



Low Carbon Ukraine

Policy advice on low-carbon
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Recommendations on energy storage regulatory framework – comments to the draft law #2582

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About Low Carbon Ukraine

Low Carbon Ukraine is a project that continuously supports the Ukrainian government with demand-driven analyses and policy proposals to promote the transition towards a low-carbon economy.

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Executive summary

Ukraine opened its electricity market in July 2019 by introducing competitive market principles in line with the 3rd energy package laid out in EU directives. The general market framework as well as the fundamental principles of how the electricity market should function are set out in the Law on the Electricity Market, while numerous by-laws provide detailed regulations.

A well-functioning and efficient market should:

- promote competition,
- focus on products and services, not actors and technologies,
- guarantee barrier-free and equal access to the market for any participant,
- not treat any technology in a preferential way, but rather be technology-neutral,
- be flexible enough to allow new technologies to thrive,
- be smartly designed in a way that minimises the need for state interventions.

In theory, a free market without price regulation will lead over time to a market equilibrium where supply equals demand. Sometimes markets fail to perform efficiently, which results in excess supply or demand for goods or services. There can be different reasons for such inefficiencies:

- Regulatory deficiencies, meaning that market rules were designed in a way that doesn't promote competition or creates barriers for certain market participants;
- Economic barriers like price caps in different market segments: on the one hand, price caps may bar suppliers with higher costs of production from entering the market (what leads to potential supply shortages in times of high demand), and, on the other hand, price caps may distort incentives and lead to excess profits for suppliers with lower costs of production.

If markets are unable to perform efficiently, rules and procedures should be designed in a way to incentivise competition, and/or to provide additional market-based incentives in order to ensure a sufficient level of provision of goods and/ or services. It is important that such incentives do neither add additional long-term distortions to the market nor harm the existing functioning framework.

In Ukraine, the ancillary services market as of today has failed to provide the services required by the transmission system operator (TSO). The reasons are manifold:

- Imperfect market rules, which set a high entry barrier for new players, e.g. by setting technical requirements for the service provider that can hardly be met in real life;
- The unpreparedness of market participants, which resulted in the absence of certified service providers in July 2019 and mostly hydropower stations certified today;
- Regulated price caps on balancing and reserves market, which may impose market entry barriers for new investors and can make business models unattractive;
- Regulatory uncertainty, meaning market rules and regulation being constantly subject to updates, and thus reducing the planning security for new investments.

The abovementioned regulatory deficiencies are exclusively the product of imperfect by-laws. Therefore, (only) the secondary legislation has to be updated to remedy the current situation, while no changes to the primary legislation are required.

The Ukrainian power system has been facing an impressive increase of renewable energy installations over the past years. The installed capacity of RES tripled in 2019 from around 2 GW to 6.4 GW. The Ukrainian TSO, Ukrenergo, argues that energy storage is of utmost importance and needs to be installed in Ukraine as fast as possible. But the latest Draft Generation Adequacy Report from 2019¹ does not provide a clear assessment of what is the current demand for ancillary services and how much can be covered by providers in the Ukrainian market, without any new battery energy storage systems (BESS). The Report emphasizes on the BESS, however lacks an assessment of alternative technologies or the capability of market participants to provide primary reserves.

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

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

One of the most controversial suggestions in draft Law #2582 is to allow grid operators to own and operate energy storages. LCU recommends that system operators should not be involved in any activities with energy storage facilities, including owning, developing, managing or operating storage facilities which are used on balancing or reserves markets. Primary legislation should not try to amend secondary legislation inefficiencies, especially by creating risks for a healthy market development.

The law may explicitly define the energy storage process, in a technology-neutral way. This would allow to distinguish storage from already existing activities (e.g. generation, consumption) and thus provide a clear framework for further unbiased treatment of technologies with the potential to participate in the market. However, energy storage technologies can participate in the market even without specific definitions in the law, as EU countries experience shows – albeit with some limitations.

The law may also envisage principles and procedures for tendering of services that the market cannot or fails to provide under real-life conditions. Such tenders should allow the TSO to procure services from market players under special conditions, but in line with the existing market framework. Tenders and rules must be subject to the approval by the Regulator.

However, it is important not to confuse a market failure with a regulatory failure. Authorities should not make any premature or unadvised decision that will overrule market-based solutions without a thorough assessment. Such assessment should not only focus on short-term necessity but also analyze long-term economic implications for the market. For example, any decision that will limit the competition on the ancillary service market segment in Ukraine will ultimately result in increasing consumers' bills.

There are other ways to create incentives in the primary legislation to ensure that modern technologies can participate freely in the market. The focus shall *not* be on providing support or state aid for specific technologies, but on incentives for *all* players to participate in the market, as well as to create a diversity of services. Energy storage may be utilized for RES power plants in various ways, which allows to avoid potential costs and to optimise operation. However, in order to make energy storage a profitable investment for RES operators and to contribute to system stability, the full market integration of RES must be fostered, for example through direct market participation and full responsibility for imbalances.

General recommendations to legislative policymakers. In order to stimulate the development of energy storage in Ukraine, a draft law:

- 1) should remove existing legislative barriers on the market. It should define fundamental principles instead of specifying detailed procedures. Detailed provisions should be set out in by-laws;
- 2) should explicitly prohibit system operators from owning, developing, managing or operating energy storage systems, which are used to provide services in organised electricity market segments;
- 3) may introduce definitions for energy storage operations in order to provide the Regulator with a legal basis to separate energy storage operations from operations of buying and selling electricity;
- 4) may introduce definitions for energy storage that distinguish energy storage used to participate in the market and energy storage used as a fully integrated grid component;
- 5) should determine an approach for a due process that will allow exceptions from the rule that prohibits the system operator from owning, operating and managing energy storage systems;
- 6) may create an incentive for RES operators to use energy storage for non-market activities by fostering a deeper integration of RES into the market and giving them more flexibility in the balancing market;
- 7) should not explicitly state any technical characteristics. Those characteristics should not be determined by legislative bodies, but by executive bodies in accordance with established rules;
- 8) consider introducing a definition for an aggregator as a market player, with a fair, equal and barrier-free status on the market compared to other players.

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

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1 The role of energy storage in the electricity market

The electricity market is a sequence of market segments that are communicating with one another. It's not only a market for a simple product of a kilowatt-hour but a range of segments with different services provided. Any player and any technology capable to meet requirements and fulfil those rules are eligible to participate in the market. The central idea of a liberalized market is that interaction between supply and demand defines the market price, and this price sends a signal about available economic opportunity. No technology should have a preferential treatment based on its physical or any other sort of parameter. The market should value specific services that fit the power system's requirements best and for the least cost.

Electricity markets are not self-organised but require clear rules that guide the interaction of different market players in different market segments. Any interference in one market segment easily affects others, thus any changes to one segment should always be carefully assessed in terms of impact on other segments.

Generally, the production of electricity and its consumption should be equal at each point in time. Despite the fact the market participants are to plan their production and consumption in order to keep it in balance, deviations may occur. Transmission system operators (TSOs), like Ukrenergo, handle deviations by procuring different kinds of reserves from a market participant on relevant market segments to secure the power supply. Such services are provided through balancing market and ancillary services market.

Reserves as part of ancillary services play a role of an insurance policy for the power system. Reserve is the particular amount of unused capacity which is needed by TSO to compensate for sudden power shortages or frequency fluctuations and to avoid blackouts. It must be ready for activation at any time defined during procurement. TSO pays to services providers for reserved capacity, or per MW of the ready-for-activation reserve. Reserves are usually procured in advance and on a regular basis.

Balancing market is designed to match supply and demand for balancing power when there is a difference between consumption and generation in each time frame. On this market, TSO buys energy in MWh and close to real-time, throughout the day.

Any player with any technology can participate in the market under the conditions that their equipment and activities are in accordance with market rules and grid codes. Ancillary services are differentiated based on their response time and duration of the service. In Ukrainian ancillary services market, these services are defined as follows:

- Frequency containment reserve (FCR, primary reserve);
- Frequency restoration reserve (FRR, secondary reserve):
 - Automatic FRR (aFRR, with fast response time, automatically activated);
 - Manual FRR (mFRR, with slower response time, activated manually);
- Restoration reserve (RR, tertiary reserve).

These services can be provided by various technologies, or a combination of technologies, such as:

- spinning reserves of thermal power plants,
- conventional pump hydro stations,
- consumers capable of managing their load via demand-response,
- quick-start reciprocating gas engines,
- among others - battery energy storage systems (BESS),
- and aggregators, which can combine various technologies in one portfolio.

In modern power systems with a high share of variable renewable energy source, like solar and wind, a reserves' shorter response time is valued. The value of reserves should be represented as a price for respective services, and the price should send a signal what quality, what parameters of services is required. Energy storage systems by themselves are capable of providing all types of reserve services. BESS are especially valuable in providing primary reserves FCR due to very fast response time. However, the application of energy storage does not limit to ancillary services. The technology can also be applied in non-frequency ancillary services, related to grid management, or other applications (see section 6).

2 Ownership of energy storage

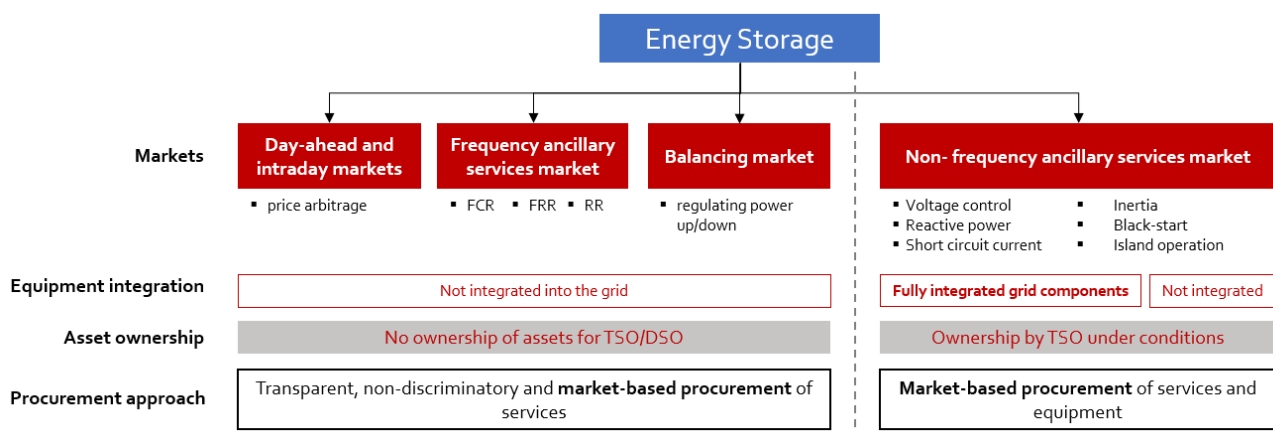
EU electricity market regulations approach is described in an updated EU Directive 2019/944, which is part of “Clean Energy for All Europeans” legislative package. It focuses on the promotion of competition and market mechanisms as well as unbundling principle for grid operators. This latter principle prohibits regulated utilities, like TSO and DSO, from participation in wholesale markets and also from owning energy storage facilities. Such restrictions on the ownership of energy storage facilities are to prevent distortion of competition, to eliminate the risk of discrimination³, to ensure fair access to energy storage services to all market participants and to foster the effective and efficient use of energy storage facilities⁴.

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

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

Directive (EU) 2019/944 provides a definition of ‘fully integrated network components’ as **network components that are used for the sole purpose of ensuring a secure and reliable operation of the transmission or distribution system, and not for balancing or congestion management**. In short, TSO and DSO should only be allowed to own and operate storage as **a part of grid equipment and are not allowed to use energy storage to participate on the market**, or to use storage to provide services to themselves bypassing the market.

Figure 1. Applications and ownership of energy storage facilities in the electricity market.



The Directive describes an approach to evaluating whether the exemptions for energy storage ownership by system operators that are supposed to be used for other than non-frequency services. System operators may be allowed to own, operate, manage energy storage facilities if all the following conditions are met:

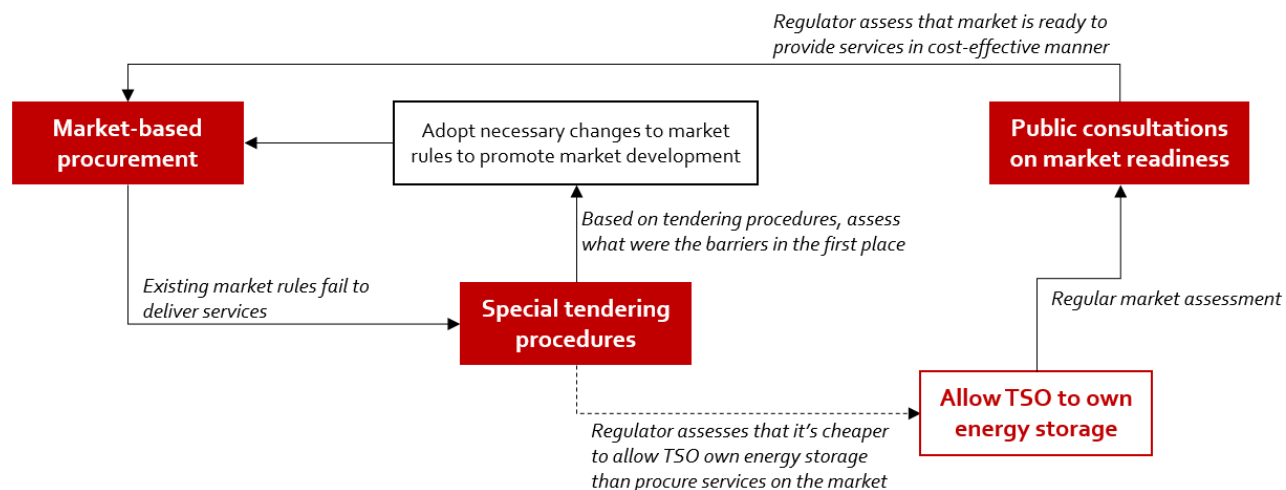
- 1) **open, transparent and non-discriminatory tendering procedure** for ancillary services did not result in any party delivering the services at a reasonable cost and in a timely manner,
- 2) energy storage is **necessary** for reliable and secure operation of the power system and is **not used to buy or sell electricity** in the markets; and
- 3) **the regulatory authority** assessed that tendering procedures will not likely result in delivering the services and **granted the right** to system operator to own energy storage.

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

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

In short, before allowing TSO or DSO to own energy storage, authorities must ensure that all market-based methods of procurement failed to deliver services. The key requirement is an assessment of the necessity of energy storage in the market in the first place. If necessity is not proven, or a reasonable doubt in such a necessity exists, no exemptions should be made. When addressing resource adequacy concerns, responsible authorities should first consider regulatory distortions, enable efficient market pricing, revise price caps.

Figure 2. Approach set out in EU Directive 2019/944 on assessing the conditions to allow TSO to own, develop, manage or operate energy storage facilities



The regulating authority must ensure that market mechanisms are in place and functioning before the decision to allow ownership of energy storage to TSO or DSO. The regulator should also assess the long-term costs of such a decision. If a market-based procurement will result in a significantly higher cost than allowing TSO to own storage, only then such a decision can be economically grounded.

The design of the market-based procurement procedures and other related regulatory framework is the key question. If tendering rules procedures are biased towards particular technology and require hardly achievable parameters from services procured, such tenders must not be treated as a representative basis for a decision. In other words, if the market is not delivering the services required, the problem may lay in poorly designed regulations or artificial administrative barriers.

3 Is there a need to define an energy storage in primary legislation?

Some of the most advanced markets with energy storages are Germany, the UK, France, Ireland, and the Netherlands. Neither of these countries has a definition for energy storage set out in primary legislation. At the same time, regulatory authorities of these countries included either definition for energy storage in market rules or grid codes or at least plan to do so. **Energy storage may operate in an existing legislative framework designed in accordance with 3rd energy package. However, the 3rd energy package has also failed to create incentives for modern technologies, like energy storage, to thrive.** The “Clean Energy for All Europeans” package remedies this by providing a guideline for technology-neutral and inclusive energy storage definition. Currently, any storage technology may be operated in the Ukrainian market and does not require a specific regulatory framework. From the technical standpoint, Ukraine has always had energy storage presented in the power system – in the form of pumped hydroelectric energy storage (PHES). PHES operator is participating in energy market according to market rules for generation facilities (except for a prescribed minimum of the mandatory purchase of electricity on DAM⁵).

However, the experience of the counties operating storage technologies shows that there are regulatory and commercial barriers which limit the development of large-scale BESS. For example, when storing energy and feeding it back to the grid the storage operators may face double charging as both a customer for its

⁵ Law of Ukraine on electricity market, Art.67, paragraph3, subparagraph 3

accumulation and as a generator for its discharge. Since storage projects are subject to several taxes or levies, the services provided by those operators may be placed into a disadvantageous position. Thus, countries willing to incentivize energy storage development face the need for the robust regulatory framework.

The double charging issue may be addressed by providing the legal status of the energy storage and energy storage facilities. This approach was used by the British energy regulator Ofgem which offered a treatment of the energy storage as the electricity generator. Relevant amendments providing the electricity storage definition and general regulatory framework for storage will be made to the respective licences.

The definitions of energy storage and energy storage facilities have two main functions:

- give the conceptual understanding of the process of energy storage in the electricity system;
- clearly provide the legal status of the energy storage in order to avoid cases of double charging;

Where the Regulator cannot provide the explicit definitions on its own in secondary legislation, the Parliament may do so in primary legislation in order to provide a unified approach to energy storage. However, the approach should be approved and recognised by the stakeholders, primarily the Regulator and the relevant executive authorities.

4 Market barriers for ancillary services in Ukraine

The lack of suppliers of ancillary services or of power on the balancing market can be the result of economic or regulatory barriers. Economic barriers refer to the relation of cost of services and market prices. E.g. market prices are too low for a certain technology to break-even under market condition – then this technology will not be presented. Regulatory barriers refer to specifics of market rules, requirements to market participants and licensing. E.g. minimum installed capacity for a service provider may be set too high for a smaller player to enter the market. Regulatory barriers may also influence economic ones. Price caps for different market segments are a case in point. Administrative prices may distort the market by sending a signal to potential investors that there is a limited or no business case for certain technologies. At the same time, these administrative barriers may serve to protect incumbent players from potential competition.

Lack of new investments into energy storage systems in Ukraine is not due to gaps in the primary legislative framework, but rather due to various market distortions and barriers. Among these barriers are:

a) Regulatory uncertainty

Ukraine's electricity market has opened in July 2019. Since that moment, legislation has been subject to change several times already and is still developing. Lack of long-term (e.g. >1 year) contracts for reserves on an emerging unstable market also limit the certainty for new potential investors.

b) Regulatory deficiencies and imperfections

Certification requirements for ancillary services providers proved to be rather extensive and far from Ukrainian reality. Methodology for ancillary services monitoring is designed in a way Ukrainian power plants hardly can meet in real-time operation. As of end February 2020, only 1 TPP, 7 HPP and 1 CHP tested for ancillary services capacities. None of the providers was committed to providing ancillary services in a market-based situation. However, hydro stations are providing some reserves without remuneration. Thus, the ancillary services market is not operational due to regulatory constraints.

c) Economic barriers

There are administrative price caps established by the Regulator on all organised electricity market segments, including balancing and ancillary services market. The caps have a negative impact on the market's ability to send adequate price signals for potential investors. A detailed and thorough assessment of the actual limitation for economic viability for service providers, energy storage included, should be made by the Regulator.

d) No clear assessment of resource adequacy concerns

The Draft Generation Adequacy Report, prepared by the Ukrenergo, has not yet once been approved by the NEURC. In the latest draft, Ukrenergo states that an additional 200 MW capacity of FCR will be required starting from 2022, with no additional capacity in later years. More to that, the report focuses on FCR being provided either by “conventional” or “battery energy storage”. There is no assessment of existing power plants park capacity for reserves. The argumentation for why the report focuses on the technology-specific choice of BESS is missing. The report is unable to answer why storage is a better and cost-efficient option for reserves provision. Given this, there is still no clear and fact-based understanding of resource adequacy to meet current and future demand for ancillary services.

The abovementioned factors indicate that **lack of supply of ancillary services in Ukraine today is rather a regulatory failure, than the actual market failure**. Under such conditions, it’s important to fix regulatory barriers as quickly as possible. Only after that conclusions on whether the market can supply required services at a reasonable cost and time can be drawn.

The resource adequacy and actual forecast demand for reserves should only be assessed based on an approved report, prepared using a reasonable methodology. Any decisions made without proper technical and economic reasons may result in excessive costs ultimately incurred by consumers.

5 Promote market development for reserves vs. allow TSO to own, develop and operate storage?

Competition is the best way to find a cost-effective and technology-neutral way of providing ancillary services. TSO and the Regulator must ensure that market rules, technical requirements and tendering procedures are not biased towards any technology or particular player, are technically achievable and provide reasonable remuneration for a service provider

The idea of system operator owning energy storage used on balancing market or frequency ancillary services market contradicts the principle of the liberalised deregulated market framework established in Ukraine. This means that allowing TSO to own or operate energy storage system will:

- make TSO buy services from itself, which distorts the market;
- TSO may be receiving compensation in tariff for costs of developing and operating storage twice: once for capital expenditures if approved by the Regulator in an investment program, and then for operational expenses;
- discourage new investors to enter the market if the required supply of services is already provided by TSO;
- discourage competition and increase final costs for consumers.

If the system operator is allowed to own up to 250 MW of BESS, as suggested in the draft law, and given the additional required primary reserve is only 200 MW for years to come, the market for FCR service might be completely blocked. When a new cheaper technology will become available, it would be blocked from entering the market. Thus, consumers will not be able to benefit from technological progress and lower costs, since they would be “stuck” with a consequence of a decision to support the monopoly, not competition.

Following the logic stated in Part 2 of this paper, before allowing TSO to own and operate storage facilities, the market should be tested – and the methodology for such “testing” should be defined in order to avoid manipulations. **A clear and due process for a derogation to allow systems operators to own and operate storage facilities should be established in primary legislation to avoid negative implications on the entire market system**. Such a process should envisage the following steps.

- 1) a proper market for the required (ancillary) services should be established - the readiness of the market should be assessed by the Regulator.

The regulator should focus the analysis on whether all technologies capable of providing required services have access to the market and at what costs, not on particular technologies like energy storage.

- 2) if a market is unable to deliver the required services - a report lining out these reasons must be prepared by Regulator.

Such a report should be based on the information provided by TSO, results of tenders for services, a corroborative inquiry from market participants etc. The report should conclude why the market failed to deliver the services and what can be done to encourage it.

- 3) The Regulator must establish a regular public consultation process to assess market readiness.

This process must be conducted in a transparent and open way. As part of public consultations, a non-binding request for information from the potential investors may be conducted before designing a special tendering procedure. A request of information process can be a faster way to assess the market readiness, than going for a lengthy process of approving tendering procedure and request for proposals (as described in step 6).

- 4) The TSO should objectively stipulate the lack of that service. The procedures designed to establish a justified approach and requirements of investments into the power system are presented by the following documents:
 - developing and adopting of Ten-year (prepared by TSO) and Five-year (prepared by DSOs) Network Development Plans – for investments into grids;
 - The Generation Adequacy Report (prepared by TSO) – for technologies and services required on the market.

- 5) The Regulator must check and adopt abovementioned reports.

Based on adopted reports, the Regulator must assess a long-term economic impact on the power system and consumers bill of two options: market-based procurement for services or to allow system operators to own storage facilities.

- 6) Then the Regulator can propose a technology-neutral market-based instrument to encourage the development of new resources that can provide the lacking service.

Corresponding tendering procedures should be carefully designed and approved by the Regulator and Antimonopoly committee to mitigate risks persisting in a market that were blocking market entry. The tenders may be conducted by TSO, or the Ministry of Energy and Environment protection (as designed for new generation capacities tenders). In any case, a tendering procedure must ensure a transparent and time- and cost-effective process. The financing source for tender remunerations may be included in total ancillary cost budget, adopted by the Regulator in TSO tariff.

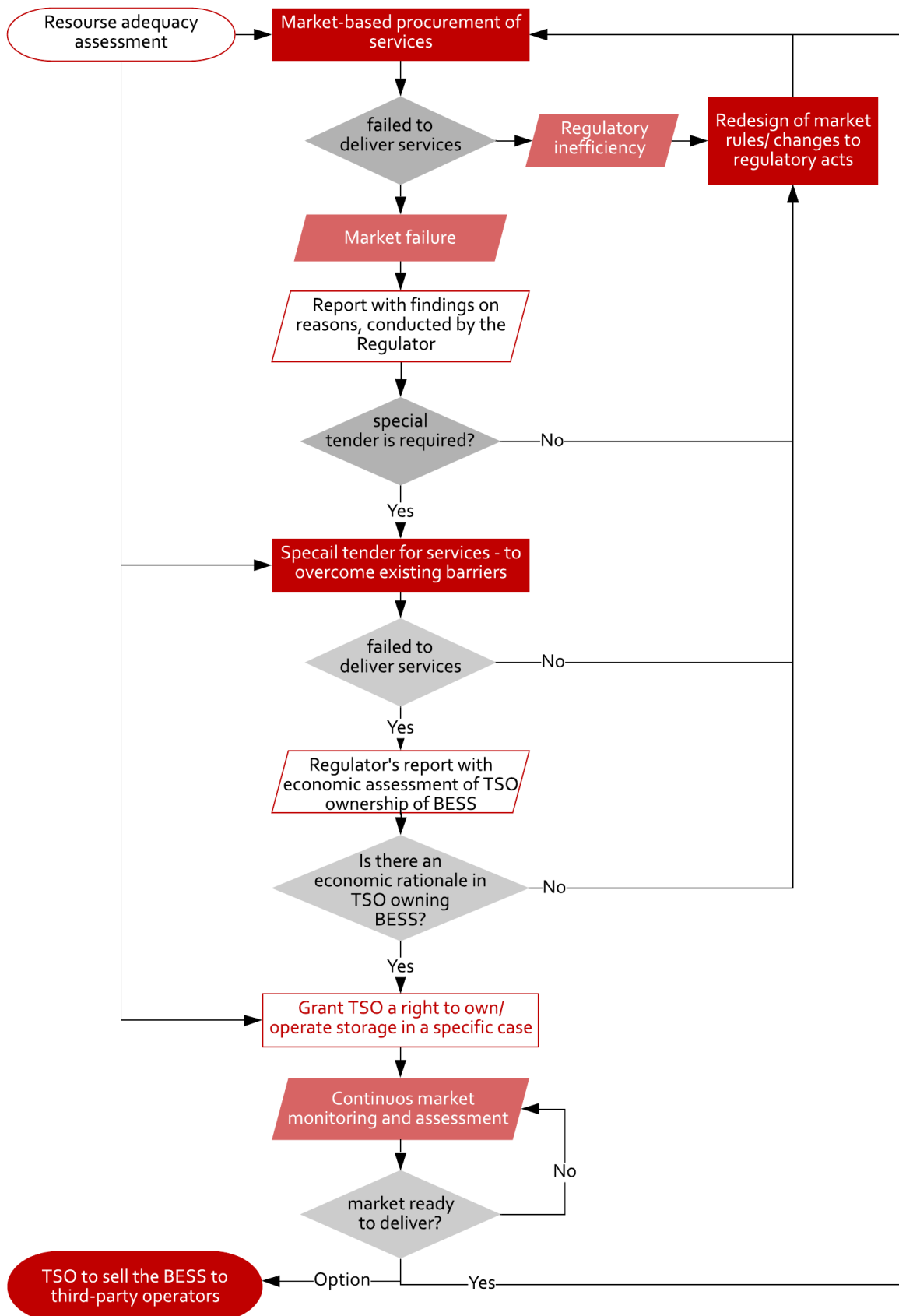
- 7) If such tendering procedure failed to attract investors, the Regulator must prepare a report with respective reasons. The report should also contain an assessment of the tendering procedure from the Antimonopoly Committee.

- 8) Based on all reports above, a Regulator than may decide to allow a TSO to own and operate a storage facility. Such decisions should be made on a case-by-case basis, not as a general rule.

The conditions for ownership and respective activities (e.g. services that can be provided, participation in certain market segments) as well as technical characteristics (e.g. total capacity and volume of a storage facility) are to be ruled by the Regulator. In his decision, the Regulator has to be in line with approved Generation adequacy report and Ten-year network development plan. The decision must also be assessed by the Antimonopoly Committee and to ensure that it does not limit the future market development. A clear procedure and pre-conditions for selling the storage facilities to a third-party should be laid out in a decision.

This approach can be broadly described in primary legislation, together with the responsibilities of the parties involved. The detailed procedure following the approach should later be designed in by-laws.

Figure 3. The suggested decision-making process for granting system operators a right to own and operate storage in Ukraine



6 How to promote energy storage and new technologies on the market?

In the current market situation in Ukraine, the first thing to do it to remove all obvious regulatory barriers which block the market from working properly. The next step would be to reassess existing price caps on the balancing and ancillary services markets. This can be done through the public consultations process. Based on the information gathered from potential investors price caps can be reviewed to guarantee a free entrance to the market and sufficient economic incentive with any technology bias. To limit the market power, a power-block specific bid cap or revenue cap related to ancillary services can be introduced for incumbent market players, while market-wide cap may be lifted.

Since BESS is special due to very fast response time, market design may reflect this in how services are valued. For example, a primary reserve service may be further differentiated into several FCR services, with different response times. A shorter time interval for settlements on the balancing market, e.g. 5 instead of 15 minutes in Ukraine, may incentives more flexible and fast-responding technologies to enter the market and compete with incumbent players. These changes can be made in secondary legislation, by the initiative of the regulating authorities.

Energy storage technology can provide value not only in system reliability applications, beyond reserves and balancing markets. Energy storage can be used by different market participants for:

- Forecast error mitigation (compensate power imbalances);
- Renewable curtailment mitigation (in case of both voluntarily and involuntarily curtailment, storage allows to shift otherwise lost power output to a later time);
- Energy shifting, or arbitrage (charging during low spot prices and discharging during high prices).

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

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

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

Appendix. Detailed recommendations on the text of Draft law #2582

Provision 1. The energy storage technologies - technological complex connected to the transmission or distribution system for collecting, accumulating, including conversion (physical, inertial, chemical, hydrogen and other technologies) of previously generated electricity, its storage and subsequent release.

Provision 2. Energy Storage Operator is a legal entity which uses an electricity storage system to buy and sell electricity on the electricity market and provides ancillary services and is responsible for the safe operation and maintenance of such energy storage system.

- A. The energy storage is defined only as a facility, but not as a process. European practice offers the approach of defining separately energy storage as a process of deferral of the final use of electricity and the energy storage facility as the facility where the electricity occurs.
- B. The main function of the operator who uses the energy storage facility is not just the sale-purchase of the electricity but providing the energy storage services which include mainly storing the converted electrical energy.
- C. Theoretically, stored electricity may be sold by any market participant who has an energy storage facility (any type) and is enabled to participate in relevant segments of the electricity market, thus the definition should not constrain other market participants from use of energy storage facilities and selling the stored electricity.

LCU recommendation: The definitions should provide the clear framework and precise legal grounds for further treatment of energy storage and energy storage facilities and their operators in the legislation in order to avoid such cases as double charging.

Provision 3. The Regulator includes the cost of the energy storage facilities built under the state aid mechanism into both TSO tariffs.

- A. The concept of the state aid mechanism providing financial incentives in order to attract investment into energy storage technology is a valid one. However, the law should provide a clear framework for the Regulator to include the cost of such technology into the tariff in a fair way. Providing the possibility to include the cost of such technologies into two tariffs contradicts the approach described in this paper and may cause the artificial and unjustified rise of the electricity cost for consumers.

LCU recommendation: The state aid mechanism and the issue of cost allocation should be agreed with the Regulator. The draft law may include the general provision regarding the compensation source given it is precise.

Provision 4. The energy storage operators are obliged to participate in the balancing market and provide ancillary services.

- A. Market participants should be able to enter and exit electricity market segments based on their assessment of the economic and financial viability of their operations. The offered obligation to participate in the electricity market segment or provide particular services is unjustified and comprises the regulatory barrier which substantially decreases the investment attractiveness of energy storage technology in Ukraine.

LCU recommendation: The provision contradicts the market principles provided by EU legislation and Ukrainian Energy Market Law. Participation in the balancing market and the market of ancillary services should be voluntary. No investor would be willing to enter the market with regulated price caps and be forced to sell without control over his prices.

Provision 5. A transmission system operator cannot operate an energy storage system, except for the following case. TSO may operate energy storage facility with the capacity up to 250 MW in cases, if there are no such services provided on the market and with a sole purpose of providing dispatch services, including a guarantee of operational security, balancing and other activities aimed at maintaining the integrity of transmission system.

and

Provision 6. "Distribution system operator cannot operate an energy storage system, except for the following case. DSO may operate energy storage facility with the capacity up to 20 MW in cases without the approval of the Regulator (with the possibility for extension), with a sole purpose of providing distribution services, including a guarantee of operational security of the distribution system and other activities aimed at maintaining the integrity of distribution system."

- A. The provision states the only prohibition of "operating" while unbundling principle will also include a prohibition of ownership, development and management of energy storage facilities.
- B. Exemption with a stated predefined capacity in MW goes beyond the purpose of the legislative document and supersedes the role put upon the regulating authority and established regulatory procedures such as approval of generation adequacy report.
- C. "Such services" are linked to "operating energy storage facility" which are not explicitly defined as specific services within established market segments. This creates a possible wrong ground to determine the exemption case.
- D. The party responsible for a determination whether such services are provided on market segments or not is not stated. This means system operator may independently decide on that, without the Regulator's approval and outside the established regulatory framework.
- E. Dispatch services, according to Ukrainian grid codes, does include system operator's activities on balancing market and ancillary services markets. This means the provision allows a system operator to own and operate energy storage and to provide services to itself.

LCU recommendation: Provisions contradict market principles described in EU Directive and distort the market. Provisions should include a prohibition for the TSO and DSO not only to operate but also own, develop and manage energy storage facilities. The law may authorise the Regulator to grant TSO and DSO a right to own, develop and operate storage on particularly clear conditions which were described in Section 2 and 5 of this paper.