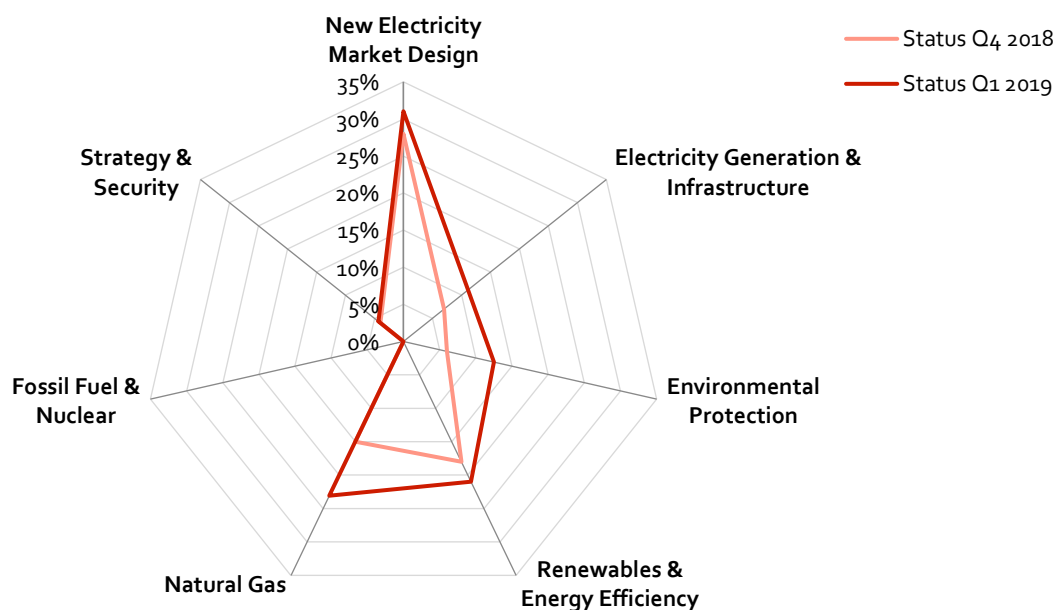


Quarterly Monitoring Report on the Implementation of Ukraine's Energy Action Plan

April 2019



Executive Summary

The most pressing energy policy issues at the beginning of the second quarter are the organisation of future gas transit and the introduction of the electricity wholesale market.

A functioning electricity wholesale market can determine (1) what new power plant capacities are really needed (optimal investment) and (2) which power plants should be operated when (optimal dispatch). An efficient market will allow to reduce excess reliance on dirty power plants and makes the integration of variable renewables into the system cheaper. The market – as it is currently prepared – will however fail these expectations.

One issue are **debts**. Already today, consumers owe suppliers around UAH 33 bln. Covering this historic debt from public budget will be very expensive and not solve the problem. Increasing electricity prices due to deregulation and increasing cost will result in a quick accrual of new debt – as it is unlikely that Oblenergos can be forced to pay their supply bills. But without solvent counterparties, a free market cannot function. Another issue is **market power**. Given the low number of generation companies, individual market participants might reduce production of efficient plants to increase prices. Finally, a convincing **master plan** on how the different parts of the electricity market interact is missing.

We hence suggest to take a step back and address these three issues systematically before the market is opened. Clear and realistic rules on cutting supplies should prevent the accrual of new debts. Market power needs to be mitigated by allowing competition from independent producers and from market-based imports. And high-level political coordination of the market opening process should be re-established, to ensure consistency of the rules and transparency of price-formation. In the end, only a functioning wholesale market will provide predictable price signals to attract investments into the gear needed to accommodate high shares of renewables such as flexible plants or storage.

Assessment by Sector

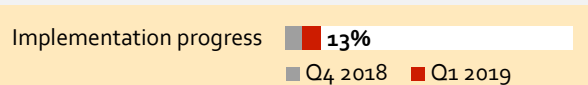
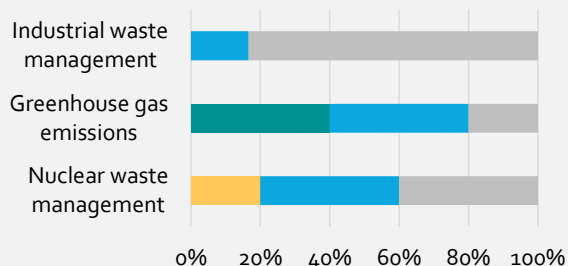
About the Assessment

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

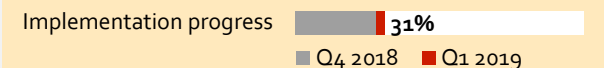
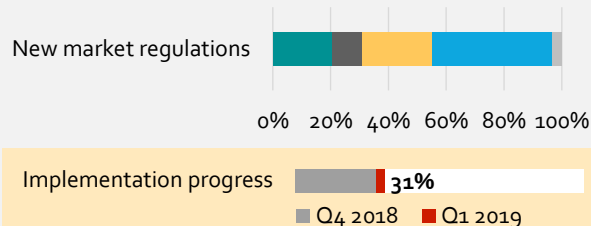
- Completed and serving the purpose of the ESU
- Completed but not serving the ESU's purpose
- In the political process
- Overdue
- Scheduled for later

Environmental Protection



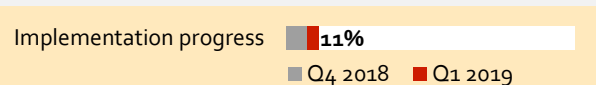
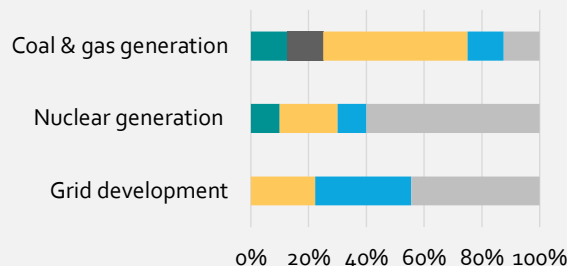
The draft laws 9253 "On principles of **GHG emissions** monitoring, reporting and verification" and 9082 "On Ozone Depleting Substances and Fluorinated Greenhouse Gases" have been adopted in the first reading. President Poroshenko signed the Law "On main principles (strategy) of state **ecological policy** until 2030", which will come into force in 2020. The CoM approved a new national plan for **waste management** until 2030. Stakeholders' approval procedure of the corresponding draft law "On waste management" is ongoing. The document is expected to be approved by the CoM in Q2 2019 and transferred to the parliament afterwards. The work on updating Ukraine's **NDCs**, supported by EBRD and SIDA, is ongoing, with a new methodology presented by the Institute of Economics and Forecasting. Ukraine restarted the cooperation with Spain on trading with Assigned Amount Units within the Kyoto protocol framework, with the first projects planned to be a thermal modernisation of the Kyiv National University and a PV plant in the Chornobyl area.

New Electricity Market Design



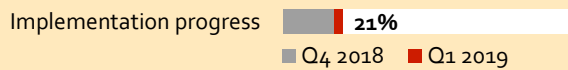
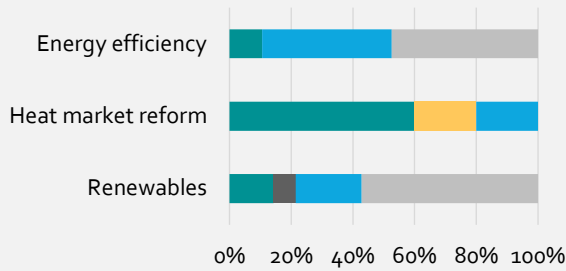
The first months of partial retail market liberalisation were characterised by **data flow** problems between market participants and Energorynok which were mostly resolved later in February. The question of **debts** was on the table once more (more on this below). The regulator NEURC suggested that both an obligation to supply power to households and to cover expenses for the renewables support system should be financed by the future profits of **Energoatom**. The test operation of the wholesale market suffers low participation and does not allow to infer risks and realistic prices. Ukrenergo's **corporatisation** process was restarted: A reorganisation commission was established and a new action plan was approved by the Ministry of Finance. Payment for the new **market management software** was delayed due to a temporary blockade by the Ministry of Energy. In March, the Cabinet of Ministers (CoM) decided that Ukrenergo does not have to approve payments with the Ministry of Energy.

Electricity Generation & Infrastructure



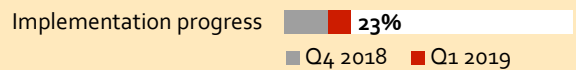
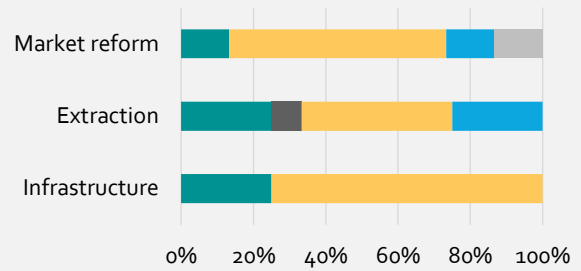
The government agreed on the draft law allowing construction of Blocks 3 and 4 of **Khmelnitsky NPP** but it is still unclear when it will be presented to parliament. The tender deadline for the **PPP project** "Energy Bridge Ukraine-EU" was prolonged for 15 days and ended on March 27, 2019 but no results were published by the Ministry of Energy. Ukrhydroenero signed a UAH 1.3 bln contract to modernise turbines and generators of Kremenchug HPP. Ukrenergo finalised its 2019-2023 development concept for **transmission system cybersecurity** and **infrastructure**. DTEK put block 10 of Prydniprovsk TPP back into operation after installing new electrical filters and switching to G-grade coal. According to the Ministry of Energy, no CHP will manage to obtain **state support** for modernisation before the electricity market introduction on July 1. The CoM is expected to initiate tenders for 500 MW of **new generating capacities** in late 2019/early 2020.

Renewables & Energy Efficiency



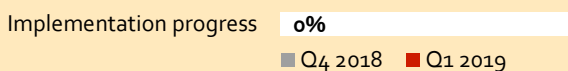
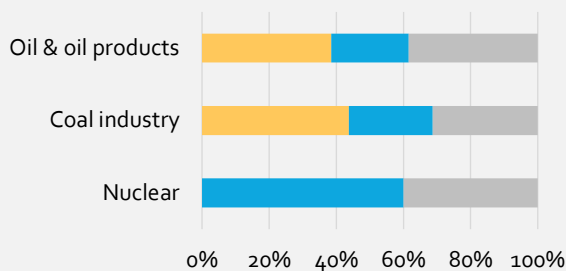
Draft law 8449-d introducing **auctions for renewables (RES)** was adopted by parliament on April 25 and is now due to be signed by the president. While the speed of new **RES deployment** in Q1 2019 outpaces forecasts, the adopted law still allows for high feed-in tariffs to be secured until the end of 2019 and may pose further risks for the market's financial stability. In 2019, the CoM adopted and launched the system of **monetisation** of consumers' heating subsidies. So far, two models of monetisation are in place: monetised savings after the heating season via Oschadbank accounts, and payments in cash or wire transfer of the whole monthly subsidy. According to the Accounting Chamber of Ukraine, the efficiency of the support scheme to promote energy efficiency (so-called "**warm loans**") was not well evaluated between 2016 and 2018 as post-assessment procedures conducted by SAEI were based on simple surveys of beneficiaries – an approach which may not have been objective.

Natural Gas



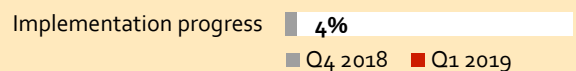
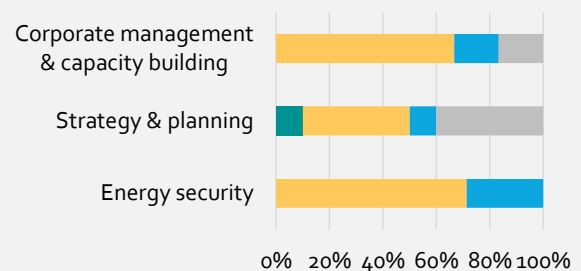
The success of first **e-auctions** for special permits represents major progress in the **upstream sector**. The government announced 12 competitions to conclude PSAs, yet the process is criticised for lack of full clarity and the CoM plans amendments to the PSA law. Updated Security of Supply Rules, including Disconnection Order, and National Action Plan in gas market, took effect. **Daily balancing** launched on March 1, with minor technical issues to be solved. Two models of **unbundling**, OU and ISO, are discussed. As preparation, Naftogaz created a TSO as a subsidiary (LLC) to Ukrtransgaz, and reported on developing a package of contracts for the purpose of **property rights transfer**. NEURC developed several drafts to refine **network codes** – on capacity allocation, balancing groups, TSO balancing charges, financial guarantees, short-haul services, and commercial balancing of PSO suppliers. The Ministry of Energy reported on the inventory of **state assets** used by DSOs – further work on asset lease depends on a change in legislation.

Fossil Fuels & Nuclear



The Ministry of Energy created a working group developing a concept for the **gas and oil refining** industry and a state policy on crude oil supply and transit. The State Property Fund finalised the Odessa refinery assets inventory and started looking for investors. As for **minimum reserves of oil and petroleum products**, the State Reserve Agency only plans to fund engineering and technical measures. Following audits of **state-owned coal mines**, the Ministry of Energy selected viable and unviable entities. However, no official list was approved to confirm the closure of selected mines. In addition, parliament prolonged the ban on mines closure and bankruptcy until January 1, 2022.

Security, Strategy & Governance



Amendments of the Naftogaz charter were criticised as detrimental to **corporate governance**. No progress was reported on the draft law "On Critical Infrastructure and its Protection". The Ministry of Energy held several exercises on **modelling and forecasting** Ukraine's energy balance by 2050. The Anti-Monopoly Committee (AMCU) introduced new reporting forms for all **state aid** providers and recipients. Starting from January 21, notifications about new state aid and amendments to the conditions of active state aid shall be submitted. The AMCU introduced separate forms for notification about new individual state aid and the new state aid programme. However, the draft CoM resolution on criteria for state aid eligibility in the coal sector is pending approval.

Key Developments in Ukraine's Energy Sector

Developments on the draft law introducing RES-e auctions

The draft law 8449-d was adopted in the first reading on December 20, 2018. Together with DiXi Group and the AURES II project, Low Carbon Ukraine (LCU) submitted detailed recommendations on the draft law positions, which were part of a joint letter signed by the EU delegation, Energy Community, EBRD, World Bank and IFC.

On February 27, the parliament's Energy Committee approved 118 out of 257 amendments. The draft law was finally adopted by parliament on April 25.

The final text is not yet available for assessment, but it is clear that some crucial amendments were included. Among those are the start of the new support scheme in July 2019, feed-in tariff (FIT) for wind and PV decreases from 2020 and lower thresholds for obligatory auction participation (1 MW for PV, 5 MW for wind starting in 2020). A provision that limits the duration of grid connection permits to 3 years (2 for PV) was adopted. The maximum capacity for households PV is now increased to 50 kW and FIT and no-license regime for commercial and industrial installations up to 150 kW is introduced. Moreover, only rooftop solar and facade-mounted PV installations are considered residential PV.

In general, the new law is a significant step forward towards a sustainable support for RES in Ukraine, but the result will depend on further implementation. Now, the law is due to be signed by the president, and after that the CoM will have only around 6 months to prepare all required regulations.

Even with the auctions to start in 2020, the adoption of this draft law is long overdue. With wind and solar producing around 2% and accounting for UAH 16.8 bln (incl. VAT) in feed-in tariffs (FIT), or 8.6% of generation costs, these figures are expected to grow dramatically in 2019. Compared to previous estimates made by LCU of 1.7 GW additions in RE in 2019, 0.86 GW has already been granted FIT in Q1 2019. At this pace, renewable generation may account for more than UAH 27 bln in 2019 already (+60% YtY increase). If the RE auctions were obligatory already in 2019, this might have helped to avoid up to EUR 1 bln of FIT payments for the 2019-2030 period.

The quickly growing FIT payments also pose risks to state-owned Energoatom, operator of nuclear power plants. According to the Law on Electricity market, for one year starting from July, 1 2019, Energoatom's revenues will be the source to cover the difference between FITs and market prices. At the same time, Energoatom is also considered for PSO to cover the difference between market prices and regulated tariff for universal service supply. Energoatom's financial stability therefore proves to be crucial for the sustainability of these support schemes. The expected difference between market prices and FITs for mid 2019-mid 2020 may result in

UAH ~20 bln payments to the Guaranteed Buyer, while the subsidies needed to cover the costs of universal supply to households amounted to UAH ~40 bln in 2018. By contrast, Energoatom's revenues were around UAH 44 bln in 2018 – which implies that prices for nuclear electricity would need to grow significantly to ensure Energoatom's financial stability. So far, it is not clear how this could be achieved.

Launch of daily balancing on gas market and Naftogaz issues

The (delayed) switch from monthly ex-post to daily balancing on the gas market was made on March 1. For this purpose, NEURC has approved amendments to the Gas Transmission System Code regarding capacity allocation mechanisms. However, the Regional Gas Company, which manages DSOs owned by Dmytro Firtash, listed several problems including incomplete information about consumers and consumption volumes, as well as cases of unjustified nominations resulting in losses.

On the other hand, Naftogaz CEO Andriy Kobolyev reported that the TSO information platform has recorded facts when DSO-affiliated PSO suppliers have sold gas for the needs of household to commercial consumers. Ukrtransgaz shall fix minor technical issues, as the platform performance is subject to NEURC monitoring – the regulator's inspection in April confirmed the platform functionality and indicated the needed technical improvements. The TSO/DSOs disputes could be mediated by the regulator as well. NEURC shall also focus on solving the issue of unauthorized offtakes.

At the same time, NEURC started inspections of DSOs regarding the issue of overcharging consumers by recalculating gas volumes distributed to standard conditions. Each of the DSOs checked so far was fined with 850,000 UAH.

In March 2018, the Cabinet of Ministers has amended the charter of Naftogaz, which is to be reorganised into a private joint-stock company. However, amendments which raised concerns included the right to appoint the CEO and members of the Board to the General Assembly (i.e. the government) instead of the Supervisory Board. Also, the General Assembly can "in exceptional cases" make decisions mandatory for implementation by the Supervisory Board. These changes were strongly criticised as stepping away from the OECD principles of corporate governance.

To prevent the possible misuse of new provisions for political influence on the company performance, amendments to the Naftogaz charter shall be reviewed to ensure full compliance with the OECD principles and the Law on Joint-Stock Companies. Moreover, the government has to facilitate the adoption of the draft law 6428 on improvement of SOEs' corporate governance.

Debts in the Ukrainian Electricity System

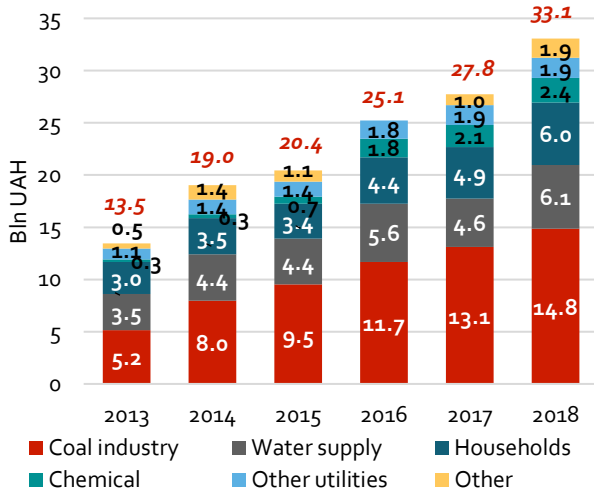
STARTING with unpaid electricity bills from consumers, debt trickles down the entire Ukrainian electricity value chain, leaving almost no participant unaffected. The problem of accumulated debt poses a major obstacle on the way towards a new electricity market as envisioned in the Energy Strategy of Ukraine. A solution to this problem needs to be found before the new electricity market design is introduced. Simply writing off old debt is clearly the wrong way as it would even encourage running into debt again. Instead, the roots of the current problem need to be identified and addressed.

The main debtors on the consumer side

The accumulation of debt on Ukraine's electricity market starts with consumers not fully paying electricity suppliers for the electricity they consume. In consequence, these suppliers cannot fully pay for the electricity purchased from the wholesale market operator Energorynok. Energorynok, in the end, cannot fully pay neither the electricity generating companies, the transmission system operator (TSO) Ukrrenergo nor their tax obligations to the state budget. Only within the last five years, the amount of debt to suppliers has increased by around 20 billion UAH and has thus more than doubled.

It is worth taking a closer look at the landscape of debtors on the consumer side: Ukraine's coal industry is by far the biggest debtor – between 2013 and 2018, coal industry accounted for 49% of the entire debt to suppliers. The absolute amount of its debt has almost tripled during that time. Coal industry is followed by households (15% of total debt to suppliers), Water supply companies (14%), and the chemical industry (11%).

Dynamics of consumers' debt to suppliers, bln UAH



Source: Own calculations

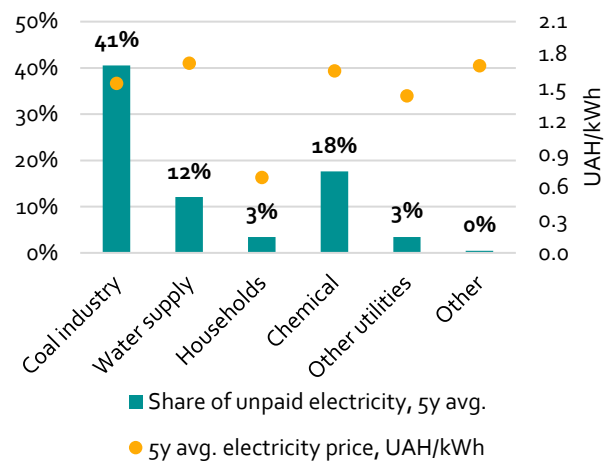
After the implementation of the new retail market in January 2019, many "notorious" debtors such as coal and water supply enterprises were transferred to the supplier of last resort, Ukrinterenergo, where new debt piles up now.

Still, the mentioned debtors only constitute small shares of total electricity consumption: With the exception of

households, who consume 16% of total electricity, the other three only consume less than 5% respectively. This indicates that payment discipline is especially bad among these actors.

In fact, the coal industry has paid less than 41% of the electricity it consumed during the last 5 years. The payment discipline for other consumer groups is significantly higher. Especially household consumers (who pay the least for each kWh of electricity) perform well. One would therefore expect higher prices leading to worse payment discipline. However, the graph below shows no clear correlation between the two.

Shares of unpaid electricity and electricity prices



Sources: Own calculations

What the data do show is that absolute debt accumulation rises with increasing electricity prices – which is just logical given that debts are the product of (unpaid) consumed kWh times their price per kWh. Over the last five years, Ukrainian electricity consumers have faced an average 20% increase in electricity prices. At the same time, debt accumulation has on average increased with similar speed. Still, this relation is weaker for households, which have experienced a 29% price increase over five years but show an accumulation of debts of only 14% over that time, indicating a weaker link between payment discipline and price increases.

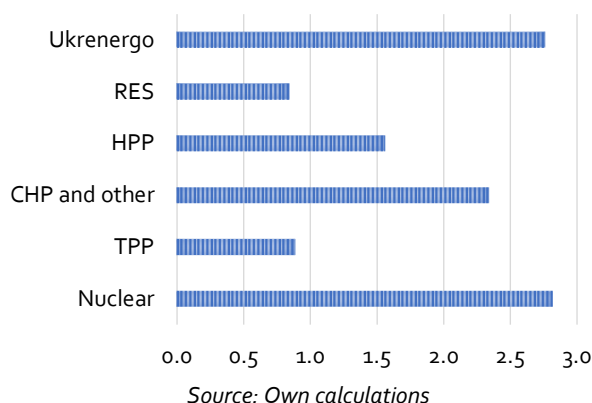
Why is Ukraine's coal industry so heavily indebted? Around 65% of total coal industry debt stems from state-owned companies. First, this might result from the fact that state-owned coal mines are largely unprofitable, which makes it difficult for those companies to cover their electricity costs. Second, the large share of state-owned debtors could indicate inefficiencies in the regulatory framework or in its enforcement. Third, some coal enterprises might be located in non-controlled territories of Ukraine.

The indebtedness of water supply and chemical enterprises is mainly due to the fact that many of them have been protected from forced electricity cut-offs as a result of unpaid bills because such abrupt cut-offs could cause environmental damage. Despite the obvious need to protect security-related industries, this regulation might have been detrimental to the incentive to pay electricity bills.

State-owned companies – big in debt, big in credit

Once consumers get into debt by not fully paying supplying companies for what they consume, this debt is passed on from suppliers to Energorynok. Eventually, it ends up at the beginning of the electricity value chain – generating companies and the TSO – that are not fully paid for their product or service by Energorynok. Moreover, the state budget is therefore partially deprived of the taxes on electricity. There are large differences between generating companies in the amount of accumulated debt. Of all the electricity that was not paid for by Energorynok to generating companies, state-owned Energoatom – the operator of all four Ukrainian nuclear power plants (NPP) – accounts for 44% alone. By the end of 2018, this added up to 12.4 billion UAH (390 million EUR) in outstanding payments to Energoatom. Following Energoatom, operators of thermal power plants (TPP) have open receivables of 6.8 billion UAH (24%), operators of combined heat and power plants (CHP) have 4.7 billion UAH (17%) and the state-owned operator of hydro power plants (HPP) has 1.2 billion UAH of outstanding receivables. Summing up, this shows that state-owned companies and the state budget have the highest receivables. One might assume that Energoatom's share simply results from the fact that nuclear provides around half of the country's electricity. Yet, a comparison of debt to the turnover of the respective generator gives a better picture of the burden that these companies carry.

Receivables-to-turnover ratio for generators and TSO, 2018



➤ A ratio of 2 means that accumulated receivables are two times higher than the usual monthly turnover

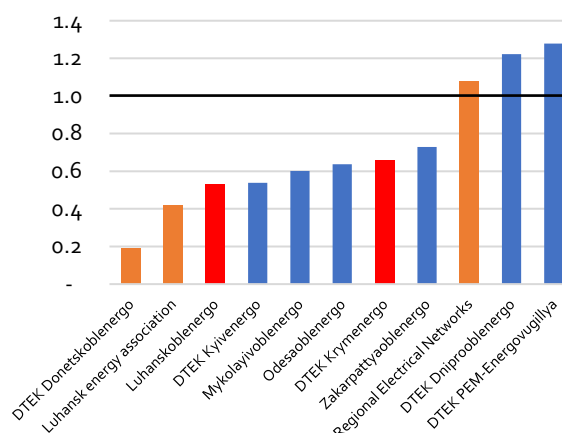
The figure above shows that the receivables-to-turnover ratio is especially high for state-owned companies – Ukrenergo, HPP-operating Ukrhydroenergo, and NPP-operating Energoatom. In the end, these companies suffer most from the initial debt from consumers to suppliers, which interestingly also stems to a large extent from state-owned companies not paying their bills.

Suppliers inflate the amount of debt in the system

Finally, one needs to take a closer look at the role of suppliers in the Ukrainian electricity debt scheme. Suppliers have to purchase every kWh of electricity they sell to consumers from the wholesale market, which is operated by Energorynok. If consumers do not pay their bills, suppliers cannot pay Energorynok in turn. Yet, it turns out that many suppliers have

even higher liabilities to Energorynok than receivables towards consumers.

Coverage ratio of electricity suppliers



Source: Own calculations

- Companies that do not conduct business
- Companies with debts from non-controlled territories

➤ A coverage ratio above 1 means that consumers' debt is enough to cover debt for electricity to Energorynok

The graph above shows that several suppliers have even more debt to Energorynok than receivables towards consumers. Altogether, 8.6 billion UAH of debt to Energorynok is not covered by receivables towards consumers. It must be taken into account that some suppliers are from currently non-controlled territories of Ukraine, which means that short-term enforcement prospects for Energorynok are limited. As of 2018, two heavily indebted suppliers have moreover stopped operations – their debt amounts to 2.4 billion UAH and might never be collected.

What remains to be done before a new market starts

Ideally, the existing debt problem on Ukraine's electricity market should be resolved before the introduction of the new market, scheduled for July 2019. It would be a grave error, however, to choose the simplest of all options: Writing off the existing debt and hoping that the problem disappears. The opposite would happen – knowing that the government stands in every time debts are out of control by freeing debtors from their obligations, debtors' payment discipline would likely be even worse afterwards.

Instead, it is highly important to avoid the emergence of new debt and to tackle the root of the problem. On the consumer side, this might involve the need to restructure unprofitable state-owned coal mines, which hardly pay their utility bills. Another challenge is to improve the compliance with grid codes – that means cutting off consumers that do not pay.

If this debt problem is not solved properly by new market rules, it might as well turn into a real security problem soon: Energoatom, which already complained that regulated tariffs are too low to cover maintenance costs for their NPPs, additionally faces the highest pressure from ever-increasing debt piling up as receivables on their balance sheet.

Electricity Market Reform

AFTER two years of preparations, Ukraine is supposed to open its electricity wholesale market in July 2019. That is, traders, suppliers and large consumers will be able to buy electricity freely from different generators. But there remain some important implementation challenges which in our view suggest that central coordination of the implementation should be revitalised and it might be better to phase-in the market more slowly.

Wholesale market is important for renewables and efficiency

A functioning wholesale market makes sure that the cheapest available power sources are used to meet the demand – and that prices reflect the true cost of production. This encourages cost-optimal dispatch of the system, cost reductions at power plants and economical usage of electricity. For example, increasing prices in times of high demand and low solar generation might encourage consumers to reduce power consumption, hence avoiding the need to switch on additional coal units. Furthermore, a functioning wholesale market is needed to ensure the profitability of Energoatom – the company whose profits are supposed to cover the cost of feed-in tariffs. Finally, more cost-recovering wholesale prices can reduce the subsidies needed for renewables – possibly making them cost-competitive on the open market¹.

Market design is a complex task

Electricity wholesale market opening is not an easy exercise. Flows of data, money and electricity between generators, consumers, traders, system and market operators must run smoothly in real time. This will require more than 100 pieces of secondary legislation that clearly define the responsibilities of the individual players, data-exchange protocols and software need to be rolled-out and people need to be trained for the new system.

The wholesale electricity market is not just one market – but a sequence of markets to ensure that all actors have the best market-signal for their operation. Based on the price-signal in *longer term markets* (e.g., a year or a month ahead of delivery), power plant operators can plan their maintenance schedules and fuel purchases. Based on the price on the *day ahead market*, power plant operators can decide on whether they will run their plant (starting up is more costly than running a plant). Based on the *intraday market* price plant operators can decide to adjust their planned production. And based on the *balancing market* price very flexible units such as pump-storages can decide whether to produce and hereby ensure that demand and supply are equal. Finally, in the ancillary service market, the system operator procures a couple of services important for the stability of the network from market participants – such as reactive power or very quickly activatable reserves.

In the design it is important that the responsibilities of each actor in each market are very clearly defined, that each actor has a strong incentive to deliver what he/she promised and that the system can even survive the failures of individual actors. This is not impossible but it requires thorough preparation. In the EU, corresponding markets are working seamlessly and are

even integrated across borders – which multiplies the complexity.

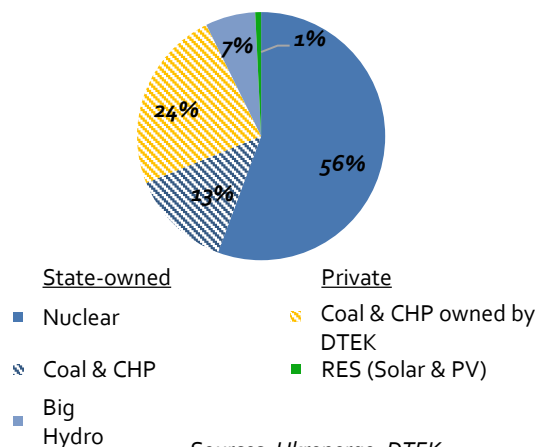
Preparation behind schedule

In Ukraine, the preparation of the introduction of the electricity wholesale market currently runs behind schedule. Important software to link the system operator, the market operator and market participants has not yet been successfully tested. Several market participants are not certified – so we cannot be sure whether they will be able to fulfil their assigned role. Important parts of the complex rulebook have not been prepared/approved. There is no mechanism in place to monitor and quickly sanction abusive behaviour – such as capacity withholding or excessive pricing - of individual market players. There are no template contracts between market participants. The rules of financial guarantees seem not to ensure that only financially viable companies can participate in the market.

Market power remains an issue

Markets only provide efficient results if there is competition – otherwise dominant players will deliver suboptimal services at too high prices – irrespective of the market design. Currently it appears conceivable that most of the electricity generation from Energoatom and Ukrhydroenergo will be dedicated to regulated supplies to vulnerable customers – while electricity imports remain blocked. If this should materialise almost only DTEK and Centrenergo will compete for the market. Hence, the temptation to increase prices beyond cost will be high.

Electricity generation by sources, 2017



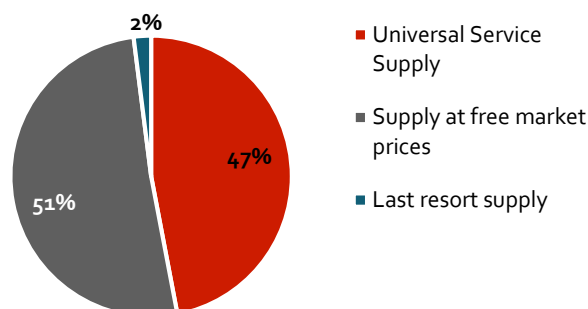
The risk of insufficient liquidity in the new wholesale market

In addition to a potentially strong concentration on the supply side, the risk of too low liquidity poses another threat to a successful new market. As shown in the figure below, half of the power exchange in the current system happens outside the wholesale market under regulated conditions. Smaller consumers (currently all with <150 kW per year) can get regulated tariffs and certain consumers such as water supply enterprises cannot be cut off from power supply for environmental reasons.

¹ At a Rotterdam+ coal price of about 100 USD/t [5200 kcal] and a plant efficiency of 33% the pure fuel cost of a coal plant are on par with the levelised cost of a utility scale solar PV installation [39-63

€/MWh according to "Fraunhofer (2018). Levelised Cost of Electricity Renewable Energy Technologies".

Segments of Ukraine's electricity market as of Feb '19



Source: NEURC

Furthermore, some of the consumers that would constitute the free market segment are integrated with generators. About 10% of total electricity in Ukraine is consumed by energy intensive companies (especially metals) belonging to SCM – the parent company of DTEK. They will likely not trade their electricity on the market. In addition to that, DTEK also controls some Oblenergos.

The way in which state-owned generators/aggregators such as the guaranteed buyer of renewable energy, Energoatom and Ukrhydroenergo will release their volumes to the market, will shape the liquidity in the different market segments (term market, day-ahead, intraday, balancing). If, for example, most of this electricity is sold in the form of long-term products (e.g., yearly baseload), strategic players with own generation assets might acquire these volumes and resell them with a profit in the shorter-term markets. Therefore, it is important that these volumes are released in all market segments.

Implementation requires more coordination

As all parts of the system need to work together the implementation of such a complex process requires a lot of coordination. Currently, the individual actors [Ukrenergo, NEURC, Ministry, Energorynok, Oblenergos, generators] are implementing (parts) of their requirements for the new market. But an overall coordination that ensures that the pieces of the puzzle fit together is at best happening informally. Such a voluntary coordination only works as long as there are mutually beneficial solutions that do not create problems in other areas. But important decisions imply shifting cost and benefits between actors. If, for example, Ukrenergo procures a software to communicate in real time with the generators and consumers, but this software is difficult/expensive to implement at for the market participants (and if Ukrenergo constantly changes the data-formats) market participants might delay the process. If Energorynok tries to centralise all the data without proper access for the other actors they might not want to share it. Or if the regulator does not provide legal certainty on important rules in order to avoid mistakes, market participants cannot prepare their parts. Moreover, timing is key. No actor will move ahead with complex and costly reforms when he cannot be sure that the others are doing their part.

Such issues are normal – but they cannot be solved bilaterally, but require politically legitimate coordination. Hence, high-level political coordination is necessary to resolve such thorny issues and make the market opening a success.

A wrong start is worse than a late start

If the market is started before it is ready it might lead to an unmitigated disaster. The 2001 Enron crisis in California shows what political fallout a failed market design could have: Skyrocketing prices and market participants that cannot fulfil their supply obligations even though they were paid ultimately caused rolling blackouts. This had lasting financial consequences for the state. Such a backlash in Ukraine might also be seen as a failure of the European model and hence have wider political consequences. Therefore, it is more important to get the market right, than to risk a failure.

But Ukraine should not lose time by just postponing market opening by some month, hoping that the technical difficulties are sorted out by then. Because they won't. The underlying problems need to be addressed immediately to ensure a success of market opening, eventually. (1) Debts: Metering and rules need to be in place to ensure that anybody that consumes more electricity than contracted is quickly cut from the grid and cannot reconnect unless he pays his debts. (2) Competition: The privatisation of Centrenergo to a non-incumbent player and the enabling of free cross-border electricity trade through Burshtyn island are crucial to have at least some competition. (3) Coordination: High-level political coordination of the market opening process needs to be re-established. It should feature a clear and transparent Action Plan that is overseen by a high-level coordination group that meets more than once a month and can be supported by external experts. Such a process can quickly enable the introduction of a functioning wholesale market that will provide predictable price signals to attract investments into the gear needed to accommodate high shares of renewables such as flexible plants or storage.

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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