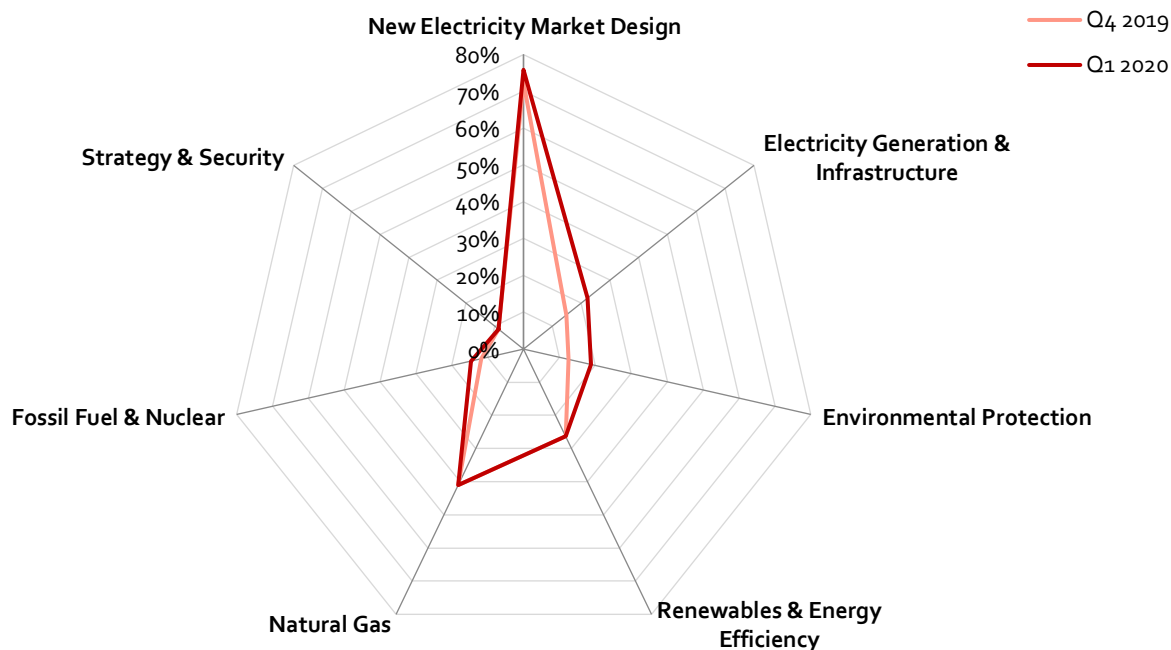


Quarterly Monitoring Report on the Implementation of Ukraine's Energy Action Plan

June 2020



Executive Summary

The past months were characterized by the government reshuffle, the Covid-19 pandemic, and a debt crisis in the electricity market. The government under new prime minister Denys Shmyhal decided to create the Ministry of Environmental Protection and Natural Resources separating it from the Ministry of Energy and Environmental Protection. This was preceded by a change in the leadership of the ministry, which was provisionally handed over to Olha Buslavets.

Due to Covid-19, we estimate a contraction in electricity consumption from 4.7% in the optimistic, 5.5% in the baseline to 8.1% in the pessimistic scenario. This contrasts with a predicted increase in demand of 1.1% for the forecast before the crisis. The decrease in demand only had a modest impact on Ukrainian wholesale prices indicating a non-functioning market.

The pandemic has deepened the existing debt crisis in the electricity sector. Already before Covid-19, electricity market players accumulated UAH 30 bln debt. This problem is magnified by the pandemic-induced economic recession and payment discipline decline. In fact, the quarantine measures were not the reason of the payment crisis in the Ukrainian electricity market – they were merely a catalyst.

The above-mentioned turbulences further delay the implementation of the actions foreseen in the energy strategy. While some long-overdue measures – like the ten-year network development plans – got finally approved, many urgent measures – such as the restructuring of unprofitable mines - saw little progress.

Assessment by Sector

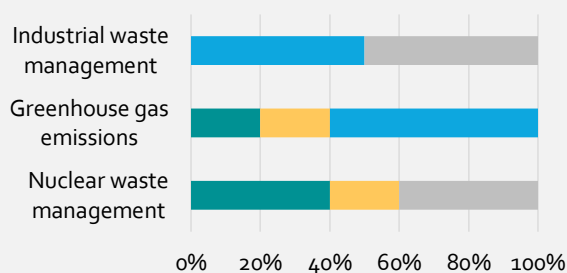
About the Assessment

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

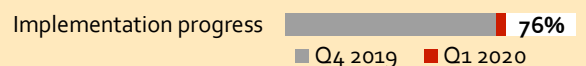
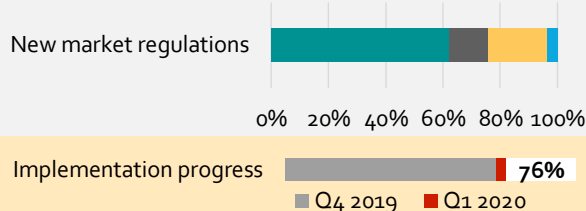
- Completed and serving the purpose of the ESU
- Completed but not serving the ESU's purpose
- In the political process
- Overdue
- Scheduled for later

Environmental Protection



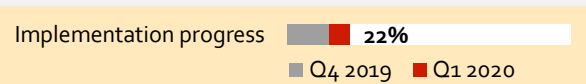
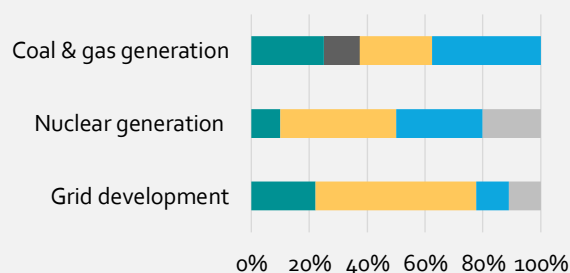
The MEEP has not developed the procedure for coordination and revision of the **extractive industries' waste management plans** on time. The 2020 Action Plan to implement the **National Emission Reduction Plan by 2033** has also not yet been developed. The process of the **2050 Green Energy Transition Concept** (Ukrainian 'Green Deal') approval has been postponed without a clear perspective. The Rada has made no progress in examining the proposed changes to the environmental tax. Due to COVID-19 restrictions, the construction of the **centralized spent fuel storage facility** has not been completed. Ukraine has still not started the **construction of a facility for the storage of high-level radioactive waste** that will be returned from Russia after processing of spent nuclear fuel.

New Electricity Market Design



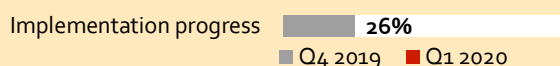
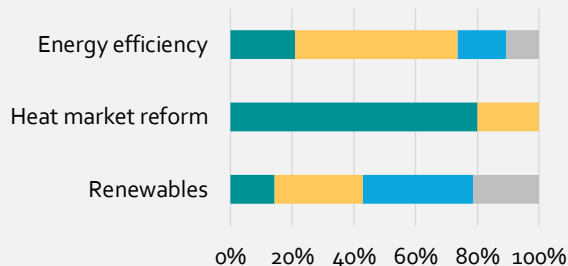
The Verkhovna Rada has adopted the draft law on **settlement of debts in the wholesale electricity market**. The regulator has adopted the **Rules of Congestion Management and Allocation of Cross-Border Capacities** in line with EU legislation and best practice that shall facilitate cross-border electricity trade and further market integration. The regulator has suspended **electricity imports from Russia and Belarus** to ensure the sustainability of the electricity system due to the crisis caused by COVID-19. The **regulator has not certified Ukrenergo as a transmission system operator (TSO)** under the ownership unbundling (OU) model due to legal inconsistencies regarding property rights on the network ownership and respective negative opinion of the Energy Community Secretariat. The **unbundling of distribution system operators (DSOs)** has slightly progressed since compliance programs of 22 DSOs are approved and published on the regulator website. The Ministry of Energy and Environment Protection (MEEP) has updated the **electricity balance for 2020**.

Electricity Generation & Infrastructure



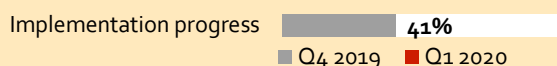
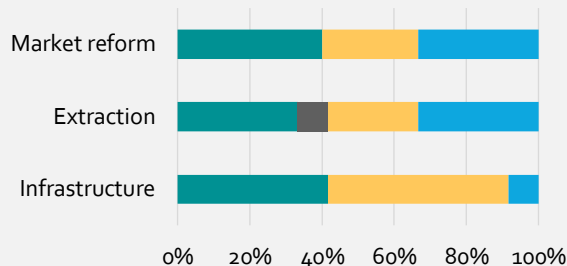
The regulator has approved Ukrenergo's **generation adequacy report** and the **transmission system development plan for 2020-2029**. Also 29 of the **five-year system development plans for 2020-2024** developed by DSOs have been approved by the MEEP, Ukrenergo, and the regulator. Ukrenergo has started testing the equipment of the **new 500 kV Kreminska sub-station**, which will improve the security of electricity supply to the Donbas region. The **regulator has revised critical economic parameters of the new distribution tariff formula**. Zaporizhzhia NPP has successfully performed **tests of frequency regulation on unit #2** for preparation of ENTSO-E integration. **Tenders for the construction of new generation capacity** have not yet started. No progress has been made in monitoring the security of electricity supply.

Renewables & Energy Efficiency



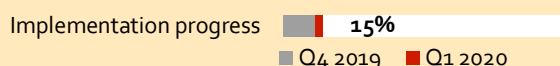
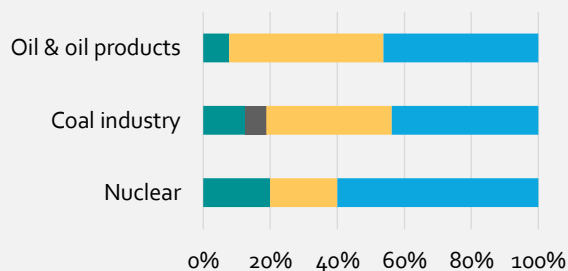
The mediation process between the CoM and RES investors on “green tariffs” supervised by the Energy Community Secretariat has still not led to the signing of a memorandum. The delay, along with the economic and energy crisis, hindered the launch of auctions for new RES capacities. The SAE published data on households’ PV installations amounting to 618 MW installed by more than 24,000 households. Although the Verkhovna Rada approved the introduction of a green bond in the 1st reading, the draft law has not yet been examined. The draft national energy efficiency action plan by 2030 developed by the SAE, along with the 2030 national target on energy efficiency were not published. The Energy Efficiency Fund has simplified the application procedures for obtaining grants on energy efficiency under the Energodim program that will facilitate energy modernization in the residential sector.

Natural Gas



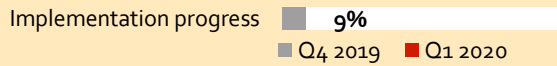
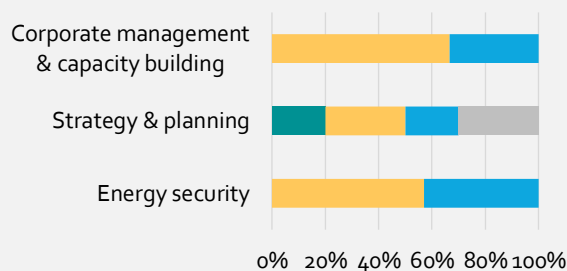
The Rada still considers draft laws on procurements for balancing needs and conversion from volumetric to energy units. The regulator published amendments to its regulations to simplify supplier switching. Ukraine’s TSO actively rolls out backhaul and short-haul products, working with neighbouring TSOs on bundled products. Involving qualified foreign partners in the management of both TSO and storage operator is suspended. The MEEP published a draft law to expand funding for the installation of gas meters for residential buildings. The CoM amended the procedure of subsoil permits issuance, lifting the preliminary confirmation of reserves, thereby extending competitive licensing. The government still has not resolved ownership issues of gas distribution systems. The transition to international systems for classifying reserves and a new methodology for determining the value of reserves and resources are overdue.

Fossil Fuels & Nuclear



The drop in electricity consumption resulted in oversupply of coal for generation needs and suspension of activity on DTEK mines. In the state-owned coal sector, there is still lack of action to further restructure unprofitable mines, although the CoM created the Coordination Center on Coal Regions Transition. Record low prices on oil market provided an opportunity to create the minimum stocks of crude oil and petroleum products, yet both the model and the draft law are not yet approved. Ukrtransnafta proposed to create a legal framework for oil storage. The MEEP published a draft Concept for the Development of Oil and Gas Refining, but studies for new refinery capacity were delayed. Public funding for uranium mining was abolished and private licenses have been challenged in court for alleged state secret leakage. Energoatom’s troubled finances create risks for new supplies of nuclear fuel and spent fuel management.

Security, Strategy & Governance



The 2050 Green Energy Transition Concept was not submitted to the MEEP’s consideration. Instead, the MEEP published a draft report on NDC scenarios. An expert council and new science and research council were formed at the MEEP to support strategic initiatives with forecasts and modelling. The draft law on improvement of corporate governance as well as draft law on critical infrastructure protection were not registered. Another internal transformation was initiated by Naftogaz, with new divisions created. The government decision to transfer 6 CHPs to the company is subject to the AMCU approval. Ukraine delays setting a legal framework for the development of projects of common interest in line with EU Regulation No 347/2013. The Extractive Industries Transparency Initiative report endorsed by the stakeholders, is pending publication.

Key Developments in Ukraine's Energy Sector

Anti-crisis measures in the electricity sector

Induced by the decrease in power consumption in the wake of the Covid-19 crisis, the MEEP has updated the annual forecasted electricity balance for 2020. In comparison to the balance approved in November 2019, the projections of both total annual electricity consumption and production were decreased by 9%. The most significant drop in production relates to hydro (-35%) and nuclear (-12%) power plants. As generators do not have to follow these projections, the impact of this measure will be at best indirect.

The pandemic has deepened the existing crisis in the electricity sector, especially with respect to accumulating debt. A decrease in consumers' payment discipline further exacerbated the cash deficit for the market players. To tackle this issue, the MEEP intends to revise the financial plans of state-owned energy companies to cut some investments and other expenses planned for 2020. In addition to the MEEP, the regulator NEURC suggested a set of actions to mitigate the impact of the crisis. Besides changes to the RES support scheme, the regulator envisages the necessity to gradually bring the electricity prices for households to market level. The first step would be an elimination of the lower limit tariff for monthly consumption up to 100 kWh. The NEURC also supports amendments to the current PSO mechanism by allowing Energoatom to trade electricity directly to consumers on the bilateral market.

Approval of key documents in electricity and progress on Ukrenergo's certification

Within the generation adequacy report and the transmission system development plan for 2020-2029 developed by Ukrenergo, the NEURC has eventually approved key long-term documents on March 13, 2020. The approval should trigger the development of grid and generation capacity, in particular RES and flexible capacity via tenders. The report contains projection scenarios of electricity demand and supply for the period until 2030 and beyond – up to 2050. It highlights the need to considerably increase flexibility by installing 2 GW of highly flexible capacity with quick start (up to 15 min) and 2 GW of storage capacity to provide sufficient reserves for system reliability. The Transmission System Development Plan for 2020-2029 specifies crucial projects on network development and enhancing cross-border interconnections with European countries. Total investments estimated by Ukrenergo amount to approx. EUR 2.3 bn with the primary funding supposed to be provided by international financial institutions (EIB, EBRD, KfW, IBRD).

Meanwhile, after the negative conclusion of the Energy Community Secretariat and the NEURC's refusal to certify Ukrenergo as a TSO under the ownership unbundling (OU) model, MPs have developed and submitted to the Verkhovna Rada on April 21, 2020, the draft law #3364 on amendments to current legislation. It aims at ensuring the certification of Ukrenergo under the independent system operator (ISO) model.

Gas market developments

From January 2020 on, all consumers started to receive separate bills for gas distribution, causing public dissatisfaction and several legislative initiatives to introduce an integrated bill for gas.

The government prolonged the PSO placed on Naftogaz to sell gas to municipal heating companies until May 1, 2021, and the obligations to create a gas resource for households until July 1, 2020. Market opening has been delayed despite the preferable price dynamics.

The NEURC published amendments to its regulations aimed at simplifying supplier switching for households. According to the draft, the household consumer will need to send a statement of acceptance of the standard supply contract with a new supplier, and the latter shall take all necessary measures. No participation or any other confirmation of the incumbent supplier is required. At the same time, the procedure still contains the clause of mandatory debt settlement with the incumbent supplier which has been considered a major barrier.

LLC "Gas TSO of Ukraine" (GNTSOU) joined ENTSO-G as associated member. It promoted a short-distance transit (short-haul) between EU member states (also in combination with storage in Ukraine). Backhaul (virtual reverse flow) started at a major interconnection point with Slovakia (Uzhgorod/Velke Kapusany) and a virtual interconnection point (VIP) "Bereg" was established with FGSZ (Hungarian TSO). GTSOU wants to establish similar VIPs with Poland and Slovakia. According to ICIS, there is still room for improvement with Romania. In July, GTSOU will offer annual capacities for gas year 2020/21 at all IPs.

These new services increased the attractiveness of the Ukrainian underground storages, which offer excess capacity for non-residents (e.g., European traders). In January-April, according to GTSOU, gas imports increased by 59% yoy, reaching 3.9 bcm. Most of the gas imported is injected to the storage in the 'customs warehouse' regime, with 162% yoy growth of gas injected by foreign companies.

Discussions on the change of RES support scheme

According to the NEURC, the installed capacity of RES under feed-in tariff has increased from 2.129 GW in 2018 to 6.379 GW in 2019, adding 738 MW before April 22, 2020. RES producers will generate about 8% of electricity in Ukraine but receive 26% of the cash market turnover.

Numerous meetings of RES investors and the government to settle this situation, mediated by the Energy Community Secretariat, did not yield results in the form of a memorandum of understanding (MoU). The MoU sets out the proposed measures that both parties could take, including a voluntary reduction in feed-in tariffs, accelerated responsibility for imbalances and a cut-off date for RE projects.

Given the complicated character of the negotiations and the pressing issue of Guaranteed Buyer financial deficit, the future of the industry is uncertain. Several foreign developers have even frozen their projects. Unfinished talks also prevent the government to approve annual support quotas and launch 'green' auctions.

Electricity market opening

Since the launch of Ukraine's electricity market, legal frameworks have been changing constantly. 16 changes were made during the first 9 months, and at least four more in the next quarter. Most changes introduced were not intended to increase competition, but rather to increase the level of administrative control.

The 'reforms' are mostly minor tweaks focused on re-regulation rather than liberalization and limiting the market power of existing market participants. Most changes attempted to manually control prices and redistribute financial flows rather than address the elephant in the room – a high market concentration.

In the mainland integrated power system trading zones (IPS), prices on the day-ahead market (DAM) have decreased in 2020 compared to 2019 (see Figure 1). This decrease, however, is not resulting from increased competition or structural changes on the market. Prices were affected mainly by the surplus of nuclear energy and imperfect balancing market rules. In January 2020, demand increased as grid operators are now covering technical losses buying on the market by themselves. Thus, suppliers to households now have less room for manipulation with volumes. This demand increase has somewhat counter-balanced the speculative supply in January, but the price dropped back in February. Legislative changes allowed to end speculative supply in March, and the price started to rise slowly.

Nuclear power dominates the organized segments of the market and its high supply depresses prices. The thermal generation, mostly private, faces no significant competition on bilateral agreements segment, as imports from Russia and Belarus have a very limited effect.

The Burshtyn Energy Island trading zone remains a classical representation of a monopoly. DTEK-related companies control >90% of generation, most of the cross-border transmission capacity – and by this, they control the supply. The result is a relatively stable high DAM price, exceeding

prices in IPS and neighbouring EU countries (see Figure 2). A significant share of DAM turnover consists of imports, which is most likely re-exported to EU countries. It is unclear why traders chose to exchange electricity among each other at high DAM prices only to export to the EU at lower prices. Import did have an impact on DAM prices but was limited by the significant market power of DTEK and their control over cross-border capacity.

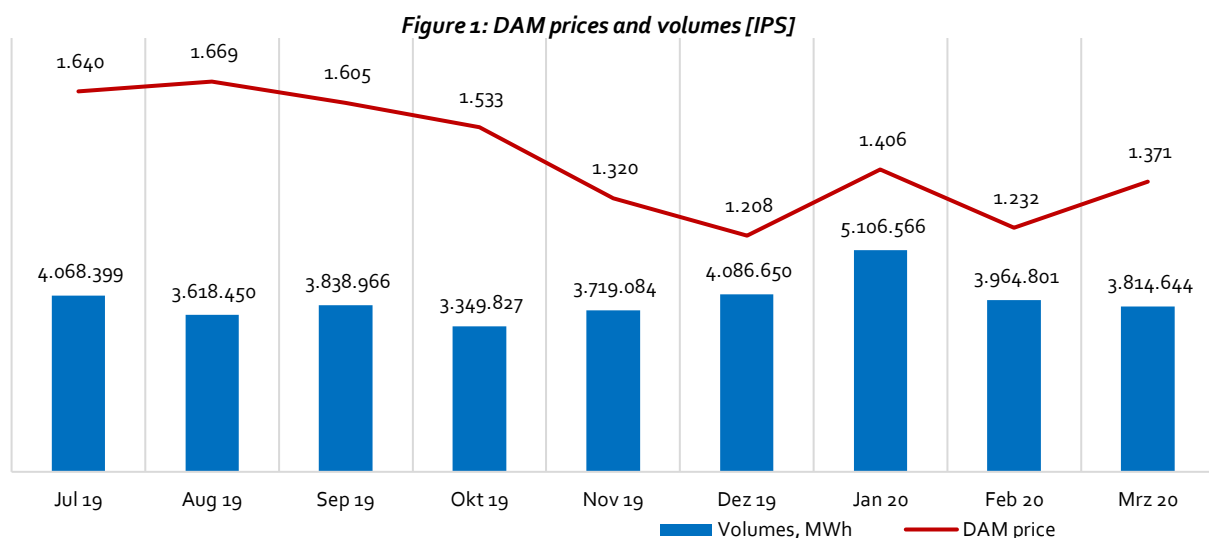
DAM-imbalance pricing loophole

Due to constant surplus of nuclear power on the market, traders were able to sell electricity on the DAM at higher prices than the price they had to pay to close their short-position on the balancing market. These uncorrected bids pushed DAM supply unreasonably high, squeezing even more nuclear out of the day-ahead into imbalances, creating a positive feedback effect. This loophole effectively syphoned away millions of hryvnias from the system by redistributing money flow from nuclear power plants operator Energoatom and the Guaranteed Buyer to speculative suppliers. Changes to the market rules effective from March 2020 set two different prices for negative and positive imbalances. This effectively closed the loophole, but the damage has already been done, fuelling the growing crisis in the market.

Debts accumulation

The previous model has resulted in UAH 30 bln accumulated debt before opening a new liberalized market. Around 1/3 of that debt is attributed to state-owned coal mines, and around 6 UAH bln is due to supply of power to non-controlled territories in the east. The main reason for this debt is that non-payments were tolerated and not being addressed. Today these 30 bln are still on the books of SOE Energorynok, and not much has been done either to manage the debt or address its source in the new model. In the current market model, new debts already beginning to accumulate.

In addition to non-payments from consumers, several new chains of debt emerged. One is attributed to a lack of funds to



Source: Market operator, Ukrenergo data, LCU calculations

Electricity market opening

cover RES support, which is financed through a TSO tariff. This deficit is a result of an administrative decision as the regulator approved a TSO tariff for 2020 which would cover only 1/4 to 1/3 of required RES support. In addition, due to the abovementioned imbalances pricing loopholes, the Guaranteed Buyer has experienced a significant drop in revenues. This led to payment defaults to Energoatom. All these problems are magnified by the pandemic-induced economic recession and payment discipline decline. In fact, the quarantine measures were not the reason of the payment crisis in the Ukrainian electricity market – they were merely a catalyst.

Cross-border trading

Eastern border. Import of electricity from Russia and Belarus under bilateral agreements was prohibited at the start of the market. It was allowed from October 2019, but after a political backlash was again limited from January 2020. Currently, import from Belarus is not limited to any market segment, import from Russia via bilateral agreement or the intra-day market (IDM) is explicitly forbidden, with the possibility for the Cabinet of Ministers of Ukraine (CMU) to lift the prohibition in order to prevent emergencies in Ukraine's IPS. The parliament is still considering banning any imports from the east, including Belarus, of any segment.

This resulted in insignificant import volumes in January-February 2020, to around 2% of DAM trade volumes. Today, imports to the IPS are curtailed in many cases by the system operator. They have been effectively stopped in April 2020 until the end of the quarantine. Also, imports observed between July 2019 and February 2020 could not affect the market prices significantly.

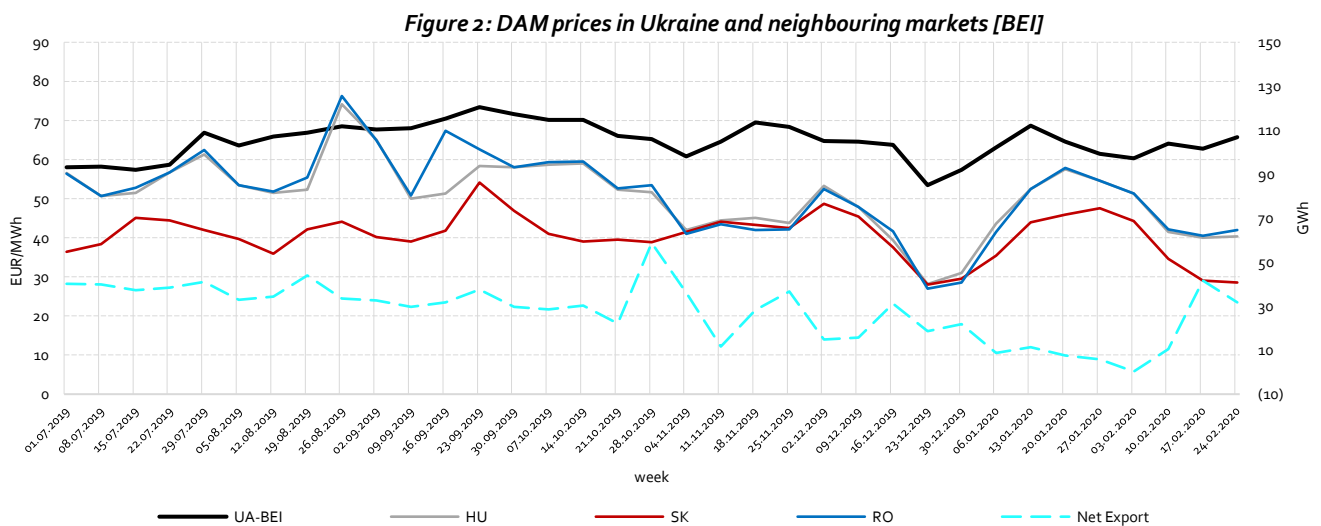
Burshtyn energy island - Entso-e. Since the beginning of 2020, Ukrenergo started monthly capacity allocations across the Slovakian and Romanian borders, in addition to the Hungarian one in 2019. On April 3, the NEURC adopted important changes to rules for cross-border capacity allocation. Among key changes are the introduction of capacity limits allocated to a single participant, penalties for underutilisation of allocated capacity, and changes to financial guarantees. These measures are designed to limit market power and lower entry barriers for competition.

Resume

The electricity market has entered a Covid-19 turmoil in an unbalanced state. Structural problems such as non-payments, lack of competition, both domestic and from importers, distortions due to PSO design, administrative control over prices – are now exposed more than ever. Volatility and imperfection of legislative framework show inconsistency in the authorities' approach to regulation and signals the continuity of tight state regulation. If fundamental flaws of the market structure will not be addressed, any minor change or tweak will not make the market function properly. Market concentration and a lack of competition, both on the wholesale and retail side, should be addressed as soon as possible. The administrative price control should be phased out.

More details on Ukraine's electricity market development are available in The Monitor of Electricity Market Opening (MEMO). MEMO is an analytical publication series that aims to present key developments in an emerging market. It is designed to provide professional and independent in-depth assessment and fact-based analysis of the Ukrainian electricity market.

You can find the latest MEMO issue #4 [here](#).

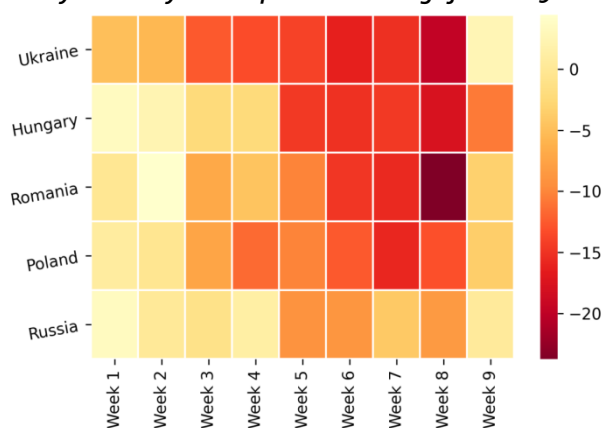


Source: Ukrenergo data, LCU calculations

The effects of Covid-19 on Ukrainian electricity consumption

The Covid-19 pandemic constitutes a massive shock for the global economy. Due to measures aiming at limiting the impact of the pandemic on the health system, economic activity has slowed down. Economies are not only expected to be affected by domestic measures, though, but also by measures in foreign countries, leading to an interruption of global supply chains, as well as to a decrease in demand for exports. The IMF projects a 3% contraction of the global economy – in contrast to a 2.9% growth in 2019 – which presents a bigger economic downturn than the global financial crisis.

Weekly electricity consumption as % change from 2019*



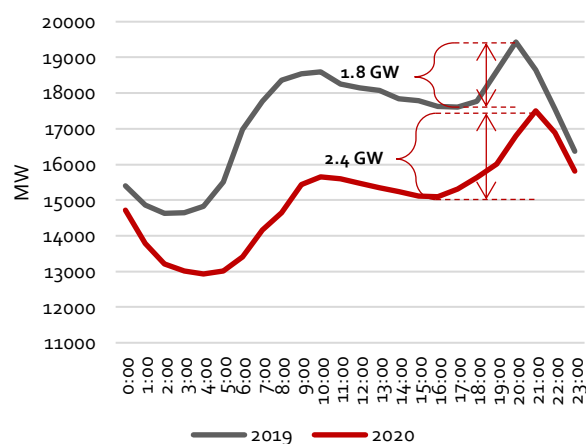
*Week 1 is 2-6 March 2020, compared to 4-8 March 2019

Source: Bruegel

Ukraine introduced strict quarantine measures in mid-March, closing foreign borders, limiting internal movement as well as social interactions. The quarantine measures affected electricity demand in two ways; 1) changing the level of demand and 2) changing the shape of the load curve. Starting in mid-March, electricity consumption contracted up to 20% compared to 2019 levels, coinciding with quarantine measures. In theory, higher temperatures could have caused the decrease in demand, but temperatures were on average slightly lower than in 2019. Controlling for temperature hence shows that the contraction in demand can mainly be attributed to the pandemic. The figure below illustrates that there was not only a change in the level of demand, but also a change in the shape of the load curve.

The average load profile in 2020 depicts a steeper evening peak than in 2019. This is caused by a shift in the share of different consumption sectors in total consumption. In April, industrial and commercial activity lay idle whereas people spent more time at home, causing the share of residential consumption in total consumption to increase. As residential electricity demand is commonly characterized by high evening demand, the evening peak in the average total load profile was hence more pronounced in April. This causes a higher demand for flexible capacities and consequently a larger ramp-up by thermal and hydro power plants in the afternoon. While quarantine measures will be faded out once the outbreak of the virus is under control, the effects on economic activity are expected to be noticeable beyond 2020.

Average hourly load for April 2019 and April 2020 weekdays



Source: ENTSO-E

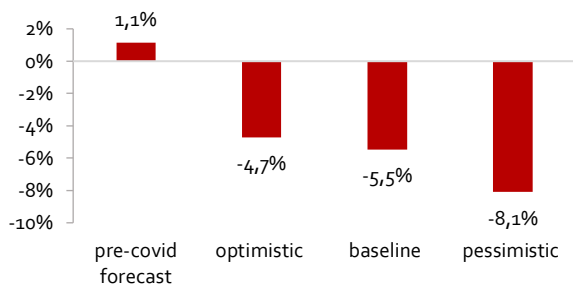
The German Economic Team (GET) Ukraine estimated the implications of Covid-19 on 2020 GDP with the help of an input-output model, taking both impact channels – the domestic measures as well as external shocks – into account. They estimate an optimistic, a baseline as well as a pessimistic scenario. In the optimistic scenario a quick relaxation of domestic measures is assumed, while for export demand the IMF WEO GDP projections are improved by 30%. In the baseline scenario domestic measures are extended moderately beyond currently announced dates, whereas export demand is based on the IMF WEO GDP projections. In the pessimistic scenario, on the other hand, domestic measures are assumed to be extended significantly. Here, export demand is determined by 30% worsened IMF WEP GDP projections. The real GDP forecast ranges from a contraction of 5.9% in the optimistic, of 7.0% in the baseline to a contraction of 11.2% in the pessimistic scenario. The contraction is mainly caused by the Covid crisis, but also takes other factors like weather – which is likely to result in a lower harvest – into account. The economic downturn is mainly driven by a steep decline in domestic demand, whereas net exports deliver a positive impulse as imports shrink faster than exports. Nonetheless, compared to the pre-crisis forecast of 3% growth, the pandemic constitutes a massive economic shock.

But what does this imply for electricity demand and consequently for the electricity market? To investigate this question, we used a top-down regression and time series model of hourly, long-term electricity demand. The electricity demand model consists of three parts: a long-, medium- and short-term component. The long-term component is built on a regression model, based on demographic (i.e. population) and economic (i.e. GDP) variables. The medium-term component accounts for intra-year fluctuations and is based on temperature, calendar variables and a stochastic part, while the short-term component accounts for intra-day fluctuations, based on calendar variables and a stochastic part. To evaluate the implications of the Covid crisis, the long-term component is used and the GET GDP projections are fed into the model. Population figures are based on Ukrstat data from the beginning of this year, reflecting a slight decrease in population compared to 2019.

The effects of Covid-19 on Ukrainian electricity consumption

We estimate a contraction in 2020 electricity demand from 4.7% in the optimistic, 5.5% in the baseline to 8.1% in the pessimistic scenario, compared to a projected increase in demand of 1.1% for the pre-crisis GDP projection. Even if Ukraine's economy successfully bounces back in 2021, it might take longer to recover 2019 output and electricity consumption levels: If GDP is assumed to grow by 3-4% in the following years again, it would take at least until 2022 until electricity demand returns to 2019 levels.

Electricity demand forecast scenarios 2020



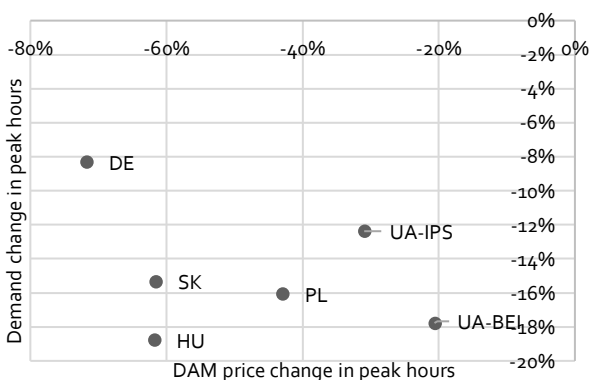
Source: IER, GET Ukraine, own calculations

These projections are, however, subject to uncertainty and depend on a variety of different factors, including the course of the pandemic, containment efforts and behavioral changes. Therefore, the results represent a first benchmark but should be updated once the consequences of the crisis are foreseeable.

Beyond the statistical uncertainty of demand projections, there is little doubt, however, that the decline in electricity demand will affect Ukraine's electricity market and the country's electricity generation mix.

One would expect that on a well-functioning market, lower demand – all other things being equal – would lead to lower prices. For most European electricity wholesale markets, this could actually be observed in April 2020. The figure below shows the 6-month relative change in average prices for peak electricity on the day-ahead markets (DAM) for some of Ukraine's western neighbor countries and Germany.

Peak load and DAM peak prices, 6-months relative change (Apr '20 vs Oct '19)



Source: ENTSO-e transparency platform, UA Market Operator data

While the reduction in electricity demand during peak hours is of the same order of magnitude for all the depicted countries (~10-20%), the magnitude of price changes differs between countries. Compared to its neighbors and Germany, Ukrainian

DAM peak prices – especially in the Burshtyn Island zone (UA-BEI) – were less affected.

This rather modest impact of the Covid crisis on Ukrainian wholesale prices might be due to Ukraine's wholesale market regulations as well as market structure and requires further assessment.

The decline in electricity demand is likely to change the electricity generation mix in Ukraine. This effect will be enhanced by the projected increase in renewable generation in 2020. Lower demand and a rising renewables infeed both exert downward pressure on residual load (load minus renewable electricity infeed). This means that the traditional dispatch of conventional generators such as nuclear and thermal plants – which are serving the residual load/demand – will need to change. Further analysis is needed to determine the optimal dispatch of the Ukrainian electricity system in this new situation.

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.

Editor: Dr. Georg Zachmann

Contributors: Roman Nitsovych, Bohdan Serebrennikov, Oleksii Mykhailenko, Julia Breuing, Clemens Stiewe, Manuel von Mettenheim

BE Berlin Economics GmbH | Schillerstraße 59 D-10627 Berlin | +49 30 / 20 61 34 64 - 0 | info@berlin-economics.com | [Impressum](#)

