

Energia Virasto

Public consultation from the Finnish regulatory authority
on demand response participation through aggregation

Contribution from a pan-European aggregators' coalition

DR4EU

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Introduction

- This response is provided by DR4EU, a pan-European coalition of companies operating demand response in more than 20 countries in Europe and abroad.



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Focus

This contribution focuses on the following issues described in the Consultation Document (CD), and related questions from the Agency to stakeholders and interested parties:

3.3 Balance responsibility and operating model

- *What is your view of an independent provider of balance sheet services aggregator (BSP-LA), or the independent balance sheet aggregator (BRP-LA) and their functioning?*

3.4 Compensation

- *What unjustified benefits could the aggregator bring to third parties that should be taken into account when determining financial compensation?*
- *How should “low energy” be defined, ie how should products for which financial compensation is not required be defined?*
- *What is your view on the reduction of financial compensation over time as market participants learn to predict the aggregator’s future actions?*

3.5 Measurement and verification

- *Can a meter measuring the total consumption of a site provide sufficiently accurate information to separate the actual flexibility from the consumption of the entire site?*
- *What possible challenges do you see in the measurement based on an additional meter, incl. meter requirements and verification of measurement data and data transmission to the balance sheet?*
- *Who would own the extra meter? What challenges do you see regarding meter ownership?*
- *What is your view on the baseline method as part of the flexibility measurement? How should the baseline curve describing assumed and unrealized energy consumption be determined?*

➤ **Responses are provided in blue**

Background and references

- **CD** stands for consultation document, i.e. the memo published by the Finnish Energy Authority
- **CEP / Clean Energy Package**
 - **EMD**: directive on electricity market design, (EU) 2019/944
 - **ER**: regulation on electricity markets, (EU) 2019/943
 - Both published on June 14th, 2019 in the OJUE
- **MS** stands for Member State in the EU
- **DRP stands for Demand Response Provider**, i.e. an entity offering demand response in the electricity system
 - Be it for instance by:
 - Bidding in the day ahead energy market; or as a BSP, i.e. providing balancing services to the TSO (e.g. FCR or mFRR)
 - Aggregating load changes triggered among a large number of consumers, then called a DR aggregator
 - An independent aggregator, as seen from the consumer, i.e. not linked to his electricity supplier; or by the supplier who would operate as a DRP, i.e. trigger consumption changes and sell DR as an aggregator would
 - In all cases, DRP commits to deliver (explicit) Demand Response as sold
 - Hence DRP should be or have a balance responsible party (BRP) as detailed hereafter
- **DR refers to Demand Reduction** in most cases, the main kind of demand response participation, although it could include also demand increase triggered to meet a system or market need

General principle: DR in all markets as an alternative to generation

- EMD requires MS to allow and foster participation of DR in all markets without discrimination versus generation
- **As mentioned in the CD (3.2), market participants providing flexibility of consumption through aggregation should participate alongside producers on a non-discriminatory basis.**
- DR is an alternative to generation: it does not use electricity generation, but provides an alternative in the wholesale market
 - Reducing consumption is a way not to need generation
 - Generation is avoided because DR is sold in the market instead
 - The more DR sold, the less generation
 - Selling DR is not selling energy from generators, it is an alternative
 - As highlighted by Recital 39, the EMD is about trading flexibility, i.e. change in consumption, not trading energy generated.
- **There is no such thing as "transferring ownership of energy" as suggested by the CD.**
DR takes place after being sold instead of energy, hence energy is not generated and does not exist; energy that does not exist cannot be transferred and this cannot be the justification for compensation; only costs may be (see *infra*).
- DR should be accepted in all markets
 - DR allowed to bid in day ahead and any wholesale electricity market (EMD 17-1) and also for ancillary services (EMD 17-2)
 - DR should "***participate alongside producers in a non-discriminatory manner***" as explicitly stated in the EMD
 - DR should be paid the same market price
 - Level playing field with generators
- **DR participation is not subject to restrictions based on benefits for consumers.** Only the 'calculation of the compensation' may be. The goal is to maximise the benefits of DR for all.

Balance responsibility of DRP/aggregators is clearly defined, and similar to generators'

- DR is an alternative to traditional generation, because avoiding to consume makes it possible (and mandatory) not to generate. It should bear the same balance responsibility
 - After generation is sold, it need be delivered to match consumption. If it fails to deliver the volumes sold, the missing difference will result in a grid physical imbalance. To avoid this, generator need to be or have a balance responsible party, i.e. an entity who will be financially responsible to pay on the basis of the undelivered volumes, called a 'negative imbalance'. This principle is set in article 5 of the ER and already in place EU-wide.
 - The same responsibility should be borne by DR. Indeed, after DR is sold, it need be delivered too, i.e. consumption should be reduced by the volume sold. Should there be a difference, it will result in a grid physical imbalance, exactly as generators. So that the DRP should bear similar balance responsibility: to deliver volumes sold.
- The EMD provides for a clear definition of this balance responsibility under art.17-3-d, referring to art.5 in the ER, further clarified by its recital 15.
 - Balance responsibility of any market party is to match sales with 'allocated volume'.
 - For a generator, allocated volume is the number of MWh of production as assessed by a meter.
 - For an aggregator, allocated volume is, as per recital 15, the number of MWh of consumption that is avoided. It is assessed as the difference between a baseline (see infra) and the remaining actual consumption.
 - The responsibility for the remaining actual consumption should remain with the supplier (and his BRP).
 - **The aggregator should be financially responsible for (and only for) any difference between his allocated volumes, as actually delivered, and his sales;** the aggregator should **not** be responsible for anything else; exactly as a generator is.
- We agree with the CD that 'BRP-IA' would not be a solution, and would rather be 'surprising'
 - Sharing individual access point would mean that the aggregator would substitute the supplier for a given part of the consumption, e.g. an e-vehicle charging. It would make it mandatory that the aggregator need become a supplier for such part.
 - This would not solve the real issue to balance the grid, hence to match DR sales with actual demand reduction (i.e. the volumes of consumption curtailed, not the remaining volumes)
 - This "supply sharing" would not comply with art.13 of the EMD whereby the consumer should be free to choose any aggregator '*independently from their electricity supply contract*'. Hence it need to be possible to operate DR on loads without supplying electricity.
- The CEP is very clear on the balance responsibility of aggregators, and leaves little room for MS if any, because this is critical to ensure that DR contributes to the grid balance, as an alternative to generation, on a level-playing field.

Balance responsibility of suppliers and possible variation on models

- While the CEP defines precisely how to calculate the balance sheet of aggregator as described *supra*, some flexibility is left to MS, regarding the model to account for DR in the balance sheets of electricity suppliers.
- As clarified by Recital 39 of the EMD, MS may introduce a ‘perimeter correction’, so that two models are possible, whether such correction is used or not, with different impacts on the suppliers’ BRP of participating consumers:
 1. Without ‘correction’, as per existing rules, such supplier will, in case of a DR event, be accounted for a **positive** imbalance, and be paid accordingly by the TSO at positive imbalance price. This is similar to what happens when a supplier is ‘long’ and there is no cost for the BRP, rather a revenue.

Besides, when DR occurs, it is likely that the system would tend to be ‘short’, so that the positive imbalance price is even better than the spot price. Therefore, the BRP is happy and can pass this benefit to the supplier, as they use to do according to their bilateral contract. Hence, with this model, no compensation need be paid to the BRP/supplier. Here, it should be emphasized that a compensation is possible according to the directive only for the suppliers/BRPs that are directly affected by DR activation, and only for the costs they incur during DR activation. With an uncorrected model, there is no such cost, so that suppliers and their BRPs should not receive any ‘compensation’.
 2. With a ‘correction’, the supplier’s BRP is deprived from his positive imbalance, and will not receive the related payment from the TSO(*). Indeed, the ‘correction’ means the TSO will modify the balance sheet of the suppliers’ BRPs, so that the consumption of their customers will be changed and considered as higher than it really is. With such model deviating from reality, the suppliers’ BRPs will be deprived from their positive imbalance, and will not receive the related payment from the TSO. Hence, to be fair, when the TSO will thus ‘correct’ (i.e. modify) the balance sheet of a BRP, the TSO should simultaneously compensate the BRP for this correction.
- Both models end up being somehow similar: suppliers and their BRPs are fairly treated and happy, as they have been compensated by the TSO, either for their positive imbalance, or for the correction imposed.
- The slight differences are : the first model is simpler, because there is no need to change the current definition of the balance responsibility of suppliers, nor to create new financial flows. However, it may be argued that suppliers/BRPs are overcompensated, at a (high) positive imbalance price, while spot price would be sufficient – hence the second model may be preferred at least when volumes grow.
- The first model should be preferred as long as financial amounts remain small, i.e. as long as DR volumes are relatively small, or as soon as they are evenly spread among consumers (and therefore among suppliers/BRPs).

** It is sometimes suggested that the consumer should then pay on the basis of the ‘corrected’ curve, but this is very complex and radically unfair, since he did not consume that volume, which was not generated either.*

The ‘compensation’ issue (1/2): Acceptable and undue justifications

- According to the EMD, a compensation to suppliers/BRPS may be implemented by MS under strict conditions set in forth in art.17-4.
 - In particular, compensation may be paid only to those suppliers or their BRPs which are directly affected by DR, and only up to the cost they incur during DR activation.
 - With a corrected model, it may be argued that the ‘correction’ imposed on the suppliers’ BRPs is a cost for them, thus justifying paying them a compensation based on this correction.
- Hence, in no case does the EMD leave any possibility to justify any compensation:
 - ‘for the balance sheet errors to the electricity retailers’, at least not as long as there is no cost for them, such as with the uncorrected model.
 - ‘related to the ownership of the energy’ as considered by the CD: indeed, there is no basis for such compensation because there is no such energy DR would change the ownership of. DR is not about selling energy, but avoiding energy (generation and use). This is why the EMD has ruled out any of the old justifications based on the idea that ‘an independent aggregator can be interpreted as selling third-party energy’. Mentioning that ‘a market participant must own the energy that is traded’ is not relevant any more regarding DR, which should be traded as such, as opposed to any such obsolete interpretation.
- The EMD set clear principles to ensure (as clarified by recital 39) that ‘*all customers should have access to electricity markets to trade their flexibility*’, not to re-sell energy: the EMD allows DR to be traded, as such, as an alternative to generation, without any discrimination. For sure, charging a compensation to DR and not to generation would be a radical discrimination so that interpreting DR as if IA would be selling third party energy is now impossible in the EU. (It has also been ruled out in the US, as backed by the Supreme Court, as well as in several countries in Asia).

The ‘compensation’ issue (2/2): How to comply with the EMD

- Should Finnish NRA (and NordREG) wish a ‘compensation’ be paid to suppliers, the conditions set forth by the EMD should be carefully met.
- To achieve this, the key innovation embedded in the EMD is to separate two different issues:
 1. Whether a compensation should be paid to suppliers or their BRPs? This is a possibility left to MS, provided the compensation is limited to those parties *directly* affected and to their *direct* costs during DR activation.
 2. Who should pay the compensation?
 - MS may require any ‘electricity undertaking’ to pay, not only nor even specifically DR aggregators.
 - On the contrary, the EMD imposes that any compensation scheme “shall not create a barrier to market entry” of DR.
 - To share the burden, and ensure it does not create unlawful barriers, the EMD sets forth a simple principle: the net benefit rule.
- Charging ‘compensation’ costs to DR only would obviously create a barrier to market entry
 - As showed supra, in a corrected model, suppliers/BRPs are likely to claim a compensation for correction at spot price.
 - It would not be possible to justify that the compensation price should be reduced over time due to better forecasting experience: the correction cost does not depend on forecasts, and would remain around spot price(*).
 - The obligation to pay spot price for each volume sold in the wholesale market (at spot price!) is a barrier excluding DR (and a radical discrimination versus generation).
- The only solution left by the EMD for MS who wish to set a ‘compensation’ to their suppliers is to share the burden of this compensation among market parties, and basically not to charge DR, or not only, as described in art.17-4 establishing the net benefit rule.

(*) Besides, it would be **very dangerous** to consider that suppliers should receive a smaller compensation because they will reduce their purchases when they know DR is sold in the market. Indeed, it would mean that: (i) either suppliers buy less DR, so that demand would not be reduced and they need to buy more generation ... otherwise the grid would be disrupted because demand would exceed generation; (2) or suppliers buy less generation, then again they need to buy more DR or the grid would break down, and they will require a higher compensation. Hence in no case is it possible for suppliers to buy less just because they expect DR to occur, precisely because DR occurs insofar as it is bought.

The economics behind the net benefit rule: how to ensure that DR always benefits all consumers

- As soon as DR is allowed to bid in the wholesale markets, DR will be selected, and sold, only when cheaper than alternative bids, so that:
 - Less generation will be sold: DR bids will be chosen instead
 - Market will settle out lower prices.
- For suppliers, economic consequences are two-fold:
 - Benefits: they will save money from buying cheaper in the market, and this will ultimately benefit consumers.
 - Costs: they will buy DR volumes they cannot bill to consumers (as opposed to MWh-s from generation, which are consumed)
- At this stage, the analysis is simple: as long as benefits are greater than costs, there is no reason DR should pay any compensation to suppliers overall, because this would mean overcompensating them.
Because numbers show that benefits are indeed due to be many times greater than cost (cf various market studies worldwide already), DR should not contribute to any compensation to suppliers – only if ever benefits would in fact not exceed costs.
However, a compensation may be defined *among* suppliers, in order to share benefits and costs evenly *among* all suppliers, and ultimately *among* customers, i.e. all consumers.
- Benefits are spontaneously shared via the market, because all suppliers will buy cheaper thanks to DR.
- Costs may not be evenly spread, and this depends on the market model used for balance sheets.
- Indeed, when DR volumes will be sold in the market and bought by suppliers, these volumes will be accounted for as inputs in their balance sheets, just as any MWh purchased. This will end up creating an ‘accounting imbalance’ for those suppliers with consumers reducing their load, i.e. a positive imbalance (note: it is an accounting imbalance, not a physical imbalance of the grid).
- Should Finland use an ‘uncorrected model’, this positive imbalance will owe them a payment from the TSO, so that BRPs/suppliers are fine without any specific ‘compensation’ for DR.
- Should Finland use a ‘corrected model’, the positive imbalance will be cancelled by the correction, but the BRPs should receive from the TSO a compensation for this correction he would impose them (and no payment by consumers for energy neither used nor generated).
- Ultimately, the TSO will end up charging his costs either (in the uncorrected model) to BRPs, or (in the corrected model) to market parties. And in the end, these will in turn finally transfer these costs to consumers.
- To sum up: DR will benefit suppliers, but in some cases there will be a cost for the TSO. And ultimately both will be transferred to the consumers. Hence DR will ensure a net benefit to all consumers provided benefits are greater than cost. In the event costs would exceed benefits, the EMD allows to charge the difference to DR. Hence **the EMD ensures that DR will always benefit all consumers.**

Practical solutions for a ‘compensation’ mechanism

- DR should be accepted in all electricity markets, including both wholesale day ahead markets, and ancillary services, and the following principles should apply throughout the Nordics
- At first, no new mechanism is needed:
 - Balance responsibility of DRPs is similar to generators’
 - Balance responsibility of suppliers remains unchanged (‘uncorrected model’)
 - No specific calculation or ‘compensation’ is needed
- If and when DR volumes grow and reach a given threshold so that they become significant, say over 3% or 5% of total market volumes (in MWh)
 - Implementation of a corrected model may be considered, without or with a compensation scheme
 - If DR is evenly spread among consumers and suppliers/BRPs, no new mechanism is needed
 - Otherwise, a cost/benefit analysis should be run
 - On the one side, the benefits of DR for all suppliers and consumers should be assessed, confirming the opportunity to let DR grow further
 - On the other side, the cost of implementing a specific compensation scheme should be assessed, and compared to the uneven sharing of net benefits resulting from DR among all suppliers.
 - Then, if appropriate, the compensation mechanism should be implemented with a view to share fairly the net benefits induced by DR among all suppliers, hence all consumers
 - These benefits should be assessed regularly, e.g. yearly, to confirm DR remains beneficial to all consumers

Measurement and verification – Principles

- Key principle is set in the CEP
 - DR volumes sold need be delivered, to ensure grid balance
 - Hence DRPs should be or have a BRP, responsible for any difference between sales and ‘allocated volume’ as clarified by recital 15 of the ER
 - For a DRP, the ‘allocated volume’ is the difference between a baseline and the actual consumption, and its calculation should be ‘*based on a defined measurement and baseline methodology*’
- How to establish such methodologies
 - Baseline methodology should be proposed by DRP in order to be adapted to the kind of DR operations and processes involved. Methodology should be approved by NRA, calculations performed by DRP, and verified by neutral third party
 - Measurement must also be adapted to DR various kinds of operations, consumers and services/markets. Hence it should be based on appropriate submetering by DRP, and verified by neutral third party
 - All under supervision and scrutiny by NRA
 - All defined, regarding ancillary services, in accordance with TSO needs (and not tailormade for generation assets)
- Examples
 - Residential and small C&I consumers
 - Better than smart meters: demand control and monitoring in real time provides appropriate, accurate and reliable data
 - Real-time individually determined baseline has proved effective: on each site, the baseline during short curtailment periods is defined as power measured just before ; such individual baselines are added to form the overall baseline, for all sites curtailed in turn, at aggregated level
 - Industrial consumers
 - Submeters are all the more useful for large consumer sites, and may be installed by aggregators
 - Historical or forecast-based baseline methodologies, or simple pre-curtailment reference, all may be used, provided they prove be reliable according to the kind of DR operated.

On detailed questions (1 / 2)

3.3 Balance responsibility and operating model

- *What is your view of an independent provider of balance sheet services aggregator (BSP-LA), or the independent balance sheet aggregator (BRP-LA) and their functioning?*

The IAs and all DRPs should bear the same balance responsibility as generators, i.e. to match their sales by physically delivering the same volumes (MWh).

3.4 Compensation

- *What benefits could the aggregator bring to third parties that should be taken into account when determining financial compensation?*

Benefits should encompass all savings on sourcing costs for suppliers due to DR participation. Additional benefits may also be considered, including to other policies such as energy efficiency and CO₂ savings, better integration of renewables, reduction of grid costs and need for investment both at TSO and DSO levels.

- *How should “low energy” be defined, ie how should products for which financial compensation is not required be defined?*

A total threshold of 3% or 5% of all electricity volumes in the market should be used as a milestone.

- *What is your view on the reduction of financial compensation over time as market participants learn to predict the aggregator's future actions?*

The need for a financial compensation to suppliers may reduce over time as more consumers will participate provided actual participation spreads evenly. There does not seem to be any rationale to reduce compensation price over time, and at least not based on the argument of better forecasts. The rationale for an evolution of the share of the compensation paid by DR providers should rather be to start without any such contribution, and consider a possible participation later on, if and when DR volumes grow, and only to the extent benefits would not exceed costs, as described in the EMD.

On detailed questions (2/2)

3.5 Measurement and verification

- *Can a meter measuring the total consumption of a site provide sufficiently accurate information to separate the actual flexibility from the consumption of the entire site?*

Experience shows that rather than using the standard TSO/DSO meter for the whole site, submetering (as close to the DR-controlled load) is by far preferable, and can be achieved at lower cost by the aggregator himself, as soon as he needs real time data anyway for operational purposes. Submetering provides more accurate data, and even is the only solution to demonstrate DR delivery in some cases.

- *What possible challenges do you see in the measurement based on an additional meter, incl. meter requirements and verification of measurement data and data transmission to the balance sheet?*

- *Who would own the extra meter? What challenges do you see regarding meter ownership?*

Meters provided and operated by the aggregators or customers should be a possibility, as well as T/DSO meters. Using common industry standards on data format could help ensure interoperability.

Meters should meet metrology requirements that would be specified in rules published by the NRA.

Meters and IT systems should be monitored and verified under supervision of the NRA, based on a QA approach, with procedures and timely audits.

- *What is your view on the baseline method as part of the flexibility measurement? How should the baseline curve describing assumed and unrealized energy consumption be determined?*

DR providers should propose baseline methods adapted to the kind of DR services they provide, and, in the case of ancillary services to TSO, the TSO should be involved. The NRA should assess such proposals as per published criteria, and approve them publicly. DR providers should be allowed to use any method already approved (subject to the above conditions on measurement data used, regarding meters and IT systems).

For instance, when DR is based on short curtailment for each load activated in turn, a simple baseline method can be used whereby it is assumed that consumption level of each site would have carried on as is without DR order sent to the site, and this individual baseline is added up at aggregated level to assess the overall DR volumes delivered, by comparing to the overall consumption of participating loads.

Appendix

Key provisions on DR from the CEP

*Article 17***Demand response through aggregation**

1. Member States shall allow and foster participation of demand response through aggregation. 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 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 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.

Recital 39 in the Directive

- (39) All customer groups (industrial, commercial and households) should have access to the electricity markets to trade their flexibility and self-generated electricity. Customers should be allowed to make full use of the advantages of aggregation of production and supply over larger regions and benefit from cross-border competition. Market participants engaged in aggregation are likely to play an important role as intermediaries between customer groups and the market. Member States should be free to choose the appropriate implementation model and approach to governance for independent aggregation while respecting the general principles set out in this Directive. Such a model or approach could include choosing market-based or regulatory principles which provide solutions to comply with this Directive, such as models where imbalances are settled or where perimeter corrections are introduced. The chosen model should contain transparent and fair rules to allow independent aggregators to fulfil their roles as intermediaries and to ensure that the final customer adequately benefits from their activities. Products should be defined on all electricity markets, including ancillary services and capacity markets, so as to encourage the participation of demand response.

Recital 15 in the Regulation

- (15) Title V of Regulation (EU) 2017/2195 established that the general objective of imbalance settlement is to ensure that balance responsible parties keep their own balance or help restore the system balance in an efficient way and to provide incentives to market participants for keeping or helping to restore the system balance. To make balancing markets and the overall energy system fit for the integration of the increasing share of variable renewable energy, imbalance prices should reflect the real-time value of energy. All market participants should be financially responsible for the imbalances they cause in the system, representing the difference between the allocated volume and the final position in the market. For demand response aggregators, the allocated volume consists of the volume of energy physically activated by the participating customers' load, based on a defined measurement and baseline methodology.

Article 13 in the Directive: Aggregation contract

1. Member States shall ensure that 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.