

Implementation Strategic Reserves

Task Force “Implementation Strategic Reserves”
19 March 2014



Agenda TF ISR – 19/3/2014 (9h30-13h00)



Location:

Elia, Keizerslaan 20, 1000 Brussels

Topic	Presenter	Time
Introduction: <ul style="list-style-type: none">• Approval of draft minutes 2nd TF ISR 28/2/2014• Update on calendar for 2014/2015• Update on consultation planning	Elia	10 minutes
Stakeholder views	Stakeholders	30 minutes
Product design <i>Parameter calibration, penalty design</i>	Elia	1 hour 30 minutes
BREAK		10 minutes
Tender design <i>Selection formula, certification</i>	Elia	40 minutes
Market design <i>Structural shortage, imbalance pricing</i>	Elia	30 minutes

Agenda

START: 9h30

- Approval of draft minutes TF ISR 28/2/'14

9h40

- Stakeholder views

10h10

- Product design (→ Functioning rules / Procedure^(*))

BREAK: 11h40

Coffee Break

11h50

- Tender design (→ Functioning rules / Procedure^(*))

12h30

- Market design (→ functioning rules)

END: 13h00

(*) Procedure to constitute the reserve

Introduction

➤ Approval of minutes 2nd TF ISR 28/2/2014



Minutes of Meeting TF “Implementation Strategic Reserves” 28/Feb/2014

Meeting location: VBO-FEB, Rue Ravenstein 4, 1000 Brussels

Meeting date: 28 February 2014, 13h30-17h30

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Meeting location: VBO-FEB, Rue Ravenstein 4, 1000 Brussels

The draft minutes were distributed by e-mail prior to this meeting:

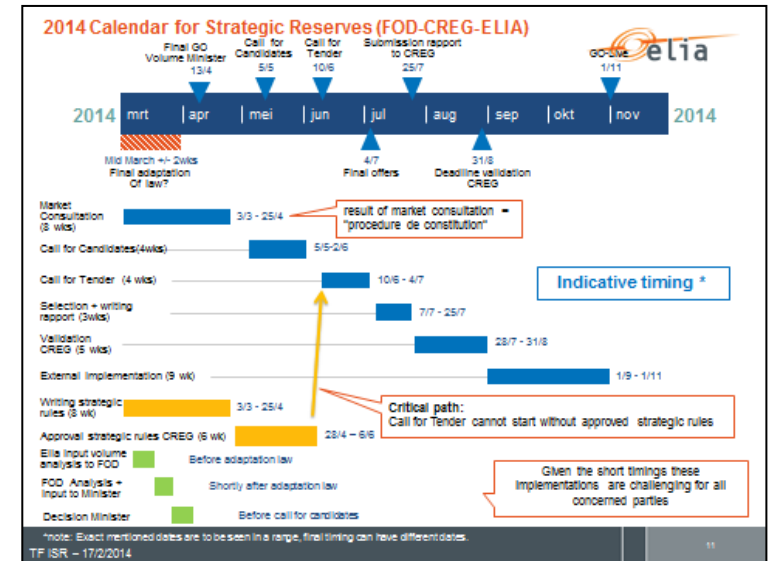
- No written comments were received.
- After approval by the Task Force (now) these will be considered as final.
- Approved minutes will be distributed and published in due time.

Introduction

Update planning 2014/2015

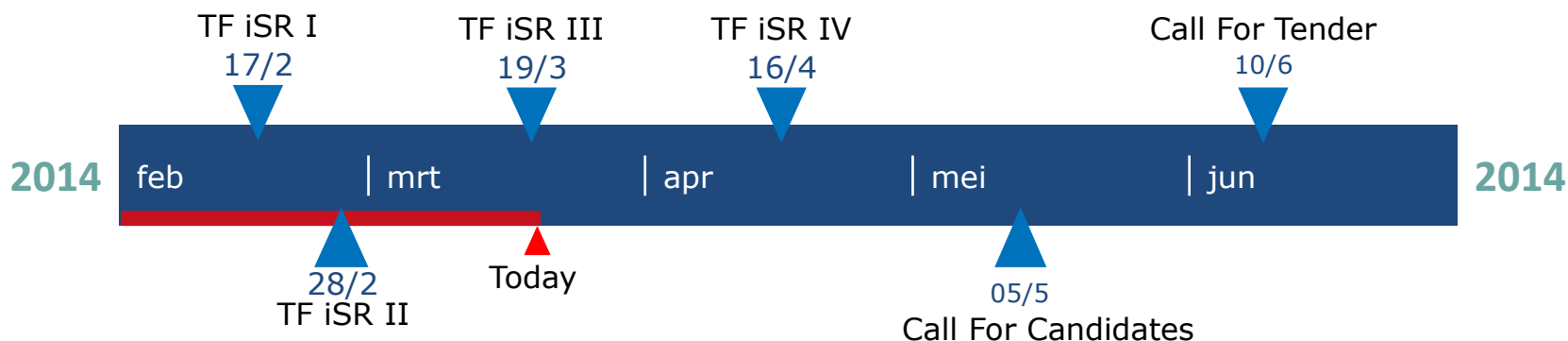


- The plenary session of the Parliament voted on March 13 the draft law amending the Law of 29 April 1999 on the organization of the electricity market, which provides for the establishment of a mechanism of strategic reserves (all texts available on the Parliament's website).
- Law foresees transitory calendar for first year to be agreed between FOD – CREG – Elia. This calendar has been presented in earlier TF and will be uploaded on the websites of Elia and CREG in the following days.
- As next step, Elia will transmit its analysis still this week to FOD, which in turn will formulate an advice to the Minister.
- The decision of the Minister on the need and the exact volumes of Strategic reserves is expected at the latest on april 13th.



Reminder: 1 of the goals of this taskforce:

- **Consult** market parties and stakeholders, in particular on the **tendering procedure** (incl. all relevant items concerning this procedure such as selection criteria, product requirements, tender rules,...) and the **functioning rules** (incl. detection, activation) for strategic reserves to be written by Elia and approved by CREG.



Procedure for constitution of Strategic reserves:

- Elia will take all feedbacks and comments received (during, or in between these taskforces) into account to finalize in week 14 (**31/03 – 04/04**) this procedure and submit it to all TF SR members for final consultation;
- Until taskforce IV (**16/04**) all stakeholders can submit their comments;
- In case needed these comments will be discussed during TF IV (**16/04**);
- Prior to the call for candidates (**05/05**) Elia will publish the final procedure.

Questions



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SGR Design

1. Availability

- 100% availability of Reserved Capacity is requested with tolerance for Forced Outages
- SGR providers must declare and justify any unavailability as soon as possible
- Remuneration on Monthly basis: **1/5** of contractually fixed reservation price
- Penalties per missing MW per quarter hour
 - ⇒ *High incentive to reduce unavailability periods, while efforts to maintain a high availability are not discouraged*
 - ⇒ *example:*
 - **3* remuneration with weekly cap** *whole week lost after a little bit more than 2 days unavailability*

Stakeholders' feedback after TF iSR of 28/2:

- Penalty too high for units that are already out of market
 - incentive to hide technical FO
- When weekly cap reached incentive to become available asap within the week is lost
 - Reduction of remuneration with an incentive given to avoid/reduce any unavailability
 - Lighter penalty in case of coordinated reparations/preventive interventions

Penalty design for SGR Availability

↳ Improved proposal



1. Unforeseen unavailabilities

- Reduction of remuneration per missing MW per quarter hour
 - 1,3 * Remuneration
 - No dissuasion of coming back asap
 - Factor 1,3 in order to give an incentive to accelerate reparations
 - Yearly cap = contractual value
(Cap reached after 3 months and 3 weeks of unavailability! → real extreme situations)

2. Coordinated unavailabilities

A reasonable period of unavailability without penalty will be consented to SGR providers in order to cover reparations due to technical incidents and which can be scheduled in the near future

Conditions:

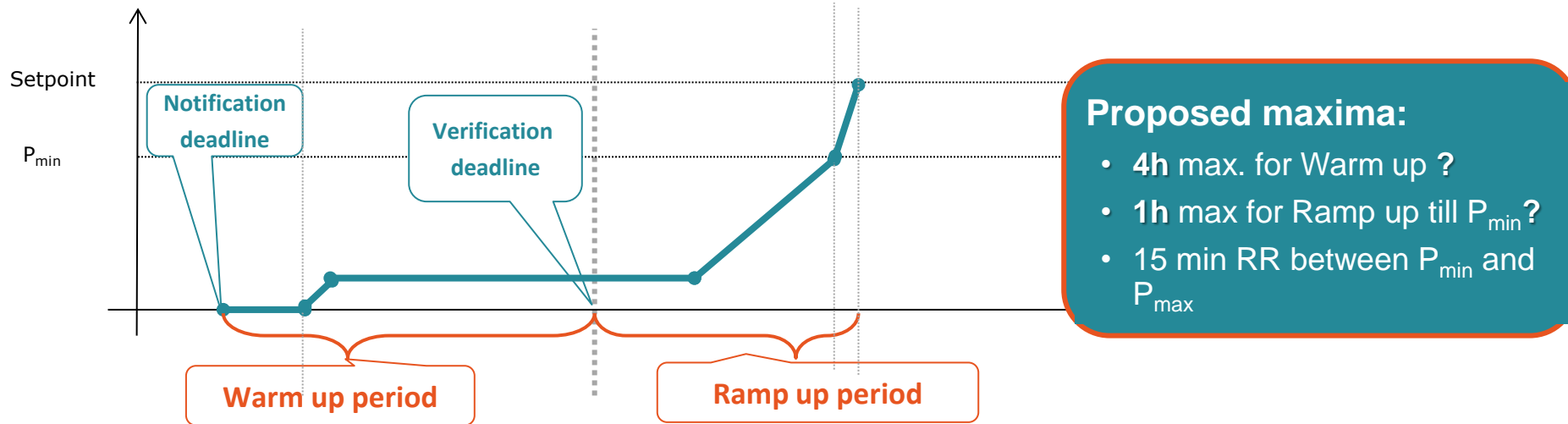
- Maximum duration in total over the contractual period: **1 week**
- No remuneration during that period
- Asked at least one week in advance (during “ready to run”) **or** for the next weekend (ex: Wednesday for WE)
- Reasons of such a request have to be justified:
what kind of incident/problem ? When should the reparation be done? Why cannot it wait till the end of the winter? What consequences if maintenance/reparation is not made within the indicated timeframe?
- Elia can accept or propose another period less critical for the system
 - Parties will make the best efforts in order to minimize the system security risks while preserving the efficiency of the PU
 - If the new date proposed by Elia is not accepted, the normal regime of *unforeseen unavailabilities* will be applied

Design for SGR Activation (Profile)

↳ New proposal based on feedbacks



- Elia will define maximum values for the different periods that characterize an activation
- Purpose:
 - Calibrate different steps and deadlines in the process between the detection and the injection (deadline for selection, notification, verification taking into account available units)
 - Set a level playing field between SGR candidates during tendering: technical performances are not selection criteria



- 1. Warm up period :** preparation period needed in order to start up and ramp up
a **cancellation is still possible**
a small injection ($\leq 10\% P_{nom}$?) necessary for example for the heating of steam turbines is possible
Subdivided into warm up with and without injection
- 2. Ramp up period:** period during which the ramp up starts and during which **a cancellation is not anymore possible.**
Subdivided into *Ramp Up period till P_{min}^** (= moment from which unit ready to increase till Pmax) *and*
Ramp Up from P_{min} to Setpoint

Design for SGR Activation (& Penalty)

⇒ Improved proposal based on feedbacks



□ Cost reflective remuneration that takes into account the price variations of fuel/CO₂

1. Start up costs ([€]) = $FC + S_{start} * SF_{price}$

- FC = fixed cost [€]
- S_{start} = fuel-cost related start up cost [GJ]
- SF_{price} = price of the fuel used for start (before any synchronization) [€/GJ]

2. Ibid costs (from injection till Set Point) = $\{1,1*(FC(I)+BHK(I)) + External(I) + ExtraROM\}$ [€/MWh]

- FC = Fuel cost
- BHK = management costs directly linked to fuel (5%*FC)
- External = external reasonable and demonstrable costs . Ex. CO₂
- ExtraROM = Operation and Maintenance costs = 2€

3. Warm up prolongation costs ([€/hour]) :

- Prolongation of formula 2 for the injected energy or prolongation of formula 1 for the additional S_{start} ?

□ Penalty for non delivered energy **and/or** for excess of delivered energy

- 2* activation price/ missing MWh
- 1* activation price / surplus MWh

⇒ *No incentive to influence the zone and avoid reaching high prices*

Note that: Any injection provided by those units will be neutralized in BRP's perimeter

⇒ *No incentive to overreact*

⇒ *Use for portfolio optimization not possible*

SDR Design

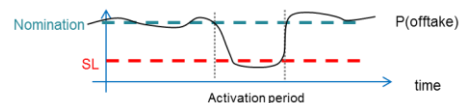
SDR Principles

Feedback from stakeholders and final proposal



□ Main characteristics of this 1st version of SDR:

- TSO grid only (individual or aggregated)
- Slow ICH-like principle :
 - fixed **Shedding Limit (SL)**
 - The **baseline** is the DA nomination
 - BRP's perimeter neutralized by replacing metering by nomination during activation



□ Calibration of activation characteristics (duration, #activations, delay between 2 activations):

- SDR will be designed as for “*peak shaving*”, however SDR can be activated at any moment
- Based on MonteCarlo simulations and historical data Elia proposed 2 options
- As there is no “preferred” option by all concerned candidates Elia will allow both options and clarify the # of activations for each of them:
 - a. **SDR_4:**
 - Duration of an activation: **up to 4 hours**
 - Delay between 2 consecutive activations (end-start) : **4 hours**
 - # activations/contract: **40**
 - a. **SDR_12:**
 - Duration of an activation : up to 12 hours
 - Delay between 2 consecutive activations (end-start) : **12 hours**
 - # activations/contract: **20**

□ Activation lead time calibrated on same scheme than for SGR

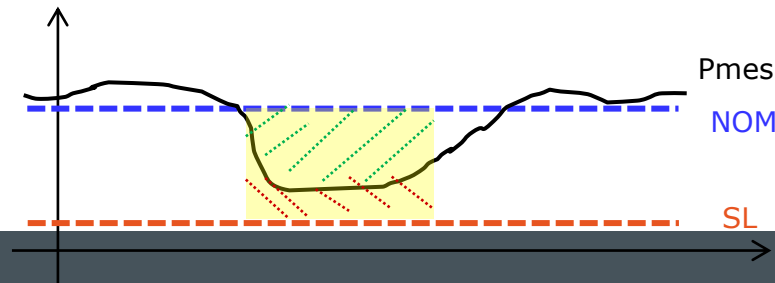
- Warm up period of 4 hours max : preparation period needed in order to be able to lower the offtake and where a cancellation is still possible
- Ramp up period of 1 hours max : period during which the consumers starts the offtake reduction and where a cancellation is not anymore possible

⇒ As the request for activation is sent 5 hours in advance the estimation of the available volume will be based on the DA nomination. **A monitoring will be set up in order** to verify the coherence between the nominations and real metered offtakes. This reinforces implicit exclusivity (towards CIM market) of that reserve.

□ Remuneration and penalties similar to ICH

- Remuneration based on activated energy at contractually fixed activation price
 Ex: $\max(\text{Nom} - (\max(P_{\text{mes}}; \text{SL})); 0) * \text{activation duration}$
 activation = period from beginning of “ramp up”(4 hours after notification)
- Penalty based on ratio (non activated/requested energy)
 Ex: Penalty = $2 * \text{activation price} * \min\left(1; \frac{\max(P_{\text{mes}} - \text{SL}; 0)}{\max(\text{Nom} - \text{SL}; 0)}\right)$
 + Penalty if SL* not reached within ramp up period

Feedback stakeholders:
 Should be equivalent to penalty for SGR, especially if SDR provider doesn't react at all to Elia's request



Product Design

Stakeholders remaining questions

1. Comparison SGR – SDR :

SDR should be ‘out of market’ ...by imposing a fixed capacity obligation (Delta-P product)

- SDR volumes sold on BPX in DA won't be considered in the capacity remuneration for SDR hence 1) they don't appear in nominations and 2) the remuneration is based on the $\min(\text{Nom}; \text{Pmes})$ → same MW is not remunerated twice
- After DA nominations, the volume between Nom and SL is “firm” (out of market) as:
 1. There is a monitoring ensuring the consistency between Nom and real measurements
 2. In case of activation, the measurement are replaced by the nominations: SDR provider will then pay the nominated volume and not the really consumed one to his supplier
- Imposing a fixed capacity obligation would only give the incentive to consume “more than usual” in order to cover the minimum capacity. This would 1) increase the risk of Structural Shortage and 2) increase the reservation costs in order to cover the cost of all times where SDR provider will nominate while BPX price is high
- SDR providers are not allowed to refuse any activation request: they must be able to reduce their consumption at any moment. In that sense there are 100% of the time available

2. Exclusivity SDR versus ICH, R3DP, R1 Load

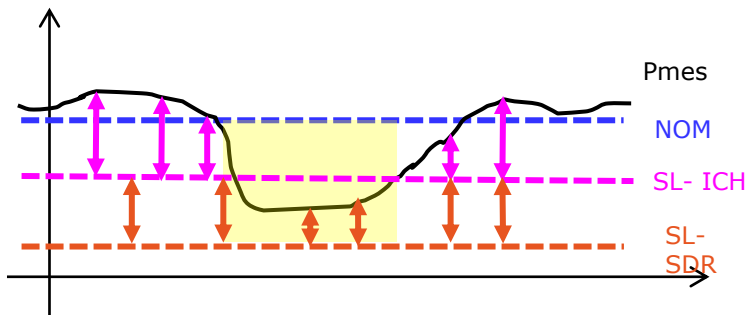
SDR candidates ask to open the possibility to offer different products:

1. On different assets/sub-processes within a same industrial site :

⇒ This implies a sub-metering system coupled to nominations. The analysis and development of such a system is not realistic within the delays of this 1st tendering. Elia foresees to analyze it for the future.

2. For the same process or same EAN

For instance for processes capable of reducing consumption up to a first limit for ICH and up to a second limit for SDR:



- If only ICH activated: there is remaining margin for SDR.
- If only SDR is activated the availability of ICH is reduced → is this acceptable ?

- ⇒ In any case combining R3DP + SDR is excluded as the supplier's back payment scheme is contradictory when both product are activated in //
- ⇒ Elia will examine option of combining ICH and SDR such as in above example with the regulator **and** investigate if such a system would be applicable to a pool of GU.

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(*) Procedure to constitute the reserve

Procedure for constitution of SR

↳ Eligibility criteria for SDR (1/2)



A certification procedure will take place in order to assess whether or not SDR is eligible to offer (and if so: for how many MW). **Key issue** is that SDR should be contracted with Demand Side flexibility not already exploited.

For winter 2014/2015, in order to be eligible for SDR one should:

1. Be a (or an aggregated pool of) grid user(s) connected to the **Elia grid**.
2. Be demand flexibility which is **not yet exploited** by the markets:
 - ✓ Eventual volumes sold on DAM are not taken into account for the capacity remuneration.
→ Exclusivity wrt DAM will however not be an eligibility criteria nor a contractual obligation.
 - ✓ Participation to CIM market is excluded by design as the DA nomination is used as baseline
→ Real metering and nominations have to be coherent (will be monitored)
 - ✓ Access points that are not used for other flexibility products such as ICH, R3_DP, R1 Load
→ Exclusivity per EAN (for next year sub metering to be analyzed), for ICH this is still under discussion.
3. Be a (pool of) Grid user(s) whose **consumption is traditionally high** during the winter peak's
 - ✓ See next slide

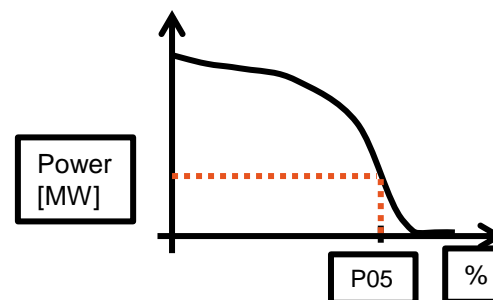
Procedure for constitution of SR

Eligibility criteria for SDR (2/2)



(Pool of) Grid users whose consumption is traditionally high during the winter period:

- **Average P15'** \geq contracted power (Rref + SL)
- **During 95% of peak periods** (9-13h & 17-21h) \geq Rref + SL
- **During 95% outside peak periods** (9-13h & 17-21h) $\geq 0,75 * (Rref+SL)$



Criteria based on historical data for last 3 winters:

- Candidates will be invited to propose (and motivate) their Rref and SL based on those criteria;
- Eventual periods that are not representative (incident, unforeseen maintenance) or evolutions of the profile due to new investments have to be motivated.

Procedure for constitution of SR

↳ Eligibility criteria for SGR



A certification procedure will take place in order to assess whether or not SGR is eligible to offer (and if so: for how many MW). For SGR this will be a translation of the law under adoption (art 7quinquies);

Each generator belonging to one of the three categories identified in the law, has the obligation to submit at least one offer for the total volume of the concerned production unit:

1. Any production for which the programmed closure (cfr development plan) was foreseen after the end of the previous winter period (31/03/2014) and before the start of the winter period on which the procedure is applicable (01/11/2014);
2. Any production that announced a temporarily closure cfr art. 4bis for which the closure is effective;
3. Any production that announced a definitive or temporarily closure cfr art. 4bis before the decision of the Minister to constitute a strategic reserve for which the closure is not yet effective;

=> To avoid doubt, it will be stipulated in the procedure for constitution of SR (or in the functioning rules) that in no case the participation (or selection) in this tendering should accelerate closure of power plants.

It is up to the producers to explicitly motivate the (in)eligibility of the concerned production units at the call for candidates and/or when submitting an offer.

Procedure for constitution of SR

↳ Call for tender

All certified candidates will receive the tendering specifications (contracts) and bidding instructions. (to fill in the bidding sheet)

Offers will be composed of:

- An offer number serving as a reference [Offer n°]
- Product offered [SGR/SDR]
- Reference Volume [MW] (Min bid size = 1MW)
- Reservation price [€/MW/h]
- Fixed activation price [€/Notification] + *Prolongation price [€/hour]*
- Activation price [€/MWh] for SDR (for SGR act. price is based on “CIPU-like” formula)
- Tariff Period [PE/L-OP/BASE]
- May not be combined with [Other Offer n°]
- Divisible [Y/N]

* Candidates may introduce multiple offers (eg for power plants with #configurations) in order to maximize the solution space for a technical-economical selection;

Procedure for constitution of SR

↳ Selection and Award Criteria

In order to compare offers, the total cost will be considered.

Act and Act_duration will be based on probabilistic (Monte Carlo) analysis

$$TC = Res + (\# Act * A1) + (A2 * Act_duration)$$

With:

- TC: Total cost [€] => calculated for each bid
- Res: Reservation cost [€] = Reference Volume [MW] * Reservation Price [€/MW/h] * 3624 [h]
- #Act: Average number of expected SR activations for winter+1 [n° Activations]
- A1: Fixed activation cost [€/Activation]
- A2: Hourly Activation cost [€/h] = Reference Volume [MW] * Variable Activation cost [€/MWh]
- Act_duration: Expected length of activations for winter+1 [h]

The objective will be to find **at least** the volume decided by the Minister, for the **lowest total cost**, taking all additional constraints (eg Min-Max for SDR) into account;

↳ Stakeholders feedbacks / questions

After previous taskforce some questions were asked regarding the tender design:

1. SGR: What is meant with “the obligation to participate is not applicable to production units that (by their nature) are unable to meet the technical requirements”
 - Each generator belonging to one of the three categories identified in the law, has the obligation to submit at least one offer for the total volume of the concerned production unit. It is up to the producers to explicitly motivate the (in)eligibility of the concerned production units at the call for candidates and/or when submitting an offer (risk of fines by CREG in case of non-respect)
2. SGR: Fixed activation price is not possible. OK, taken into account via “CIPU-like” formula’s
3. How will Elia take into account that the Minister fixes volumes for more than 1 year?
 - most likely we will apply the selection and award criteria on a yearly basis, but not excluding multi-year contracts.
4. According to our understanding Elia will look for 400MW of SDR?
 - Not only the political goal of “400MW new” is to be reached gradually, but this is also product independent (thus not necessarily strategic reserves, could also be additional AS, market response, etc...)
5. Formula to determine total cost is to be clarified. OK, done on previous slide
6. Activation fee should be determining whether SGR or SDR is activated.
 - The principles on how an SR profile will be translated into an SGR/SDR activation remain to be clarified, Elia will come back on this next taskforce.
7. SGR product should be open to all users including demand
 - Elia prefers to develop a specific product both for SDR and SGR, however, this doesn’t exclude competition.
8. Transparency: bid curves, template contracts, ex-post analysis are requested.
 - Elia will evaluate these requests.
9. Some comments on tariffs and how to distribute costs were made
 - This is out of scope for this taskforce

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(*) Procedure to constitute the reserve

Two topics in the context of **step 4: 'injection & balancing'**

- **Criterion for structural shortage**
- **Impact imbalance pricing**

Step 4: Injection & Balancing

Basic principles

- ❑ **Economic trigger:** signal coming from BPX in DA, indicating that a volume of SR has to be furnished for a certain period.
 - Such a transaction can be sufficient and solve the (market) problem
- ❑ **Technical trigger:** decision Y hours in advance (“verification”) to inject SR energy to the system in order to avoid a risk of “plan de sauvegarde”
 - Preventive action

- The economic and/or technical trigger alone should not influence the imbalance prices.
 - But a warning must be sent to the market in order to announce a risk of high prices for the coming hours.
- The imbalance prices should be high when one of those triggers is coupled with a Real Time Indicator that confirms the structural shortage.
 - Transparent and clear criterion that can be followed by market.

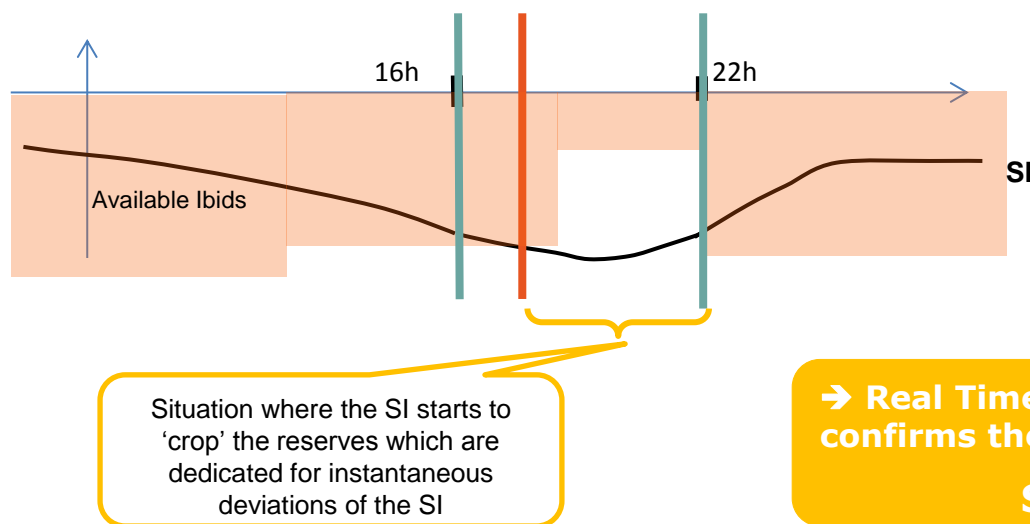
Step 4: Injection & Balancing

↳ “Structural shortage” - Real Time Indicator

□ Typical scenario of an adequacy problem:

Total offtake > total injection ($SI \leq 0$) and all units at their max

- Reserves (R2 + R3 + interTSO) contracted for residual imbalances and FO



□ Market parties will be able to follow the situation on the online Elia dashboard

- The activation of SR will be visible in the NRV
- The SI (situation of the zone in no action by Elia) as well as the remaining margin of the system (Ibids) are clearly indicated in the website

Step 4: Injection & Balancing

Residual energy - impact on balancing (1/2)

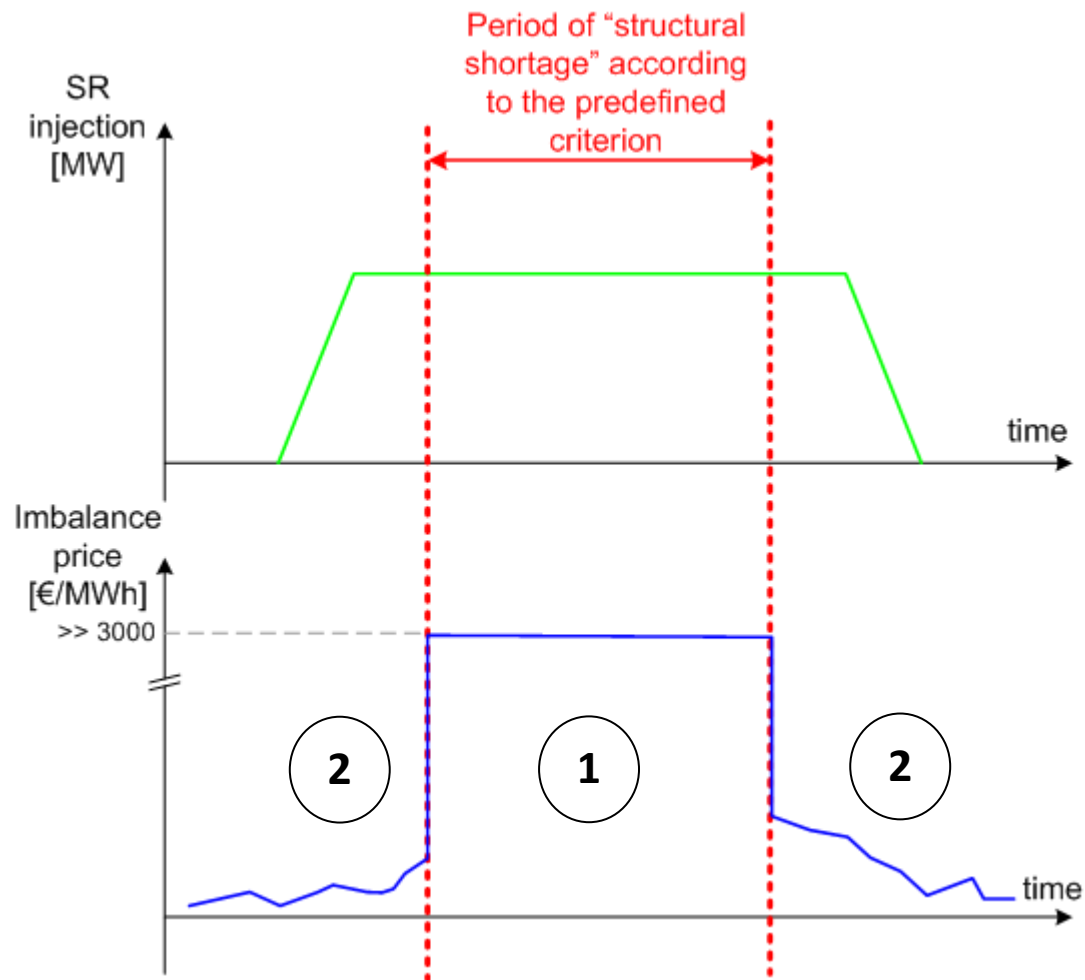


Situation 1:

IF strategic reserves are activated, **AND IF** there is “structural shortage”, **THEN** the imbalance price should be very high ($\gg 3000$ €/MWh)

Situation 2:

IF strategic reserves are activated, **AND** there is **NO** “structural shortage”, **THEN** the imbalance price should be a proxy of what would have been the situation without residual energy.



Step 4: Injection & Balancing

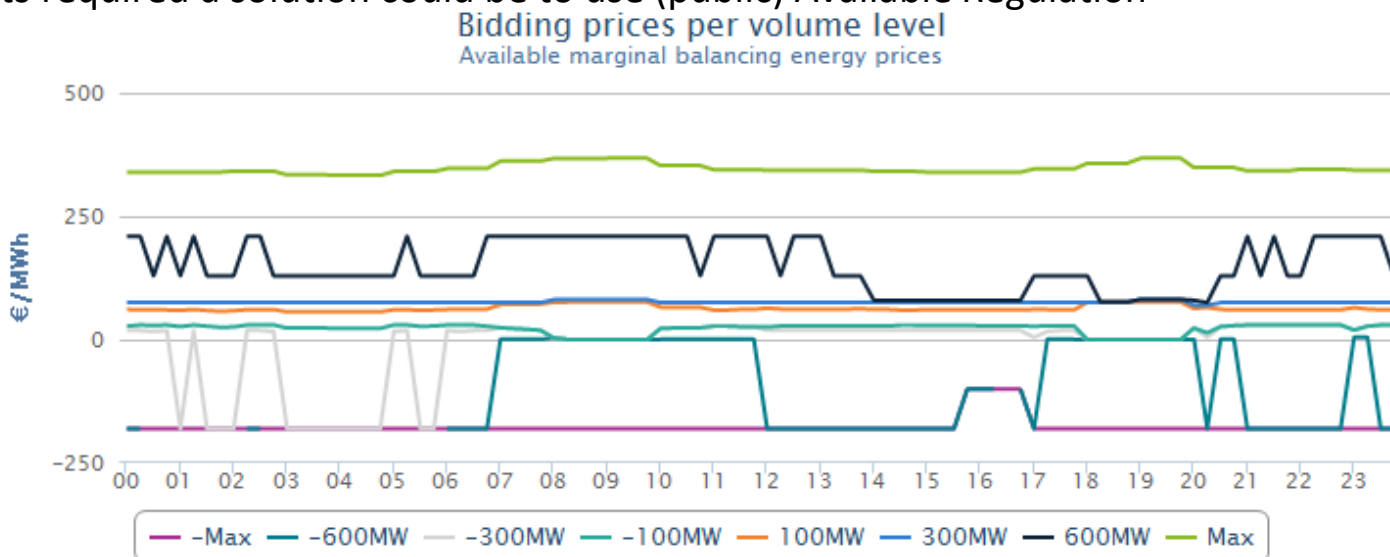


Residual energy - impact on balancing (2/2)

Situation 2: *IF* strategic reserves are activated, **AND** there is **NO** “structural shortage”, **THEN** the imbalance price should be a proxy of what would have been the situation without residual energy.

➔ Considering the importance to have transparent prices and in order to limit (at least for the first year) developments required a solution could be to use (public) Available Regulation

Capacity publications:



		Marginal prices (€/MWh) for activation of							
Quarter		-Max	-600MW	-300MW	-100MW	100MW	300MW	600MW	Max
00:00 >	00:15	-180.00	-180.00	18.86	27.81	62.09	75.40	210.00	340.21
00:15 >	00:30	-180.00	-180.00	18.86	30.30	60.87	75.40	210.00	340.21
00:30 >	00:45	-180.00	-180.00	17.25	20.19	60.69	75.40	120.69	247.31

Step 4: Injection & Balancing

➔ How much is “>> 3000 €/MWh” in case of structural shortage?

- High enough as incentive to keep the balance.
- But not too high resulting in over-rewarding and potential gaming

VOLL Estimates

• Belgian Planbureau (2004)

3 methods/proxies with various results

- 2001 Added-value method: 128 M€ / hour of curtailment → 9.846 €/MWh
- 2003 US management method: 50-88 M€ / hour of curtailment → 3.846 €/MWh – 6.769 €/MWh
- 2004 Dutch WTA-method: 57 M€ / hour of curtailment → 4.385 €/MWh

Remarks:

- Assuming 13 GW load at hours of structural shortage
- Up to 2001 values (above data are not indexed to 2014: CPI about +30% since 2001)

• Belgian Planbureau (2014)

- Austrian Blackout simulator: 120 M€ / hour of curtailment → 9.231 €/MWh
- Bbp-method → 61 M€ / hour of curtailment → 4.962 €/MWh

Remark: Assuming 13 GW load at hours of structural shortage

- 2011 RTE-model: 26.000 €/MWh

• Revue-E paper by Tirez et al. (2013)

- 25.000 €/MWh, based on a study of RTE based on 2011 data

• London Economics for OFGEM & DECC (2013)

- Differentiated view:
average VOLL-SME (33.000-39.000 £/MWh) > average VOLL-Residential (6.500 – 11.800 £/MWh) > average VOLL industrials (1.400 £/MWh)
- Load-share weighted average across domestic and SME users for winter, peak, weekday = 16.940 £/MWh

- ➔ A **gradual introduction** of a high price allowing market participants to learn and prepare themselves.
- ➔ Price signal should not equal VOLL, but should **conceptually be one step below VOLL**

Step 4: Injection & Balancing

↳ Imbalance pricing in a world without SR

Changes in imbalance pricing depend on two conditions:

- Has there been a trigger for strategic reserves?
- Is there (in real-time) structural shortage?

		REAL TIME INDICATOR	
		No structural shortage	Structural shortage $SI \leq -IBIDs$
DETECTION	No SR trigger	Normal imbalance pricing	
	SR trigger (econ. or tech.)	Corrected price, reflecting situation without SR injection → Based on ARC (Available Regulation Capacity)	Strong (single) price signal >> 3.000 €/MWh

Only when two conditions are fulfilled, a very high price will occur

↳ Stakeholders feedbacks / questions

After previous taskforce some questions were asked regarding the Market design:

1. Quid Economic Trigger in case of Belpex Decoupling procedures without real need for SR to be activated?
 - The economic trigger will be activated and provide a counterparty for BE curtailed energy
 - However, it is to be foreseen that in flagrant, obvious cases of no structural shortage threat, SR units will not be activated.
2. Quid intraday activations following technical trigger and notification delays?
 - Contractual delays will always be respected.
3. Quid pre-notification period?
 - The Elia traffic light system already provides a first indication. However, green light does not mean SR cannot be activated.
 - Pre-notification would already influence the market and is therefore not foreseen.
4. Quid transparency technical trigger criteria?
 - As suggested by the stakeholder asking the question, the regulatory approved functioning rules will provide sufficient transparency on this matter.

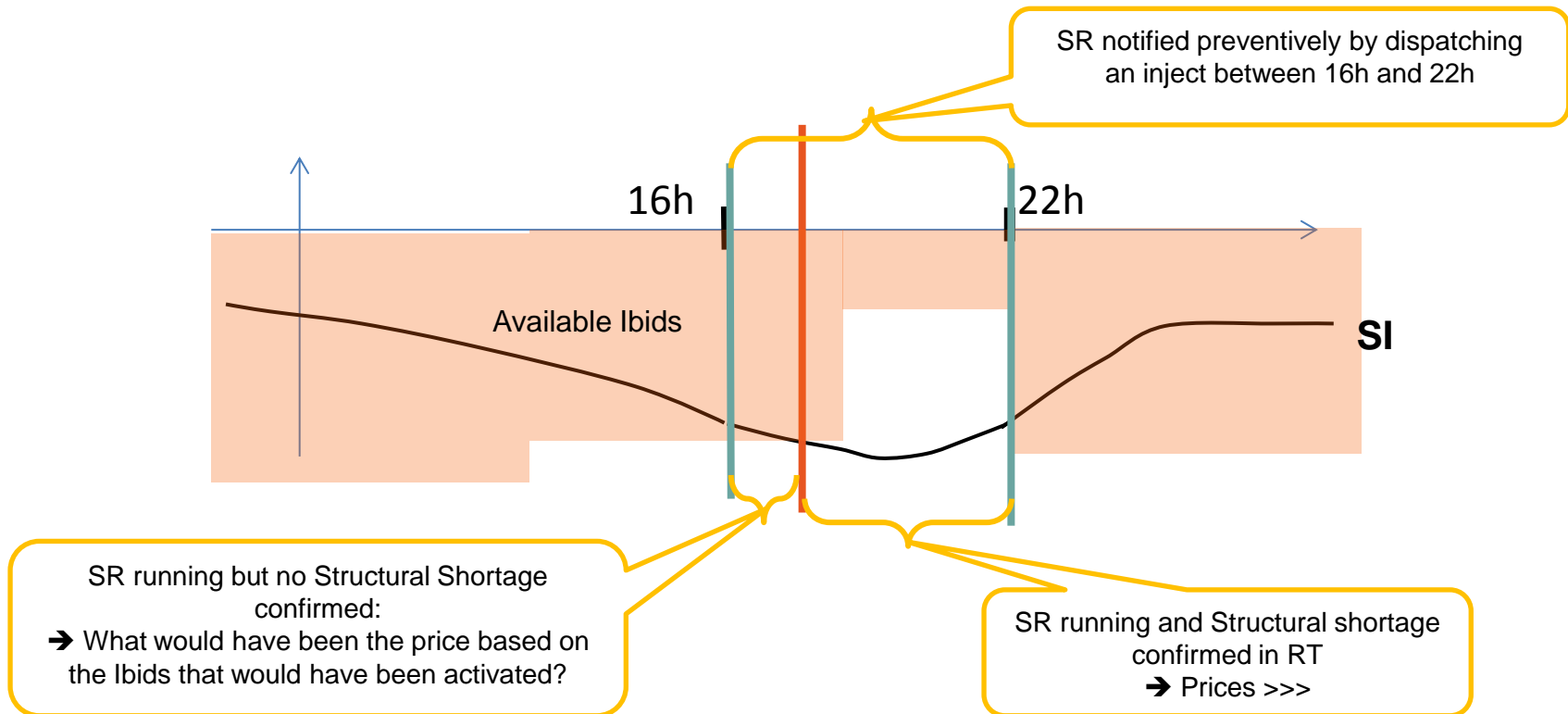
Questions



Back up slide 1

Structural Shortage

- When SR are activated but the Structural Shortage Indicator is not reached, Imbalance **prices** will be reconstituted in order to reflect the situation *as if there was no SR running* so that the surplus of energy gives not a false impression of a better situation.



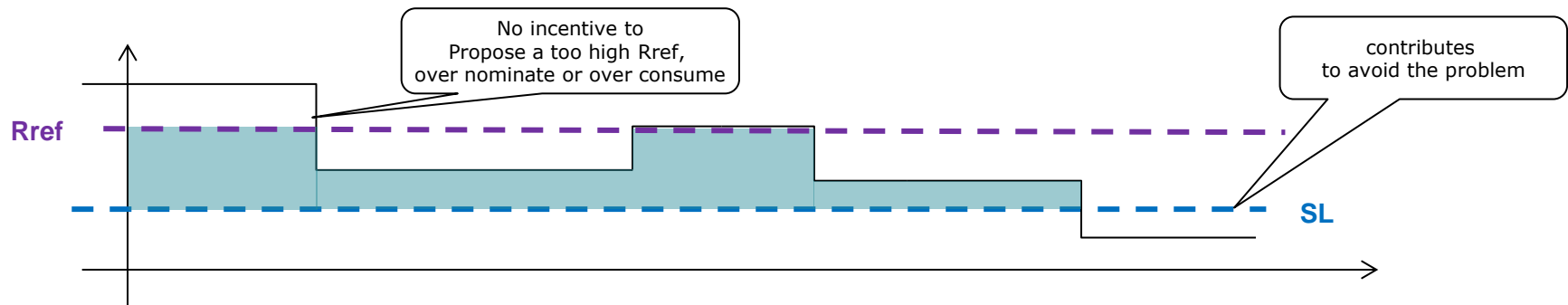
Back up slide 2: SDR Design

Capacity reservation

1. **No fixed capacity obligation** but commitment to lower the consumption **at any moment** under the SL
 - Purpose: avoid incentive to consume in order to reach a fixed capacity obligation
 - Candidates are grid users with a traditionally high consumption during critical periods → a certification based on historical data will allow to confirm the proposed **Rref** (Reference reserve power)
 - When the offtake is low, the GU contributes to avoid the structural shortage

2. Availability:

- Remuneration based on the available volume per quarter hour
 - **available volume = min (Nomination, Rref, Pmeasured)**
 - An ex post comparison of the available volume and the contracted one could lead to a reduction of the last one for next winters.



- Contribution to the economic trigger
 - No “firm” SDR volumes can be determined before the economic trigger process. Therefore, For the first year, SDR volumes are not yet taken into account in the volumes that can be allocated by Belpex in the economic trigger.
 - Nevertheless Elia can decide afterwards to use a SDR volume in order to inject the energy sold;