



Monitoring the Energy Strategy of Ukraine 2035



OECD Monitoring of the Energy Strategy of Ukraine until 2035



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Acknowledgments

This report was prepared by the OECD Global Relations Secretariat, led by Andreas Schaal, Director of OECD Global Relations, as part of the project Supporting Energy Sector Reform in Ukraine. The project is implemented in the context of the OECD-Ukraine Memorandum of Understanding, and is made possible thanks to the financial support of the Government of Norway.

The report was drafted by Geoff Upton, Policy Analyst, under the supervision of Gabriela Miranda, Country Manager for Ukraine, and William Tompson, Head of OECD Eurasia Division within the Global Relations Secretariat. Valuable comments, inputs and support were received from Miguel Castro and Nina Chitaia from the OECD Global Relations Secretariat, and Nelly Petkova from the OECD Environment Directorate. Talya Vatman and Anna Petrus from the International Energy Agency should also be thanked for their useful comments. The constructive feedback of Krzysztof Gierulski of the European Commission Support Group for Ukraine and Janez Kopač, Director of the Energy Community Secretariat, was also valuable in helping to finalise the report. Additional research support was provided by Mariia Melnyk and Yustyna Zanko from the OECD Global Relations Secretariat. In Ukraine, operational, logistical and administrative support was provided by Mykhailo Semchuk, and interpretation was provided by Liudmila Taranina and LLC Alesco Ukraine.

The OECD is grateful to DiXi Group, including Olena Pavlenko, Anton Antonenko, Roman Nitsovykh, Bohdan Serebrennikov and Anastasiya Yermakova for their contribution to the preparation of the OECD Monitoring Framework, the data collection for the analysis, and the organisation of the Expert Focus Group meetings in Kyiv. Moreover, comments and insights of Roman Nitsovykh on the draft were very valuable for the finalisation of this report.

The OECD would like to thank the representatives of several Ukrainian ministries and government agencies for their co-operation and support during the fact-finding missions that took place in Kyiv in October and December 2019. Their availability to meet with the OECD team, and provide verbal and written comments on the OECD Monitoring Framework (which informed the report's findings) is greatly appreciated. In particular, the OECD would like to extend its gratitude to Serhiy Maslichenko, Deputy Minister, Konstantyn Chyzhuk, Deputy Minister, and Vitaliy Kushnirov, Head of the Directorate of Strategic Planning and European Integration in the Ministry of Energy and Environmental Protection. The OECD is also grateful to the representatives of the Secretariat of the Cabinet of Ministers, particularly Tetiana Kovtun, Andriy Zhimin'ko, Dmitriy Shevchuk, Oleksandr Melnychenko, and Oleksiy Voloshin, for their continued support during the fact-finding missions and the information collection process.

Thanks are also due to the members of the OECD Expert Focus Group in Ukraine. They include Oleksandr Laktionov of Naftogaz, Anatoliy Fryzorenko, Ihor Verner and Olena Shevtsova of the State Statistics Service, Vsevolod Kovalchuk, Nataliya Slobodian and Liliya Lutsyuk of Ukrenergo, Igor Gorovykh, Ivan Zaika and Olena Lenska of the State Agency on Energy Efficiency and Energy Saving, Valeriy Tsaplin of NEURC, Iliya Poluliakh, Denys Rudyka, Mykola Yakovenko and Oleksiy Ryabchun of the Ministry of Energy and Environmental Protection, Alex Boykul and Olena Baida of the Ministry of

Communities and Territories Development and Julia Usenko of the All-Ukrainian Association of Investments and Sustainable Development.

The implementation of this project would not have been possible without the administrative and logistical support of Elisa Larrakoetxea from the OECD Global Relations Secretariat during the preparation of the missions and events, and Kristin Sazama for the finalisation of the report. For their continued support, special thanks are due to the representatives of the Government of Norway, including Ole T. Horpestad, Ambassador of Norway to Ukraine, Petter Bauck, Head of Co-operation at the Norwegian Embassy in Ukraine and Ellen Stie, Senior Adviser at the Norwegian Ministry of Foreign Affairs.

The report is based on a variety of sources, including questionnaires and focus group sessions during missions to Ukraine, information and presentations shared by local stakeholders and experts, previous OECD reviews, and desk research on the energy sector of Ukraine and OECD member states. The draft report was circulated among Ukrainian stakeholders in January 2020 and its revised version was discussed at an event in Kyiv on February 20, 2020.

Acronyms and abbreviations

AMCU	Antimonopoly Committee of Ukraine
BEIS	Department of Business, Energy and Industrial Strategy
CCC	Committee on Climate Change
CHP	Combined Heat and Power
CHPP	Combined Heat and Power Plant
CMU	Cabinet of Ministers of Ukraine
ESCO	Energy Service Company
EEG	Erneuerbare Energien Gesetz (Renewable Energy Sources Act)
ENTSO-E	European Network of Transmission System Operators for Electricity
ESU	Energy Strategy of Ukraine until 2035
EU	European Union
EUR	Euro
FEC	Fuel and Energy Complex
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IEA	International Energy Agency
KhNPP	Khmelnitsky Nuclear Power Plant
KPI	Key Performance Indicator
kWh	Kilowatt/hour
MEDTA	Ministry of Economic Development, Trade and Agriculture
MEEP	Ministry of Energy and Environmental Protection
NERP	National Emissions Reduction Plan
NEURC	National Energy and Utilities Regulatory Commission
NPP	Nuclear Power Plant
NSDCU	National Security and Defence Council of Ukraine
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
PSO	Public Service Obligation
RAB	Regulatory Asset Base
SAEE	State Agency on Energy Efficiency and Energy Saving of Ukraine
SDGs	Sustainable Development Goals

SOE	State-Owned Enterprise
SSSU	State Statistics Service of Ukraine
TPES	Total Primary Energy Supply
UAH	Ukrainian Hryvnia
USD	US Dollar

Executive summary

Energy sector reform remains central to promoting Ukraine's sustainable growth. While remaining a strategic player in energy transit, the country is also one of the largest producers of hydrocarbons in the region. However, following the dissolution of the Soviet Union, political and economic turmoil reshaped the patterns of Ukraine's energy production, supply and consumption. While the decline in population and economic output cut overall demand, mismanagement of energy state-owned enterprises (SOEs), heavy regulation of the sector and outdated technologies fuelled energy inefficiency. Despite recent improvements, Ukraine remains one of the most energy-intensive economies in the world, consuming approximately three times the OECD average per unit of GDP.

Following the 2013-2014 Euromaidan protests, the government sought to press ahead with energy-sector reforms. Russia's seizure of Crimea and the conflict with Russian-supported separatists in the Donbass resulted in supply disruptions and energy shortages, particularly in the coal sector. The need to promote energy security and stability, together with commitments to the European Union and the IMF prompted the government to introduce changes across sub-sectors, including tariff deregulation, privatisation and the improvement of corporate governance of energy SOEs. As a Contracting Party to the Energy Community Treaty since February 2011, Ukraine has made legally binding commitments to adopt core EU energy legislation: the so-called "*acquis communautaire*." These obligations prompted the government to introduce several laws to comply with EU standards, for instance on the natural gas and electricity markets, as well as to promote energy market reforms such as unbundling of energy SOEs (notably the oil-and-gas company Naftogaz), while increasing the share of renewables in the energy mix.

In 2017, the government adopted the Energy Strategy of Ukraine until 2035 (ESU 2035) as part of its efforts to promote a more systematic and holistic approach to energy sector reform. The strategy envisions a sectoral transformation that will improve Ukraine's energy efficiency, security, competitiveness and integration with the EU energy space. It outlines six headline objectives, along with sub-sectoral policy goals to ensure their fulfilment. The 2020 Action Plan was also drawn up for the first phase of energy strategy delivery (2017-2020), and identifies a more concrete list of policy deliverables for implementation. In December 2019, a presidential decree tasked the Cabinet of Ministers with revising the current strategy by 1 April 2020. By providing an assessment and recommendations on the implementation framework of the ESU 2035, this report aims to provide a benchmark to support this work, while assessing the progress that has been made towards energy strategy goals.

The report finds that the ESU 2035 suffers from a number of structural weaknesses, which could affect the quality of implementation. The first of these relates to the roadmap for energy strategy implementation. The ESU 2035 and 2020 Action Plan documents are not systematically aligned, which makes it difficult to track how different components of the strategy contribute to the achievement of higher-level objectives. The ESU 2035 also suffers from a lack of methodological clarity regarding the lower-and-higher-level components of energy sector reform. Additional issues include the current strategy's lack of mechanisms for effective risk assessment, and an implementation timeline that fails to give due consideration to the hierarchy and sequencing of reforms. OECD recommendations to address these issues include synchronising the ESU 2035 and 2020

Action Plan, improving the modelling and analysis of different energy scenarios and developing an annualised timeline for implementation.

Another weakness identified in the assessment pertains to the effectiveness of current mechanisms and procedures for monitoring the ESU 2035. The Key Performance Indicators (KPIs) listed in Annex 1 of the ESU 2035 are inadequate for holistically tracking on-the-ground progress across the energy sub-sectors included in the strategy, and the majority are not clearly linked to headline energy strategy objectives. They also lack the capacity to monitor whether policy implementation benchmarks are being met during the energy strategy rollout. Additional issues include the lack of clear allocation of responsibilities for monitoring and implementation, and the absence of formal mechanisms for soliciting expert advice (e.g. policy and scientific input). OECD recommendations to address these issues include developing a comprehensive set of indicators that are matched with all six headline objectives, and including a set of new implementation indicators to measure how successfully policies are being rolled out. A more specific and concise set of implementation and monitoring responsibilities for stakeholders should also be delineated and synchronised with headline goals.

The report also evaluates the Energy Strategy of Ukraine for its compliance with international agreements. The ESU 2035 is found to be broadly consistent with the energy commitments outlined in Ukraine's Sustainable Development Goals. However, the strategy is only partially consistent with the EU-Ukraine Association Agreement. Although the ESU 2035 clearly outlines measures to: (i) reduce greenhouse gas emissions, and (ii) restructure the coal sector to reduce its environmental impact, the Association Agreement also mandates a set of legal acts to (a) reform energy markets, and (b) align energy efficiency standards according to EU rules, which are lacking from the current ESU 2035 and should be clarified.

Policy gaps that may affect the achievement of headline objectives are also considered in the OECD report. For example, the lack of measures to promote the phase out of coal-fired power stations could be detrimental to the ESU 2035 "network integration" objective, because coal-fired power risks being excluded from the EU power market after full synchronisation with ENTSO-E. The OECD recommends reviewing such policies to ensure their full consistency with headline objectives.

In addition, the report evaluates the quality of budgeting processes that are outlined in the ESU 2035. It finds that the ESU 2035 lacks clear information regarding how planned policy initiatives have been costed by the government. It is also unclear whether any formal mechanisms exist through which policy measures can be reviewed for their cost-effectiveness. In this regard, the OECD recommends developing a comprehensive budget detailing funding allocations among the different ministries and government agencies, as well as conducting an annual cost-and-benefit assessment of existing ESU 2035 measures.

The other component of the OECD report is the assessment of ESU 2035 implementation progress towards the six headline objectives. It draws on analysis conducted using the OECD Monitoring Framework, a tool comprising 119 indicators and 344 sub-indicators that will help the government track the energy strategy more holistically.¹ The findings suggest that implementation progress towards ESU 2035 objectives has been mixed. Progress towards the Market Development and Modern Management System objectives is at an intermediate stage, while progress towards the Energy Efficiency, and Energy

¹ An abridged version of the OECD Monitoring Framework is included in Annex 1.

Independence, Sustainability and Reliability, Investment Attractiveness and Network Integration objectives is at an initial stage. At the sub-sectoral level however, implementation progress has varied much more significantly. The report concludes with a summary of progress towards headline objectives in each of the sectors, in which a comprehensive overview of the sub-indicator results is presented.

The draft findings and recommendations stemming from this work were presented at a seminar in Kyiv on 20 February 2020 in the presence of Deputy Minister for Energy and Environmental Protection, Serhiy Maslichenko, as well as several key Ukrainian energy stakeholders from government bodies, state-owned enterprises, the regulator and academia, all of whom contributed through their comments to the finalisation of the present report.

OECD Monitoring of the Energy Strategy of Ukraine until 2035

Introduction

This OECD monitoring report fulfils two functions. First, it provides an assessment of the implementation framework for the Energy Strategy of Ukraine until 2035. The report includes analysis of the ESU 2035's robustness as an implementation planning document, and an evaluation of the monitoring mechanisms and processes. An analysis of the ESU 2035 budgeting processes is also included. Additionally, the assessment considers the ESU 2035's compliance with international agreements, and evaluates the strategy for any policy gaps that could hinder the quality of implementation. A series of OECD recommendations to strengthen the implementation framework are also provided.

Second, the OECD monitoring report provides an assessment of implementation progress made so far towards the energy policy objectives set out in the ESU 2035. It evaluates progress made across nine sub-sectors of energy policy, which are outlined in the strategy as prepared by the government. The assessment has been conducted through data collection and analysis of 119 tracking indicators and 344 sub-indicators, which have been developed as part of a new tool, the OECD Monitoring Framework for the ESU 2035. The OECD Monitoring Framework has been created by taking a bottom-up approach, and will help the government to identify key objectives, policy deliverables and the data needed to track the implementation of the energy strategy. A condensed version of the OECD Monitoring Framework and a full overview of its methodological approach are presented in Annexes 1 and 2 of the report respectively (MECI, 2017^[1]).

A new government assumed office in mid-2019. In December 2019, the president instructed the government to revise the energy strategy by 1 April 2020. The newly created Ministry of Energy and Environmental Protection is leading the revision of the strategy. Informed by and consistent with the forthcoming Green Energy Transition 2050 Concept and the National Energy and Climate Plan 2030, the new energy strategy will include fresh objectives and a new roadmap for implementation. It will also ensure consistency with Ukraine's international energy obligations, notably the Paris Agreement, the EU Association Agreement (AA), the Energy Community Treaty and the Sustainable Development Goals (SDGs).

Although this OECD monitoring report is based on the ESU 2035 that was adopted in 2017, the recommendations presented here should provide a solid basis for the Government on which to develop a revised energy strategy in 2020 as planned (President of Ukraine, 2019^[2]) (Cabinet of Ministers, 2020^[3]).

Energy Sector Overview

Energy sector reform remains one of the main priorities in promoting Ukraine’s sustainable development. While acting as a key transit country, above all for natural gas, Ukraine has also been one of the largest producers of hydrocarbons in Eastern Europe (OECD, 2019^[4]). The dissolution of the Soviet Union in 1991 led to severe political and economic turmoil that affected Ukraine’s energy sector, with total primary supply falling by more than 45% over the course of the decade (IEA, 2019^[5]). Moreover, heavy government regulation, as well as mismanagement of state-owned enterprises and the prevalence of rent-seeking on the part of certain actors further undermined the stability and security of the energy sector, rendering Ukraine one of the least energy efficient countries in the world (OECD, 2019^[4]). Despite increasing energy efficiency in recent years, Ukraine continues to consume nearly three times the OECD average per unit of GDP.

Ukraine has worked for some years to reform its energy sector in order to put the country on a path of sustainable growth. In 2011, Ukraine became a Contracting Party to the Energy Community Treaty, making legally binding commitments to adopt core EU energy legislation: the so-called “*acquis communautaire*.” The implementation of the renewable energy and energy efficiency *acquis* based on comprehensive, multi-annual action plans, and the obligation of Ukraine to provide regular reports on progress has driven some of the country’s efforts in this respect. Later, in 2014, Russia’s occupation of Crimea and the beginning of the conflict in the Donbass disrupted the energy supply chain, as a significant share of Ukraine’s coal mines are located in Donetsk and Luhansk regions (OECD, 2018^[6]).² As Ukraine signed the Association Agreement with the European Union (EU) in 2014 and engaged in further international commitments, it marked the start of a new chapter for its energy reform ambitions. In 2015, Ukraine committed itself to achieving a range of policy targets attached to the UN Sustainable Development Goals (SDGs), which include the energy sector. In 2016, the government ratified the Paris Agreement, which commits Ukraine to ensuring that greenhouse gas emissions in 2030 will not exceed 60% of the 1990 emissions level (MEDT, 2017^[21]) (UNFCCC, 2017^[7]).

The increasing geopolitical headwinds in the region have further highlighted the importance of improving Ukrainian energy efficiency and transforming energy markets, as well as bolstering the energy sector’s attractiveness to domestic and foreign investors. Since 2015, the government has partially deregulated pricing in wholesale and retail gas markets, while raising tariffs for regulated consumers (such as households, municipal heating companies and religious organisations). It has also taken steps to reduce cross-subsidies within the electricity sector and been working towards the liberalisation of the market. Moreover, the state began phasing out coal subsidies and decommissioning unprofitable state-owned mines, while launching efforts to promote energy efficiency measures.

In August 2017, the Cabinet of Ministers of Ukraine (CMU) adopted the “Energy Strategy of Ukraine until 2035” (ESU 2035) which overarching goal is to address “the needs of society and economy for fuel and energy in a technically-reliable, safe, economically-efficient and environmentally-friendly way, in order to guarantee the improvement of social well-being” (Cabinet of Ministers, 2017^[7]). The strategy identifies energy sector reform as

² While thermal power plants had been constructed to burn anthracite coal to produce electricity, following the conflict with Russia Ukraine increased coal imports and introduced Rotterdam+ methodology (under which coal price was set according to an average market price for 12 months based on Amsterdam-Rotterdam-Antwerp index. This formed the basis of wholesale market price that helped forecast tariffs for industrial consumers). In addition, limited availability of resources contributed to modernising and re-equipping generation units to switch from anthracite to other types of coal.

essential to achieving four policy outcomes: energy efficiency, security, competitiveness and greater integration with the EU energy space (MECI, 2017_[11]). More broadly, sustainable development of the energy sector is identified in the ESU 2035 as a key step towards the recovery and growth of Ukraine's economy. In this regard, it echoes the visions outlined in other national energy plans that view a sectoral energy transformation within a broader framework of economic policy goals, such as increasing national competitiveness and creating new economic opportunities for citizens (MECI, 2017_[11]) (BMW, 2018_[8]) (The Danish Government, 2011_[9]). Ensuring alignment between the country's energy and economic policy goals, particularly in the context of Ukraine's forthcoming Economic Development Strategy, will be critical for maximising the fruits of the energy transition. The forthcoming government concept – Ukraine's Green Energy Transition by 2050 – provides a starting point from which this alignment can begin to be engineered. Modelled on the EU Green Deal, it will set out a blueprint for decarbonising Ukraine's energy sector by 2050 while promoting sustainable economic development (Cabinet of Ministers, 2020_[3]). The sustainability of the concept will need to be guaranteed, in order to withstand future government reshuffles and ensure that valuable progress is not lost.

The Energy Strategy of Ukraine until 2035 (ESU 2035)

The current ESU 2035 contains five main sections. Section 1 provides a brief summary of global energy trends in relation to Ukraine, and an overview of challenges and opportunities for the Ukrainian energy sector. Section 2 outlines six headline strategic objectives for energy sector reform, along with a list of strategic priorities for meeting each objective. Section 3 provides an outline of energy policy goals across various sub-sectors, and a proposed timeline for the implementation of the ESU 2035. Section 4 includes a set of policy priorities for improving the business climate and increasing the investment attractiveness of the energy sector. Section 5 provides an overview of the oversight and monitoring responsibilities for the ESU 2035, which are the purview of various stakeholders (MECI, 2017_[11]). A short overview of each of these sections is provided below.

Section 1: Energy challenges and opportunities for Ukraine

In Section 1, the ESU 2035 provides a brief overview of challenges and opportunities for Ukraine's energy sector. Geopolitical tensions with Russia, which could result in a significant loss of Ukrainian gas transit revenues, are cited as the primary risk. Opportunities, however, include the chance for Ukraine to bolster its energy independence by reducing its reliance on gas imports from Russia. The ESU 2035 also regards the possibility for greater integration with the European energy market as an opportunity for Ukraine to liberalise and demonopolise internal energy markets.

Section 2: Six headline strategic objectives

In Section 2, the ESU 2035 identifies six broad objectives for transforming the energy sector: (1) building an energy-efficient society, (2) ensuring energy independence, and the reliability and sustainability of the fuel and energy complex (FEC), (3) strengthening market development, (4) enhancing the sector's investment attractiveness, (5) promoting network integration, and (6) establishing a "Modern Management System". Each objective is supported by a list of more concrete sub-objectives to ensure their achievement (MECI, 2017_[11]).

Section 3: Policy goals and implementation timeline

Section 3 sets out a list of policy outcomes intended to ensure the achievement of energy sector objectives. They fall under eleven sub-sectors and aspects of energy policy: electricity, natural gas, oil, coal, renewables, nuclear, heat, energy efficiency, modern management system, European integration and environmental protection (MECI, 2017_[1]).

Section 3 also contains an implementation timeline for the ESU 2035 that is divided into three, core phases. **Phase 1 (2017-2020)** is foreseen to consist primarily of launching the alignment of Ukraine’s natural gas and electricity markets with EU energy legislation, as well as restructuring the coal industry and increasing the share of renewables in the energy mix. **Phase 2 (2021-2025)** is intended to focus on upgrading energy infrastructure and the practical integration of Ukraine’s energy complex into the European energy sector, while **Phase 3 (2026-2035)** is expected to involve a more holistic reform focus on promoting sustainable development (MECI, 2017_[1]).

Section 4: Improvements to the business climate

Section 4 of the ESU 2035, on “creating pre-conditions for investment attractiveness”, underscores how successful implementation of the various phases of reform is fundamentally contingent on substantial improvements in the business climate. The rule of law, effective competition oversight, and the introduction of market pricing based on non-discriminatory principles are all identified as fundamental pillars for sectoral development (MECI, 2017_[1]).

Section 5: Oversight and monitoring

The “Performance Monitoring” section of the strategy broadly identifies the parties responsible for overseeing the various components of the ESU 2035. The Cabinet of Ministers of Ukraine (CMU) and the National Security and Defence Council of Ukraine (NSDCU) co-ordinate and control ESU implementation. Some general guidelines for the responsibilities of government departments, regulatory authorities, local government bodies and civil society are also set out (MECI, 2017_[1]).

Key entities identified as responsible for implementation and monitoring include the former Ministry of Energy and Coal Industry (MECI) (which oversees the main coordination and monitoring functions), the former Ministry of the Environment and Natural Resources (MENR), the former Ministry of Economic Development and Trade (MEDT)³ and the National Energy and Utilities Regulatory Commission (NEURC) (MECI, 2017_[1]).

Annexes 1 and 2

Additionally, the ESU 2035 includes two annexes. Annex 1 lists 23 largely quantitative indicators that are intended to help measure progress towards ESU objectives. Where applicable, these indicators are staggered in the form of five-year targets through 2035. Annex 2 offers estimates of how energy strategy implementation will affect the structure of Ukraine’s Total Primary Energy Supply (TPES) and electricity mix in five-year increments. Key 2015 baseline estimates include a reduction of the share of coal in TPES

³ As of October 2019, under the new Government of Ukraine, MECI and MENR have been restructured to form the new Ministry of Energy and Environmental Protection. MEDT has been restructured to form the new Ministry of Economic Development, Trade and Agriculture.

from 30.4% to 12.5% by 2035, and increases in the shares of wind and solar from 0.1% to 10.4% and of biomass/biofuels and waste - from 2.3% to 11.5% (MECI, 2017_[1]).

2020 Action Plan

In order to support the implementation of ESU 2035 Phase one (2017-2020), a 2020 Action Plan was drawn up by the Ministry of Energy and Coal Industry and approved by the Cabinet of Ministers in June 2018. The 2020 Action Plan identifies 186 actions to be completed by end-2020, and lists the plurality of stakeholders (e.g. government ministries, agencies, state companies) involved in their implementation. MECI also committed to submitting draft action plans for the second and third phases of implementation to the CMU respectively, but to date these have not been published. The Action Plan also mandates quarterly reporting on implementation by stakeholders, with MECI defined as responsible for aggregation and delivery of annual performance reporting (MECI, 2018_[10]) (MECI, 2017_[1]).

OECD assessment of the ESU 2035 implementation framework

The OECD assessment of the ESU 2035 looks at the structure of the strategy adopted in 2017 as drafted by the government and provides recommendations for improving its effectiveness in the future revision. Specifically, the methodological approach adopted by the OECD evaluates both structural and policy-specific aspects of the energy strategy. With regards to structure, the assessment considers the extent to which the ESU 2035 provides a holistic and systematic roadmap for conducting energy strategy implementation and monitoring. This includes analysis of the ESU 2035's robustness as an implementation planning document, and an evaluation of the quality of monitoring mechanisms and processes.

With regards to policy, the assessment considers the extent to which the ESU 2035 contains policy gaps that could hinder the quality of implementation. In particular, it evaluates the strategy's compliance with international energy agreements that Ukraine has signed. The assessment also considers the effectiveness of individual policy measures for meeting headline objectives. Additionally, a section on the quality of the budgeting processes that govern the ESU 2035 is included. In areas specifically identified for improvement, the findings are compared with energy strategy examples from OECD member countries to highlight good practice.

Part 1: Structural flaws of the ESU 2035 policy roadmap

As the good practice of an OECD member state shall partly illustrate below, energy strategy implementation can benefit from the prior development of a policy roadmap that is both coherent and systematic. Important planning-related considerations include the following. Firstly, the roadmap should methodically outline how the proposed mix of policy measures will collectively contribute to fulfilment of headline energy objectives. Secondly, it should provide an ex-ante assessment of possible risks that could hinder successful implementation of the energy strategy.

Thirdly, it should set out a timeline for energy strategy implementation that is both logical – and can account for any bottlenecks in the energy sector – as well as realistic. The OECD's assessment of the ESU 2035 found that to improve the quality of implementation, the policy roadmap could be revised to take greater account of these principles. The lack of a clear implementation plan, the failure to evaluate ex-ante risks and the implementation

timeline's unsystematic sequencing of planned reforms are shortcomings of the current energy strategy that could impede the achievement of headline objectives.

Issue 1.1: different components of the ESU 2035 are not systematically aligned

The policy roadmap for the implementation of the ESU 2035 is set out in two separate documents: the ESU 2035 and the 2020 Action Plan. The ESU 2035 sets out headline objectives, and provides an outline of the policy goals (across different energy sub-sectors) that will need to be met to achieve them (MECI, 2017_[11])⁴. The 2020 Action Plan provides a list of measures to be implemented on an annual basis, consisting primarily of legislative and regulatory acts to be adopted by the government, along with some additional policy actions for energy strategy delivery (MECI, 2018_[10]). Each year, the Ministry of Energy and Environmental Protection is required to produce a progress report regarding the number of additional policy actions that have been successfully implemented and remain outstanding (MECI, 2018_[11]) (MECI, 2018_[12]).

There is to some extent a lack of alignment between the headline objectives outlined in the ESU 2035 and the policy measures set out in the Action Plan. The Action Plan and the ESU 2035 exist as wholly separate documents, and no clarity is provided on how individual policy measures are expected to contribute to the fulfilment of various higher-level energy objectives. As such, the roadmap in its current form does not provide a clear outline of how the energy strategy will be implemented, nor does it clarify the assignment of responsibilities for different actions (MECI, 2017_[11]) (MECI, 2018_[10]).

Recommendation: match policy measures with headline ESU 2035 objectives

The ESU 2035 and the 2020 Action Plan should be fully synchronised, in order to make the policy roadmap more systematic and ensure it can provide a comprehensive framework for energy strategy implementation. Policy measures should be matched with headline objectives, sub-objectives and sectoral goals, with the relationships between these components clearly sign-posted. The OECD Monitoring Framework, in which policy deliverables (indicators and sub-indicators) have been methodically reorganised to reflect this approach, should help to address the issue.

Issue 1.2: the structure of the ESU 2035 roadmap is unsystematic

The policy roadmap's design could also benefit from a clearer methodological structure. Logically, the outline of a systematic roadmap should be able to clearly account for and distinguish between high-level strategic objectives and the policy outcomes (divided by energy sub-sectors) that are necessary to achieve them. The ESU 2035 appears to have been designed to reflect this logical structure, with Section 2 mostly consisting of an outline of higher-level energy objectives and sub-objectives, and Section 3 broadly comprising of the various sub-sectoral goals that will need to be met to fulfil them (MECI, 2017_[11]).

However, it also contains significant levels of content overlap between Sections 2 and 3, which undermines the logic of the energy strategy implementation outline. For example, a bullet point in the "energy-efficient society" sub-section (Section 2) envisages the "introduction of energy management systems at national and municipal levels, and in companies," while another bullet point in the "energy efficiency" sub-section (Section 3)

⁴ The term 'objectives' refers to the six high-level ESU 2035 strategic objectives that are set out in Section 2, while 'goals' refers to the sub-sectoral goals outlined in Section 3 to help achieve the objectives.

calls for the “introduction of energy management system at national, municipal level and at the level of public and administrative buildings and companies” (MECI, 2017^[11]).

Recommendation: adopt a logical structure reflecting the different levels of implementation

The current ESU 2035 policy roadmap should be revised to feature a more systematic division between the higher and lower-level components of energy strategy implementation. Higher-level strategy sub-objectives and lower-level policy goals across sub-sectors should be kept clearly separate from each other in Sections 2 and 3, in order to maintain a consistent methodological approach and avoid confusion regarding the way in which different components of the strategy fit together.

Germany’s *Energiewende* “energy transition” (see Box 1) offers an OECD good practice example of how addressing these issues can improve the quality of energy strategy implementation. *Energiewende* policy measures are clearly synchronised with headline energy objectives through a four-tiered methodological structure, spanning: 1) measures, 2) steering targets, 3) strategic (sub)-objectives and 4) headline objectives. First, this approach ensures that the energy strategy is both coherent and holistic, with each individual policy measure and the contribution it will make towards headline objectives fully accounted for. Second, it enables policy-makers to conceptualise how the different components of the energy strategy fit together in a logical way (BMW, 2018^[8]).

Box 1. Germany’s Energiewende

The Energiewende is Germany’s plan for transitioning into a low-carbon, nuclear free economy. It is based on the Energy Concept policy published in 2010 and the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) passed in 2000 and further revised. Its fundamental precepts are the Federal Government’s commitments to cut greenhouse gas emissions 80% by 2050 compared with 1990 levels, and complete the phase-out of nuclear power by 2022. The Energiewende sets out three headline objectives that should be mutually compatible and guide all energy policy-making: preserving security of supply, maintaining affordability and ensuring environmental compatibility (with CO₂ and nuclear aims).

In order to meet these objectives, the Energy Concept follows a bottom-up methodological structure. It consists of three inter-linking layers, including:

1. Core objectives at the strategy level;
2. Steering targets; and
3. Measures (laws, ordinances and directives, funding programmes etc.)

This multi-layered structure helps policy-makers to gain a clearer picture of areas where progress is being made towards headline objectives and where further attention may be required. The effectiveness of individual measures is extrapolated from progress towards near-term steering targets across energy sub-sectors and aspects. In turn, these steering targets clarify progress towards higher-level strategic objectives. A biennial Government report also evaluates how policies are affecting security of supply.

Sources: (BMW, 2018^[14]) (Energiewende, (n.d)^[15])

Issue 1.3: ESU 2035 policy goals are not sufficiently process-oriented

An additional flaw in the ESU 2035 roadmap's design concerns the way in which policy goals have been formulated. The successful fulfilment of energy strategy objectives requires policy-makers first to define a process-oriented set of policy deliverables that will enable their achievement. Ensuring the process-oriented nature of such deliverables is necessary for creating clarity on course of action required to achieve them, rather than merely outlining the desired end-result. In the ESU 2035 however, policy deliverables are often result-oriented rather than process-oriented, and overemphasise policy ambitions while underemphasising the measures needed to accomplish them (MECI, 2017_[11]). For example, although integrating the Ukrainian energy system into ENTSO-E is repeatedly cited as a policy priority and a key metric for evaluating energy strategy progress, there is little acknowledgement of the technical, institutional or legislative steps that will be required to achieve this objective (MECI, 2017_[11]).

Recommendation: develop a more process-oriented set of policy deliverables

The current ESU 2035 roadmap should be refined to include a more concrete set of policy deliverables and milestones, along with a timeline for implementation and clearly allocated responsibilities. This will improve the quality of implementation by ensuring that further clarity is provided on the specific benchmarks that need to be met to achieve the ESU 2035 objectives. The OECD Monitoring Framework indicators and sub-indicators have been developed with this approach in mind.

Issue 1.4: the ESU 2035 lacks effective mechanisms for risk evaluation

In its current form, the ESU 2035 lacks any assessment of risks that may affect the achievement of its objectives. The inherent uncertainty involved in delivering a large, cross-sectoral energy policy project necessitates a comprehensive *ex ante* assessment of domestic and external risks that may arise during energy strategy implementation, along with a series of contingency policy measures that can be implemented in case they arise (MECI, 2017_[11]).

It is also notable that the energy balance forecasts set out in the ESU 2035 do not account for potential implementation risks. Annex 2 of the ESU 2035 provides two tables with estimated values for the structure of TPES through to 2035, both in absolute numbers (Mtoe) and in percentage shares. However, the assumptions around which these estimates were developed are unclear. Detailed modelling, assessment and analysis of different energy scenarios is a good practice globally, and a crucial component of energy strategy development. It helps policy-makers to better understand the possible outcomes and necessary resources and determine a reasonable course of energy development for their countries. Despite the uncertainty involved in long-term forecasting of energy supply, the ESU 2035 lacks sensitivity analysis that can evaluate how variations in the speed of implementation or modifications to the policy blueprint could affect TPES dynamics. According to public information, this kind of long-term forecasting for the purposes of supporting ESU 2035 implementation was only conducted in 2019 (MECI, 2017_[11]) (Danish Energy Agency, 2019_[13]).

Recommendation: insert a risk assessment section in the ESU 2035 and revise the energy balance forecasts

The ESU 2035 should also be updated to feature a new section on risk assessment, thereby enabling a comprehensive evaluation of ex-ante risks that may arise during energy strategy implementation. Where risks are identified, the assessment should provide a list of potential policy solutions that can mitigate or contain their impact in the event of occurrence. Through the early identification of ESU 2035-related challenges, a risk assessment section will help to facilitate the time-efficient delivery of various energy strategy components and minimise the impact of adverse circumstance on the pace of implementation.

Regarding the energy balance forecasts, the assumptions around which they were developed should be substantiated in the ESU 2035. The forecasts should also be revised to take greater account of different energy scenarios, with sensitivity analysis being an appropriate tool for solid long-term modelling of how various implementation challenges might affect estimates of TPES dynamics and other indicators.

Issue 1.5: the implementation timeline of the ESU 2035 is not clearly defined

The proposed timeline for the implementation of the ESU 2035 is currently lacking in detail and could benefit from further refinement. The three implementation phases and their thematic goals – energy sector reform (2018-2020), optimisation and innovative infrastructure development (2021-2025), and ensuring sustainable development (2026-2035) – provide a useful starting point for conceptualising the order in which energy strategy deliverables will need to be executed (MECI, 2017^[11]).

However, they are also rather broad and ignore the fact that certain policy outcomes within these time frames will be more easily achieved once others have been successfully completed (i.e., sequencing). Failing to create a more detailed chronological roadmap for implementation risks encouraging policy-makers to focus on the easiest deliverables, while difficult but more transformational reforms requiring a sequence of policy actions are avoided. For instance, any policy measures designed to increase private investment in energy infrastructure depend largely on the prior creation of a strong framework for property rights (MECI, 2017^[11]).

Recommendation: reorganise the timeline by year of expected implementation

The policy deliverables that are outlined in the ESU 2035 should be re-categorised into their expected year of implementation, rather than in the current five to ten-year period blocks. This will enable them to more effectively capture the sequencing and hierarchy of reforms, and the way in which the implementation of some measures will be dependent on the prior execution of others. By developing an annualised time frame for initiating reforms, the strategy will help to pinpoint the key bottlenecks that are stalling reform momentum, and improve implementation effectiveness.

Part 2: Effectiveness of the mechanisms and procedures in place for monitoring the ESU 2035

Effective monitoring of energy strategy implementation typically involves the development of certain mechanisms and organisational procedures, as the OECD good practice examples below help to illustrate. This includes developing a systematic architecture of KPIs that can measure progress towards energy strategy objectives, with headline targets underpinned by a comprehensive set of steering targets across various sub-sectors. It also includes

developing procedures for the clear allocation of ESU 2035 implementation and monitoring responsibilities, and the facilitation of internal and external collaboration on energy strategy activities. The OECD's assessment of the tracking mechanisms and procedures outlined in the ESU 2035 and the 2020 Action Plan found that these processes should be strengthened to enhance the quality of energy strategy monitoring and implementation.

Issue 2.1: the ESU 2035 lacks steering targets to monitor on-the-ground implementation progress

The Key Performance Indicators (KPIs) architecture set out in Annex 1 of the ESU 2035 is intended to provide a blueprint for the holistic tracking of progress towards energy strategy objectives. Annex 1 of the ESU 2035 includes two headline targets, which reflect higher-level energy strategy objectives. Quantitative indicators monitor whether progress towards meeting these targets is on track. The two headline targets include the following:

- Reducing energy intensity of GDP from 0.28 in 2015 to 0.13 by 2035 (toe/1000 USD 2015 PPP).
- Increasing the share of renewables in TPES from 4% in 2015 to 12% in 2025 and 25% in 2035.

These indicators are useful for providing a 'big picture' overview of how much progress is being made towards headline strategy objectives. However, what the ESU 2035 currently lacks is a comprehensive set of lower-level steering targets, which are able to monitor on-the-ground progress across the different energy sub-sectors. As a result, it is currently difficult to identify areas where energy policy has been less effective for meeting strategic goals, and where new measures may be needed to remedy the situation. A small number of steering targets – 21 in total – are listed in Annex 1 of the ESU 2035 (e.g., percentage share of heat distribution networks in an emergency condition). However, they are insufficient to enable comprehensive monitoring of progress across all sub-sectors (MECI, 2017^[11]).

Recommendation: revise the KPI architecture to include a holistic set of steering targets

The KPI architecture laid out in Annex 1 of the ESU 2035 should be revised to include a more comprehensive list of lower-level steering targets and indicators (e.g. reducing final energy consumption for heat to a certain level by a set year). These indicators should be able to track the implementation progress being made in all nine of the energy sub-sectors that are outlined in the ESU 2035. This will improve the quality of progress monitoring towards headline objectives. In particular, it will help to create a clearer picture of whether targets at the sub-sectoral level are being met, and facilitate the identification of areas where implementation has been less effective and may need to be reassessed.

Issue 2.2: KPIs are unsuitable for holistically tracking progress towards objectives

Another problem with the ESU 2035 steering targets is that they are not systematically matched with energy strategy objectives. The indicators listed in Annex 1 of the ESU 2035 track progress towards only two out of the six headline objectives (energy efficiency and energy independence). Some of the other indicators are matched with three completely separate objectives, which bear only a tangential relevance to ESU 2035 headline objectives.

An additional issue with the existing indicators is that they consist almost exclusively of policy output indicators (measuring whether policy outcomes in a certain energy sub-sector are on track to be achieved). By contrast, there is little consideration of policy implementation indicators (assessing the extent to which measures have been put in place to deliver the policy outcomes). As such, the current KPIs lack the capacity to monitor whether policy implementation benchmarks, which are necessary for achieving energy strategy objectives, are being met.

Recommendation: synchronise KPIs and objectives, and develop new implementation indicators for more effective energy monitoring

The ESU 2035 should be revised to ensure that steering targets and indicators are tracking progress towards all six of the headline objectives. Furthermore, the ESU 2035 should be updated to include a new set of policy implementation targets and indicators. These indicators should be complementary to the existing output indicators, which will enable policy-makers to track how successfully policies are being rolled out as well as the effect that measures are having on successfully meeting targets. The OECD Monitoring Framework contains an extensive set of implementation indicators for tracking progress towards ESU 2035 objectives, which may prove helpful in this regard (MECI, 2017^[11]).

Scotland's Energy Strategy (see Box 2) provides a good practice example of how policy output and implementation indicators can improve the quality of progress monitoring. Tracking of the Scottish Government's Climate Change Plan 2018-2032, which is consistent and being conducted in parallel with the Scottish Energy Strategy, includes a comprehensive list of implementation indicators that measure progress towards each output indicator (Scottish Government, 2018^[14]).

For instance, one policy output target includes increasing the proportion of the Scottish bus fleet made up of low emission vehicles to 50% by 2032. To monitor the rollout of measures involved in meeting this target, three corresponding implementation indicators have been established: a) number of low carbon buses purchased, b) annual low carbon bus expenditure through various funding mechanisms, and c) number of kilometres run by low emission buses as a percentage of total bus kilometres. The clear alignment between output and implementation indicators, along with their synchronisation with strategic objectives, engenders a more holistic picture of progress towards energy targets (Scottish Government, 2018^[14]).

Box 2. Scottish Energy Strategy 2050

The Scottish Energy Strategy 2050 is a national action plan for implementing the low-carbon energy transition. Published in December 2017 by the Scottish Government, it sets two high-level energy targets for 2030: increasing the share of renewables in Scotland's heat, transport and electricity consumption to 50%, and boosting the energy productivity of the Scottish economy by 30%. The Strategy is consistent with commitments laid out in the Climate Change Scotland Act 2009, which set an 80% reduction target for Scottish GHG emissions by 2050.

In parallel, a monitoring framework for tracking progress towards low-carbon targets is provided for under the Scottish Government's Climate Change Plan 2018-2032. Sixty-five quantitative indicators help to evaluate progress towards headline climate policy objectives. 'Implementation' indicators evaluate whether sufficient measures have been implemented to deliver a desired policy outcome, while output indicators track whether the outcome in itself is on track to be delivered.

Sources: (Scottish Government, 2017[16]) (Scottish Government, 2018[22]) (Scottish Government, 2019[22])

Issue 2.3: ESU 2035 monitoring and oversight responsibilities are not clearly defined

The monitoring and oversight responsibilities of stakeholders involved in the delivery of energy strategy outputs and objectives are vague, and need to be clarified to ensure that implementation can take place effectively. In the ESU 2035, some general responsibilities of key stakeholders have been outlined in Section 5. Table 11 below presents the allocation of energy strategy responsibilities as they are currently set out.

However, the list contains only a cursory outline of what stakeholders' monitoring and oversight duties will involve in relation to the implementation of the ESU 2035. There is no clarity afforded on the specific energy strategy deliverables that various departments are tasked with overseeing. The general nature of this allocation of responsibilities creates a lack of clear accountability for parts of the strategy. The 2020 Action Plan suffers from a related but separate issue. In it, the list of policy deliverables is laid out more concretely than in the ESU 2035, but responsibility is simultaneously co-assigned to an extensive list of stakeholders. Although the main responsible authorities are defined, there is no clarification of the specific implementation or oversight duties they are supposed to undertake.

Recommendation: revise the ESU 2035 and 2020 Action Plan with more specific accountabilities

Both the ESU 2035 and the 2020 Action Plan should be revised to: a) delineate more specific and concise implementation and monitoring responsibilities that stakeholders are responsible for, and b) link each responsibility to the corresponding headline objective to which it is intended to contribute. This will ensure a clear line of sight can be established across the different energy strategy components, increasing the accountability of stakeholder bodies. The OECD's Monitoring Framework includes extensive sections on responsible parties for implementation and monitoring, which may prove helpful for addressing this issue. (MECI, 2017_[11]) (MECI, 2018_[10]).

Table 1. Example of key stakeholder responsibilities for implementation and monitoring as presented in the ESU 2035

Cabinet of Ministers of Ukraine (CMU)	<ul style="list-style-type: none"> • Exercises joint co-ordination and control over ESU 2035 implementation • Approves programmes and action plans drafted by MEEP • Develops draft laws and regulations • Approves social and economic development programmes • Provides aid to business entities • Approves 5-year forecasted energy balance (on annual basis) • Defines requirements to emergency response planning of business entities • Set indicators for energy security status assessment
National Security and Defence Council of Ukraine (NSDCU)	<ul style="list-style-type: none"> • Exercises joint co-ordination and control over ESU 2035 implementation
Ministry of Energy and Environmental Protection (MEEP)	<ul style="list-style-type: none"> • Responsible for developing the ESU 2035 • Develops ESU 2035 action plans • Monitors the results and presents annual implementation report to CMU/NSDCU • Monitors the implementation of ESU provisions in the activities of energy sector entities • Co-ordinates and clarifies measures related to ESU 2035 implementation • Publishes National Report on State Energy Policy Implementation
Ministry of Economic Development, Trade and Agriculture (MEDTA)	<ul style="list-style-type: none"> • Develops draft target economic programmes • Develops state programmes for business support • Implements public-private partnership programmes • Coordinates foreign economic and trade policy • Implements economic and technology policies aimed at structural change for lower energy intensity and higher added value • Ensures improvement of the system of energy statistics

Source: (MECI, 2017^[5]) (MECI, 2019^[10])

Additionally, certain relevant stakeholders and their responsibilities (e.g. the Ministry of Communities and Territories Development, which is responsible for implementing district heating schemes) are absent from the ESU 2035 and should be included.

Issue 2.4: ESU 2035 reporting procedures and guidelines are not clearly defined

The ESU 2035 envisages that the Ministry for Energy and Environmental Protection will develop a “National Report on State Energy Policy Implementation” for consideration by the CMU and NSDCU. It indicates the report will provide a detailed analysis of implementation progress, including a full appraisal of the effectiveness of measures, and suggested mechanisms and instruments for ESU 2035 implementation in the next phase. A January 2020 announcement from the CMU has indicated that the ESU implementation report will be published in Q1 2020. Another type of reporting is the annual reporting from MEEP based on its monitoring of the ESU 2035. The first report on ESU 2035 implementation for 2018 with respective annexes has been published on the MEEP website (Cabinet of Ministers, 2020^[3]) (MECI, 2019^[15]) (MECI, 2018^[11]).

The ESU 2035 lacks detail on key organisational elements relating to the reports. There are no guidelines set out on how the reporting will be conducted which, given that MEEP will partly be monitoring its own performance, is relevant to ensuring impartiality can be preserved during the assessment. An additional issue to be addressed is the availability and quality of data to track and confirm actual progress noted by the official reports. Few datasets are available in the annexes of the 2018 implementation report, with no reference to primary sources. The level of Ukrainian energy sector transparency (in terms of data availability and its quality) is insufficient. A recent study on Energy Transparency Index 2019 by think tank DiXi Group shows that despite the overall level of transparency in 2019 having increased from 2018, it remains low by global standards (total Index score is 48 out of 100) (DiXi Group, 2019^[16]).

Recommendation: Include further information on ESU 2035 reporting

The revision of the ESU 2035 should also include further information on key aspects relating to the ‘National Report on State Energy Policy Implementation’. This should notably include further information on the analytical contents it will consist of and the reporting guidelines that will be followed during the drafting process to ensure an impartial assessment of progress. Regarding the latter point, MEEP will to some extent be monitoring its own performance when compiling the report, as it derives from the sole report on the ESU 2035 implementation that was published in 2019. If no reporting guidelines or instruments for the involvement of separate entities currently exist to ensure its impartiality, then they should be established prior to initiation of the drafting process.

Issue 2.5: Structures and procedures for the monitoring and facilitation of cross-departmental collaboration are not clearly defined in the ESU 2035

The successful delivery of the ESU 2035 will require effective collaboration between stakeholders across a large number of government departments and agencies. The current ESU 2035 document provides little clarity on the structures or procedures that exist to monitor and facilitate cross-departmental co-ordination. According to responses received in the OECD’s stakeholder questionnaire, there have been discussions about the possible creation of an internal working group to help coordinate implementation activities across various departments and bodies and evaluate progress. As of this writing, however, no

working group has been formally established for the specific purposes of facilitating ESU 2035 implementation.

In 2018, the government created the Coordination Council for Reforms in the Fuel and Energy Complex as a temporary advisory body, formed with the purpose of facilitating inter-agency dialogue, making strategic decisions and developing policy proposals and recommendations. However, these mechanisms did not prove to be efficient as the meetings were held rarely, and only on an ad hoc basis. According to OECD questionnaire responses from stakeholders, MEEP's Directorate for Strategic Planning and European Integration is currently responsible for monitoring cross-departmental implementation. However, little information is available regarding the nature of this process or the level of collaboration that is taking place with other stakeholders (Cabinet of Ministers, 2018^[17]) (MECI, 2019^[18]) (Ukrenergo, 2019^[19]).

Recommendation: Clarify cross-departmental collaboration procedures for the delivery of the ESU 2035

In order to strengthen the quality of implementation and oversight, the energy strategy should be updated to clarify what procedures exist to monitor and facilitate the delivery of cross-departmental projects within the remit of the ESU 2035. This exercise should be combined with an 'audit' of all coordinating and/or advisory bodies created in previous years for the purpose of interagency coordination, in order to avoid duplication and to create a single forum. The energy strategy should also be clearly defined as a MEEP-led endeavour that brings together all appropriate stakeholders from across the government and other relevant institutions. Additionally, MEEP should ensure that it is working closely with the State Statistics Committee in terms of: a) including appropriate tracking indicators and b) ensuring those indicators are tied to robust data sets that can be collected regularly.

Issue 2.6: Formal mechanisms for soliciting expert advice are lacking from the ESU 2035

The ESU 2035 contains no formal mechanisms for policy-makers to solicit outside advice from experts. Expert counsel can add value to the monitoring process by providing policy advice and scientific input that improves quality of energy strategy implementation. For example, they can advise on whether the KPI architecture for achieving energy strategy objectives is sufficiently rigorous, or whether specific measures are proving effective for achieving the desired policy outcomes.

Recommendation: create an independent body to advise on ESU 2035 implementation

Policy-makers should consider creating an independent body that can provide policy and scientific advice on implementation approaches taken in the ESU 2035, such as an expert commission or independent advisory board. An expert commission would provide a sounding board for evaluating goals, measures and targets against best practice. Additionally, the early involvement of the State Statistics Committee and other analytical institutions in the elaboration of the Green Energy Transition concept 2050 would allow for a bottom-up approach that drives future data collection strategy and strengthens forecasting.

The Expert Focus Group of stakeholders assembled to advise on development of the OECD Monitoring Framework could provide an initial forum for this kind of expert counsel

(MECI, 2017_[11]).⁵ While in theory MEEP could monitor the strategy effectively without external support, the process could be found wanting for rigour in practice because the Ministry will effectively be evaluating its own work. Regarding this latter point, if no reporting guidelines or instruments for the involvement of separate entities currently exist to ensure its impartiality, then they should be established prior to initiation of the drafting process.

The UK's Committee on Climate Change (CCC) provides a good practice example of how to structure a forum providing expert energy counsel to governments. The CCC is an independent advisory body to the UK Government, which provides expert legal and policy advice on the implementation of the National Energy and Climate Plan. Its core responsibilities include providing independent advice on how to meet energy goals, as well as tracking progress made in reducing emissions and meeting carbon budgets and targets. The impartial nature of the committee's work ensures a realistic assessment of progress and challenges to energy strategy implementation (Committee on Climate Change, 2019_[20]).

Box 3. UK Committee on Climate Change (CCC)

The Committee on Climate Change is an independent, statutory body established under the Climate Change Act 2008, which set a legally binding target for the UK Government to reduce greenhouse gas emissions to 100% of 1990 levels by 2050. It advises the UK Government, as well as devolved UK administrations such as the Scottish Government, on progress made towards meeting their emissions targets.

Appointments of the CCC Chair and its Members are made jointly by the UK Secretary of State for Business, Energy and Industrial Strategy (BEIS), and energy Ministers in the devolved administrations. Key CCC responsibilities include the following:

- Providing independent advice on setting and meeting carbon budgets and preparing for climate change
- Monitoring progress in reducing emissions and achieving carbon budgets and targets
- Conducting independent analysis into climate science, economics and policy
- Engaging with a wide range of organisations and individuals to share evidence and analysis

Source: (Committee on Climate Change, 2019_[13]) (BEIS, 2019_[14])

⁵ The Expert Focus Group advising on the development of the OECD Monitoring Framework has included expert representatives from the following organisations: All-Ukrainian Sustainable Development and Investment Agency, DiXi Group, Ministry of Energy and Environmental Protection, Ministry of Regional Development, Naftogaz, NEURC, State Agency on Energy Efficiency, State Statistics Service, Secretariat of the Cabinet of Ministers, Ukrenergo.

Part 3: The ESU 2035 and compliance with international agreements

The Energy Strategy of Ukraine until 2035 is broadly consistent with the energy objectives and targets laid out in Ukraine's Sustainable Development Goals. The relevant 'affordable and clean energy' SDG goal that Ukraine has committed to meeting is composed of four thematic objectives, which include the following:

1. expanding the infrastructure and modernising networks for reliable and sustainable energy supply through the introduction of innovative technologies,
2. ensuring diversification of the supply of primary energy resources,
3. increasing the share of renewable energy in the national energy balance, and
4. increasing the energy efficiency of the economy

Progress towards these four thematic objectives is tracked through seven SDG targets, including the following:

- i. generation of power (bn kWh)
- ii. process power loss in electrical distribution (%)
- iii. heat losses in heat networks (%)
- iv. maximum share of imported energy resources in TPES (%)
- v. share of one supplier in the nuclear fuel market (on each stage of production cycle) (%)
- vi. share of energy produced from renewable sources in TPES (%) and
- vii. energy intensity of GDP (primary energy consumption per unit of GDP) (%).

With the exception of i) generation of power (bn kWh), the above SDG targets are reflected in Annex 1 of the ESU 2035. Additionally, the four SDG thematic objectives are reflected in the ESU 2035's headline objectives, as is identifiable through the stated aims of "building an energy-efficient society" and "ensuring the sustainability of the fuel and energy complex" (MEDT, 2017_[21]) (MECI, 2017_[11]).

The ESU 2035 is broadly consistent with the conditions of the EU-Ukraine Association Agreement. Signed in June 2014 and in force since September 2017, it commits the Government of Ukraine to the "principles of sustainable development and the green economy". Regarding the concrete energy policy commitments that are relevant to the ESU 2035, the Association Agreement binds Ukraine to undertake the following steps: a) developing and implementing long-term measures to reduce emissions of greenhouse gases, and b) restructuring the coal sector to reduce its environmental impact. The ESU 2035 demonstrates commitment to the reduction of GHG emissions through the formulation of a wide range of policy measures, which span a number of energy sub-sectors. Regarding the restructuring of the coal sector in particular, the energy strategy foresees policy measures such as the liquidation of loss-making state coalmines by 2025, which will reduce the sector's environmental impact (European Commission, 2014_[22]) (MECI, 2017_[11]).

Indirectly, the Association Agreement also mandates a series of legal acts to reform energy markets and set energy efficiency standards. Although outlined within a framework of cooperation, it foresees the establishment of new Ukrainian energy efficiency policies and legal and regulatory frameworks, with the aim of achieving major improvements corresponding to EU standards. It also foresees the development of competitive, transparent and non-discriminatory energy markets in convergence with EU rules and standards through regulatory reforms. Although the ESU 2035 outlines a range of measures intended to help meet these obligations, their alignment with EU standards is only elaborated upon in general terms. This should be developed further, with greater specificity provided.

Separately, the ESU 2035 outlines a list of measures to continue with the transposition and implementation of the Energy Community acquis. This includes the funding of investment projects under the National Emissions Reduction Plan (NERP) (MECI, 2017_[11]).

Part 4: Compatibility of individual policy choices with headline objectives

Several of the policy choices outlined in the ESU 2035 appear to conflict with headline energy strategy objectives. Policy-makers should revisit some policy choices, in order to establish whether other measures may provide a better fit with the various headline energy strategy aims.

Issue 4.1: Coal sector measures may be ineffective for promoting network integration or sustainability of the FEC

The measures outlined in the energy strategy to circumscribe the coal sector's environmental impact are largely restricted to the liquidation of inefficient state mines by 2025. As such, the ESU 2035 lacks any measures to facilitate the phase out of coal-fired power stations in Ukraine over the medium to long term. This is significant given that a headline ESU 2035 objective is network integration, and the poor environmental performance and unreliability of Ukraine's depreciated coal power plants could make them unfit for competition in the EU power market after full synchronisation with ENTSO-E. Failure to identify measures that promote the phase-out of coal-fired power risks leading to the incomplete fulfilment of the network integration objective (MECI, 2017_[11]) (Energy Community Secretariat, 2019_[23]).

The ESU 2035 also cites the development of domestic coal extraction as a strategic goal and foresees the development of export infrastructure for coal products as a policy priority that should be subsidised. These policies appear to contradict the objective of ensuring the sustainability of the fuel and energy complex, although policy-makers may be calculating that any additional environmental impact will be counter-balanced by the mitigating effect of other policies.

Recommendation: coal sector measures should be reviewed against ESU 2035 headline objectives

Within the context of the low-carbon vision that the ESU 2035 sets out to achieve, the lack of a plan for the medium-to-long-term phase-out of coal-fired power stations should be reviewed. In particular, given the fact that network integration is a headline ESU 2035 objective, the failure to plan for the phase-out of coal fired power plants risks their exclusion from the EU power market after full synchronisation with ENTSO-E, and the introduction of a carbon border adjustment mechanism under the European Green Deal. Regarding the planned development of domestic coal extraction and coal export infrastructure in Ukraine through subsidies, it may be worth considering whether other policies might be more compatible with the dual headline objectives of energy independence and sustainability of the fuel and energy complex (MECI, 2017_[11]).

Issue 4.2: Nuclear sector measures may be cost-inefficient for meeting sustainability objectives

A core priority identified in the ESU 2035 is that energy strategy objectives be achieved through policies that are both environmentally friendly and economically efficient. However, certain nuclear policy measures that are outlined in the strategy do not appear to

provide optimal taxpayer value for money, and may need to be revised to ensure headline objectives can be met more cost-effectively. In particular, a 2019 Danish Energy Agency report based on modelling and forecasting scenarios for ESU 2035 implementation suggests that the plan to build a new unit (#3) at the Khmelnytsky Nuclear Power Plant in 2025 will be unnecessary to meet projected energy demand. Its modelling suggests that the significant reduction of energy intensity and increase in renewables that is foreseen in the strategy means that existing NPP units will still not be fully utilised in 2025. According to the report, Ukraine would be well advised to delay the construction of KhNPP #3 until 2030-2035, which would reduce the overall required investment by 270 million euros (due to the optimisation of the commissioning of power generating facilities) (MECI, 2017^[11]) (Danish Energy Agency, 2019^[13]).

Recommendation: nuclear sector measures should be reviewed against ESU 2035 headline objectives

With respect to nuclear policy choices, policy-makers should consider whether a revision in the planned development of nuclear capabilities in Ukraine could still deliver on headline sustainability objectives while also delivering better taxpayer value for money. This reflects the Danish Energy Agency report's findings, which suggest that delaying the construction of KhNPP #3 from 2025-2030 until 2030-2035 would reduce the overall required investment while still effectively meeting projected energy demand. (Danish Energy Agency, 2019^[13]).

Issue 4.3: Targets and indicators to monitor the rollout of high-efficiency municipal heating systems are absent from the ESU 2035

It is notable that the ESU 2035 contains very few indicators to track the rollout of high-efficiency district heating systems. The Ukrainian district heating sector is both ageing and highly inefficient, and although a number of measures to optimise systems are foreseen in the ESU 2035 document, there is a lack of targets and metrics identified to monitor the effectiveness of sectoral reform. Given that energy sustainability is a headline objective of the ESU 2035, the lack of targets and metrics poses a risk to the quality of implementation over the medium term.

Recommendation: the ESU 2035 should set a target to reform district heating systems, which is bolstered by effective monitoring

The government should consider revising the ESU 2035 to include an ambitious sectoral target (e.g. ensuring that at least 20-30% of district heating systems in Ukraine are high-efficiency by 2030). MEEP should also work with analytical organisations to ensure that datasets on district heating are developed as comprehensively as possible. This will help to improve the quality of implementation.

Part 5: Effectiveness of the budgeting processes for the cost-efficient implementation of the ESU 2035

Financial support for the implementation of the ESU 2035 is provided by the European Union, as per the agreement between Ukraine and the European Commission "Continued support to the Implementation of the Energy Strategy of Ukraine" (7 November 2018). The Ministry of Energy and Environmental Protection is the direct beneficiary of the funding. However, MEEP was notified by the Commission regarding the suspension of the second instalment of financial support (13.5 million EUR), since Ukraine failed to fulfil the

conditions of the agreement. This decision followed an assessment of the implementation of the Memorandum of Understanding between Ukraine and the EU in 2018. Subsequently, MEEP has requested a revision of the terms and conditions of the agreement, to ensure its compliance with the main priorities of the updated national energy policy and to secure the third instalment of funding (21.5 million EUR) (Government of Ukraine & the European Commission, 2018^[24]) (MEEP, 2020^[25]).

Issue 5.1: budgeting processes are not clearly defined

The 2020 state budget allocates UAH 739 million (approx. 28 million EUR) towards the “Support for ESU Implementation” budget item, which is financed by the European Union (Verkhovna Rada, 2019^[26]). Public financial control mechanisms – referred to as “passports” for budget programmes – exist to help ensure that funds allocated are being used efficiently. A passport for the Support for ESU Implementation budget item defines specific tasks and projects that must be funded and a set of performance indicators governing this process. Annual reports on implementation of these passports are published on the MEEP website (MECI, 2019^[27]) (MEEP, 2019^[28]).

However, it is unclear what costing or sequencing of ESU 2035 planned policy initiatives has been undertaken, along with any proposed financing package for their implementation (Verkhovna Rada, 2019^[26]). The ESU 2035 outlines no formal mechanisms under which policy choices can be reviewed for their cost-effectiveness.

Box 4 presents the Danish Energy Strategy until 2050, which provides a good practice example of budgeting processes as applied to the financing of an energy transition. Each proposed energy policy initiative in the strategy is fully costed, along with a detailed outline of specific funding instruments that will enable its fulfilment, such as modifications to tariffs or tax rates, and the reallocation of existing funds in the energy and climate budget away from other schemes. An economic analysis of how the mix of new policy initiatives is likely to affect the energy costs of business-owners and households is also set out in the document. A holistic overview is developed of all budgetary issues that are specific to the Danish Energy Strategy, helping to ensure that funding streams are allocated as effectively and efficiently as possible (The Danish Government, 2011^[9]).

Box 4. Danish Energy Strategy until 2050

The Danish Energy Strategy is the Danish Government’s plan for a national transition to a fossil fuel-independent society by 2050. Published in 2011, the strategy presents a spectrum of energy policy initiatives spanning various sub-sectors to deliver the country’s low-carbon transition. Two of the strategy’s guiding principles include: a) cost-effectiveness, and b) ensuring a minimal impact on public finances.

The Danish Energy Strategy is fully costed, with a detailed financing plan for initiatives through 2020 outlined in Section 5. Each of the proposed new initiatives contains a cost-estimate at 2020 levels, along with a list of funding instruments and their respective contributions to meeting the total cost of the policy. An analysis of the cumulative additional costs of energy strategy policies on households and businesses of varying sizes is provided based on various fuel and tax assumptions.

Source: (The Danish Government, 2011^[20])

In addition, each responsible entity should receive the share of budget to meet the allocated target and objective. For instance, in order to achieve a 25% share of renewables in TPES by 2035, as per the ESU target, the State Agency for Energy Efficiency (SAEE) has estimated that approximately EUR 30 billion will need to be raised. Funds will be required for the construction of renewable energy facilities (e.g. bio-thermal power plants, biomass boilers, biogas plants) (SAEE, 2019_[29]).

Recommendation: budgeting processes should be clearly substantiated in the ESU 2035

A comprehensive budget detailing the allocation of funds among different ministries and government agencies should be developed by MEEP and approved by an independent audit committee and the Ministry of Finance. The costing of policy measures that has been undertaken should be clarified from the onset and revised regularly, along with any funding instruments that will financially support each policy (with differentiation of existing mechanisms/funding schemes and instruments that shall be developed). The funding could be a mix of international funds and national budget, but it is recommended that the government allocate budget in order to maximise the efficient use of resources, build ownership among Ukrainian stakeholders and invest effectively in Ukraine's energy transition. Policies should, at a minimum, be costed over the medium-term (a 3-5 year period). Such information is currently lacking from ESU 2035.

In addition, any mechanisms for the regular evaluation of policies to review their cost-effectiveness should be clearly outlined, in order to ensure that taxpayer value for money is being consistently maximised during energy strategy implementation. For instance, this might include an annual cost-and-benefit assessment of new technological developments with a bearing on Ukraine's energy sector, thereby ensuring that new and more cost-efficient technological solutions can be easily identified and integrated into the delivery of the ESU 2035. The government's close collaboration with energy services companies (ESCOs) via the Ukrainian Association of ESCOs may prove helpful in supporting this work (MECI, 2017_[11]) (OECD, 2018_[30]).

Nevertheless, the ESCO market in Ukraine still needs to be better understood and developed. ESCOs are companies that manage and offer a range of services, which can span all the stages of an energy efficiency project, from energy efficiency analysis and project design to monitoring and maintaining equipment. In contrast, a company remains below the threshold considered for an ESCO if it only sells equipment or individual services and does not bring know-how and expertise. A service provider that does not arrange finance, requires the beneficiary to bear the risks of project implementation, or makes no commitments in energy management, also cannot be qualified as an ESCO (OECD, 2018_[29]).

OECD assessment of ESU 2035 implementation progress

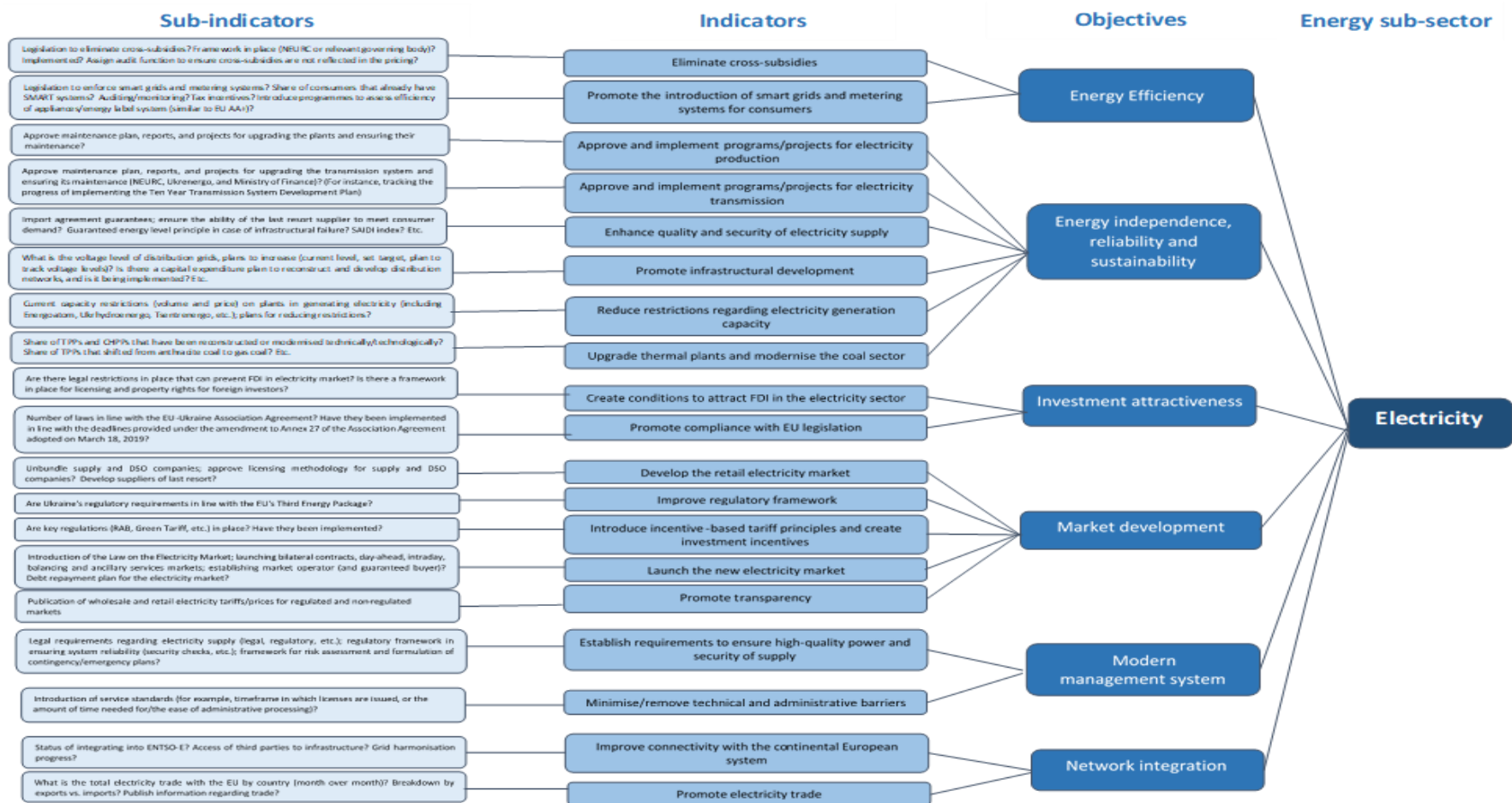
The assessment of ESU 2035 implementation progress draws on the analysis of data collected in December 2019 through the OECD Monitoring Framework. Progress towards the achievement of 344 sub-indicator targets and 119 indicator targets from the OECD Monitoring Framework (as of 1 January 2020) was evaluated on the basis of publicly available data (see Annex 1 for the sub-indicators). Since the OECD Framework systematically matches indicators and sub-indicators with headline objectives as well as categorising them by sub-sector, it was possible to order the data in such a way as to ascertain a granular snapshot of implementation progress towards the ESU 2035. This includes a comprehensive evaluation of how much progress was made towards each ESU 2035 headline objective, as well as a cross-sectoral analysis.

It should be noted that the OECD assessment of ESU 2035 implementation progress looks exclusively at the implementation of Phase 1 of energy strategy delivery (2017-2020), which aimed at launching the alignment of Ukraine's natural gas and electricity markets with EU energy legislation, as well as at restructuring the coal industry and increasing the share of renewables in the energy mix. The two other phases (Phase 2 and Phase 3) have not been evaluated as implementation was meant to start at a later stage, and it is no longer relevant in view of the planned revision of the strategy.

Overview of the OECD Monitoring Framework

The OECD Monitoring Framework aims to track implementation progress of the ESU 2035 through a bottom-up approach (see full overview in Annex 2). It entails holistic tracking of the ESU 2035 by developing a link between the sector-specific policy goals outlined in Section 3 and the headline objectives and sub-objectives listed in Section 2. Sector-specific goals have been converted into 119 progress indicators, each of which are underpinned by approximately 3-5 sub-indicators (344 in total). Indicators reflect the wide range of sub-sectoral policy goals that will need to be completed to meet ESU 2035 headline objectives. In turn, sub-indicators comprise the specific policy deliverables that will need to be carried out in order to achieve each of the policy goals.

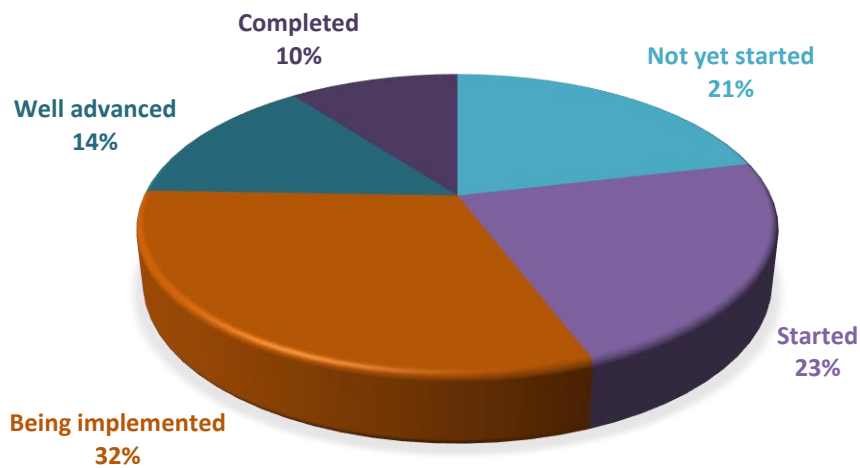
Figure 1. OECD Monitoring Framework for the ESU 2035: Example of Electricity Sector



Overview of progress towards meeting indicator and sub-indicator-based targets

The OECD assessment found that 33 of 344 sub-indicators have been completed, while implementation is well advanced for another 45, and at an intermediate stage in the case of an additional 100. Data were unavailable for 25 sub-indicators (or 7% of the original sample). These sub-indicators were therefore excluded from the analysis, reducing the analytical sample to 319. Access to datasets that could track their progress might have altered the picture of ESU 2035 implementation progress. For the purposes of future tracking, it is recommended that MEEP should work with data providers to develop and make public the data that was unavailable. Out of a remaining sample of 319 sub-indicators, progress was at an intermediate-to-advanced stage in the case of 178 (or 56%). The pie chart in (below) provides an overview of the sub-indicator implementation progress results.

Figure 2. ESU 2035 Implementation Status: Sub-Indicators

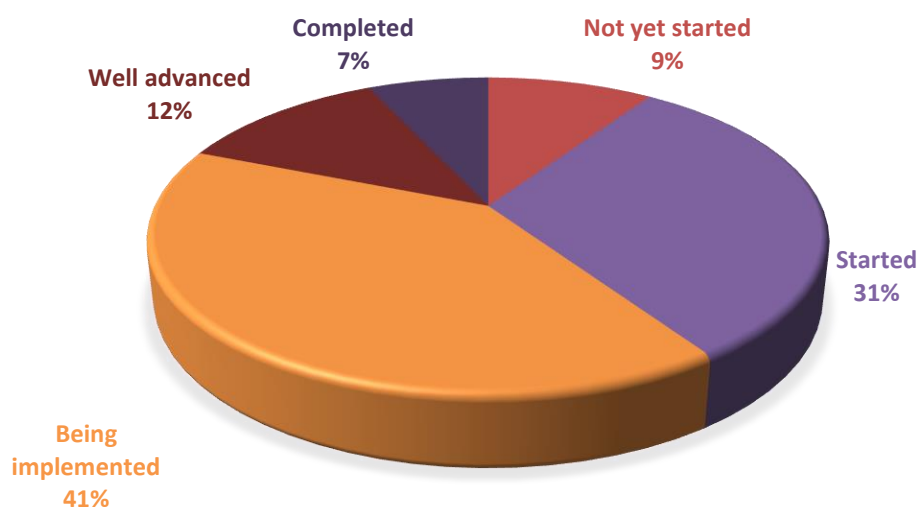


Source: OECD Monitoring Framework, January 2020

The pie chart in Figure 3 (below) provides an overview of the results. The OECD assessment also found that out of 119 indicators, eight have been completed, while another 14 are at an advanced stage of implementation and an additional 47 are at an intermediate stage. Three indicators were excluded from the OECD's analysis, owing to lack of data, with the indicator sample under evaluation thereby reduced from 119 to 116.⁶ Of these, implementation progress was found to be at an intermediate-to-advanced level in the case of 69 (or 60%).⁷

⁶ The three excluded indicators included the following: 1) nuclear fuel and uranium concentrate reserves, 2) promot[ion of] the creation of a competitive biomass market, 3) decentralis[ation of] resource management. The OECD recommends developing and making public the data to track these indicators, along with new data for other sub-indicators where it is currently lacking, in order to enable more effective monitoring of the ESU 2035.

⁷ Aggregate indicator progress was determined by classifying the five stages of implementation into a numerical range from 1 (not started) to 5 (completed), summing the total sub-indicator values and

Figure 3. ESU 2035 Implementation Status: Indicators

Source: OECD Monitoring Framework, January 2020

Evaluation of progress made towards meeting headline objectives

An evaluation was conducted of the implementation progress made towards fulfilling each of the six headline objectives: 1) energy efficiency, 2) energy independence, reliability and sustainability, 3) investment attractiveness, 4) market development, 5) Modern Management System and 6) network integration. In order to conduct the evaluation, a three-step process was followed.

First, the sub-indicators in the OECD sample were converted into a numerical value range **from 1 (not started) to 5 (completed)**.⁸ Secondly, sector-specific analysis was conducted, to establish what progress had been made towards meeting each headline objective across the nine sectors. An aggregate measure of sub-sectoral implementation progress towards each headline objective was derived by (i) summing the total sub-indicator values within a certain sector that are matched with a headline objective, and (ii) dividing the total value calculated of sub-indicators within the sector that are matched to that objective.

This provided an average implementation value for each sub-sector and objective.⁹ Thirdly, the results were inputted into a chart, enabling a broad cross-tabulation of progress towards each headline objective across the different sub-sectors. The full cross-tabulation for the nine energy sub-sectors can be found in Annex 1.

Results from the monitoring showed that the most significant progress made was towards the fulfilment of the Modern Management System objective, with an average

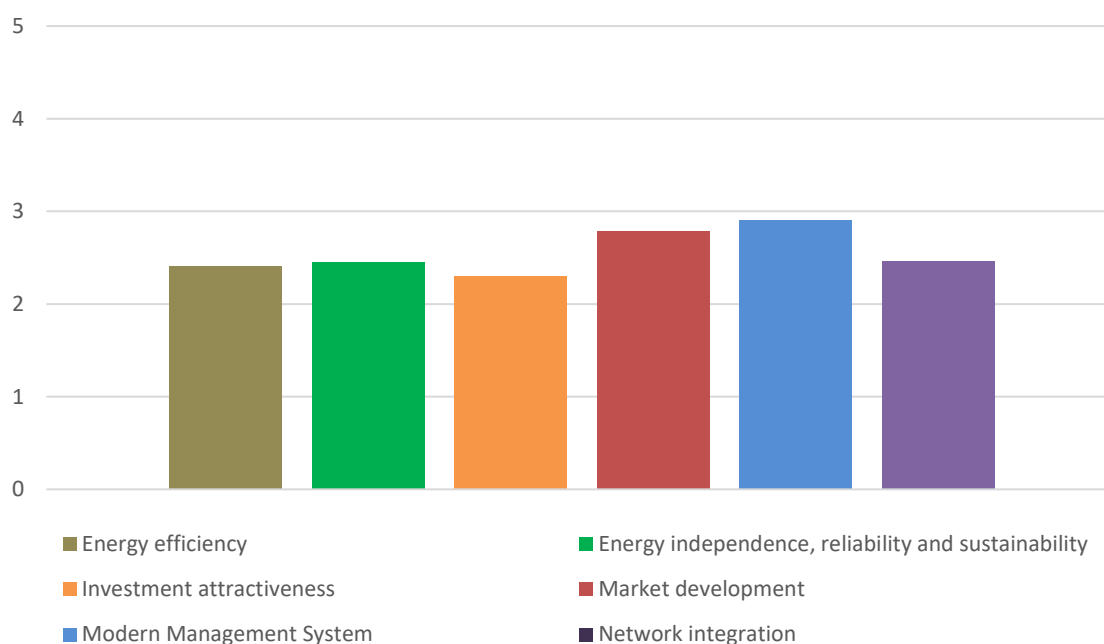
then dividing them by the total number of sub-indicators within each analytical category (e.g. objectives or sub-sectors).

⁸ These determinations and justifications were made on the basis of extensive data collection and verification by think tank DiXi Group.

⁹ Given the significant heterogeneity of different sub-indicators (e.g. legislation vs operational upgrades) sub-indicators were not weighted because of the high level of subjectivity this would have involved.

implementation value of 2.9/5 across the energy sub-sectors. This reflects a strong performance in electricity (5/5) and natural gas (4/5). Progress was weakest for the Investment Attractiveness objective, with a 2.3/5 average implementation value across the energy sub-sectors. In particular, the Investment Attractiveness average implementation value was negatively affected by two 1/5 values (not started) having been received for sub-indicators within the environment and climate and heat sub-sectors. Overall, progress towards each of the headline objectives has been variable (see Figure 4).

Figure 4. Overview of cross-sectoral implementation progress towards ESU 2035 objectives



Source: OECD Monitoring Framework, January 2020

The OECD assessment also evaluated how much overall progress within a given sector has been made towards meeting the headline objectives. Progress towards objectives was strongest in natural gas, with an average implementation value of 3.2/5. These scores reflect the robust efforts within the gas sector that are being made to meet certain objectives, notably Modern Management System and network integration. By contrast, implementation progress was weakest within the oil sector, with an average implementation value of 1.93/5. This lower than average sectoral score was negatively impacted by the high proportion of objectives towards which progress had either not commenced or was only at an initial stage Table 2 presents a full cross-tabular summary of the results.

The findings suggest that implementation progress towards ESU 2035 headline objectives has been mixed. Aggregate sub-indicator values for the Modern Management System (2.9) and market development (2.79) objectives indicate that their overall implementation progress is at a broadly intermediate stage. Values for the investment attractiveness (2.3), energy efficiency (2.41), energy independence, sustainability and reliability (2.45) and network integration (2.46) objectives indicate that their overall progress implementation progress is closer to an initial stage.

However, a more diverse picture of ESU 2035 implementation progress can be observed at the sub-sectoral level. For instance, within the electricity sector, progress towards fulfilment of the Modern Management System objective has already been completed. This is due to the successful introduction of service standards in licensing (as measures that remove technical and administrative barriers), and the introduction of various legal requirements to ensure high-quality power and security of supply

Table 2. Cross-sectoral tabulation of implementation progress towards ESU 2035 objectives

	Energy efficiency	Energy independence, reliability, sustainability	Investment attractiveness	Market development	Modern management system	Network integration
Coal			n/a			n/a
Electricity						
Environment and climate						n/a
Heat						n/a
Natural gas						
Nuclear	n/a		n/a	n/a	n/a	n/a
Oil						
Renewables	n/a				n/a	n/a
Sector oversight /management						

Not started
 Initiated
 Under implementation
 Advanced implementation
 Completed

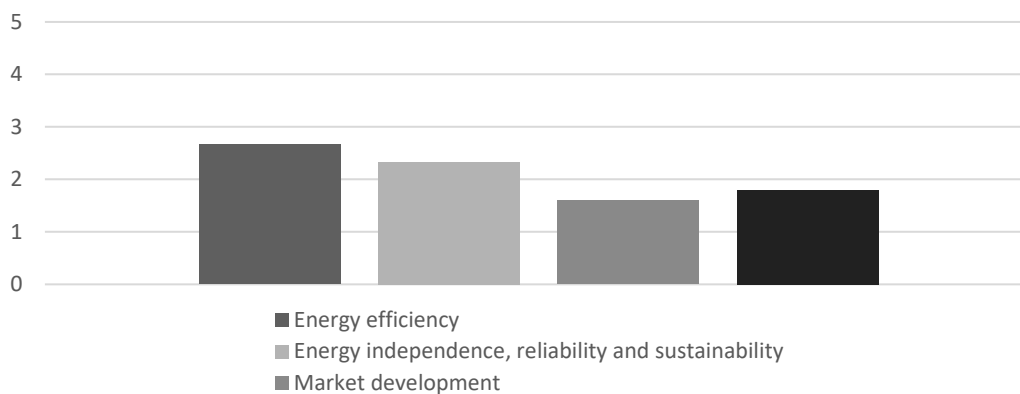
Conversely, but also within the electricity sector, almost no progress towards the fulfilment of the energy efficiency objective has been made. This is due to the lack of steps taken to eliminate cross-subsidies or promote the introduction of smart grids and metering systems for consumers. Along with the attainment of the energy efficiency objective within the electricity sector, the other areas where almost no progress has been made include: 1) achievement of the investment attractiveness objective within the a) environment and climate and b) heat sectors, 2) achievement of the energy efficiency objective within the oil sector and 3) achievement of the network integration objective within the oversight and management sector. The OECD Monitoring Framework (presented in Annex 1 and explained in detail in Annex 2) has been designed to enable identification of such areas – where implementation progress has been most lacking – as early as possible, and facilitate more holistic tracking of the ESU 2035. To conclude, a comprehensive overview of the sectoral sub-indicator results is outlined below.

Monitoring results of the Coal Sector

Within the coal sector, progress towards the energy efficiency objective was at a broadly intermediate stage, while progress towards other headline objectives was closer to an initial stage. Figure 5 shows that progress made towards the market development objective was particularly weak. Despite attempts by MEEP to reform the sector, a majority of state-owned coal mines remain inefficient, economically non-viable and supported by subsidies from the state budget.

The weakest progress recorded by the OECD was for the sub-indicator evaluating the establishment of an open and competitive coal market with transparent and market-based pricing. This reflects the fact that, at the time the assessment was conducted, the draft Law on coal market had not been submitted to the Verkhovna Rada. Lacklustre progress was also observed with regards to the launching of re-training and assistance programs in the coal sector. This suggests that more government efforts will be needed to promote a just and socially acceptable transition when inefficient coal mines are phased out.

Figure 5. Monitoring: Coal Sector



Monitoring results of the Electricity Sector

Progress towards the different objectives in the electricity sector varied strongly, as shown in Figure 6. The most significant progress made was towards the launch of new electricity market, in particular with regards to the development of relevant legislation, market rules, regulations and network codes, as well as the establishment of key institutions such as market operator, guaranteed buyer, supplier of last resort and suppliers under the public service obligation (PSO) mechanism. The standards of electricity supply and administrative service were introduced by decrees of the National Energy and Utilities Regulation Commission (NEURC).

The unbundling process is well advanced, with all the distribution system operators (DSOs) licensed by the regulator, and 21 of 34 DSOs' compliance programmes approved by NEURC and published on its website. NEURC developed the methodological background and regulations for the introduction of RAB tariffs for the transmission system operator (TSO) and DSOs, although no further implementation progress was observed. NEURC also approved preliminary decisions on the certification of Ukrenergo, however there are still some legislative inconsistencies on the ownership of networks that may hinder completion of the process.

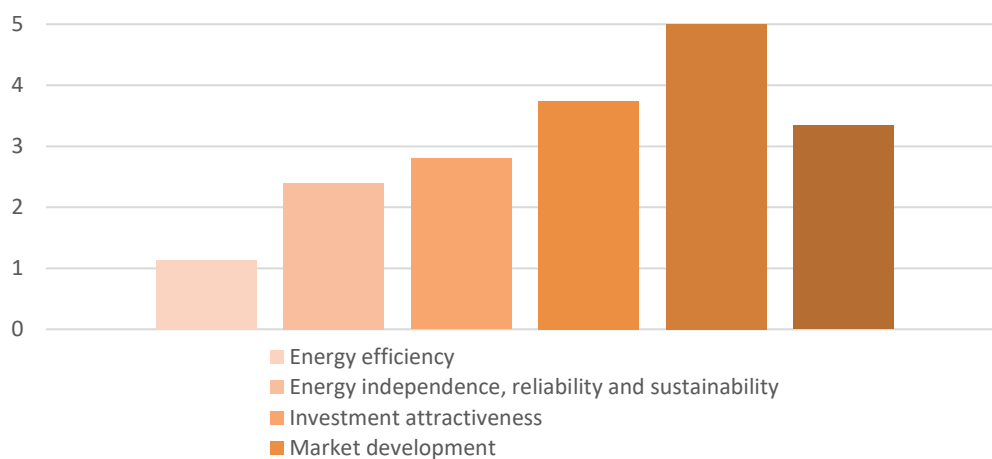
Regarding the availability of electricity market data, market information, wholesale and retail prices, feed-in tariffs, as well as information on access to the grid is published by relevant responsible parties.

Moderate to weak progress was observed with regards to generation capacity and network modernisation, since the process requires large investments that cannot be attracted by the TSO and DSOs until the introduction of the RAB tariff. Large investments in renewable generation capacity were only observed due to the comparatively high feed-in tariffs, which have promised a rapid return on investment. Separately, investment in the upgrade of the thermal and hydro power plants remains critically insufficient.

Market and grid integration with ENTSO-E is proceeding at a slow pace, owing to difficulties with grid modernisation, as well as building new infrastructure components that are aimed at increasing the reliability and security of power system operation and electricity supply. A notable obstacle to the current process is the failure by NEURC to approve the Generation Adequacy Report and the Ten-Year Network Development Plan submitted by Ukrenergo, which could open the door to further investment and projects.

The weak progress observed in the electricity sector pertains to the lack of elimination of cross-subsidies, since household pricing remains a highly sensitive social and political issue. Cross-subsidies were transferred to and concealed within the current PSO mechanism, which was approved by the Cabinet of Ministers of Ukraine (CMU). Losses in electricity networks remain high as the issue is closely linked to grid upgrades and investments made by operators. Progress towards the introduction of smart grids and metering systems for consumers remains insignificant for related reasons.

Figure 6. Monitoring: Electricity Sector



Monitoring results of the Environment and Climate Sector

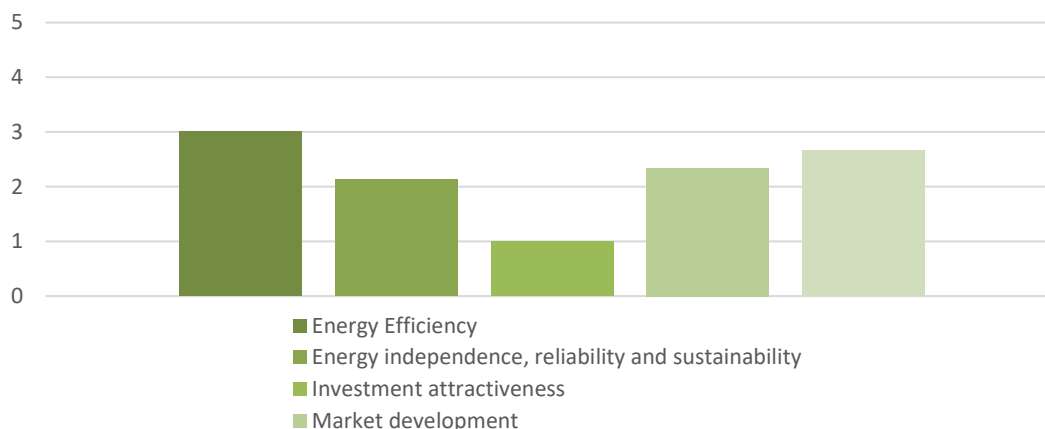
Progress towards objectives in the environment and climate sector was mixed, as shown in Figure 7. The strongest progress was observed on the development of environment and climate-related documents, in particular the 2050 Low Emission Development Strategy under the auspices of Paris Agreement implementation, and the National Emissions Reduction Plan for Large Combustion Plants by 2033 (NERP). Both documents provide set targets for reducing GHG and other pollutants. However, the implementation of NERP

has been relatively poor, as annual action plans were only developed for 2018, and financial incentives have not been allocated effectively.

The adoption of environmental impact procedures is well advanced in most cases, since the relevant laws on strategic environmental assessment and environmental impact assessment have been adopted by Verkhovna Rada, with further implementation carried out by governmental bodies and business entities.

The majority of policy measures intended to promote the use of environmentally friendly transport and infrastructure, as well as waste treatment, are at an intermediate or early level of implementation. The weakest progress was observed for sub-indicators monitoring legislation related to the GHG emissions trading scheme, monitoring mechanisms for tracking GHG emissions, and the introduction of global best practices for environmental management and audit system.

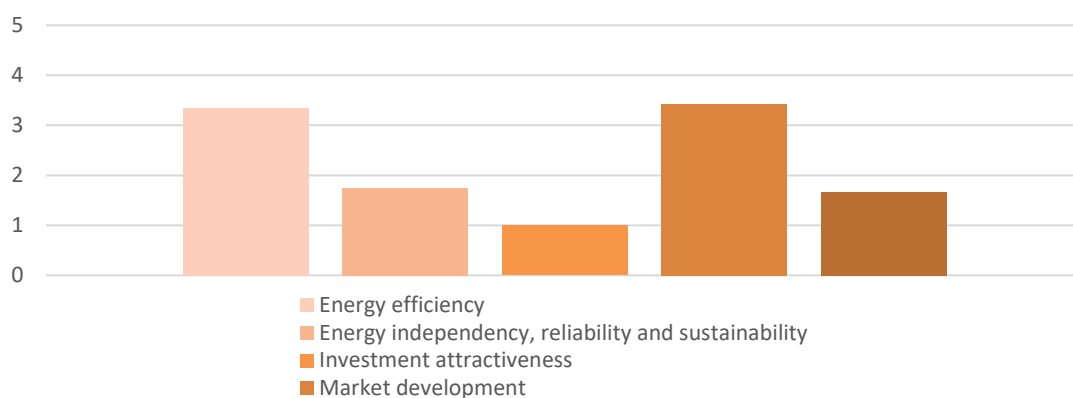
Figure 7. Monitoring: Environment and Climate



Notably, no data was available for tracking the dynamics and share of fueling stations with electric charging or alternative fuels, or the volume of waste produced by generating facilities. This data should be developed and published to ensure effective ESU 2035 monitoring.

Monitoring results of the Heat Sector

In the heat sector, progress towards headline objectives was intermediate to weak, as illustrated in Figure 8. The most significant progress was observed for sub-indicators related to metering of heat consumption in residential and public buildings, including in terms of legal requirements, data on the installation of metering units, and the publication of applicable tariffs.

Figure 8. Monitoring: Heat Sector

Measures at the local level to reconstruct heating systems and modernise equipment and heat-generation facilities have been at varying stages of implementation. This is also the case regarding the expansion of electricity and biomass as sources of heat, and the transition to autonomous and/or individual heating – depending on the feasibility of individual system changes.

Little progress has been made on issues related to changes in pricing and tariff methodologies (which is related to support for cogeneration facilities), and increasing the share of users of energy efficiency support programmes. To date, the Energy Efficiency Fund allocated funding streams have comprised an excessively complex application process, and further streamlining is required to promote a more inclusive allocation of funds. Government efforts to incentivise thermal modernisation through a top-down approach may be effective with some municipalities, but could also undermine other programmes aimed at supporting organised and motivated households.

The assessment also found that scant progress has been made with regards to management and coordination of the decentralisation of heat supply, with no regular information published on the share of consumers in residential and public buildings using either autonomous or individual heating. Progress towards reducing losses in heat transmission and distribution networks has also been slow, with the 2020 interim target of <17% having been missed. In addition, the ESU 2035 goal of ensuring access to heat networks for third parties has not been fulfilled, as both legislation and the implementation plan for the full TPA have not been adopted, with no cases of unbundling of centralised heating supply.

The existence of rather decentralised and complicated regulation of heat supply, with responsibilities that are unevenly distributed among the government, local authorities and NEURC, means there is a lack of credible data for certain sub-indicators. For example, the Ministry for Communities and Territories Development could have been monitoring not only metering and upgrade progress, but also specific quantitative targets such as the cost efficiency of boilers and general goals like the rollout of modern equipment (weather-dependent regulation at individual heating substations) or reduction in the share of heat distribution networks in a state of emergency. This highlights the need to review the overall regulatory framework and keep heating system upgrades under the purview of central government, while also allocating due responsibility to local authorities.

Monitoring results of the Natural Gas Sector

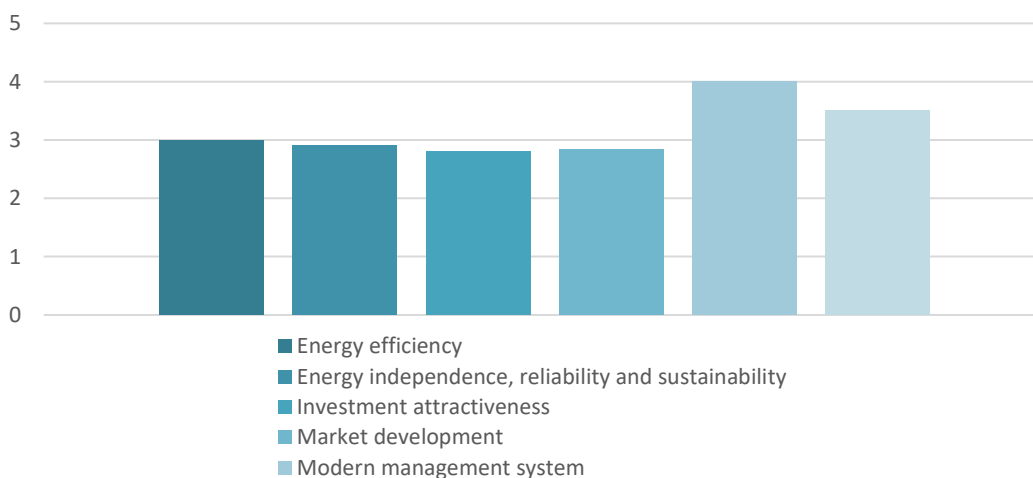
Progress towards objectives in the natural gas sector was at a predominantly intermediate level (see Figure 9). The most significant progress was recorded in relation to the diversification of supply and access provision of gas transmission and storage systems to EU market players (with new services provided). For example, Ukraine has excess interconnection capacity with EU member states at approximately 24 bcm/a (66 mcm/d) and, as of 1 January 2020, virtual reverse flow (back-haul) is available on all interconnection points with Western TSOs, increasing the available capacity.

Recent successes also include the unbundling and certification of an independent TSO, and the conclusion of new transit contracts with Russian stakeholders. Most network codes have been adopted but remain subject to effective implementation by the TSO; only a small number of issues remain outstanding in terms of the EU's Third Energy Package requirements. Good progress has also been demonstrated in relation to the publication of prices, tariffs and methodologies, with the NEURC practice of market monitoring benefiting from continuous improvements and making it most transparent sector in this regard.

The introduction of upstream tax incentives (reduction of royalties on natural gas production from new wells) made the effective tax burden broadly comparable to levels observed in European countries, but not sufficiently attractive to achieve higher levels of investment in natural gas exploration and development of new deposits. According to SSSU, capital investments in gas production increased by 143.3% in 2018, and by 145% in January-September 2019.

The introduction of market prices for all consumers by lifting the PSO mechanism (which expires on 1 May 2020) for the sale of natural gas to households and municipal heating enterprises could be the next significant measure to drive down market concentration and support the development of a liquid gas hub (exchange trading). With housing subsidy monetisation (in place for end-users) and the protection of consumers' right to switch suppliers (subject to streamlining and proper enforcement), the efficiency of gas consumption could be substantially improved after its levels reach zero imports need.

Figure 9. Monitoring: Natural Gas Sector



In order to steadily reduce gas consumption, measures will need to be adopted to optimise capacities of transmission and storage systems to meet domestic and foreign demand. Unbundling of the storage systems operator and the introduction of RAB regulation for distribution services are examples of further steps that could boost investment in the reconstruction, optimisation and modernisation of infrastructure, while reducing losses.

Sub-indicators that evaluated DSO management and development were those towards which the least progress was observed, with no ongoing activities recorded. The government has to report on measures to solve property issues, in particular regarding the independent assessment of state-owned assets. NEURC needs to report on setting the monitoring system for the functional unbundling of DSOs and the system of KPIs to reduce accident rates.

There is a lack of official information available on the number of steps necessary to receive special permits for subsoil use, as well as on the amount of time and resources for permits and administrative processing. Estimates for these procedures were provided by some industry associations and were not confirmed by any government entity. Data on the recovery of unconventional hydrocarbons has to be reported separately (as both public and private companies have started to invest in intensification operations and fracking), along with the share of foreign companies working in upstream.

Monitoring results of the Nuclear Sector

Within the nuclear sector, progress towards the sole relevant objective - energy independence, reliability and sustainability - was at a broadly intermediate stage. The most significant progress made was in respect of the diversification of nuclear fuel supply, with the share of the largest supplier having fallen from 61% in 2018 to 52% in late 2019 (according to SSSU data). Additionally, the extension of the operational period for 11 out of 15 nuclear power units has been completed, with their being licensed for a further 10-year operation and the possibility of additional extension after that period. Notable progress was also made by Energoatom in its work to complete the construction of spent nuclear fuel and radioactive waste storage facilities, with the process now in its final stages.

An intermediate level of progress was observed with regards to the implementation of measures for the modernisation of NPPs and the construction of facilities for spent nuclear fuel and radioactive waste treatment. The least progress was observed with regards to ensuring domestic nuclear fuel production and developing a long-term nuclear power development programme. Appropriate technologies for the construction of new NPP units have not yet been identified, and no decisions or action plan have so far been developed regarding the replacement of nuclear generation capacities after 2030. Additionally, no data was found on the amount of nuclear fuel and uranium concentrate available in reserve.

Monitoring results of the Oil Sector

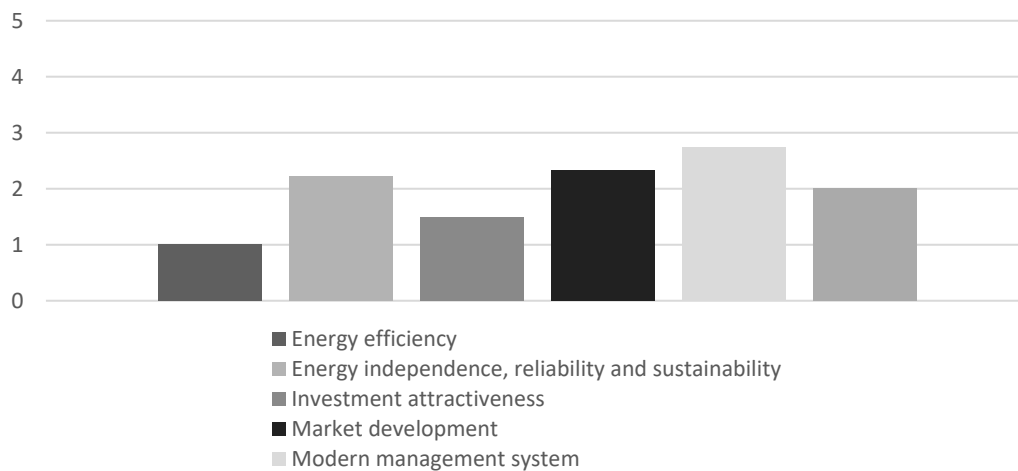
Within the oil sector, progress towards objectives was intermediate to weak, as shown in Figure 10. Steps taken to introduce a new licensing regime for production, imports and exports, sale and storage of oil products have been relatively effective for establishing a framework to reduce counterfeit products in the market. However, further improvements will be needed to deal with illegal mini-refineries. The enforcement of competition regulations by the antitrust authority (AMCU) is also relatively strong, with abuse of market power cases being frequently penalised. One should also note the improvements made to the procedure for obtaining special permits for subsoils use, in particular regarding

electronic procurement of such licenses and reporting under the Extractive Industries Transparency Initiative.

Less significant progress was observed on issues such as the creation of minimum reserves of oil and oil products (under Council Directive 2009/119/EC) and the introduction of European fuel quality standards (including a monitoring and enforcement system). Government concepts to develop the oil and gas fuels market, the oil and gas refining industry, the supply and transit of crude oil and oil transportation systems are still at an initial stage. An unclear policy trajectory has contributed to a lack of infrastructural development, which adversely affects the efficiency of oil supply and integration with European networks. It also results in the continual increase of oil products' share in TPES, which suggests there is no dedicated policy to substitute consumption with more “climate friendly” fuels.

There has been little progress with regards to the promotion of favourable tax conditions (in terms of excise duties on wholesale and retail sales, port duties and other service fees, as well as aggregate tax burden on the industry) and infrastructure development (oil leak detection and tampering systems, oil deposits digitisation).

Figure 10. Monitoring: Oil Sector



In comparison with other sectors, the oil sector lacks reliable and full-market information. Tariffs are published, yet prices are only available as aggregated average statistics. Despite streamlined access to geological information, which has recently undergone significant improvements, most of the data (over 170,000 volumes, approx. 80%) remains undigitised. There is no centralised source of information on the administrative permitting process for extractive companies. The government does not provide information on the share of losses in oil supply or the share of “environmentally safe” fuels marketed. Data for these areas should be more widely available.

Monitoring results of the Renewable Energy Sector

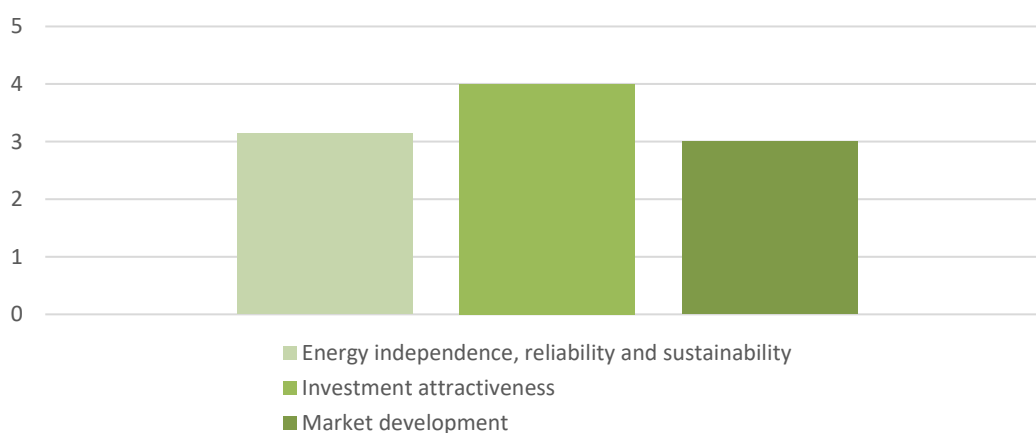
Progress within the renewables sector was at an intermediate to advanced stage, as demonstrated in Figure 11. The target of reaching a 7% share of renewables in electricity generation by 2020 has been met. Significant progress has been made towards other renewable targets (with the notable exception of the transport sector), owing to the

significant growth of renewable capacity commissioning in 2019. Feed-in tariffs and the registry of non-household facilities that use feed-in tariffs are regularly published on the NEURC website. Considerable progress has been made towards providing legislative support for renewables, and in particular, the approval by the CMU of regulations on respective auctions and the administrator of the auction system. Efforts have also been made to attract foreign investors to the sector with highly favourable feed-in tariffs.

Progress towards increasing the share of renewables in total primary energy supply and final energy consumption is at an intermediate stage. However, little progress was observed regarding the development of energy storage technologies and flexible generation capacity that will be necessary to ensure effective balancing of variable electricity production from renewables. Relevant government support and the appropriate legislative provisions have also not been provided.

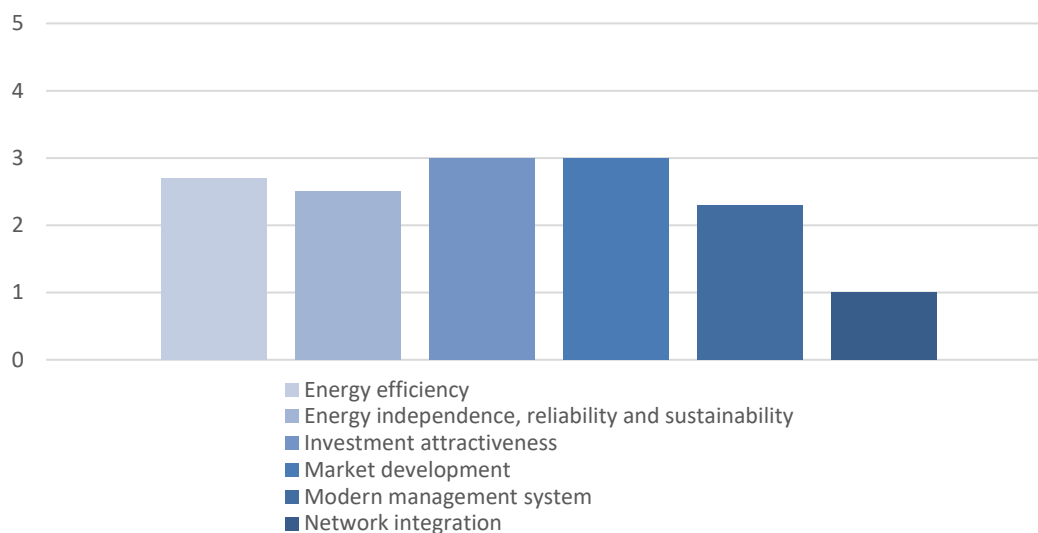
It is notable that a large number of sub-indicators in the sector were difficult to assess due to data unavailability. This was particularly significant for the sectoral breakdown of renewables' share in total secondary energy generation (namely heat and electricity), as well as in the transport sector, growth of foreign investment in the market, the distribution of green energy investments by types of generation and growth in the total volume of biomass products. In order to ensure more holistic monitoring of the strategy, statistical data that can track these sub-indicators effectively should be developed and made publicly available.

Figure 11. Monitoring: Renewable Energy Sector



Monitoring results of the Sector Oversight and Management

Progress towards objectives within sector oversight and management was at an intermediate to weak stage (see Figure 12). The assessment found that energy security policy (notably emergency planning) and transparent public procurement were areas where the strongest progress was made. Along with financial support for implementing energy efficiency measures in residential buildings (Energy Efficiency Fund, “warm loans” programme, commercial loans etc.), these areas comprise functional mechanisms for policy implementation.

Figure 12. Monitoring: Sector Oversight and Management

The introduction of standards to promote energy efficiency measures (both soft and hard) is underway, as can be observed through the growth of ESCOs and Energy Performance Contracts, as well as the implementation of an energy labelling system (without all technical regulations currently in place). This helps to explain why progress towards one of the key KPIs of the ESU 2035 – reduction in primary energy supply per unit of GDP – appears to be slower than expected.

With regards to the creation of a favourable investment climate, key deliverables have either not been carried out or are at an initial stage. This applies to mechanisms that can prevent capital leakage to tax havens, mechanisms for public-private partnerships, as well as the decentralisation of utilities regulation. Corporate governance reform of SOEs is only advanced for a few enterprises, with no sustainable solutions enshrined in legislation and various difficulties arising in the practical implementation of the OECD Corporate Governance Principles.

Energy statistics are another area where progress has been slow, with the SSSU practice of data collection and systematisation not yet compliant with the regulation (EC) 1099/2008. Further noted difficulties in the assessment pertain to the lack of data on contingency planning practices at the level of business entities and reserves of energy consumption created for emergency situations.

Annex 1. Sectoral monitoring of ESU 2035 implementation progress

The tables below provide an overview of implementation progress towards headline ESU 2035 objectives across the nine energy sub-sectors. The sub-indicators that are listed have been developed for the OECD Monitoring Framework. They are grouped into five categories and according to the type of measurement they are providing: data availability, legislation, operational assessment, qualitative assessment and quantitative target. A numerical range from 1 to 5 is used to evaluate progress on a scale from not started to completed. An average implementation value for each objective is provided along with the sub-indicator values.

<i>Coal</i>	Category	Score
<i>Energy efficiency</i>		2.67
➤ Coal consumption by end-users (household, industry, services, transport)?	Data availability	3
➤ Define targets to reduce coal consumption?	Qualitative assessment	2
➤ Share of coal in total primary energy supply?	Data availability	3
<i>Energy independence, reliability and sustainability</i>		2.33
➤ Amount of coal extracted domestically (track growth)?	Data availability	4
➤ Share of exports and imports relative to Ukraine's total coal supply?	Data availability	1
➤ Share of mines with self-financed extraction (e.g. without subsidies)?	Data availability	2
<i>Market development</i>		1.6
➤ Elimination of public wholesale coal buyer?	Qualitative assessment	3
➤ Establishment of open and competitive coal market?	Qualitative assessment	1
➤ Introduction of market-based pricing?	Qualitative assessment	1
Availability of data regarding coal prices, coal-based energy prices and tariffs?	Data availability	1
➤ Number of state-owned coal mines (absolute and share of total coal mines) and their production/output (share of total coal production)?	Data availability	2
<i>Modern management system</i>		1.8
➤ Share of coal SOEs under the management of a single entity?	Data availability	2
➤ Transparency of ownership structure?	Qualitative assessment	3
➤ Assistance programmes launched?	Qualitative assessment	1
➤ Creation of policies on re-training programmes for coal workers?	Qualitative assessment	2
➤ Measures implemented for social reconvension where mines were closed?	Qualitative assessment	1

<i>Electricity</i>	Category	Score
<i>Energy efficiency</i>		1.14
➤ Assign audit function to ensure cross-subsidies are not reflected in the pricing?	Qualitative assessment	1
➤ Framework implemented to eliminate cross-subsidies?	Legislation	1
➤ Legislation to eliminate cross-subsidies?	Legislation	1
➤ Auditing/monitoring in place regarding the SMART systems and metering installations?	Qualitative assessment	1
➤ Legislation to enforce smart grids and metering systems?	Legislation	2
➤ Share of consumers that already have SMART systems?	Data availability	1
➤ Tax incentives in place regarding the SMART grids and metering installations?	Legislation	1
<i>Energy independence, reliability and sustainability</i>		2.4
➤ Approve maintenance plan, reports, and projects for upgrading the plants and ensuring their maintenance?	Qualitative assessment	3
➤ Approve maintenance plan, reports, and projects (such as the Ten Year Transmission System Development Plan) for upgrading the transmission system and ensuring its maintenance?	Qualitative assessment	3
➤ Ensure the ability of the last resort supplier to meet consumer demand?	Qualitative assessment	3
➤ Guaranteed energy level principle available in case of infrastructural failure?	Qualitative assessment	2
➤ Plans to develop electricity storage (for example, through hydro power plants or generators for Ukrenergo and DSOs)?	Operational assessment	3
➤ Reduce loss percentage in electricity networks to 10% by 2020?	Quantitative target	1
➤ Reduce SAIDI index score to <450 by 2020? (minutes/year/subscriber)?	Quantitative target	1
➤ Are there financial incentives in place to upgrade distribution networks under private ownership?	Legislation	3
➤ How much of the transmission infrastructure (e.g., the grid) has gone through upgrades (percentage)?	Data availability	0*
➤ Introduce automated metering (SMART) system for the TSO?	Qualitative assessment	2
➤ Is there a capital expenditure plan to reconstruct and develop distribution networks, and is it being implemented?	Operational assessment	3
➤ What is the voltage level of distribution grids, plans to increase (current level, set target, plan to track voltage levels)?	Data availability	3
➤ Current capacity restrictions (price) on plants in generating electricity (including Energoatom, Ukrhydroenergo, Tsentrenergo, etc.)?	Operational assessment	2
➤ Current capacity restrictions (volume) on plants in generating electricity (including Energoatom, Ukrhydroenergo, Tsentrenergo, etc.)?	Operational assessment	3
➤ Plans for reducing restrictions (NEURC/CMU regulations)?	Qualitative assessment	2
➤ Share of TPPs that shifted from anthracite coal to gas coal?	Data availability	3
➤ Decommissioning of 2-6 GW capacity of TPPs and commissioning of replacing flexible generation capacity?	Operational assessment	1

➤ Share of TPPs and CHPPs that have been reconstructed or modernised technically/technologically?	Data availability	2
➤ Share of TPPs whose efficiency improved through capacity optimization?	Data availability	2
➤ Flexible generation capacity program developed?	Qualitative assessment	2
➤ Regulations on auctions for new generation capacity construction in place?	Qualitative assessment	4
<i>Investment attractiveness</i>		2.8
➤ Are there legal restrictions in place that can prevent FDI in electricity market?	Qualitative assessment	3
➤ Growth of FDI in the electricity sector?	Data availability	2
➤ Is there a framework in place for licensing and property rights for foreign investors?	Legislation	3
➤ Have the laws been implemented in line with the deadlines provided under the amendment to Annex 27 of the Association Agreement adopted on March 18, 2019?	Legislation	3
➤ Incorporation of the laws and regulations listed under the EU-Ukraine Association Agreement?	Data availability	3
<i>Market development</i>		3.74
➤ Rules of retail electricity market adopted?	Qualitative assessment	5
➤ Approve licensing methodology for supply and DSO companies?	Legislation	5
➤ Develop suppliers of last resort?	Qualitative assessment	5
➤ Unbundle supply and DSO companies?	Qualitative assessment	4
➤ Are Ukraine's regulatory requirements on network access, competition and pricing in line with the EU's Third Energy Package?	Legislation	4
➤ Are key regulations (RAB, Green Tariff etc.) in place?	Legislation	4
➤ Growth of investments within the sector?	Data availability	3
➤ Have the regulations on the RAB/Green Tariffs etc. been implemented?	Qualitative assessment	2
➤ Approval of regulatory acts necessary for market operation?	Legislation	5
➤ Certification of Ukrenergo?	Qualitative assessment	4
➤ Debt repayment plan for the electricity market?	Qualitative assessment	2
➤ Development of software systems for the balancing and ancillary services markets?	Qualitative assessment	4
➤ Establish market operator and guaranteed buyer?	Qualitative assessment	5
➤ Introduction of the Law on the Electricity Market?	Legislation	4
➤ Launching bilateral contracts, day-ahead, intraday, balancing and ancillary services markets?	Qualitative assessment	4
➤ Information on electricity market concentration published?	Qualitative assessment	2

➤ Publication of PSO data?	Qualitative assessment	4
➤ Publication of wholesale and retail electricity tariffs/prices for regulated and non-regulated markets?	Qualitative assessment	4
➤ Electricity prices for households are cost-reflective?	Qualitative assessment	1
Modern Management System		5
➤ Framework for risk assessment and formulation of contingency/emergency plans?	Legislation	5
➤ Legal requirements regarding electricity supply (legal, regulatory etc)?	Legislation	5
➤ Regulatory framework in ensuring system reliability (security checks etc.)?	Legislation	5
➤ Introduction of service standards (amount of time needed for/the ease of administrative processing)?	Qualitative assessment	5
➤ Introduction of service standards (timeframe in which licenses are issued)?	Qualitative assessment	5
Network integration		3.34
➤ Access of third parties to infrastructure?	Qualitative assessment	4
➤ Grid harmonisation progress?	Qualitative assessment	3
➤ Status of integrating into ENTSO-E?	Qualitative assessment	3
➤ Breakdown by exports vs. imports statistics?	Data availability	3
➤ Publish information regarding trade?	Qualitative assessment	4
What is the total electricity trade with the EU by country (month over month)?	Data availability	3
Environment and climate		Category Score
Energy efficiency		3
➤ Develop low carbon strategy for Ukraine to implement the provisions on the Paris Agreement?	Qualitative assessment	5
➤ Framework in place to ensure the implementation of Ukraine's commitments to achieving the objectives of the Paris Agreement, Kyoto Protocol, and the UN Framework Convention on Climate Change?	Legislation	2
➤ Dynamics of fueling stations with electric charging available, dynamics of fueling stations with alternative fuels?	Data availability	0*
➤ Regulatory framework in place to develop infrastructure for charging stations and stations with alternative fuels (according to Directive 2014/94/EC and IMO 2020)?	Qualitative assessment	3
➤ Share of fuelling stations available considered safer and eco-friendly for consumption?	Data availability	0*
➤ Availability of programmes (across sub-sectors) to encourage energy saving?	Qualitative assessment	3
➤ Legal framework in place to reduce waste from generating facilities?	Legislation	2
➤ Approval of the National Large Combustion Plants Emission Reduction Plan (SO ₂ , NO _x , dust)?	Qualitative assessment	5
➤ Defined targets to reduce emissions?	Qualitative assessment	5

➤ Emissions credit trading scheme in place?	Qualitative assessment	1
➤ Framework in place to achieve defined targets in reducing emissions?	Qualitative assessment	2
➤ Implementation of and reporting on National Large Combustion Plants Emission Reduction Plan (SO ₂ , NO _x , dust)?	Qualitative assessment	2
➤ Defined other targets to reduce greenhouse gas emissions?	Qualitative assessment	4
➤ Legislation in place regarding greenhouse gas emission trading scheme?	Legislation	1
➤ Monitoring mechanism in place to track greenhouse gas emissions?	Qualitative assessment	1
➤ Reduced CO ₂ emissions in 2020 by <60% compared with 1990 levels?	Quantitative target	5
➤ Volume of greenhouse gases produced/National registry of GHG emissions available?	Data availability	4
<i>Energy independence, reliability and sustainability</i>		2.13
➤ Creation of a coordination program for handling waste?	Qualitative assessment	2
➤ Creation of a regulatory framework and legislation on waste management?	Qualitative assessment	2
➤ Initiatives to promote technological upgrades and information exchange in handling waste?	Qualitative assessment	1
➤ Volume of waste produced by generating facilities?	Data availability	0*
➤ Has EMAS, or similar assessments been conducted?	Qualitative assessment	1
➤ Introduce measures to limit the impact of energy on the environment, including environmental impact assessments / implementation of environmental impact assessment in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)?	Qualitative assessment	3
➤ Introduce measures to stimulate the development of the use of transport and related equipment on environmentally friendly fuel (electric transport, natural gas, and biofuels and other alternative fuels)?	Qualitative assessment	3
➤ Introduction of environmental management and audit system (EMAS)?	Qualitative assessment	1
➤ Launch of environmental impact assessment?	Qualitative assessment	4
<i>Investment attractiveness</i>		1
➤ Policies or initiatives launched to finance investment projects under the framework of the National Emissions Reduction Plan (NERP) for Large Combustion Plants?	Qualitative assessment	1
<i>Market development</i>		2.34
➤ Growth in the share of vehicles using environmentally friendly fuels?	Data availability	2
➤ Measures in place to increase the attractiveness of environmentally friendly vehicles (on alternative fuels)?	Legislation	3

➤ Regulatory framework to develop the electric vehicle market and vehicles on alternative fuels?	Qualitative assessment	2
Modern management system		2.67
➤ Administrative mechanism in place to coordinate the handling of waste?	Qualitative assessment	3
➤ Implementation of the mechanisms to handle waste?	Qualitative assessment	3
➤ Amount of electricity, heat and liquid fuel produced from biomass/biofuel waste?	Data availability	2
Heat	Category	Score
Energy efficiency		3.34
➤ Change in annual consumption of heat by households and public buildings?	Data availability	3
➤ Growth in share of households/MCBA that use energy efficiency support programmes?	Data availability	3
➤ Meet specific cost target of heat production by boilers, 160 per kg of s.f./Gcal by 2020?	Quantitative target	0*
➤ Share of residential and public buildings with heat metering systems installed?	Data availability	4
Energy independence, reliability and sustainability		1.74
➤ Growth of share of heat supplied through electric boilers (diversifying the sources of heat supply)?	Data availability	3
➤ Increase the use of biomass in heat generation?	Data availability	3
➤ Support the implementation of biofuels based on cogeneration?	Qualitative assessment	3
➤ Programmes introduced to modernise and replace district heating networks, including improved connection of consumers, repair of emergency section of networks, modernisation of equipment and heat-generated facilities?	Qualitative assessment	3
➤ Share of individual heating substations upgraded and equipped with weather-dependent regulation?	Data availability	0*
➤ Share of consumers in residential and public buildings connected to the central heat supply network?	Data availability	1
➤ Reduction / Non-increase in share of consumers in residential and public buildings using autonomous or individual heating?	Data availability	1
➤ Share of heat supply units that have been upgraded?	Data availability	3
➤ Estimate of the total capacity of heat cogenerating facilities and its growth rate?	Data availability	2
➤ Number of commissioned cogeneration (three-generation, quad-generation) installations that can be replacements for conventional boilers, and that can be installed in district boiler houses?	Qualitative assessment	1
➤ Rate of (re)construction of co-generation heat plants?	Data availability	2
➤ Reduce percentage share of losses in heat transmission and distribution networks to <17% by 2020?	Quantitative target	1

➤ Share of heat distribution networks in state of emergency (less than 18.6% by 2020, and 4.4% by 2025)?	Quantitative target	0*
➤ Timely repair/replacement/reconstruction of thermal networks? (e.g. ratio of failures or supply interruptions)	Qualitative assessment	3
Investment attractiveness		1
➤ Average duration for third parties to connect to the heating system?	Qualitative assessment	0*
➤ Existing legislation and implementation plan for third-party access to heat networks?	Legislation	1
➤ Number of permits/barriers required for third parties to access heat system?	Qualitative assessment	0
➤ Share of centralised heating supply unbundled?	Data availability	1
		3.43
Market development		
➤ Assessments of distributed heat generation (incl. transition to autonomous and/or individual heating where feasible)?	Qualitative assessment	2
➤ Local energy initiatives, in particular SMEs and energy cooperatives, developing?	Qualitative assessment	2
➤ Legal requirements for transparent accounting?	Legislation	5
➤ Publication of heat tariffs for consumers?	Qualitative assessment	5
➤ Assessment of market pricing levels for regulated and non-regulated markets?	Qualitative assessment	3
➤ Cost-plus tariff methodology replaced with incentive-based tariffs for heat supply?	Qualitative assessment	3
➤ Regulatory and legal framework in place to promote incentive-based tariffs for heat supply?	Legislation	4
		1.67
Modern management system		3
➤ Average duration for connecting to the heating system for new users/buildings?	Operational assessment	1
➤ Decentralisation of heat supply management and coordination mechanism?	Qualitative assessment	1
➤ Introduction of quality-based commercial settlement system in the heat market?	Category	Score
Natural gas		3
Energy efficiency		
➤ Has a subsidy/monetisation scheme been introduced for end-users?	Qualitative assessment	4
➤ Assessment of the dynamics of gas consumption reduction? (industry, households, public institutions, municipal heating companies, technological purposes)	Data availability	3
➤ Analysis of the efficiency of gas consumption (monthly) in the heating season according to the average temperature and weather conditions?	Data availability	4
➤ Are there environmental parameters and energy consumption requirements for equipment and technologies?	Qualitative assessment	1
➤ Availability of smart meters, balancing automatisation, and installations of remote accounting system?	Qualitative assessment	3

- Increased share of household consumers with natural gas meters (individual and building-level)?

Energy independence, reliability and sustainability

- Developed and implemented measures to improve the operation of natural gas distribution systems, reducing their accident rates?
- Share and reduction rate of losses in natural gas transmission?
- Share of Action Plan to the Concept to Develop Gas Production Industry of Ukraine by 2020 implemented? Concept's indicators achieved?
- Concept to develop the natural gas industry of Ukraine after 2020 drawn up (along with corresponding plan of measures)?
- Favourable aggregate tax burden on economic entities in the gas industry compared with other countries (production segment)?
- Introduction of tax incentives and effective use of preferential tax rates?
- Increase (%) in offshore natural gas recovery as compared to previous respective one?
- Increase (%) in volume of domestic natural gas recovery from conventional sources as compared to previous period?
- Growth rate of investment in natural gas exploration and development of new deposits (including existing and new technologies, and purchases of equipment)?
- Number of auctions and concluded production sharing agreements; number of issued special permits for exploration and development in the recent year?
- Simplified administrative procedures for taxes and fees?
- Started domestic natural gas recovery from unconventional sources? Increase in domestic natural gas production from unconventional sources as compared to the previous period (%)?
- Availability of technical and commercial conditions for importing and storing gas from LNG terminals in neighbouring countries?
- Develop and launch new gas storage services for domestic and foreign customers by the relevant operator? Increase the number of gas storage users (and volumes of gas storage) in line with EU Strategy for liquefied natural gas and gas storage?
- Partners involved in improving storage facilities management?
- Share of gas storage facilities in use? Share of gas storage capacity in use (%)?
- Share of capacity of gas storage facilities upgraded within the last year (%)?
- Share of gas stored by non-residents (at least 5%)?
- Action plan to modernise gas transmission system?
- Ten-Year Network Development Plan approved and updated?
- Construction/renovation of the share of compressor stations? Number and share of compressor stations with construction/upgrade/reconstruction carried out?

Data availability	3
	2.91
Qualitative assessment	1
Data availability	2
Qualitative assessment	3
Qualitative assessment	2
Data availability	4
Data availability	1
Data availability	2
Data availability	4
Data availability	3
Qualitative assessment	2
Data availability	0*
Operational assessment	4
Data availability	4
Qualitative assessment	1
Data availability	3
Data availability	0*
Data availability	4
Qualitative assessment	4
Operational assessment	4

- Optimise GTS capacities to meet load and concluded agreements domestically?
- Share of gas imports needed from the RF to balance demand (bln m3) reduced to 0% by 2020?
- Diversification of sources and routes of natural gas imports by country (not to exceed 30% by source) and types of supply?
- Review and ensure the feasibility of legal requirements and targets for creating insurance gas stocks?
- Total imports/exports of natural gas?

- Y-o-y growth/reduction?

Investment attractiveness

- Introduction and implementation of regulation in line with the EU network codes?
- Share of the EU's Third Energy Package requirements, directives and resolutions regarding the gas TSO implemented?
- Studies conducted on efficient implementation options of using GTS and involving European energy companies in gas storage?
- Western partners involved in TSO management in compliance with the Natural Gas Market Law?
- Growth of FDI in developing existing and new technologies, and for the purchase of equipment?
- Number of contracts concluded with foreign companies (following tenders, auctions for PSAs)?
- Share of hydrocarbon deposits being explored by foreign companies (through conventional and unconventional methods) in Ukraine and the Black Sea shelf?

Market development

- Benchmarks and monitoring in place to maintain data on DSO functional unbundling?
- Market concentration dynamics (HHI, CR3)? (retail market)

- Protection of consumers' right to switch suppliers (ex. regulations, ombudsman office)?
- Reduced number of steps/procedures and average time necessary to switch suppliers?
- Measures and legislation in place to support gas hub development?

- Market concentration dynamics (HHI, CR3)? (wholesale market)

- Share of exchange trading of energy resources (natural gas) reached 25% of domestic consumption by 2020?
- Introduce market prices (legislation, action plan, implementation) in natural gas for all consumers by abolishing the mechanism for state regulation of natural gas supply within the PSO framework?
- Replace cost-plus methodology with incentive-based system for setting tariffs?

Qualitative assessment	1
Quantitative target	5
Data availability	4
Qualitative assessment	3
Data availability	4
Data availability	2
	2.8
Legislation	3
Data availability	0*
Qualitative assessment	3
Qualitative assessment	3
Data availability	3
Data availability	2
Data availability	0*
	2.83
Data availability	2
Data availability	2
Legislation	2
Qualitative assessment	1
Qualitative assessment	3
Data availability	3
Quantitative target	2
Qualitative assessment	3
Qualitative assessment	3

➤ Ease of accessing geological information? Average time to access information and the number of companies which used the service?	Qualitative assessment	3
➤ Introduction of Extractive Industries Transparency Initiative (EITI) principles (mandatory reporting of payments to government)?	Qualitative assessment	3
➤ Introduction of industry-specific methodology for cost accounting in the context of individual hydrocarbon fields?	Qualitative assessment	0*
➤ Average retail prices for household and industrial consumers (by consumption bands) published?	Qualitative assessment	5
➤ Price monitoring in wholesale and retail markets established?	Qualitative assessment	5
➤ Publish applicable tariffs and methodologies for services of TSO and DSOs?	Qualitative assessment	5
➤ Reports on average weighted prices published regularly?	Qualitative assessment	5
➤ Losses of natural gas in distribution networks decreased?	Data availability	1
➤ Projects for reconstruction, optimisation and modernisation of distribution systems implemented?	Qualitative assessment	2
➤ Property issues solved, in particular independent assessment of the assets value conducted?	Qualitative assessment	1
Modern management system		4
➤ Has an independent TSO operator been established and unbundled?	Legislation	5
➤ Has the TSO been certified?	Legislation	5
➤ Centralised source of information on administrative permitting process for extractive companies developed (for the purpose of improvements)?	Qualitative assessment	1
➤ Amount of time and resources needed for administrative processing?	Data availability	0*
➤ Number of steps in licensing process (including special subsoil use permits)?	Qualitative assessment	0*
➤ Reduction in time needed for processing and approval of special permits by local councils?	Qualitative assessment	5
Network integration		3.5
➤ Can GTS capacities be optimized to meet load requirements and agreement conditions with the EU?	Operational assessment	2
➤ Feasibility of equipping entry points on the eastern border of Ukraine with gas metering stations?	Operational assessment	1
➤ Russian gas transmission points transferred to the eastern border of Ukraine?	Qualitative assessment	3
➤ New contracts have been concluded with the Russian side, including under trilateral negotiation process?	Qualitative assessment	5
➤ Cross-border capacity of interconnectors as compared to domestic market volume reached target of 2% (30) by 2020?	Quantitative target	5
➤ Is there access (ex. through contracts) to the gas transmission and underground storage systems between Ukrainian and EU participants?	Operational assessment	

Nuclear	Category	Score
<i>Energy independence, reliability and sustainability</i>		2.87
➤ Technologies identified to construct new nuclear power blocks?	Qualitative assessment	1
➤ Largest supplier share in the nuclear fuel supply reduced to <70% by 2020?	Quantitative target	5
➤ Share of nuclear fuel produced domestically?	Data availability	1
➤ Implementation of projects aimed at the release of closed facilities and removal of internal restrictions?	Data availability	3
➤ Increased efficiency of nuclear power plants operation (capacity utilisation factor (%))?	Data availability	3
➤ Share of nuclear plants that have been modernised?	Data availability	3
➤ Approval of decision to extend nuclear power plant operation?	Qualitative assessment	5
➤ Conduct studies on development of nuclear fuel production facilities domestically?	Qualitative assessment	3
➤ Develop and put new uranium deposits into operation?	Qualitative assessment	2
➤ Implement state program to expand Ukraine's own uranium base?	Qualitative assessment	2
➤ Completion of construction of spent fuel and radioactive waste storage facilities?	Qualitative assessment	4
➤ Construction of facility for spent fuel and radioactive waste processing?	Qualitative assessment	3
➤ Approval of decisions and action plan for replacement of NPPs capacities to be taken out of operation after 2030?	Qualitative assessment	1
➤ Creation of a long-term nuclear power development programme?	Qualitative assessment	2
➤ Development of a State Target Environmental Programme to remove old nuclear capacities from operation?	Qualitative assessment	5
➤ Amount of nuclear fuel and uranium concentrate available in reserve?	Data availability	0*
<i>Oil</i>	Category	Score
<i>Energy efficiency</i>		1
➤ Share of oil products in TPES reduced?	Data availability	1
<i>Energy independence, reliability and sustainability</i>		2
➤ Fulfilment of commitment to create the MROO (Minimum reserves of oil and oil products), as per law of Ukraine on creating minimum oil reserves in accordance with Ukraine's obligations under the AA with EU, and commitments under the energy community and EU directive 2009/119/EU?	Qualitative assessment	2
➤ Model and law established for creating reserves based on a 90-day or 61-day availability standard?	Legislation	2
➤ Optimisation of reserves based on regional consumption structures and use scenarios?	Qualitative assessment	1

➤ Implement European fuel quality standards?	Qualitative assessment	3
➤ Legislation to reduce counterfeit oil products in the market, including illegal mini-refineries?	Legislation	4
➤ Legislation to reduce sulphur oxide emissions from road and water transport (and consistent with EU and IMO standards)?	Legislation	3
➤ Set up monitoring mechanism for oil product quality control?	Qualitative assessment	2
➤ Supervisory agency designated to check motor fuel quality?	Qualitative assessment	2
➤ Adopted Concept for developing the oil and gas fuels market of Ukraine? Implementation begun?	Qualitative assessment	2
➤ Adopted Concept for developing the oil (and gas) refining industry of Ukraine? Implementation begun?	Qualitative assessment	3
➤ Revised state policy (Concept) on supply/transit of crude oil and oil transportation system development? Implementation begun?	Qualitative assessment	3
➤ Share of oil (including petroleum, diesel fuel, LPG) imports by country, company or companies affiliated does not exceed 50% before 2025 and 33% from 2025 onwards?	Quantitative target	2
➤ Current share of losses in oil supply (and targets for reduction)?	Data availability	0*
➤ Legislation adopted to strengthen criminal liability for unlawful interference in oil transportation operations?	Legislation	2
➤ Mechanism in place to manage/reduce oil spills?	Operational assessment	3
➤ Oil transportation system modernised with oil leak detection and tampering systems?	Qualitative assessment	1
➤ Introduction of advanced technologies for transporting and blending (mixing) different types of oil?	Qualitative assessment	3
➤ Number of projects for separate transportation of oil (or share of transportation volumes) to Ukrainian and EU consumers?	Qualitative assessment	3
➤ Digitise oil deposits, develop visual web platforms, trace data coming from oil deposits?	Qualitative assessment	1
➤ Growth in the share of domestic demand being met by domestic production?	Data availability	2
➤ Growth in volumes of oil production?	Data availability	2
➤ Monitor reservoir recovery rate, optimise extraction from existing wells (including by repairing and replacing electric borehole pumps and water insulation works)?	Data availability	2
➤ At least 50% of internal market's needs for oil products (petroleum, diesel, LPG) met with (at least 50%) Euro-5 standard domestically produced oil?	Data availability	1
➤ Increase oil processing in Ukrainian enterprises? Increase in volumes of processing hydrocarbon raw materials at domestic oil and gas refineries?	Data availability	3
➤ Revised excise policy on petroleum products (on the basis of existing domestic refining capacities and state priorities)?	Qualitative assessment	2

➤ Development of infrastructure for expanding use of LPG and CNG as motor and heating fuels?	Qualitative assessment	2
➤ Development of sea facilities for oil transportation and infrastructural improvements for LPG imports?	Qualitative assessment	3
➤ Systematic performance monitoring established for oil transmission operations?	Operational assessment	1
➤ Implementation of EU Directive 2014/94/EU on the deployment of alternative fuels infrastructure?	Qualitative assessment	2
➤ Initiatives to support the development of environmentally friendly public transport with engines using natural gas (methane) as fuel?	Qualitative assessment	1
➤ Maintenance of Ukraine's oil sector technical conditions (refurbishment, pipeline system, regulatory documents)?	Operational assessment	3
➤ Measures to increase the production and use of biofuels?	Legislation	3
➤ Share of fuel characterised as “environmentally safe”?	Data availability	0*
<i>Investment attractiveness</i>		1.5
➤ Adopt legislation to stimulate and protect FDI in oil exploration, production and transportation ventures in Ukraine?	Legislation	1
➤ Growth of FDI in oil exploration in Ukraine?	Data availability	3
➤ Approximate tax standards applied in the EU member states (e.g. excise duties in wholesale and retail sales of fuel)?	Legislation	1
➤ Favourable aggregate tax burden on economic entities in the oil industry compared with other countries (production segment)?	Data availability	1
➤ Introduction of tax incentives and effective use of preferential tax rates?	Qualitative assessment	1
➤ Simplified administration of taxes and fees?	Qualitative assessment	2
<i>Market development</i>		2.34
➤ Ensure oil prices are at market levels?	Qualitative assessment	4
➤ Legislation to reduce port duties and other service fees to a competitive level?	Legislation	1
➤ Regulatory framework in place aimed at promoting diversification of oil supply from alternative sources?	Qualitative assessment	1
➤ Regulatory framework in place to ensure competitive prices for all consumers?	Qualitative assessment	4
➤ Publication of oil tariffs and prices?	Qualitative assessment	2
➤ System of information exchange in place?	Qualitative assessment	2

Modern management system

2.75

- Centralized source of information on administrative permitting process for extractive companies developed (for the purpose of improvements)?
- Initiatives to promote transparency and public availability of permits for subsoil use, contracts and data on payments in the extractive industry?
- Non-discriminatory access to high-quality geological information?
- Reduction in terms and procedures necessary for permit issuance?

Qualitative assessment	1
Qualitative assessment	4
Qualitative assessment	3
Qualitative assessment	3

Network integration

- Increase in volume of oil exports?
- Increase in volume of oil imports?
- Participate in projects to integrate Ukrainian and European oil transportation systems (assessment of implementation progress)?
- Participate in the projects for construction of cross-border pipelines?

	2
Data availability	1
Data availability	3
Qualitative assessment	2
Operational assessment	2
Category	Score

Renewables**Energy independence, reliability and sustainability**

- Government support for flexible generation capacity building to balance renewables?
- Is the required amount of renewable balancing capacity identified for regional distribution?
- Volume of storage capacity already put in place?
- Achievement of targets in the share of renewables in total secondary energy generation (namely heat and electricity) and in transport sector?
- Framework to adopt maximum renewable energy capacity volume targets annually to ensure continuous operational safety of the grid?
- Growth in the share of renewables in total secondary energy generation (namely heat and electricity) and in transport sector?
- Legislation in place to develop renewable energy?
- Reach 7% target share of renewables in electricity generation by 2020?
- Sector breakdown of the share of renewables in total secondary energy generation (namely heat and electricity) and in transport sector by each sector of consumption?
- Deviation of the share of renewables in total primary energy supply from targets?
- Growth rate of the share of renewables in total primary energy supply (breakdown by sectors: solar, wind, hydro, biomass, geo-thermal)?
- Growth rate of total renewable energy supply?
- Reach 8% target share of renewables in total primary energy supply by 2020?

	3.14
Qualitative assessment	1
Qualitative assessment	3
Data availability	2
Qualitative assessment	4
Qualitative assessment	2
Data availability	4
Legislation	4
Quantitative target	5
Data availability	0*
Data availability	3
Data availability	3
Data availability	3
Quantitative target	3

➤ Construction and putting into operation of 5 GW capacities of RES (except high-power hydro plants)?	Operational assessment	4
➤ Quantity and capacity of new hydropower units put into operation at big hydropower plants and hydro pump-storage power plants (subject to confirmation of environmental safety of the projects)?	Data availability	3
➤ Share of existing hydro plants that were reconstructed/ modernised?	Data availability	3
<i>Investment attractiveness</i>		4
➤ Legal framework in place to attract FDI?	Legislation	4
➤ Monitor growth of foreign investors in the market?	Data availability	0*
➤ Policies/communication initiatives to attract foreign investors to the RES market?	Qualitative assessment	4
➤ Distribution of green energy investments by types of generation, including solar, wind, hydro, biomass and geothermal?	Data availability	0*
➤ Growth rate of investments in the renewable energy sector (domestic and foreign)?	Data availability	4
➤ Total investments in the renewable energy sector (domestic and foreign)?	Data availability	4
<i>Market development</i>		3
➤ Growth in the volume of biomass products traded for secondary energy production?	Data availability	0*
➤ Growth in the total volume of biomass products?	Data availability	0*
➤ Publication of feed-in tariffs and the registry of non-household facilities working under feed-in tariff?	Qualitative assessment	5
➤ Publication of RES generation prices under the auctions or other support schemes?	Qualitative assessment	1
<i>Modern management system</i>		0*
➤ Initiatives to promote renewable energy and alternative fuels For end-use?	Qualitative assessment	0*

<i>Sector oversight and management</i>	Category	Score
<i>Energy efficiency</i>		2.7
➤ Introduce programmes to assess efficiency of appliances/energy label system (similar to EU AA+)?	Qualitative assessment	3
➤ Number of Energy Performance Contacts signed in public sector?	Data availability	3
➤ Savings achieved through ESCOs?	Data availability	2
➤ Energy efficiency standards in place for transport, buildings, etc.?	Operational assessment	3
➤ Introduction of training programmes and awareness raising campaigns?	Qualitative assessment	3
➤ Policy regarding energy audits and implementation?	Operational assessment	3
➤ Availability of financing through the Energy Efficiency Fund, Warm Loans, and municipal/regional co-financing programs?	Qualitative assessment	3
➤ Tools/state and commercial financial and technical support in implementing energy efficiency measures in residential buildings?	Qualitative assessment	4
➤ Reduction in primary energy supply per capita?	Data availability	1
➤ Reduction in primary energy supply per unit of GDP, (kg of oil equivalent per USD1 by PPP 2011) to 0.20 by 2020? (breakdown by sub-sector?)	Quantitative target	2
<i>Energy independence, reliability and sustainability</i>		2.5
➤ Reduced share of imported primary energy (excluding nuclear fuel) from one country (company) in the total supply (imports) to <30% by 2020?	Quantitative target	1
➤ Access to 1.5 months' worth of energy resource consumption for emergency situations by 2020?	Quantitative target	0*
➤ Contingency planning practices at the level of economic entities implemented?	Qualitative assessment	0*
➤ Indicators of energy security assessment set and updated?	Qualitative	3
➤ Requirements for the development of emergency response plans introduced?	Qualitative assessment	4
➤ Reduction of fossil fuels in total primary energy supply (coal, oil petroleum products, gas)?	Data availability	2
<i>Investment attractiveness</i>		3
➤ Mechanisms in place to prevent capital leakage to tax havens?	Qualitative	2
➤ Clear and understandable mechanisms of public-private partnership and transparent regulation of investments in the energy sector formed?	Legislation	3
➤ Transparent mechanisms of public procurement introduced?	Qualitative	4
<i>Market development</i>		3
➤ Measures in place to provide information on the structure of tariffs for utilities (including natural gas, electricity, and heat), and renewables feed-in tariffs?	Qualitative assessment	3
➤ Independence of the NEURC and the Antimonopoly Committee (incl. financial independence and autonomy in decision-making) ensured?	Legislation	3

- Trainings of personnel on new models of functioning of energy markets conducted?

Modern management system

- Formation of associations to manage multi-apartment residential buildings?
- Implementation of policies adopted regarding the decentralisation of the provision housing and utility services?
- Policy adopted regarding the decentralisation of the provision housing and utility services?
- Decentralise the provision of housing and utility services in municipalities?
- 5-year forecasted production and consumption balance (according to the IEA form) annually developed?
- Strategic management system, including scenario-based modelling introduced?
- Implemented Regulation (EC) 1099/2008 to improve collection and systematisation of energy statistics?
- Target energy balance by 2035 formed?

- Corporate governance (CG) system in the SOEs with public share over 50% improved, taking into account OECD CG Principles?
- Introduce regulatory impact analysis/assessment mechanism across energy sub-sectors?

Network integration

- Adopt EU regulation 347/2013 (on guidelines for trans-European energy infrastructure) into law?
- Established the Institute of the Special Commissioner of Ukraine for Energy Security?

Qualitative assessment	3
	2.3
Operational assessment	2
Qualitative assessment	2
Legislation	3
Legislation	3
Qualitative assessment	1
Qualitative assessment	3
Qualitative assessment	3
Qualitative assessment	1
Qualitative assessment	3
Qualitative assessment	2
	1
Legislation	1
Qualitative assessment	1

Annex 2. Overview of the OECD Monitoring Framework for ESU 2035

In order to improve the quality of energy strategy implementation, the OECD has devised the Monitoring Framework, which will enable holistic tracking of the Energy Strategy of Ukraine. The main rationale for developing the OECD Monitoring Framework was threefold. Firstly, it would provide a tool that could track the overall implementation progress of the ESU 2035, and ensure uniformity in tracking energy sub-sectors. The current Monitoring Framework is based on the ESU 2035, but the tool itself is intended to be adjusted to the needs of the government for monitoring future Energy Strategies of Ukraine. Secondly, it would enable policy-makers to monitor and compare progress across sub-sectors, and facilitate the early identification of potential shortfalls and challenges, including in future Energy Strategies. Thirdly, it would provide a more systematic monitoring approach that includes implementation indicators as well as outputs, and enables the monitoring of the actual implementation of the Energy Strategy on a continuous basis.

In order to meet these aims, the OECD Monitoring Framework takes a bottom-up approach to measuring progress. It ensures holistic tracking of the ESU 2035 by developing a link between the sector-specific policy goals outlined in Section 3 and the headline objectives and sub-objectives listed in Section 2. Sector-specific goals have been converted into 119 progress indicators, each of which are underpinned by approximately 3-5 sub-indicators (344 in total). Indicators reflect the wide range of sub-sectoral policy goals that will need to be completed to meet ESU 2035 headline objectives. In turn, sub-indicators comprise the specific policy deliverables that will need to be carried out in order to achieve each of the policy goals. The link is presented below:



The clear link that is established between each sub-indicator, indicator, and headline objective ensures the OECD Monitoring Framework can provide a holistic snapshot of implementation progress, thereby facilitating the early identification of problems during energy strategy delivery. Additionally, indicators and sub-indicators are classified into the nine sub-sectors of energy policy set out in section 2 of ESU 2035, facilitating the comparison of implementation progress across sectors.¹⁰ The bottom-up structure of the OECD Monitoring Framework will also enable it to be easily adjusted to replace outdated indicators with fresh ones, as implementation moves from one phase to the next. Although the OECD Monitoring Framework is only seeking to evaluate implementation progress of the ESU 2035 until 2020, the bottom-up structure will enable it to serve as a benchmark for future revisions of ESU 2035 that are expected by the Government of Ukraine.

Unlike the policy deliverables set out in the 2020 Action Plan, which consist primarily of new laws and regulations needing to be adopted in order to deliver the energy strategy, the

¹⁰ The nine sub-sectors of energy policy, which are derived from the categories outlined in the ESU 2035 document, include the following: coal, electricity, environment and climate, heat, natural gas, nuclear, oil, renewables, sector oversight and management. Two further categories that were included in the ESU 2035 – energy efficiency and European network integration – are duplicated in the headline objectives, and have thus been excluded from the Monitoring Framework’s sub-sectoral energy policy categories to avoid repetition.

sub-indicators in the OECD Monitoring Framework also include additional measures of implementation progress, such as operational and qualitative benchmarks. Their inclusion helps to create a more fine-grained picture of energy strategy delivery that charts impact on the ground as well as improvements to the energy sector's formal legal and institutional architecture.

The sub-indicators in the OECD Monitoring Framework fall into 'implementation' and 'output' categories, and capture whether policy measures: a) are being successfully implemented, and b) are having the desired impact on the energy sector to meet headline objectives. The qualitative sub-indicators in the OECD Monitoring Framework include legislative acts or regulations to be implemented, as well as operational and qualitative measures of progress (e.g. whether a capital expenditure plan to reconstruct electricity distribution networks has been adopted and implemented, or whether oil deposits have been digitised).

'Qualitative assessment' sub-indicators may also concern the existence or non-existence of strategy documents (e.g. Action Plans) that are necessary to ensure more effective implementation of the energy strategy. It is notable that these sub-indicators evaluate the quality of the policy instruments in place to help achieve a specific goal in the strategy, and do not measure progress towards the goal itself. They are nevertheless included because the OECD Monitoring Framework seeks not only to assess sectoral outputs, but also the strength of the policy framework in place to deliver them. Both of these elements are required for delivering on headline strategy objectives, and therefore need to be monitored in parallel.

Quantitative sub-indicators include set targets (e.g. achieving a 7% share of renewables in electricity generation by 2020), as well as areas where data availability should be ensured to track implementation progress more effectively (e.g. ensuring adequate data exists regarding the share of centralised heating supply that has been unbundled). It should be noted that the current OECD Monitoring Framework comprises only a small number of set quantitative targets, all of which are derived from the performance indicator sections of the ESU 2035 and the National Baseline Report 2017 on Ukraine's Sustainable Development Goals (SDGs).

The OECD has refrained from including new quantitative targets, in light of plans by the Government of Ukraine to revise the energy strategy in the near future. The OECD anticipates, however, that after the energy strategy has been revised, a number of the "data availability" sub-indicators in the Monitoring Framework will be able to be converted into quantitative targets by the Ministry of Energy and Environmental Protection (MEEP), thereby generating additional steering targets for tracking implementation progress.

It should also be noted that because the OECD Monitoring Framework only seeks to measure implementation progress until 2020, it does not contain an assessment of the sequencing or hierarchy of policy goals. However, the OECD recommends that when the Monitoring Framework is revised to fit the objectives of the revised Energy Strategy of Ukraine, the sequencing of policy outputs should be clarified and comprehensively re-evaluated, in order to ensure that bottlenecks in the energy sector can be eliminated in a timely fashion.

An additional feature of the OECD Monitoring Framework is the section on responsible parties. While the ESU 2035 and the 2020 Action Plan do provide a general overview of these duties, the OECD Monitoring Framework specifies the key parties that are directly or implicitly responsible for: a) implementing and b) tracking outputs for every indicator

and sub-indicator, thereby ensuring that accountability for delivery of the energy strategy is both clear and comprehensive.

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MONITORING THE ENERGY STRATEGY OF UKRAINE 2035

Energy sector reform is one of the main priorities of Ukraine and is one of the key focus areas of attention of the international community. The Government aims to reform the energy sector in order to improve Ukraine's energy complex to a thoroughly and qualitatively new level of development, harmonize it with EU rules and standards, liberalize and form genuine markets of natural gas and electricity with transparent and competitive pricing and proper protection of vulnerable consumers.

In December 2019, a Presidential Decree tasked the Cabinet of Ministers of Ukraine to revise the Energy Strategy of Ukraine 2035 (ESU 2035) taking into account Ukraine's international commitments in the energy field. This report provides a review of the ESU 2035, including the effectiveness of the current policy roadmap, monitoring mechanisms and procedures, budgeting processes and compliance with international agreements. Based on this analysis, it also provides a series of recommendations that can serve as a benchmark for the Government of Ukraine to revise its energy strategy as planned. In addition, based on data collection and analysis conducted using the OECD Monitoring Framework, it provides a progress overview of the implementation of the ESU 2035.

The report was prepared based on desk research, information collected through questionnaires, face-to-face consultations in Kyiv and inputs provided by Government representatives and energy stakeholders in Ukraine. The report has been prepared by the OECD Global Relations Secretariat as part of the project Supporting Energy Sector Reform in Ukraine. The project is implemented in the context of the OECD-Ukraine Memorandum of Understanding, and is made possible thanks to the financial support of the Government of Norway.

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