coal-mining enterprises	direct transfer	PSE	140	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	445	n.a.	n.a.
State support for the construction of mine №10 "Novovolynska"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	146	50	70	35	62	n.a.	n.a.
Measures to support domestic production of coal and reform of the coal sector	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 671	n.a.	n.a.	n.a.
State support of the PJSC "Mahistralni Gazoprovody Ukrainy"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.13	20	n.a.	n.a.	n.a.
Compensatng NJSC "Naftogaz of Ukraine" for the difference between the purchase prices of imported natural gas and its sale for heat production for households	direct transfer	CSE	3 424	n.a.	3 900	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Budget transfer to Smilakomunteploenergo to prevent an emergency in the Smila town due to the financial inability of the enterprise to pay for natural gas	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets to compensate for the difference between the actual costs of utilities and tariffs set	direct transfer	CSE	n.a.	2 857	14 443	2 052	12 423	4 685	n.a.	1 798	978	n.a.	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets for the provision of benefits and housing subsidies for utility payment to low-income households	direct transfer	CSE	5 131	6 069	6 718	6 046	6 173	17 995	44 120	69 740	69 977	21 561	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets for the provision of benefits and housing subsidies for purchasing of solid and liquid household furnace fuel and LPG for low-income households	direct transfer	CSE	496	557	738	733	715	1 121	2 280	2 633	2 694	1 820	n.a.	n.a.
Direct payments of benefits and housing subsidies to households to partially cover	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23 267	36 357	35 208

utilities, solid and liquid furnace fuel and LPG costs													
Repayment of arrears of wages to employees of PJSC "Nadiya Mine"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51	n.a.
Compensating the NJSC "Naftogaz of Ukraine" for supplying imported gas to PSO consumers	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	32 205	n.a.
Ensuring the acquisition of LLC "Operator of the gas transmission system of Ukraine" by JSC "Main Gas Pipelines of Ukraine" from JSC "Ukrtransgaz"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3 851	n.a.
Compensation to consumers using electric heating for increased electricity prices	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 400
Total budget expenditure			**16 739.1**	**20 023.3**	**39 016.7**	**24 393.3**	**28 716.0**	**25 799.0**	**48 692.6**	**77 039.6**	**77 100.7**	**50 856.3**	**78 057.9**	**41 105.2**
Corporate income tax deduction for expenditure of energy enterprises planned within investment programmes	tax expenditure	PSE	n.a.	263	975	761	957	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Corporate income tax credit for the amount of excise tax levied on heavy distillates (gasoil) used in transport vehicles	tax expenditure	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	735	639	n.a.	n.a.
Corporate income tax deduction for costs associated with exploration and organisation of oil and gas fields	tax expenditure	PSE	-	23	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Temporary VAT relief for operations on natural gas supply imported into the customs territory of Ukraine by NJSK “Naftogaz of Ukraine”	tax expenditure	PSE	n.a.	575	1 464	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Temporary VAT relief for supply of coal and/or products of its enrichment on the customs territory of Ukraine	tax expenditure	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2 116	2 609	3 042	2 808	1 333	1 431
Excise tax relief for operations on the sale of LPG at specialised auctions for the needs of households	tax expenditure	CSE	n.a.	13	69	78	78	14	14	109	65	57	n.a.	n.a.
Lowering excise tax rate for operations on the sale of aviation gasoline and fuel for jet engines produced in Ukraine as well as imported	tax expenditure	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5 191	2 235	2 398

Total tax expenditure			**-**	**873.9**	**2 507.5**	**838.8**	**1 035.6**	**14.1**	**2 129.8**	**2 717.5**	**3 841.4**	**8 694.7**	**3 568.4**	**3 828.9**
Requirements for domestic gas producers (more than 50% owned by the state) to sell gas for household needs at regulated tariffs	induced transfer	CSE	-	-	43 168	44 493	36 679	53 893	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Requirements for domestic gas producers to sell gas at regulated prices under PSO regime	induced transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	-	16 404.7	25 529.1	91 092.72	n.a.	1 683.45	n.a.
Cross-subsidies in the electricity sector	induced transfer	CSE	23 326	28 048	34 467	37 557	40 825	43 848	45 466	36 595	45 344	26 053	n.a.	n.a.
Total induced transfers			**23 326.4**	**28 048.1**	**77 634.6**	**8 050.1**	**77 503.3**	**97 741.0**	**61 870.7**	**62 124.1**	**136 436.7**	**26 052.5**	**1 683.5**	n.a.
Increasing the statutory capital of NJSC “Naftogaz" via the mechanism of issuing state bonds to cover its deficit	risk transfer to government	CSE	12 400	7 500	6 000	8 000	96 610	29 700	n.a	n.a	n.a	n.a	n.a	n.a
Total risk transfer to government			12 400	7 500	6 000	8 000	96 610	29 700	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL ALL MEASURES			**2 465.5**	**56 445.4**	**125 158.8**	**115 282.3**	**203 864.5**	**153 254.2**	**112 693.1**	**141 881.2**	**217 378.8**	**85 603.5**	**83 309.7**	**44 934.0**

Note: n.a.: not applicable, -: not available, p. – provisional.

Source: Prepared based on previous estimates of fossil-fuel subsidies in the EaP countries published in the (OECD, 2018[1]) report, data collected for (OECD, 2021[2]), (Ministry of Finance of Ukraine, 2020[3]), (Ministry of Finance of Ukraine, 2018[4]), (Ministry of Finance of Ukraine, 2017[5]), (Ministry of Finance of Ukraine, 2014[6]), (Ministry of Finance of Ukraine, 2013[7]), (Ministry of Finance of Ukraine, 2010[8]), (NERC, 2014[9]), (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]), (NEURC, 2018[13]), (NEURC, 2017[14]), (NEURC, 2015[15]), (State Treasury Service of Ukraine, 2021[16]).

Table A B.2. State support to production and consumption of fossil fuels in Ukraine, USD million

Programme	Mechanism of support	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021p.
Restructuring of coal and peat industry	direct transfer	PSE	133	200	135	147	30	9	4	9	n.a.	126	187	113
Decommissioning of unprofitable coal and peat mining enterprises	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10	5	10	37
Rescue measures at coal mining enterprises	direct transfer	PSE	35	48	52	54	24	11	10	11	11	11	11	12
Prevention and elimination of emergencies at coal mines	direct transfer	PSE	n.a.	0	n.a.	0	n.a.	n.a.	n.a.	0	3	n.a.	n.a.	n.a.
Liquidation of emergency at the main gas pipeline “Luhansk - Lysychansk – Rubezhnoye”	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	n.a.	n.a.	n.a.	n.a.
Liquidation of emergency at TPP "Vuhlehirska"	direct transfer	PSE	n.a.	n.a.	n.a.	14	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Partial compensation of production costs of finished marketable coal	direct transfer	PSE	732	842	1 273	1 664	732	55	54	80	39	n.a.	n.a.	n.a.

Improvement of safety measures at coal mining enterprises	direct transfer	PSE	9	17	33	25	0	n.a.	n.a.	4	n.a.	n.a.	n.a.	n.a.
Construction and technical re-equipment of coal and peat mining enterprises	direct transfer	PSE	42	216	162	43	5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Replenishment of current capital or increase of the statutory funds of coal mines to settle the arrears of wages	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	9	20	n.a.	n.a.	n.a.	n.a.	n.a.
Repayment for electricity arrears of state-owned coal-mining enterprises	direct transfer	PSE	18	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17	n.a.	n.a.
State support for the construction of mine №10 "Novovolynska"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	7	2	3	1	2	n.a.	n.a.
Measures to support domestic production of coal and reform of the coal sector	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	61	n.a.	n.a.	n.a.
State support of the PJSC "Mahistralni Gazoprovody Ukrainy"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0	1	n.a.	n.a.	n.a.
Compensation to NJSC "Naftogaz of Ukraine" the difference between the purchase prices of imported natural gas and its sale for heat production for households	direct transfer	CSE	431	n.a.	488	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Budget transfer to Smilakomunteploenergo to prevent an emergency in the Smila town due to the financial inability of the enterprise to pay for natural gas	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets to compensate for the difference between the actual costs of utilities and tariffs set	direct transfer	CSE	n.a.	359	1 807	257	1 045	214	n.a.	68	36	n.a.	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets for the provision of benefits and housing subsidies for utility payment to low-income households	direct transfer	CSE	647	762	841	756	519	824	1 727	2 622	2 573	834	n.a.	n.a.
Inter-budgetary transfer (subvention) from the state budget to local budgets for the provision of benefits and housing subsidies for purchasing of solid and liquid household furnace fuel and LPG for low-income households	direct transfer	CSE	63	70	92	92	60	51	89	99	99	70	n.a.	n.a.
Direct payments of benefits and housing subsidies to households to partially cover utilities, solid and liquid furnace fuel and LPG costs	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	900	1 349	1 276

Repayment of arrears of wages to employees of PJSC "Nadiya Mine"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2	n.a.
Compensation to the NJSC "Naftogaz of Ukraine" for supplying imported gas to PSO consumers	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 195	n.a.
Ensuring the acquisition of LLC "Operator of the gas transmission system of Ukraine" by JSC "Main Gas Pipelines of Ukraine" from JSC "Ukrtransgaz"	direct transfer	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	143	n.a.
Compensation to consumers using electric heating for increased electricity prices	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51
Total budget expenditure			2 109.4	2 513.1	4 882.6	3 051.8	2 415.8	1 181.0	1 905.7	2 896.6	2 834.5	1 967.7	2 895.6	1 438.6
Corporate income tax deduction for expenditures of energy enterprises planned within investment programmes	tax expenditure	PSE	n.a.	33	122	95	81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Corporate income tax credit for the amount of excise tax levied on heavy distillates (gasoil) used in transport vehicles	tax expenditure	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	27	25	n.a.	n.a.
Corporate income tax deduction for costs associated with exploration and organisation of oil and gas fields	tax expenditure	PSE	n.a.	3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Temporary VAT relief for operations on natural gas supply imported into the customs territory of Ukraine by NJSK “Naftogaz of Ukraine”	tax expenditure	PSE	n.a.	72	183	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Temporary VAT relief for supply of coal and/or products of its enrichment on the customs territory of Ukraine	tax expenditure	PSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	83	98	112	109	49	52
Excise tax relief for operations on sale of LPG at specialised auctions for the needs of households	tax expenditure	CSE	n.a.	2	9	10	7	1	1	4	2	2	n.a.	n.a.
Lowering excise tax rate for operations on sale of aviation gasoline and fuel for jet engines produced in Ukraine as well as imported	tax expenditure	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	201	83	87
Total tax expenditure			n.a.	109.7	313.8	104.9	87.1	0.6	83.4	102.2	141.2	336.4	132.4	138.7
Requirements for domestic gas producers (more than 50% owned by the state) to sell gas for household needs at regulated tariffs	induced transfer	CSE	-	-	5 402	5 566	3 086	2 467	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Requirements for domestic gas producers to sell gas at regulated prices under PSO regime	induced transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	-	642	960	3 349	n.a.	62	n.a.
Cross-subsidies in the electricity sector	induced transfer	CSE	2 939	3 520	4 313	4 699	3 434	2 007	1 779	1 376	1 667	1 008	n.a.	n.a.

Total induced transfers			2 939.4	3 520.3	9 715.2	10 265.2	6 520.2	4 474.4	2 421.4	2 335.8	5 016.0	1 008.0	62.4	n.a.
Increasing the statutory capital of NJSC "Naftogaz" via the mechanism of issuing state bonds to cover its deficit	risk transfer to government	CSE	1 563	941	751	1 001	8 128	1 360	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total risk transfer to government			**1 563**	**941**	**751**	**1 001**	**8 128**	**1 360**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
TOTAL ALL MEASURES			**6 611.4**	**7 084.4**	**15 662.4**	**14 422.9**	**17 150.7**	**7 015.6**	**4 410.5**	**5 334.6**	**7 991.7**	**3 312.1**	**3 090.4**	**1 577.3**

Note: n.a.: not applicable, -: not available, p. – provisional.

Source: Prepared based on previous estimates of fossil-fuel subsidies in the EaP countries published in the (OECD, 2018[1]) report, data collected for (OECD, 2021[2]), (Ministry of Finance of Ukraine, 2020[3]), (Ministry of Finance of Ukraine, 2018[4]), (Ministry of Finance of Ukraine, 2017[5]), (Ministry of Finance of Ukraine, 2014[6]), (Ministry of Finance of Ukraine, 2013[7]), (Ministry of Finance of Ukraine, 2010[8]), (NERC, 2014[9]), (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]), (NEURC, 2018[13]), (NEURC, 2017[14]), (NEURC, 2015[15]), (State Treasury Service of Ukraine, 2021[16]).

Annex C. State support to energy efficiency measures and electricity produced from renewable energy sources

Table A C.1. State support for energy efficiency measures and electricity producers from renewable energy sources, UAH million

Programme	Mechanism of support	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021p.
Cheaper loans programme	direct transfer	CSE	n.a.	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Energy efficiency programme	direct transfer	CSE	11	282	57	n.a.	2	302	861	818	418	546	384	150
Energy Efficiency Fund	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 500	1 219	n.a.	100
Total support for energy efficiency			**11**	**283**	**57**	n.a.	**2**	**302**	**861**	**818**	**1 918**	**1 765**	**384**	**250**
Corporate profit tax exemption with respect to profit of power producers that generate electricity exclusively from renewable energy sources	tax expenditure	PSE	-	-	468	450	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Corporate profit tax exemption with respect to income of biofuel producers obtained from sales of biofuels	tax expenditure	PSE	120	-	15	15	15	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Corporate profit tax exemption with respect to income of combined heat and power plants using biofuels, and thermal energy using biofuels	tax expenditure	PSE	-	-	548	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Zero excise tax rate with respect to bioethanol used for the production of biofuel and bioethanol-gasoline fuel blends	tax expenditure	CSE	1 153	-	752	788	183	776	1 663	532	569	-	-	-
VAT exemption with respect to materials and equipment for the production of renewable energy sources, electricity generation from renewable sources as well as energy serving equipment if identical goods are not produced in Ukraine	tax expenditure	PSE	-	-	-	-	-	-	-	-	-	-	-	-

Import duty exemption with respect to materials and equipment for the production of renewable energy sources, electricity generation from renewable sources as well as energy-saving equipment if identical goods are not produced in Ukraine	tax expenditure	PSE	-	64	-	-	-	-	-	-	-	-	-	-
Total tax expenditure			**1 273**	**64**	**1 783**	**1 253**	**198**	**776**	**1 663**	**532**	**569**	**-**	**-**	**-**
Feed-in tariff for electricity producers from renewable energy sources (wind, solar, biomass, small hydro, etc.)	induced transfer	PSE	119	271	1 700	3 029	4 322	5 973	5 946	6 624	9 136	14 915	39 033	-
Total support to renewable energy producers			**1 392**	**336**	**3 484**	**4 282**	**4 520**	**6 748**	**7 610**	**7 156**	**9 706**	**14 915**	**39 033**	**-**
Total support to energy efficiency and renewables			**1 402**	**618**	**3 540**	**4 282**	**4 523**	**7 050**	**8 471**	**7 974**	**11 624**	**16 680**	**39 416**	**250**

Note: n.a.: not applicable, -: not available; p. – provisional.
Source: Authors' compilations and calculations based on data collected for the (OECD, 2018[1]) report, (State Treasury Service of Ukraine, 2021[16]), (Ministry of Finance of Ukraine, 2010[8]), (Ministry of Finance of Ukraine, 2013[7]), (Ministry of Finance of Ukraine, 2014[6]), (Ministry of Finance of Ukraine, 2017[5]), (Ministry of Finance of Ukraine, 2018[4]), (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]).

Table A C.2. State support for energy efficiency measures and electricity producers from renewable energy sources, USD million

Programme	Mechanism of support	Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021p.
Cheaper loans programme	direct transfer	CSE	n.a.	0.10	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Energy efficiency programme	direct transfer	CSE	1.4	35.4	7.1	n.a.	0.2	13.8	33.7	30.8	15.4	21.1	14.2	5.4
Energy Efficiency Fund	direct transfer	CSE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	55.1	47.2	n.a.	3.6
Total support for energy efficiency			1	35	7	n.a.	0	14	34	31	71	68	14	9
Corporate profit tax exemption with respect to profit of power producers that generate electricity exclusively from renewable energy sources	tax expenditure	PSE	-	-	59	56	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Corporate profit tax exemption with respect to income of biofuels producers obtained from sales of biofuels	tax expenditure	PSE	15	-	2	2	1	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Corporate profit tax exemption with respect to income of combined heat and power plants using biofuels, and thermal energy using biofuels	tax expenditure	PSE	-	-	69	0.01	0.01	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Zero excise tax rate with respect to bioethanol used for the production of biofuel and bioethanol-gasoline fuel blends	tax expenditure	CSE	145	-	94	99	15	36	65	20	21	-	-	-
VAT exemption with respect to materials and equipment for the production of renewable energy sources, electricity generation from renewable sources as well as energy serving equipment if identical goods are not produced in Ukraine	tax expenditure	PSE	-	-	-	-	-	-	-	-	-	-	-	-
Import duty exemption with respect to materials and equipment for the production of renewable energy sources, electricity generation from renewable sources as well as energy-saving equipment if identical goods are not produced in Ukraine	tax expenditure	PSE	-	8	-	-	-	-	-	-	-	-	-	-
Total tax expenditure			160	8	223	157	17	36	65	20	21	-	-	-
Feed-in tariff for electricity producers from renewable energy sources (wind, solar, biomass, small hydro, etc.)	induced transfer	PSE	15	34	213	379	364	273	233	249	336	577	1 448	-
Total support to renewable energy producers			**175**	**42**	**436**	**536**	**380**	**309**	**298**	**269**	**357**	**577**	**1 448**	**-**
Total support to energy efficiency and renewables			**177**	**78**	**443**	**536**	**380**	**323**	**332**	**300**	**427**	**645**	**1 462**	**9**

Note: n.a.: not applicable, -: not available; p. – provisional.

Source: Authors' compilations and calculations based on data collected for the (OECD, 2018[1]) report, (State Treasury Service of Ukraine, 2021[16]), (Ministry of Finance of Ukraine, 2010[8]), (Ministry of Finance of Ukraine, 2013[7]), (Ministry of Finance of Ukraine, 2014[6]), (Ministry of Finance of Ukraine, 2017[5]), (Ministry of Finance of Ukraine, 2018[4]), (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]).

Annex D. Compensation for losses of utility supply companies

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct spending → Earmarks	
Stimulated activity	Energy and other utility consumption	
Subsidy name	**Subvention (transfer) from the national budget to local budgets for the repayment of the difference between the actual cost of central heating and services of centralised hot and coal water supply and sewerage, which were produced, transported and supplied to households, state-funded institutions and enterprises for the heat and water supply providing such services, and tariffs approved and/or agreed by public authorities or local governments**	
Jurisdiction	National and/or local level	
Legislation / Endorsing organisation	Budget Code of Ukraine, Article 2, p. 48 (Parliament of Ukraine, 2010[17]) and budget laws passed by Verkhovna Rada (Parliament) of Ukraine; Resolutions of the Cabinet of Ministers No. 692-p of 1 August 2012; No. 517 of 11 June 2012, No. 110 of 14 February 2018	
Policy objective(s) of subsidy	To keep utility tariffs for households low	
End recipient(s) of subsidy	Utility supply companies were getting compensation for losses but the final beneficiaries are households	
Time period	2016 - 2018	
Background	Providers of utility services received compensation for the difference between the actual cost of central heating and the services of centralised hot and cold water supply and sewerage, on the one hand, and actual tariffs, on the other, via a subvention (transfer) from the national budget to local governments. Regulation No. 692-p by the Cabinet of Ministers of 1 August 2012 categorises provision of heat and water supply services to households at prices (tariffs) lower than economically justified production costs as "a quasi-fiscal operation". The Cabinet of Ministers would approve the procedures for this subvention on an annual basis and the latest one is Resolution No. 110 of 14 February 2018. The responsibility for the administration of this programme lied with the Ministry of Regional Development, Construction and Utilities. This budget programme was closed down in 2019 due to the implementation of the gas pricing reform (see section on Natural Gas and Taxation policy as a source of fossil-fuel subsidies in the Energy pricing and taxation policy as a source of fossil-fuel subsidies in Ukraine chapter).	
Amount of subsidy conferred	2016	n.a.
	2017	UAH 1 798 million (USD 68 million)
	2018	UAH 978 million (USD 36 million)
	2019	n.a.
	2020	n.a.
Information sources	Treasury reports on budget execution (State Treasury Service of Ukraine, 2021[16]), (Cabinet of Ministers, 2012[18]), (Cabinet of Ministers, 2012[19]), (Cabinet of Ministers, 2018[20]).	

Annex E. State support to coal mining enterprises for partial compensation of production costs of finished marketable coal

Subsidy category		Direct and indirect transfer of funds and liabilities → Direct spending → Earmarks
Stimulated activity		Coal production
Subsidy name		**State support to coal mining enterprises for partial compensation of the production costs of finished marketable coal**
Jurisdiction		National level
Legislation / Endorsing organisation		Budget Code of Ukraine (Law No. 2 456-VI of 8 July 2010) and budget laws passed by Verkhovna Rada (Parliament) of Ukraine; Resolution of the Cabinet of Ministers No. 92 of 21 February 2017
Policy objective(s) of subsidy		To provide state support for unprofitable state-owned coal mines
End recipient(s) of subsidy		State enterprises and economic operators 100% owned by the state or enterprises operating under concession or lease agreements registered by the Ministry of Energy and Coal Industry
Time period		2003-2018
Background		The government introduced a budget programme on partial compensation of production costs of finished marketable coal back in 2003. Procedures for funds allocation under this programme were defined by the Cabinet of Ministers resolutions, the latest one being Resolution No. 92. (Cabinet of Ministers, 2017[21]). Budget funds were used for financial rehabilitation of coal mining enterprises via partial compensation of the costs, which were included in the production cost of finished marketable coal products, and could be used to cover expenditures for the payment of wages and the cost of electricity consumed. Coal mining enterprises prepared estimates of forecast technical and economic performance indicators and submitted them for consideration of the Ministry of Energy and Coal Industry. The Ministry was responsible for the allocation of the national budget funds to coal mines if the forecast prices for coal did not cover the estimated production costs. The Ministry also approved monthly performance indicators of coal mines (including their output amounts) and defined production costs and losses for each coal mining enterprise depending on its product range as well as quality indicators and forecast prices. This budget programme was terminated in 2019 but state-owned coal mines can receive partial compensation of production costs (e.g., wages of miners) under the coal sector restructuring programme (see Annex F).
Amount of subsidy conferred	2016	UAH 1.4 billion (USD 54 million)
	2017	UAH 2.1 billion (USD 80 million)
	2018	UAH 1.1 billion (USD 39 million)
	2019	n.a.
	2020	n.a.
Information sources		Treasury reports on budget execution (State Treasury Service of Ukraine, 2021[16]), (Cabinet of Ministers, 2017[21]).

Annex F. State support to the restructuring of the coal industry

Subsidy category	Direct and indirect transfer of funds and liabilities → Direct spending → Earmarks	
Stimulated activity	Decommissioning of coal mines	
Subsidy name	**State support for the restructuring of coal industry**	
Jurisdiction	National level	
Legislation/Endorsing organisation	Budget Code of Ukraine (Law No. 2 456-VI of 8 July 2010) and budget laws passed by Verkhovna Rada (Parliament) of Ukraine; Resolution of the Cabinet of Ministers No. 80 of 23 January 2019	
Policy objective(s) of subsidy	To meet the needs of the economy in the appropriate amount of high-quality marketable coal products, as well as maintain the unfinished construction of mine № 10 "Novovolynska" in a safe mode	
End recipient(s) of subsidy	State enterprises and economic operators 100% owned by the state	
Time period	2005 - ongoing	
Background	The government introduced a budget programme on restructuring the coal and peat industry back in 2005 and it is still operational. Funds under this budget programme were previously allocated for the purposes of the preparation of the coal mining enterprises for liquidation (e.g., preparation for the transfer or write-off of coal stock and equipment; reducing the number of employees; settling arrears of wages and social payments; development of the documentation for liquidation and government inspections, etc.). Since 2018, the 101070 budget programme was renamed “Liquidation of Unprofitable Coal Mining and Coal Processing Enterprises” and in 2020 it was further renamed “Measures on Liquidation of Unpromising Coal Mining Enterprises”. At the same time, the “Restructuring of the Coal Industry” programme under a different budget code (2401590) was introduced in 2019. The aim of the programme and types of spending covered differ considerably from the programme with a similar title introduced in 2005. The most important difference concerns the procedure for funds allocation under this programme and is defined by the (Cabinet of Ministers, 2019[22]). Resolution No. 80. According to this Resolution, budget funds can be used for the repayment of budget loans, partial compensation of production costs (wages and electricity use), settling arrears of wages and social payments, technical re-equipment and modernisation of coal mining enterprises, maintenance of the unfinished construction of mine № 10 "Novovolynska".	
Amount of subsidy conferred	2016	UAH 107 million (USD 4 million)
	2017	UAH 244 million (USD 9 million)
	2018	n.a.
	2019	UAH 3 269 million (USD 126 million)
	2020	UAH 5 039 million (USD 187 million)
Information sources	Treasury reports on budget execution (State Treasury Service of Ukraine, 2021[16]), (Cabinet of Ministers, 2019[22]).	

Annex G. Housing and Utilities Subsidy and Benefits Programme

Subsidy category		Direct and indirect transfer of funds and liabilities → Direct spending → Earmarks
Stimulated activity		Consumption of energy and other utilities
Subsidy name		**Subvention (inter-budgetary transfer) from the national budget to local budgets for the provision of benefits and housing subsidies to households for the payment for electricity, natural gas, heat, water supply and wastewater treatment, rent (maintenance of houses and buildings and house-adjoining areas), management of multi-apartment buildings, removal of domestic waste and liquid sewage, fees for installation, maintenance and replacement of water and heat meters, customer service for consumers of utilities provided in apartment buildings under individual contracts**
Jurisdiction		National level
Legislation / Endorsing organisation		Budget Code of Ukraine (Law No. 2 456-VI of 8 July 2010, Article 2, p. 48, Article 87, p. 9) and budget laws passed by the Verkhovna Rada (Parliament) of Ukraine; Resolutions of Cabinet of Ministers No. 256 of 4 March 2002, No. 848 of 21 October 1995 and No. 1 156 of 27 July 1998
Policy objective(s) of subsidy		To provide targeted subsidies to low-income households (mostly in cities) and benefits on utility payments to certain categories of consumers
End recipient(s) of subsidy		Low-income households and a range of beneficiary groups of consumers listed in Article 87 (p.9) of the Budget Code of Ukraine
Time period		1995 - 2019
Background		Means-tested households were eligible for a non-monetary subsidy for partial compensation of utility bills according to the procedures defined in Resolution of Cabinet of Ministers No. 848 of 21 October 1995. Means-testing was based on a formula taking into account the household's income level and the minimum cost of living (Cabinet of Ministers, 1998[23]). Beneficiaries of this programme were receiving discounts on their utility bills while the difference was compensated to utility providers. In addition to low-income households, certain categories of consumers listed in Article 87, p. 9 of the Budget Code could apply for a 25%-100% discount on utility payments and purchase of fuel for individual heating in accordance with procedures defined in Cabinet of Ministers Resolution No. 389 of 4 June 2015. Financing of local budgets' expenditures related to the implementation of the national social programmes was undertaken through subventions (inter-budgetary transfers) from the national budget for a given year in line with Cabinet of Ministers Resolution No. 256 of 4 March 2002. Decisions on the allocation of subsidy to households and monitoring of the earmarked funds were a responsibility of the social protection departments of regional authorities. Personified accounting of subsidy beneficiaries and settling up compensations to utility companies (based on their monthly reports on services eligible for subsidies) were also undertaken at a local level. This budget programme was cancelled in 2020 due to the reform of the housing and utility subsidies programme. Instead, a new mechanism and budget programme has been gradually introduced since 2019, which allowed beneficiaries to receive state support directly either in cash or on accounts opened in banks approved by the Cabinet of Minister (see section on Housing and utility subsidies and benefits for households in the chapter on State support in the energy sector in Ukraine).
Amount of subsidy conferred	2016	UAH 44.1 billion (USD 1.7 billion)
	2017	UAH 69.7 billion (USD 2.6 billion)
	2018	UAH 70 billion (USD 2.6 billion)
	2019	UAH 21.6 billion (USD 834 million)
	2020	n.a.
Information sources		Treasury reports on budget execution (State Treasury Service of Ukraine, 2021[16]), (Cabinet of Ministers, 1995[24]), (Cabinet of Ministers, 1998[23]), (Cabinet of Ministers, 2002[25]), (Cabinet of Ministers, 2015[26]) Resolutions

Annex H. Subsidy and Benefits Programme for the Purchase of Furnace Fuel and LPG

Subsidy category		Direct and indirect transfer of funds and liabilities → Direct spending → Earmarks
Stimulated activity		Consumption of energy
Subsidy name		**Subvention (inter-budget transfer) from the national budget to local budgets for the provision of benefits and housing subsidies for the purchase of solid and liquid furnace fuel and LPG**
Jurisdiction		National level
Legislation / Endorsing organisation		Budget Code of Ukraine (Law No. 2 456-VI of 8 July 2010, Article 2, p. 48, Article 87, p. 9) and budget laws passed by the Verkhovna Rada (Parliament) of Ukraine; Resolutions of Cabinet of Ministers No. 256 of 4 March 2002, No. 848 of 21 October 1995 and No. 1 156 of 27 July 1998
Policy objective(s) of subsidy		To provide targeted subsidies and benefits to low-income households (mostly in villages) for the purchase of solid and liquid furnace fuel and LPG
End recipient(s) of subsidy		Low-income households and a range of beneficiary groups of consumers listed in Article 87 (p.9) of the Budget Code of Ukraine
Time period		1995 - 2019
Background		Subsidies and benefits to certain categories of households for partial compensation of expenditures for the purchase of solid and liquid furnace fuel and LPG were provided to low-income households if their houses were not provided with electricity, heat and gas for heating. Procedures for defining the eligibility of households and allocation of subsidies were similar to those for the targeted subsidies programme for utility payments defined by Cabinet of Ministers' Resolutions No. 256 of 4 March 2002, No. 848 of October 1995 and No. 1 156 of July 1998. However, subsidies for solid and liquid furnace fuel and liquefied gas are provided in a monetary form and on an annual basis. Due to the reform of state support to low-income households, in 2020 this budget programme was replaced by the budget programme "Direct Payments of Housing Subsidies and Benefits to Households to Partially Cover Utilities, Solid and Liquid Furnace Fuel and LPG Costs" (see section on Housing and utility subsidies and benefits for households in the chapter on State support in the energy sector in Ukraine).
Amount of subsidy conferred	2016	UAH 2.3 billion (USD 89 million)
	2017	UAH 2.6 billion (USD 99 million)
	2018	UAH 2.7 billion (USD 99 million)
	2019	UAH 1.8 billion (USD 70 million)
	2020	n.a.
Information sources		Treasury reports on budget execution (State Treasury Service of Ukraine, 2021[16]), (Cabinet of Ministers, 1995[24]), (Cabinet of Ministers, 1998[23]), (Cabinet of Ministers, 2002[25]) Resolutions.

Annex I. Cross-subsidisation in the electricity sector by means of subsidy certificates

Subsidy category	Income or price support → Market price support and regulation → Regulated prices set at below-market rates for households	
Stimulated activity	Consumption of electricity	
Subsidy name	**Cross-subsidisation of households by industrial consumers**	
Jurisdiction	National level	
Legislation / Endorsing organisation	Resolutions of the National Electricity Regulatory Commission for a given year	
Policy objective(s) of subsidy	To keep electricity prices for all households at an affordable level regardless of their income	
End recipient(s) of subsidy	Preferential groups of consumers (up to 10 different groups)	
Time period	At least since 2000 – mid 2019	
Background	Cross-subsidisation of preferential consumers at the expense of industrial consumers was designed via the system of so-called "subsidy certificates". In order to compensate losses of energy companies, which supply electricity to preferential categories of consumers at regulated tariffs (well below cost-recovering levels), the value of "subsidy certificates" was incorporated into the structure of the wholesale market price of electricity. The share of "subsidy certificates" in the latter reached almost 31% in 2014 and decreased to approximately 22% in 2018 (NEURC, 2016[27]), (NEURC, 2016[27]), (NEURC, 2020[11]). Overall, the volume of cross-subsidisation increased from UAH 23.3 billion (NERC, 2014[9]) to UAH 45.5 billion in 2016 (NEURC, 2020[11]) despite the fact that the regulator cancelled several preferential consumer groups. For example, preferences to ore mining and chemical companies were cancelled in 2011 (NERC, 2014[9]). In 2015-16, the NEURC cancelled preferential tariffs to coal mining enterprises and economic entities that implement innovation projects as well as for urban electric municipal transport and street lighting (NEURC, 2016[27]), (NEURC, 2017[14]). By mid-2019, five preferential groups of consumers remained (NEURC, 2020[11]) As the wholesale electricity market was launched on 1 July 2019, cross-subsidisation between different consumer groups by means of subsidy certificates was phase-out. Instead, the government introduced a different instrument for subsidising low tariffs for households through public service obligations imposed on electricity producers on nuclear power and larger hydropower plants (Cabinet of Ministers, 2019[28]).	
Amount of subsidy conferred	2016	UAH 45.5 billion (USD 1.8 billion)
	2017	UAH 36.6 billion (USD 1.4 billion)
	2018	UAH 45.3 billion (USD 1.7 billion)
	2019	UAH 26.1 billion (USD 1 billion)
Information sources	Reports of the National Electricity Regulatory Commission (NERC, 2014[9]), (NEURC, 2015[15]), (NEURC, 2020[11]).	

Annex J. Feed-in tariff for electricity producers from renewable energy sources

Subsidy category		Income or price support → Market price support and regulation → Feed-in tariff for renewable energy producers
Stimulated activity		Production of renewable energy
Subsidy name		**Feed-in tariff for renewable energy producers**
Jurisdiction		National
Legislation / Endorsing organisation		Article 9.1 of Law No. 555-IV of 20 February 2003 On the Alternative Energy Sources of Ukraine (Parliament of Ukraine, 2003[29]).
Policy objective(s) of subsidy		To stimulate the development of the renewable energy sector
End recipient(s) of subsidy		Renewable energy producers
Time period		2009 - 2029
Background		Feed-in tariffs (FITs) for renewable energy producers were introduced in Ukraine in 2009. According to Law No. 555-IV, the so-called "green" tariff for renewable energy producers is set based on the retail tariff for consumers of the second voltage class, as of January 2009, multiplied by the "green" coefficient approved for each type of renewable energy (Article 9.1). "Green" coefficients and procedures for providing and financing FITs were amended several times (DiXi Group, 2021[30]). The authors estimate the value of the induced transfer to renewable energy producers using the price-gap method, i.e., estimating the difference between the weighted average FIT and the average tariff for Thermal Power Plants (TPPs), which is then multiplied by the amount of electricity produced from renewable energy sources. Regulator reports were used as a data source (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]). As the mechanism of FITs financing was altered with the launch of the new electricity market, the value of induced transfers via FITs in 2020 is the sum of services cost for supporting renewable energy producers under the Public Service Obligations of the Guaranteed Buyer and universal services providers.
Amount of subsidy conferred	2015	UAH 6 billion (USD 273 million)
	2016	UAH 5.9 billion (USD 233 million)
	2017	UAH 6.6 billion (USD 249 million)
	2018	UAH 9.1 billion (USD 336 million)
	2019	UAH 14.9 billion (USD 577 million)
	2020	UAH 39 billion (USD 1 448 million)
Information sources		Annual reports of the National Energy and Utilities Regulatory Commission (NERC, 2014[9]), (NEURC, 2021[10]), (NEURC, 2020[11]), (NEURC, 2019[12]), (Parliament of Ukraine, 2003[29]).

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Review of Energy Subsidies in the Context of Energy Sector Reforms in Ukraine

Since the first comprehensive analysis of fossil-fuel subsidies in Ukraine carried out by the OECD in 2018, the government of Ukraine undertook considerable reforms in the energy sector, which reshaped the energy subsidy landscape. Between 2018 and 2021, many subsidy schemes were phased out but new instruments of implicit consumer support were also introduced.

This study evaluates the progress of fossil-fuel subsidy reform since its launch in 2016 using the OECD "bottom-up", inventory, approach. The analysis covers: budgetary transfers, government revenue foregone (or tax expenditure), induced transfers in the form of cross-subsidies or below market tariffs and transfer of risk to government.

The study covers fossil-fuels subsidies to production and consumption, particularly, for natural gas, coal and electricity generated from fossil fuels while support for energy efficiency and renewables is considered for comparative purposes. This report also briefly discusses the taxation and energy pricing policies in Ukraine that have had direct or indirect impact on the evolution of fossil fuel subsidies in the country. Detailed estimates of all individual support measures are provided in the Annexes to the report. The analysis in this report reflects the energy subsidy policies and reforms in Ukraine prior to Russia's full-scale invasion in February 2022.

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