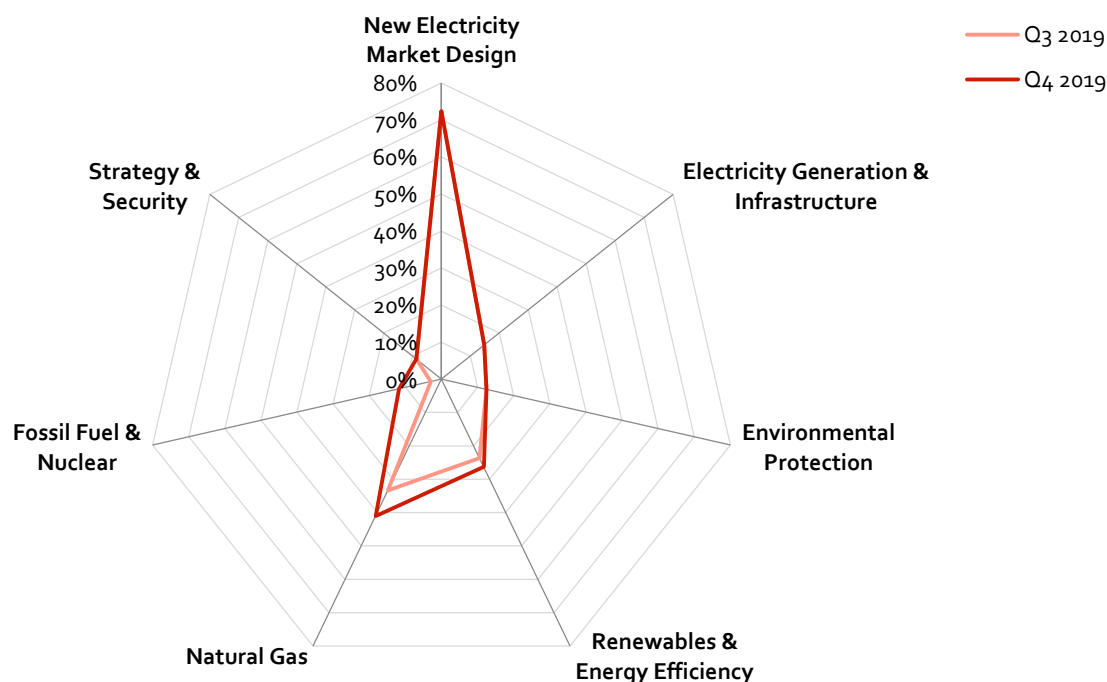


Quarterly Monitoring Report on the Implementation of Ukraine's Energy Action Plan

March 2020



Executive Summary

The outgoing Honcharuk government left a **mixed legacy**. On the climate side, the **Ukraine Green Deal** announced in early 2020 provides strategic guidance to investors and policymakers towards a sustainable energy and climate system. But to become effective this concept will still need to be underpinned by significant measures. The **National Energy and Climate Plan** – that is to be completed in the second half of 2020 – should help to identify concrete policy measures. One important quick measure can be redesigning the current **carbon tax** into an upstream tax on fuels. A tax of about 1 EUR/t proposed by the Ministry could help to collect some UAH 6 bn.

The new **gas contract with Russia** can also be seen as a success as it provided significant short-term benefits to Ukraine and avoided a month-long “gas war” that would have been detrimental for Russia-Ukraine, Russia-EU and EU-Ukraine relations.

On the other hand, there was limited progress on many other urgent matters. Coal sector reform did not progress and the **electricity market** remains a tightly-regulated mechanism in need of repeated quick-fixes such as Ukrenergo's pursuit to operate storage facilities. Also, energy efficiency programs remain stuck and privatisations (Centrenergo) did not proceed. A new issue is investment-uncertainty over a discussed **restructuring of feed-in tariffs for renewables**. Given the quickly increasing cost, investors and government so far unsuccessfully tried to achieve a mediated compromise and there is a risk that unilateral actions will destroy credibility and significantly increase the cost of future foreign investments.

Assessment by Sector

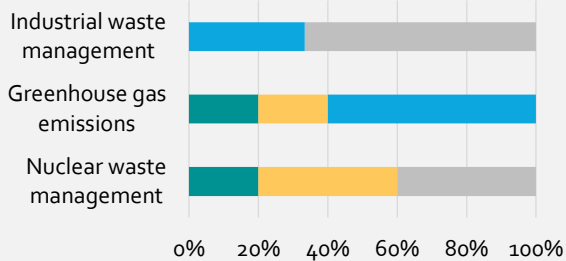
About the Assessment

IN this quarterly monitoring report, we assess Ukraine's progress on implementing the Action Plan measures for the Energy Strategy of Ukraine until 2035 (ESU). We grouped 206 actions into **seven sectors** and rated their status of implementation: completed, in political process (e.g., being discussed or provisionally adopted), overdue, or scheduled for a later date. Completed actions are classified as serving or not serving the purpose, i.e., whether or not they contribute to achieving the goals laid out in the Energy Strategy of Ukraine until 2035. The report and additional material will be made available online at www.LowCarbonUkraine.com.

Legend

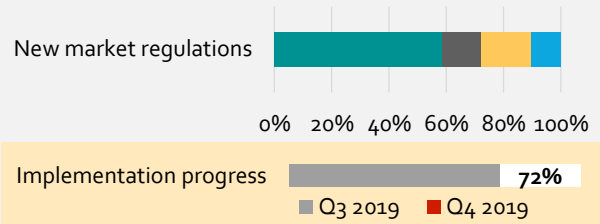
- Completed and serving the purpose of the ESU
- Completed but not serving the ESU's purpose
- In the political process
- Overdue
- Scheduled for later

Environmental Protection



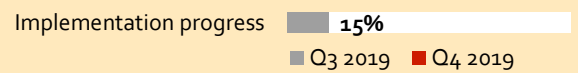
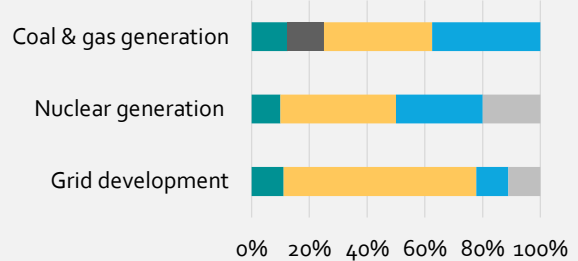
The Ministry of Energy and Environmental Protection (MEEP) has developed the draft of **Ukraine's 2050 Green Energy Transition Concept** (Ukraine's Green Deal) and launched a public discussion. The law on **principles of monitoring, reporting and verification of greenhouse gas emissions** was adopted on December 12, 2019, and shall come into force in 2021. The 2020 action plan on implementation of the **National Emission Reduction Plan 2033** was not developed by the MEEP. The introduction of the **Environmental Management and Audit System (EMAS)** at energy objects in accordance with international standards is overdue. The construction of the **centralized storage facility for spent nuclear fuel** is ongoing. Energoatom has successfully tested equipment for transporting HI-STAR and HI-TRAC containers, which are designed for **handling the spent nuclear fuel from NPPs**.

New Electricity Market Design



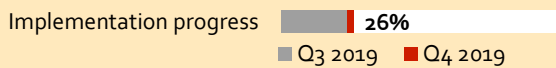
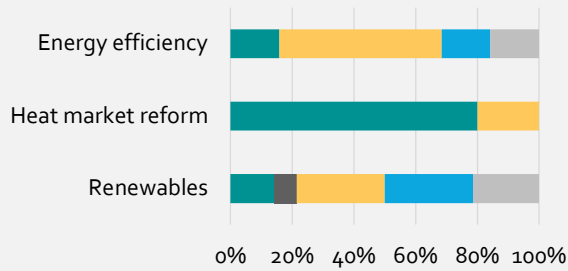
To mitigate the Guaranteed Buyer's financial imbalance, the public service obligations (PSO) mechanism was altered: Transmission and distribution system operators (TSO & DSOs) now have to purchase electricity for covering their grid losses at day-ahead market prices instead of lower non-market PSO prices. Also, the part of nuclear electricity that has to be sold through regulated actions was reduced from 90% to 85%. The **unbundling of DSOs** has proceeded slightly as compliance programs of 21 out of 34 DSOs were approved and published on the regulator NEURC's website. The regulator also published the updated draft **Rules of Congestion Management and Allocation of Cross-Border Capacities** for public discussion and preliminarily approved the **certification of Ukraine's TSO Ukrenergo**. The **ancillary services market** was launched and the first auction was held by Ukrenergo on December 12, 2019. The registry of certified suppliers of ancillary services and a schedule of quarterly, monthly and weekly auctions are published by the TSO.

Electricity Generation & Infrastructure



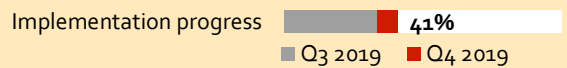
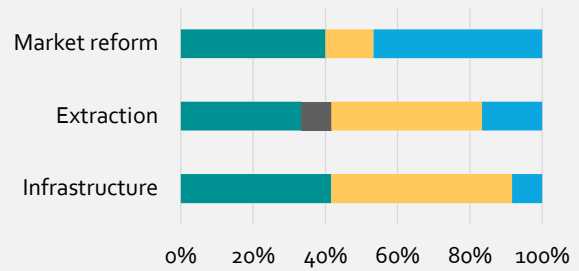
The State Nuclear Regulatory Inspectorate of Ukraine has extended the lifetime of the third unit of **Yuzhno-Ukrainska NPP** until February 10, 2030. The reconstruction of the **technical water supply system** at Yuzhno-Ukrainska NPP is progressing and will allow for a higher plant utilisation during summer. 17 DSOs had their **five-year electricity distribution system development plans for 2020** approved by the MEEP, Ukrenergo and the NEURC. The NEURC has still not approved Ukrenergo's updated **generation adequacy report** and the **Ten-year network development plan**. The privatisation of **Centrenergo** is scheduled for 2020 but still remains doubtful. The concept of **long-term nuclear energy development**, as well as the approval of the inventory of sites for the construction of new units of nuclear power plants are overdue.

Renewables & Energy Efficiency



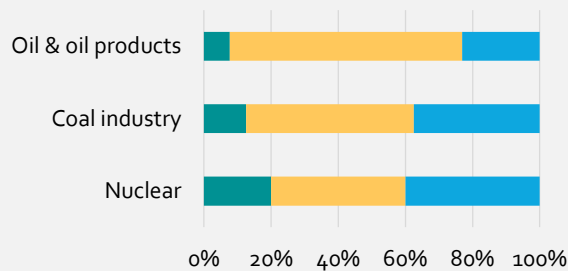
Working group meetings organised by the MEEP, MinRegion, the State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE) and IFIs focused on a new draft **law on energy efficiency** based on Directive 2012/27/EU. The marathon involved over 120 officials, business entities' representatives and experts joining into 12 working groups. The SAEE, the Ukrainian-Danish Energy Centre and GIZ developed a **mechanism for supporting industrial enterprises** in implementing energy efficiency and CO₂ emission reduction measures. The draft law on the **green bonds market** has been approved on December 19, 2019. The Cabinet of Ministers (CMU) has approved a concept on energy efficiency in buildings and **zero-energy consumption buildings** as well as a respective national action plan on January 29, 2020. The CMU approved the general **procedures for conducting RES auctions**. However, it is still unclear when the first auction will be held.

Natural Gas



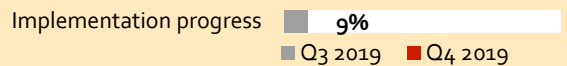
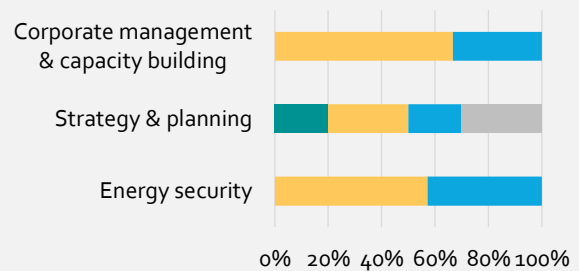
The TSO of Ukraine LLC was **preliminary certified and legally unbundled from Naftogaz**, becoming a subsidiary of MGU on January 1, 2020. However, the Naftogaz management openly opposes the unbundling of gas storage facilities. The NEURC has approved **new entry/exit transmission tariffs** (both internal and cross-border) and **new distribution tariffs**. The draft law 2284 aiming at **improving financial markets legislation** (incl. commodity markets), which would facilitate spot trading of gas, was adopted in the first reading. A draft law on household gas supply systems maintenance is supported by the government but criticised by civil society and housing associations. The government has **amended the licensing procedure (special permit for exploration only through e-auctions)**, the procedure of using the funds from geoinformation sale, and introduced services for **subsoil users** and an investment 'book' for potential investors.

Fossil Fuels & Nuclear



The government disclosed the **list for privatisation** by 2021, including the Krasnolymanska mine, as well as Lvivvugillia, Selydivvugillia, Krasnoarmiyskvugillia, Pervomayskvugillia, and Lyschanskvugillia mines, plus other assets. The MEEP decided against merging state-owned assets into a single company, creating the **Ukrvugillia** enterprise instead. As for **minimum stocks of crude oil and petroleum products**, both the model and the draft law are under review of the State Reserve Agency. First oil supplies from Libya arrived in Ukraine. The **industrial exploitation (final stage of qualification) of nuclear fuel by Westinghouse Electric Sweden AB** started at South Ukraine NPP unit 3.

Security, Strategy & Governance



The MEEP published the **draft 2050 Green Energy Transition Concept**, Ukraine's first strategy document of integrated climate and energy policy. It is based on the long-term energy system model used for developing the second NDC of Ukraine. The policy of **improving corporate governance continues**, with changes of government representatives in key supervisory boards (Ukrhydroenergo, Ukrenergo). SOE charters were made compliant with **OECD standards** in November 2019. The **Krasnolymanska mine privatisation** is scheduled for 2020, yet it might be complicated as the Krasnolymanska advisors Concorde Capital complained about a lack of cooperation by the government.

Key Developments in Ukraine's Energy Sector

Ukraine's 2050 Green Energy Transition Concept

The MEEP has developed a draft of Ukraine's 2050 Green Energy Transition Concept to relaunch a system of policy-making and strategic governance in energy and climate-related sectors. The initiative was presented to EU officials as a commitment of Ukraine to meet the objectives of the European Green Deal. It should serve as an umbrella document outlining the further development of related lower-level documents, as well as adjusting current energy and climate-related documents to ensure their compliance with the Concept. According to the MEEP, the Concept together with an updated Low Emission Development Strategy 2050 and National Energy and Climate Plan for 2021-2030 might replace the current Energy Strategy of Ukraine 2035. The new hierarchy of documents envisages to develop a new set of action plans, in particular national action plans for energy efficiency and renewables until 2030.

The Concept is mainly focused on reducing GHG emissions, improving energy efficiency and boosting RES deployment. In particular, the Concept envisages an increase in the share of RES electricity production of up to 70%, while the share of nuclear power plants gradually decreases and coal-fired power plants are to be decommissioned until 2050.

Legislative amendments to the electricity market

To address risks and distortions in the electricity market, a set of amendments were made to the Law on Electricity Market on December 04, 2019. To maintain sufficient market liquidity, the regulator may set a minimum quantity of electricity to be sold at the day-ahead market (DAM), which must not be more than 30% of production for one supplier. At the same time, the minimum quantity of electricity to be sold at the DAM was increased from 10% to 15% for all producers (except RES) and importers for the period of 2020 – 2025. In case of considerable price fluctuations on the DAM, intraday (IDM) or balancing market, the NEURC may apply temporary marginal prices (minimal or maximal price caps) at these markets. Prior to implementation, the price caps should be consulted with the Antimonopoly Committee and are to be revised at least once in six months.

Moreover, selling or supplying electricity from Russia via bilateral agreements or to IDM are banned. To avoid possible emergencies on the market, the CMU may temporarily cancel the ban. Moreover, the NEURC got the right to limit the available cross-border capacity with non-Energy Community members until 2020 and cancel the results of capacity allocation auctions, implying compensation for the awarded companies.

Gas transit deal

On December 31, 2019, representatives of Naftogaz, Gas Transmission System Operator of Ukraine LCC (TSOU) and Gazprom have signed a set of agreements, thus continuing Russian gas transit. The minimum guaranteed transit capacity was set at 65 bcm for 2020 and at 40 bcm per annum for 2021-2024. The NEURC shall set a competitive tariff comparable to tariffs in countries of Western and Central Europe. The

agreements include the settlement of disputes, in particular the payment of almost 2.9 bn USD by Gazprom under the Stockholm arbitration award, the withdrawal by both parties of all arbitration claims and lawsuits with no final award as well as the waiver of possible complaints and lawsuits related to the 2009 contracts. The deal does not affect Naftogaz claims against Russia regarding the assets seized in Crimea. According to then Minister Oleksii Orzhel, the contract offers more benefits than any possible result of the arbitration, which Naftogaz decided to stop.

According to TSOU estimates, the guaranteed tariff income from transit accounts to 185 bn UAH (incl. VAT) in the next five years, which represents 80% of system operation costs. The remaining 20% will be received from Ukrainian companies using TSO services. At the same time, according to Naftogaz Executive Director Yuriy Vitrenko, revenues from the contracted minimum volumes will fully cover the marginal costs of keeping Ukraine as a transit route. Had the transit contract not been signed, tariff revenues over five years would have been 123 bn UAH, 94% of which should have been covered by Ukrainian system users at higher entry/exit tariffs. Therefore, due to lower tariffs alone, TSOU estimates the positive economic effect over five years at app. 150 bn UAH.

FIT restructuring issues

The stability of the renewable PSO scheme is at risk. According to Deputy Minister Kostyantyn Chyzyk, the shortage of funds for SE Guaranteed Buyer was 400 mln UAH at the end of 2019. Depending on DAM prices, LCU expects a deficit of 15-20 bn UAH in 2020. According to the NEURC, 43 bn UAH would be required from the Guaranteed Buyer in 2020 for payments to RES producers under FITs. With the Guaranteed Buyer having signed pre-PPAs for almost 12 GW, its potential deficit could grow further. The idea of voluntarily restructuring FITs is considered as one of the ways to reduce the deficit and keep the guarantees made to investors.

After the MEEP presented first provisions on the FIT reform in November 2019, investors pushed for a draft law with milder FIT reductions – which was however rejected by the parliament's energy committee. Due to the implied uncertainty and the delay of RES auctions, several investors have reported to suspend their projects. Since January, negotiations between both sides are mediated by the Energy Community Secretariat.

According to the latest provisions from the MEEP published in March, RES projects above 1 MW that are not willing to reduce their FIT would be immediately and fully responsible for their imbalances. RES projects could however voluntarily accept a FIT reduction of -12.5% (PV) or -5% (wind) from the date of restructuring and a reduced imbalance responsibility. A second voluntary option would imply a FIT reduction for PV of -15% (<10 MW), -20% (10-50 MW) or -25% (>50 MW) and for wind of -10%, together with an extension of the support period of 5 years. The latest date for commissioning and grid connection of pre-PPA projects to be eligible for FIT would be June 31, 2020 for PV and December 31, 2020 for wind.

Ukraine's regulatory framework on energy storage

The Ukrainian power system is facing a fast-growing number of renewable energy installations. The installed capacity of RES tripled in one year, from around 2 GW to 6.4 GW as of end 2019. The Ukrainian transmission system operator (TSO) Ukrenergo argues that energy storage is in utmost need to be installed in Ukraine as fast as possible. Still, the current Draft Generation Adequacy Report 2019¹ does not provide a clear assessment of the current demand for ancillary services. Battery energy storage systems (BESS) have a special emphasis in the report, while an assessment of any other technology or existing market participant capable of providing primary reserves is lacking.

On December 12, 2019, the draft law #2582² was registered in the Ukrainian parliament. Its goal is to provide incentives for energy storage systems in the Ukrainian electricity market. LCU's analysis of the draft law text shows that instead of providing incentives for energy storage, it may undermine competition on the ancillary services market.

One of the most controversial suggestions in the draft law #2582 is to allow grid operators to own and operate energy storages. The draft law even sets a specific capacity limit for BESS that can be owned by systems operators. LCU recommends that system operators should not own, develop, manage or operate storage facilities which are to be used on any segment of the electricity market. Primary legislation should not try to rectify secondary legislation inefficiencies, because this can jeopardise the development of a healthy market.

EU Directive 2019/944 focuses on the promotion of competition and market mechanisms as well as the unbundling principle for grid operators. This latter principle prohibits regulated utilities, like TSOs and DSOs, from participating in wholesale markets and also from owning energy storage facilities. Such restrictions on the ownership of energy storage facilities are meant to prevent the distortion of competition, to eliminate the risk of discrimination³, to ensure fair access to energy storage services to all market participants and to foster the effective and efficient use of energy storage facilities⁴.

The general approach is that **the system operator should not own, develop, manage or operate storage facilities which are used for balancing or congestion management**. This means that to ensure that markets work properly and to minimise the costs, **services provided by energy storage should be market-based and competitive**. However, there is a clear guideline for establishing an exemption from this rule. System operators may be allowed to own and operate storage facilities under two scenarios:

- 1) energy storage used as a fully integrated network component – upon approval by the regulator;
- 2) the market is not capable of delivering the service required – and the decision is made by the regulator after a due process.

Competition is the best way to find a cost-effective way of providing ancillary services. The TSO and the regulator must ensure that market rules, technical requirements and tendering procedures are not biased towards any technology or particular player, are technically achievable and provide reasonable remuneration for a service provider. The idea of the system operator owning energy storage used on the market contradicts the principle of the market framework established in Ukraine.

If markets under existing regulatory settings are unable to efficiently provide the required system services, the first step should be to assess the suitability of the existing rules and procedures. In Ukraine, the ancillary services market as of today has failed to provide the services required by the TSO. The reasons for that are in our view:

- Imperfect market rules, which set a high entry barrier for new players as well as technical requirements for service providers that can hardly be met in real life;
- The rushed introduction of the market in July 2019 which caught potential market participants unprepared. Even today, only few service providers managed to certify for market participation;
- Regulated price caps on the balancing and reserves markets impair the business case for new investors;
- Market rules and regulation are being constantly subject to change – causing substantial regulatory uncertainty and deterring new investments.

The abovementioned regulatory deficiencies are due to imperfect by-laws. To remedy the situation, not primary legislation has to be changed – but secondary legislation needs to be adjusted.

It is important not to confuse a market failure with a regulatory failure. Authorities should not make any premature or unadvised decision that will overrule market-based solutions without a thorough assessment. Such assessment should not only focus on short-term necessities but also analyse long-term economic implications on the market. For example, any decision that will limit the competition on the ancillary services market in Ukraine will ultimately result in increasing consumer bills.

¹ <https://ua.energy/wp-content/uploads/2019/12/Zvit-z-otsinky-vidpovidnosti-2019.pdf>

² http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=67624

³ For example, cross-subsidisation between energy storage and the regulated functions of distribution or transmission should be avoided.

⁴ Directive (EU) 2019/944, paragraph (62), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944>

Before allowing the TSO to own and operate storage facilities, the market should be clearly tested – and the methodology for such “testing” should be defined in order to avoid manipulations. **A clear and due process for a derogation to allow system operators to own and operate storage facilities should be established in primary legislation to avoid negative implications on the entire market system.** LCU suggests the process described in the figure. This process and the responsibilities of the parties involved should be prescribed in general terms in primary legislation. The detailed procedure should be specified in corresponding by-laws.

BESS can meet special system requirements (mainly fast response time) that might not be appropriately valued by the design of the ancillary services market currently. As such capabilities might be increasingly required due to higher shares of RES integration the corresponding market rules might need to be adjusted to provide adequate incentives. For example, primary reserve may be differentiated into several FCR services with different response times. A shorter time interval for settlements on the balancing market, e.g. 5 instead of 15 minutes in Ukraine, may incentivise more flexible and fast-responding technologies to enter the market and compete with incumbent players. These changes can be made in secondary legislation, on the initiative of the regulating authorities.

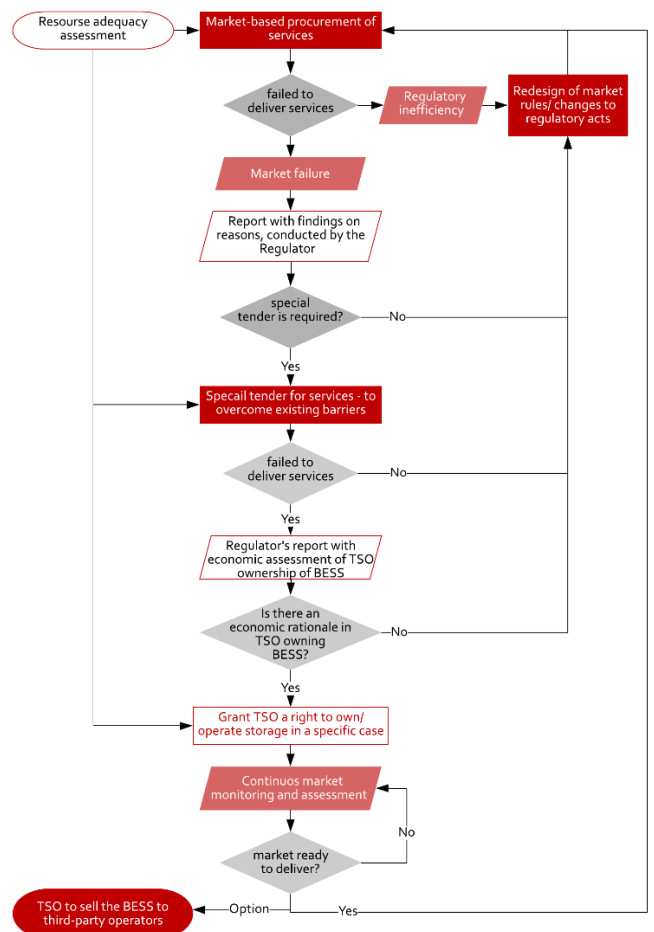
Energy storage technology can provide value not only in system reliability applications, beyond reserves and balancing markets. Energy storage can be used by different market participants for a) forecast error mitigation (compensate power imbalances), b) renewable curtailment mitigation (storage allows to shift otherwise lost power output to a later time) and c) energy shifting, or arbitrage (charging during low spot prices and discharging during high prices).

These applications can be utilized by both standalone energy storage and behind-the-meter installation (as a part of an existing power plant). In order to encourage market participants to apply energy storage technologies and enable them to utilize its full potential by stacking different value streams, market rules and regulations might require changes. Among them could be the following:

- Introduction of financial responsibility for imbalances for RES;
- The transition from a single off-taker model based on power curve and flat FIT rate to direct participation in the market for renewable energy producers;
- Allow flexible forming of balancing groups for FIT-eligible RES, instead of obligatory participation in one single balancing group of the Guaranteed Buyer;

Introduce time-of-day dynamic remuneration for RES producers under the support scheme based on auctions results; Another important market player type, which is currently not presented in the Ukrainian market, are aggregators. Aggregators play an important role by enabling small distributed generation, otherwise too small for direct participation by themselves, to be combined into a big enough portfolio and get access to the market. Aggregators (e.g. virtual power plants) allow to mobilise a hidden reserve in the power system and provide previously missing or unaccounted services. The legislators may consider providing a special definition into Ukrainian legislation for aggregation activities and respective rights of parties engaged in aggregation contracts.

The suggested decision-making process for granting system operators a right to own and operate storage in Ukraine



Carbon taxation in Ukraine

In order to combat climate change, the Ukrainian government has been discussing new instruments to tax the emissions of carbon dioxide.

One of the instruments discussed is the upstream – or fuel-based – taxation of CO₂, meaning the taxation of primary energy production and primary energy imports. In this case, the tax payers are the producer or the importer of the energy carrier. There are several advantages of upstream taxation when compared to taxing the next steps of the value chain. Firstly, upstream taxation resolves existing problems with large emitters' under-reporting on CO₂ emissions. Secondly, the upstream tax basis might be easier to implement. By way of illustration, tonnes of coal delivered from a mine are measured more easily than the amount of coal a plant burns. Thirdly, in contrast to downstream taxes, any losses in the energy conversion process into secondary energy, such as electricity and heat, would be taxed and, therefore, discouraged.

LCU estimates the annual tax revenues for two taxation design options: While **option I** assumes a uniform emission factor of 3t CO₂ per ton of fuel, **option II** considers specific emission factors based on CO₂ contents per energy unit (TJ) for each fuel (following IPCC 2006) and assumptions on calorific values of fuel volume units.

We show that the government could generate tax revenues ranging from 5.6 to 6.1 bn UAH per year. These estimates are based on the 2017 energy balance and an assumed tax rate of 1 EUR per ton of CO₂ (~27 UAH/tCO₂). This tax rate would more than double the current rate of 0.40 EUR/tCO₂ (10 UAH/tCO₂) – but would still be way below the current EU price of around 25€/t. In this analysis, the following primary energy fuels were considered: Coal & peat, crude oil, oil products and natural gas.

Estimation of tax revenues for option I* and II†

Energy carrier	Total primary energy supply, ktoe	TPES, ton of fuel	Emission factor, tCO ₂ /ton of fuel	Taxed emissions, in Mt CO ₂	Tax revenue, mln UAH
Coal & Peat	26,000	43,700	3* 2.4†	131* 107†	3,500* 2,900†
Natural gas	25,000	20,000	3* 2.9†	60* 58†	1,600* 1,600†
Crude oil	3,000	3,000	3* 3.1†	9* 9†	200* 300†
Oil products	10,000	9,400	3* 3.1†	28* 29†	800* 800†
Non-fossil	26,000	-	-	-	-
Total	90,000	-	-	228* 204†	6,100* 5,600†

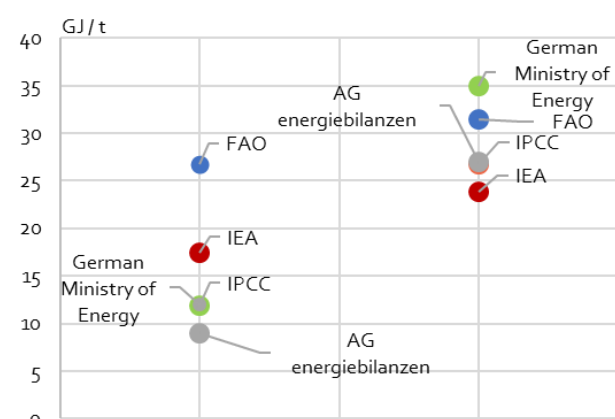
Source: Ukrstat, IPCC 2006, UN, Umweltbundesamt

The highest price increase resulting from taxing carbon emissions at 1 EUR/t is estimated for coal (between +3.5 and +4.3%) while price increases for transport fuels, electricity, natural gas and household district heating tariffs would be more moderate (between +0.2 and +2.7%). As a result of a carbon tax, non-fossil electricity producers might actually make windfall profits if wholesale electricity prices are not yet at their respective caps. In the following, the two options for

CO₂ taxation and their effects on prices are explained in-depth.

The table above depicts the results of our analysis. The uniform emission factors for option I are set to 3 while the emission factors of option II are expressed in tons of CO₂ per ton of fuel for every energy carrier. Coal & peat have lower emissions per volume unit due to lower energy content while the other primary energy fuels are close to 3. Comparing the taxed emissions of both options reveals that their total value increases mainly due to the higher emission factor of coal & peat. As a result, the government would generate higher tax revenues when applying a uniform emission factor (6.1 bn UAH vs. 5.6 bn UAH). It is important to note that the tax revenues for option II heavily depend on the energy content of fuels. The calorific values of coal, for example, differ significantly depending on its type and origin. The graph below depicts standard calorific values of lignite and anthracite coal expressed in GJ/t as estimated by various organisations.

Approximated calorific values of coal



The higher burden on coal due to a uniform emission factor is also shown by the passing through of additional costs to consumers. The increase in the price of coal is higher for option I than for option II (+4.3% vs. +3.5%) while consumer prices of unleaded, diesel, natural gas and heat are only negligibly hit by both CO₂ taxation options, ranging from +0.2% to +0.7%. Consumer prices for electricity are more affected by option I, increasing between +1.5 and +2.7%. Option II would lead to a slightly more moderate increase of electricity consumer prices, namely +1.2% to +2.2%.

A carbon tax of 1EUR/tCO₂ would also affect electricity producer revenues. In Ukraine the electricity wholesale price is in each hour set by the marginal power plant, i.e., the plant with the highest variable costs that is still needed to meet the demand in that hour. Usually, this marginal plant is a low-efficiency coal-fired thermal power plant. CO₂ taxation increases the marginal costs of these plants and, thus, wholesale prices. As a consequence, revenues for all producers increase while consumers pay higher prices. In total, a carbon tax would increase electricity expenditures by about 2% or 5.2 bn UAH, respectively. However, tax revenue (1.7 bn UAH) is limited to the share of coal and natural gas production in electricity generation. This implies a substantial

windfall profit of 3.5 bn UAH for carbon-free producers such as nuclear power plants and big hydro plants. However, electricity price caps might prevent coal plants from passing through carbon costs to the consumers.

Impact on consumer prices for option I* and II†

Fuel	CO ₂ content per ton of primary fuel inputs	Unit	Price	CO ₂ content	CO ₂ tax	Δ Price
	t CO ₂ / t fuel		UAH	kg per unit	UAH per unit	%
Unleaded	3.0* 3.1†	per liter	28	2.3* 2.3†	0.1* 0.1†	+0.2%* +0.2%†
Diesel	3.0* 3.1†			2.5* 2.6†	0.1* 0.1†	+0.2%* +0.2%†
Natural gas	3.0* 2.9†	per 1,000 cm	8,383	2,100* 2,047†	56.7* 55.3†	+0.7%* +0.7%†
			9,102	2,100* 2,047†	56.7* 55.3†	+0.6%* +0.6%†
Coal	3.0* 2.4†	per ton	1,900	3,000* 2,448†	81.0* 66.1†	+4.3%* +3.5%†
Heat	3.0* 2.8†	per Gcal	1,300	204* 204†	5.5* 5.5†	+0.4%* +0.4%†
Electricity	3.0* 2.4†	per MWh	1,250	1,239* 1,011†	33.5* 27.3†	+2.7%* +2.2%†
			2,240	1,239* 1,011†	33.5* 27.3†	+1.5%* +1.2%†

Measures: Unleaded (July 2019, incl. VAT); Diesel (July 2019, incl. VAT); Natural gas (1st half 2019 average household price, incl. VAT, and 1st half 2019 average non-household price, incl. VAT); Coal (DTEK import Rotterdam price mid 2019); Heat (exemplary average residential heat price 2019); Electricity (1st half 2019 average households price, incl. VAT, and 1st half 2019 average non-household price, incl. VAT)

Comparing the options

Option I with uniform taxation is easy to implement since respective calorific values are not necessary to determine emission factors. However, it discriminates against coal which is taxed disproportionately to its carbon content. Option II is a fair taxation based on actual carbon content but lacks in simplicity since the correct values for energy content of fuels need to be established.

Advantages and disadvantages

Option I – “Uniform taxation”	Option II – “Fuel-specific taxation”
+ Easy to implement and collect	+ Fair taxation based on actual carbon content
– Coal is taxed disproportionately to its carbon content	– Correct values for energy content of fuels need to be established

It is important to note that a carbon tax of only 1EUR/tCO₂ is too low to generate a change in behaviour of market players. However, it is a way for the Ukrainian government to ease pressure on the budget deficit. The additional tax revenues can be set aside for specific purposes based on either political or legal commitments, so-called “earmarking”. While legal earmarking should be avoided, combining reform packages or reforms with compensation measures politically can be beneficial. For example, using carbon tax revenues for further ecological policy purposes can increase the environmental impact of the tax reform.

In addition to discussing carbon taxation, the Ukrainian government is currently preparing the introduction of a national emissions trading system (ETS). A national ETS for Ukraine would provide a transparent and efficient instrument to reduce carbon emissions at low costs in the medium term. In the long run, a national ETS would prepare Ukraine for the integration into the EU ETS.

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All results of the project are available online at www.LowCarbonUkraine.com.

We are grateful for feedback on this monitoring report, in particular comments how to make it even more useful for supporting the implementation of the energy strategy and contributing to a low-carbon development for Ukraine. Please get in touch via info@LowCarbonUkraine.com.

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