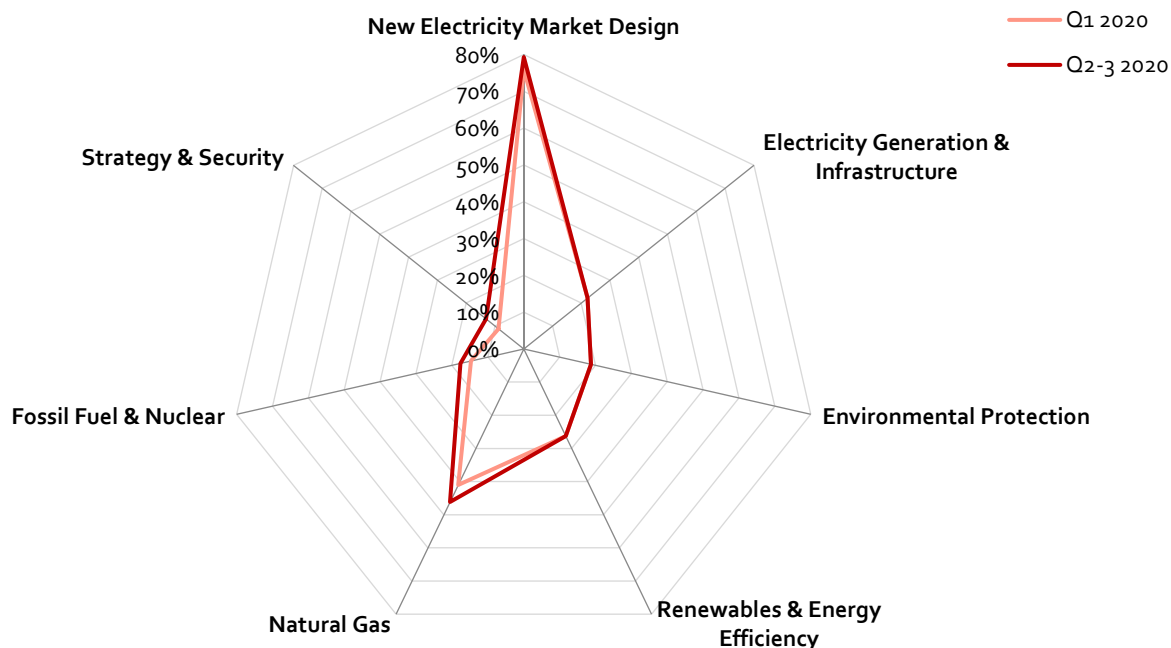


Quarterly Monitoring Report on the Implementation of Ukraine's Energy Action Plan

December 2020



Executive Summary

The last six months were characterized by the Covid-19 pandemic. The Ukrainian electricity system has been put under stress in the first half of 2020. Quarantine measures caused a decline in electricity consumption as industry and businesses reduced operation. Moreover, renewable electricity generation has reached record levels, testing the technical limits of Ukraine's power plant park. A decline in nuclear output could be observed in May 2020 that was not justified by technical or economic reasons, lower electricity demand or RES deployment. Instead, Energoatom's decision to decrease nuclear electricity generation has been a result of market design inefficiencies.

In cooperation with the German government, MinEnergO is laying groundwork for reforming the coal sector. It is working on the pilot project of restructuring two mines and the respective municipalities with support from Germany. In the long-term, the announced restructuring aims at a social, economic and environmental transformation. However, the government tends to continue to support the highly subsidized coal sector.

Wage arrears in the coal sector and debt in the electricity and RES market owed by the Guaranteed Buyer further delay the implementation of the actions foreseen in the energy strategy since no long-term solution has been proposed. However, the Ukrainian government has proceeded with the development of interrelated policy documents – the National Energy and Climate Plan (NECP) and the Nationally Determined Contribution (NDC) which provide planning security. On July 22, the Low Carbon Ukraine project submitted a draft NECP to MinEnergO. The plan has been developed according to the Energy Community guidelines and considering the best European practices. The draft NECP has integrated primary energy and climate objectives as well as targets, policies and measures.

Assessment by Sector

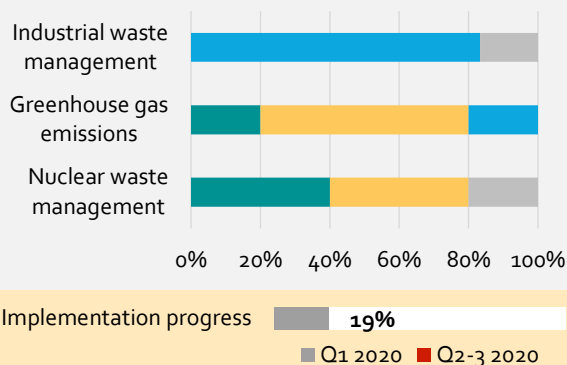
About the Assessment

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

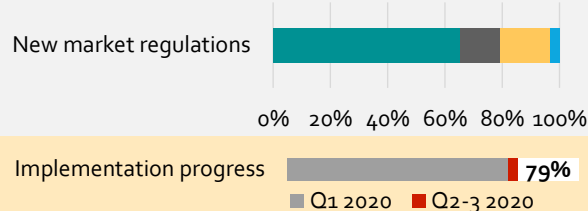
- Completed and serving the purpose of the ESU
- Completed but not serving the ESU's purpose
- In the political process
- Overdue
- Scheduled for later

Environmental Protection



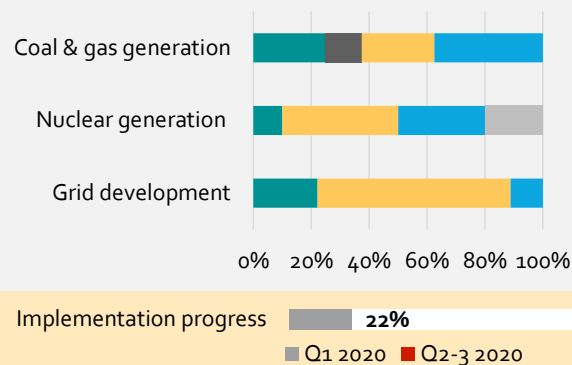
The Verkhovna Rada amended **the law on environmental impact assessment**, which allow to conduct public discussions online during the COVID-19 period to avoid consequent delays. MinEnergо and the State Agency on Energy Efficiency and Energy Saving (SAEE) developed a draft law amending the Budget code to ensure the **financing of energy-efficient retrofitting of industrial enterprises and cutting their CO₂ emission** by allocating carbon tax funds. The State Agency of Ukraine on Exclusion Zone Management approved **the construction of an interim storage facility for high-level nuclear waste returned from Russia**. The State Nuclear Regulatory Inspectorate of Ukraine granted permission to Chornobyl nuclear power plant (NPP) for the **pilot operation of the commissioning of stage 1 of the New Safe Confinement**. The CMU approved decrees on Measurement, Reporting and Verification procedures necessary for the further introduction of GHG ETS. The **implementation of the National Emission Reduction Plan until 2033** remains frozen and without a proper action plan.

New Electricity Market Design



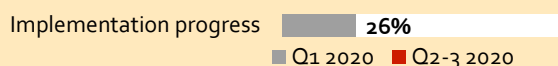
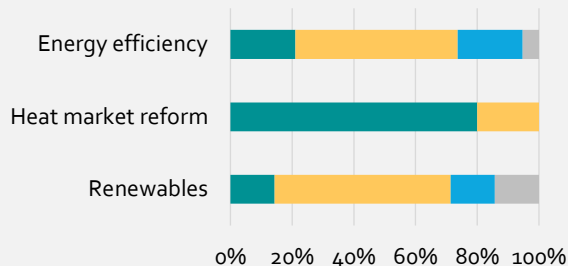
For the **settlement of debt previously accumulated on the wholesale electricity market**, the Verkhovna Rada adopted amendments to the Bankruptcy Code to prohibit the SOE Energoynok's bankruptcy and measures to repay the debt. The Cabinet of Ministers (CMU) reduced the **mandatory part of electricity traded by Energoatom under public service obligation (PSO)** from 80% to 50-55% and by Ukrhydroenergo from 35% to 30%. Also, the Guaranteed Buyer was enabled to trade electricity on the bilateral market. Ukrenergo developed and published the documentation on the **renewable energy (RES) curtailment management system** as an electronic platform for automating the process of RES (re)dispatching. The regulator (NEURC) enabled Ukrenergo to **temporarily limit the connection of RES to the network** due to operational security. The ancillary service (AS) market demonstrated slight progress since **Ukrenergo certified Burshtynska and Zaporizka thermal power plants (TPPs) as AS providers**.

Electricity Generation & Infrastructure



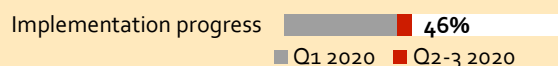
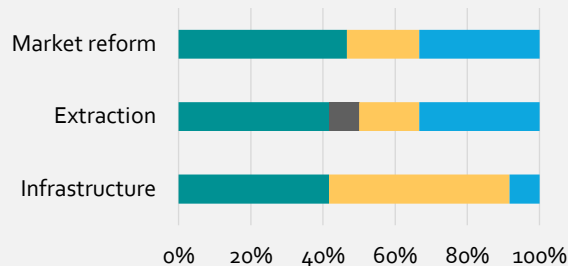
The NEURC approved updated regulations on RAB-tariff for DSOs with new economic parameters. The CMU developed amendments to the state budget for 2020 to **facilitate the financing of hydro storage plants (HSPs) of Kanivska and Dnistrovska** by allowing Ukrhydroenergo to attract loans under state guarantee. Additionally, Ukrhydroenergo completed the **reconstruction of the 6th unit of Kyivska HSP** aimed at increasing its efficiency and lifetime extension. Ukrenergo signed a contract with the Chinese company Xian Electric Engineering Co. Ltd for the retrofitting of **Rivne and Kalush substations**. Ukrenergo and Energoatom launched tests of NPP equipment required for the integration into ENTSO-E. **Tenders for the construction of new generation capacity** have not been launched and no progress has been observed in monitoring the security of electricity supply. However, Minenergo developed a draft law #3657 aimed in particular at facilitating the launching of **tenders for new generation capacity and demand-side management**.

Renewables & Energy Efficiency



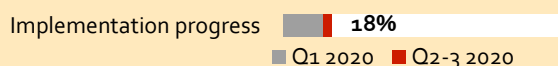
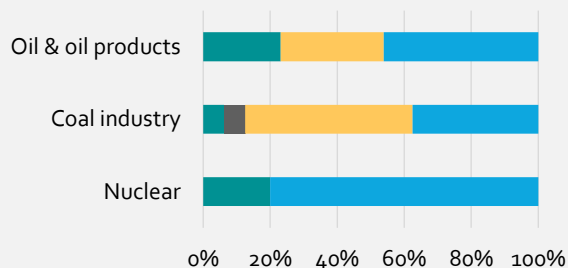
Resulting from the memorandum between the CMU and some RES investors, the **Verkhovna Rada adopted the law on adjusting the scheme of RES state support**. Furthermore, the Verkhovna Rada adopted and the president signed the law on the facilitation of investments and application of new financial instruments, envisaging the **introduction of green bonds** for energy efficiency, waste management, RES deployment, etc. In cooperation with UNIDO, **new national standards on energy efficiency and management have been introduced**. MinEnergO and SAEI have developed a draft law aimed at ensuring the **application of ESCO-contracts by heat and water supply utilities**. The Verkhovna Rada envisaged in its operational plan for 2020 the elaboration of **legislation for boosting high-efficiency cogeneration development** and ensuring compliance with Directives 2004/8/EC and 2012/27/EU.

Natural Gas



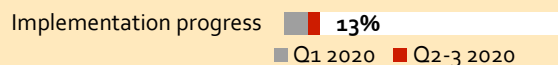
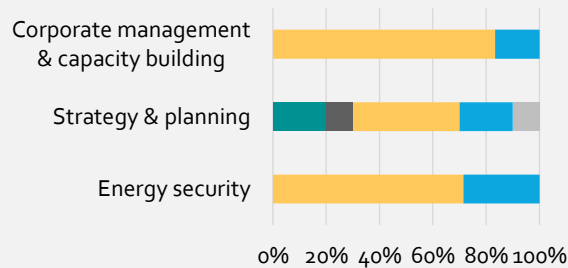
Before the PSO regime for households was lifted on August 1, the NEURC adopted **new rules on switching suppliers** to simplify the procedure. Amendments have been introduced on auction capacity allocation, and the gas transmission system operator of Ukraine (GTSOU) held a **first annual capacity auction** followed by quarterly, monthly and daily auctions. The use of short-haul service expanded, and a **virtual interconnection point was launched with the Polish TSO**. On the agenda are changes in public procurement allowing the TSO to use the exchange for balancing and the NEURC draft resolution to improve balancing responsibility. Several government agencies reported to start **developing a new Subsoil Code** with support of the European technology assessment (TA) project. The Rada endorsed draft laws on **metering and settlements in energy units and on amending legislation in housing and utilities sector**.

Fossil Fuels & Nuclear



MinEnergO drew up a new concept for coal sector development and a National Program for the Transformation of Coal Regions, with **new inspections are being carried out to check the mines for privatization/closure**. A coordination centre was created and Germany, Poland, EU, and World Bank confirmed their support. MinEnergO also reported on **pilot projects to close mines** based on German experience, while, however, budget funds are spent on **coal subsidies**. A **vertically integrated company shall be created from CentrenergO**. New **Technical regulation on fuels and liquified petroleum gas** were adopted. Ukrtransnafta achieved progress in **transporting new oil types** and reported on technical possibility for organizing stocks, but called for a change in legislation to introduce 'customs warehouse'. The concern **Nuclear Fuel will be liquidated** as it has not fulfilled its function of building nuclear fuel assemblies.

Security, Strategy & Governance



Following the introduction of salary caps for members of the SOEs' supervisory boards during Covid-19, international financial institutions (IFIs) reported a **crisis in the corporate governance reform**. The **draft law "On Critical Infrastructure and its Protection"** and a set of draft acts to define critical infrastructure facilities, to form registries and to audit information security of such facilities were developed. **The Extractive Industries Transparency Initiative's 2017 report** was finally published, as was the annual **ESU implementation report for 2019**. The Antimonopoly Committee disclosed the impact assessment of state aid rules, but the government has still not **adopted the criteria for assessing the eligibility of state aid in the coal industry**. In terms of **priority projects of common interest**, Ukraine's legal framework is **still not compliant with the EU acquis**, as discussion on draft regulations continue.

Key Developments in Ukraine's Energy Sector

Changes in RES support scheme

Based on the memorandum signed between the government and RES investors, the relevant law became effective on August 1. This law provides for a reduction of feed-in tariff (FIT) levels, a timetable for the introduction of balancing responsibility for RES producers, a one-year extension of the incumbent universal service suppliers and the supplier of last resort functions. It also introduces the maximum FIT for all facilities commissioned before July 1, 2015, and for all other facilities which would receive a higher FIT after restructuring. The document also sets a provision to prepare draft laws regarding the settlement of debt owed by the Guaranteed Buyer (GB) to RES producers; the government also declared the intention to borrow money and use other financial instruments to settle the debt.

Yet the problem of the financial deficit as such was not resolved. The government estimates the economic effect of legislative changes at 7 bn UAH in annual savings. Moreover, the law created more imbalances: among the most questionable provisions are benefits for electrometallurgical enterprises and the compensation of the Guaranteed Buyer's expenses from the budget (at least by 20% of the forecasted RES electricity production cost for the relevant year).

Based on the adopted changes, MinEnergo reported to start developing annual RES support quotas, an auction plan and other legal acts; it has also reached agreement with state-owned banks on restructuring loans to developers. In return, NEURC has promptly adopted a resolution changing the FITs while increasing the transmission tariff of Ukrenergo first to 240.23 UAH/MWh (from August 1) and later to 312.76 UAH/MWh (from December 1). While the government amended the PSO scheme, it allowed the GB and Energoatom to sell electricity in the bilateral contracts market, thus enabling more revenues to be collected.

Retail gas market opening for households

After a one-month delay, the government lifted the PSO regime for the supply of gas to households, starting from August 1, 2020. Currently, over 50 suppliers offer gas to households; offers include both monthly (variable price) and seasonal (fixed price) ones.

Two important issues allowed to start liberalization. First, NEURC amended a number of acts to simplify the procedure of supplier switching. The change of supplier became almost automatic, using the TSO information platform. Furthermore, obstacles, such as references and other documents confirming the absence of overdue debts to the incumbent supplier, were lifted. Second, the government designated Naftogaz subsidiary as the supplier of last resort (SoLR). Naftogaz proposed a markup of 0% and has already addressed the NEURC with a proposal to simplify the procedure of switching to SoLR and make it automatic.

Other notable events were the scheduled raise (+9.4% on average) of the distribution tariffs on July 1 and the adoption of a law to facilitate trade in organized commodity markets,

which opens up the opportunity of creating a functioning gas hub. As the deadline for full commercial metering for households (January 2021) is approaching, MinEnergo published a draft law extending it to 2023.

Progress on energy- and climate-related policy documents

Ukraine has proceeded with the development of interrelated policy documents – the National Energy and Climate Plan (NECP), and the Nationally Determined Contribution (NDC2). Both documents have a similar 2030-time horizon with an outlook to 2050. The NDC is Ukraine's international commitment under the Paris Agreement. The NECP is recommended by the Energy Community Secretariat (EnCS) for the Contracting Parties. Following the Presidential Decree No.837/2019, the NECP, and updated NDC were supposed to be prepared and approved by September 30, 2020.

On July 22, the Low Carbon Ukraine project submitted a draft NECP to the Ministry of Energy. The draft had been developed following to the EnCS template and best European practices. It integrates primary energy and climate objectives, and targets, as well as policies and measures (P&M) in various sectors, and cross-sector policy documents (plans and strategies) of Ukraine. It also contains a baseline scenario describing the current situation, and projections of existing P&M with a respective impact assessment. However, the draft NECP does not yet include an impact assessment of suggested P&M, as these measures hinge on details of the NDC2 modelling process, which is not yet finalized. Currently, LCU, and the Ministry are collaborating to complete the document.

Coal sector developments

Despite having quite ambitious plans and considerable recent growth of RES deployment, the government tends to continue to support the highly subsidized coal sector. The CMU ensured repayment of previously accumulated salary debts for miners spending UAH 3.5 bn in 1H2020. Given the consumption crisis, on June 17, 2020, the CMU has also prioritized the usage of domestic coal by TPPs to avoid outages of mines and coal production decline, and additionally ensured primary dispatch of those TPPs.

The government also made progress in starting the sector reform considering the best European practice and attracting international support, in particular from Germany (under the strategic energy partnership agreed in August), the EU, the World Bank (Polish experience), and other IFIs. Having established a dedicated coordination body chaired by the Prime Minister, MinEnergo elaborated the Concept of Coal Sector Development while MinRegion drafted the National Program of Coal Regions Transformation.

In a first step, MinEnergo will rank the state-owned mines and define the most viable ones. In parallel, the Ministry is working on the pilot project of restructuring two mines and the respective municipalities with support from Germany. The announced restructuring aims at a social, economic and environmental transformation. A multi-partner fund to support this activity is being considered.

Comparison of different Ukrainian climate & energy targets

WHAT would Ukraine's targets for greenhouse gas (GHG) emissions, energy efficiency, and for the share of renewable energy in its electricity mix be, if the country were subject to European Union (EU) legislation? Like the EU, which currently revises its climate and energy targets in the context of European Commission president von der Leyen's "Green Deal", Ukraine is discussing to revise its national goals. This debate mainly takes place under the Paris Agreement framework, which requires an updated set of Nationally Determined Contributions (NDCs) later this year.

The following paragraphs will strive to explain the differences of Ukraine's actual and potential commitments under (1) business as usual developments, (2) EU regulations, or (3) updated NDCs. For the latter, we assess scenario 2 of an existing draft NDC. This draft scenario 2 represents a medium-ambitious path between continuing business as usual on the one hand and pursuing a climate-neutral economy by 2050 on the other. Additionally, draft scenario 2 does not propose any new policy measures, but instead just requires thorough implementation of all existing policies.

To determine Ukraine's hypothetical goals under EU legislation, we apply the EU's respective distribution formulas. The EU develops EU-wide climate and energy targets, but then determines nationally binding contributions to these goals based on economic and technological strength of its member states. In general, its climate and energy targets are structured along four main goals, which we will use to describe and compare Ukraine's targets: energy efficiency of the economy, GHG emissions covered by the European Emission-Trading System (ETS), emissions not covered by it, and the share of renewables in final energy consumption.

I. Energy Efficiency

As a general target, the EU decided to improve its energy efficiency by 32.5% by 2030 with respect to (w.r.t.) a baseline scenario calculated in 2007. While "energy efficiency" is often defined as 'unit of energy consumed per unit of GDP', the EU sets clear caps for final energy consumed for each of its member states. Taking 2017 as base year, the EU Commission assessed member states' targets for energy efficiency as 'sufficient' if their final energy consumption was 14.8% lower by 2030 w.r.t. 2017 values. Similarly, the commission assessed primary energy consumption targets to be sufficient if they aimed at a reduction of 18.4% by 2030 w.r.t. 2017.

Ukraine's final energy consumption in 2017 was at 50 Mtoe. A 'sufficient' target under EU regulation for 2030 would thus be to lower final energy consumption by 14.8% to 43 Mtoe in 2030.

Under Ukraine's currently most likely business as usual development, the draft National Action Plan on Energy Efficiency (NEEAP)'s project scenario, Ukraine is estimated to have a final energy consumption of 50 Mtoe by 2030. Under the draft scenario 2 of the NDC, Ukraine would even consume 50.5 Mtoe. Compared to both NDC and NEEAP, Ukraine would thus need ca. 15% less final energy under EU legislation. Both NDC scenario 1 and scenario 2 would therefore be assessed "low" by the EU commission.

However, taking the original EU baseline projection from 2007, and projecting Ukrainian business as usual energy consumption in a similar way as the EU did back then for its own member states, Ukraine would do better in comparison. While the EU goal is to lower energy consumption by 32.5%, Ukraine's NDC scenarios 1 & 2 project a decrease in final energy consumption by 25.5% or 38.2%, respectively.

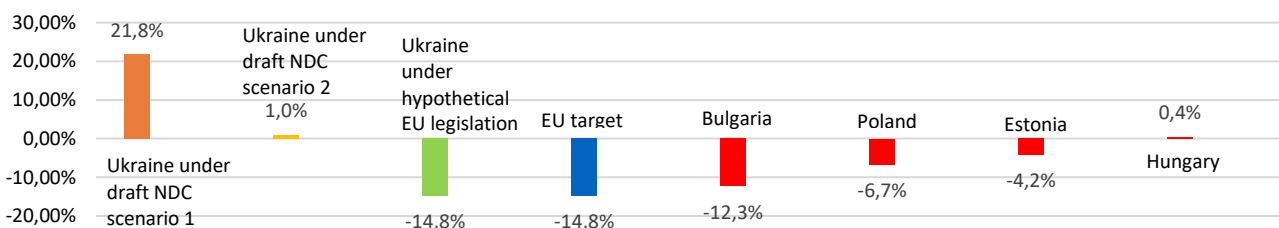
II. Power and industry sector emissions

The EU has divided all its GHG emissions into two parts, one covered by the bloc-wide ETS, and the other one covered by national regulations only. The ETS is the chosen EU tool for emission reduction in heavy industry and electricity production facilities, as well as in intra-EU aviation. The rest is covered by national regulations such as subsidies, emission caps, technology mandates, etc.

All in all, the EU aims at reducing the emissions in its ETS sectors by 42% until 2030 w.r.t. 2005, which was the first year when comparable ETS sector emission data for all countries became available. While the ETS works throughout the whole EU, it still gives member states the opportunity to auction off their share of ETS emission permits individually. This makes it possible to calculate how much each state is allowed to emit in its ETS sectors. 90% of permits are distributed to states according to their share of overall EU emissions in either 2005, or on average in the period from 2005-2007, whichever number is larger. The leftover 10% are distributed to states according to their wealth.

Taking these numbers into account, one finds that in the EU, Ukraine would have to lower its ETS emissions to a maximum of roughly 210 Mt of CO₂ equivalents in 2030. This represents a reduction of 20% w.r.t. 2005, and of 67% w.r.t. 1990. Our result further assumes Ukraine to get a sizeable share of

Final energy consumption reduction targets for 2030 (% of 2017)



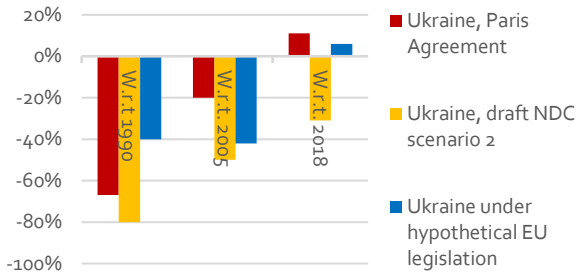
Source: EU Commission, TU Wien, own calculations

Comparison of different Ukrainian climate & energy targets

permits representing 60Mt of CO₂ equivalent emissions (MtCO₂e) via the share for poorer countries.

Ukraine's current obligations from 2016 under the Paris Agreement establish that Ukraine's emissions shall not exceed 60% of 1990's emissions, resulting in 383 MtCO₂e. Under EU legislation, Ukraine would emit 45% less. However, under the NDC's draft scenario 2, Ukraine would only emit 140 MtCO₂e in 2030, 34% less than under EU legislation.

GHG emissions in ETS Sectors



Source: UNFCCC, ESU2035, TU Wien, own calculations

III. Waste, agriculture and transport emissions

The main sectors not covered by the ETS are waste, agriculture, and transport. For all its members combined, the EU set a target of reducing non-ETS emissions by 30% w.r.t. 2005. However, the EU does not implement policies towards reaching this goal. Instead, every member state has an individual target which it must achieve. The states are free to choose which path to take towards reaching it. Added up, these national targets achieve a 30% reduction in non-ETS emissions by 2030 w.r.t. 2005.

The EU set national non-ETS emission targets according to member states' wealth, measured by its GDP per capita. If

Ukraine were subject to these goals, it would thus be compared to other EU states. The on average lowest-income state is Bulgaria, which nonetheless has a higher GDP per capita than Ukraine. Since Bulgaria currently has a zero % reduction goal w.r.t. 2005 emissions, Ukraine would likely not have to reduce its 2005 non-ETS emissions of 136 MtCO₂e further (2018: 138 MtCO₂e).

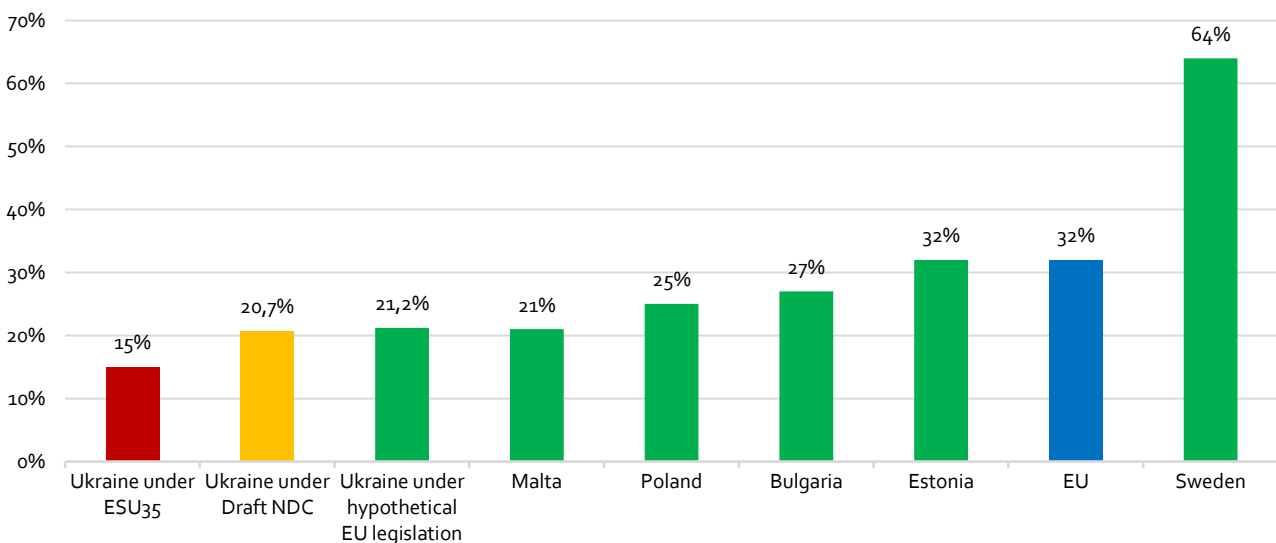
Under its 2016 Paris Agreement contributions, Ukraine would be allowed to emit 172 MtCO₂e, 26% more than under EU legislation. However, under the draft NDC's scenario 2, Ukraine would only emit 110 MtCO₂e in 2030 in its non-ETS sectors, 20% less than under EU rules. Note that these rules do not yet reflect the expected tightening of the EU targets from 40% to 55% GHG reduction by 2030.

IV. Renewable energy share

The EU's overall goal for the whole bloc is to have renewable energies contribute 32% of final energy consumed in 2030. The EU Commission again breaks this overarching goal down into differentiated national goals, depending on four principles: (a) all states shall deploy renewables on an equal basis, (b) they shall do so in a fair manner, based on their wealth measured in GDP per capita, (c) those with the cheapest possibility to use renewables should use more of them, and (d) renewable energy should be well-transferable to other states via existing transmission lines. Following these principles, the Energy Community finds in a [study](#) that Ukraine would have to reach a renewable share of 21.2% of final energy consumption in 2030.

Ukraine's own targets are lower. Under the currently existing Energy Strategy 2035 for Ukraine, Ukraine would receive 15% of its final energy consumption from renewables. The draft NDC's scenario 2 would achieve a 20.7% share, almost reaching EU levels.

Renewable share goals for final energy consumption, selected EU countries and Ukraine



Source: UNFCCC, Regulation (EU) 2018/842, EU Commission COM/2019/285, TU Wien, own calculations

Was the dispatch of power plants in May 2020 optimal?

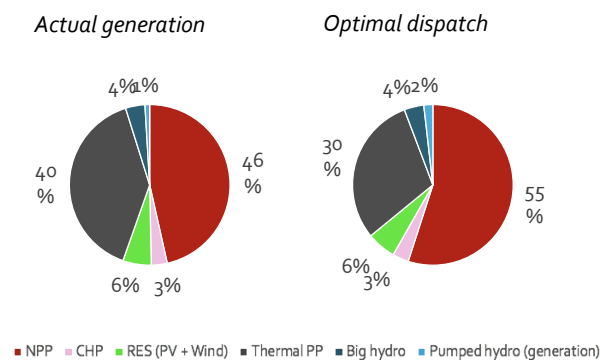
UKRAINE'S electricity system has been put under remarkable stress in the first half of 2020: Quarantine measures in Ukraine have resulted in significantly lower electricity consumption as industry and businesses lay idle. Moreover, renewable electricity generation has reached record levels, testing the technical limits of Ukraine's power plant park.

In May 2020, a remarkable situation could be observed on the Ukrainian electricity market: Thermal electricity generation, normally accounting for around 30% of total supply, almost levelled with nuclear electricity generation, which usually supplies half of Ukraine's electricity demand. In other words, nuclear output has been reduced much more than thermal output.

This situation has been justified with the limited balancing abilities of nuclear plants, which can only provide stable baseload generation in a safe operation mode. Ukraine's coal-fired thermal plants, on the contrary, can provide sufficient technical flexibility to balance the intermittent generation of renewable energy sources (RES). Relying on coal plants as a provider of flexibility, however, comes with high monetary and emission costs: Since many thermal units have to be spinning to provide sufficient flexibility due to their high minimum load, nuclear units – which incur both less generation costs and emissions – are pushed out of the system.

This particularity of Ukraine's electricity system could in principle explain why nuclear output has been reduced more strongly than thermal. At the same time, the immaturity of Ukraine's electricity market leads to suspect that market failures might have contributed to this situation. To assess whether the observed power plant dispatch in May 2020 was in fact economically optimal given the balancing restrictions, we have modelled the optimal power plant dispatch of Ukraine's electricity system for the last week of May 2020 using our electricity system model ODM.

Actual vs. optimal schedule 25-31 May 2020



Source: Ukrenergo, own calculations

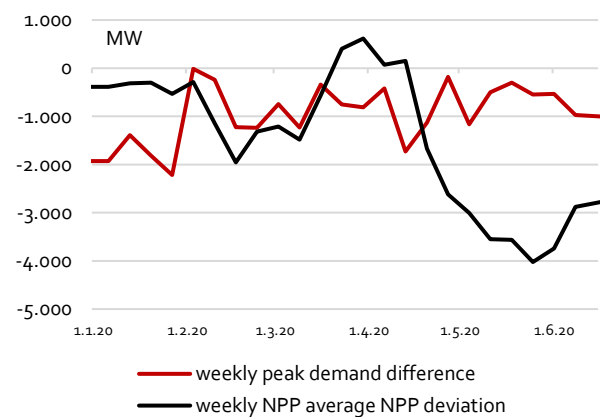
We show that the actual dispatch was in fact economically sub-optimal: A 15% higher nuclear generation would have been technically feasible and compatible with the objective of safe system operation. The sub-optimal dispatch has resulted in

additional emissions of 250,000 t CO₂ in only one week. Moreover, the higher utilization of thermal plants has increased operational costs by UAH 150 mln, which amounts to 10% of total operational cost.

Covid-19 demand slump and RES as potential explanations

Can the lower nuclear output be explained by reduced electricity demand due to Covid-19 measures? Since March, electricity demand has been up to 10% lower than during the same time in 2019. As shown below, the drop in nuclear output has kicked in only by the end of May, when electricity demand had already stabilised. Lower electricity consumption thus cannot explain why nuclear output has dropped that much.

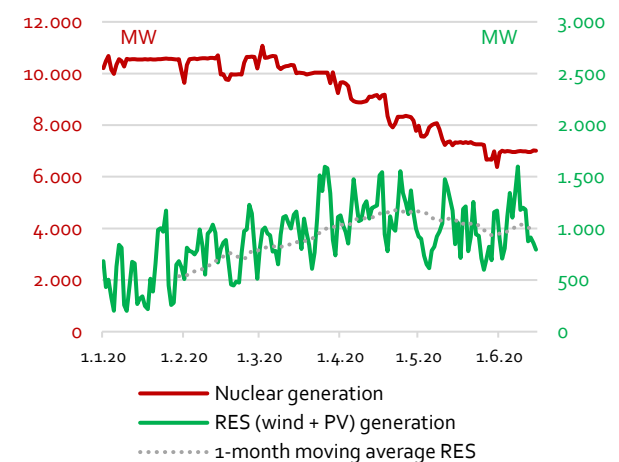
Weekly peak demand vs. nuclear deviation 2019/20



Source: Ukrenergo, own calculations

High RES generation might also explain the decrease in nuclear output in May 2020. In fact, RES (wind and PV) output steadily increased in 2020. Yet, for the week of May 25-31, average RES output had remained almost constant since the beginning of May. Our modelling results show that thermal generation for this week was higher than necessary to provide spinning reserves for the observed RES electricity infeed. The increase in RES electricity generation in 2020 does therefore not serve as a sufficient explanation for lower nuclear output.

Nuclear and RES electricity generation January-June 2020



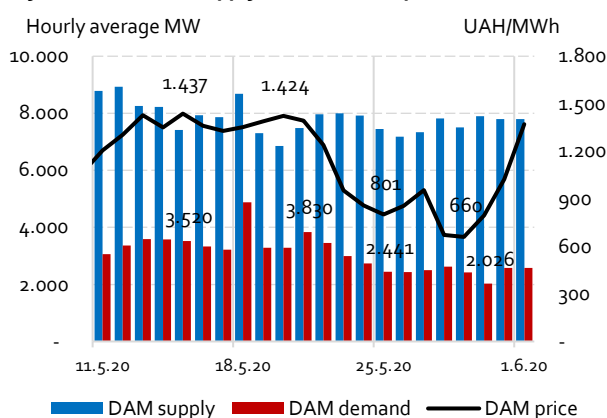
Source: Ukrenergo, own calculations

Was the dispatch of power plants in May 2020 optimal?

Electricity market developments

During the last two weeks of May 2020, prices on Ukraine's day-ahead electricity market (DAM) dropped by more than 50%. This was mainly due to demand shifting from the DAM to the bilateral agreements segment of the electricity market. Meanwhile, consumption and supply on the DAM remained relatively stable, implying that prices would eventually drop. On the bilaterals segment, DTEK generation companies were the sources of additional electricity supply – no other player has significantly changed its offers. The state-owned nuclear generation company Energoatom, on the other hand, could not react by offering more on the bilaterals segment as public service obligations (PSO) heavily regulate on which market segments it can sell electricity.

Day-ahead market supply, demand and price

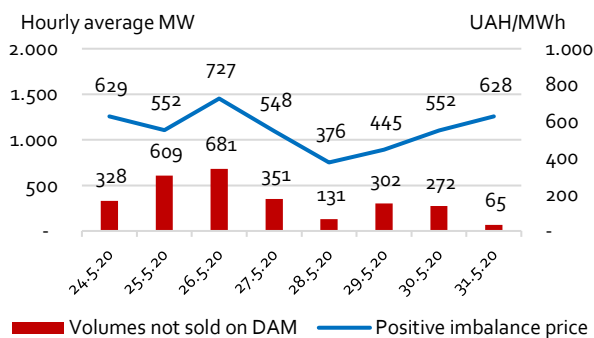


Source: Market operator, Ukrenergo, UEEX data, own calculations

Being unable to adjust its positions to react to the changing market situation, Energoatom could not sell all of its electricity on the market, thus incurring positive imbalances. This means that actual output was higher than the amount of electricity sold on the market segments. As a penalty for failing to abide by the generation schedule, an imbalance price had to be paid by Energoatom.

In order to minimize their exposure to imbalances and hence their economic losses, Energoatom decided to voluntarily decrease the output of their nuclear plants by another 600 MW from May 27 on.

Unsold day-ahead market volumes and imbalance prices during off-peak hours



Sources: Market Operator, Ukrenergo data, own calculations

Conclusion

The decline in nuclear output that could be observed in May 2020 in Ukraine was not justified by economics, lower electricity demand or RES deployment. Instead, Energoatom's decision to decrease nuclear electricity generation has been a result of market design inefficiencies. The tight regulation of state-owned Energoatom through the PSO scheme has led to higher generation from more expensive and polluting plants, increasing the total cost of electricity generation.

The current design flaws of Ukraine's electricity market – price caps, the link between DAM and balancing market prices as well as the PSO design – give a structural advantage to privately-owned generators over their strictly regulated, state-owned competitors such as Energoatom. To ensure electricity supply at the lowest possible costs, this imbalance between private and public generators, along with the market power of incumbent private players, must be addressed.

This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.

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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