

Monitor of Electricity Market Opening

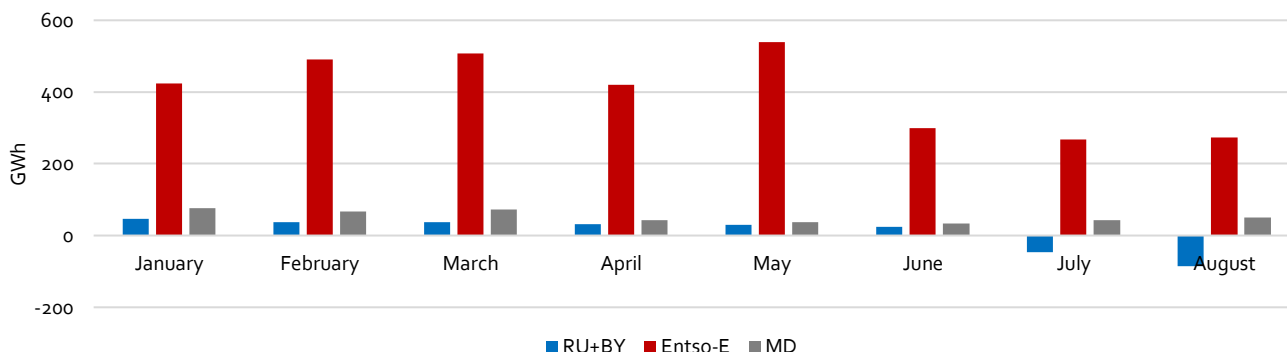
Issue #3. September 30th, 2019

Ukraine opened its electricity wholesale market on July 1st 2019. This monitoring report is an analytical publication series that aims to present and analyse key developments in the emerging market.

Executive Summary

- I. Market regulations continue to adjust financial flows in the system. This time Energoatom and Ukrhydroenergo are required to provide more electricity at low prices to the Guaranteed Buyer (GB) so that the GB can increase profits from selling this power at higher prices and use these additional revenues to take over financing renewables support costs from the transmission tariff. While this allowed to decrease the transmission tariff for the time being, it may put renewables support at a risk if the profitability of the GB is challenged – e.g., by the discussed reduction in price caps at which the GB can sell its electricity. Furthermore, it implies that more and more electricity is traded at regulated prices – undermining the very idea of market opening.
- II. Ukraine's electricity imports from Russia and Belarus continue to rise (see Figure 1 below). Nevertheless, import volumes remain limited in terms of total market volumes. However, recent changes to the Law allowed to import power from Russia and Belarus under bilateral agreements, which was not possible before. This will clearly lead to increased cross-border flows with these countries. This might be good for competition and market liquidity but due to the highly regulated nature of the system (see above) may lead to problems on other market segments.
- III. In Burshtyn trading zone producers execute their market power and maximize their profits by switching volumes to the balancing market segment. This pushed average day-ahead prices to their highest levels since market opening.
- IV. In the mainland trading zone, making more low-cost electricity available to the GB may have positively affected the liquidity on the day-ahead market, leading to price decrease during last 2 weeks. However, liquidity was slightly boosted by increasing RES output, and this positive effect might decrease in autumn-winter, as Ukrainian RES is mostly PV.
- V. Average prices, at which state-owned TPP operator Centrenergo sells on exchange are significantly lower than on organised segments. Press reports indicate that this low-cost electricity is mainly bought by one business group that also allegedly exercises some managerial control over the Centrenergo management.

Figure 1. Net exports from Ukraine to neighbouring markets in 2019



Source: Entso-e transparency platform

Note: The higher the bar, the higher difference between export and imports. Negative net export means that import is higher than export for a given period.

Latest developments

Market Operator expands on transparency

The market Operator added new information and an English version on its website www.oree.com.ua. New data comprise day-ahead market (DAM) base/peak/off-peak daily indexes. It's worth noting that the peak(9-20h)/off-peak(0-8,21-24h) hours on the website do not coincide with the peak (9-23h) off-peak (0-8,24h) hours set out for bid caps by the Regulator.

New 10-days express reports on day-ahead and intraday market results are now being published starting from August, as well as a comprehensive report for the whole month. The August report sheds some light on market shares of different market participants in August 2019 (see p.3/4 of this report).

Amendments to Public Service Obligation (PSO)

On 21st of August the Cabinet of Ministers of Ukraine adopted amendments to the PSO mechanism:

- Share of electricity Ukrhydroenergo is obliged to sell to the Guaranteed Buyer (GB) is increased from 20% to 35%;
- Share of electricity Energoatom is obliged to sell to the Guaranteed Buyer (GB) is increased from 75% to 90%;
- Now the GB is responsible for selling power to grid operators to cover 80% of their technical losses (before Energoatom sold directly to grid operators' minimum 80% of losses);
- The CMU is now responsible for setting electricity tariffs for households (before market opening NEURC regulated household tariffs, current tariffs are still based on NEURC legislative act).

The biggest change is that the GB is now allowed to use the profit it makes from selling excess power on the day-ahead and intraday market to finance payments to renewable energy producers under FIT scheme.

New transmission tariff adopted

The change in PSO allowed the Regulator to reduce the amount of RES support included in the transmission tariff. Starting from September 1st the transmission tariff is reduced from 312.14 UAH/MWh to 116.54 UAH/MWh. At the same time, the Regulator also approved an update to GB's financial plan for 2019 to account for additional income from PSO activities and increased payments to renewables financed from these incomes. Renewables support is now partly financed through transmission tariffs and partly through the GB.

Total payments to renewables producers from the Guaranteed Buyer amounted to UAH 3 bln (July 2019) and UAH 3.4 bln (August 2019). UAH 1.56 bln and 1.75 bln respectively were financed from the transmission tariff. The proportion of each source will change in the future, as the GB has access to limited volumes and price caps that currently determine market prices are likely to change.

Changes to the Law "On electricity market" on imports

The previous version of the electricity market law limited the sale of imported electricity from non-Energy Community countries to the day-ahead and balancing market. On September 18th the Parliament has adopted an amendment

which annuls the abovementioned limitation. This change will allow Ukrainian consumers and traders to buy electricity from Belarus and Russia directly under bilateral agreements. With wholesale electricity prices in these countries significantly lower compared to Ukraine's, this will also create a competition in the bilateral agreements segment, which is now dominated by DTEK. However, this may negatively affect the liquidity on the DAM and IDM segments and create unwanted dependencies. Effect on wholesale market liquidity and prices in Ukraine are yet to be seen.

Market Operator works on a centralized bilateral agreements platform

USAID's Energy Security Project will work with the Market Operator to create a centralized platform for bilateral agreements trading. This is considered to be a measure aimed at easing the life of market participants, as stated in the Market Operators press-release. According to the Law, state-owned generators are obliged to sell their electricity through bilateral agreements platform, while private companies are not. At this point, it's not clear from the press release whether trade via a centralized platform will be obligatory for all market participants.

Energy Community Secretariat analysis

The Energy Community Secretariat has issued a document "Ukrainian electricity wholesale market – A critical assessment of the first two months". In this analysis, the Secretariat welcomes Ukraine's commitment to the reform. Among other issues it argues that:

- 1) The Public Service Obligations mechanism was not consulted with the Energy Community Secretariat and it brings back the single-buyer model and "goes well beyond what is necessary to ensure affordable prices for household customers"
- 2) There is a lack of liquidity measures to stimulate trade on DAM and IDM. The PSO also indirectly affected the liquidity, as only around 53% of electricity was traded on the open market.
- 3) Price caps "may be justified in an oligopolistic market such as the Ukrainian one", but they have to be phased out in order to stimulate the development of competition.
- 4) Absence of an ancillary services market, as no provider has yet completed the lengthy procedure of certification.
- 5) Debts to the last resort supplier and unresolved issue of legacy debts of Energorynok.
- 6) Room for improvement regarding transparency and data publication.

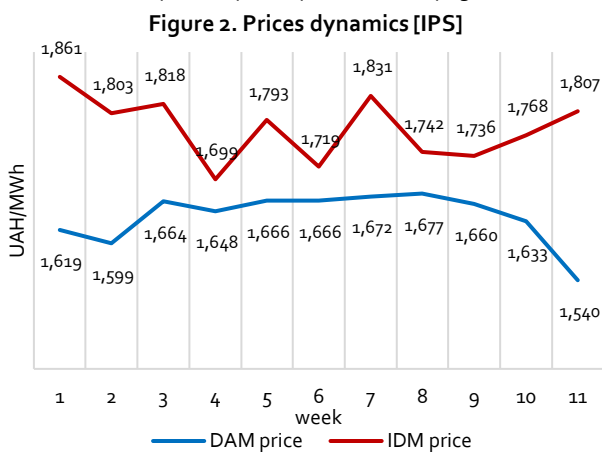
The general assessment is that "all market segments (except for ancillary services) started functioning without major problems due to strong market regulation via various price caps as well as a PSO that do not allow full competition to develop. Ensuring that the price caps and other restrictive measures such as disproportionate PSOs are limited in time and phased out in order to stimulate participation to the market and allow competition to develop should be treated with high priority by the Cabinet of Ministers and NEURC".

Key data: Wholesale market – Main system [IPS] trading zone

Prices dropping after period of stable growth

Average weighted prices on the day-ahead market continued to rise slowly towards capped levels in most of August, until week 9. During weeks 9-11 the price dropped by 8%. In weeks 9-10 this occurred mostly due to price drops during off-peak hours, while peak prices remained stable at around 2,000 UAH/MWh. One exception is week 11 with average peak price of 1,918 UAH/MWh peak and an off-peak average of 843 UAH/MWh.

Week 10 and 11 showed increases in bid volumes for both peak and off-peak hours. This is due to increased supply from the Guaranteed Buyer, which after the changes to PSO now has more electricity in its portfolio, and 43% generation increase of RES in week 11 compared to week 10. Details on volumes and deviations from price caps are presented on page 6.

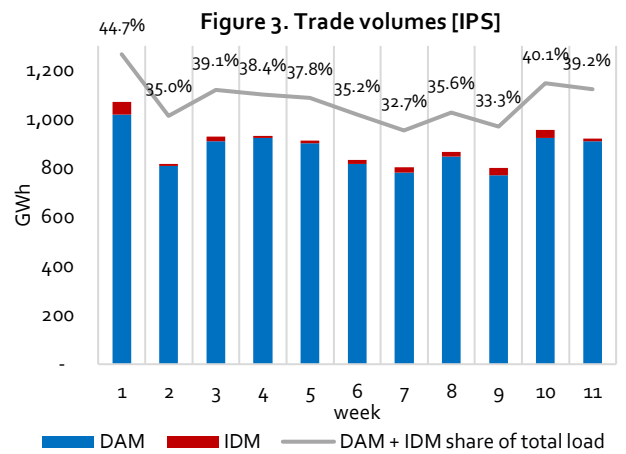


Source: LCU calculations based on Market Operator data, Ukrenergo data

Volumes affected by repair campaigns

The share of electricity traded in the DAM and the IDM continued to decrease until week 10, when it rose to 40% of total consumption in the IPS trading zone. Volume Drops in week 7 and 9 can be explained by repair campaigns on the nuclear blocks Rivne-4 and South-Ukrainian-1, while volume increases in week 8 and 10 were due to Zaporizhzhya-2 and Rivne-3 nuclear blocks connecting back to the grid.

Activity on the IDM segments has increased after week 8, which may correspond to an increase in RES generation. This has stabilised the segment, lowering the deficit between demand and supply declared volumes.



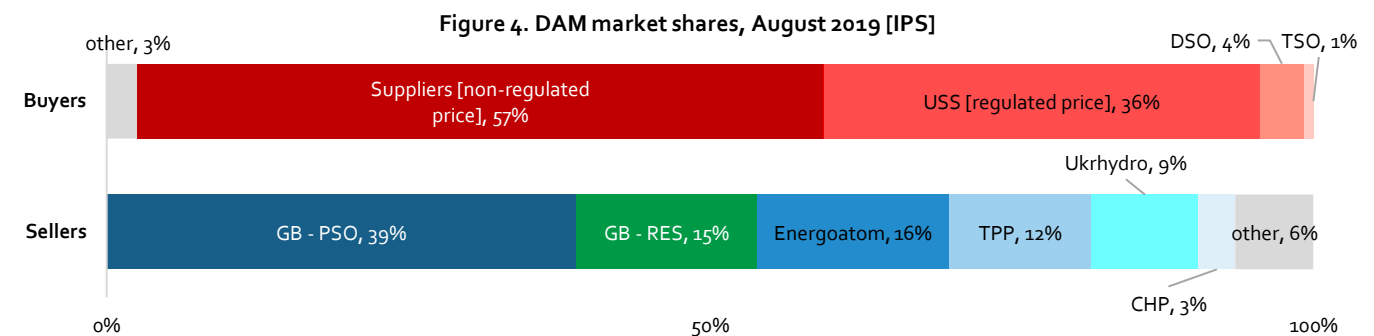
Market shares

In its recent market analysis report for August 2019, the Market operator disclosed information on market shares of different market players' groups in August 2019. The information provided is somewhat limited by the way the Market operator chose to present it, and does not give a full picture of July 2019 structure to compare with. Nevertheless, this new data gives a broader understanding of participants in the different segments. More detailed information (beyond single month, hourly details, more details on buyers' side) would be helpful in analysing a potential exercise of market power. We look forward to further work on data transparency.

Universal service suppliers (USS) in this figure only represent volumes these companies buy to supply to small businesses at

regulated prices, and to other clients at free market prices. The volumes sold under PSO by the Guaranteed Buyer do not directly correspond to the volumes of household consumption, but rather show "excess" power between Guaranteed Buyer's portfolio under PSO and households demand.

Notably, the share of renewable energy on the DAM was higher than the thermal power share. LCU calculations based on available data show that thermal power plants sell around 87% of their output outside the DAM and IDM segments. Twenty percentage points of this is sold by Centrenergo on the UEEX. The remaining 67 percentage points then correspond to bilateral agreements and balancing market volumes of private DTEK and Donbasenergo.



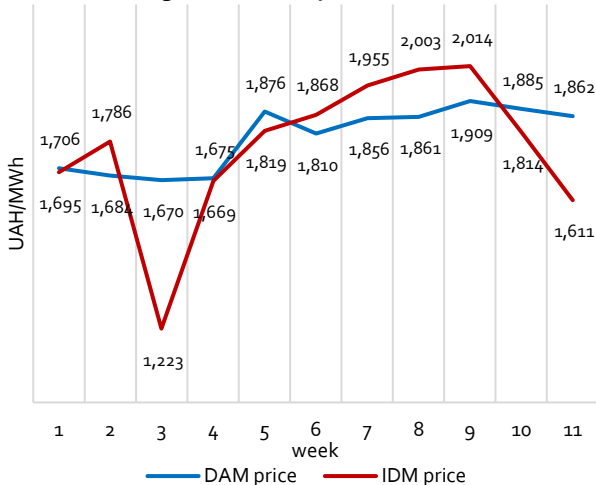
Source: Market Operator August 2019 report

Key data: Wholesale market - Burshtyn island [BEI] trading zone

Prices climbing up to caps

Prices in the Burshtyn island trading zone continued to rise until week 10. The stable increase in average prices is due to volume withdrawal during off-peak hours. Thus, peak hours have a higher share in overall trade volumes. Imported electricity volumes continue to be negligible and therefore cannot affect the price. Further analysis on price factors is presented on page 6.

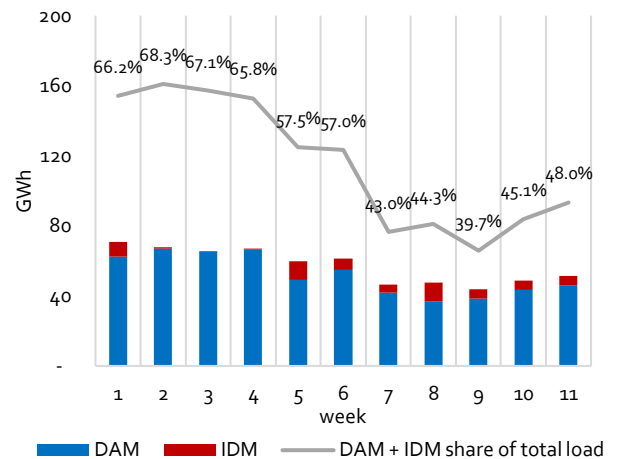
Figure 5. Prices dynamics [BEI]



Volumes withdrawn to balancing segment

DAM and IDM trade volume dropped after week 5, which coincides with increase of volumes on balancing market (see figure 10). Notably volumes on IDM volumes increase to 5-10% share of total load after week 5. This pattern can also be due to shift of supply to balancing market, with trading on IDM as a way to adjust to dynamic balancing market volumes.

Figure 6. Trade volumes [BEI]



Source: LCU calculations based on Market Operator data, Entso-e data

Market shares

It is worth noting that renewable energy makes up 13% of the DAM in the Burshtyn trading zone, which is the second biggest individual contribution according to the Market operator's representation. However, the composition of 44% "other" sellers remains unclear, despite this being almost half of the market share.

The Burshtyn power plant provides more than 80% of the zone's annual consumption. The DAM's TPP share is given by the Market Operator as 35%. According to the Market operator, volumes sold by TPPs in Burshtyn island dropped significantly in August compared to July, yet no exact figure is available.

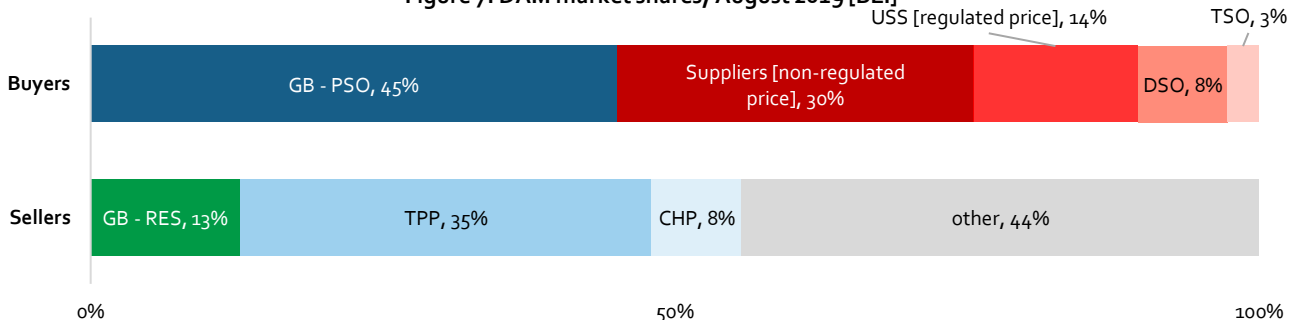
Assuming an 80% share of total load for Burshtyn TPP, we estimate that around 78-82% of the TPP's output are being sold outside the DAM and IDM segments. Based on data presented in figure 6, we assume that part of Burshtyn power

plant's output may have switched to other market segments, mainly to bilateral agreements and – to a smaller extent – to the IDM.

The data in figure 7 may indicate that "other" sellers represent traders with bilateral agreements signed with Burshtyn TPP, as there was no significant increase in electricity export in August (see figure 1). The reason for such intermediary between producer and the market is not clear.

In contrast to the IPS trading zone, the Guaranteed Buyer's volumes under the PSO mechanism are on the buyers' side. This is due to a lack of physical connection between the BEI and IPS zones. With Energoatom's and Ukrhydroenergo's power plants all connected to the mainland system, the Guaranteed Buyer is forced to sell power on the IPS and buy from private generators in the BEI zone in order to supply power to households below market prices.

Figure 7. DAM market shares, August 2019 [BEI]



Source: Market Operator August 2019 report

Bilateral agreements auctions and Balancing Market

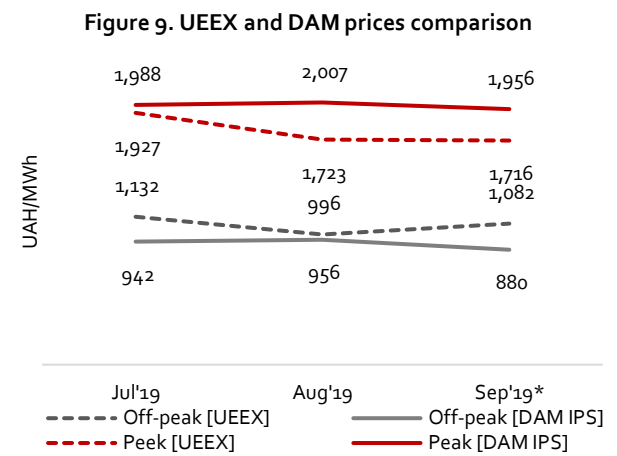
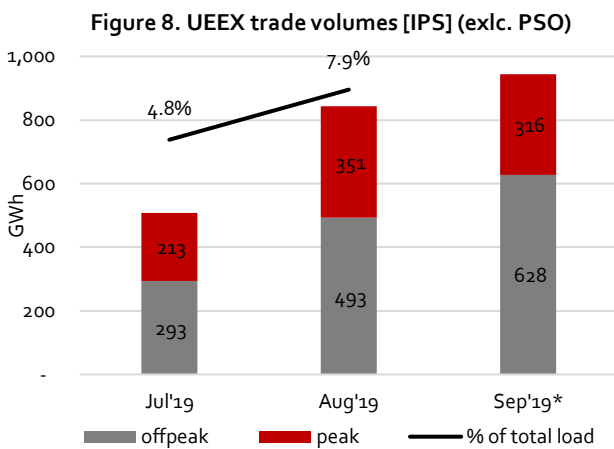
Bilateral agreements auctions results

99.9% of the volumes at UEEX (see Figure 8) represent Centrenergo auction results. On September 17th, DTEK has offered 36 GWh baseload power on the UEEX in the IPS zone for 1,640 UAH/MWh (while DAM baseload for that day was 1,601 UAH/MWh) – and could not find a buyer for it. However, in the BEI trade zone, DTEK managed to sell 13.2 GWh of baseload power at 1,631 UAH/MWh (DAM baseload for the same day was around 1,600 UAH/MWh). The buyer was D.Trading company, which is part of the DTEK group.

Centrenergo electricity prices continue to be higher than DAM prices (23% in September) for off-peak hours and lower than DAM for peak hours (12% in September). Based on UEEX results, the weighted-average price for Centrenergo power

amounts to 1,467 UAH/MWh in July and 1,295 UAH/MWh in September, which is 11% and 18% lower, respectively, than the DAM average.

This may indicate that Centrenergo is facing a competitive disadvantage compared to private producers, who may benefit from higher DAM prices and are not obliged to sell through auctions. From another perspective, lower prices for Centrenergo's TPPs may show that current price caps do allow for significant profit margin during peak hours, which was analysed in MEMO #2. Either way, these figures show that there is a certain distortion in the market, which occurs due to unbalanced administrative regulation.

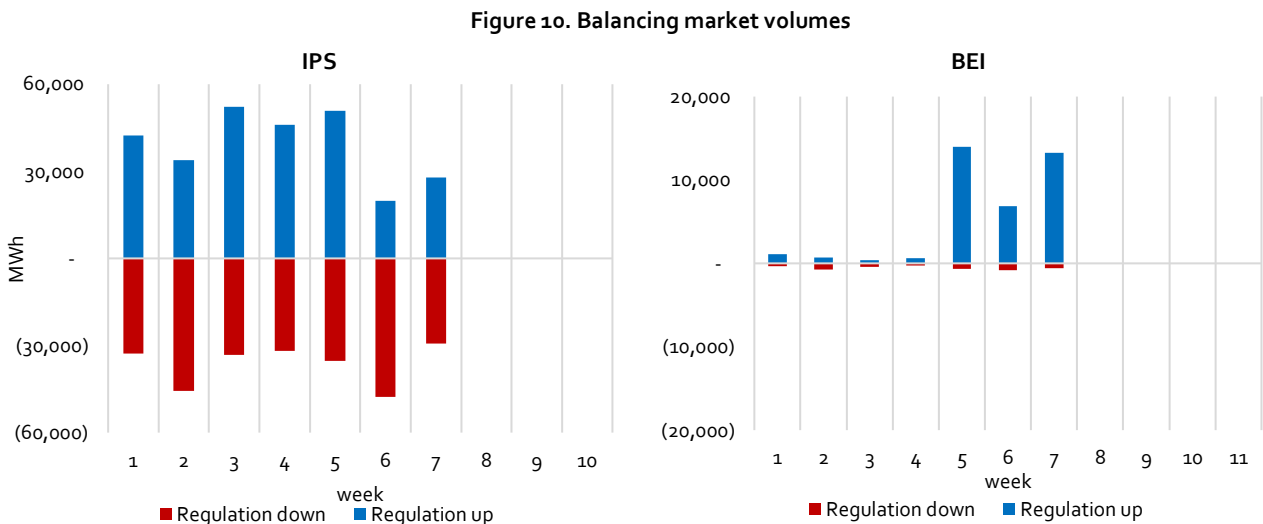


*Note: volumes for September delivery represent data available at 20/09/2019 and may not be complete for whole September
Source: LCU calculations based on UEEX data, Ukrenergo, Market Operator data

Balancing market results

The Ukrainian TSO Ukrenergo operates the balancing market and has published balancing market results starting from July 1st until August 20th. Figure 10 shows the weekly volumes of balancing energy. Data on imbalances volumes are still not publicly available.

The significant increase of balancing volumes in the Burshtyn trading zone since week 5 coincides with a decrease of DAM and IDM shares. This is a clear indication that generators tend to withdraw volumes in order to benefit from higher balancing market prices. This is also supported by Figure 7, where one can see the unusually low market share of the biggest generator in the BEI zone, and also by Figure 12.



Source: Ukrenergo data

Market power monitoring

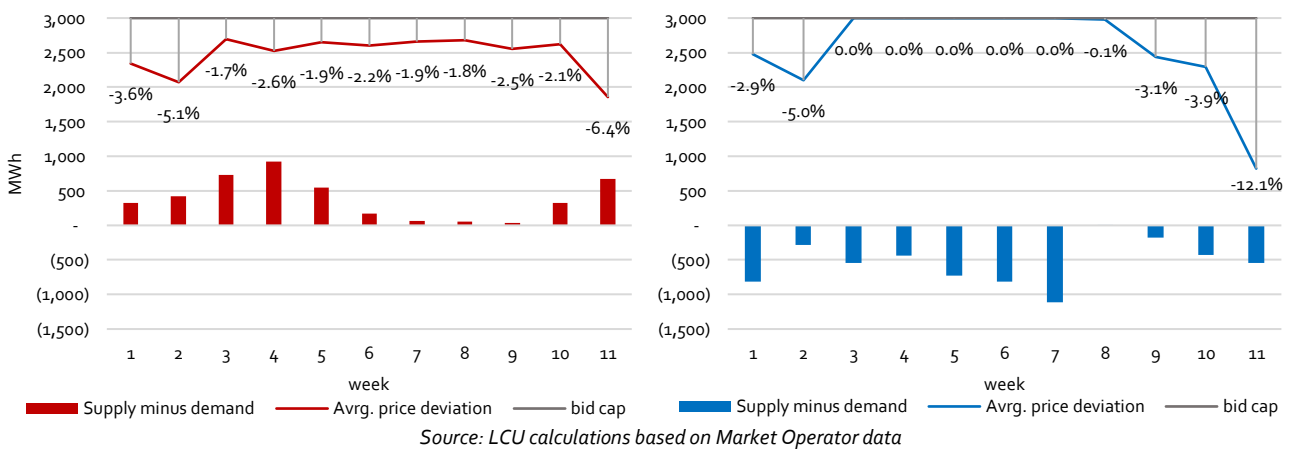
IPS: Additional liquidity after changes to PSO pushes down prices

One of the factors contributing to the shortage between declared supply and demand volumes in week 6 to 9 was a repair campaign on nuclear power plants. From week 10 on, prices started and then continued to deviate from capped levels. This is also boosted by changes to the PSO regime, channelling even more volume through the state-owned Guaranteed Buyer. Liquidity during week 11 was also slightly boosted by increased output from renewable energy, as new power plants continue to connect to the grid at high pace.

In week 11, average daily DAM prices on weekend were 1,462 and 1,123 UAH/MWh. This happened due to previously unprecedented total supply volumes during weekend declared by sellers for peak hours.

During night hours, the Guaranteed Buyer now sells excessive nuclear from their portfolio, thus pushing down the off-peak average price. However, declared demand volumes also increased, from about 3.5-4.5 before to 5-5.5 GWh after week 10. This might be due to buyers trying to get a higher pro-rata allocation of oversubscribed off-peak volumes. Weeks 10-11 showed the highest average of traded volumes during off-peak hours.

Figure 11. Hourly average declared supply-demand spreads and price deviations from caps in Main system



BEI: Volumes withdrawal and increasing imports

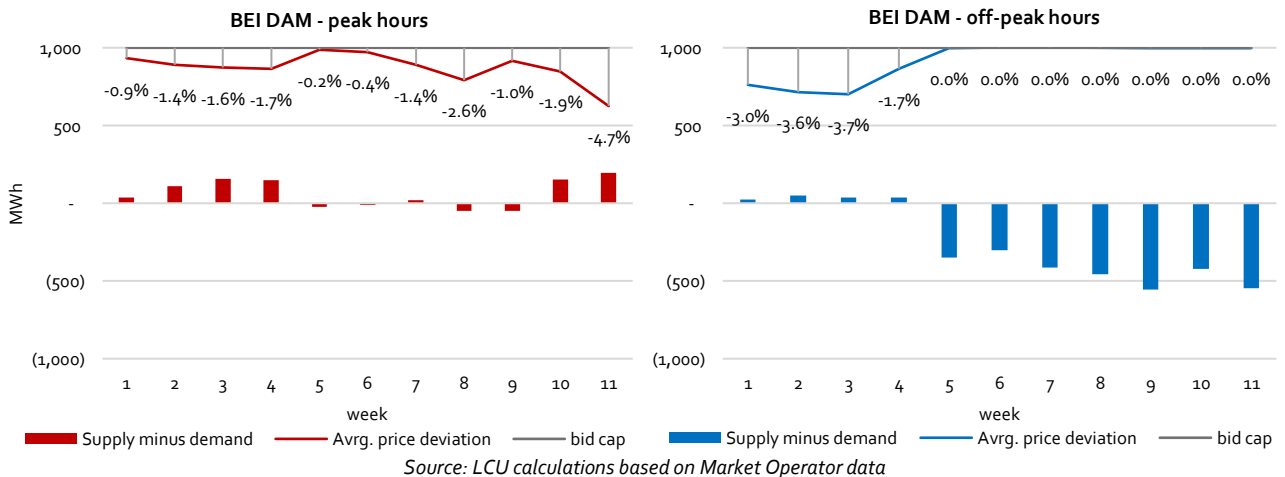
The price in peak hours started to deviate from caps from week 10 on. While analysing hourly net cross-border flows in the BEI trading zone, we identified a clear pattern: During peak hours, the net export flow tends to be lower than during off-peak hours. This may indicate that traders tend to import exclusively during peak hours, benefiting from higher price caps.

An analysis of bidding curves showed that during off-peak hours, supply is significantly lower. Figure 12 clearly shows the increasing volume of unsatisfied demand during night hours. This results in prices closing at their maximum level, i.e. at the level of the bid caps.

The data also shows a decrease in net exports in week 11 during peak hours, which may have contributed to the highest price deviation from the maximum capped level since the market opening. However, the resulting average price, as shown in Figure 5, is still mostly dictated by peak-hour volumes.

A comparison with hourly balancing volumes and volumes traded in the BEI zone also showed that from week 5 on, volumes traded on the DAM during off-peak hours are falling while up-regulation volumes are rising. The observed withdrawal of volumes during hours with unattractive price would be consistent with strategic bidding to maximise profits.

Figure 12. Hourly average declared supply-demand spreads and price deviations from caps in Burshtyn island



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 will be grateful for your feedback on the Monitor of Electricity Market Opening, in particular comments how to make it even more useful for parties interested in understanding processes and outcomes in the emerging electricity market in Ukraine.

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