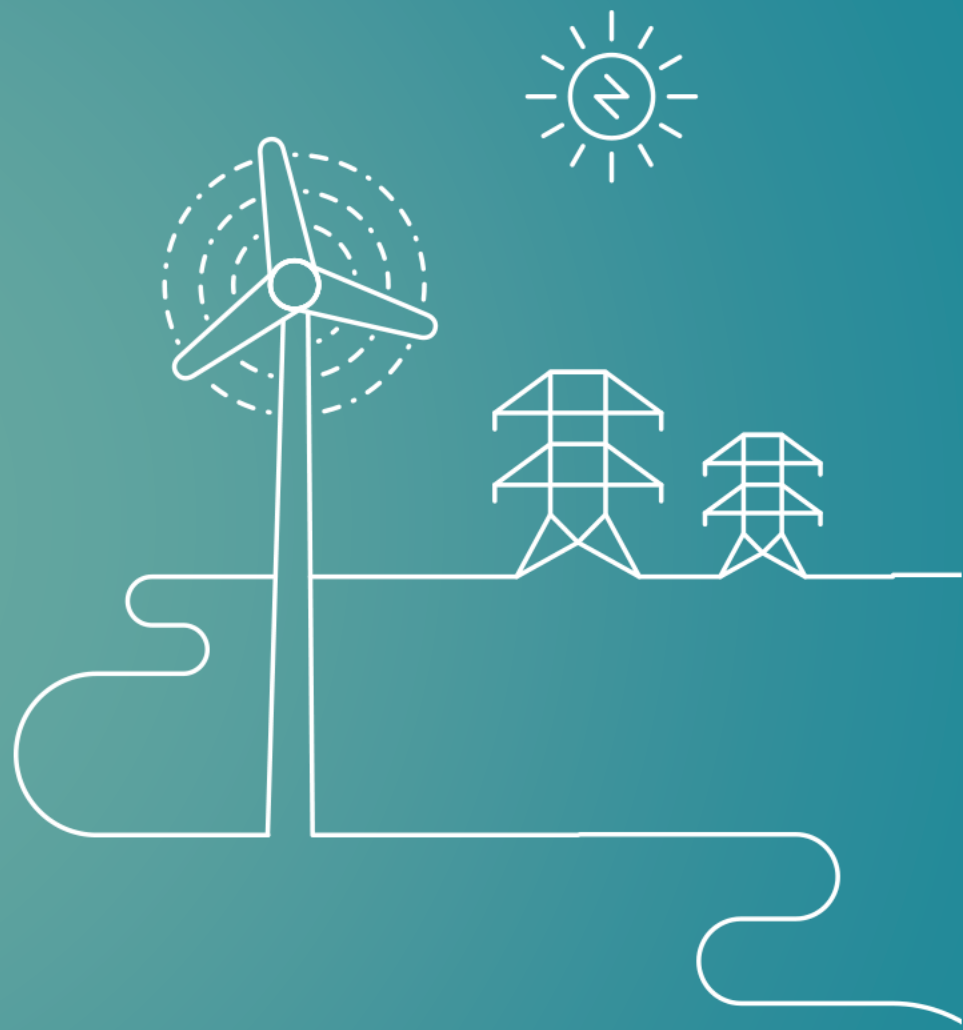
[#8]

Status CRM Design

Patrik Buijs

General introduction

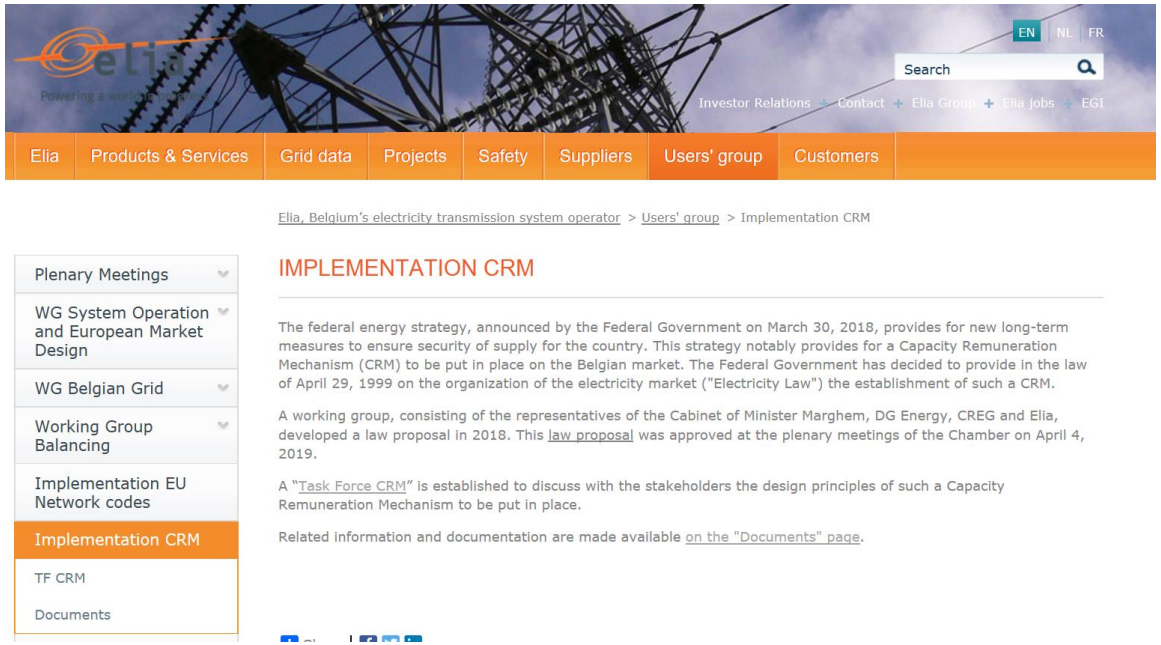
Overview of CRM design process



Reminder that all information related to the TF CRM is publicly available online

On the **website of the Task Force CRMs**, the following can be found:

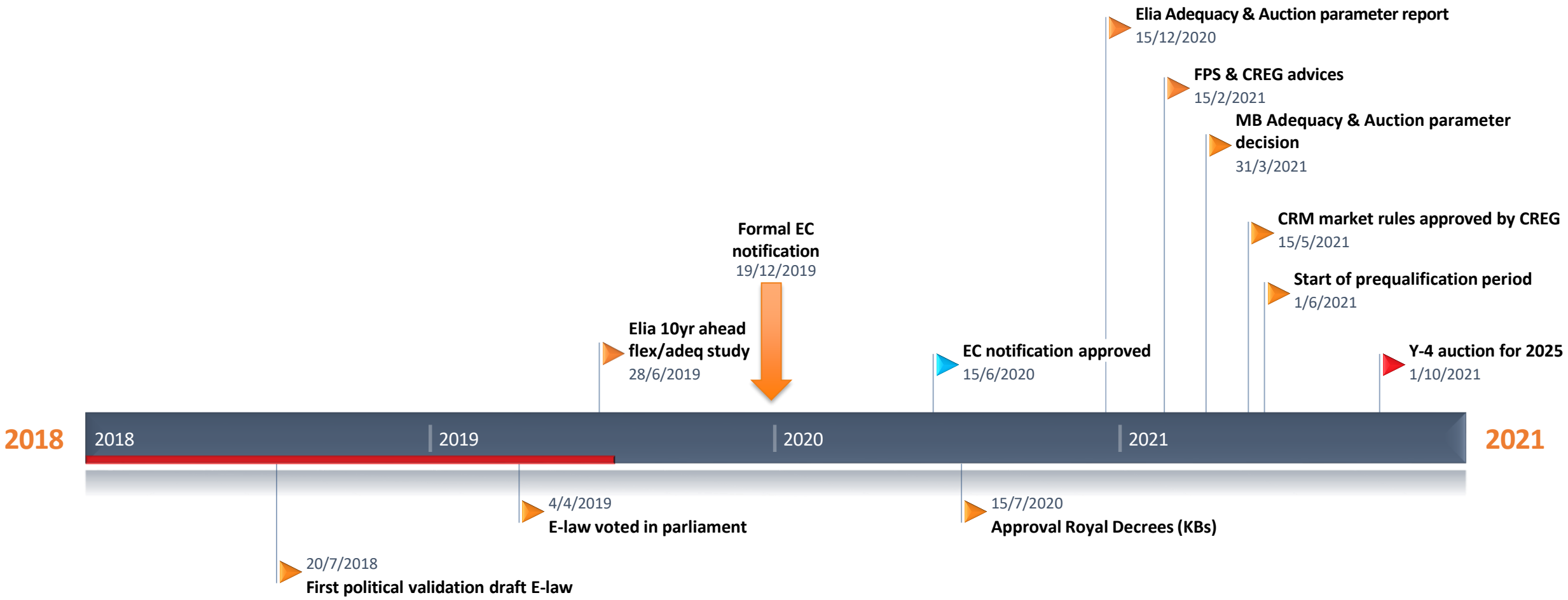
- Presentations of proposals by Elia, CREG and the FPS Economy
- Presentations, papers and reactions provided by stakeholders
- (detailed) Minutes of Meeting of all Task Force meetings



URL:
www.elia.be/en/users-group/Implementation%20CRM

Timeline until first auction in Q4/2021

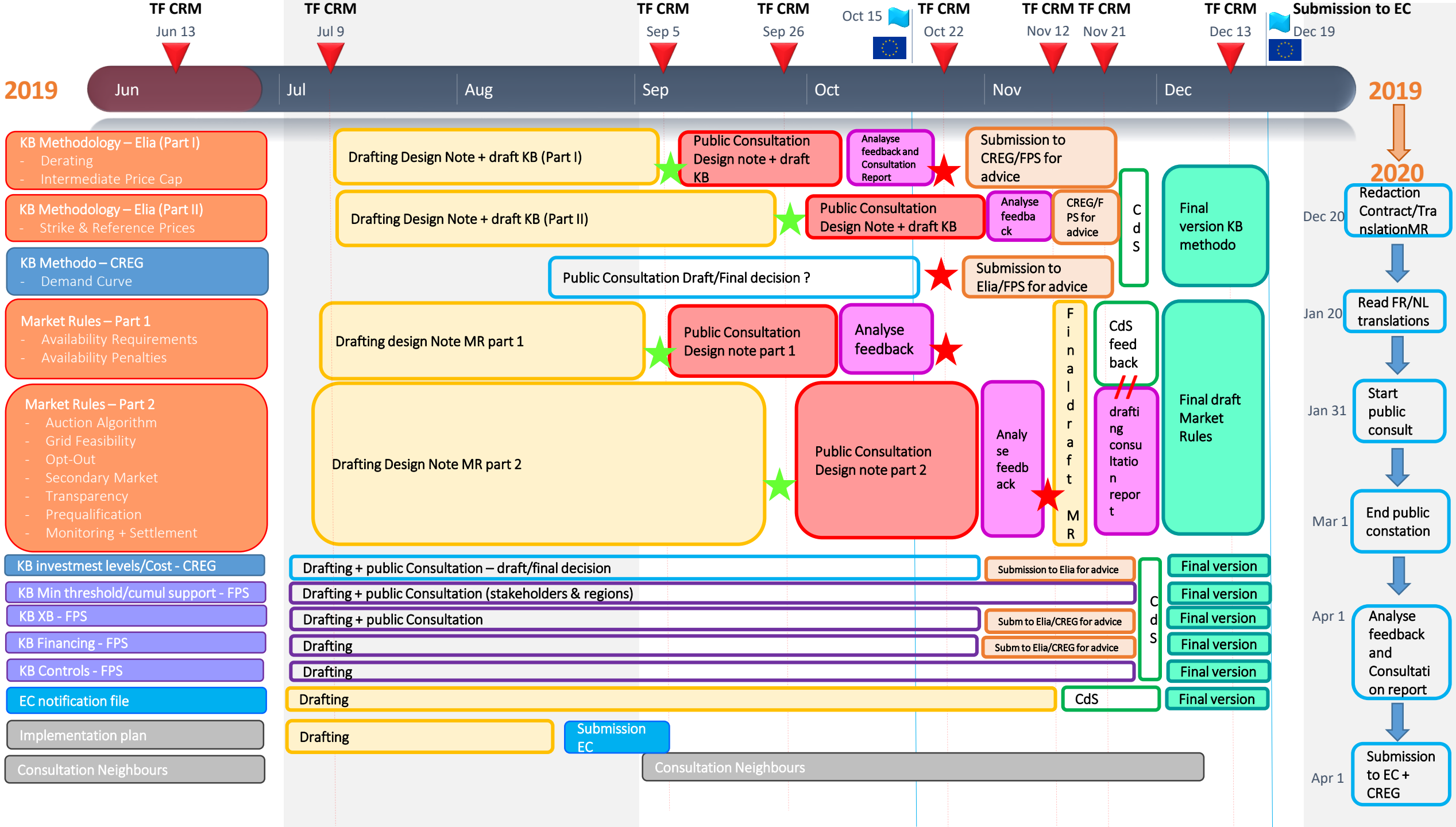
Goal: Formal State Aid notification by the end of 2019 to be ready for the first auction in October 2021



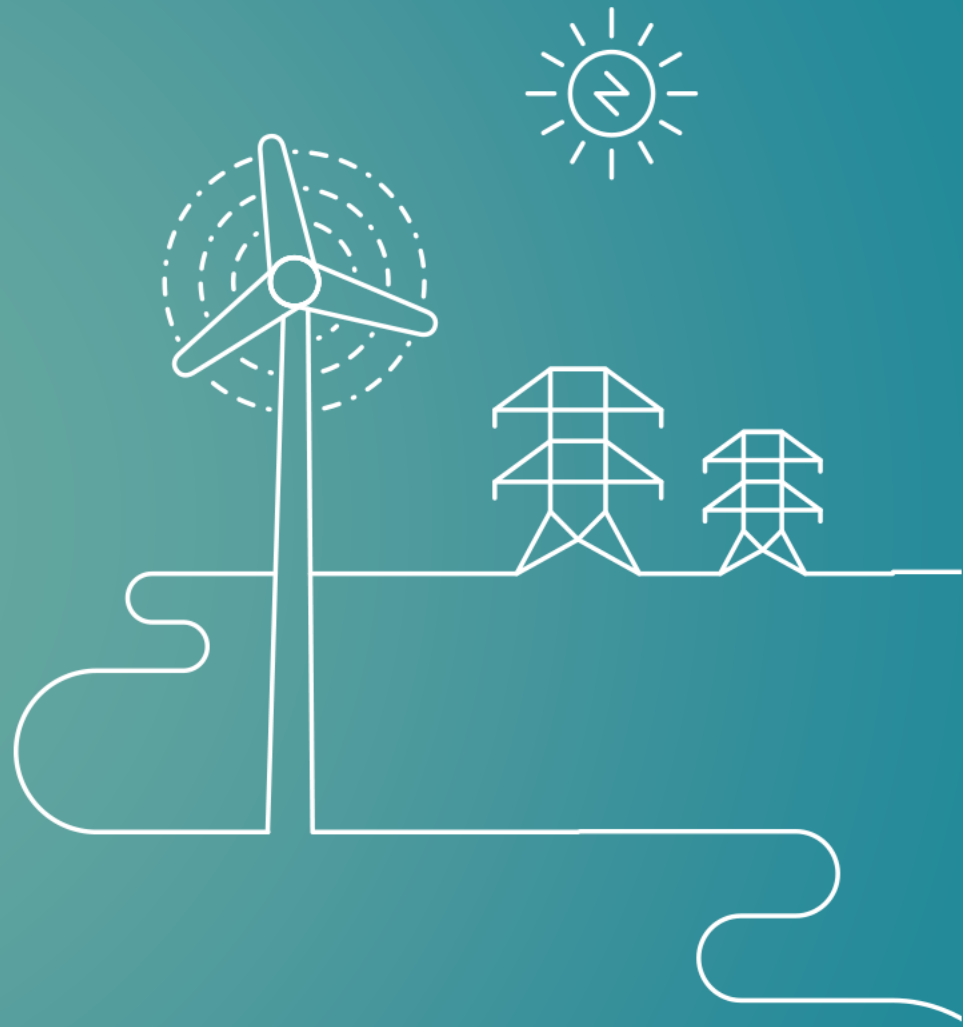
* *Exact moments of prenotification and notification will be defined in consultation with European Commission*

Planning Second Semester 2019

- **Different steps**
  - Drafting — Based on principles presented during TFs in Q2/2019 and finetuning over summer
  - ★ present design for public consultation
  - Public Consultation — one in ~September (4 weeks) and one in ~October (4 weeks)
  - Analyse feedback — and drafting consultation report
  - ★ freeze the design during TF
  - Submission to XX for advice — 4 weeks are foreseen
  - CdS — final review by CdS
  - Final version — finalise version within for submission towards EC
- Work doesn't stop with official notification to EC
  - Public consultation to be foreseen on Market Rules & Contract in Q1/2020


TF CRM Jun 13
TF CRM Jul 9
TF CRM Sep 5
TF CRM Sep 26
Oct 15
TF CRM Oct 22
TF CRM Nov 12
TF CRM Nov 21
TF CRM Dec 13
Submission to EC Dec 19
2019
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2019
2020
KB Methodology – Elia (Part I)
- Derating
- Intermediate Price Cap
KB Methodology – Elia (Part II)
- Strike & Reference Prices
KB Methodo – CREG
- Demand Curve
Market Rules – Part 1
- Availability Requirements
- Availability Penalties
Market Rules – Part 2
- Auction Algorithm
- Grid Feasibility
- Opt-Out
- Secondary Market
- Transparency
- Prequalification
- Monitoring + Settlement
KB investmest levels/Cost - CREG
KB Min threshold/cumul support - FPS
KB XB - FPS
KB Financing - FPS
KB Controls - FPS
EC notification file
Implementation plan
Consultation Neighbours
Drafting Design Note + draft KB (Part I)
Public Consultation Design note + draft KB
Analayse feedback and Consultation Report
Submission to CREG/FPS for advice
Drafting Design Note + draft KB (Part II)
Public Consultation Design Note + draft KB
Analyse feedback
CREG/FPS for advice
CdS
Final version KB methodo
Public Consultation Draft/Final decision ?
Submission to Elia/FPS for advice
Drafting design Note MR part 1
Public Consultation Design note part 1
Analyse feedback
Final draft MR
CdS feed back
drafting consultation report
Final draft Market Rules
Drafting Design Note MR part 2
Public Consultation Design note part 2
Analyse feedback
Drafting + public Consultation – draft/final decision
Submission to Elia for advice
Final version
Drafting + public Consultation (stakeholders & regions)
Final version
Drafting + public Consultation
Subm to Elia/CREG for advice
Final version
Drafting
Subm to Elia/CREG for advice
Final version
Drafting
Final version
CdS
Drafting
CdS
Final version
Drafting
Submission EC
Consultation Neighbours
Dec 20 Redaction Contract/TranslationMR
Jan 20 Read FR/NL translations
Jan 31 Start public consult
Mar 1 End public constation
Apr 1 Analyse feedback and Consultation report
Apr 1 Submission to EC + CREG

Overview Design Notes



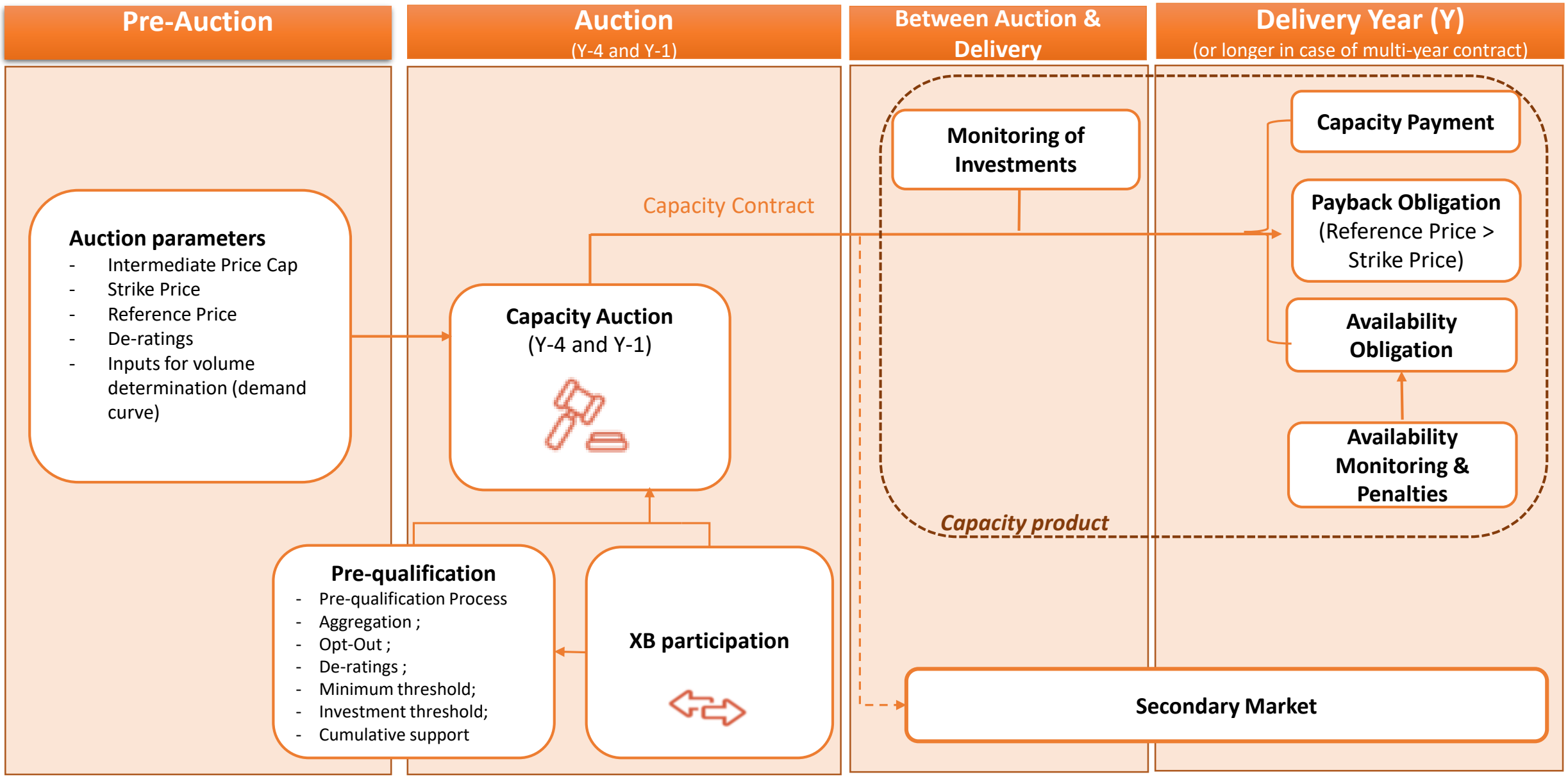
In the coming weeks, a set of CRM design notes will be published by Elia for market consultation, in 2 phases.

	CRM Design Topic	Market Consultation Period
Introduction	Global overview of CRM Components	*(Not applicable)*
Design Note 1	Methodology for calculation of the de-rating parameters and inputs for volume determination (part Elia).	Part I : from 13/9/2019 until 11/10/2019
Design Note 2	Methodology for calculating the intermediate price cap	Part I : from 13/9/2019 until 11/10/2019
Design Note 3	Description of the pre-qualification requirements and monitoring of investments (until start of delivery period).	Part II : from 2/10/2019 until 30/10/2019
Design Note 4	Description of auction process including auction format, clearing algorithm, opt-out and grid feasibility, as well as transparency rules.	Part II : from 2/10/2019 until 30/10/2019
Design Note 5	Determination of the Payback Obligation, including the reference price and methodology to calibrate the strike price.	Part II : from 2/10/2019 until 30/10/2019
Design Note 6	Description of the Availability Requirements, the Monitoring and Testing process and Penalties.	Part I : from 13/9/2019 until 11/10/2019
Design Note 7	Functioning of the secondary market, including transparency rules.	Part II : from 2/10/2019 until 30/10/2019

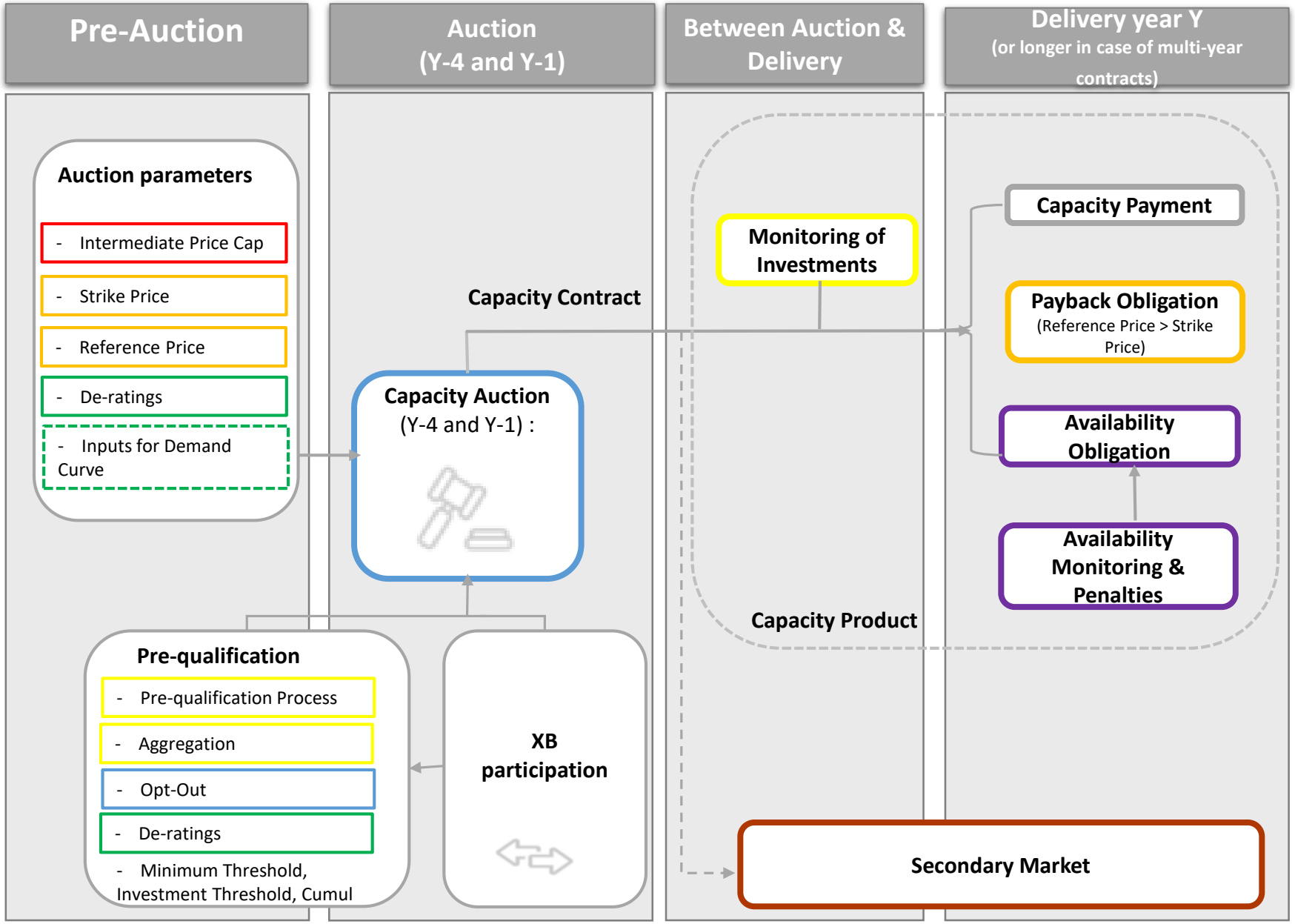
Global Overview

Introductory note: Global Overview CRM Components

The CRM auction process is organized both 4 years and 1 year before the delivery year (Y-4 and Y-1) and results in 1-year or multi-year contracts (max 3/5/8/15) for the in-merit bidders.



In the coming weeks, a set of CRM design notes will be made public by Elia for market consultation.
Topics not in scope are covered by FPS Economy/CREG.



Design Note 1:
De-rating& input for volume determination **(Elia's part)**

Design Note 2:
Intermediate price cap

Design Note 3:
Prequalification & Monitoring

Design Note 4:
Auction Process

Design Note 5:
Payback Obligation

Design Note 6:
Availability Requirements & Penalties

Design Note 7 :
Secondary Market

Phase I Consultation
13/09 – 11/10

Phase II Consultation
2/10 – 30/10

Main design principles

Design Note 1 :

De-rating parameters, inputs for volume determination (parts Elia)

De-rating per technology, a best practice approach is used

CRM units are not assumed to be available 100% of the time at 100% of their installed capacity, due to break downs, maintenance cycles, weather conditions, production/consumption processes,... In order to determine the contribution to the SoS of each unit, the capacity is de-rated.

Thermal/ combustion	→ **Historical values**	→ **Per technology (CCGT, OCGT, diesel, small DSO connected, etc …)**

→ **Average contribution during "near scarcity" hours**

Wind/PV	→ **Model based (Monte Carlo)** antaressimulator	→ **Per type (wind on /off, PV)**
DSR Storage		→ **Per type and with limitations (eg Storage 1H, Storage 2H, MR 4H, …)**
XB		→ **Level of imports for BE in scarcity** → **Per border decomposition**

High level principles:

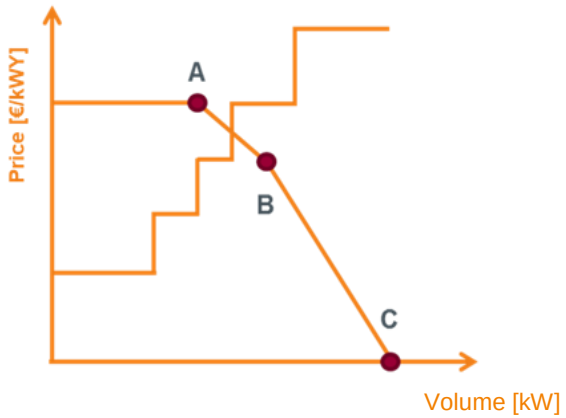
- Average contribution within "near scarcity" hours
- Historical data for thermal generation per type of unit.
- Categories: Defined to ensure that large enough sets of data (e.g. FO for thermal units) are available + defined to allow the correct definition of the technical constraints for technologies
- For weather driven or energy-limited technologies and cross-border a model-based approach is used to reflect its actual contribution

- **Data** for Belgium and neighboring countries based on **latest ENTSO-E MAF** (Mid-Term Adequacy Forecast) **+** update based on **new policies**
- **Consultation** for Belgium data (generation/storage/demand)
- **Adequate scenario** (compliance with legal adequacy criteria)

De-ratings levels to reflect the contribution to SoS of the different categories shall be determined based on the methodology described in Design Note 1. First auction parameters report is due Q4 2020

High level principles of demand curve

- Demand curve to be defined for both **Y-4** (auction 4 years before delivery date) **and Y-1** (auction 1 year before delivery date).



X-axis (Volume)

- ✓ A = Minimum capacity to be cleared at price cap;
- ✓ B = Targeted procured capacity (MW needed to meet the reliability standard);
- ✓ C = Maximum procured capacity level above which extra capacity has no further value.

Y-axis (Price)

- ✓ A = Global Auction Price Cap to avoid unreasonable capacity offers and to cover for uncertainty on point B.
- ✓ B = Price offered by (i.e. missing money of) Best New Entrant;
- ✓ C = X-axis intersect (0 €/kWY).

Figure for illustrative purposes- Shape of the demand curve (sloped/vertical) still to be decided.

- X-as determination:
  - Point B
    - Reliability standard according to the value to be determined following the CEP or, by default, the reliability standard as currently defined in the Belgian law (LOLE < 3h & LOLE95 < 20h);
    - Consistency should be ensured between determination of X-axis (point B) and deratings and other relevant parameters
  - Point A & C to be calibrated in line with the design of the shape of the demand curve.
  - Other relevant input for calibration includes a.o. the calculation of MWs needed to meet the reliability standard, running hours, deducting the Y-4 contracted volumes in Y-1 (no over-procurement), non-eligible volumes,…
- Take into account volumes to be reserved for Y-1 auction (linked to 200 running hours/yr).

Design note 1 includes the input for the volume determination (Elia's part), necessary to calibrate the demand curve.

Main design principles

Design Note 2 :

Intermediate Price Cap

Intermediate price cap is foreseen to avoid windfall profits and further mitigate market power

- An **intermediate price cap is** applicable to 1-year contracts and sets the **maximum remuneration** that can be received by a bid in the CRM auction. This price cap obviously also acts as a bid cap.

- **Goals** of the intermediate price cap are :

  - ✓ **Avoid windfall profits,** i.e. by **limiting the infra-marginal rent** in the CRM auction and thus avoiding disproportionate remuneration. There is no economic rationale for inframarginal rents in the CRM that is residual to the energy market.

  - ✓ **Mitigate market power**:

    - Limiting the ability of capacity providers to **withhold their capacity economically** (by offering it at a high price), resulting in a higher remunerated clearing price for all cleared capacity (also mitigated by a bid cap)

    - Limiting the ability for **strategic mothballing/closure decisions** to influence probability of the market clearing at cost for new capacity (not mitigated by a bid cap).

- **Calibration** of the intermediate price cap will be key and will be based on the estimated missing-money of the **worst-performing existing technology class**

    - In function of its Fixed Operating & Maintenance costs and recurring maintenance expenditures minus the expected revenues from the energy market.

    - External consultancy expert study on the cost of capacity will be used as input to determine the missing money of the worst-performing existing technology.

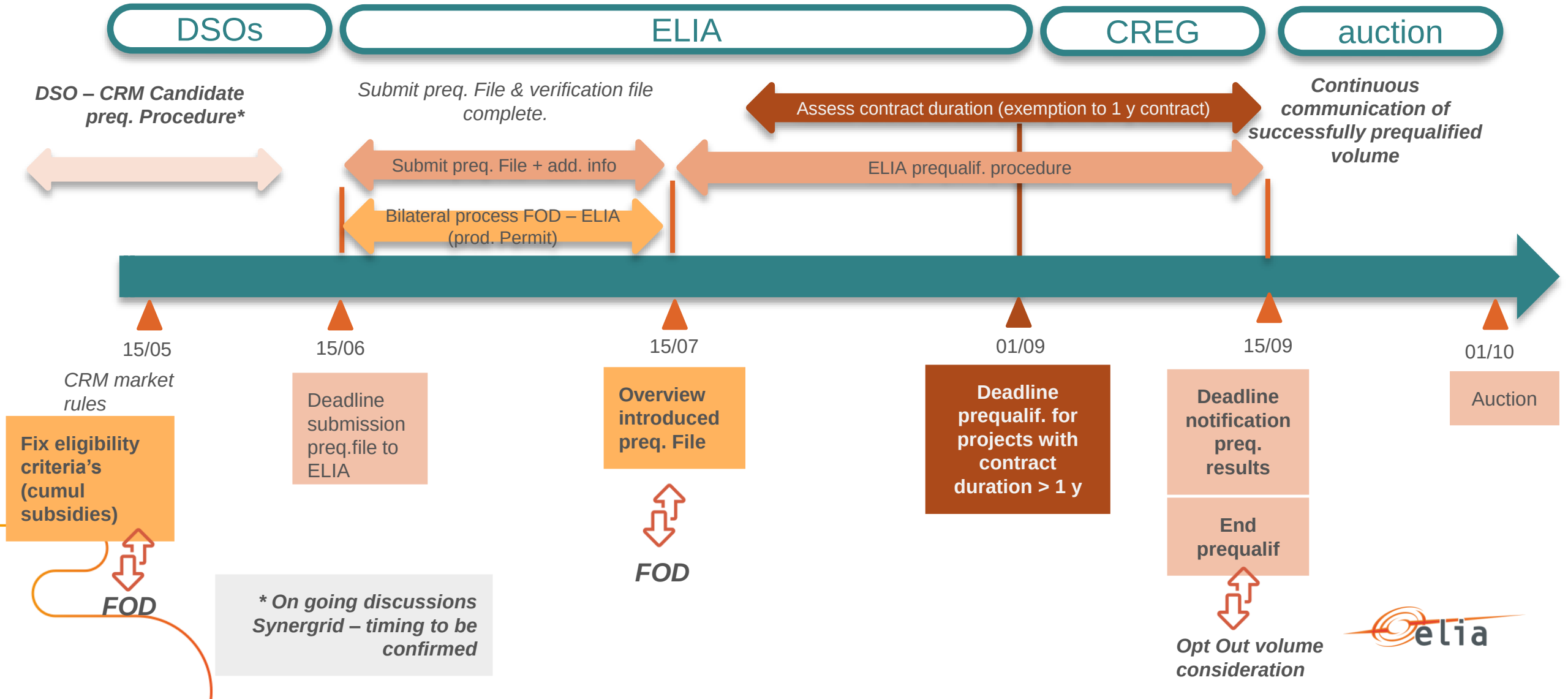
Main design principles

Design Note 3 :

Prequalification requirements and monitoring of new investments

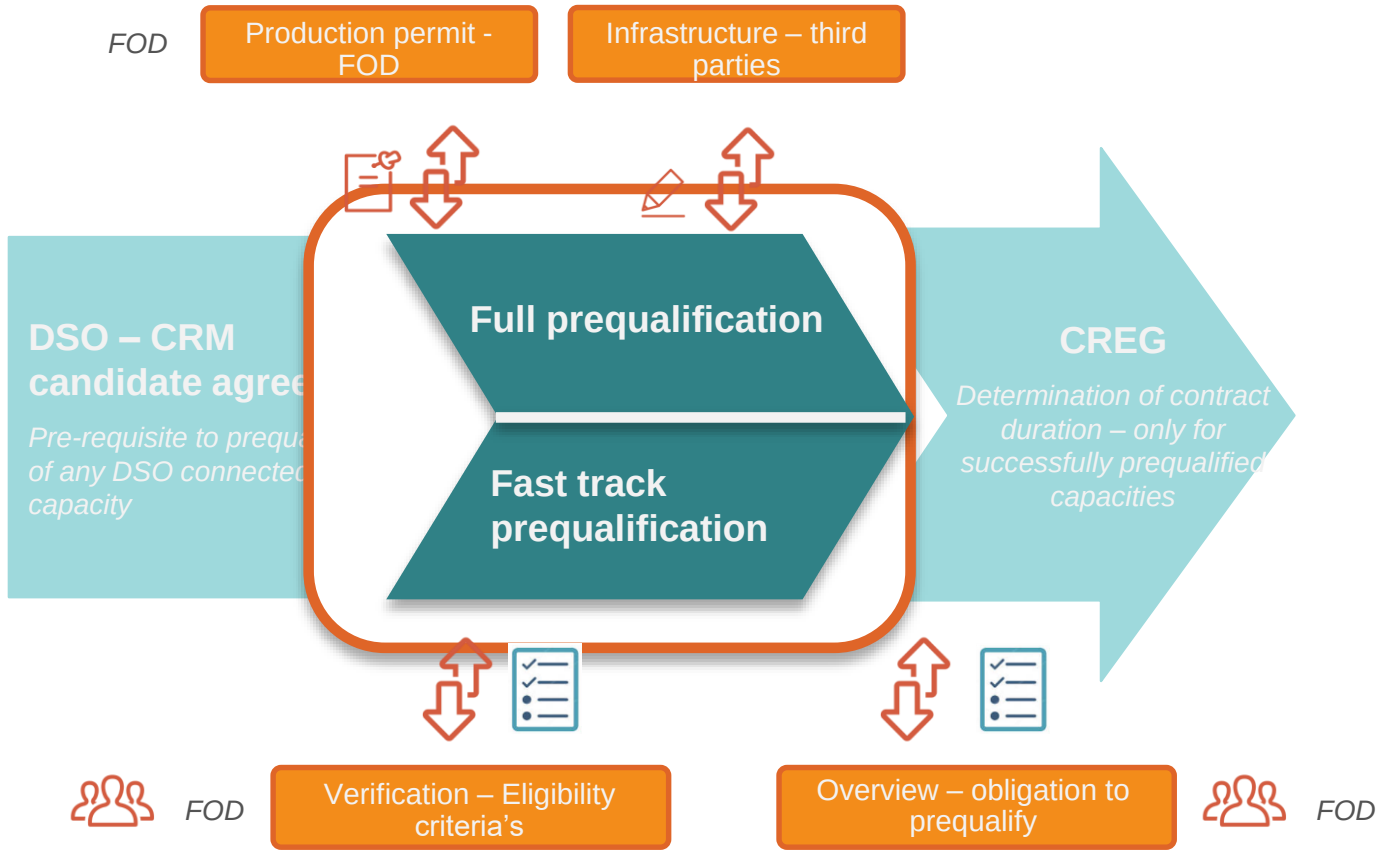
Prequalification process

Timing including interactions with third parties



ELIA prequalification process

Sequential process applicable to any CMU



Aggregation is explicitly facilitated across technologies and with an open approach to derating

- **General principle**: Same principles for aggregated capacities as for individual participations.
- **De-rating** of an aggregated portfolio and link with availability requirements/penalties based on selected **Service Level Agreement**:
  - ✓ Elia determines ex ante derating factors taking into account different service levels (e.g. x hours energy constraints & y activations/period (day, week,..)). → The aggregator chooses the SLA/ derating factor that best fits its portfolio.
  - ✓ Availability monitoring and penalties are applied in a similar way as for individual delivery points (see further topic)

"Aggregation category"	Duration	De-rating
SLA #1	1h	X_1%
SLA #2	2h	X_2%
SLA #3	3h	X_3%
SLA #4	4h	X_4%
SLA #5	8h	X_5%
SLA #6	No limit	X_6%

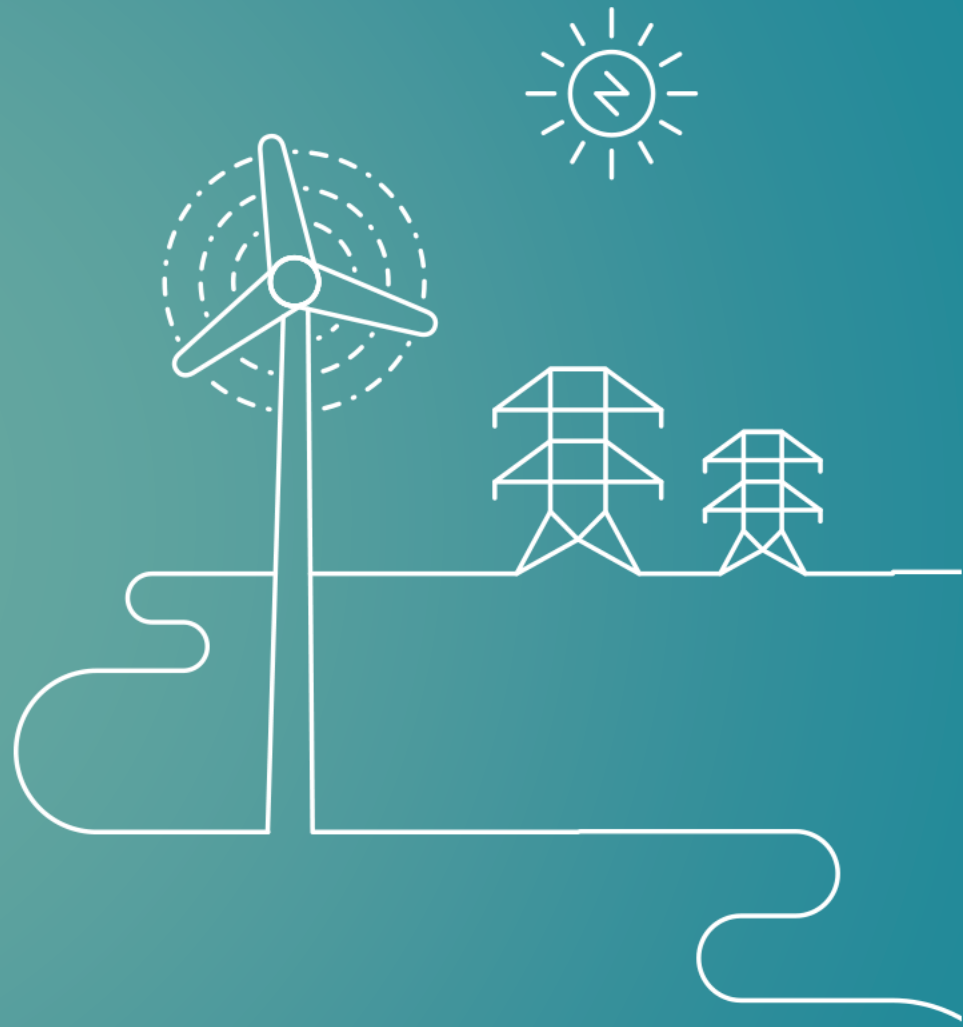
- Some specific elements related to **portfolio composition** are to be determined:
  - ✓ **Technologies:** No limitations wrt technologies within 1 portfolio **Multi-yr contracts:** All capacity units in a single aggregated portfolio must respect the investment threshold (cf. rules on investment thresholds)
  - ✓ **Size** of the portfolio:
    - a) Minimum participation threshold below which aggregation is required participate (see further topic)
    - b) Maximum installed capacity for an individual delivery point > today in practice 25 MW *(system relevance)*

    (note: 100 MW maximum for a portfolio is no longer proposed)
- In **prequalification phase**, amongst others, the aggregator will have to dispose of a clear **mandate/declaration of the grid user** of the delivery point

Main design principles

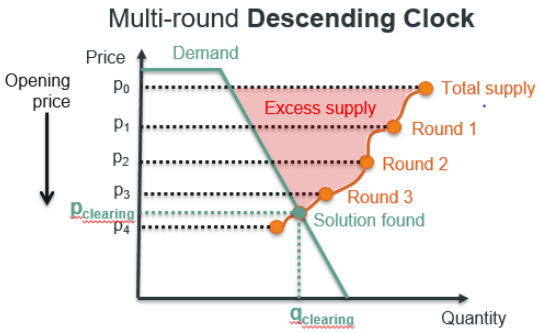
Design Note 4 :

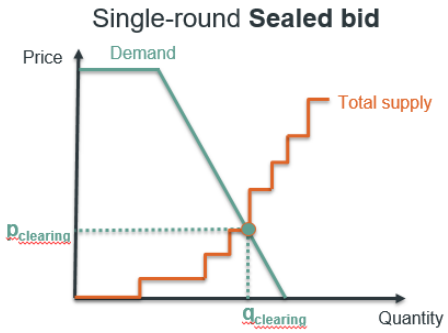
Auction Process including opt-out



Sealed bid and switch from PAB to PAC is put forward in the BE context

- Regarding the **auction format,** sealed bid is the preferred option, mainly driven by the high concentration in the Belgian market.





✓ Multi round **Descending Clock:**
Information is revealed between rounds, providing greater price discovery, but also more potential for market abuse (as observed in some markets).

✓ Single round **Sealed Bid:**
Single round market clearing process, providing less price discovery information, but also less potential for market abuse.

- A **pay-as-bid** pricing rule will apply **to the first 2 auctions** (Y-4 auction for delivery years 2025 and 2026), afterwards a switch to pay-as-cleared is made

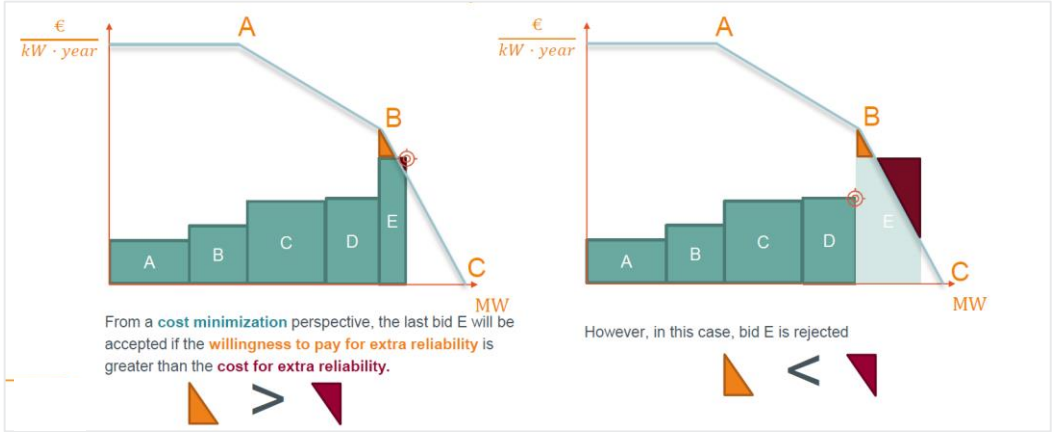
✓ **Pay-as-Bid (P-a-B):**
Selected bidders are only remunerated according to their individual bid.

✓ **Pay-as-Cleared (P-a-C):**
In-merit bidders receive the market clearing price.

Note*: In any case intermediate price caps for capacity subject to 1-year contracts are considered in both P-a-C and P-a-B mechanisms to limit market power abuse and limit the "inframarginal CRM rent" without economic rationale*

Further Auction Rules aim to limit the CRM cost for society

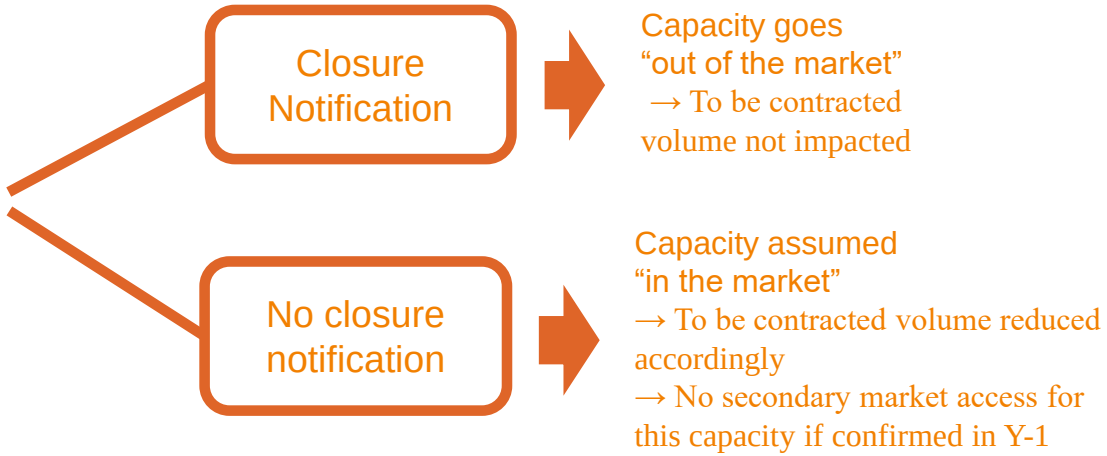
- Bidding requirements are further defined in the design note:
  - ➢ A set of general bidding requirements will apply related to a.o. **bid volumes** (e.g. in function of eligible volumes, minimum participation threshold, …) and the **bid format**.
  - ➢ Only **indivisible bids** are allowed, meaning that each bid corresponds with a fixed volume and price that is to be accepted in its entirety or not at all. However, **mutually exclusive bids** are allowed (up to a certain extent), providing the necessary flexibility
- The auction clearing rule is based on selecting the **most cost-efficient CRM outcome** that is grid feasible, taking into account the administratively set demand curve.
- In **maximizing welfare**, the algorithm will make a trade-off between willingness-to-pay for additional capacity and cost for additional capacity
- Tie-breaking rules: in case of equivalent CRM outcomes, the solution with the **least carbon emissions** is selected.



Treatment of opt-out capacity in Y-4 & Y-1 capacity auctions

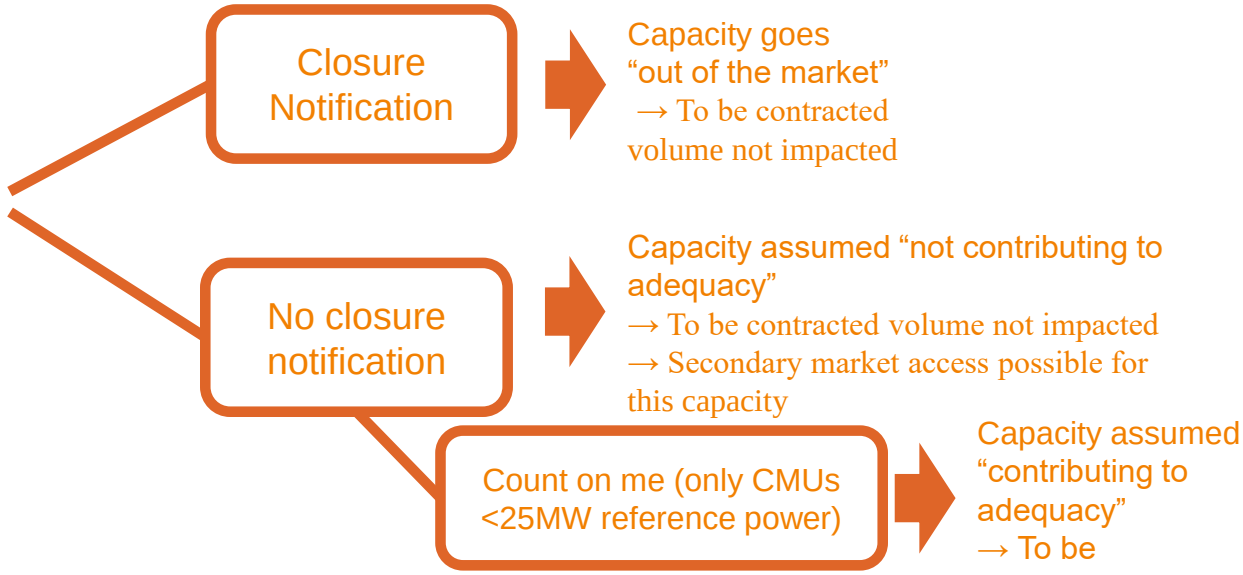
In line with the CRM law, a CRM candidate (eligible & prequalified) is allowed to opt-out (partially) from the CRM, meaning he does not commit to a bid for this opted-out capacity in the CRM. However, the way we treat this opt-out capacity depends on 1) the capacity auction (Y-4 vs Y-1) and 2) whether or not the opt-out is backed by means of a (temporary or definitive) closure notification, as meant in Art. 4bis of the E-law.

Y-4 capacity auction



- ✓ **Avoid over procurement**
- ✓ Opt-out capacity without notification is assumed in the market since we are only in Y-4, there is still time
- ✓ Avoidance of strategic behavior by abusing opt-out

Y-1 capacity auction



- ✓ **Final call for adequacy**, i.e. last chance for primary market contract
- ✓ No longer the possibility to secure adequacy in an auction closer to the delivery period
- ✓ Trust in capacity holder opt-out decision

Note: Capacity opted-out for Y-4 may revise its position towards Y-1.

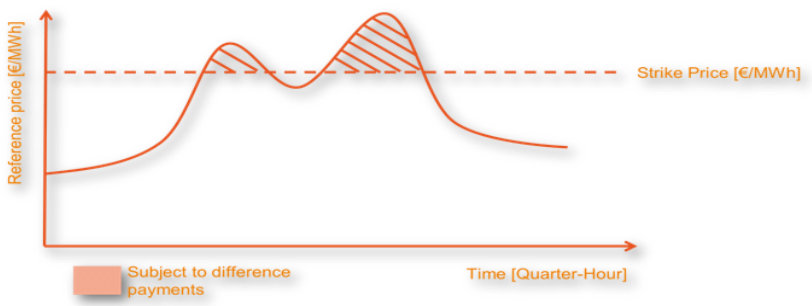
Main design principles

Design Note 5:

Payback Obligation in function of Strike and Reference Price

The payback obligation as a mechanism to limit windfall profits

- **Reliability option** under which the capacity provider has a **payback obligation** to society whenever the **reference** energy spot price exceeds a pre-defined **strike price.**



- **Reference price** should represent a continuous and relevant energy (spot) price signal (€/MWh) of the Belgian Power market revenues, which captures **moments relevant for adequacy**, while not being overly stringent towards technologies

  ➔ **Day-ahead market** is selected.

- **No payback exemptions related to forward hedging** are proposed.

- A **single, sufficiently high strike price** complemented with (1) a **payback exemption in case of unplanned and planned unavailability**, (2) **load following factor** and (3) a **separate stop-loss limit on the payback obligation**

- Indicative range for the single strike price: 500-800 €/MWh

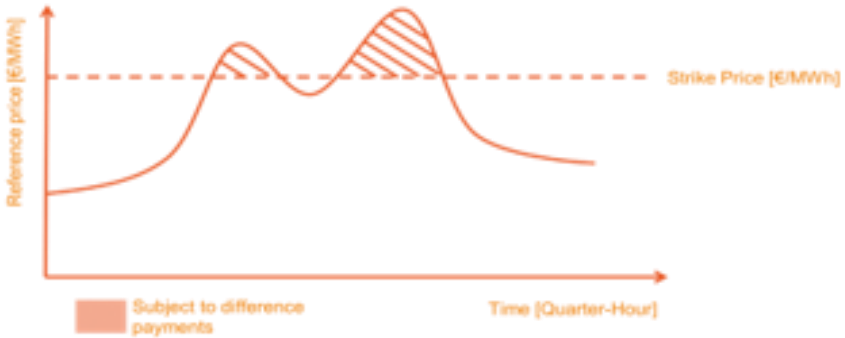
Main design principles

Design Note 6 :

Availability Obligations & Penalties

Payback obligation to limit windfall profits, to be complemented with a sufficient availability requirement

- **Payback obligation effect could in theory be two-fold (see also next "Strike & Reference price" topic)**
  - ✓ Incentive for availability during scarcity
  - ✓ Limiting of windfall profits



- **In practice:**
  - ✓ It is **uncertain whether reliability options will occur sufficiently** to incentivize availability for all contracted capacities.
  - ✓ This is particularly true as the CRM ensures adequacy (and thereby limits price spikes) and the payback obligation will particularly trigger technologies with SRMC (Short Run Marginal Costs) smaller than the strike price(s)).

The Payback obligation should be mainly considered as a mechanism to limit windfall profits, as it is likely to be insufficient to guarantee the actual availability. Consequently, **availability requirements (and penalties)** in case of non-compliance are **crucial to ensure adequacy** at all times.

A market-based trigger mechanism for availability monitoring to optimise the link with the energy market

- Only during periods that the **Availability Monitoring Trigger (AMT)** is triggered, will obligated capacity be monitored
  - ✓ AMT based on Day-Ahead Market price, as a relevant trigger for relevant moments for adequacy.
- **Obligated capacity** and **de-rating** in function of **energy constraints** :

	Obligated Capacity	De-rating
Non-Energy Constrained Assets (e.g. thermal)	De-rated capacity at every AMT moment	Fixed parameter, yearly reviewed.
Energy Constrained Assets (e.g. battery with duration and activation constraints)	***Before depletion of energy constraint:*** Maximum installed capacity. ***After depletion of energy constraint:*** 0	De-rating based on a selected Service Level Agreement (SLA) in function of energy constraints.

  - ✓ The more constraining the energy constraints, the less favorable the de-rating factors;

- **Monitoring mechanism of contracted capacity** in function of availability (<> delivery of energy) and using data collected through other market mechanisms as much as possible:
  - ✓ Units with full schedule obligations in wholesale market or with availability in balancing market are deemed available as indicated.
  - ✓ Units without full schedule are monitored in function of their Declared Market Price (DMP) :
    - ✓ DMP is DAM price above which they are willing to sell and deliver energy.
    - ✓ If DAM > DMP : available capacity is measured as delivered energy and results in Proven Availability
    - ✓ If DAM < DMP : available capacity is presumed based on a declaration (scheduling or otherwise) and results in Unproven Availability
    - ✓ If low Proven Availability, CMU is more prone to Availability Testing as declaration of available capacity is to be backed by delivery of energy

Availability monitoring during relevant moments for SoS, with penalties in case of non-compliance

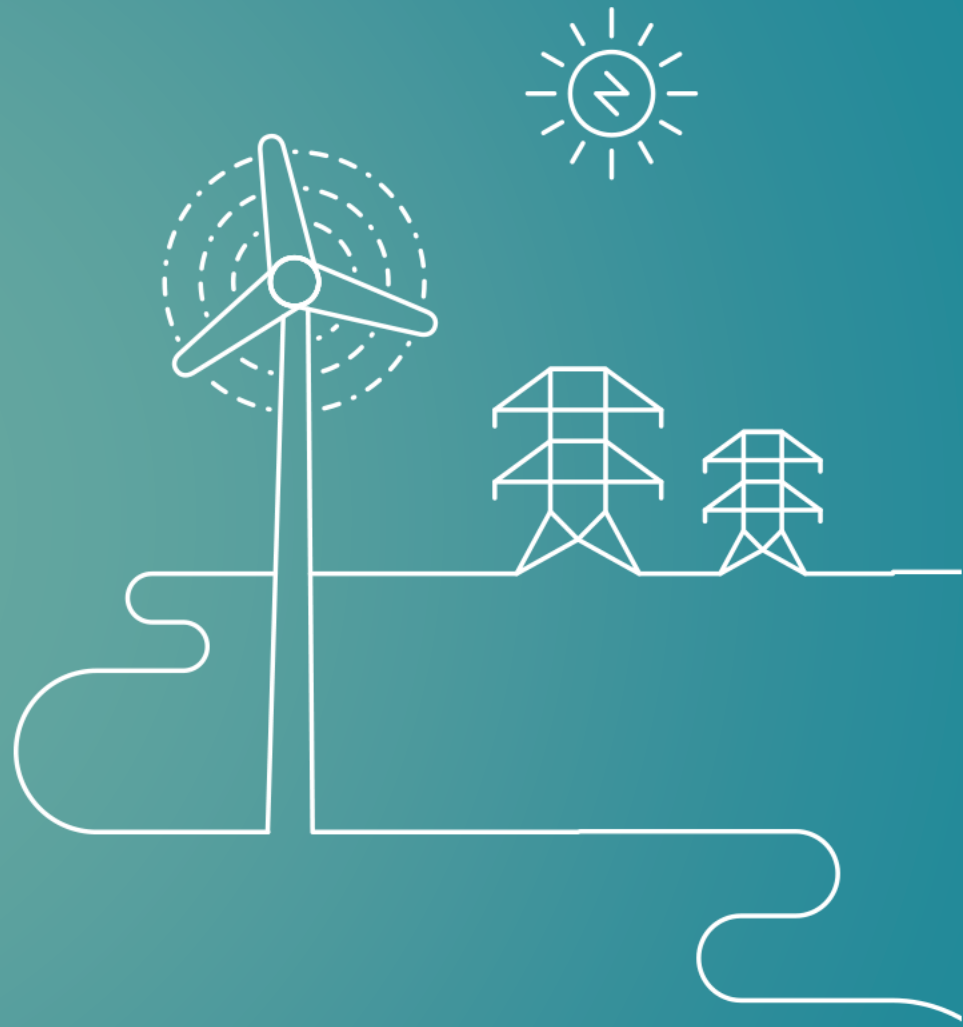
- **Penalties** for differences between **Obligated Capacity** and **Available Capacity, not covered in the secondary market**.
  - ✓ Penalty **cap**: common practice that the penalties do not exceed a pre-defined cap (stop loss limit), e.g. the contract value.
  - ✓ The pay-back obligation (reliability option) is part of a financial option between capacity provider and contractual counterparty and is not regarded as a penalty under this cap.

- Main proposals for **penalties**:
  - ✓ $$Penalty\ [€] = \frac{(1+X) * \left(P_{obligated} - P_{available}\right)}{UP} * yearly\ contract\ value$$
  - ✓ The penalty scales with the positive difference between Obligated Capacity and Available Capacity and with contract value.
  - ✓ Penalty factor (X) to be linked to moment of unavailability > higher penalties in relevant moments for adequacy (i.e. during winter).
    - E.g. if $X_{winter}=1$ & $X_{zomer}=0$
  - ✓ Value of contract is spread over expected number of audited hours, expressed as Unavailability Period (UP) in the formula.
  - ✓ In case of severe underperformance, remunerated capacity can be lowered or contract can be modified.

Main design principles

Design Note 7 :

Secondary Market



Topic of secondary market is further investigated by Elia and will be presented during the next task forces

- Secondary market principle is included in the Belgian CRM-law.
- Penalties for differences between obligated capacity and available capacity are only applicable if not covered in the secondary market.
- Secondary market to give comfort to the elected bids to be able to transfer their CMU obligations to another party for an agreed price.
- Conditions and eligibility criteria to be determined.