

European Platforms for the exchange of Balancing Energy

TERRE and IGCC projects

30 January 2020

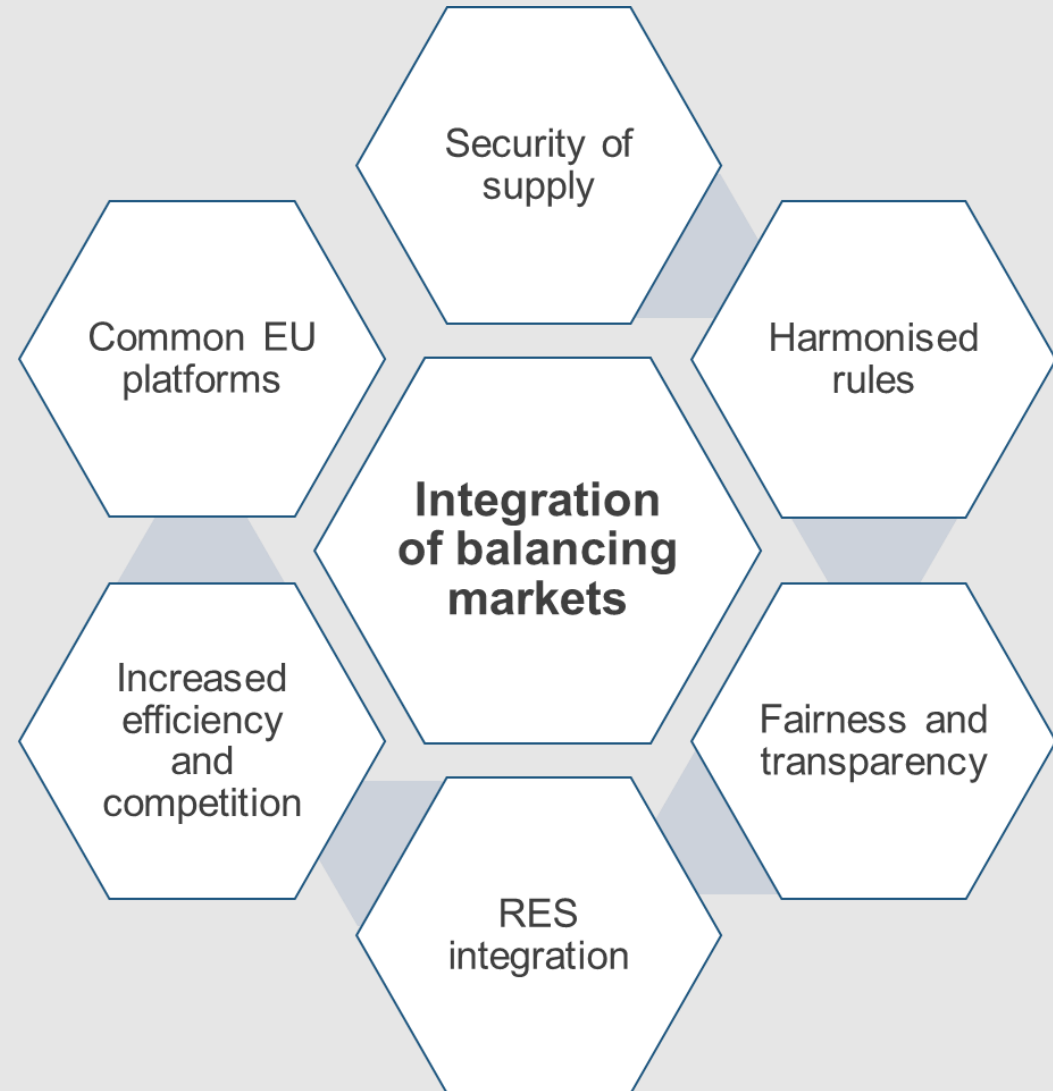
Lisbon

Albino Marques
Head of Electricity System Operator

REN 

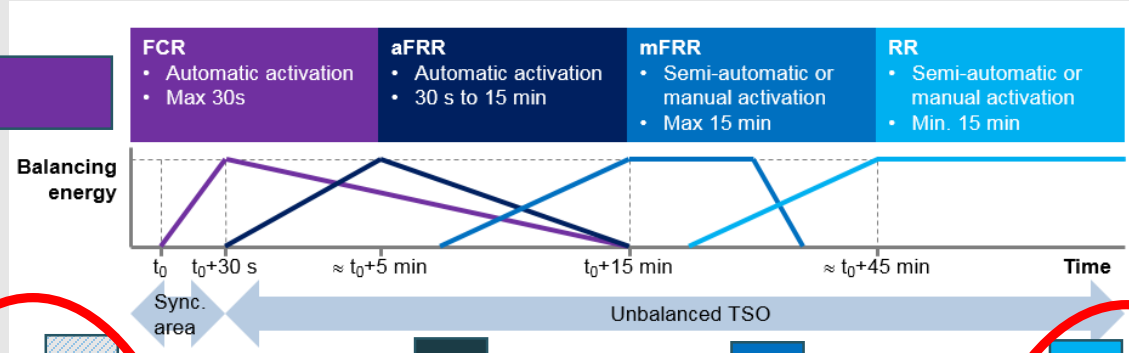
What is the purpose of the EB GL?

The main target of the EB GL is to **integrate** and **harmonise** balancing energy markets through a TSO-TSO model facilitated by **European platforms**.



Balancing platforms per product/process

No common platform for FCR foreseen in EB GL



Each process has different specifications

Each process has different timing

Imbalance netting: IGCC

aFRR: PICASSO

mFRR: MARI

RR: TERRE

Each process has different geographical scope

Member Observer

REN



Topic 1

TERRE

Trans European Replacement Reserve Exchange

The TERRE project: Participants & Go-live

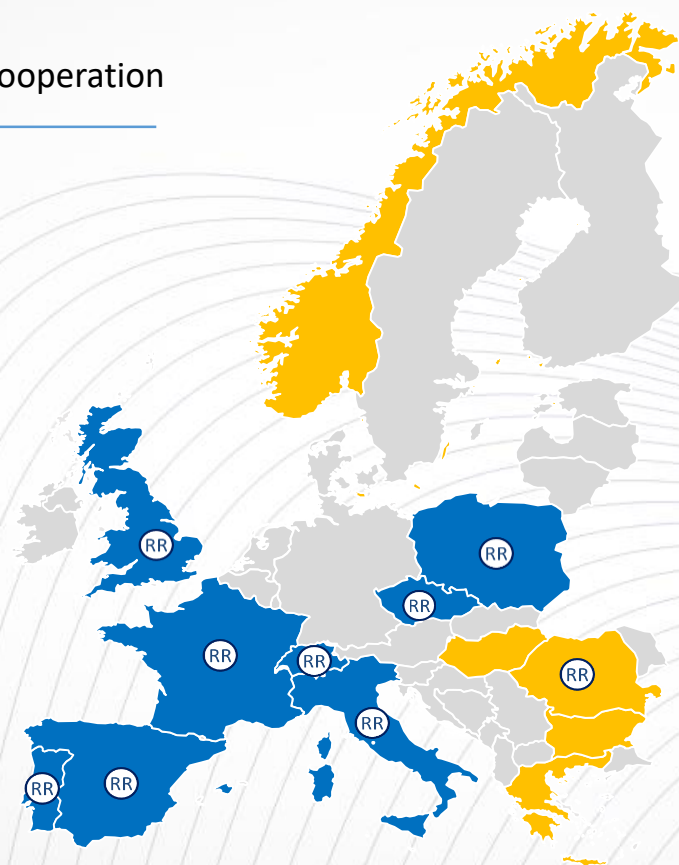
Following TSOs were included in the cooperation

Full members

France	RTE
Italy	Terna
Portugal	REN
Spain	REE
Suisse	Swissgrid
UK	National Grid
Czech Republic	CEPS
Poland	PSE

Observers

Greece	ADMIE
Hungary	Mavir
Bulgary	ESO
Romania	TLE
Norway	Statnett
ENTSOE-E	entsoe

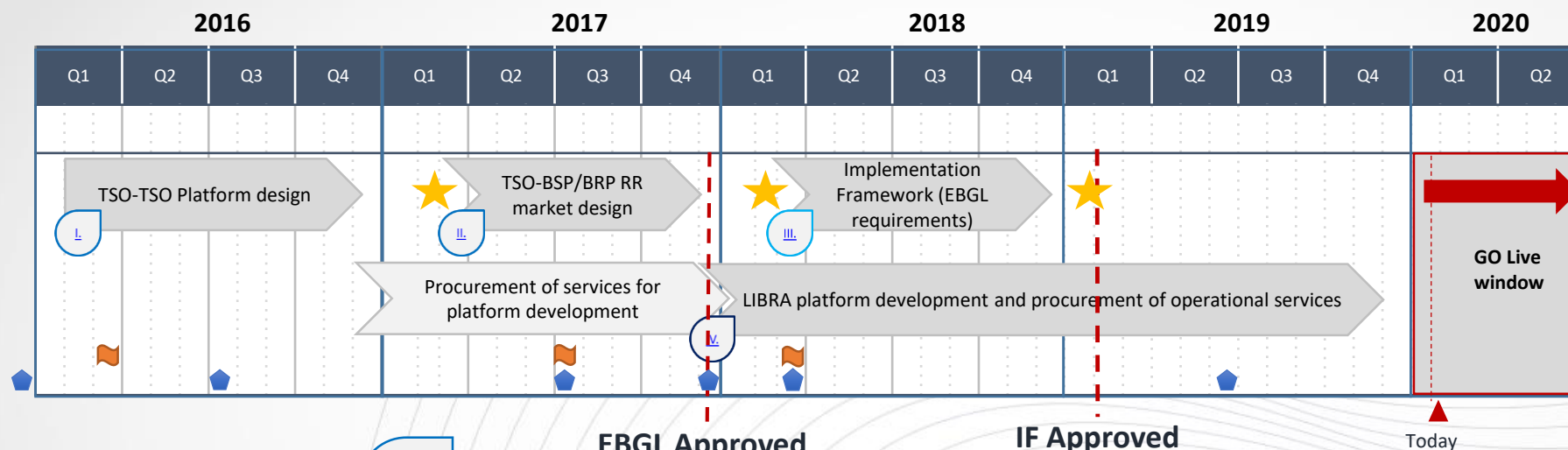


- RR countries
- Full members
- Observers

TSO	Go live
CEPS	6 th January 2020
REE	Q1 2020
REN	Q1 2020 (31 March)
SG	Q2 2020
TERNA	Q2 2020
NG	june 2020
RTE	june 2020
PSE	Q1 2021

← 1st TSO

Project timeline, main steps and milestones



- Workshops:**
- December 2015;
 - July 2016
 - July 2017
 - December de 2017
 - March 2018
 - June 2019

- Public Consultation**
- 1st Products definition and platform design (2016);
 - 2nd RR Harmonization topics (2017);
 - 3rd Implementation Framework (2018).

- TSO-TSO design:**
- CBA
 - Definition of the product
 - Imbalance need
 - Unshared and Restricted bids
 - Algorithm
 - Settlement
 - Timings

- RR market design**
- TSO-TSO model
 - Accepted RR Product
 - Harmonization of incentives/settlement rules
 - BEGCT definition

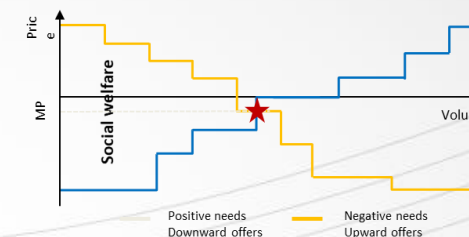
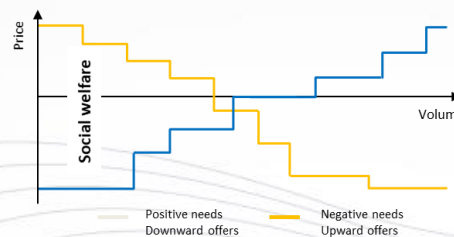
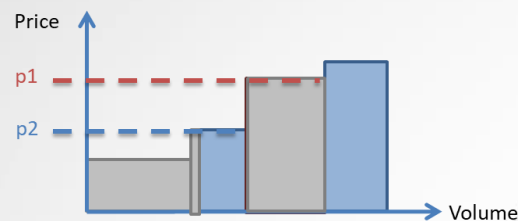
- Implementation Framework**
- Involvement of all RR countries into discussion
 - LIBRA TSO-TSO rules and designing
 - RR market rules and design
 - Governance and cost-sharing rules

- Development of the LIBRA platform**
- Functional design
 - Development main modules LIBRA
 - Testing (IOP and E2E)
 - Contracting of services

★ Public Consultation and NRA support

LIBRA optimization specifications

Optimization of balancing energy



Bid formats

- Delivery of 15min which can be linked together
- Large variety of bid formats (links)
 - Block
 - Exclusive offers (time/volume)
 - Multi-part offers in volume
 - Linking offers in time/volume

ALGORITHM

- Single clearing (up and down offers/needs)
- Netting of TSO needs
- Counter-activations permitted or blocked
- Controllability of XB interconnections (XB implicit Countertrading for DC and AC links)
- At the launch of the RR-Platform, the number of daily gates will be 24.

SETTLEMENT

- TSO-TSO balancing energy = Energy Block settled
- Pay as cleared
- Marginal Pricing
- One price for upwards & downwards activations
- Congestion rent generated

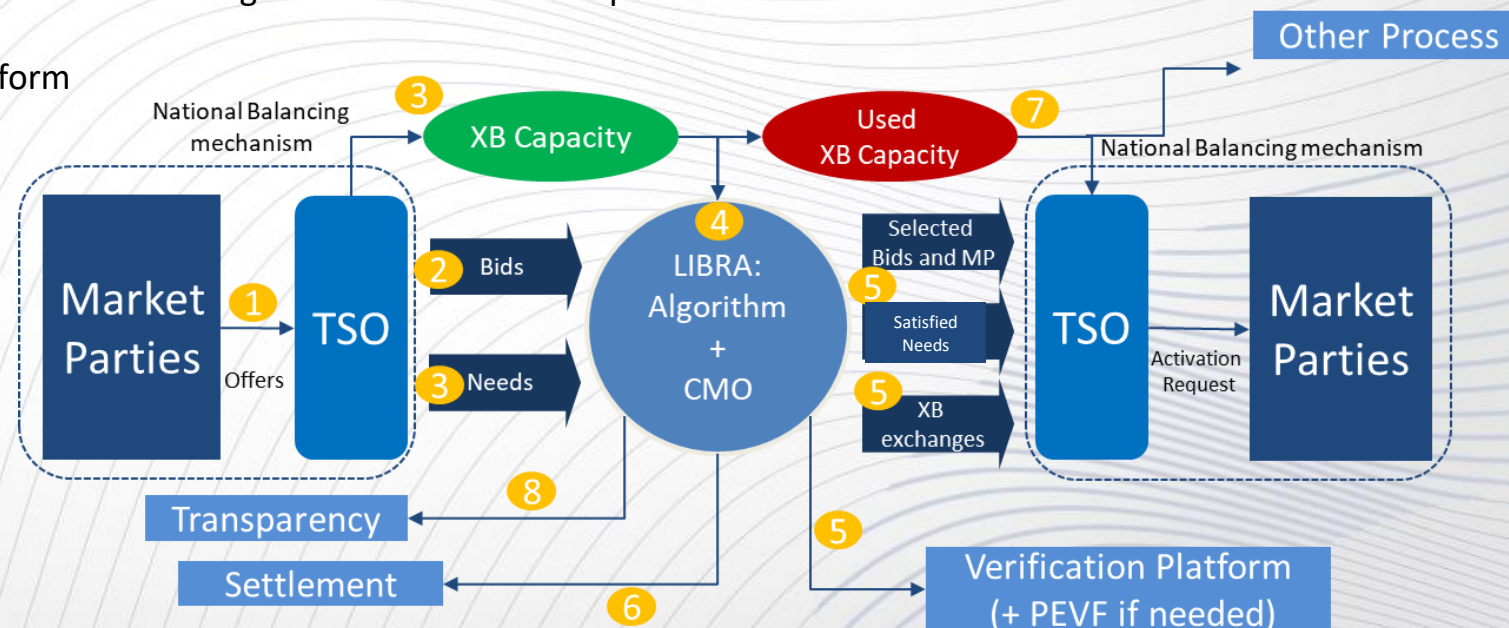
LIBRA Process and Timing

TERRE Process

LIBRA: a TSO-TSO platform

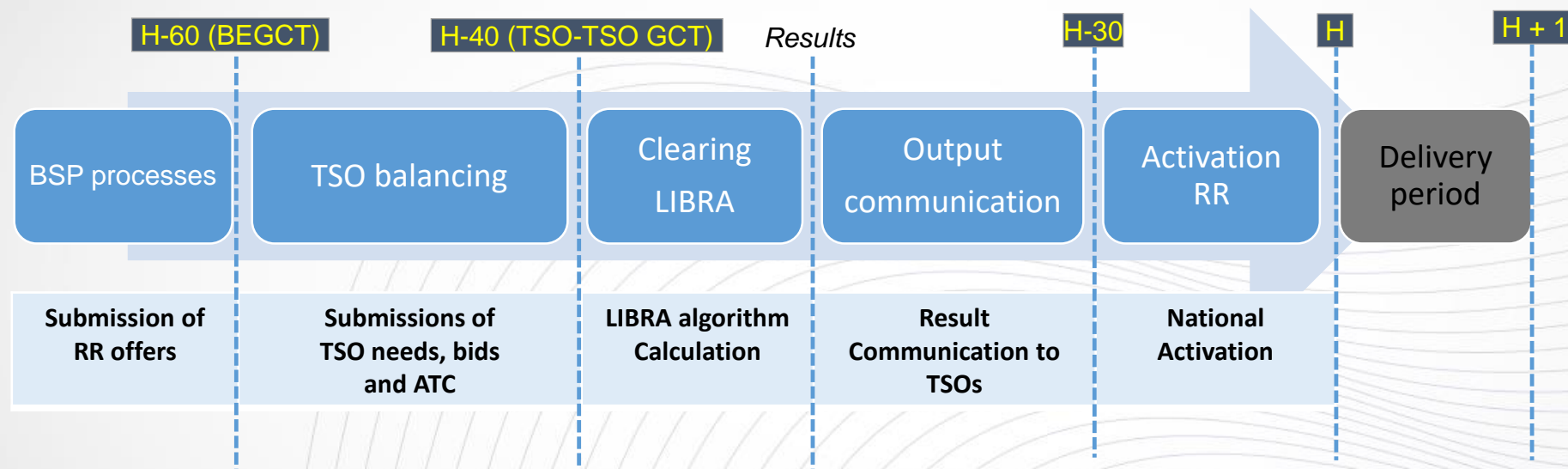
Libra processes and information flow:

1. TSOs receive offers/bids from Market Parties in local market balancing area
2. Check and submission of bids to LIBRA platform (AOF)
3. TSOs communicate their foreseen imbalance energy needs, the available XB transmission capacities (ATC)
4. AOF run to satisfy the imbalance energy needs with the bids under ATC constraints
5. Communication of the accepted offers for activation, satisfied needs, prices and XB exchanges (Net Position)
6. Calculation of the commercial flows between Market Balancing areas and settle the expenditure and revenues between TSOs
7. The remaining ATC is sent to the TSOs
8. Sending the information for Transparency Platform



LIBRA Process and timing

LIBRA Timings



- BSP can **submit** its offers since **15:00 CET of the day before delivery**.
- **The Gate Closure Time** for sending/updating an RR energy offer, by BSP, will be:
 - **H-60** during the **first year** of operation of the platform;
 - **H-55** after this period

RR – Implementation Framework

RR balancing energy needs

What kind of needs can be submitted?



BASIC NEED FORMAT

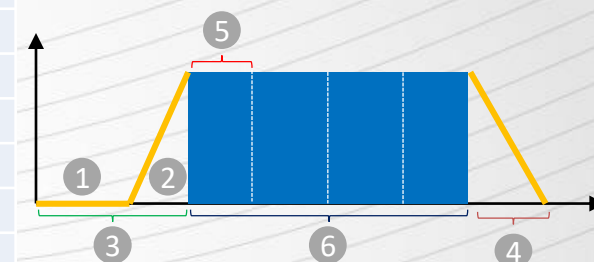
- 15 min resolution
- Upward or downward direction
- Mix of inelastic and elastic

Minimum size	1 MW
Minimum delivery period	15 min
Max delivery period	60 min
Location	Bidding zones (ex: several needs for Italy)
Maximum Size	The maximum size of the RR balancing energy need submitted by the TSO for its LCF area should be less or equal to the sum of the shared Offers made in the same direction. Under certain conditions, a TSO can notify the system which will apply an exemption to this rule
Divisible Volume	Under the responsibility of TSO to a resolution of 1MW
Price	For inelastic needs TSOs will not price their needs. For elastic needs a price will be submitted, which will set a min/max price each TSO is willing to receive/pay to satisfy its needs. Its resolution is 0.01€/MWh.
Time Resolution	15 min
Firmness	Yes
Direction	Positive (system short) or Negative (system long)
Tolerance Band in volume	Parameter under the responsibility of RR TSO

RR – Implementation Framework

RR Standard Product

Standard Characteristics	
Mode of activation	Manual and scheduled
① Preparation Period	From 0 to 30 min
② Ramping Period	From 0 to 30 min
③ FAT	30 min
④ Deactivation Period	Under national responsibility
Minimum quantity	1 MW
Maximum quantity	In case of divisible bid, no max is requested only technical limit (IT limit). In case of indivisible bid, national rules will be implemented
⑤ Minimum duration of delivery period	15 min
⑥ Maximum duration of delivery period	60 min
Location	Balancing Area
Validity Period	Defined by BSP and respecting the min and max delivery period
Minimum duration between the end of deactivation period and the following activation	Recovery Period = determined by BSP
Divisibility	Divisible and/or indivisible bids allowed (Resolution for divisible bids = 0,1MW)
Price of the bid	Defined by the BSPs €/MWh
Time Resolution	15 min

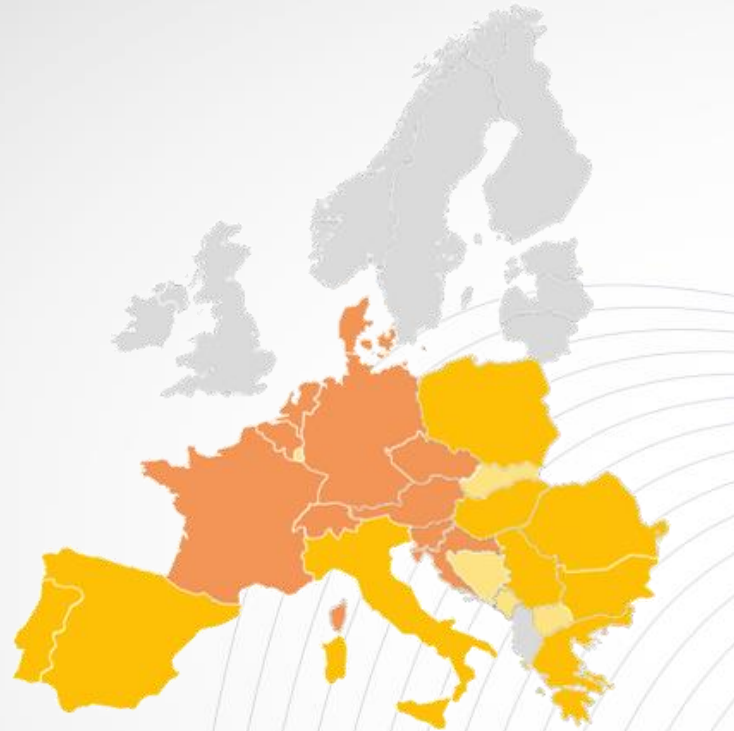


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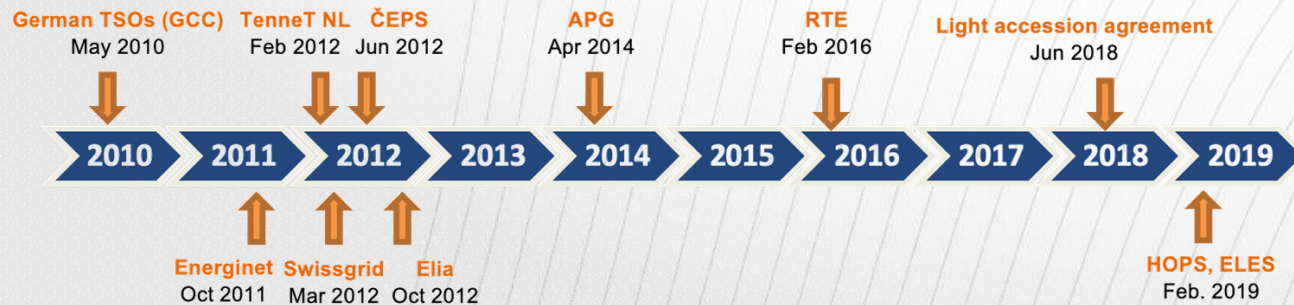
Topic 2

IGCC - International Grid Control Cooperation

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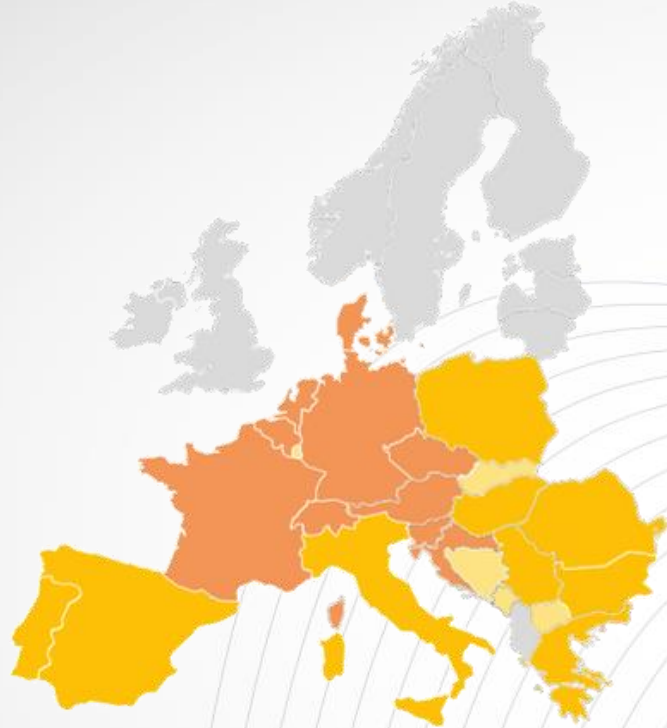


- IGCC operational member (participating TSO)
- IGCC non-operational member
- IGCC Observer

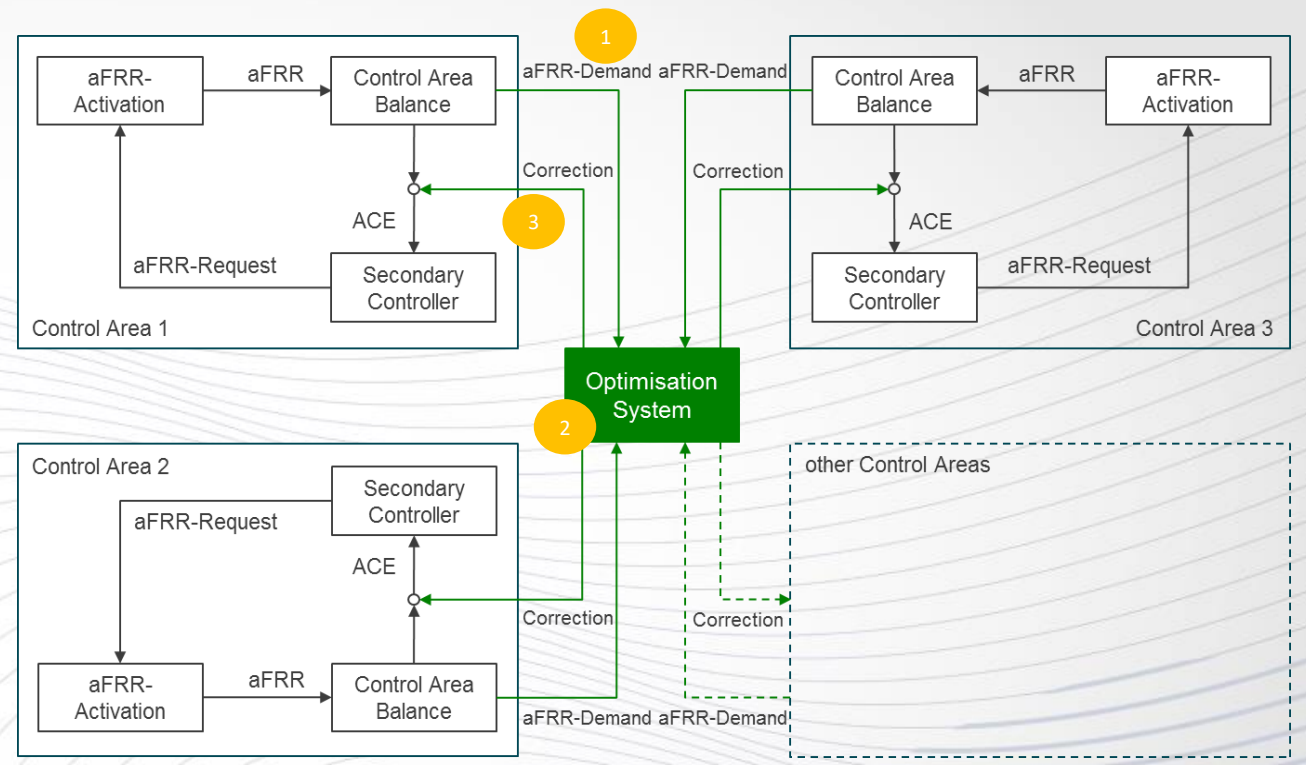
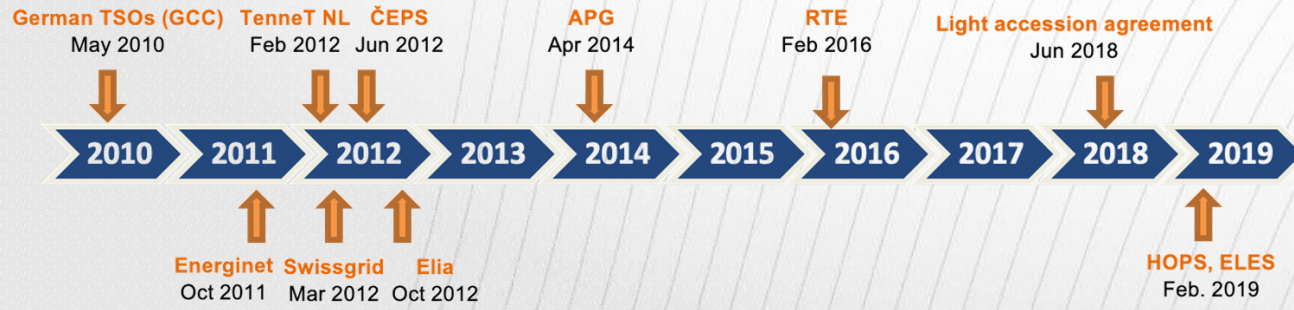


Imbalance netting is the process agreed between TSOs of two or more areas that allows **avoiding the simultaneous activation of frequency restoration reserves (FRR) in opposite directions** by correcting the input of the involved frequency restoration processes **considering the limits of the interconnection capacity.**

IGCC - International Grid Control Cooperation



- IGCC operational member (participating TSO)
- IGCC Observer
- IGCC non-operational member



Compensation volume - energy in the quarter-hour period t agreed with **TransnetBW**, which reflects the variation in time of the power increments assigned by the European central regulator to each member m .

$P_{IGCC}(t)$ - weighted average **price of avoided activations** for all members m in the quarter-hour period t :

$$P_{IGCC}(t) = \frac{\sum_{m=1}^M E_{Imp}(t, m) * C_{Imp}(t, m) + \sum_{m=1}^M E_{Exp}(t, m) * C_{Exp}(t, m)}{\sum_{m=1}^M E_{Imp}(t, m) + \sum_{m=1}^M E_{Exp}(t, m)} \quad \left[\frac{\text{€}}{\text{MWh}} \right]$$

$C_{Imp}(t, m) / C_{Exp}(t, m)$: import/export avoided activation price

Note: the avoided activation price of the Portuguese member in the import direction corresponds to the up-regulation price and in the export direction, to the down-regulation price

Negative benefit for one or more members and positive IGCC Global Benefit in a quarter-hour period



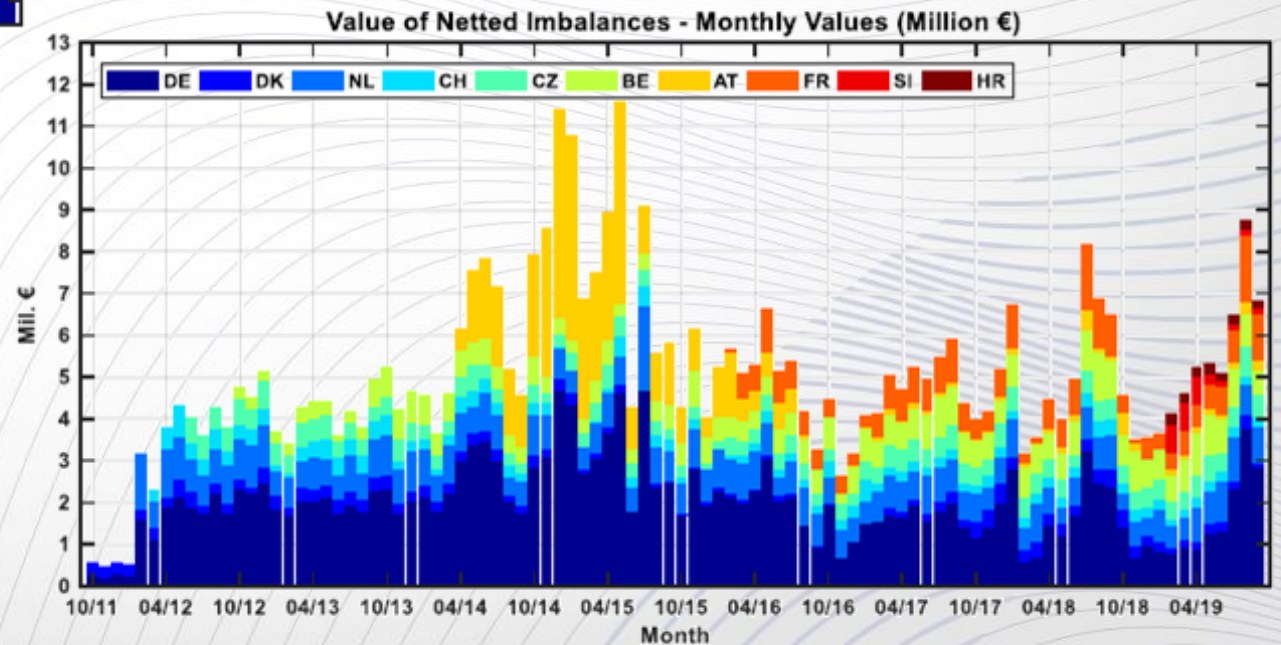
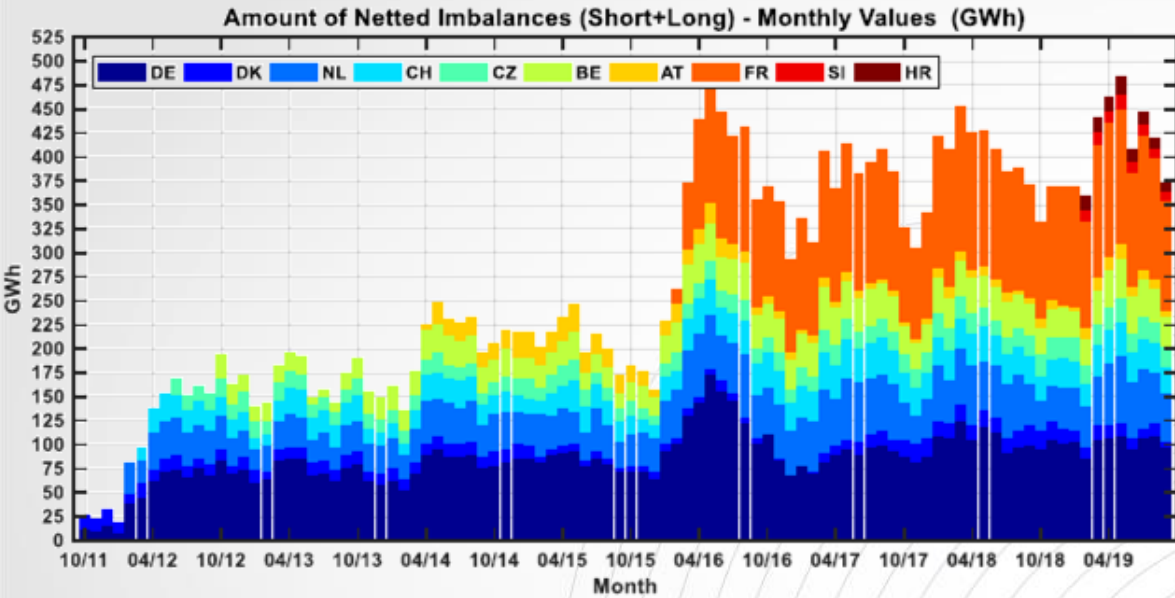
Adjustment mechanism

IGCC Initial Settlement Price

Who pays

The cost / benefit resulting from the imbalance netting process is reflected in the imbalance settlement

IGCC - International Grid Control Cooperation



Source: IGCC Regular Report on Social Welfare Q3 2019

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Topic 3

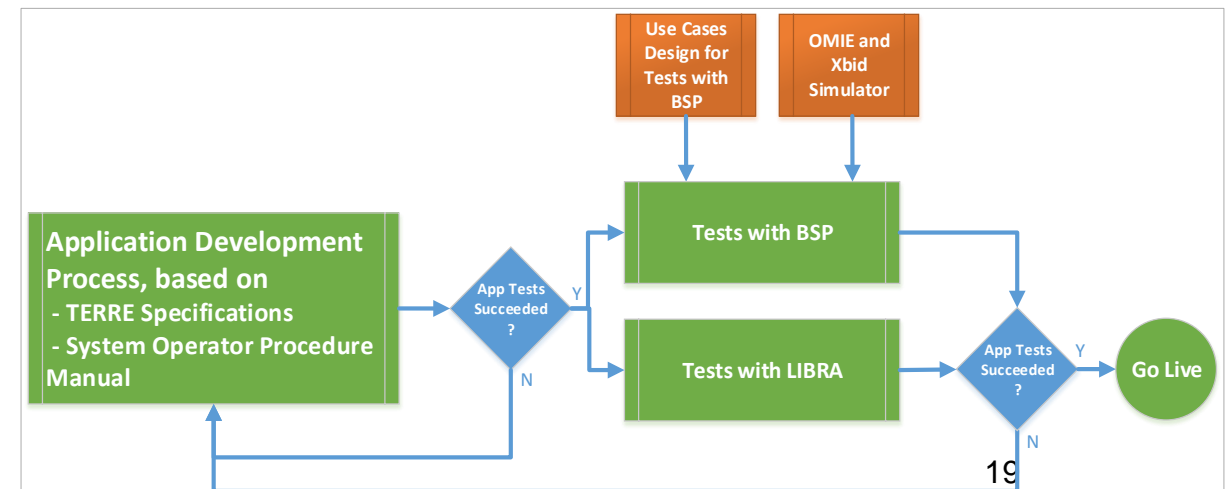
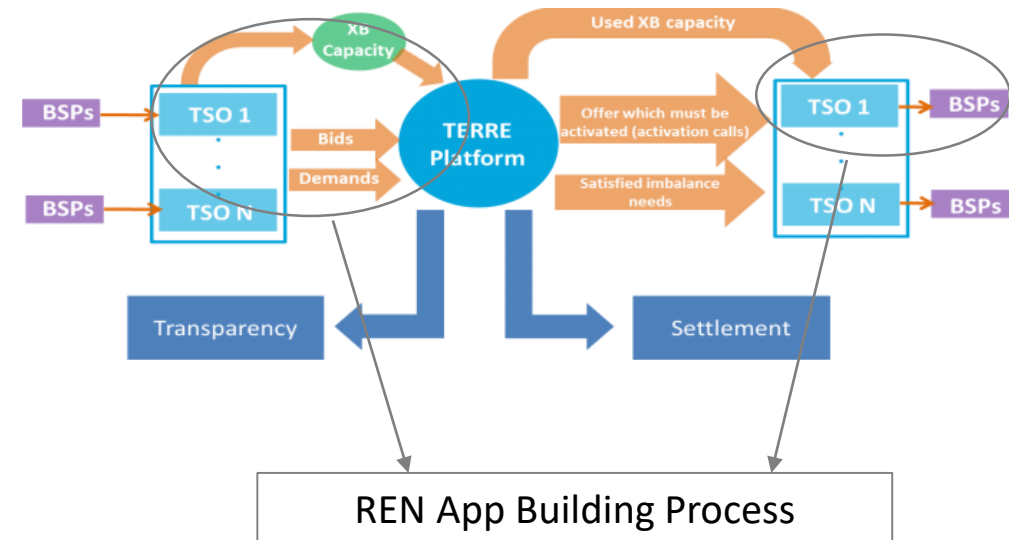
New IT tools for new processes

➤ REN ITWG Participation (Since 2016)

- LIBRA Project Management, Specification and Tests
 - Dashboards; Functional Specification; Architecture solution; Algorithm prototype (optimization algorithm)
 - Global System Test Plan; Factory Acceptance Test Strategy and Plan
 - Integration Guide – LIBRA Connections to: TSOs, JAO, Transparency Platform; Verification Platform;
 - Implementation Guide (review and adaptation of data models to be used)
- Host platform Requirements Specification (EPEX)
- IT Monitoring
 - Incident management process description for software maintenance

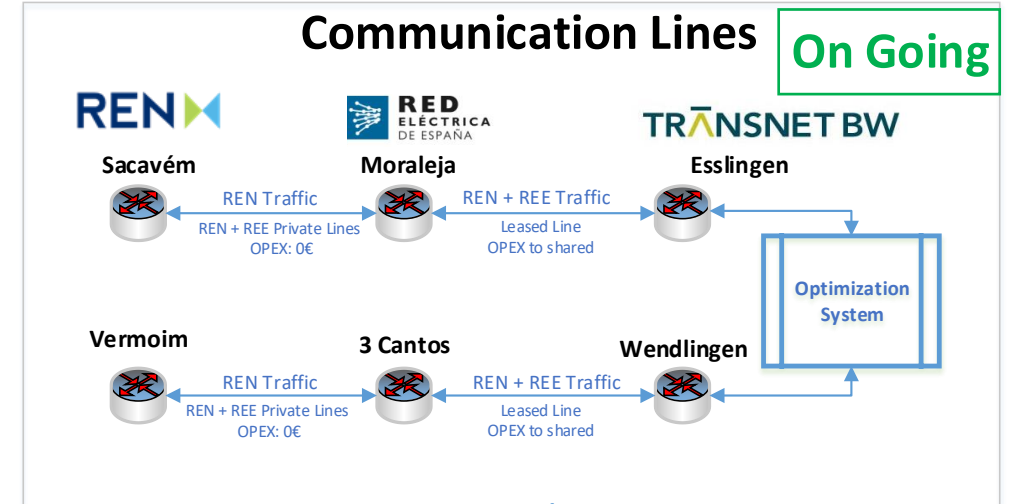
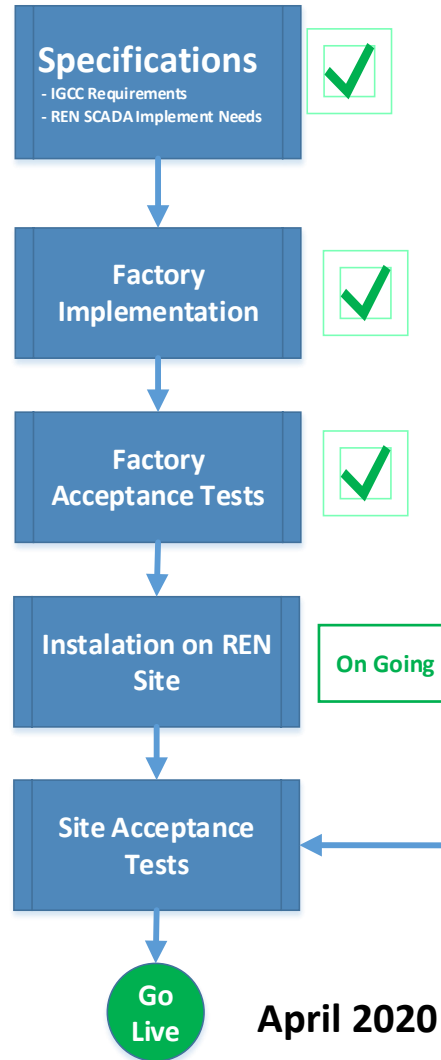
➤ REN Application Module dedicated to TERRE

- Business Process based on **TERRE Specifications and System Operator Procedure Manual**
- Big effort on Application Specification and Tests



➤ Project Key Elements

- SCADA EMS (AGC module) adaptation:
 - Setpoint correction must be received from Transnet BW
 - Virtual tie line shall be considered to accommodate Power System Inbalances imposed by Optimization System
 - Virtual line metering for settlement purposes
- Real Time Communication Lines between REN and Transnet BW needed
- New inter TSO Settlement process must be created



April 2020 is the Goal

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Topic 4

Future Challenges

Future Challenges related with EBGL implementation

- 1. Implementation of 15 minutes ISP**
- 2. Imbalance Price Settlement Harmonization**
- 3. Quantification of Secondary Energy Regulation**
- 4. Segregation of BSP and BRP**
- 5. Flexibility Aggregators and Settlement Agents**
- 6. Implementation of Fskar (settlement of unintended deviations between TSOs)**

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Thank you for your attention