Implementing the Clean Energy Package for Demand Response

6th Workshop:
DR in balancing markets

Monday 12th July 2021

16.30-17.30 CET

EUROPEAN ENERGY RETAILERS
Network of Independent Energy & Solution Providers

DR4EU
DEMAND RESPONSE FOR EUROPE

AGENDA OF THE 6th WORKSHOP ON MONDAY 12th JULY

DR in balancing markets

16:30 Welcome & opening remarks

Antonio COLINO, President, European Energy Retailer (EER)

16:35 Current state of play: a benchmark of DR participation in balancing markets

Fernando BARRERA, Frontier Economics

16:45 New provisions from the CEP on DR in balancing markets

Mathilde LALLEMAND, DG ENER, European Commission

16:50 European framework: EBGL and related decisions

Athina TELLIDOU, Market codes - Electricity, ACER

17:00 Implementing EU framework nationally to ensure DR participation in balancing markets

Pierre BIVAS, Chair, DR4EU

Q&A session moderated by
Michele GOVERNATORI, EER Advisor & Energy Lead at ECCO Think Tank

17:30 **CLOSING REMARKS** & end of the workshop

1. A brief benchmark of national experiences so far

Past state of play before the implementation of the new European framework

frontier economics

DR in the balancing markets: short benchmark of current national experiences

Presented to DR workshop #6 organised by EER & DR4EU

12th July 2021

Demand Response participation models in balancing markets in Europe

	Correction	Compensation	Centralised or bilateral agreements
Great Britain	✓	✗	Centralised.
Ireland	✓	✗	Centralised.
Switzerland	✓	✓	Centralised.
Belgium	✓	✓	Prevalence of bilateral agreements. Centralised option in the absence of bilateral agreements.
France	✓	✓	Possibility of bilateral agreements, alternatively centralised option.
Italy	✓	✓	Centralised. Pilot project.
Germany	✓	✓	Currently, need for bilateral agreement between supplier and aggregator but draft law implements correction and compensation.

Demand Response participation models in balancing markets in Europe

	Estimated baseline consumption (to determine the size of demand response and thus set the amount of compensation, correction and imbalances)	Price compensation (in short)
Switzerland	Information not available.	Pool price (Day-ahead).
Belgium	The reference consumption is the consumption observed in 15 min before activation or historical data. The demand response is the difference between the reference consumption and the consumption observed during activation.	Bilaterally agreed price. Defined by law as a default.
France	Several options, depending on site or entity level: ▪ Based on observed reduced consumption (two different methodologies) ▪ Based on a forecasts (one methodology) ▪ Based on historical consumption (one methodology)	▪ Regulated supply price for small consumers. ▪ Market price for the rest.
Italy	The reference consumption is the schedule sent by the aggregator adjusted by the imbalance 15 minutes before activation. The demand response is the difference between the observed consumption and the reference consumption during the activation period.	Pool price (Day-ahead).
Germany	Law implementing compensation and correction in the process of approval. No details on estimated reference consumption and compensation price.	

2. The new European framework

- Provisions from the Clean Energy Package
- New regulations and ACER decisions

Demand side flexibility: Participation in balancing markets

Mathilde Lallemand

European Commission – DG Energy
Internal Energy Market

Energy

European Commission

Electricity Directive – DSR Participation in ancillary services

Article 17 - Demand response through aggregation

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.***

Definition
*(48) '****ancillary service****' means a service necessary for the operation of a transmission or distribution system, including* ***balancing and non-frequency ancillary services****, but not including congestion management;*

European Commission

Electricity Regulation – Balancing Market

Article 6 – Balancing Market

1.Balancing markets, including prequalification processes, shall be organised in such a way as to:

(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***;

(b) ensure that services are defined in a transparent and ***technologically neutral manner*** and are procured in a transparent, market-based manner;

(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.

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European Union Agency for the Cooperation of Energy Regulators

Demand response participation in balancing energy markets

Athina Tellidou

Market Codes Team, Electricity Department, ACER

12.07.2021

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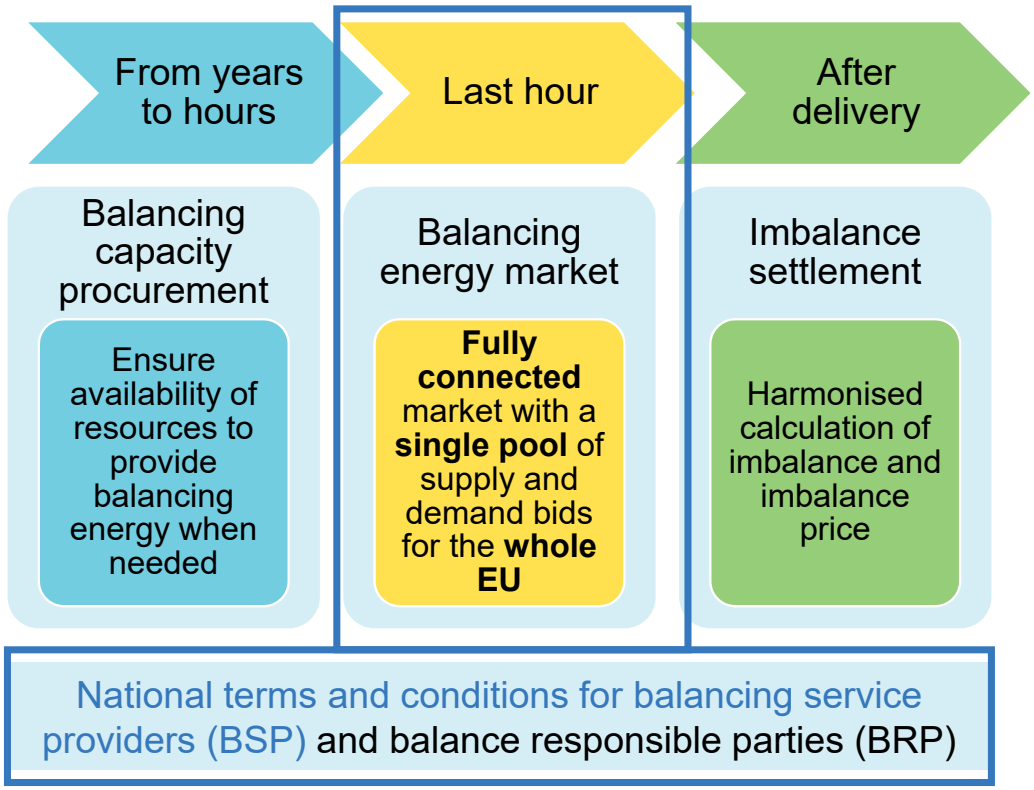
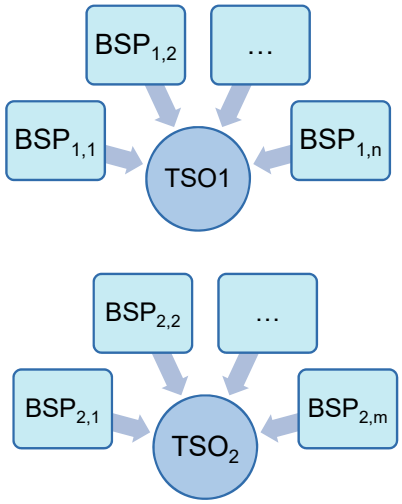
EB Regulation – Balancing energy market

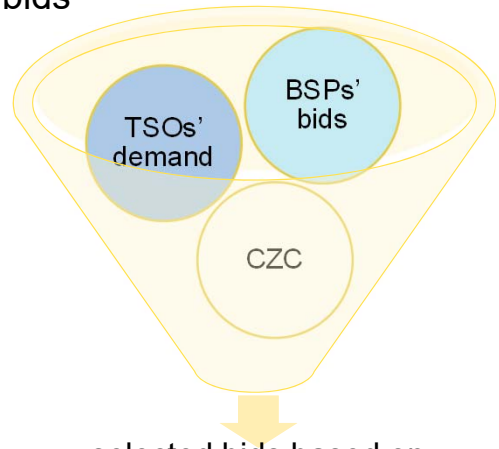


Balancing energy market = European Platforms

TSO-TSO model:

- BSPs submit bids to TSOs
- TSOs submit them to the European platform
- the platform selects bids for activation based on the common merit order, s.t. available cross-zonal capacity
- TSOs activate selected bids





selected bids based on common merit order list to be activated by the connecting TSO

EB Regulation: Regulation (EU) 2017/2195
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R2195

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Demand response in EB Regulation

- Article 3(1)(f): This Regulation **aims at** […] **facilitating the participation of demand response** including aggregation facilities and energy storage while **ensuring they compete with other balancing services at a level playing field** and, where necessary, act independently when serving a single demand facility […]
- Article 18:
  - 4. The terms and conditions for **balancing service providers** shall: […] (b) **allow the aggregation of demand** facilities, energy storage facilities and power generating facilities in a scheduling area to offer balancing services subject to conditions referred to in paragraph 5 (c); (c) **allow demand facility owners**, third parties and owners of power generating facilities from conventional and renewable energy sources as well as owners of energy storage units **to become balancing service providers** […]
  - 5. The terms and conditions for **balancing service providers** shall contain: […] (c) the rules and conditions for the aggregation of demand facilities, energy storage facilities and power generating facilities in a scheduling area to become a balancing service provider;
- Article 25(6): **Standard products for balancing energy** and balancing capacity shall: […] (b) **facilitate the participation of demand facility owners**, third parties and owners of power generating facilities from renewable energy sources as well as owners of energy storage units as balancing service providers.

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Demand response in balancing energy markets

- Article 2(4) of the EB Regulation: 'balancing energy' means energy used by TSOs to perform balancing and **provided by a balancing service provider**;
- Article 2(6) of the EB Regulation: 'balancing service provider' means a **market participant with reserve-providing units** or reserve-providing groups able to provide balancing services to TSOs;
- Article 3(10) of SO Regulation: 'reserve providing unit' means a **single or an aggregation** of power generating modules and/or **demand units** connected to a common connection point **fulfilling the requirements to provide FCR, FRR or RR**;
- Demand response is merely one type of balancing service provider, which can equally provide positive or negative balancing energy
  - this means that there is no differentiation or specific provision in the EB Regulation nor in the methodologies that are developed pursuant to the EB Regulation for demand response;
  - any provision for BSPs is also automatically applicable to demand response;
  - to the extend that the national terms and conditions for BSPs have been amended in order to allow demand facility owners to be BSPs (pursuant to Article 18(4) of the EB Regulation), the requirements are neutral towards them.

SO Regulation: Regulation (EU) 2017/1485
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1485

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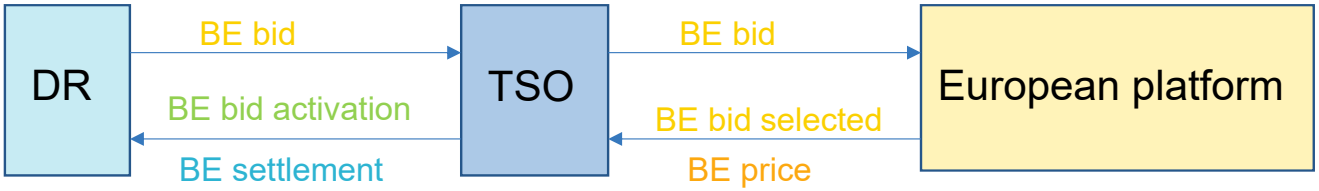
Demand response in European platforms

- The European platforms for the exchange of balancing energy from **aFRR (PICASSO)** and **mFRR (MARI)** have been established through ACER Decisions last year and are being implemented by the TSOs; their **go-live is expected by July 2022**, but TSOs may get up to two years derogation for joining.
- ACER Decisions relevant for DR (BSPs) in balancing energy markets:
  - Balancing energy pricing (ACER Decision 01/2020)
  - aFRR Implementation Framework (ACER Decision 02/2020)
  - mFRR Implementation Framework (ACER Decision 03/2020)
  - Activation purposes (ACER Decision 16/2020)

Balancing energy market from the DR perspective



aFRR/mFRR Implementation Framework

- TSO-TSO model and common merit order list
- Gate closure time: 25 min before real time (per 15 min)
- Balancing energy (BE) bid characteristics
  - min quantity and granularity 1 MW
  - validity period 15 min
  - full activation time: 5 min aFRR, 12.5 min mFRR

PICASSO: https://www.entsoe.eu/network_codes/eb/picasso/
MARI: https://www.entsoe.eu/network_codes/eb/mari/

Thank you.
Any questions?

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3. Implementing the EU framework

For DR in the balancing markets

Implementing the Clean Energy Package for Demand Response

DR participating in balancing markets

Workshop #6

12th July 2021

Takeaways from previous sessions on DR in wholesale markets (e.g. day ahead)

- Balance responsibility of aggregator: to deliver volumes sold
  - Need for baseline and measurement methodologies
- Impact on third parties (suppliers/BRPs) is two-fold
  1. Positive imbalance for BRP
  2. Money: cost versus revenues for suppliers
- 'Models where imbalances are settled or with perimeter correction'
  - Imbalance may be offset by perimeter correction
  - … but this deprives BRPs of their revenues for positive imbalance
- DR in the market means suppliers buy it and don't bill it to consumers
  - Cost = cost of buying DR => compensation at market price
  - Counterfactuals: same physical situation = spot ; others: retail, average,…
  - In any case, compensation cannot create a barrier
    - Cost need be spread among market parties
    - Option: net benefit rule, those who share benefits share costs
  - DR: a solution to avoid price spikes (and solve physical issues/overcome limits)
    - Reduce sourcing costs and volatility for suppliers: significant benefits
    - A more efficient energy system (similar to paying overbooked passengers not to fly)
- Today: similar issues when DR is sold in balancing markets

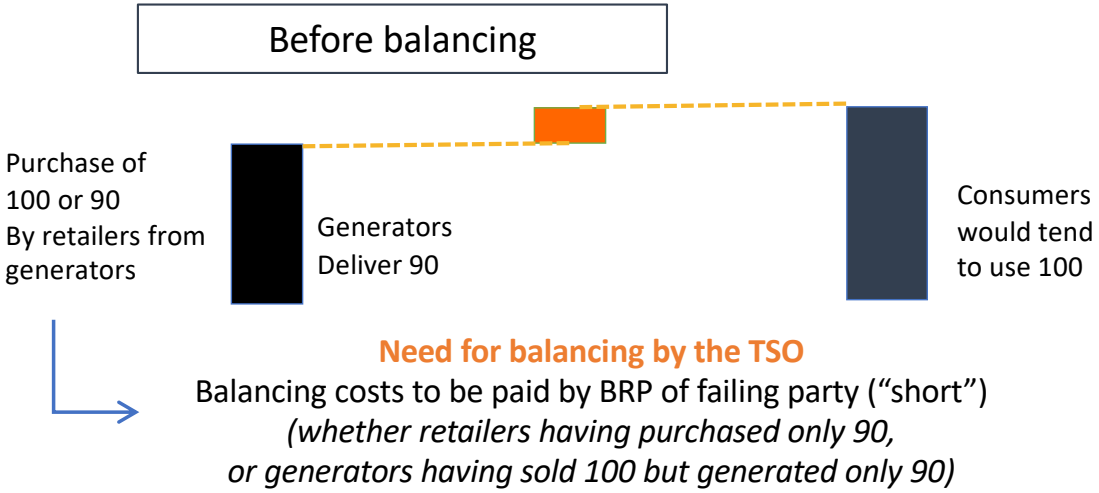
Demand response for balancing by TSO

Demand response for balancing by TSO

Need for balancing by the TSO

Balancing costs to be paid by BRP of failing party (“short”)

Demand response for balancing by TSO



Need for balancing by the TSO

Balancing costs to be paid by BRP of failing party (“short”)

(whether retailers having purchased only 90,
or generators having sold 100 but generated only 90)

Demand response for balancing by TSO

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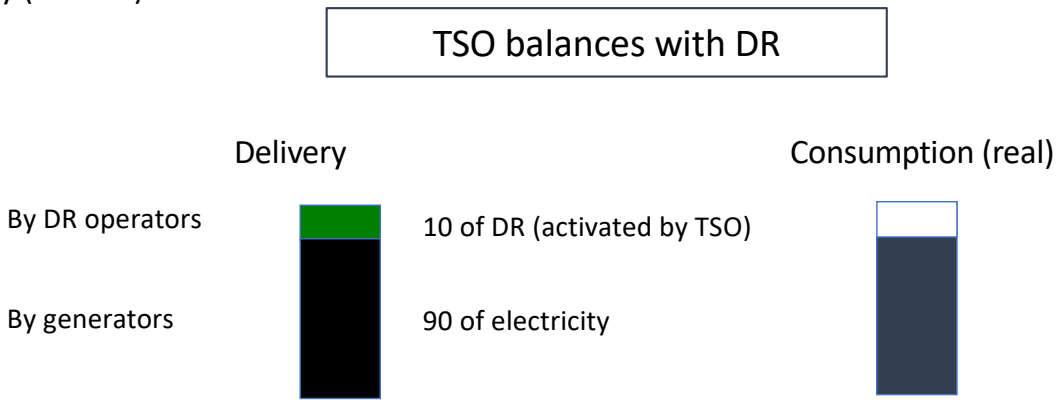
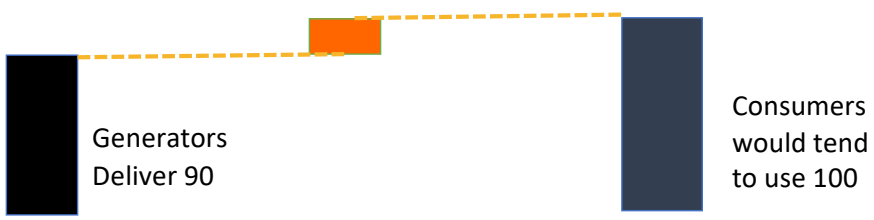


Demand response for balancing by TSO

Before balancing

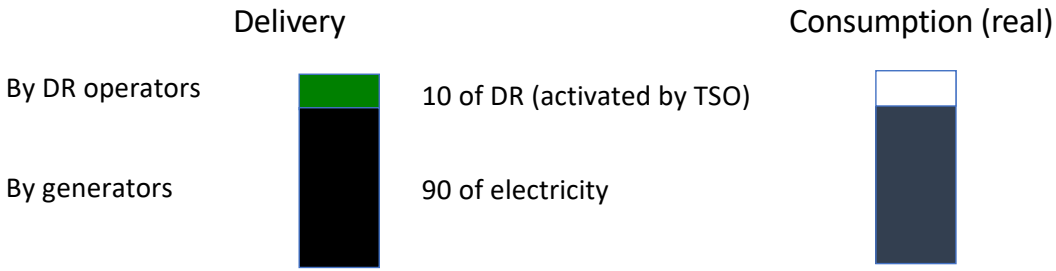


Need for balancing by the TSO

Balancing costs to be paid by BRP of failing party (“short”)

Involving demand-side flexibility reduces the cost of reliability for all

TSO balances with DR



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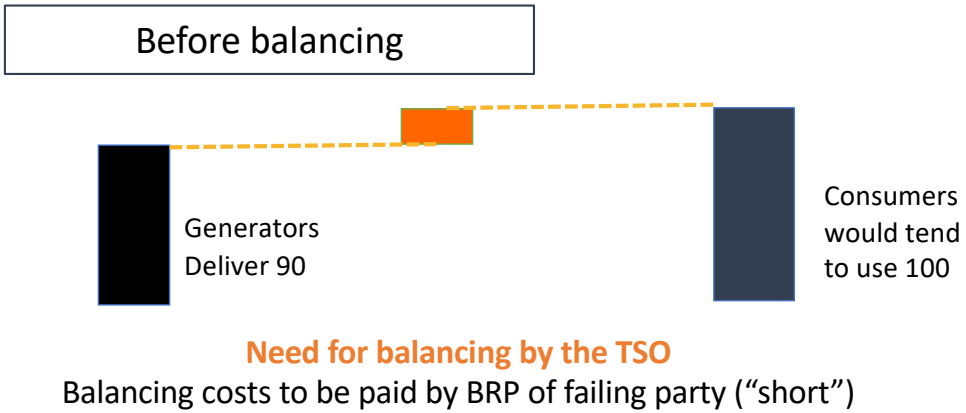

Involving demand-side flexibility reduces the cost of reliability for all

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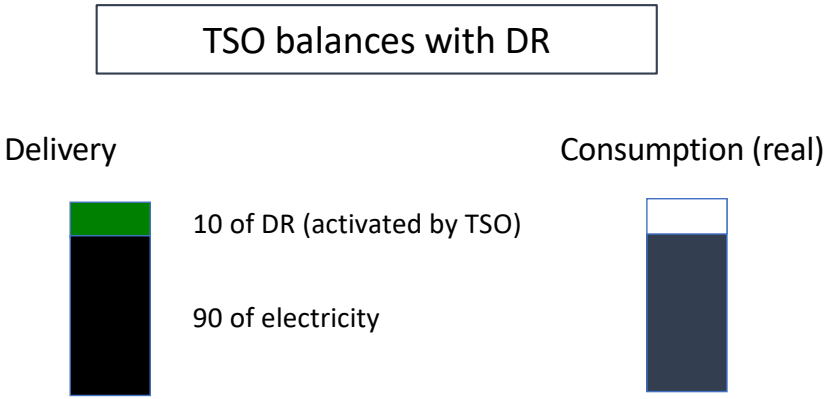


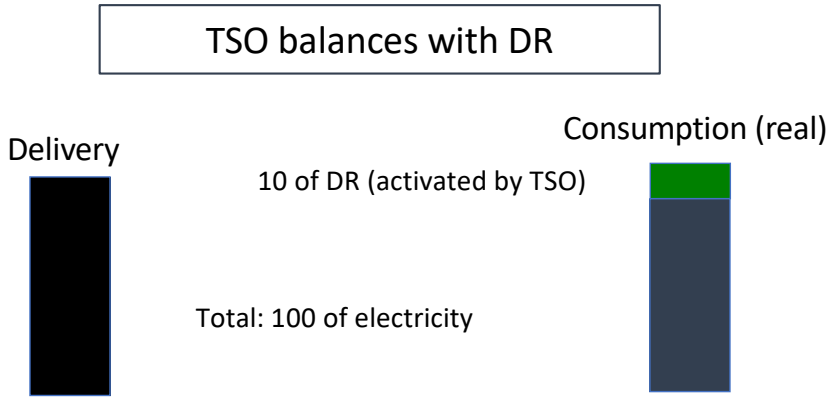
- DR ensures balance (90=90)
- Retailers sell all the electricity generated (90)
- Retailers sell less than if TSO had called additional generation for balancing (10+90=100)
- “Cost” for retailers = cost of DR being bought and not billed to consumers

Such cost may be compensated to retailers, by TSO; then TSO needs to share the cost among market parties … according to the same rule as for day ahead market

Note: demand response for balancing by TSO is also Downward regulation (= consumption increase)

Need for balancing by the TSO

Balancing costs to be paid by BRP of failing party (“long”)



- Price for balancing depends on bids … and national rules
- Need for consistency to ensure DR actually participates, no discrimination

Balance responsibility of BSP and other BRPs
Imbalance adjustment *vs* perimeter correction

- Definition from EBGL
  - Commission regulation (EU) 2017/2195 – art. 2 *Definitions*

(14) 'imbalance adjustment' means an energy volume representing the balancing energy from a balancing service provider and applied by the connecting TSO for an imbalance settlement period to the concerned balance responsible parties, used for the calculation of the imbalance of these balance responsible parties;

  - Which *concerned* BRP? That of the BSP, not necessarily others
- Then the Clean energy package
  - Directive (EU) 2019/944 & Regulation (EU) 2019/943
  - For the BRP of the suppliers, models where imbalances are settled or with perimeter correction

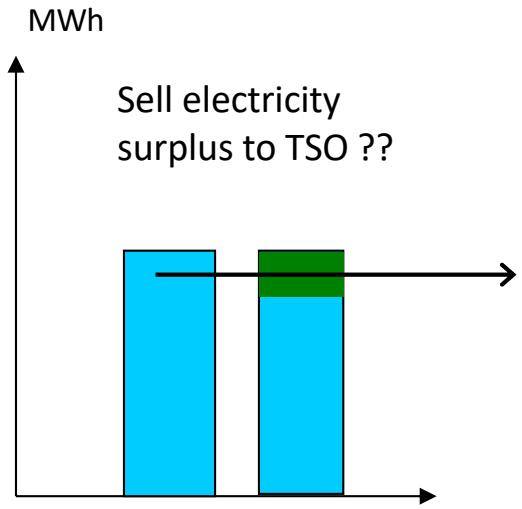
Not necessarily same model as day ahead, yet consistent

Inconsistency of the old notion of “ToE”

No energy to be transferred

=> not the basis for a ‘compensation’ as per CEP

Beware of the trick of a partial description



DR would capture an excess of electricity?? No

Not enough electricity: when DR is called for balancing, it’s because system is « short »

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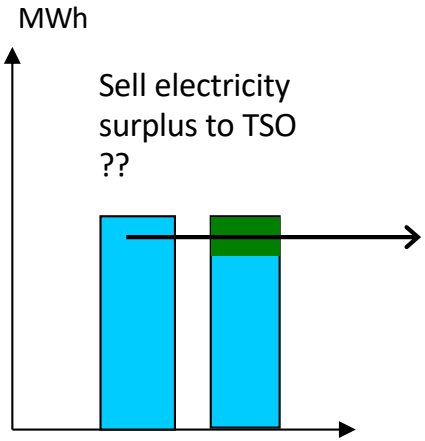

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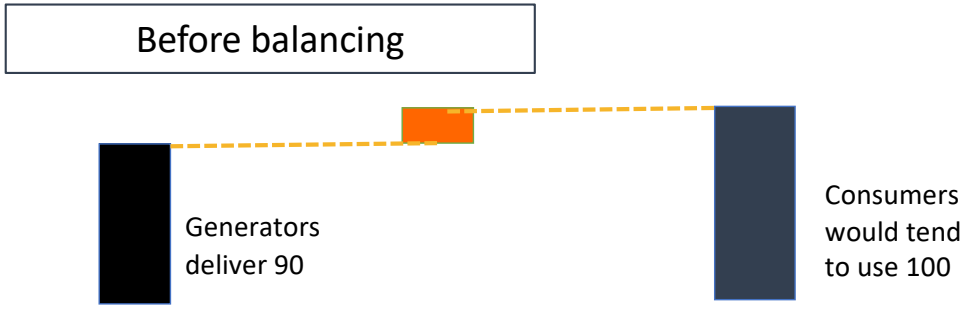

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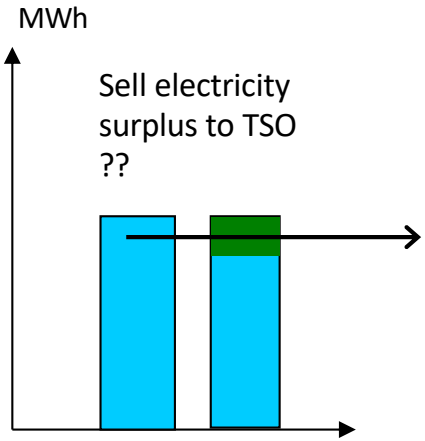

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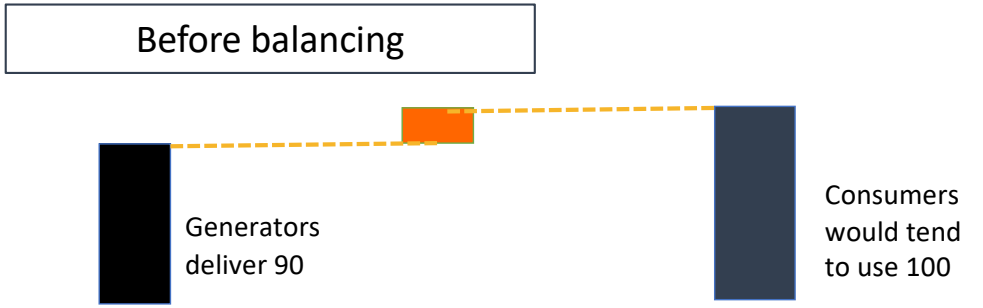

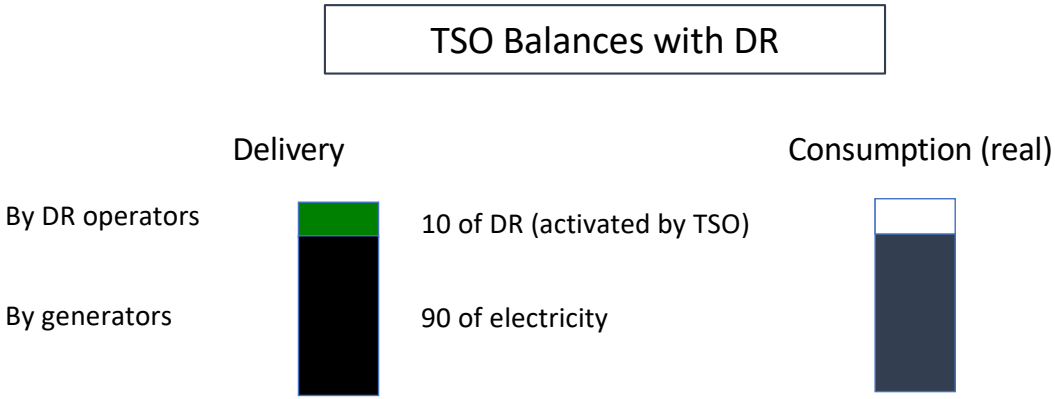

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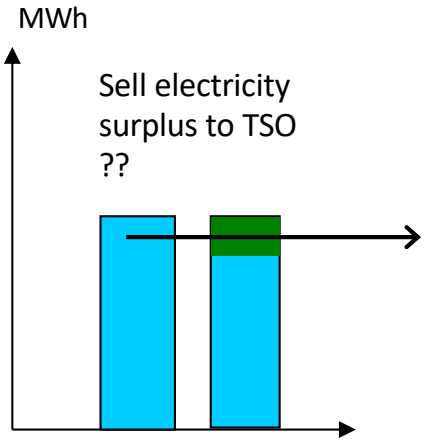

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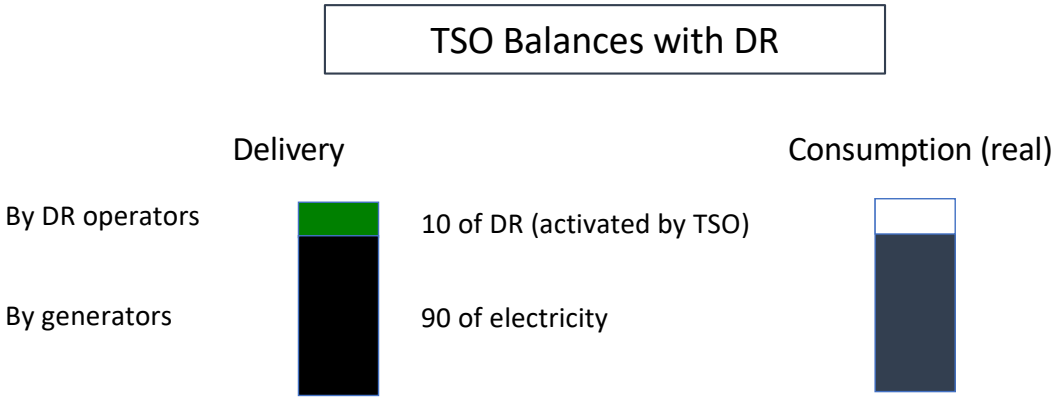


All the energy generated is consumed and paid to retailers

- Compensation to suppliers is an issue of money, not energy

Inconsistency of the old notion of "ToE"

No energy to be transferred

=> not the basis for a 'compensation' as per CEP

Before balancing

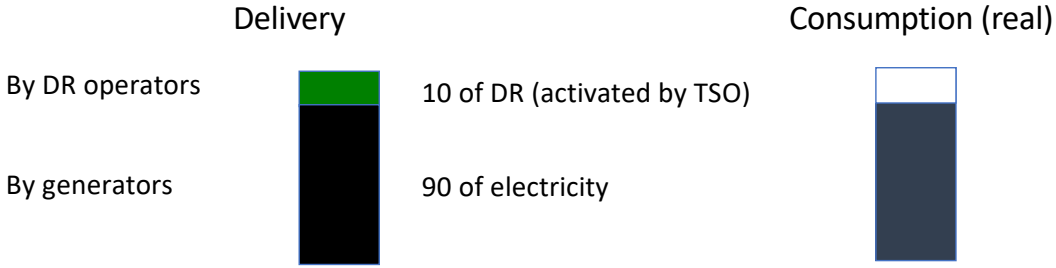
Involving demand-side flexibility reduces drastically the cost of reliability for all

Need for balancing by the TSO

Balancing costs to be paid by BRP of failing party ("short")

(whether retailers having purchased only 90, or generators having sold 100 but generated only 90)

TSO Balances with DR



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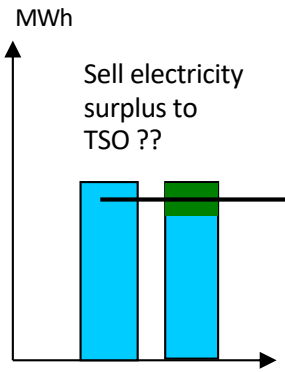
- **Such cost may be compensated to retailers, by TSO; then TSO shares the cost among market parties according to the same rule as for day ahead market**

Beware of the trick of a partial description

Remember:

All the energy generated is consumed and paid to retailers



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Not enough electricity: when DR is called for balancing, it's because system is « short »

Should a 'compensation' be granted to suppliers/BRPs?

- Allowed by art.17-4
- No more than costs incurred during activation
- Identify costs
  - Direct costs: DR bought no billed
  - Counterfactual scenarios
    - For instance: same physical situation without having to pay for DR
    - Similar discussion as previously
- Not necessarily but likely to adopt similar approach as for DR in the wholesale market (e.g. day ahead)

Who would pay any 'compensation' granted to suppliers/BRPs, and how?

- "*Not create a barrier for DR*" in the balancing market
  - Balancing price may be > compensation price
  - Need to assess whether 'spread * volumes' make it viable to DR … while competing with production, no discrimination [not with energy traders]

- Also need for consistency
  - On the one side, when DR in the wholesale market: need to share the cost of compensation granted to suppliers
  - On the other side, in balancing markets: compensation cost charged to DR?
  - Would mean basically DR would go only on wholesale, not contribute to balancing *this would be bad for reliability and energy transition*
  - Art.17-4 is the same regarding all DR (art.17-1 and art.17-2)

- Solution: option to implement the net benefit rule globally
  1. Calculate benefits in every market and add them
  2. Compare total benefits to total (compensation) costs
  - ➢ Practically: volumes are much greater on wholesale, will determine rule

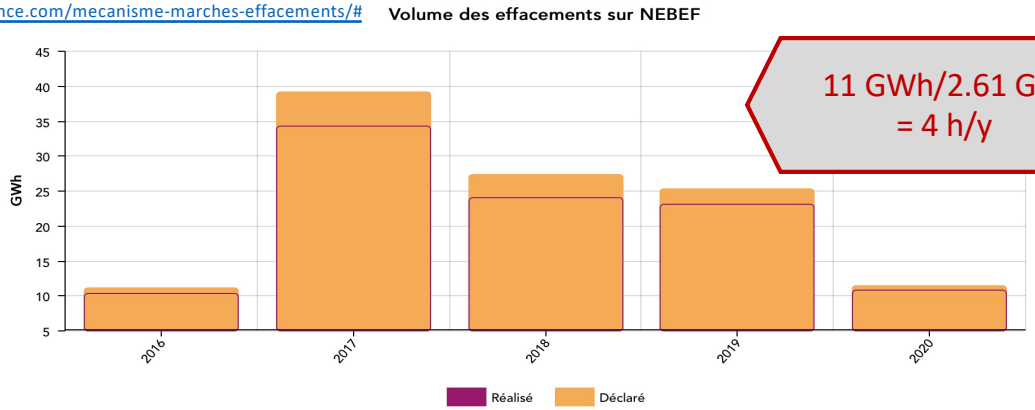
WS#5
wholesale

DR4EU view of the French long standing experience reflected by numbers published by TSO:

A dead end for DR in the markets?

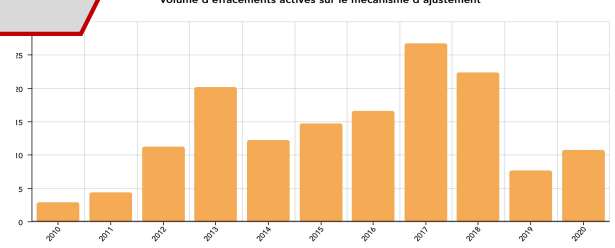
- Everything right or so, … except the 'compensation' system
- Markets opened to DR for years, balancing then also wholesale ('NEBEF rules', 2014)
- DR potential is there (all sizes, from electrical heating in 7 M homes to large industrial processes)
- DR capacities are there: 2.61 GW certified (official 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,…)

Le dispositif NEBEF

A ce jour, 22 opérateurs d'effacement ont contractualisé avec RTE pour participer à ce dispositif, dont 12 disposent de l'agrément technique et sont actifs.

WS#6
Balancing

DR4EU view of the French long standing experience reflected by numbers published by TSO:

barrier to DR in balancing markets too

- Everything right or so, … except the 'compensation' system
- Markets opened to DR for years, balancing since 2003 (2007 for 'small' consumers)
- 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
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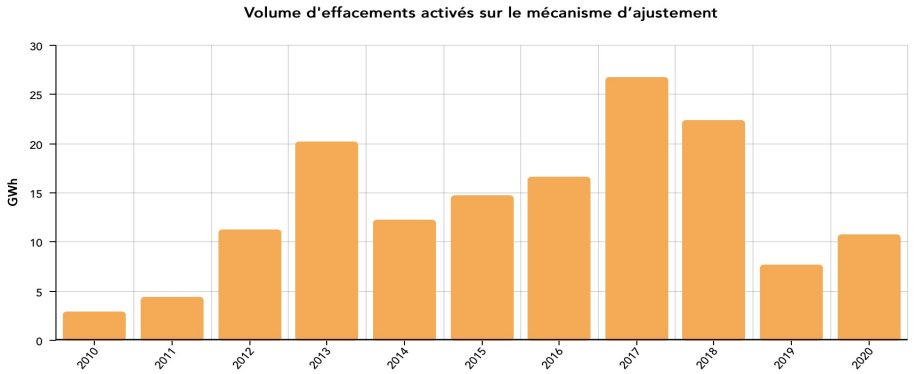

10 GWh/2.61 GW
< 4 h/y

No access to balancing markets

10 GWh * 10 €/MWh = 0.1 M€/year all DR volumes on balancing

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DR4EU
DEMAND RESPONSE FOR EUROPE

EUROPEAN ENERGY RETAILERS
Network of Independent Energy & Solution Providers

Demand response in balancing markets

Other topics coming later

- ***Baseline***
- ***Data needed***
- ***Implementing the net benefit rule***
- ***DR in capacity markets***
- ***DR in the local flex markets***
- ***…***

Now Q&As, comments welcome!