



Most suitable Capacity Mechanism for Estonia

Estonian resource adequacy webinar

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AFRY conducted study to identify a potential capacity mechanism for Estonia if future security of supply assessments suggest a scheme is needed

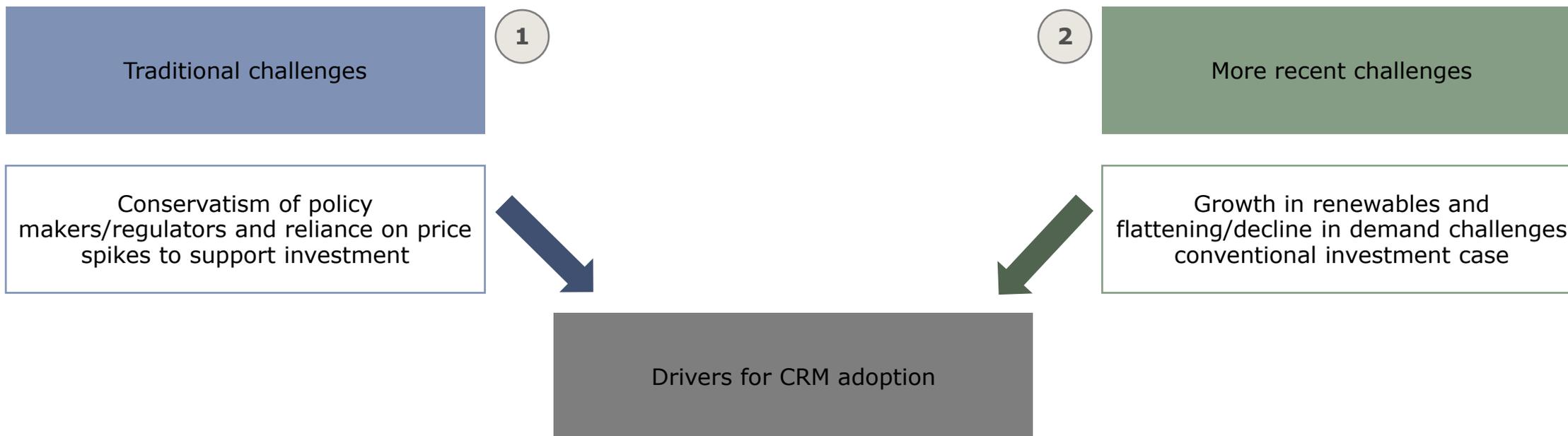
STATE-OF-PLAY

- Estonia has been self-sufficient in terms of electricity supply in the past thanks to its abundant oil shale resources. However, the **Estonian electricity system is facing substantial changes** over the coming years:
 - majority of existing thermal capacity will be closed down;
 - renewable electricity generation is growing; and
 - importance of interconnection capacity is increasing.
- The changing landscape of the energy sector in Estonia has **prompted discussion in relation to future resource adequacy**.
- Studies in relation to Estonian security of supply have concluded that there is a **very low probability of security of supply issues in the near- to mid-term**, but moving towards the 2030s the probability for loss of load increases.
- The potential adequacy issues identified by the studies are linked to **non-availability of several pieces of interconnector infrastructure**, i.e. simultaneous interconnector outages.

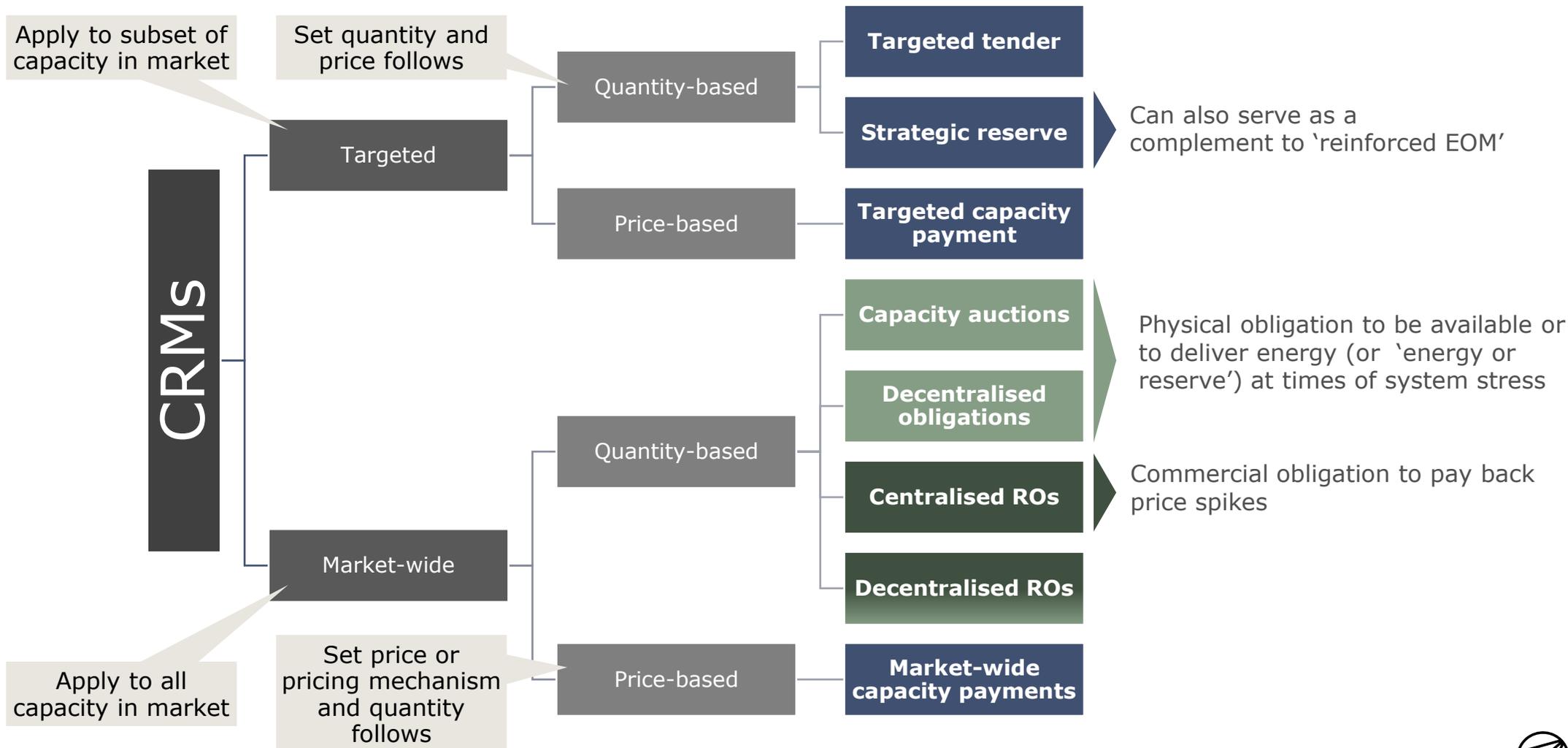
STUDY OBJECTIVES

- The situation is being monitored by the electricity transmission operator Elering, the Estonian Competition Authority and the Ministry of Economic Affairs and Communications.
- Although all three **favour retention of the energy only market design**, the parties have decided to establish a back-up plan to call into action in the event that resource adequacy issues do arise in the future.
- In this context, the objective of this study is to **identify a practical CRM for possible implementation in the Estonian context**, in the event that a scheme is considered to be needed.

The spread of CRMs has been driven by the 'missing money' problem for the conventional thermal investment paradigm – CRMs provide a distinct capacity related revenue stream that can improve revenue certainty



CRMs can take many forms



APPROACH

Our approach centred on assessment of different CRM options within the Estonian context specifically

IDENTIFICATION OF OBJECTIVES FOR ESTONIAN CRM

- Establishing Estonian adequacy context including:
 - drivers for security of supply challenges
 - ‘need’ requirements to mitigate potential security of supply issues

OVERVIEW OF CRM OPTIONS

- Reviewing CRM design options:
 - conceptual CRM designs
 - CRM case studies

ASSESSMENT OF CRM OPTIONS

- Assessing merits of different CRM options for Estonian context:
 - qualitative assessment of different CRM approaches against agreed objectives
 - quantitative assessment, including socio-economic welfare impact, of different CRM approaches

NEXT STEPS

- Outlining next steps:
 - drawing conclusions from assessment to develop recommendation for Estonia
 - identifying implementation roadmap
 - highlighting detailed design features

EU regulations¹ include specific requirements in respect of any potential CRM

CRM CHOICE AND DESIGN RESTRICTIONS

Strategic reserve first option

a. Requirement to assess whether CRM in form of Strategic Reserve is capable of addressing adequacy concerns

b. **Only if this is not the case** can another type of CRM be implemented

CO₂ limit restrictions

New Generation capacity coming online on or after 4 July 2019 is **not eligible** if it emits **more than 550g CO₂** of fossil fuel origin per kWh.

Old From 1 July 2025, generation capacity that was online before 4 July 2019, is **not eligible** if it emits:
- **more than 550g CO₂** of fossil fuel origin per kWh; and
- **more than 350kg CO₂** of fossil fuel origin on average per year per installed kWe

DESIGN PRINCIPLES FOR CRMs

CRM shall...

- Be temporary
- Not cause undue market distortion and not limit cross-zonal trade
- Not go beyond what is necessary to address specified adequacy concerns
- Select capacity providers via a transparent, non-discriminatory and competitive process
- Provide incentives for capacity providers to be available in times of expected system stress
- Ensure that remuneration is determined through the competitive process
- Set out technical conditions for participation in advance of the selection process
- Be open to all resources capable of providing the required technical performance

¹ – Electricity Regulation 2019

Qualitative assessment of CRM options suggests that Strategic Reserve is the best option for the Estonian context

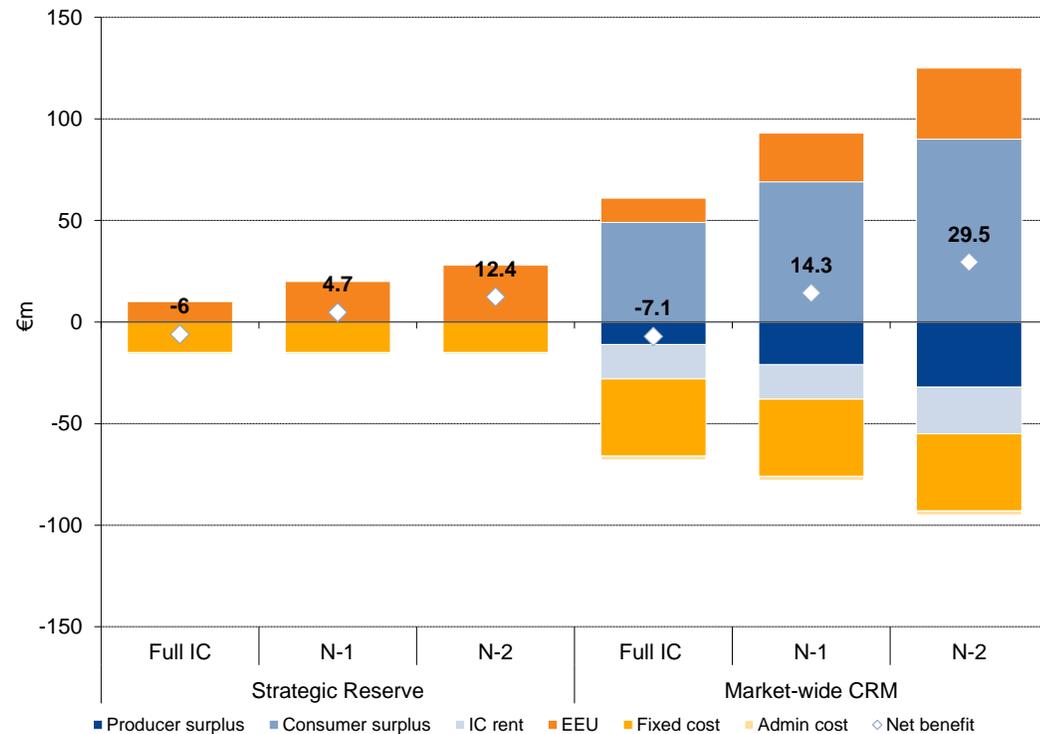
Rank	Model	Compatibility of solution with problem		Appropriate allocation of responsibilities		Relative ease of EC clearance		Minimising energy market impact		Administrative ease	
1	Strategic reserve	✓	Targeted solution to alleviate adequacy concerns linked to low probability risk of simultaneous interconnector outages	✓	Central management of risks of low probability interconnector outages is appropriate	✓	EC's starting option if the need for intervention to introduce some form of CRM is demonstrated	✓	Good design minimises distortion and market-led investment continues	✓	Simplest of the CRM options to implement and operate
2	Capacity auction for reliability option capacity contracts	✗	Models better suited to coverage of peak demand conditions, rather than interconnector outages	✓		✗	More challenging than strategic reserve in terms of EC approvals	✓	Investment driven by CRM, but CRM penalties encourage effective price formation	✗	Centralised schemes with associated administrative complexities
3	Capacity auction for non-option capacity contracts	✗		✓		✗		✗	Investment driven by CRM and administered CRM penalties do not support effective wholesale price formation		
4	Decentralised obligation	✗		✗		✗		✗	Investment driven by CRM and administered CRM penalties do not support effective wholesale price formation		
					Retailers not best placed to manage risks of concurrent interconnector outage risks						

Framework for quantitative assessment attempts to capture the differences between CRM designs in terms of economic welfare and distribution of surplus

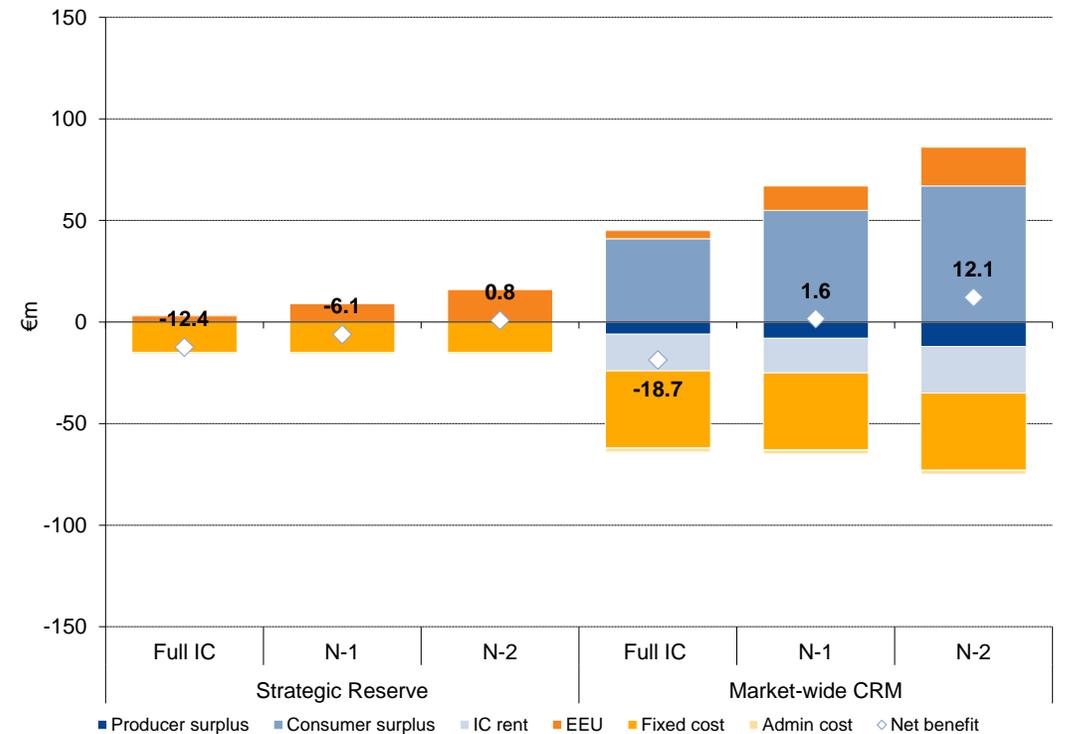
Counterfactual	Two CRM design options are assessed against the energy-only market option (status quo) – we assume that an energy-only market may not deliver the desired security standard
Geographical perimeter	The modelled region includes the Baltics, Nordics and Poland
Security standard	We used a statutory security standard of 9h LOLE
Modelled years	2027 to capture the full effects of de-synchronisation and 2031 to highlight impact of oil shale closures
Demand, capacity and commodities	2019 Elering SoS report for Estonia and the ENTSO-E National Trends scenario for all other countries
Modelling platform	We used AFRY’s in-house electricity market model, BID3

The Strategic Reserve option delivers more moderate results in both directions

2027



2031



The above charts include the results from the analysis that assumes oil shale unit opt out of the CRM. We have also explored an alternative world, where oil shale units restrict their operating hours to be eligible for a CRM contract.

Our conclusion is that a Strategic Reserve approach is the best fit for Estonia

CONCLUSIONS AND RECOMMENDATION

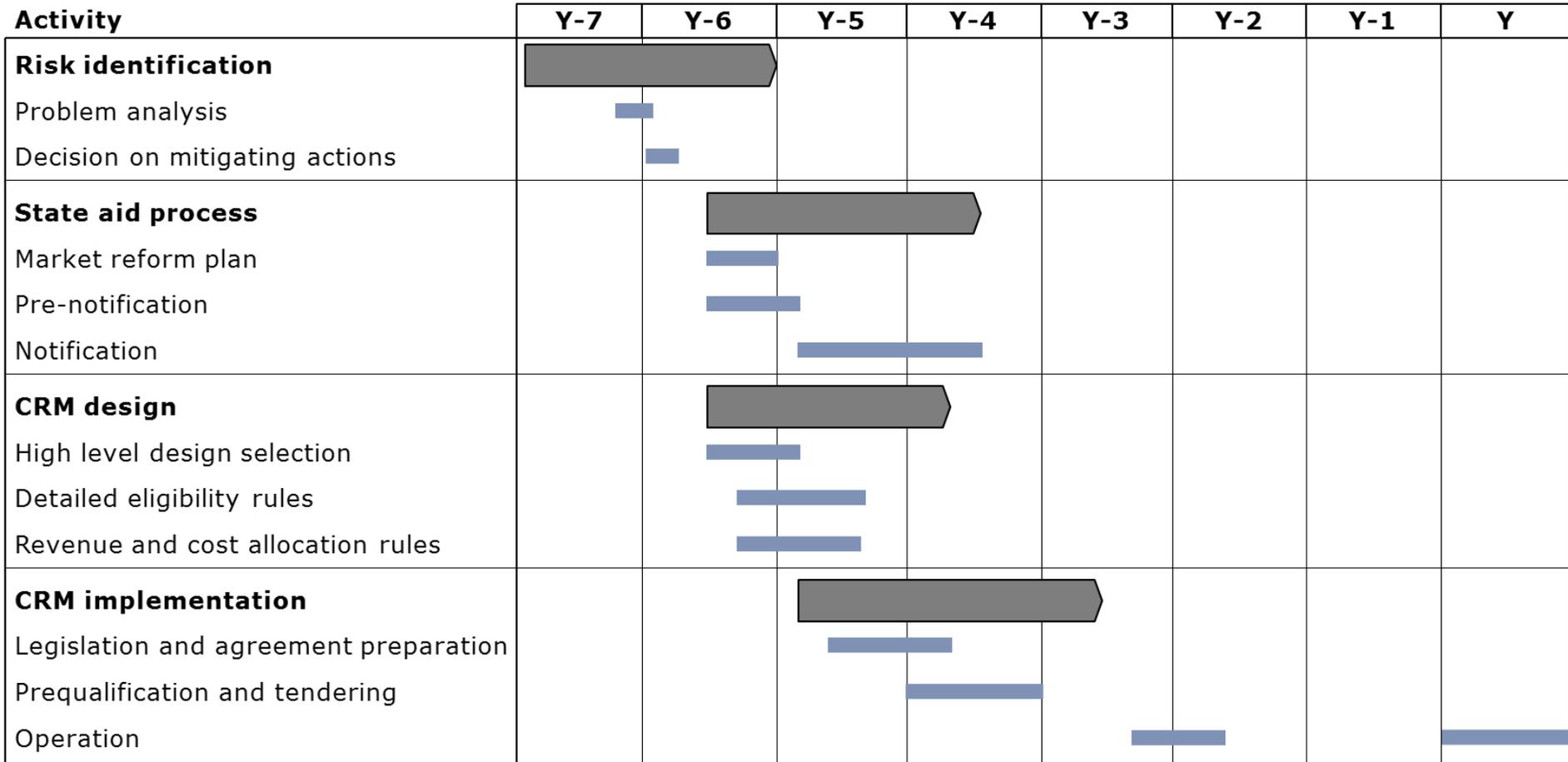
- **Strategic Reserve approach is a better fit for the Estonian context:**
 - possible security of supply issues linked to low probability, simultaneous interconnector outages and targeted solution is considered to work better than the broad CRM options to cover this risk;
 - if designed well, strategic reserve minimises the potential for distortion to the wholesale market;
- There is **nothing to indicate that a Strategic Reserve model will not resolve Estonia's adequacy issues** if a CRM is demonstrated to be required:
 - given Electricity Regulation 2019 requirements, options other than Strategic Reserve can only be considered if Strategic Reserve is shown to be incapable of addressing resource adequacy concerns;
 - assessment does not indicate that a Strategic Reserve will be deficient, so other options are precluded from consideration.

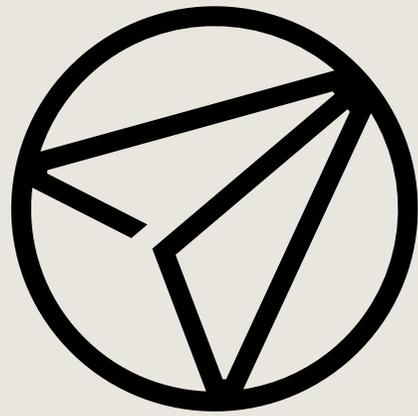
UNDERLYING DESIGN DETAILS TO BE DETERMINED

- If strategic reserve implementation in Estonia is to be considered further, underlying design details need to be defined, with a requirement for supporting analysis, including in respect of the following features:
 - capacity requirement needed to alleviate adequacy issues;
 - notice period for response of contracted capacity;
 - response duration requirements and minimum running times;
 - criteria for utilisation and market pricing arrangements;
 - contracting process; and
 - commercial arrangements.

INDICATIVE IMPLEMENTATION TIMELINE

Process for implementation could require 7 years before time of actual 'need', although preparatory works means that headway already made





AFRY

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