PROPOSALS FOR THE MARKET FRAMEWORK IN ESTONIA FOR DEMAND RESPONSE THROUGH INDEPENDENT AGGREGATION

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Contents

1. Background

More distributed generation and consumption and the increasing electrification of transportation create new challenges in the electricity grid and thus also resulting in new needs and opportunities for more flexible and cost-effective management of the electricity system by all network operators. In view of the small size of Estonian electricity system and also of the Baltic countries in general, and the already low liquidity in the Baltic balancing market, this in turn supports the need for a new approach and a vision for the development of the market for flexibility services in the Baltic and Nordic markets.

The development of markets for flexibility services requires digitization, data exchange and new IT platforms. Under the definition of flexibility market there is seen a market framework and a flexibility platform as a marketplace that unites different flexibility products and makes them available for different market stages. Access to such a trading environment (a market platform for flexibility services) must be easy for both end-users and market participants who offer or wish to purchase flexibility market products.

Thus, in order to better involve consumers in electricity markets and to make more efficient use of the flexibility services, it is important to allow the flexibility of the network to participate simultaneously in the supply of different products (different system services, balancing reserves) and to offer products simultaneously to different users, meaning to distribution system operators (DSOs), transmission system operators (TSOs) and other producers, consumers and suppliers of electricity.

For such an efficient use of flexibility, it is important that flexibility is able to enter to all market levels and thus creation of an appropriate environment (in the form of a market framework and a market platform for flexibility services) is crucial, enabling coordinated interaction between different market players and the most optimal use of flexibility, both in terms of solving network problems and in terms of maximising revenue for the resource owner.

The Clean Energy Directive, in turn, states that a supportive regulatory framework should be established that would provide an incentive for network operators to use flexibility services in network development and management. Also, the most uniform flexibility market products possible must be created between the TSOs and DSOs for congestion management and use in the balancing market (the objective being to allow the same flexibility to be used as a number of products, thus supporting the vision of increasing liquidity in the electricity markets), thereby ensuring close cooperation between the TSOs and DSOs in the development of flexibility products and markets and the related data exchange.

According to the Clean Energy Directive, demand response including aggregators, must also be allowed at all market levels. The supporting market model shall not create market barriers and shall also take account of market generated revenues, the necessary data exchange between market participants (including the market model for settlements) and consumers' access to their data.

2. Purpose of the concept paper

This concept paper details a vision developed during the discussions of the Demand response Working Group established by the Estonian Competition Authority, Elering AS and the Ministry of Economic Affairs and Communications for the inclusion of an independent aggregator at all market levels in Estonia.
The general principles of the concept paper are based on the objectives of the Clean Energy Directive to involve the entire flexibility available on the market, allowing it to participate equally to generation at all market levels. To this end, it is necessary to establish a clear market framework as a first step and the data exchange principles for the settlement of the activated flexibility between the system operator — aggregators / flexibility providers — BRPs. In the second phase, the focus can be on further encouraging the use of flexibility, allowing the same flexibility to be used jointly by the TSOs and DSOs, creating coordination mechanisms between the TSOs and the DSOs, and increasing liquidity in the market through this, also developing clear technical conditions for the flexibility products used by the DSOs, clarifying the issues of data exchange, etc.
This concept paper focuses on the first phase and omits the flexibility services provision for DSOs, their technical conditions as well as coordination between the system operator and the network operators, but takes into account that such an obligation derives from the Clean Energy Directive and these issues are further treated as a second step, involving DSOs in the discussions.
The purpose of this concept paper is to describe the solution for involving flexibility through the independent aggregator model at the following market stages: day-ahead, intraday and balancing reserve markets (mFRR in Estonian case). The document describes possible market models for Estonia, proposes an approach for each market stage, both in terms of the explanatory model, the exchange of data and the balance management. The focus of the document is therefore mainly on developing the market framework and making the necessary legislative changes. More technical and detailed questions have been left uncovered in this concept paper. These issues are planned to be addressed in the second phase of the work of the Demand Response Working group, which aims to discuss the remaining issues still in the air with market participants in a more detailed manner, involving more distribution system operators in the working group with a view to better incorporation of flexibility into the operation of distribution networks, resulting in the development of another concept pape,r if necessary.

The purpose of the public consultation of this concept document is to consult market participants on the proposed visions, to determine whether the proposed market model II is an acceptable approach for market participants, what the attitude of market participants is towards the temporary reference price variants, which option of these would be the best option, and whether the proposed changes to the legislation are sufficient in the vision of market participants when taking into account the requirements of the Directive and the approach of the market model.

The concept paper shall be ultimately formulated after the consultation, in accordance with the results of the consultation, and any remaining amendments to the draft Electricity Market Act and the Network Code on the Operation of the Electricity Market shall also be made. The legislative changes will apply from 2021, as planned.

3. Definitions

Aggregator means a market participant who provides an aggregation service.

Aggregation means the activity of an aggregator which combines multiple customers loads or generated electricity for sale, purchase or auction in any electricity market. Aggregation may include the flexible capacities of customers in the consumption or generation capacities of the open supply chain from different BRPs portfolios, but must be covered by the balance responsibility obligation throughout the balance responsibility process.

Active customer means a consumer/producer who offers its flexibility through explicit demand response to electricity markets, either by itself or through an aggregator.

Balance responsible party (BRP) means a market participant who is responsible for its imbalances and has entered into a balance agreement with a system operator in order to secure its balance, in accordance with the procedure laid down in the legislation in force.

Electricity market operator means the party operating the electricity market designated by the Competition Authority in accordance with Article 4(3) of Commission Regulation (EU) 2015/1222 laying down guidelines on capacity allocation and congestion management (OJ L 197, 25.07.2015, p. 24-72).

Independent aggregator means a market participant engaged in aggregation who is not affiliated to the customer's supplier.

Implicit demand response means a consumer's response to market's price signals where, depending on the price of the market, the consumer can change its consumption pattern (either through automatic systems or by making personal choices) in order to save electricity costs. [1] This type of demand response is possible through dynamic electricity packages.

mFRR means manually activated frequency restoration reserve.

Explicit demand response means balancing flexibility that can be traded (similar to generation offerings) in different electricity markets (wholesale, balancing and system services markets). This type of demand response is usually administrated by an aggregator, which may be an independent aggregator (self-contained aggregator) or the electricity supplier itself. This type of demand response is often referred to as incentive-based. [1]

Demand side flexibility in the context of the concept paper means a system ability to change the demand resulting in service that reduces cost-effectively the need to increase or replace network capacity and manage network congestions and helps the network to operate efficiently and securely, by involving to the markets the electricity producers with renewable sources, market participants involved in demand response, undertakings operating energy storage units, and market participants active in aggregation;

Flexibility service means a service where the consumption and/or generation curve is changed from the initially planned curve according to the market signals, by way of more efficient involvement of electricity producers using renewable sources, distributed producers of electricity, market players involved in demand response, energy storage companies, and market players involved in aggregation in the electricity market.

When used by the network operator, the flexibility service allows for cost-effective reduction of the need to increase or replace network capacity and control network load, and helps the network to operate efficiently and securely. By system operatore the flexibility services can be used in reserve markets (balancing and ancillary services markets)..

Balancing service provider means a person who provides energy to the balancing market, can be an aggregator and an independent manufacturer/consumer who has entered into a balancing contract with the system operator and is able to offer an adequate and market-wide offer.

Demand response means a change in the electricity consumption by consumers by changing normal or current consumption curve in response to market signals, including in response to financial incentives or electricity prices changing in time or in response to an offer made by a consumer, either independently or through an aggregator and accepted by market, to sell a reduction or increase of consumption for the price of the organised market set out in Art. 2 (4) of the Commission Implementing Regulation (EU) No 1348/2014 on data reporting implementing Article 8(2) and Article 8(6) of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency (OJ L 363, 18.12.2014, p. 121–142).

I AGGREGATION PRINCIPLES AND MARKET SOLUTION

4. General principles of demand response

Demand response refers to the flexibility of the customer, meaning the temporary change in consumption or in distributed production due to a market signal. This means that demand response is able, similar to generation, offer to the markets both an increase and a reduction of energy depending on the need of electricity market, particularly in terms of the reserve markets. For wholesale markets, the aim is in most cases to reduce consumption, for example helping cut off high consumption during peak hours, thereby harmonising market prices, but also by improving system governance and security of supply. Through demand response, it should be possible for households, distributed energy producers as well as large consumers in the industry or the service sector to offer flexibility to the market.

The value of demand response to the Estonian electricity system will increase over time due to the decrease in generation capacity (from the shutdown of fossil fuel based generation capacity from oil shale) and the increase of system reserve need (from the synchronisation with the Central European electricity system in 2025) and will also depend on the amount of demand response involved in the market. However, the increase in the value of demand response varies also depending on its use by different market participants.
Competitive uses of demand response mainly include:
• trading on the wholesale market (day-ahead and intraday) in order to avoid price volatility in particular, but also to reduce CO2 emissions;
• postponement of investments or reductions in congestion of networks (not covered further in this concept paper);
• provision of reserves and system services to the system operator. This area will be particularly relevant in 2025, when the desynchronisation of the IPS/UPS electricity system is planned to take place and the needs for system reserves, mostly for FCR an aFRR but for also

other system services will increase significantly. To date, the usage is relevant for the mFRR product as the only reserve market in Baltics.

Demand response also has the potential to significantly improve Estonia's security of supply, helping compensate cost-effectively for declining base generation capacity and increasing demand.

This concept paper deals with explicit demand response, which means that the customer directly offers its flexibility to the market. The another, implicit approach to demand response means that the customer controls its own consumption, for example turns off some equipment in hours of higher market prices, but makes no offers on that part to the market.
Explicit demand response can take place both within the portfolio of a BRP and across the portfolios of different BRPs. A cross-portfolio aggregation can be offered on the markets by an independent aggregator.

4.1. Demand response through aggregation

The role of the aggregator in providing flexibility to the market lies primarily in the capability of pooling the resources of the various distributed flexibility providers. The management of consumption through aggregation also enables small bidders to participate in the market, as they would not independently comply with the minimum market bid requirement, and thereby they can make their flexibility available to the market. An aggregator may also pool individual providers in its portfolio who, while fulfilling the relevant minimum market bid quantity requirement, are not interested in dealing with market data exchange and requirements themselves. An aggregator may operate within the portfolio of one BRP as well as across portfolios. In the latter case, it is an independent aggregator, so to speak.
By aggregating flexibility from the portfolios of different BRPs, an independent aggregator could create additional costs for BRPs whose portfolios contain the customers whose flexibility was aggregated. In view of this, it is important to create regulative framework in the form of a market model that establishes principles for clarifying data and, where appropriate, for compensation. Market model approaches are covered in more detail under point 6.

5. A vision of EU legislation on demand response.

The main documents giving an overview of the European Union's vision for demand response are Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and the directly applicable Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity ("the Regulation").

The principles laid down in the Directive:

Article 12 sets out the principles for switching aggregators, which are the same as for switching electricity suppliers. The most important principles are as follows:

1. Switching supplier or market participant engaged in aggregation shall be carried out within the shortest possible time. Member States shall ensure that a customer wishing to switch suppliers or market participants engaged in aggregation, while respecting contractual conditions, is entitled to such a switch within a maximum of three weeks from

the date of the request. By no later than 2026, the technical process of switching supplier shall take no longer than 24 hours and shall be possible on any working day.

2. Member States shall ensure that at least household customers and small enterprises are not charged any switching-related fees.

Article 13 reflects the principles of an aggregation contract as well as the approaches between the consumer and its electricity supplier upon the consumer's participation in the aggregation.

1. All customers are free to purchase and sell electricity services, including aggregation, other than supply, independently from their electricity supply contract and from an electricity undertaking of their choice.
2. Where a final customer wishes to conclude an aggregation contract, the final customer is entitled to do so without the consent of the final customer's electricity undertakings. Member States shall ensure that market participants engaged in aggregation fully inform customers of the terms and conditions of the contracts that they offer to them.
3. Final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity free of charge at least once every billing period if requested by the customer.
4. Customers shall not be subject to discriminatory technical and administrative requirements, procedures or charges by their supplier on the basis of whether they have a contract with a market participant engaged in aggregation.

Article 17 reflects demand response through aggregation.

1. Member States shall allow final customers, including those offering demand response through aggregation, to participate alongside producers in a non-discriminatory manner in all electricity markets.
2. Member States shall ensure that transmission system operators and distribution system operators, when procuring ancillary services, treat market participants engaged in the aggregation of demand response in a non-discriminatory manner alongside producers on the basis of their technical capabilities.
3. Member States shall ensure that their relevant regulatory framework contains at least the following elements:

a) the right for each market participant engaged in aggregation, including independent aggregators, to enter electricity markets without the consent of other market participants;
b) non-discriminatory and transparent rules that clearly assign roles and responsibilities to all electricity undertakings and customers;
c) non-discriminatory and transparent rules and procedures for the exchange of data between market participants engaged in aggregation and other electricity undertakings that ensure easy access to data on equal and non-discriminatory terms while fully protecting commercially sensitive information and customers' personal data;
d) an obligation on market participants engaged in aggregation to be financially responsible for the imbalances that they cause in the electricity system; to that extent they shall be balance responsible parties or shall delegate their balancing responsibility in accordance with Article 5 of Regulation (EU) 2019/943;
e) provision for final customers who have a contract with independent aggregators not to be subject to undue payments, penalties or other undue contractual restrictions by their suppliers;

f) a conflict resolution mechanism between market participants engaged in aggregation and other market participants, including responsibility for imbalances.

4. Member States may require electricity undertakings or participating final customers to pay financial compensation to other market participants or to the market participants' balance responsible parties, if those market participants or balance responsible parties are directly affected by demand response activation. Such financial compensation shall not create a barrier to market entry for market participants engaged in aggregation or a barrier to flexibility. In such cases, the financial compensation shall be strictly limited to covering the resulting costs incurred by the suppliers of participating customers or the suppliers' balance responsible parties during the activation of demand response. The method for calculating compensation may take account of the revenue brought about by the independent aggregators to other market participants and, where it does so, the aggregators or participating customers may be required to contribute to such compensation but only where and to the extent that the revenue to all suppliers, customers and their balance responsible parties do not exceed the direct costs incurred. The calculation method shall be subject to approval by the regulatory authority or by another competent national authority.

5. Member States shall ensure that regulatory authorities or, where their national legal system so requires, transmission system operators and distribution system operators, acting in close cooperation with market participants and final customers, establish the technical requirements for participation of demand response in all electricity markets on the basis of the technical characteristics of those markets and the capabilities of demand response. Such requirements shall cover participation involving aggregated loads.

Principles arising from the Regulation:

Article 3 sets out the principles for the functioning of electricity markets.

Clause (g) sets out that market rules shall deliver appropriate investment incentives for sustainable generation and also for demand response to meet market needs, and shall facilitate fair competition.

Clause (j) sets out that safe and sustainable generation, energy storage and demand response shall participate on equal footing in the market, under the requirements provided for in the Union law;

Clause (m) sets out that market rules shall enable the efficient dispatch of generation assets, energy storage and demand response.

Article 6 concerns the balancing market.

Article 6, clause 1 sets out the following concerning the arrangements for the pre-qualification of the balancing market:

a) ensure effective non-discrimination between market participants taking account of the different technical needs of the electricity system and the different technical capabilities of generation sources, energy storage and demand response;

c) ensure non-discriminatory access to all market participants, individually or through aggregation, including for electricity generated from variable renewable energy sources, demand response and energy storage;

d) respect the need to accommodate the increasing share of variable generation, increased demand responsiveness and the advent of new technologies.

Article 12 deals with the load distributions of generation and demand response.

Clause 1 sets out that the dispatching of power-generating facilities and demand response shall be non-discriminatory, transparent and, unless otherwise provided under paragraphs 2 to 6, market based.

Article 13 concerns load redistribution, which provides for the possibility of demand response participation in the so-called redispatch, taking into account the following principles:
1. The redispatching of generation and redispatching of demand response shall be based on objective, transparent and non-discriminatory criteria. It shall be open to all generation technologies, all energy storage and all demand response, unless technically not feasible.
2. The resources that are redispatched shall be selected from among generating facilities, energy storage or demand response using market-based mechanisms and shall be financially compensated. Balancing energy bids used for redispatching shall not set the balancing energy price.

Article 18 sets out the following principle concerning network charges and demand response:
1. Network charges must not discriminate positively or negatively against energy storage or energy aggregation, nor shall they reduce the incentive to produce electricity for own consumption, to consume that electricity, and to participate in demand response.

Article 55 sets out the following under the functions of distribution system operators:
c) facilitating consumption flexibility and demand response as well as distribution network users' access to markets;

Article 57 concerns cooperation between distribution system operators and transmission system operators.
Clause 2 sets out that distribution system operators and transmission system operators shall cooperate with each other in order to achieve coordinated access to resources such as distributed generation, energy storage or demand response that may support particular needs of both the distribution system operators and the transmission system operators.

As **previous regulation**, Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency can be highlighted; more specifically, Article 15 of the Directive, dealing with the following principles:

1. Demand response should be encouraged to participate in wholesale and retail markets, including reserve and system services markets, jointly with generation resources (Art. 15 (4), Art. 15 (7), Art. 15 (8)).
2. The TSOs and the DSOs must treat providers of demand response, including aggregators, in a non-discriminatory manner and taking into account their technical capabilities. (Art. 15 (6), Art. 15 (8)).
3. The TSOs and the DSOs shall develop and the national regulatory authorities shall grant their approval to the technical conditions for participation in the markets (Art. 15(8)).
4. The relevant conditions must also include allowing the participation of aggregators (Art. 15(8)).

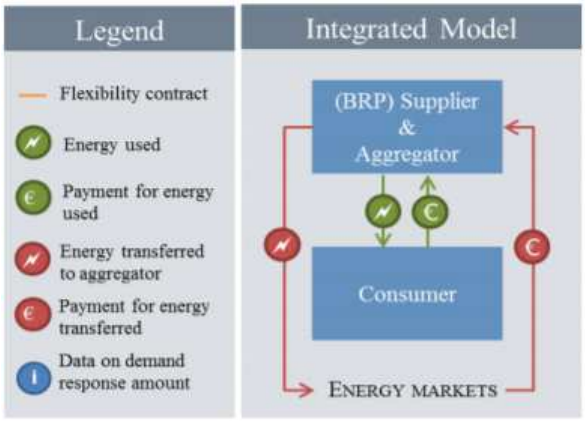
6. General principles for the concept of demand response in Estonia

Taking into account the principles laid down in European Union regulations, as well as the existing market developments related to flexibility in Estonia, the following principles have been agreed between the drafters of the concept paper, which shall be taken into account in the preparation of the market framework and the national legislation:

1. Flexibility's access, including through an independent aggregator, is granted at all market levels (day-ahead, intraday, reserve markets and other system services markets).
2. The aggregator has no obligation to enter into any separate contract with or pay fees to its customer's electricity supplier or BRP. Voluntary contracts/arrangements between the aggregator and the BRPs/electricity suppliers that contribute to the market's enlivenment are possible.
3. Flexibility holders (i.e. end-consumers/producers) must be allowed to participate in the provision of flexibility services without any additional charges from their BRP or electricity supplier.
4. Flexibility holders must be able to choose freely and also to switch easily between aggregators.
5. Customers must have an overview of their flexible demand activations, just as they have an overview of their consumption data at a metering point (in Data Hub). In the first phase, compliance with the relevant obligation remains the responsibility of the aggregator.
6. The aggregator must have an overview of the consumption and activation of its customers.
7. The aggregator has a balance responsibility, as do all market participants. It may employ a BRP or itself become a BRP.
8. The system operator has a central data exchange and clarification role. No further data exchange or clarifications between the aggregator and the customer's electricity supplier or BRP are necessary.
9. The customer's BRP or electricity supplier shall not be notified of the participation of a separate measuring point from its portfolio in demand response, with the exception that the respective BRP or the electricity supplier have taken on the role of the aggregator for that measuring point.
10. For the development of the market, it is necessary to establish clear regulation that includes the introduction of the market's settlement model approach to each market level. The general principles of the market model shall be set out in legislation. More detailed principles shall be included in the methodology to be prepared by the system operator and approved by the Competition Authority.

7. Market models

7.1. Model I: Integrated or in-portfolio model



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The aggregation of flexibility takes place only within the portfolio of one electricity supplier/BRP and on its knowledge. The aggregator may be either the electricity supplier/BRP itself or an aggregator operating in its portfolio and providing service to it. On that case the aggregator itself has also the same BRP for its own imbalances. The consumer's load will be changed in accordance with the demand of the electricity supplier/BRP either to balance the BRP's own portfolio or to provide flexibility to the markets.

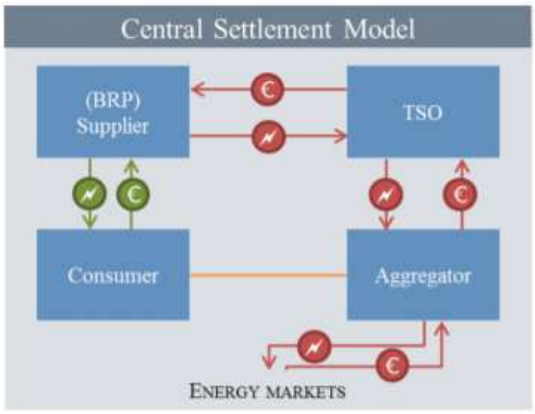
With this model, the balance responsibility is considered by the system operator on the basis of the entire portfolio of the BRP, therefore there is no need for separate settlement for aggregated flexibility by the system operator.. As the electricity supplier/BRP is aware in this model and can take aggregations into account for the management of its portfolio and even use it for this purpose, there is no need for additional compensation for electricity supplier in this model. So aggregators/active customers are able to earn more through aggregation. However, this model excludes the activities of an independent aggregator and the aggregator can only operate by having an agreement with the electricity supplier/BRP.

Pros	Cons	Evaluation
• A simple model that does not require the creation of an additional settlement mechanism by the system operator. • No baseline model needed for settlement between aggregator-system operator-BRP/electricity supplier. • There is no need for a compensation mechanism between the aggregator and the electricity supplier/BRP, as the entire settlement takes place within the BRP's portfolio.	Only allowing the use of the relevant model restricts market development by not allowing the participation of independent aggregators in the market and is therefore contradicting to EU regulation.	Taken alone (without an additional model), does not comply with the Directive.

7.2. Independent aggregator models:

The following models allow the activities of an independent aggregator that may aggregate active customers across the portfolios of different BRPs and simultaneously (aggregating them into a single bid). However, the aggregator has a balance responsibility, which means that it also has to have a BRP or it has to have itself identified as a BRP.

7.2.1. Model II: Market model with central settlement



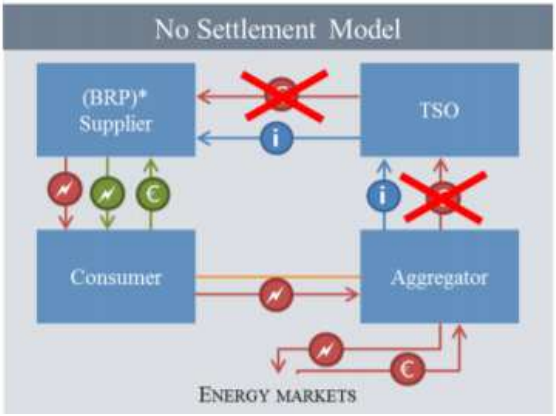
Source of Figure [2]

The accounting of the energy exchange between the aggregator and the consumer's electricity supplier/BRP shall be done by a neutral entity, which is usually the system operator. All the aggregated electricity shall be recorded as a trade between the BRP of the consumer's electricity supplier and the BRP of the aggregator. The BRP of an active customer's electricity supplier therefore has a legitimate expectation of compensation in respect of the quantity aggregated from its portfolio.

The calculation of compensation according to the reference price and the volume of the aggregated quantity shall be carried out by a neutral entity. All the settlement between the aggregator and the electricity supplier/BRP shall be carried out then by a neutral entity. The main issue with this model is the finding of a reference price for market equilibrium to compensate for the losses incurred to the active customer's BRP, while also taking into account the socio-economic benefits generated by aggregation and leaving sufficient financial incentives for the aggregator and the active customer to operate on the market.

Pros	Cons	Evaluation
• Enables to compensate BRPs/electricity suppliers for the costs that may be incurred by aggregation. • The entire settlement goes through the system operator, so no further data exchanges between the aggregator and the customer's electricity supplier/BRP are required. • The customer's electricity supplier and/or BRP have no information if the customer participates in the demand response and therefore there is no desire to impose separate charges or additional data exchange requirements to the customer as a result.	• It is necessary to establish a reference price methodology to enable the use of the market model at all market levels. • It may be necessary to set a different compensation scheme, or reference price, for different market levels. • Depending largely on the reference price approach, the development of the demand response market may be restricted • To develop the most optimal solution for the reference price methodology, it would be useful to carry out a socio-economic analysis, which would allow to take into account the benefits brought to the different market parties and to the society as a whole by demand response, in addition to the costs generated for the BRPs/the electricity suppliers by the demand response.	Depending on the reference price methodology, the most optimal solution for BRPs/electricity suppliers vs flexibility providers/aggregators can be achieved.

7.2.2. Model III: Market model without explanation



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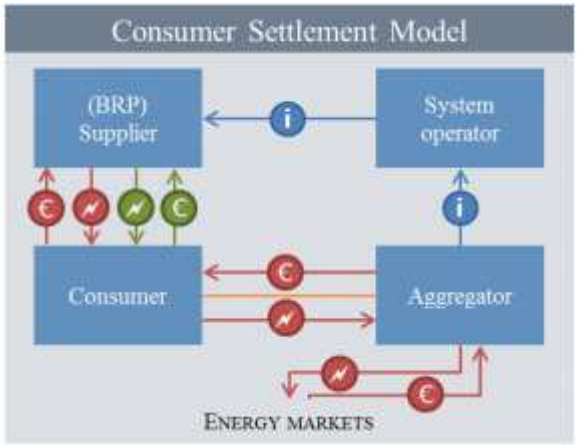
Unlike Model II, the aggregated quantity in this model is not indicated as a trade between the active customer's electricity supplier's BRP and the aggregator's BRP. This means that the active customer's electricity supplier and/or its BRP will be able to take into account the probability of aggregation of flexibility from their portfolio in their portfolio forecasts, and to reduce potential aggregation costs through forecasting.

In the event that the BRP does not additionally forecast possible aggregated amounts from its portfolio, those will remain imbalanced and, in the event of a decrease in consumption, the BRP will receive compensation through an imbalance price. As the aggregator does not have to pay compensation to the electricity supplier/BRP in this model, the model enables the aggregator and the active customer to obtain sufficient financial incentive to participate in the market. This model could work quite successfully in wholesale markets where the incentive for aggregation is price, and forecasting aggregations depending on price should be quite feasible for electricity suppliers and their BRPs. However, the weakness of the model is that it is likely to conflict with the approach in Regulation (EU) 2017/2195 (hereinafter EBGL), Article 49, which provides that each bid for balancing energy (balancing reserve) launched must be shown in the portfolios of the BRPs from which they were activated. However, since the models of wholesale markets and reserve markets should be as similar as possible in order to promote an even inclusion of flexibility in markets and not to give different incentives to some market levels, for example encouraging wholesale markets at the expense of reserve markets, it is not reasonable by the opinion of the developers of this concept paper to apply a model that could only be used at some market levels.

Pros	Cons	Evaluation
• The system operator does not need to set a compensation price. • Promotes the development of the demand response market, as it enables to generate the greatest revenue for the aggregator and the active customer, among these models. • If BRPs are able to predict demand response activations with sufficient accuracy (in a more mature market with sufficient historical data, this is likely) or if the BRP is informed of the planned activation of demand response for a sufficient time in advance, they can take them into account to balance their portfolio, and demand response may not lead to high costs for the BRPs. • Taken separately, it is suitable for the day-ahead market and to some extent the intraday market (if there is further information exchange) where the BRP can easily forecast its portfolios, as the possible share of demand response activated from the outside depends only on the market price.	• Not usable for the balancing market as EBGL stipulates that the quantities sold to the balancing market must be taken into account as balancing supplies in the BRP portfolios from which they were activated. • Does not take into account the cost to the BRP/the electricity supplier in the form of demand response from of its portfolio and does not compensate for the energy already purchased. The BRP must be able either to anticipate the potential activation of its own demand response from its portfolio, which will impose an additional forecasting obligation on BRPs, or additional information exchange advice must be created where the aggregator informs the BRP of the planned demand response activation for a sufficient time in advance so that the BRP is able to balance its portfolio (possible on day-ahead and intraday markets). • A model that is not available at all market levels is unreasonable because the use of excessively different models creates incentives for the resources to participate at some market levels more than at others.	Favours flexibility providers/aggregators more than BRPs/electricity suppliers.

7.2.3. Model IV: Without a central settlement but with a data exchange where BRPs are allowed compensation from active customers



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With this model, the electricity supplier/BRP of the active customer receives information from the system operator about the quantities activated from its portfolio by the consumer/measurement point. No compensation is paid through the system operator to the electricity supplier/BRP, but the electricity supplier/BRP is able to ask the compensation from the active customer itself. In order for the active customer to retain the incentive to participate in the market, it is likely that the aggregator should, in such a case, pay compensation to the electricity

supplier/BRP through the active customer from its profit earned. The drawback of the model is that without setting a central and neutral compensation rate, such as in Model II, this model can lead to overcompensation or also to discrimination against active customers by taking away from them, and hence from the aggregators, the incentive to participate in the market. The model currently used in Estonia for the mFRR market is quite similar to this model – BRPs known the active customers in their portfolios and although information on active customer activations is passed on to BRPs on a portfolio basis rather than on a measuring point basis, BRPs have been able to apply compensation based on these activations to consumers due to the small size of the market and the presence of very few active customers at the moment. This approach, in addition to leaving the aggregators with a relatively low financial incentive, has significantly reduced the willingness of potential active customers to participate in the market, as active customers are also subject to additional administrative obligations (additional invoices from the electricity supplier, etc.).

Pros	Cons	Evaluation
• Does not need the system operator to set a compensation price. • Enables the BRP and/or the electricity supplier to obtain compensation for their costs through consumers.	• Creates at times an unclear market framework, which is ultimately inhibiting for the development of demand response. • The possibility for BRPs/electricity suppliers to seek compensation from consumers may lead to discrimination against active customers and the imposition of unreasonable compensation or other claims/charges, which significantly reduces the incentive for a consumer to participate in the market as an active customer.	Favours BRPs/electricity suppliers to flexibility providers/aggregators/active customers.

7.3. Market model proposals:

Both the intra-portfolio aggregation model and the approach of the independent aggregation model should be encouraged. Consequently, the proposal for an aggregation market model includes both the integrated aggregation model that does not require further settlement mechanisms from the system operator, and the independent aggregator model.

7.3.1. Model I: Integrated aggregation model:

This model can be used for all market levels in Estonia at present. As the integrated aggregation model does not provide any additional data exchange with the system operator or settlement from the system operator, the concept paper does not provide detailed descriptions for this model under the description of the aggregation processes. Clarification of the data, as well as possible financial benefits for active customers, are the subject of a contract between the consumer and the aggregator. At the same time, legal approaches to consumer rights, such as the switching of aggregators, the availability of their activated flexibility data, and other provisions of the law setting out the rights of the active customer apply here as well.

7.3.2. Model II: Market model with central settlement

Taking into account the advantages and disadvantages of different market models, the proposal for a market model with an independent aggregator for Estonia is the market model with central settlement.

The development of a suitable reference price for compensation, in order to find a balance between the costs generated by the off-portfolio demand response activations for BRPs and the revenue generated by the demand response for the society and market participants, is essential for this model.

Article 17(4) of the Directive provides that the calculation method for compensation may take account of the benefits brought about by the independent aggregators to other market participants and, where it does so, the aggregators or participating customers may be required to contribute to such compensation but only where and to the extent that the benefits to all suppliers, customers and their BRPs do not exceed the direct costs incurred.

As most of the trade takes place in the day-ahead market, the potential cost for a BRP is mostly measurable with day-ahead market price; the socio-economic benefits are measurable in lower electricity prices for consumers, if activation led to a price drop, and in the balancing market also in lower imbalance prices, which also benefits the BRPs. In addition, reduced consumption means reduced generation, which means a reduction in CO2 emissions if generation decreased on account of reduced fossil fuel use for generation. A further analysis is needed to assess the socio-economic benefits in more detail way, and to provide an approach to how socio-economic benefits could be taken into account for the calculation of the reference price for Estonia, for all market levels.

The concept document of an independent aggregation, drawn up by NordReg (Nordic Regulators Association) in 2020, also highlights the complexity of determining the potential compensation price. The document separately stresses that in the case of compensation, it is very important to assess its potential effects on market participants. Full compensation (day-ahead market price) is expected to have an excessively negative impact on the business model of aggregators. There is a risk that aggregators will not enter the market with such a model and aggregations will simply not take place. It is therefore necessary to carry out a thorough analysis of this risk vs the market distorting effects on BRPs, which would be caused by complete or partial lack of remuneration in the markets. Moreover, since under the Directive, the compensation should only be paid in so far as the revenue incurred does not exceed the costs, the compensation mechanism requires a thorough additional analysis to identify the socio-economic benefits to the parties and, on that basis, recommend the price of compensation (the reference price calculation solution). Thus, the Nordic regulators also recommend that an *ex ante* analysis be carried out in order to develop the compensation price [4].

Within the framework of this market model, the system operator shall establish and submit to the Competition Authority for approval a reference price methodology which shall provide for the following approach:

Reference price (RP) = price of fixed supply (FS) – socio-economic value created by aggregation (SE)

In this regard, the SE is determinable on the basis of an analysis carried out in advance by the system operator, which shows the revenue incurred for various parties from the involvement of flexibility to the markets.

7.3.2.1. Temporary reference price approach

As the determination of the SE through analysis is time-consuming and therefore it is likely that the methodology for the reference price taking into account the SE will be developed no earlier than by the end of 2021, the concept paper proposes a temporary reference price approach. From the regulation point of view, any temporary reference price approach must also be presented with the reference price methodology, prepared by the system operator and approved by the Competition Authority.

Temporary reference price approach for the intraday and balancing reserve market:
RP = day-ahead market price for the relevant hour.

Day-ahead market's reference price approach:
In this context, the concept paper offers two options for the consultation, among which one will have to be chosen for the final concept:

Option 1	Option 2
RP = day-ahead market price for the relevant hour. Similarly, to the intraday and balancing reserve market, the day-ahead market price for the relevant hour shall also be used for the day-ahead market. Revenue for active customers can be comparable to implicit demand response revenue for this model, being expressed especially in terms of energy savings or in terms of shifting consumption to lower-priced hours. The aggregator's income can come from the consumer. The Option 1 approach leaves the aggregator with very low, if any, incentive to participate at this market level, but follows the same approach as the other market levels for RP, so it is clear and easy to understand. Given that the main profit for the aggregator and the active customer would come from the balancing market, this RP approach on a day-ahead market may be a solution on a temporary basis until the definition of the SE.	A statistical approach where: • On working days: RP = average day-ahead market price for the same hour of the last 5 working days • On rest days: RP = average day-ahead market price for the same hour of the last 2 rest days. This approach would enable the BRP's costs to be compensated at least in partially while.in the case of hours with higher market prices, still create an incentive for aggregators and active customers to participate in the day-ahead market.

II AGGREGATION RELATED PROCESSES

8. General principles and scope

In this chapter, the concept paper describes the organisation of the aggregator's data exchange and balance management for its participation in day-ahead and intraday market stages and in balancing reserve markets for model II "Market model with central settlement and compensation". The same general requirements are also applicable to the provision of network congestion management products (similar in the counter-trade balancing service data exchange and settlement arrangements), but are not reflected in more detail as there are currently no specific business requirements for the respective products and product specifications defined.

9. Contracts

The standard terms and conditions of the balance agreement shall determine the rights and obligations of the balance responsibility process between the BRP and the system operator, and in particular set out the following:

a) under the balance contract, the system operator shall sell or purchase from the BRP the amount of lower imbalance necessary to cover its imbalance as an open supply during each period of settlement. The BRP shall not premeditatedly use the lower imbalance, which means that the contract does not allow a predictable systematic purchase or sale of lower imbalance;
b) for the settlement of the trades by aggregator, the system operator shall sell or purchase from or to the BRP the designated trades performed by the market participants in its balance region as specified by the aggregator, during each trading period.

The standard terms and conditions of a balancing service contract shall determine the rights and obligations of balancing service providers, including between the aggregator and the system operator, which should apply for making balancing bids, ordering, using and terminating the use of the balancing service, and billing. A balancing service provider shall have a BRP.

An aggregator data exchange and settlement contract is a new contract to be developed by the system operator for concluding with aggregators. Under this contract, the aggregator shall be registered, data exchange and settlement requirements, agreements and IT solutions shall be set for it, and balance responsibility arrangements, consents to the processing of the aggregated measurement points data, and the management of the consents of the customers in the aggregation portfolio shall be described.

The contract for the use of the Data Hub's Live environment shall be concluded with all market participants –BRPs, open suppliers, aggregators, network operators, line holders. The open supply balance portfolios of the BRPs, including the aggregators, shall be managed in the Data Hub.

10. General principles, data exchange and settlement of an aggregator's trades

10.1. In order to act as an aggregator, an enterprise must enter into a data exchange and settlement contract with the system operator and enter into a balance agreement with either the system operator becoming BRP) or with the BRP to cover its trades (hereinafter referred to as the aggregator's BRP).

10.2. If an aggregator wishes to trade on a day-ahead and intraday market, it shall provide the electricity exchange operator with its BRP's details. All trades carried out by the aggregator on the market shall be included in the portfolio of its BRP by the electricity exchange operator. The electricity exchange operator shall communicate to the system operators the supplies traded on the market, by BRPs.

10.3. Where an aggregator has traded on a day-ahead and intraday market, a balance plan shall be communicated by the aggregator's BRP in such a way that the aggregator's supply is included in its balance area, at the virtual trade point set up by the system operator for that purpose. The system operator shall allow the adjustment of the data at the balance settlement stage, where the corresponding quantity is allocated to the balance area of the BRP of the customer aggregated. The principles for this purpose are:

10.3.1.1. As long as the system operator has not implemented its own information system for the distribution of the aggregator's supplies, the relevant distribution shall be provided by the aggregator's BRP with the deadline of submitting the data within the next working day. The reference value is that the sum of supplies distributed between BRPs must be equal to the data of the virtual trade point in the approved balance plan.

10.3.1.2. The aggregator shall provide the system operator with more detailed data on aggregated customers, including information of the customer, measurement point code and minute-based measurement data regarding activation, in accordance with the data exchange contract concluded with the system operator. If the system operator determines on the basis of measurement data that the assigned trade carried out is not reliable, the system operator shall cancel the distribution of the assigned trade to the balance area of the relevant BRP and the corresponding assigned trade shall remain in the area of the aggregator's BRP as an imbalance. The system operator shall forward the correction of the assigned trade to the respective BRPs.

10.4. If an aggregator wishes to take part of the balancing reserve market, it must enter into a contract for the provision of balancing services with the system operator. The provision of a balancing bid shall be on an equal footing with other providers, but, similar to trades in day-ahead and intraday electricity markets, the amount activated by the system operator should be allocated to the balance regions of the measurement points' BRPs during the balance settlement phase.

10.4.1.1. As long as the system operator has not implemented its own information system for the division of the aggregator's supplies, the relevant division shall be provided by the aggregator with the deadline of submitting the data within the next working day. The reference value is that the sum of the trades distributed between the BRPs must be equal to the amount of the balancing trade activated by the system operator.

10.4.1.2. The aggregator shall provide the system operator with more detailed data on the aggregated customer data, including information of the customer, measurement point's code and minute-based measurement data regrading activation, in accordance with the data exchange contract concluded with it. If the system

operator determines on the basis of measurement data that the balancing trade carried out is not reliable, the system operator shall cancel the distribution of the balancing trade to the balance area of the relevant BRP and the corresponding trade shall remain in the balance area of the aggregator's BRP as an imbalance. The system operator shall forward the correction of the assigned supply to the respective BRPs. The relevant supply shall be included in the balance settlement report and settled between the system operator and the BRPs on the basis of the settlement methodology set out in point 11.

11. Explanation and settlement of supplies related to the aggregator

11.1. The requirements for the aggregator data exchange will be set out in the data exchange and settlement contract concluded with the aggregator.

11.1.1.1. The system operator shall coordinate the "Settlement reference price methodology" for the aggregator's supplies with the Competition Authority and shall publish it on its website.

11.2. The system operator shall communicate to the BRPs the balance settlement reports, together with the aggregator's supplies based on the following:

11.2.1.1. For day-ahead market and intraday market supply, which entered the aggregator's balance portfolio as a purchase from another balance portfolio (example: sales of a reduction of consumption to the electricity market and purchases to cover it from another balance portfolio), the aggregator's BRP pays to the system operator according to the reference price agreed with the methodology, and the system operator pays the amount to the BRP whose balance portfolio the corresponding supply was allocated to, based on the same reference price.

11.2.1.2. For day-ahead market and intraday market supply that exited as a sale from the aggregator to another balance portfolio (example: sales of an increase in consumption to the electricity market and sales to another balance portfolio to cover it) the system operator pays to aggregator's BRP according to the reference price and the BRP to whom portfolio the corresponding trade was allocated pays to system operator according the reference price

11.2.1.3. For the trades of the balancing reserve market that entered the balance portfolio of the aggregator as a purchase from another balance portfolio (example: sales of a decrease in consumption to the balancing market and purchases to cover it from another balance portfolio), the system operator shall pay the reference price to the BRP whose balance portfolio the corresponding supply was allocated to. The system operator shall set off the cost of the balancing supply directly on the basis of a balancing contract concluded with the aggregator, on the basis of the respective reference price.

11.2.1.4. For the supply of the balancing reserve market that exited as a sale from the balance portfolio of another balance aggregator (example: sales of increase in consumption to the balancing market and sales to another balance portfolio to cover it), the BRP whose balance portfolio the corresponding supply was allocated to, shall pay the amount to the system operator on the basis of the reference price. The system operator shall set off the cost of the balancing supply directly on the basis of a balancing contract concluded with the aggregator, on the basis of the respective reference price.

11.3. The pricing of balancing reserve market trades directly with the balancing service provider shall be in accordance with the contract, as follows:

11.3.1. In the case of up-regulation, the system operator shall pay to the balancing service provider for the amount of electricity supplied by the balancing service:

11.3.1.1. if using the bid for balance management, the marginal price of the balancing market, that is, the price of the highest-priced bid purchased from the balancing market and used for balance management by the system operator in a given trading period, EUR/MWh. If the balancing service provider is an aggregator, the system operator shall reduce the respective price by the aggregator's reference price for the settlement of supplies, as EUR/MWh, for which the supplies under the balance contract shall be settled with the respective BRPs.

11.3.1.2. if using the bid for a system service or countertrading, the price indicated in the bid, as EUR/MWh, but not lower than the price of the balancing market. If the balancing service provider is an aggregator, the system operator shall reduce the respective price by the aggregator's reference price for the settlement of the supplies at EUR/MWh, for which supplies under the balance contract shall be settled with the respective BRPs.

11.3.2. In the case of down-regulation, the balancing service provider shall pay the system operator for the amount of electricity supplied by the balancing service:

11.3.2.1. if using the bid for balance management, the marginal price, that is, the price of the lowest-priced bid sold to the system operator in the given trading period and used to manage the balance, as EUR/MWh. If the balancing service provider is an aggregator, the system operator shall reduce the respective price by the aggregator's reference price for the settlement of supplies as EUR/MWh, for which supplies under the balance contract shall be settled with the respective BRPs.

11.3.2.2. if using the bid for a system service or countertrading, the price of the bid, as EUR/MWh, but not higher than the price of the balancing market. If the balancing service provider is an aggregator, the system operator shall reduce the respective price by the aggregator's reference price for the settlement of the supplies, as EUR/MWh, for which supplies under the balance contract are settled with the respective BRPs.

12. Proposal for the settlement reference price methodology

12.1. The settlement reference price methodology proposes to implement a central settlement model for the purchase, sale and settlement of an aggregated designated trades between balance portfolios through the system operator's balance settlement.

12.1.1. Settlement per unit of energy = Market price of the product — Reference price

12.1.2. Reference price (RP) = price of fixed supply (FS) — from the socioeconomic value (SE) generated by the aggregation. In this respect, until an analytical method for the calculation of the socio-economic value in the price area has been applied, a temporary reference price methodology shall be established, which would provide for the following:

12.1.3.

12.1.3.1. For the intraday and balancing markets:

- The assigned fixed supply price (FS) is the day-ahead market price based on statistics that more than 90% of the trade is still carried out at the day-ahead market level.
- The price of the socioeconomic value (SE) is zero until an analytical method for calculating the socioeconomic value in the price area has been applied.

12.1.3.2. For the day-ahead market:

Option 1:

- The assigned fixed supply price (FS) is the day-ahead market price based on statistics that more than 90% of the trade is still carried out at the day-ahead market stage.
- The price of the socioeconomic value (SE) is zero until an analytical method for calculating the socioeconomic value in the price area has been applied.

Option 2:

Since the use of the same hour's market price as the day-ahead market's reference price is likely to eliminate the incentive for an aggregator to move flexibility to a given market level, the concept paper proposes a statistical price approach, which provides for the following:

- On work days: RP = average day-ahead market price for the same hour of the last 5 working days
- On rest days: RP = average day-ahead market price for the same hour of the last 2 rest days.

12.2. Below are examples of invoicing for the proposal made, based on the assumptions:

EXAMPLE 1:

- An aggregator sells 1MWh of consumption reduction at different market stages
- The day-ahead market price is $40/MWh
- The intraday market price is $50/MWh
- The balancing market price is €100/MWh
- The reference price for settlement between the parties under point 11.1.3.1 is €40/MWh
- The reference price for settlement between the parties under point 11.1.3.2 is €40/MWh for Option 1 and €30/MWh for Option 2 (assuming that the statistical approach for the last days has yielded such a result)

12.2.1 Day-ahead market's settlement

Option 1:

- The operator of the electricity exchange pays the aggregator €40 and the aggregator pays the system operator €40.
- The system operator pays the BRP €40, and the BRP pays the electricity exchange operator €40. The consumer in the balance area consumes less, its benefit being the price of its open supply contract. The aggregator's benefit and incentive to participate in the market is likely to come from the opportunity to retain the customer in order to earn from the customer at other market levels.

Option 2:

- The operator of the electricity exchange pays the aggregator €40 and the aggregator pays the system operator €30.
- The system operator pays the BRP €40, and the BRP pays the electricity exchange operator €30. The consumer in the balance area consumes less, its benefit being the price of its open supply contract. The aggregator's benefit and incentive to participate in the market is the price difference of 40-30 = $10, which it likely has to share with the consumer in some part. The BRP will incur a cost of $10.

12.2.2. Intraday market's settlement

- The operator of the electricity exchange pays the aggregator €50 and the aggregator pays the system operator €40.
- The system operator pays the BRP €40 and the BRP has previously paid the electricity exchange operator €40. The consumer in the balance area consumes less, its benefit being the price of its open supply contract.

12.2.3. Balancing market's settlement and conclusion

- The system operator pays the aggregator 100-40 = $60 as a net amount.
- The system operator pays the BRP €40 and the BRP has previously paid the electricity exchange operator €40. The consumer in the balance area consumes less, its benefit being the price of its open supply contract and an additional margin from the aggregator.

12.2.4. Conclusions and differences in a reduction of consumption:

- The value of flexibility in the day-ahead, intraday and balancing markets is generated in the extent of socio-economic benefits. The socio-economic benefits are expressed in lower consumption, which also means lower generation and, if the reduction in generation comes from lower fossil fuel use, lower CO2 emissions. Lower consumption may also lead to a lower market price; in particular the decrease in the market price due to the activity of the aggregator is likely to occur in a balancing market where the market is illiquid. The decrease in price in the balancing market also reduces the price of balance energy, which has a positive effect already on all BRPs in imbalance. A separate analysis must be carried out to determine the approach for determining the socio-economic benefit. Until the analysis has been carried out, a temporary reference price approach must be used. With the approach of the temporary reference price in the intraday market and the balancing market, the aggregator will be able to generate additional revenue if the sale of flexibility is more expensive than the price of the day-ahead electricity market. On the day-ahead market, the aggregator will be able to generate additional revenue in case of option 2 RP approach if the market price is above average for the near-term period. It is precisely in the hours of higher prices that the aggregator will be more likely to generate additional socio-economic benefits to the market with its activities, so it is justified to encourage the aggregator to enter the market in case of prices above average.
- If the supply is properly distributed across balance portfolios, there will be no imbalance for BRPs and customers in the Model II:central settlement model.
- If the aggregation supply is related to a large consumer who holds a separate supply contract, that consumer must inform its own BRP of its balancing market supply (Network Code on the Operation of the Electricity Market).
- It is not necessary to bring the aggregation settlement to the level of an open supplier; it could remain within the balance management framework – the open supplier's income from the consumer will be reduced, but it will be settled as the sale of its imbalance to its BRP.

EXAMPLE 2:

- The aggregator sells an increase in consumption for 1 MWh at different market stages
- The day-ahead market price is $40/MWh
- The intraday market price is $30/MWh
- The balancing market price is €0/MWh

- The reference price for settlement between the parties under point 11.1.3.1 is €40/MWh
- The reference price for settlement between the parties under point 11.1.3.2 is €40/MWh for Option 1 and €50/MWh for Option 2 (assuming that the statistical approach for the last days has produced such a result)

12.2.4. Day-ahead market's settlement and conclusion

Option 1:

- The aggregator pays the electricity exchange operator €40, and the system operator pays the aggregator €40.
- The BRP pays the system operator €40 and the consumer in the balance area pays its open supplier according to the open supply contract.

Option 2:

- The aggregator pays the electricity exchange operator €40, and the system operator pays the aggregator €50.
- The BRP pays the system operator €50 and the consumer in the balance area pays its open supplier according to the open supply contract.

12.2.2. Intraday market's settlement and conclusion

- The aggregator pays 30 €to the electricity exchange operator and the system operator pays 40 €to the aggregator.
- The BRP pays the system operator €40 and the consumer in the balance area pays the open supplier according to the open supply contract.

12.2.3. Balancing market' settlement and conclusion

- The aggregator pays the system operator 0-40 = €-40 as a netting, i.e. the system operator pays the aggregator.
- The BRP pays the system operator €40 and the consumer in the balance area pays the open supplier according to the open supply contract.

12.2.5 Conclusions and differences in consumption increase:

- The value of flexibility in increasing consumption to the electricity market arises from the principle that if the price of consumption is lower than usual and there is an incentive to increase consumption, the electricity system is likely to have more (cheap) generation and less consumption than usual. Thus, shifting consumption to a period when there is less consumption than normal or more generation than normal, helps harmonise the consumption schedule, make electricity prices more homogeneous and balance excess generation (especially relevant in the case of a surplus from uncontrolled generation, such as wind energy in periods of high wind).
- With the temporary reference price approach, an aggregator will be able to generate additional revenue in the intraday market and the balancing market if the purchase of flexibility is cheaper than the price of the day-ahead electricity market.
- If the supply is properly distributed across balance portfolios, there will be no imbalance for BRPs and customers.
- If the aggregation supply is related to a large consumer who holds a separate supply contract, that consumer must inform its own BRP of its balancing market supply (Network Code on the Operation of the Electricity Market).
- It is not necessary to bring the settlement of the agreement to the level of the open supplier; it could remain within the balance management framework - the open

supplier's income from the consumer will increase, but it will be settled as a purchase of its imbalance from its BRP.

13. Contracts with the aggregator

13.1. In order to act as an aggregator, the enterprise must enter into the following contracts with the system operator:

13.1.1. Data exchange and settlement arrangement contract. To this end, the enterprise shall:

13.1.1.1. submit an application for registration as an aggregator to the general contact of the system operator: info@elering.ee;

13.1.1.2. have and successfully test IT solutions for data exchange, in a manner that meets the data exchange requirements specified by the system operator;

13.1.1.3. ensure that the system operator is informed of the customer's consent to participate in the aggregation portfolio of its aggregation, in the manner specified by the system operator;

13.1.1.4. ensure that the system operator is informed of the customer's consent to collect and process its measurement data in the manner specified by the system operator;

13.1.1.5. other data exchange and settlement requirements as specified by the system operator;

13.1.2. enter into a contract with the system operator for the use of the Data Hub Live environment;

13.1.3. enter into a balance responsibility agreement with either the system operator or the BRP to cover its supplies.

14. Data exchange requirements for an aggregator

14.1. An aggregator shall provide the system operator with the following information, not later than on the following working day, on day-ahead, intraday and balancing market supplies:

14.1.1. A breakdown of assigned supplies (day-ahead and intraday) and balancing supplies by balance portfolio. The corresponding data transfer obligation ends when the system operator has implemented an information system for the distribution of the aggregator's supplies that takes over the relevant functionality.

14.1.2. A breakdown of assigned supplies (day-ahead and intraday) by the measurement point of the balancing customer, as a data transmission by minute and by trading period;

14.1.3. A breakdown of balancing supplies (orders activated at the system operator) by the measurement point of the balancing customer, as a data transmission by minute and by explanation period, i.e.:

14.1.3.1. the minute-based power output volumes of the activated points and the active power output of the explanatory period, broken down by each activated measurement point (including EIC code);

14.1.3.2. the minute-based and explanatory period-based balancing energy quantities of points activated by the balancing service provider at each measurement point (including the EIC code);

14.1.3.3. the total minute-based output capacity of active power activated by the system operator.

15. Verification of reliability of supplies, baseline methodology

15.1. The system operator shall set up an information system application, its functionality being to distribute the performed supplies to the balance portfolio related to a given measurement point and to verify the reliability of the supplies performed by an aggregator. The reliability of the data and the distribution of supplies shall be applied for all market stages.

15.2. An aggregator shall provide to the system operator, in accordance with the data exchange contract concluded with the system operator, data on the aggregated customers, including customer data, measurement point code and minute-based activation measurement data. If the system operator determines on the basis of the measurement data that the balancing supply performed is not reliable, the system operator shall cancel the distribution of the balancing supply to the balance area of the relevant BRP and the corresponding supply shall remain in the balance area of the aggregator's BRP as an imbalance.

15.3. The system operator shall settle the supplies, using the settlement methodology, so-called baseline methodology, the principles of which shall be developed by the system operator and validated by the Competition Authority.

15.4. In the first approach, the baseline methodology can only prescribe the baseline value generated by the aggregator (which is customer-based), verified by the system operator on the basis of 1 minute measurement data provided by the aggregator.

15.5. In the longer term, the system operator may also be likely to need to develop a central approach baseline methodology, in which case the baseline calculated and transmitted by the aggregator must undergo certification and will only be usable if the comparison with measurement data can produce a more accurate result than the central approach baseline calculation. Certification verifications may also be carried out by the system operator at random, after certification. In case the aggregator's baseline is more inaccurate or becomes more inaccurate over a period of time than the central approach baseline, the aggregator must transition to the central approach baseline.

<u>Verifying the reliability of measurement data, with baseline methodology</u>

15.6. The system operator shall base the day-ahead and intraday distribution on the following data on market stages:

15.6.1. The breakdown of the aggregator-reported assigned supplies (day-ahead and intraday) by the measurement point of the balancing customer, as a by-minute and by-trading-period data transmission;

15.6.2. The system operator's information system shall apply the actual measurement data by the measurement point of the balancing customer (based on data warehouse measurement data for a specific EIC and explanation period) as the reference value.

15.6.3. When implementing the central settlement model set out in point 11, it is not necessary to develop additional verification mechanisms to verify the execution of the assigned supplies. In the event that the aggregation process caused damage to the consumer, the aggregator shall compensate the consumer for the damage on the basis of its own contract.

15.7. The system operator shall base the distribution of activated balancing supplies on the following data:

15.7.1. the minute-based and explanation period-based active power output capacities of the activated points provided by the aggregator, broken down by each activated measurement point (including the EIC code);

15.7.2. minute-based and explanatory period-based balancing energy quantities reported by the aggregator at each measurement point (including EIC code);

15.7.3. the total minute-based active power output capacity activated by the system operator.

15.7.4. The system operator information system's application displays the actual measurement data, broken down by the measurement point of the adjustable customer (based on the data warehouse's measurement data and broken down by specific EIC and explanation period), as a reference value over a minute-by-minute period of time.

15.7.5. In the event that there has been no change in the minute-based data during the explanation period when up-regulating i.e. reducing consumption, the system operator shall cancel the supply by measuring point and the imbalance shall be added to the balance area of the aggregator's BRP.

15.7.6. In the event that there has been no change in the minute-based data during the explanation period when down-regulating, i.e. increasing consumption, the system operator shall cancel the supply by measurement point and the imbalance shall be added to the balance area of the aggregator's BRP.

Distribution of supplies to balance portfolios

15.8. The system operator shall create an information system application, its functionality being the allocation of aggregator-performed supplies to the balance portfolio linked to a particular measurement point.

15.9. To this end, the system operator shall establish an information system where the supply measuring point (EIC) transmitted by the aggregator is aggregated into the balance portfolio of the BRP being that customer's measuring point's BRP during the given explanation period.

III LEGISLATIVE CHANGES RELATED TO DEMAND RESPONSE AND AGGREGATION

16. Amendments to the legislation (the Electricity Market Act and the Network Code on the Operation of the Electricity Market)

The Electricity Market Act will set out definitions of who is an aggregator, an independent aggregator, what is an aggregation, a flexibility service, a demand response. The corresponding terms are explained under point 2.

The Electricity Market Act incorporates a new theme of demand response by aggregation, where the main principles reflected are the obligations of the DSOs and TSO to treat market participants active in demand response aggregation on a non-discriminatory basis and according to their technical capacity upon in the provision of support services, and to establish the conditions for market participants' participation in demand response and to coordinate those conditions with the Competition Authority. A market participant active in aggregation shall also be subject to balance responsibility unless it delegates its balance obligation in accordance with Article 5 of Regulation (EU) 2019/943 of the European Parliament and of the Council.

A new theme will be added: flexibility services, which will include cooperation between network operators in order to involve network-connected market participants effectively in electricity markets, to ensure safe and economically and technically efficient operation of the network when using flexibility services and to facilitate market development.
Network operators shall agree on the conditions for the provision of flexibility services based on distribution network resources in accordance with Article 57 of Regulation (EU) 2019/943 of the European Parliament and of the Council and Article 182 of Commission Regulation (EU) 2017/1485. The distribution network operator shall coordinate the conditions with the Competition Authority and shall organise a public tendering for the lowest bid to find flexibility service providers in order to improve the operation and development of the distribution network.
As a derogation, a public tendering for the lowest bid need not be organised where the distribution system operator has determined that the use of flexibility services is economically inefficient or would create serious market distortions or create congestion and submits a reasoned request to the Competition Authority for not organising a public tendering for the lowest bid.

In the Electricity Market Act, the provisions of the chapter "Contracts" are supplemented by provisions concerning the aggregation contract, which, inter allows the consumer and the distributed producer to enter into an aggregation contract without the consent of their electricity supplier. The aggregator shall provide the system operator with a notification about the conclusion of the aggregation contract, in the manner specified in the Network Code for the Operation of the Electricity Market.

The Network Code for the Operation of the Electricity Market receives a supplement on the subject of the aggregator, including the conclusion and amendment of an aggregation contract. The main principles set out are as follows:

- switching the aggregator at 21 days advance notice;
- one measuring point = one aggregator;
- the aggregator shall send to the system operator an authorisation of the market participant (consumer/producer) for the aggregation contract to allow the Data Hub to access the measurement data related to the aggregated market participant's measurement point;
- an aggregator shall not charge household consumers and small businesses with a fee for the conclusion of a contract. No later than in 2026, the technical process of switching the aggregator shall not be longer than 24 hours and shall be possible on any working day.

As regards the approach to the market model, including the reference price methodology, it is not yet clear to what extent the topic will be included in the network code and to what extent it will be implemented in the proposed methodology or methodologies; the same goes for the baseline approach and the technical conditions for flexibility products, which, when used by the system operator, are partially covered by the standard terms of balancing service contracts (for mFRR), but congestion products used for the network, both for TSO and DSOs grid, require additional technical conditions.

IV CONSULTATION

17. Purpose and scope of consultation

As part of the consultation, market participants have been asked to comment on the approaches proposed in this document. Following the consultation, the final conception document shall be formulated in respect of the market model of an independent aggregator, suitable for Estonia, based on the respective document and the feedback received by the market participants in consultation, and the necessary amendments shall be made to the legislation.
Feedback may be provided in free form writing.
There are also questions below that make it easier to provide feedback, but they are optional.

- Does the proposed market model II facilitate the growth of demand response in markets without discriminatory treatment of market participants or creation of entry barriers?
- What is your opinion regarding the reference price model, which takes into account the socio-economic impact?
- What is your opinion regarding the temporary reference price model, including which option for the day-ahead market you consider reasonable for the temporary reference price and why?
- In part of the proposed market model II, do you see the risk that the model could have a negative impact on retail prices of electricity?
- How does the proposed model II address the balance between different market participants (suppliers, BRPs, aggregators, active customers)?
- Does the market model II promote effective investment by market participants or rather inhibit the investment environment? Is the model reliable enough to make investments?
- Is the model comprehensible and clear enough?
- Will the model require complex IT settings from market participants or increase additional administrative load?
- Will the model increase or decrease competition in the electricity market?
- What topics did this concept paper not cover, that you consider important to discuss and solve in the context of the Demand response Working Group, and what could be the focus of the Working Group in the so-called “second phase”?

18. References

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