Trans European Replacement Reserve Exchange

Stakeholders meeting
17th December 2014
Please note that these slides are a snapshot of the current status of the TERRE work streams.

The information provided is still under discussion and does not reflect the final status of the project.
Agenda

Context

Project description

Focus: TERRE Product

Focus: TERRE CMO

Focus: TERRE Settlement

Focus: TERRE CBA

Plan
Context
TERRE = Pilot Project validated by ENTSO-E for RR exchanges

The Design of TERRE solution will be compliant with the requirements of:

- The FW guidelines on Electricity Balancing
- The implementation of TSO-TSO balancing model
- The NC on Electricity Balancing (NCEB)
  - Centralised and automatic management of XB capacity
  - Offer based on “cheapest” internal bids
  - Improved matching process…

The TERRE solution will enhance the experience of current Balit bilateral solution used between NG-RTE, REE-RTE and REN-REE

The TERRE project will use as an input the previous work of REN, REE and RTE on enduring regional solution for the exchange of balancing energy between TSOs
TSOs involved = more than 80% of TSOs using RR

- REN
- NGET
- TERNA
- REE
- RTE
- ADMIE
- Swissgrid
TERRE in the NCEB context

Proposal for the implementation framework to implement the European integration model for the Replacement Reserves

Definition of Standard products

Multilateral CMO - RR

Harmonization of settlement principals

Go live TERRE

t0 ≈ January 2016

t0

1 Y

1,5 Y

2,5 Y

3 Y

5 Y

1 Y
Local implementation of TERRE project will be carried by the national market frameworks.
Project description
Working axes

1. Definition of the standard TERRE products
   - RR offer by BSP
   - RR requests by TSO

2. Balancing CMO
   «FCFS» will be improved by «Algorithmic optimization» including automatic ATC management

3. Settlement procedure
   - Marginal price as preferred solution for XB exchange
   - Definition of Financial settlement between the TSOs

4. Cost-Benefit analysis
   Study of the potential financial benefit (social welfare)
Working axes

5. Timing and scheduling

6. ATC management
   - Centralized ATC management module
   - Interaction between the Intra-day market and the TERRE process

7. Governance issues
   - Preparation of the NRAs approval process
   - Preparation of the Implementation Phase
Communication and consultation process

Discussions will be launched between TSOs and NRAs in order to set up the best discussion, exchange and consultation framework for TERRE project.

The TSOs will organize within 2015 an ad-hoc TERRE stakeholders meeting.

In parallel, each TSO involved in TERRE will communicate (at periodic meetings and/or specific local workshop) with local market participants for discussing TERRE development.
Focus: TERRE Product
TERRE product

TERRE product should:

- be compliant with TSOs requirements
- be as close as possible with the RR standard product definition
- be scheduled and manually activated

(a) Preparation Period  
(b) Ramping Period  
(c) Full Activation Time;  
(d) minimum and maximum quantity;  
(e) Deactivation Period;  
(f) Price of the Bid;  
(g) Divisibility;  
(h) minimum and maximum duration of Delivery Period;  
(i) The Bidding Zone where the bid is located;  
(j) Validity Period;  
(k) Mode of Activation.  
(l) minimal duration between end of Deactivation Period and the beginning of following Ramping Period
The BSP could apply toward its connecting TSO an offer which represents several products.

The TERRE CMO, based on TSOs needs, will select the offer required.
## TERRE product: Linked blocks / firmness of offers

- Minimum duration of TERRE product is 15 min (e.g. product cannot last 5 or 10 min)
- TERRE products can last 15, 30, 45 or 60 minutes (nX15min)
- BSPs can offer longer products (e.g. duration > 15 min) by linking several consecutive blocks (through time divisibility condition)
  - E.g. if a BSP links 2 blocks, the BSP shall be activated during (at least) 30 minutes
- The BSPs will include this information in the RR offer by putting different parameters in the product (e.g. duration, validity period, divisibility, etc)
- A BSP will be invited to send all parameters which represent the offer in order to have all information for the CMO processing

Once the offer is selected by the matching process and asked for activation, the connecting TSO is responsible for the energy delivery on its border.
Energy volume used for the centralized matching

The financial flows between BSP and connecting TSO should be defined (under national framework)

Financial exchanges between TSOs will be based on this energy volume
Focus: TERRE CMO
TERRE process

TSO A

Products

Needs

TSO B

Products

Needs

XB Capacity

TERRE

 Offers which must be activated

Needs netted and matched

$\sum XB_{exchanges}$

XB capacity used

TSO A

TSO B

BSP

BSP

XB capacity used

$\sum XB_{exchanges}$

Needs netted and matched

Offers which must be activated
Each TSO must submit to TERRE, after the ID GCT and before the TERRE algorithmic matching process, the need expected for the next hour/delivery period.

Following an initial qualitative study and analysis using a simplistic prototype, it was concluded that the most efficient matching solution is an algorithmic optimization based on implicit auctions model. A second study will now look at defining the “mathematical equations” of the algorithm.

The project focus its studies on algorithmic matching (CMO).

The aim of this centralized optimization will be:
- The netting of needs when it’s economically efficient
- The matching between the needs and the TERRE offers submitted by TSOs

The project will process quantitative simulations in order to demonstrate that this solution could be implemented at an “industrial” level.
TERRE process (current proposal)

- Receiving offers by TSO
- Offers, needs and ATC tendering
- CMO
- Receiving results by TSOs
- Activation demands

- Delivery period
  - Offers activation by BSP
  - 1h
  - 30min

The process is still under discussions
- Warning: ID market GCT not harmonized
- The time allocated to the CMO is not completely defined yet
Focus: Settlement
NC EB:
Article 39 GENERAL PROVISIONS

“1. All TSOs shall harmonise the pricing methods for at least each Standard Product for Balancing Energy (…)
2. No later than one year after the entry into force of this Network Code, all TSOs shall develop a proposal for the pricing methods of each Standard Product for Balancing Energy. The pricing methods shall be based on marginal pricing (pay-as-cleared), unless TSOs complement the proposal with a detailed analysis demonstrating that a different pricing method is more efficient for European-wide implementation pursuing the general objectives defined in Article 10. “

Following the NC EB request, the proposal for settlement in TERRE CMO would be XB settlement based on marginal price
Settlement (II)

- Settlement of TSO-TSO exchanged energy

- Governance of settlement tasks (TSO-TSO):
  - TSO-TSO Settlement Function (NC EB): Assumed by one/more TSOs, delegation to 3rd Party, etc

- TERRE settlement: global financial flows
  - Calculation of XB financial Flows
  - Firmness (TSO, BSP)
  - Penalties (TSO, BSP)
  - Impact on National Balancing Markets (Settlement TSO-BSP, TSO-BRP)
  - How to manage financial neutrality of TSOs

- Fallback procedure for settlement
- Work is ongoing to prove the methodology which will focus on demonstrating social welfare
- ENTSO-E is also defining a standard approach to CBAs
- Once methodology and simulation tool have been proven (tool developed / under improvement), work will progress to do a full simulation to understand the benefits of the TERRE solution
## Overview

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Annex
Matching example

Structure of TSO need (example)

Matched by XB (Swiss and French, and could be extended to other borders (s.t. XB ID market and involved TSO’s agreement) or local products

Matched by XB or local products

If XB ID time market period = 1 hour, The TSO (Control Block) net position \( \sum_{XB\text{ exchanges}} \) updated by TERRE results must be the same for the whole delivery hour, unless TSO’s involved would agree a shorter timeframe for LFC Control Block process
Thank you...