Industry workshop on regulatory issues related to the market entry of demand response aggregation

DR4EU
DEMAND RESPONSE FOR EUROPE

27th January 2022

CEP: DR through aggregation to participate in all electricity markets

- Fair competition on both sides of the market
  - DR operator ('aggregator') may be supplier or independent
    - ➢ Ensure fair competition on access to consumers
  - DR in all electricity markets competing with production
    - ➢ Ensure fair competition with producers in electricity markets

- Have DR in main market: wholesale day ahead
  - Usual starting point: DR for ancillary/balancing services
  - Far more DR needed to reach climate goals (> GWs)

    ≠ last minute balancing due to be small… and cheap
  - Capacity market if any: should include DR, just a complement

Provisions for fair competition to benefit all suppliers hence all consumers

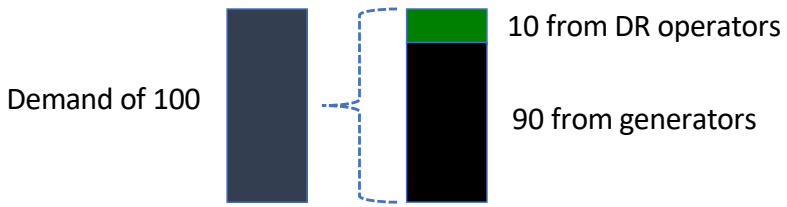
DR is based on a two-sided market

- Supplier *vs* DR aggregator: access to consumers
  - Supplier may become aggregator, hence competitor to IAs
    - French Competition Authority (2012)
  - No prior consent from supplier nor BRP
  - Protect commercially sensitive data
  - No individual data provided to supplier/BRP; only aggregated (all aggregators, not mentioning which consumers) if proved necessary

- Generator *vs* DR aggregator: access to electricity wholesale markets
  - DR and generation on an a level playing field: same responsibilities, competing via market thus reducing overall sourcing costs for suppliers
  - Suppliers benefit globally, and are kept whole individually (correction/compensation)
  - No overcompensation of suppliers, neither globally nor individually
  - Spread costs according to benefits, thus net benefits for all suppliers hence for all consumers
  - Compensation + mutualisation = any supplier can become DR aggregator same basis as IAs
  - Charge (average) sourcing cost means DR would bear costs of its competitors, no surprise it would be a barrier to market access… as proven by the French experience

DR = an alternative to generation in the wholesale day ahead market => benefits for suppliers

Wholesale markets
(in advance, e.g. day ahead)



Via wholesale markets (i.e. in advance) consumption forecast is balanced by purchases

✓ Cleaner

✓ Cheaper for all suppliers

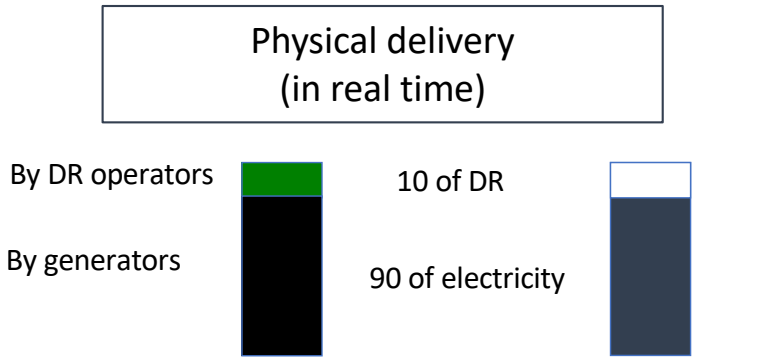
- DR is sold in the market rather than generation
  - ➢ Less generation: avoid using expensive MWh-s
  - ➢ Cheapest market price => benefits for all suppliers

DR in the market to reduce wholesale prices and volatility thus benefit all suppliers

Demand reduction = less consumption

✓ Cleaner

✓ Cheaper for participating consumers

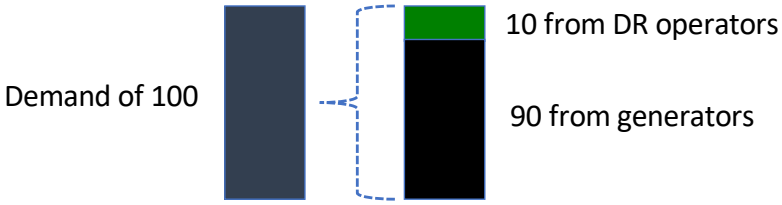


Actual consumption (90) *(as reduced by DR)*
is balanced
by actual electricity generation (90)

- DR reduces consumption down to the available generation
  - ➢ Less consumption
  - ➢ Consumers pay less than would otherwise
  - ➢ Less revenues for suppliers

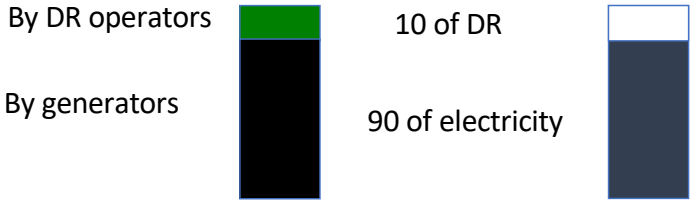
DR sold then delivered = physical balance

Wholesale markets
(in advance, e.g. day ahead)



Via wholesale markets (i.e. in advance)
consumption forecast is balanced by purchases

Physical delivery
(in real time)



Actual consumption (90) *(as reduced by DR)*
is balanced
by actual electricity generation (90)

✓ DR = balance

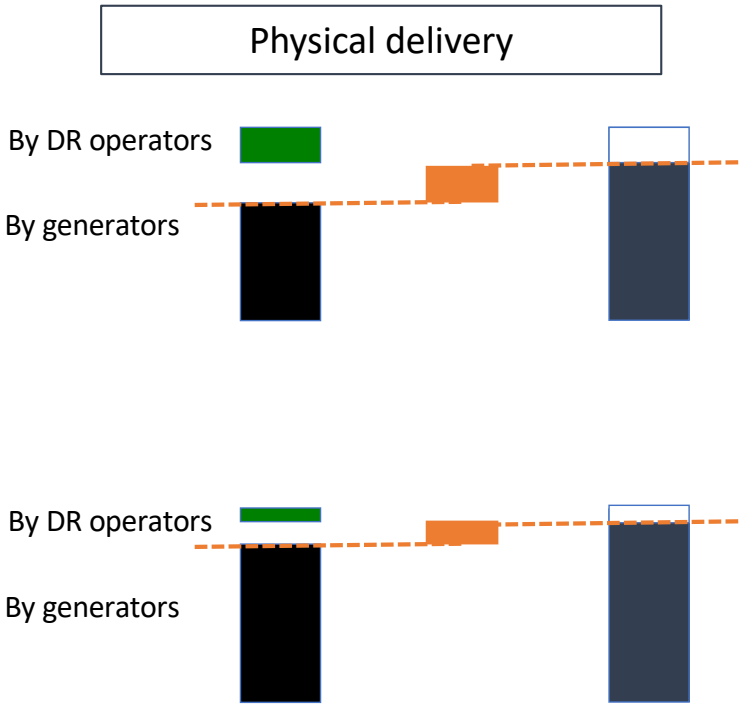
- DR ensures overall balance by reducing *both* generation and consumption
  - ✓ DR provides 'best energy ever': 'energy that is not consumed'
    - ➢ Market based: DR is used only if cheaper than generation

Balance responsibility of generators and aggregators = to deliver volumes sold

❖ Generation failure creates imbalance

✓ Same responsibility

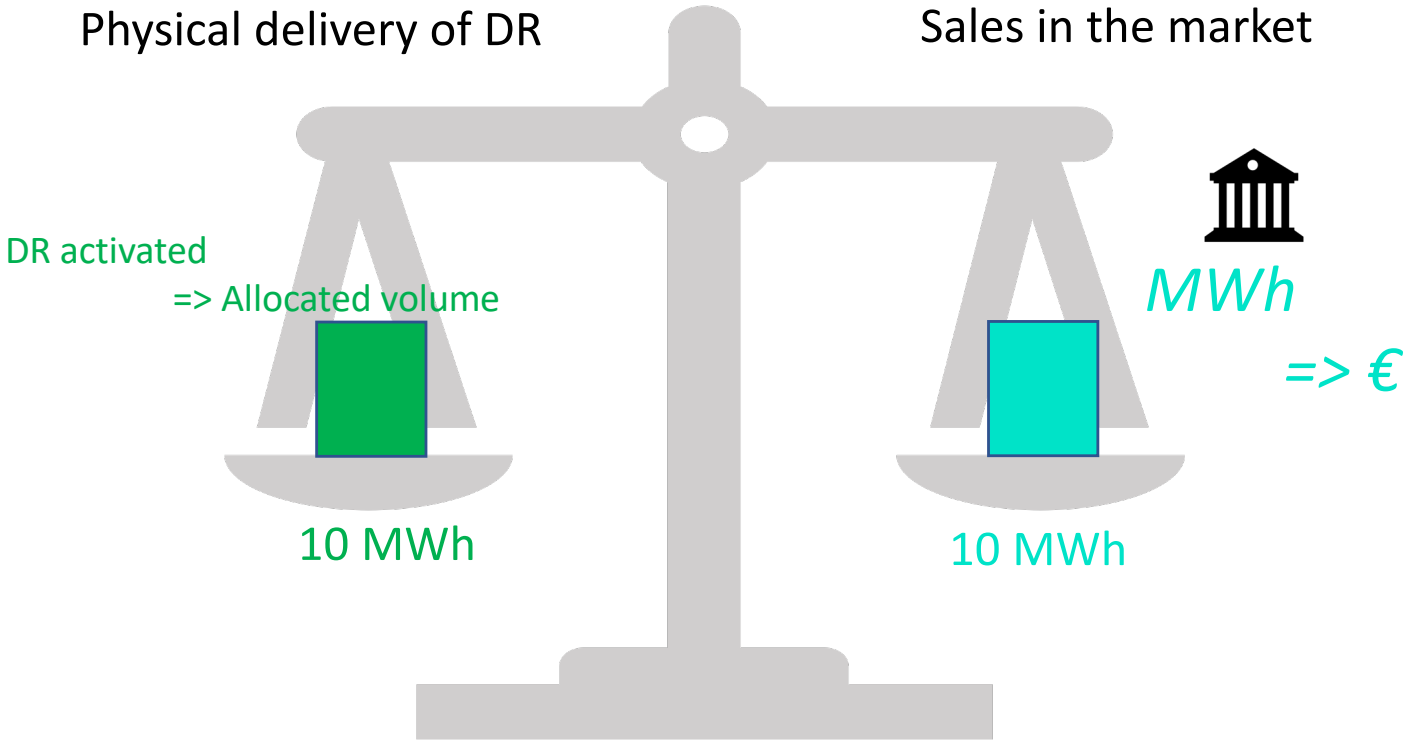
❖ DR failure creates imbalance



- Generators and DR aggregators should both be committed to deliver
  - ➢ Balance responsibility = to deliver volumes sold
  - ✓ Level playing field, no free rider, fair competition

Imbalance = allocated volume – sales

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.



When allocated volume = sales, DR aggregator creates no imbalance

To determine one's imbalance position, compare sales and deliveries, not impact on third parties

More info: https://dr4eu.org/wp-content/uploads/2021/06/workshop2-Balance-Resp-of-Aggregators.pdf

Set forth by the Clean Energy Package

- Directive art.17

(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;

- Regulation art.5

1. All market participants shall be responsible for the imbalances they cause in the system ('balance responsibility'). To that end, market participants shall either be balance responsible parties or shall contractually delegate their responsibility to a balance responsible party of their choice. Each balance responsible party shall be financially responsible for its imbalances and shall strive to be balanced or shall help the electricity system to be balanced.

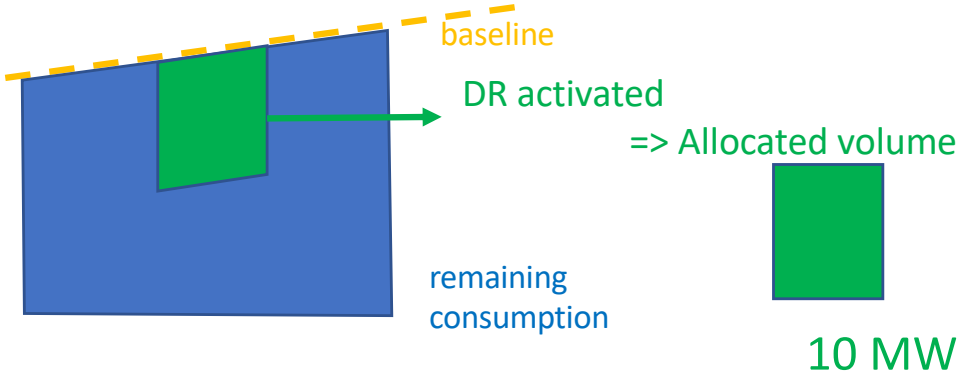
- Regulation recital 15 *(to clarify the intention of articles)*

(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.

Allocated volume for DR aggregators = DR volumes delivered = change in consumers' load

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.

Physical delivery of DR

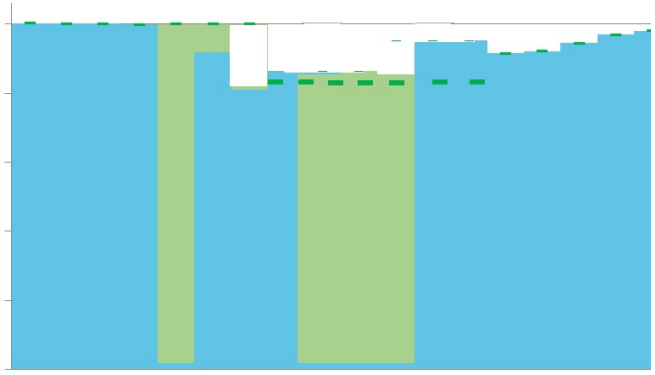


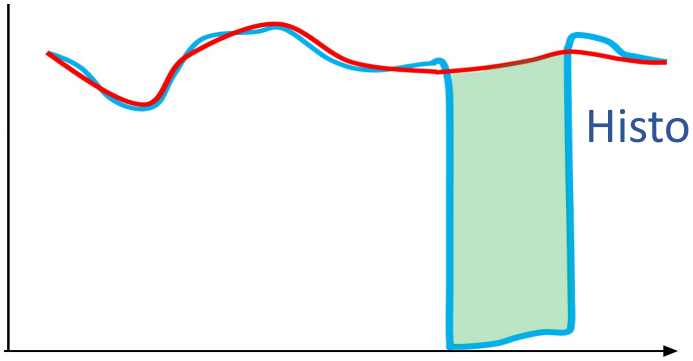
- Allocated volumes = volumes of DR physically delivered

Various baseline methodologies possible depending on the kind of DR loads and services

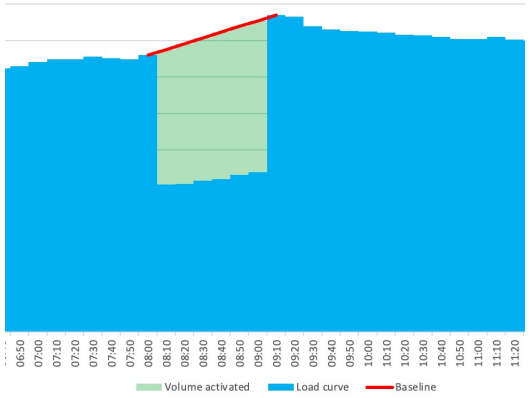
Direct reading

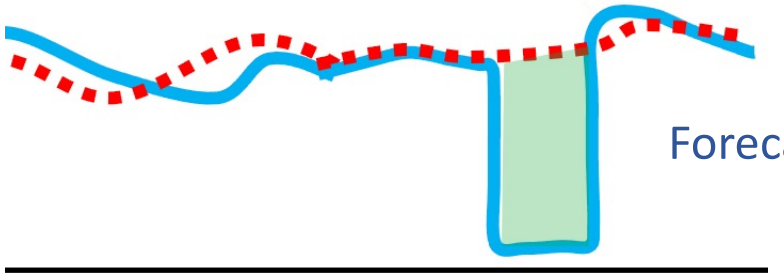
- ✓ Real time
- ✓ Individually determined
- ✓ Overall aggregated





Straight interpolation

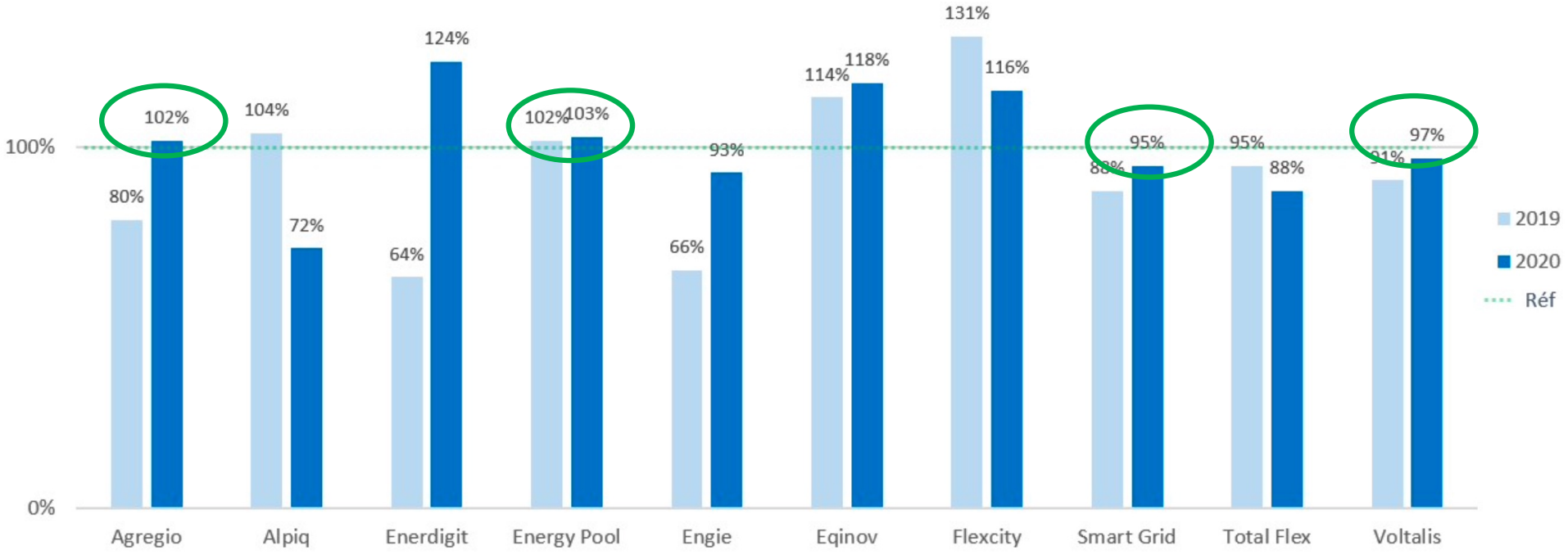




- Methodologies should be proposed by Aggregators, subject to approval by NRAs
- Data used provided by T&DSOs or by Aggregators, subject to audits by neutral third party (e.g. mandated by NRA)

DR is very reliable, like generation

- Same balance responsability = same strong incentive to be reliable
- Real life in France: excellent reliability + improving



Source RTE (French TSO): https://www.services-rte.com/en/learn-more-about-our-services/reliability-indicators-of-load-reductions-at-activation.html

BRP of suppliers, ‘models’ & ‘compensation’

- Start with uncorrected, suppliers/BRPs are compensated at positive imbalance price, just as any unforeseen deviation
- Perimeter correction means BRP deprived of this payment, likely need of a compensation for correction
- Issue is: who should pay? Not create a barrier for DR
- Solution: spread compensation among all suppliers, as they all benefit financially from DR taking high prices down

- Detailed analysis
  - https://dr4eu.org/wp-content/uploads/2021/06/workshop3_Balance-Resp-of-Suppliers-and-Models.pdf
  - https://dr4eu.org/wp-content/uploads/2021/07/workshop4-Possible-compensation-paid-to-suppliers_BRPs-.pdf
  - https://dr4eu.org/wp-content/uploads/2021/07/workshop5_who-and-how-to-pay-compensation-if-any.pdf

Physical balance

…but accounting imbalance for suppliers…

…and for TSO

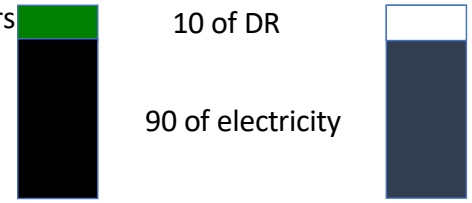
Physical balance

By DR aggregators

By generators

10 of DR

90 of electricity



Actual consumption (90) *(as reduced by DR)*
is balanced
by actual electricity generation (90)

Sellers' side
All balanced: sales = deliveries

Generators Aggregators

Buyers' side
Accounting imbalance? Correction?

Retailers: accounting imbalance (+)

- An accounting issue for the TSO, and a cost (not for suppliers, but for the settlement account)
- Some (TSOs) suggested to use a corrected model => suppliers request a compensation for correction

CEP on balance responsibility of suppliers

- General rule for all market participants
  - art. 5 of the Electricity Regulation of the CEP

1. All market participants shall be responsible for the imbalances they cause in the system ('balance responsibility'). To that end, market participants shall either be balance responsible parties or shall contractually delegate their responsibility to a balance responsible party of their choice. Each balance responsible party shall be financially responsible for its imbalances and shall strive to be balanced or shall help the electricity system to be balanced.

  - Further provisions in Commission regulation 2017/2195 (EBGL)

(8) 'imbalance' means an energy volume calculated for a balance responsible party and representing the difference between the allocated volume attributed to that balance responsible party and the final position of that balance responsible party, including any imbalance adjustment applied to that balance responsible party, within a given imbalance settlement period;

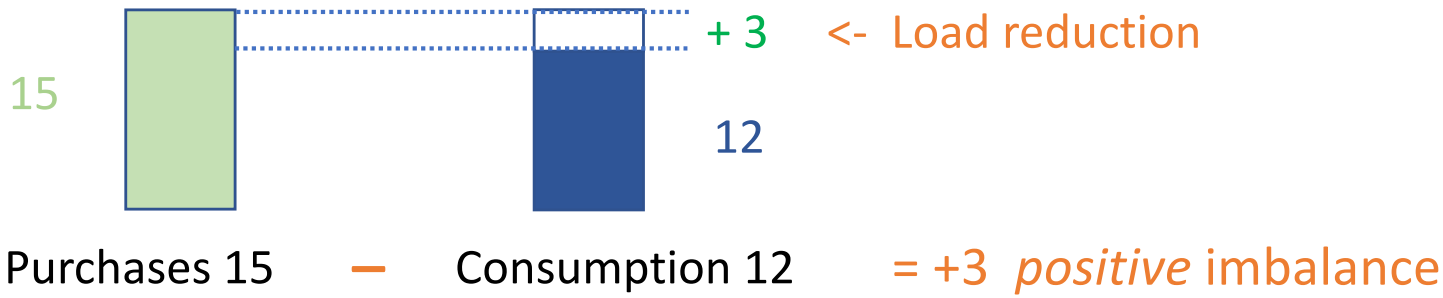
(9) 'imbalance settlement' means a financial settlement mechanism for charging or paying balance responsible parties for their imbalances;

- New for DR as per EMD recital 39 *(to clarify the intention of articles)*

(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.

(1) *"Where imbalances are settled"* also called uncorrected models

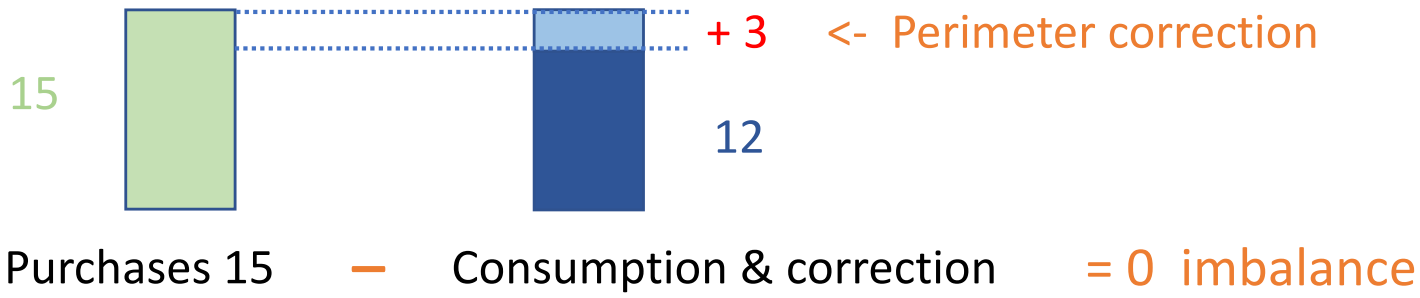
Accounting for imbalance of a supplier with curtailed consumers



- DR => positive imbalance for supplier of curtailed consumers
- Imbalance settlement => supplier ('s BRP) paid for positive imbalance
- Price depending on national rules, EBGL promotes single price ~spot ±ð

(2) *"with perimeter correction"* also called *corrected* models

Accounting for imbalance of a supplier with curtailed consumers



- DR => no impact on imbalances of supplier ('s BRP)
- Issue of compensation for supplier who buys 15 and bills 12

Who may receive a ‘compensation’ for which costs?

- Art.17-4 of Directive 2019/944
- “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.”
- “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”

✓ Consider suppliers of participating customers or the suppliers’ BRPs

✓ During activation (not ‘rebound’)

✓ Identify costs … those affected will depend on ‘models’

Who should pay? subject to the obligation not to create a barrier for DR nor aggregators

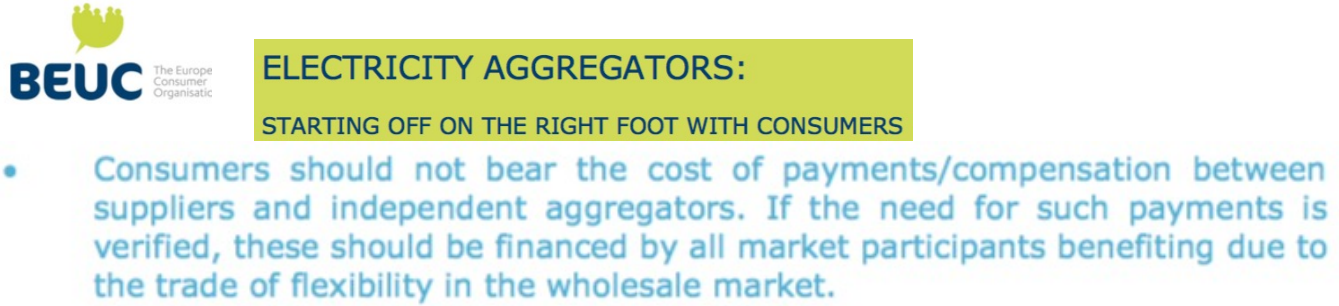
- Art.17-4: *Such financial compensation shall not create a barrier to market entry for market participants engaged in aggregation or a barrier to flexibility.*
- In conjunction with Art. 17-1: *foster DR through aggregation. […participate] in all electricity markets.*

➢ Impossible to charge full compensation costs to DR

- With compensation = market price, no revenue for DR, i.e. most radical barrier
- With compensation based on retail price, so little revenue for DR, radical barrier, as shown by France

➢ Solution provided by art.17-4: share the burden among *electricity undertakings*

- Echoing recommendation from BEUC during negotiations, backed by EP etc.

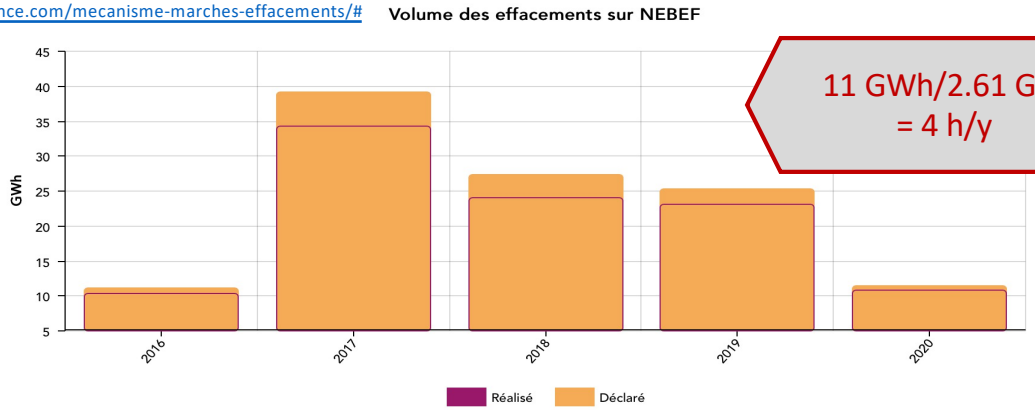


French long standing experience:

A dead end for DR in the markets?

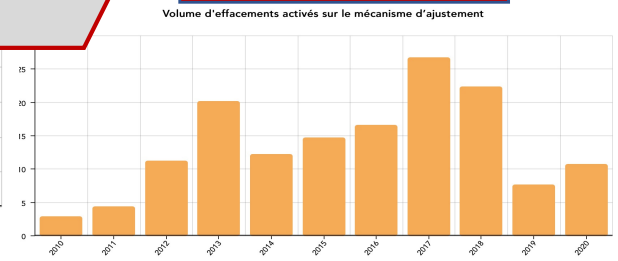
- Everything right or so, … except the 'compensation' mechanism
- Markets opened to DR for years, balancing then also wholesale ('NEBEF rules', 2014)
- DR potential is there (all sizes, from electrical heating in 7 M homes to large industrial processes)
- DR capacities are there: 2.61 GW certified (official number), paid (only) with state aids
- After years, volumes delivered in the markets remain insignificant, and decrease

From French TSO: https://bilan-electrique-2020.rte-france.com/mecanisme-marches-effacements/#



11 GWh/2.61 GW
= 4 h/y

No access to wholesale market



20-30 GWh * 5-10 €/MWh = 0.2 M€/year all DR volumes

No access to electricity markets at all

- Number of market players decreased too
  - From over 20, down to 12 (incl. EdF and subsidiaries,…)

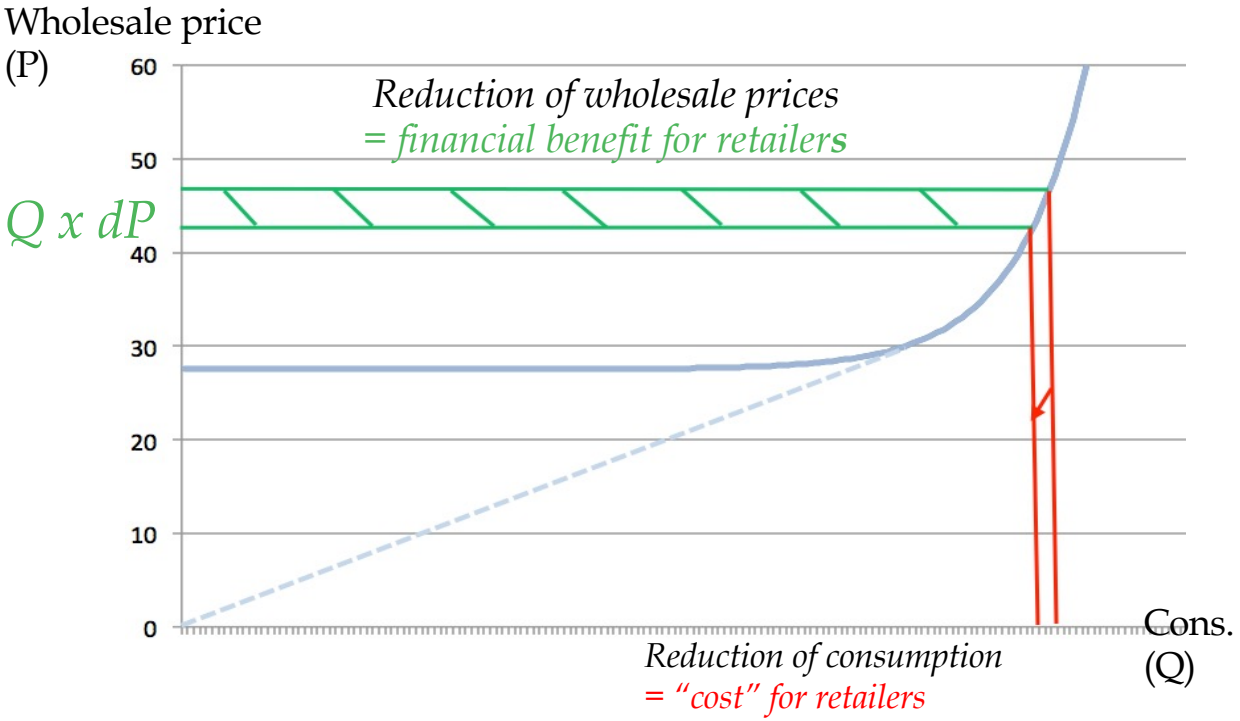
The NEBEF mechanism

As of today, 22 demand response operators have contracts with RTE to participate in the mechanism.
Twelve of them have received technical certification and are active.

Solution in the CEP: if compensation is used, share costs according to benefits

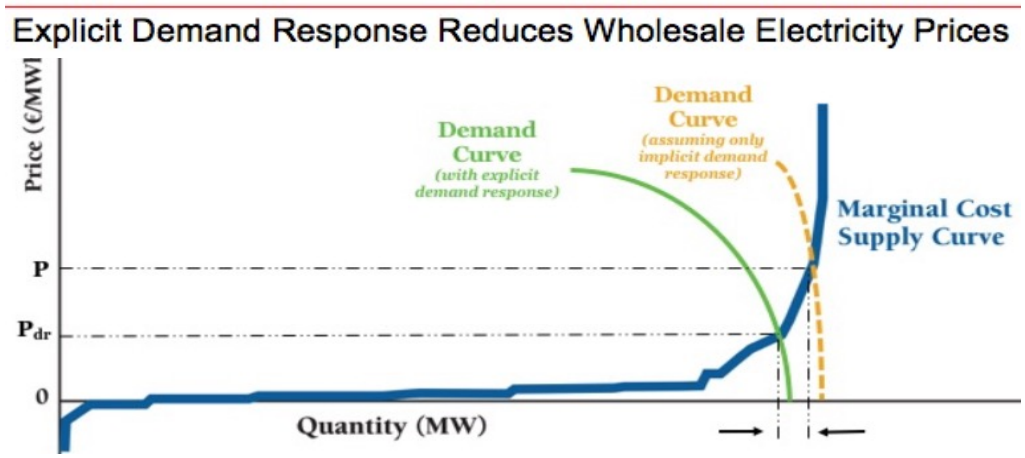
- MS may spread costs among “electricity undertakings”: how?
- Only option proposed in CEP: to take into account benefits
  - Spread costs as benefits are, to all suppliers and ultimately all consumers
  - Share benefits – costs = net benefit fairly among all suppliers, thus may be transferred to all consumers
  - DR to contribute only if and to the extent that benefits would not exceed costs
    - DR contribution by aggregators or participating consumers only in that case
    - ➢ Always a net benefit (or 0) for suppliers
    - ➢ No barrier to DR, because no charge, subject to this safeguard
  - ✓ Additional incentive for DR to deliver when prices are high… and thus maximise benefits for all
- All good for suppliers, for competition, and ultimately for all consumers
  - ✓ Individual supplier with participating consumers receives compensation
    - ✓ Hence DR is a viable business for the supplier to launch too, and become a DR aggregator (not only IAs)
  - ✓ All suppliers get a net benefit thanks to some consumers providing DR via aggregation

Benefits for suppliers and consumers



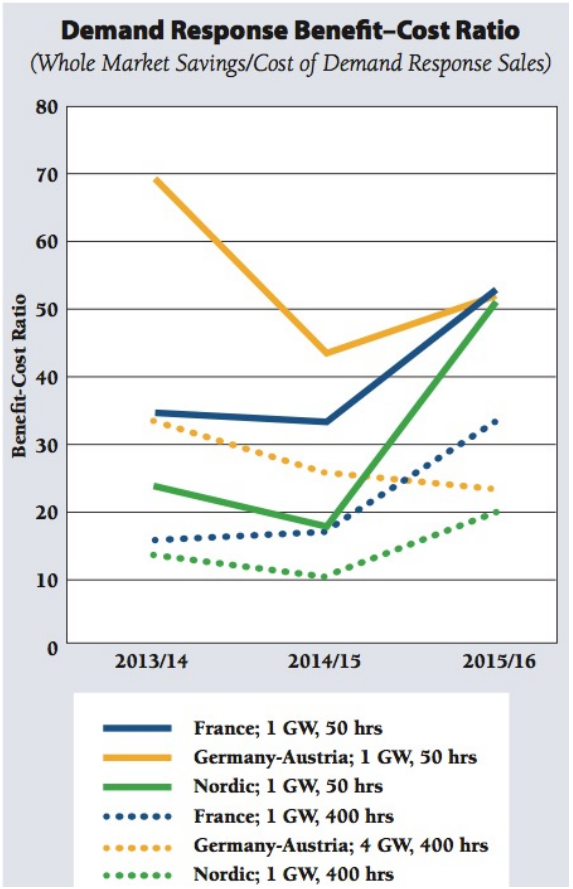
- Reduced sourcing costs + reduced volatility
- US net benefits rule = DR without any compensation when market price ≥ monthly threshold
  - Cf PJM (net benefits test) threshold price around 20-30 $/MWh
- European approached refined, with similar results
- A service to benefit all (better use of infrastructures): precedent of payment of overbooking flights
  - Regulation (EC) 261/2004 of the European Parliament and of the Council of 11 February 2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding (…)

Historical data shared during discussions of CEP



Source: The Regulatory Assistance Project

	Market	Year	Average decrease in spot price on application of DR (€/MWh)	Whole market retailer benefit [M€]	Compensation payment to retailers (based on French compensation model) [M€]	DR sales [M€]	Retailer market benefit/ (Cost = DR sales)
400h/1GW	FRA	2013/14	13.01	379.27	28.06	24.68	15.37
		2014/15	11.81	344.57	27.93	20.77	16.59
		2015/16	18.99	515.54	21.42	15.72	32.80
	GER-AUT	2013/14	20	635.83	24.44	19.13	33.24
		2014/15	13.83	458.89	22.66	17.9	25.64
		2015/16	11.29	355.13	18.4	15.58	22.79
	NORDIC	2013/14	7.71	186.32	19.69	14.26	13.07
		2014/15	5.49	135.12	18.08	13.47	10.03
		2015/16	10.21	272.75	14.75	13.98	19.51



Benefits from market-based DR: reduce sourcing costs for retailers

450 GWh/mkt = 1.6 G€/y benefits for retailers

COMPASS LEXECON

The benefits of Demand Response for Electricity Retailers and Consumers

Thursday 6th May 2021
15.30-17.30 CET

EUROPEAN ENERGY RETAILERS

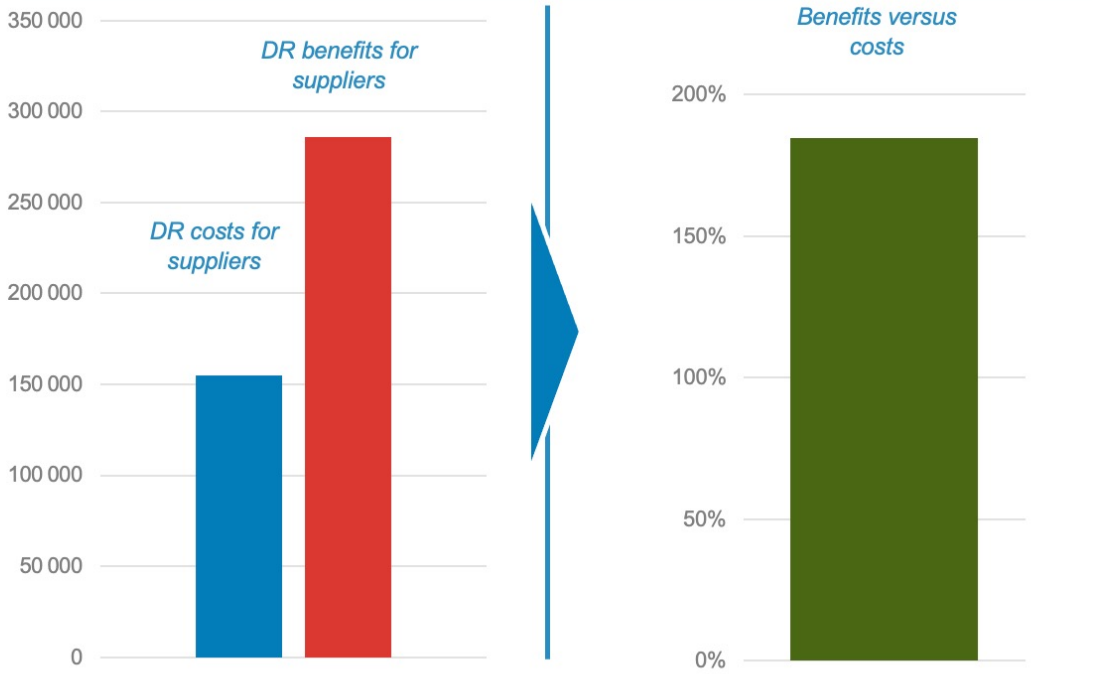
DR4EU DEMAND RESPONSE FOR EUROPE

DR benefits assessment

With the 30 GW DR portfolio, market benefits for suppliers in their energy sourcing are 190% of DR market costs for suppliers

- Gross market-wide benefits are defined as the reduction in suppliers' sourcing costs in the wholesale energy market
  - Not taking into account indirect benefits e.g. on capacity markets/mechanisms.
- Suppliers' extra costs related to DR are the market remuneration of DR:
  - DR being offered as "production" on the market it receives the market clearing prices
- **With several assumptions leading to a prudent estimation of market wide gross benefits (i.e. for all suppliers) and maximising the market costs of DR, benefits account for twice the market costs**

Costs of energy sourcing with DR (€) and benefits versus costs analysis for DR portfolio - Central Scenario - EU 2030



Thank you!

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