TF Implementation of Strategic Reserves for Winter 2015-16

3 December 2014

Agenda

9h00

- Approval of draft minutes TF ISR 22/10/2014
- General introduction

9h10

- Overview of evolutions

9h20

- SDR product design:
  - Shedding modalities and availability remuneration
  - SDR DSO: feedback experts WG on prequalidication process
  - Submetering
  - Baseline
  - Model of impact on BRP

10h30

- Break

10h45

- SGR product design

11h00

- Tender design
  - SGR bidding sheets
  - SDR Certification

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Strategic Reserves

Axes for evolutions

SDR

- Different segments: (SDR TSO, SDR DSO SDR behind submetering in TSO grid)
- Baseline (for SDR DSO & TSO submetering)
- Shedding modalities and availability remuneration (DROP BY/DRO TO)
- Activation characteristics (#, duration) + penalty
- Model for impact BRP: what Model for what segment

SGR

⇨ Fine-tuning of Product characteristics in order to reflect reality:
- start-up characteristics
- precise some definitions for bidding instructions
- update of activation characteristics (# activations, cumulated duration)

REM: Product characteristics should not be exclusion criteria

Tender design

- Eligibility Criteria
- bidding instructions
- SDR DSO prequalification process & contractual modalities
- SDR certification criteria
- SDR: criteria to offer @ sub –meter
- combination with other AS
- Tender Calendar
- Scenario of average probability of occurrence for tendering
- Competition factor SDR

Market Design

- Assessment of current process & market functioning based on experience during current winter.
- Lessons learned from winter 2014-15, or product design changes **could** lead to modifications.

Legend:
- = needs decision on volumes to be precised (last TF). Principles will be presented in 19/12. Final
- On track: depends on other evolutions

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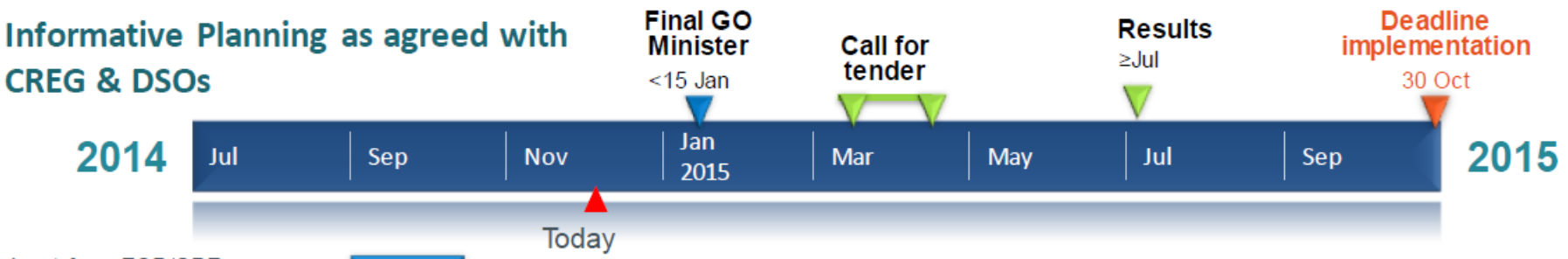
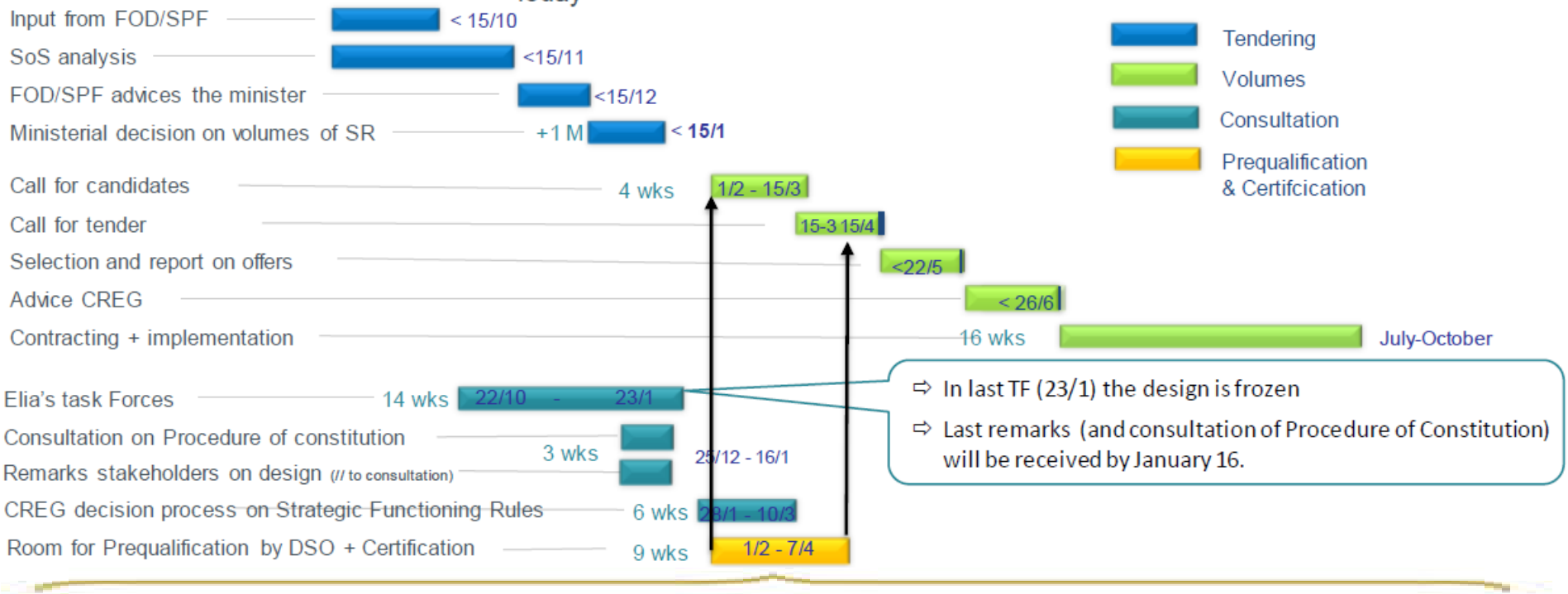
Feedback Expert Working Group Nov 17th

- ELIA understands the clear **preference** from the stakeholders for a **“drop by” product** for SDR from DSO-grid.
- Consensus on introducing a SDR from DSO-grid product applying **no correction** of BRP-perimeter in case of activation.
- According to CREG, **Emergency generators and CHP are not considered as SDR** within the legal context of SR. Aggregators have a different view regarding this issue.
- **Submetering@ ELIA-grid**. ELIA investigates 3 options, incl. use of private submeters subject to specific conditions and criteria.
- Aggregators have made a **proposal for a unique baseline** using X-Y methodology

Informative Planning as agreed with CREG & DSOs





compliancy check request to DSO → result **compliancy check** by DSO → **deadline NFS-request** to DSO → outcome **NFS-request** by DSOs → **deadline certification request** → outcome **certification** by ELIA

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SDR 2015-16

New segments

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO		
BRP's perimeter in case of activation	neutralisation		
# activations	• 4/12 [illegible]vation • 4[illegible]etween activations • [illegible]0 activations [illegible]0hours max		

New segments in winter 2015-16

- **What Model for what segment?**
- **What Characteristics ?**

Purpose:

Keep differences to a minimum and avoid complexity

SDR 2015-16

New segments

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO		
BRP's perimeter in case of activation	neutralisation		
# activations	• 4/12 h/activation • 4/12 h between activations • 40 activations max • 130 hours max } + Monthly/weekly CAP		

New segments in winter 2015-16

- **What Model for what segment?**
- **What Characteristics ?**

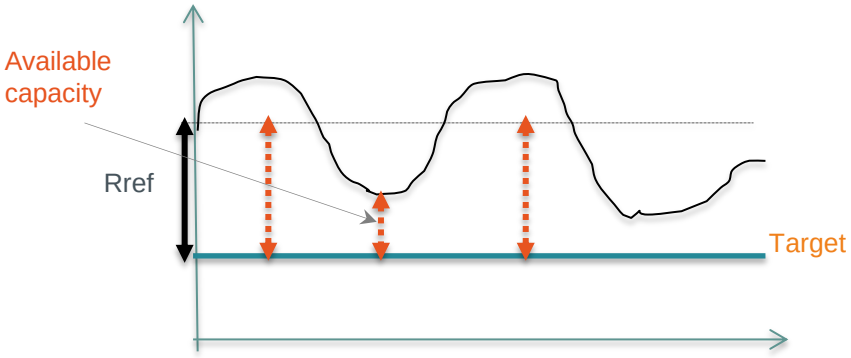
Purpose:

Keep differences to a minimum and avoid complexity

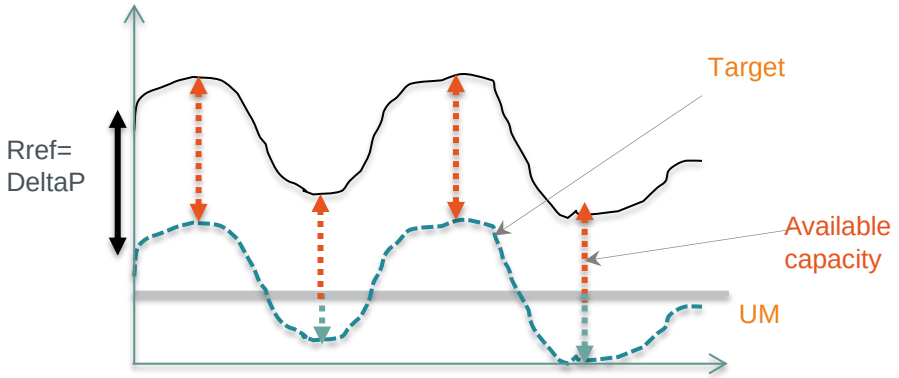
SDR 2014-15:
Shedding modalities:

- Based on experience feedback Elia proposed to extend SDR from “DROP TO” **also** to “DROP BY”.

DROP TO a fixed Shedding Limit



DROP BY a fixed Power (deltaP)



	DROP TO	DROP BY
Parameters	- Rref = contracted capacity - Unsheddable Margin: minimum level of consumption vital for site and that cannot be activated - Target = level to reach in case of activation	
Activation	Target is fixed = fixed SL	Target is variable = baseline - DeltaP
Availability	- Remuneration based on Available Capacity : max(min(Rref;(metering-max(target; UM)));0) - No obligation/incentive to consume : NO penalty when avaiilable capacity is <Rref but providers who offer Rref during 100% of the Time are better remunerated - Certification shows that expected consumption is *usually* > Rref +UM	

SDR 2015-16

What shedding modalities for what segment

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO/DROP BY	?	?
BRP's perimeter in case of activation	neutralisation		
# activations	• 4/12 h/activation • 4/12 h between activations • 40/20 activations • 130hours max		

SDR 2014-15:
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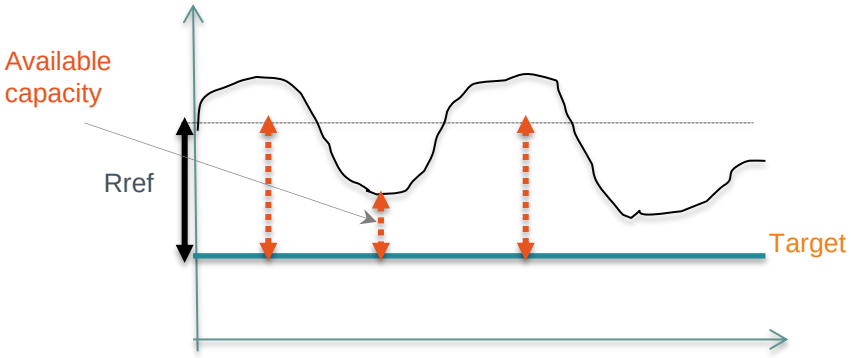

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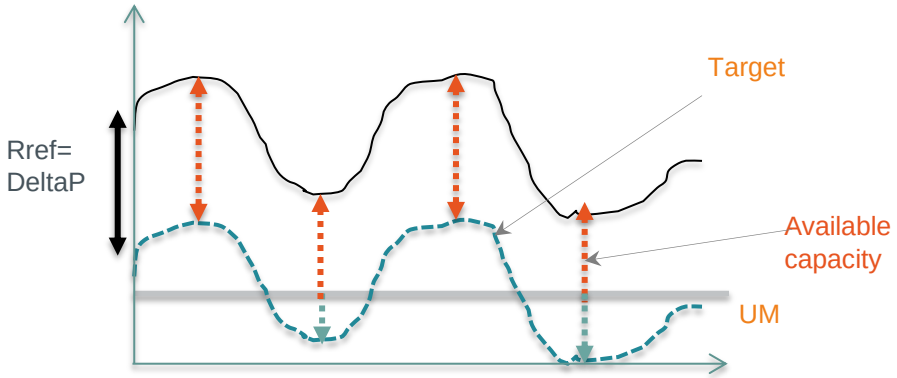

- ⇨ In TSO grid the coexistence of 2 options is requested
- ⇨ In DSO grid, parties showed a preference for DROP by; A DROP to option in DSO grid would mean additional implementation with lightly increased complexity.
- ⇨ Therefore Elia proposes to start in DSO grid only for the DROP By segment, unless there is a need expressed during task forces.

SDR 2015-16

What shedding modalities for what segment

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO/DROP BY		DROP BY
BRP's perimeter in case of activation	neutralisation		
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SDR 2015-16

BRP's perimeter: What model for what segment

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO/DROP BY		DROP BY
BRP's perimeter in case of activation	neutralisation		No correction
# activations	• 4/12 h/activation • 4/12 h between activations • 40/20 activations • 130hours max		

Proposal experts WG of 17/11

"No correction fits well for capacity products such as SDR"

SDR 2015-16

BRP's perimeter: What model for what segment

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO/DROP BY		DROP BY
BRP's perimeter in case of activation	neutralisation ?	?	No correction
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- What for SDR behind submetering ?
- Move towards harmonisation through all segments? (as for example R3DP)
- If not, how to compare neutralisation/no correction in selection?

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  - Baseline
  - Model of impact on BRP for submetering

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Submetering

Content

1. What is submetering and why is it usefull ?
2. For which purpose will it be used for ?
3. What are the technical possibilities ?
4. Conclusion

What is submetering and why is it usefull ?

- Submetering allows to monitor specific energy flows **behind the headmeter**
- Advantages of submetering

→ **Grid User**	Improves the **accuracy of the determination of activated flexibility** service/volumes (in case of activation is not accurately reflected in the global off-take)
	Allows diversification in offered flexibility services at one customer site
→ **Elia**	Provides **extra liquidity** in flexibility service/volumes

- Request for submetering at both TSO & DSO-level as from **Winter 2015-16**

- Investigation of technical solutions currently **limited@Elia grid**

For which purpose will it be used for ?

Fundamentals

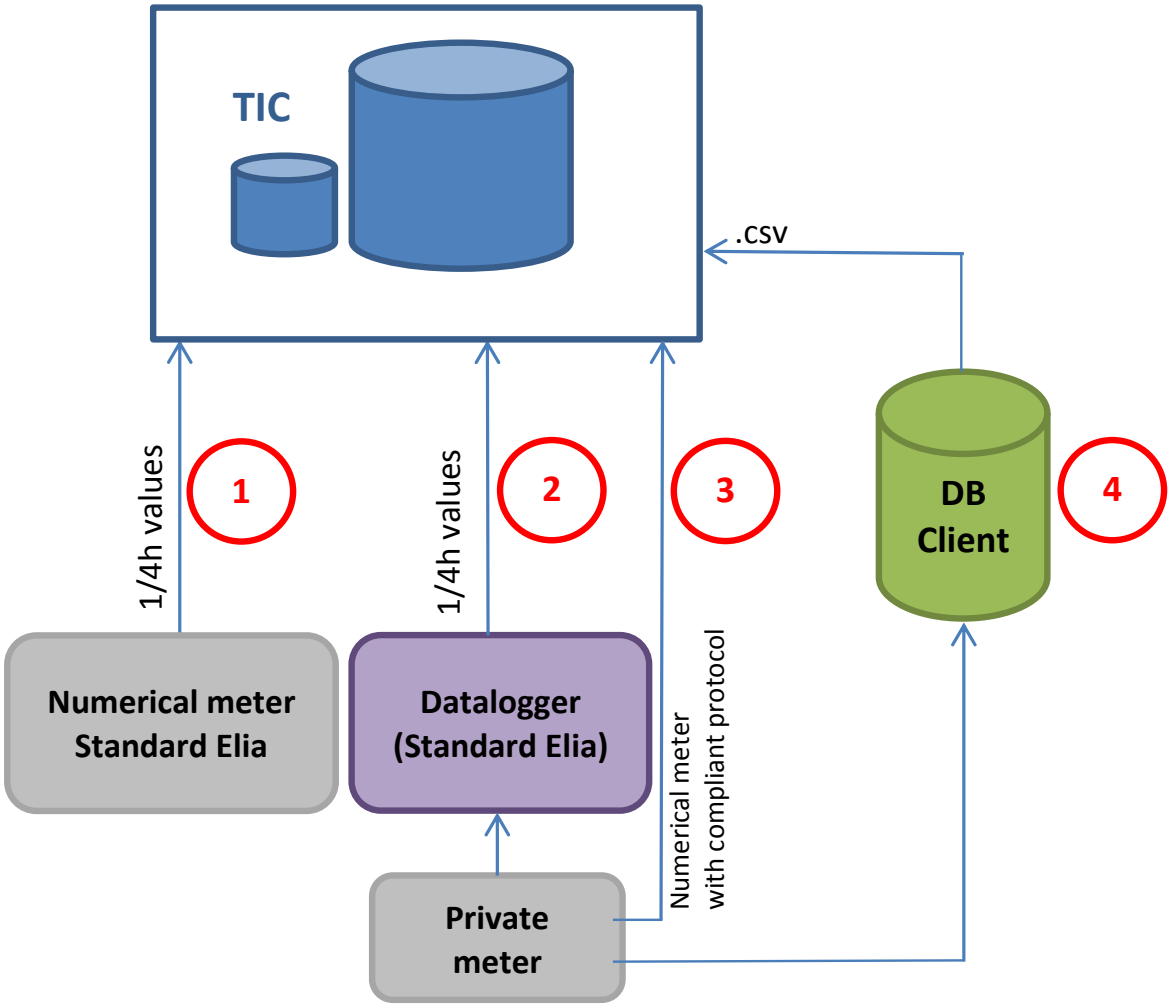
- Subject to product design, the submetering data will be used :
  - only for **activation and availability control**
  - or for **correction of BRP-perimeter** as well

- Regulatory framework :
  - Current regulatory framework does not forbid private submetering nor does prescribe it as a regulated activity
  - If submetering data are used for settlement purposes (correction of BRP-perimeter), submeters have to be compliant with minimum technical requirements of legislation

- In any cases, following **principles** must be observed :
  - **Ownership** of the meter (allow private meter)
  - **Accuracy** of meter data (certification)
  - **Authenticity** of transferred meter data
  - **Liability** in case of missing/erroneous/false data
  - **Hierarchy** : submetering data are not opposable to headmeter data that measure the global off-take on an access point

What are the technical possibilities ?

Overview

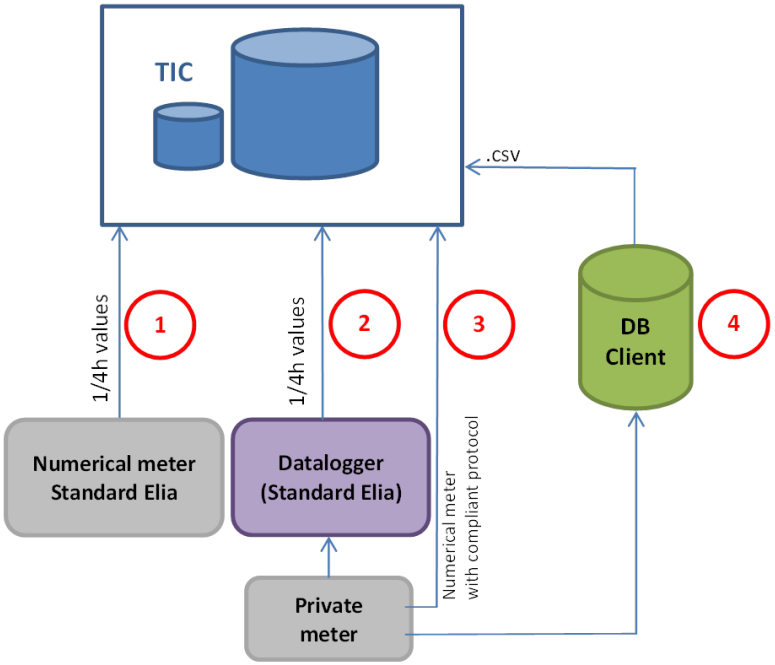


Technical solutions investigated:

1. Elia submeter
2. (Elia) datalogger (with private submeter)
3. Private submeter with compliant protocol
4. Private database (with private submeter)

Conclusion

Possible solutions



Solutions	1	2	3	4
Allow private submeter	NA	OK	OK	OK
Accuracy	OK	Need for certification		
Authenticity	OK	OK	OK	✗
Liability	OK	To be solved		
Protocol compliancy	OK	OK	OK	OK

4- Private database (with private submeter) is **not allowed**

→ Following solutions (@ customer's choice) are possible :

1- Elia submeter
2- (Elia) datalogger (with private submeter)
3- Private submeter only if compliant with protocol used by Elia

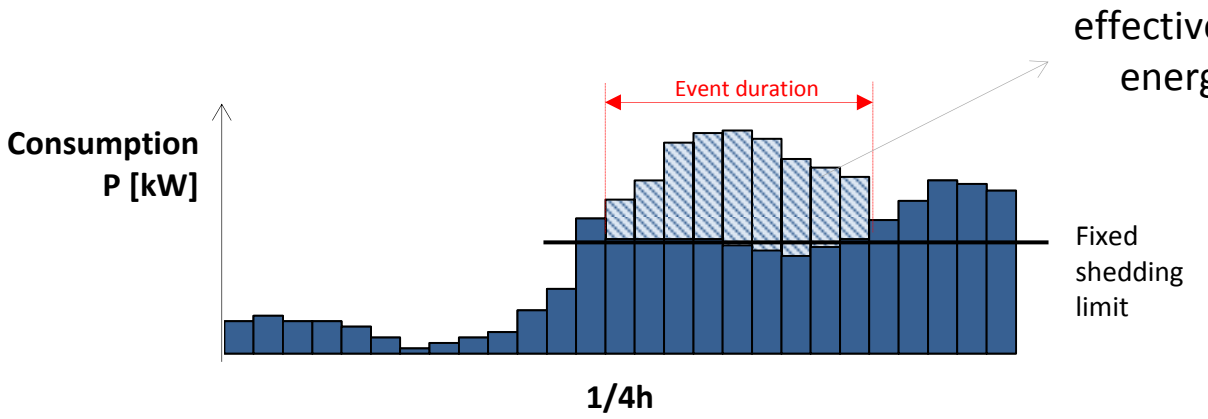
Baselining

Content

1. What is a baseline and for which purpose will it be used for ?
2. What‘s the best baseline ?
3. Baseline process - Roles & Responsibilities

What is a baseline and why is it needed ?

- A **baseline** is an <u>estimate</u> of the electricity that ***would have been consumed/produced*** by a customer in the absence of a demand response event.



- The baseline is required **at least** for the **control of activation** of following demand response products :

Elia grid	**Submeter**	ICH, SDR TSO
DSO grid	**Headmeter**	SDR DSO

- Subject to product design, the baseline will be used for **correction of BRP-perimeter** as well.

NB : for R3DP : use of the measure 1/4h before the event as baseline

What's the best baseline & how to get there?

Fundamentals & planning

- Several baseline methods exist (based on historical measured data)
- In any cases, following **principles** must be observed :

Accuracy **Precision**	• Estimation of the effectively activated energy volume within a (statistical) confidence interval • Financial settlement for effectively curtailed load
Integrity **Transparency** **Reproducibility**	• No gaming possibilities • Common standard framework • Univocal result
Simplicity **Comprehensibility**	• Operational feasability • Simplicity of implementation • Workload and administrative burden

Acceptance

- Getting everyone to agree on one (or several) baseline(s)
- Must be in line with the goals and interests of all stakeholders

- Calculation of the baseline is **based on 1/4h-measured data** coming from individual AMR **of each activated point** (submeter@Elia grid and headmeter@DSO grid)
- Proposal made by Aggregators on previous Expert WG (17/11/2014) : X of Y method

Getting There

- ⇨ **Baseline is part of product design SDR**
- ⇨ Product design is consulted in // to Procedure of Constitution between 25/12-16/1
- ⇨ **Baseline must be aligned prior to launch consultation on Procedure of Constitution (< 25/12)**

- ⇨ **Between 17/11 and 10/12:** remarks on proposed Baseline are collected, stakeholders invited to propose alternatives
- ⇨ **10/12:** discussion and alignment on Baseline in Exp WG
- ⇨ **19/12:** validation of Baseline in TF iSR

AMR = Automatic Meter Reading

Proposal of baseline method

Slide presented at Expert WG 17/11/2014 by Aggregators

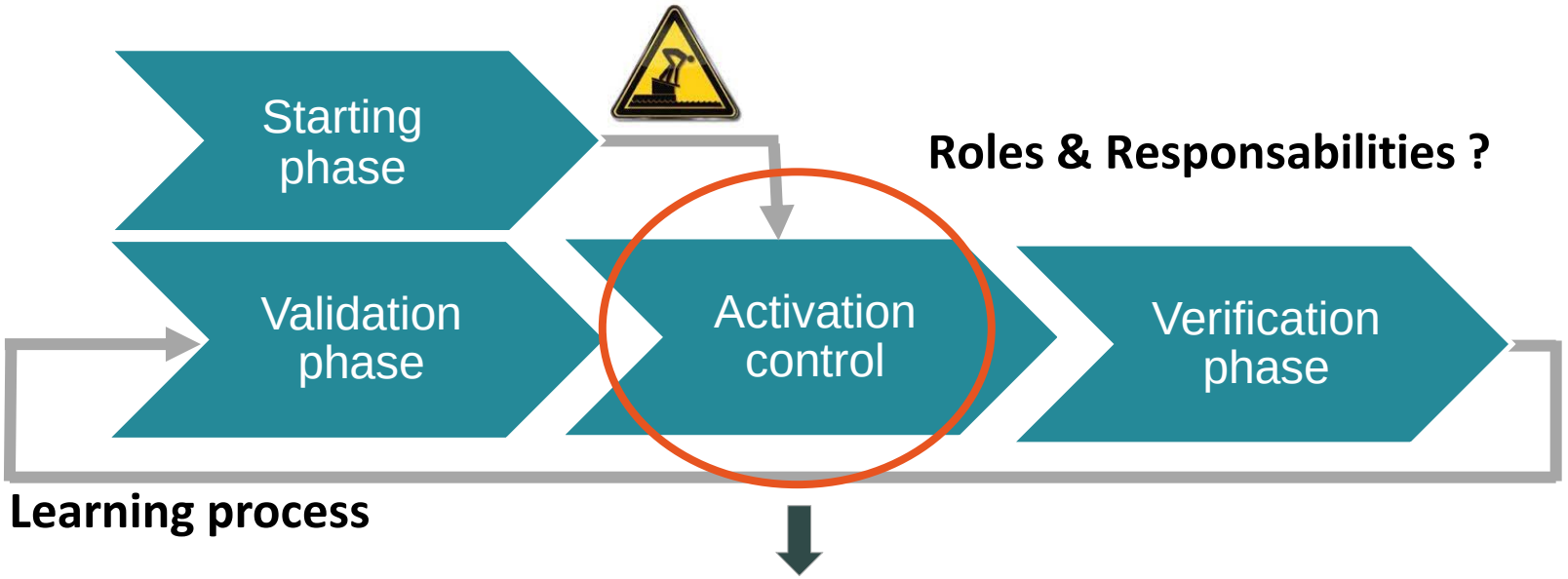
Proposed baseline – based on principles and best practice

- Where it increases accuracy at a reasonable cost, the baseline should be based on the sub metering data
- To strike the best balance between simplicity and accuracy, the baseline should be based on
  - 4 of 5 of the last weekdays if the event is on a weekday
  - 2 out of 3 of the last week-end days if the event is on a week-end;
  - for every settlement period to be baselined the lowest consumption is discarded, i.e. one uses the high 4 of 5 and high 2 of 3, respectively.
- Any days on which an Economic Trigger or Technical Trigger has occurred, should be excluded from the baseline;
- The resulting profile is then adapted based on the consumption in the 3 hours preceding the notification on the event day.
- The activated volume is the difference between the baseline and the actual consumption for the duration of the event (ramps are not included)

AMR = Automatic Meter Reading

Baseline process

General principles (proposal)



- If any, selection of one baseline method /EAN or subaccess point
- Accuracy assessment required

- **Collecting** of data
- **Calculation** of the individual baselines
- **Calculation** of activated energy volume
- **Aggregation** of data : activated energy volume /FSP (and /BRP depending on the product design)
- **Control / Settlement**

Performance assessment

- trigger for baseline review (adjustement for ex.) or a new baseline
- trigger for additional baseline (part of a portfolio)

Activation control

Who does what ?

Collecting of data	@Elia-grid (submeter) @DSO-grid (headmeter)	Elia DSO
Calculation of the individual baselines	@Elia-grid (submeter) @DSO-grid (headmeter)	Elia DSO
Calculation of activated energy volume	@Elia-grid (submeter) @DSO-grid (headmeter)	Elia DSO
Aggregation of data	@Elia-grid (submeter) @DSO-grid (headmeter)	Elia DSO
Control / Settlement		Elia

* based on validated data transfered by Elia and/or DSO

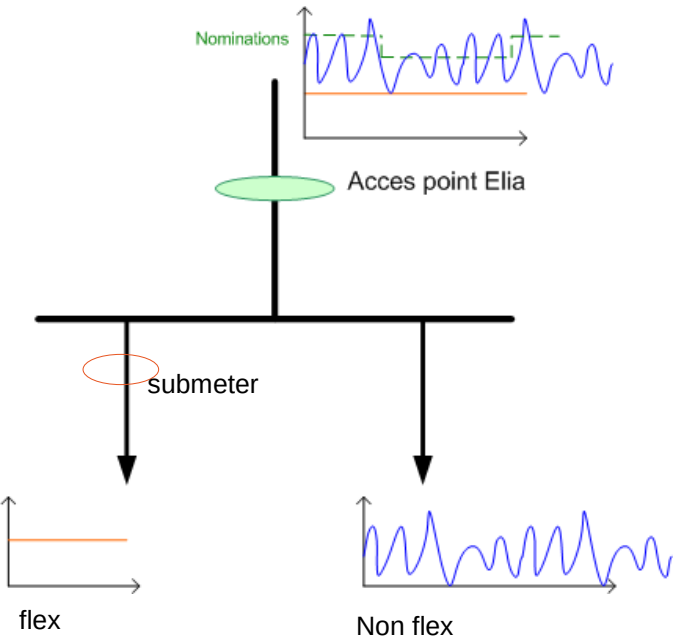
- If measured data are used for correction of BRP-perimeter, a **neutral entity** should handle the data.
- There is no added value if BSP/FSP calculates the baselines and activated energy volumes as Elia has to control anyway the calculations.
- In any cases, Elia will ask detailed data to DSO for ad hoc control purposes (related to the calculation of the individual baselines) (verification phase)

SDR 2015-16

What Model for TSO submetered

SDR	TSO	TSO Submetering	DSO
Shedding modalities	DROP TO/DROP BY		DROP BY
BRP's perimeter in case of activation	neutralisation	?	No correction
# activations	• 4/12 h/activation • 4/12 h between activations • 40/20 activations • 130hours max		

What Model for TSO submetered



Distinction between activation control and impact on BRP's perimeter. In any case, submeter data is used for activation control (with a baseline @ submeter)

Options:

1. No correction
2. Neutralisation:
   a. By replacing metered value @ head meter by Nomination
   b. By calculation: headmeter data is replaced by baseline @ submeter + (headmeter data – submeter data)

Currently no conclusion but:

1. With option 2 the submetered data are used for BRP's imbalance settlement
   - ⇨ le sub-meter has to be compliant with technical specifications of grid code
   - ⇨ The correction modalities (and baseline principles) have to be described in BRP contract
2. Option 2.a is excluded as volatility of non flexible part is attributed to the zone (ACE)

SDR 2015-16

BRP's perimeter: What model for whart segment

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- If not, how to compare neutralisation/no correction in selection?

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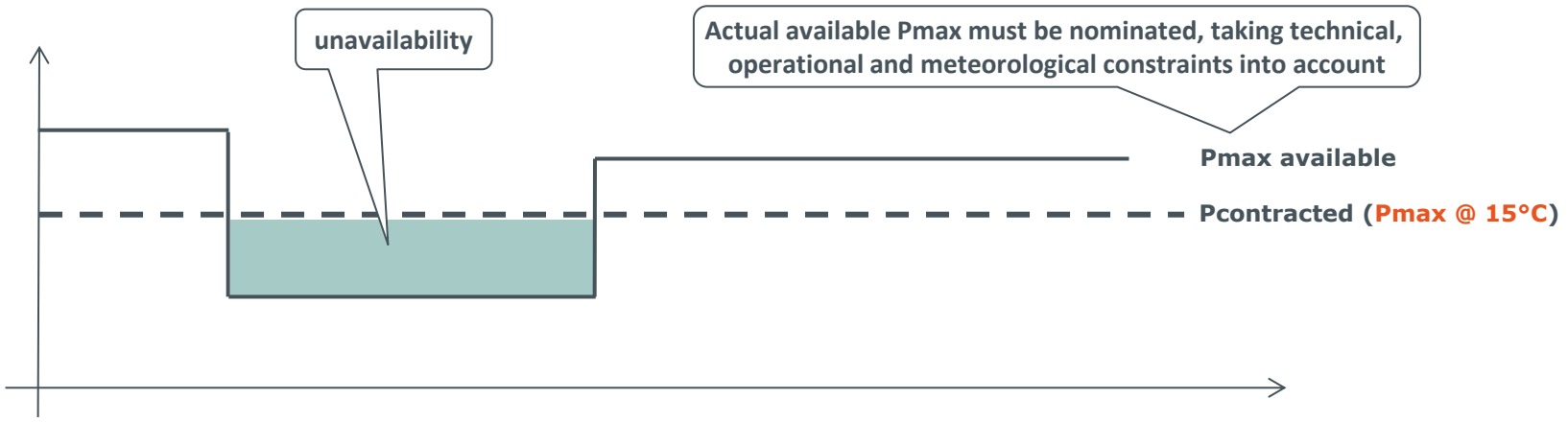
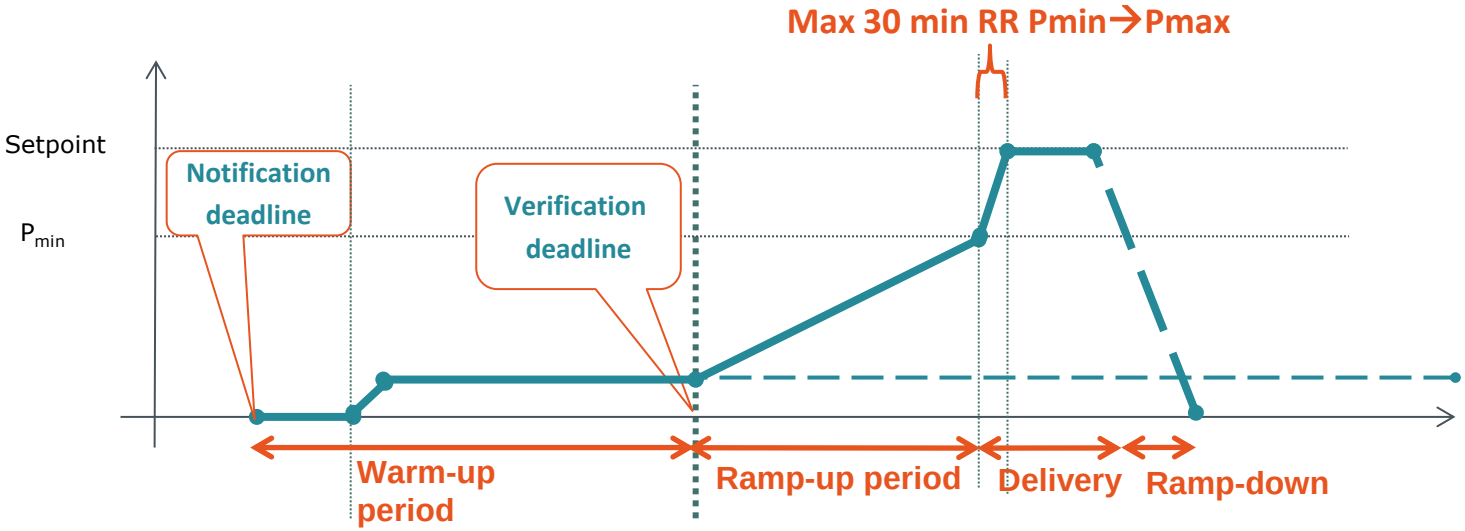
SGR design – capacity reservation



- **Remuneration**:
  - Monthly fixed remuneration based on Pcontracted during winter period
- **Unforeseen unavailability:**
  - Penalty per missing MW per quarter hour: 1,3*remuneration
- **Coordinated unavailability:**
  - Request at least one week in advance (during “ready to run”) or for the next weekend
  - Maximum cumulated duration = 1 week during the winter period
  - No reservation remuneration for missing MW

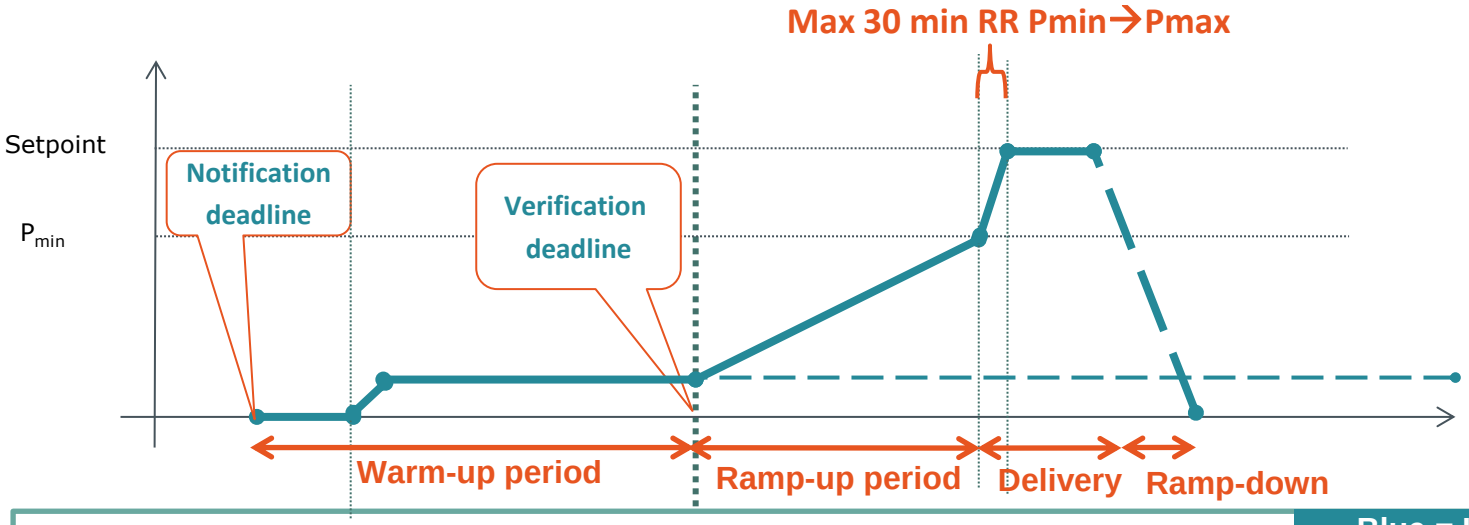
SGR design – activation



Objectives:

- Limit spillover
- Take decision to activate strategic reserves based on best possible input (e.g. the later SR can be activated, the more information is available)
- Limit the exclusion of suppliers based on design characteristics

SGR design – activation



Blue = Under investigation

1. **Warm up:**
   - Preparation period needed in order to start up and ramp up
   - A cancellation is still possible
   - A small injection (≤**15%** Pnom) necessary for example for the heating of steam turbines is possible
   - Subdivised into warm up with and without injection
   - **Maximum 5 hours**
   - **Warm-up prolongation possible**
2. **Ramp up:**
   - Period during which the ramp up starts and during which cancellation is not anymore possible
   - Remuneration based on billable margin (**linear**)
   - **Maximum 1,5 hours**
3. **Delivery:**
   - **Max 30 min** RR from Pmin to Pmax
   - Penalty for non-delivered energy and/or excess of delivered energy; 2*activation price (1% Pmax tolerance)
   - Additional penalty for not reaching Pmin on time; 3* reservation remuneration (+unavailable)
   - Total unavailability + activation penalties limited to yearly reservation remuneration

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SGR – bidding sheets

Clarifications to bidding sheets instructions:

- CO2 reference price used for total cost
- Amount of cold and warm start-ups used for total cost
- Pcontracted @ 15°C (ISO gas)
- Offer / configuration

SDR eligibility

For winter 2015/2016, in order to be eligible for SDR one should:

- Be a (or an aggregated pool of) grid user(s) connected to the Elia grid **or the DSO** (non-Elia) grid **NEW**
- Be demand flexibility that is not yet exploited by the markets
  - Combination with R3DP, ICH and/or R1Load **Under discussion – link submetering**
- Be a (pool of) grid user(s) whose consumption profile fits the need profile of strategic reserves
  - → Certification of an Rref (reference power) based a **new methodology** compared to winter 2014-2015 **NEW**
  - → This new methodology will be used for drop to and drop by type

SDR certification – feedback winter 2014-2015

Certification methodology winter 2014-2015

(based on historical load profile in 3 winter periods):

- Average hourly consumption ≥ SDR Reference Power + SL_{SDR}
- Global offtake [average MW per hour] during 85% of the peak * hours > Rref + SL_{SDR}
- Global offtake [average MW per hour] during 75% of the non-peak hours > 0,75* (Rref + SL_{SDR})

Stakeholder feedback:

- Very administrative process (obtain metering data…), prefer to send SL and let Elia determine a max Rref
- Further elaborate fit between historical consumption profile and SR needs
- Certification is based on historical data which might not be a guarantee for future reliability
- 85% is too restrictive, does not valorize the flexibility in an optimal manner

SDR certification – overview changes winter 2015-2016

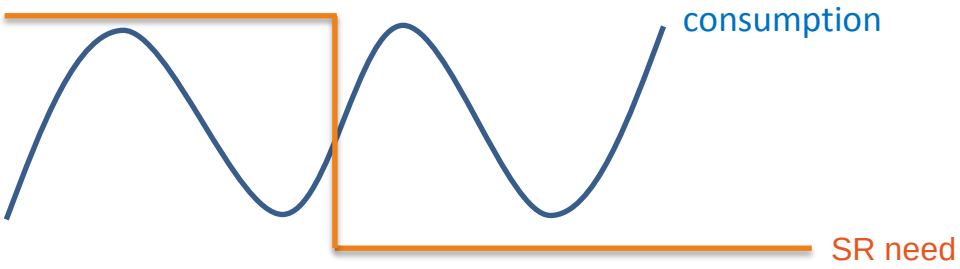
The new certification methodology for the winter 2015-2016 can be summarized in 3 main changes:

1) Peak & non-peak hours → fit with SR needs simulations
2) x% of time available → x% of Rref available
3) Newly calibrated values for x%

SDR certification- change 1

1) **Instead of a differentiation in criteria for peak & non-peak hours → fit with simulated SR needs**

→ investigate the fit of the historical consumption profile of an SDR supplier of the past 3 winters with the simulated needs for strategic reserves (for multiple scenarios); for each combination (1 winter + 1 SR needs scenario) only the consumption during the hours where an SR need is detected are considered



→ Results in a more accurate investigation of the fit between the historical consumption profile and the simulated SR needs

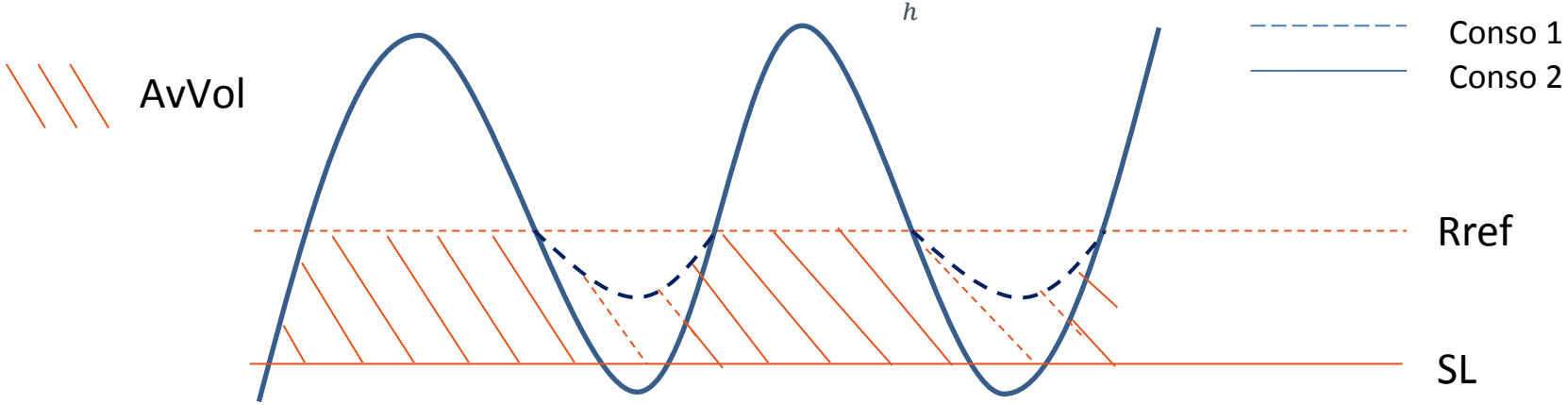
SDR certification – change 2

2) x% of time available → x% of Rref available

→ for each scenario s (each scenario is a combination of 1 winter + 1 SR need scenario), the Availability Rate (AvRate) of a certain Rref is calculated:

$$\forall scenario\ s, \quad AvVol_s(R_{ref}) = \sum_h min(Rref, AvPow(t)) \quad \text{with} \quad AvPow(t_q) = max(0, Conso(t_q) - SL(t_q))$$

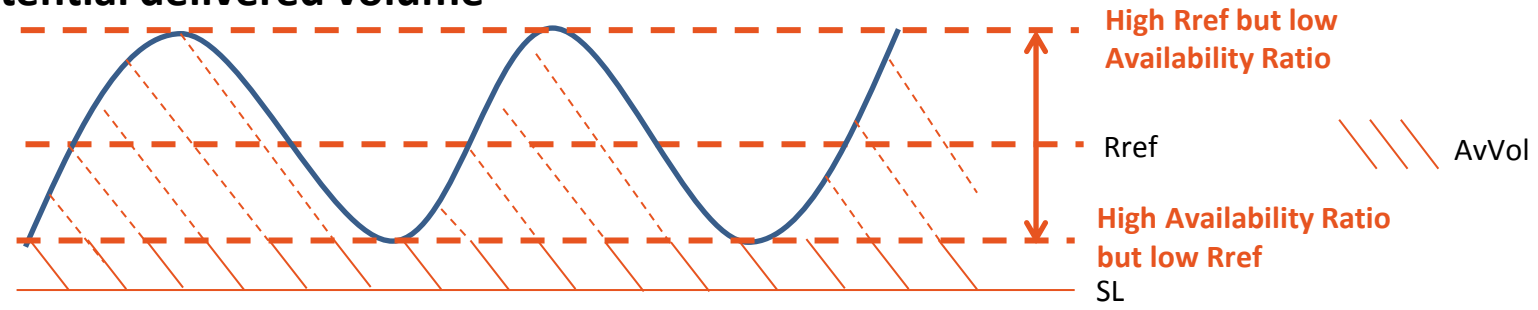
$$\forall scenario\ s, \quad AvRate_s(R_{ref}) = AvVol_s(R_{ref}) / \sum_h R_{ref}$$ **= Availability Rate**



→ to determine the availability, both the time and volume aspect are taken into account (former methodology: only time aspect)

SDR certification – change 3

3) Values for x% are calibrated based on a trade-off between Availability Rate and Potential delivered volume



STEP 1 **Determine an optimal way to valorize flexibility**

→ based on the historical data used for certification 2014-2015 and simulated SR needs for winter 2014-2015

→ determine Rref based on an optimal trade-off between the Availability Rate and Potential delivered volume:

$$\max\left(SCORE\left(R_{ref}\right) = Average_{s\in S}\left(AvVol_s\left(R_{ref}\right)\right) * Q25_{s\in S}\left(AvRate_s\left(R_{ref}\right)\right)\right)$$

→ results in an optimal Rref for a given consumption profile

STEP 2 **Results of step 1 are used to determine minimum threshold values for SDR certification**

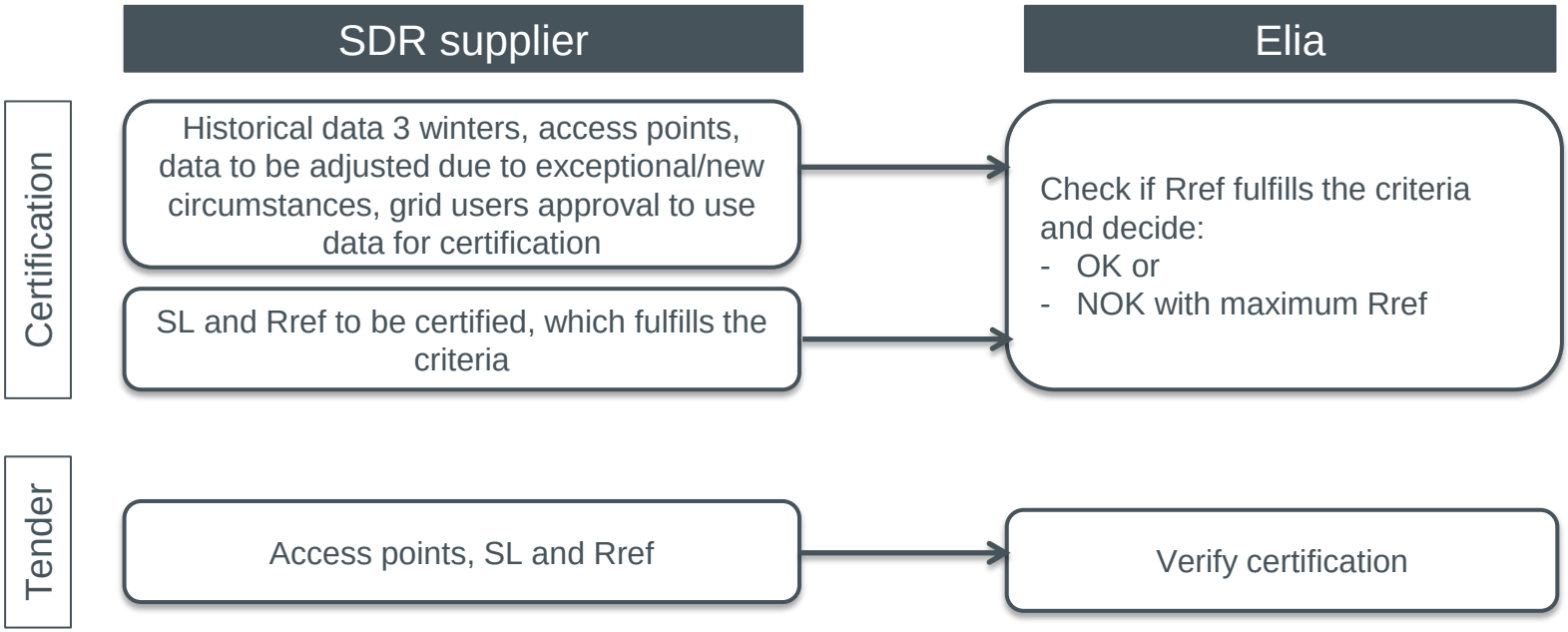
Over all combinations (winter + simulation SR need):

→ Average Availability Rate ≥ 80 % AND

→ Q25 Availability Rate ≥ 70 %

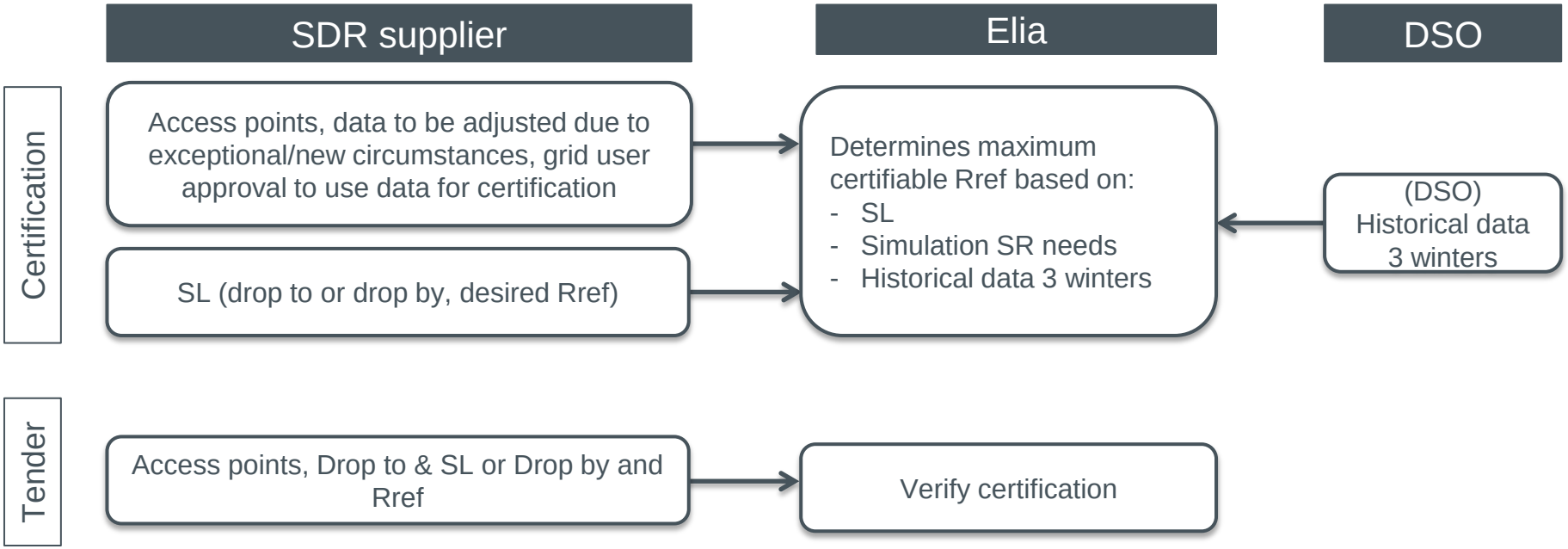
SDR certification – process

The following process was used for the certification of SDR for winter 2014-2015:



SDR certification – process

The following process will be used for winter 2014-2015, to accompany the new methodology:



SDR certification - conclusion

This new methodology and process for the certification of SDR allows:

- A more **accurate assessment of the fit** between an SDR consumption profile and the needs of strategic reserves
- A more **accurate valorization of the consumption** profile
- New criteria for the certification based on a trade-off between Availability Rate and Potential delivered volume
- A **simplified process** for the SDR suppliers; Elia performs analysis and determines a maximum Rref / SDR supplier
- Same methodology for **drop to and drop by** type product