



Hybrid electric market models: key principles and possible approaches

Presentation to IAEE conference

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OBJECTIVES AND FOCUS OF THE PAPER

Focus of the paper

Electricity markets in Europe have evolved towards hybrid markets combining price signals from short term markets with a wide a range of planning and contractual mechanisms.

This paper provides:

- A review of the issues that are driving the need for such evolution of the market design towards hybrids
- An analysis of the key design features of an efficient hybrid market investment framework
- A structured review of the different approaches for hybrid markets
- An analysis of the pros and cons of different hybrid market approaches against a set of criteria

Content of the presentation

- A. Introduction: Diagnostic of the issues with the current market design and need for hybridation
- B. Key features of an efficient hybrid market investment framework
- C. Key design choices for a hybrid market investment framework
- D. Impact assessment & conclusion on the recommended investment framework

A. Introduction: Diagnostic of the issues with the current market design and need for hybridation



STEPPING UP AND SECURING INVESTMENTS IN THE EU POWER SYSTEM IS KEY TO MAKE THE EU DECARBONISATION AMBITION A REALITY

Historically most EU investments in the power sector were made under regulation or supported by long term contracts

- Based on the current regulatory framework, only a small share of total generation investments in the next decade are expected to be merchant

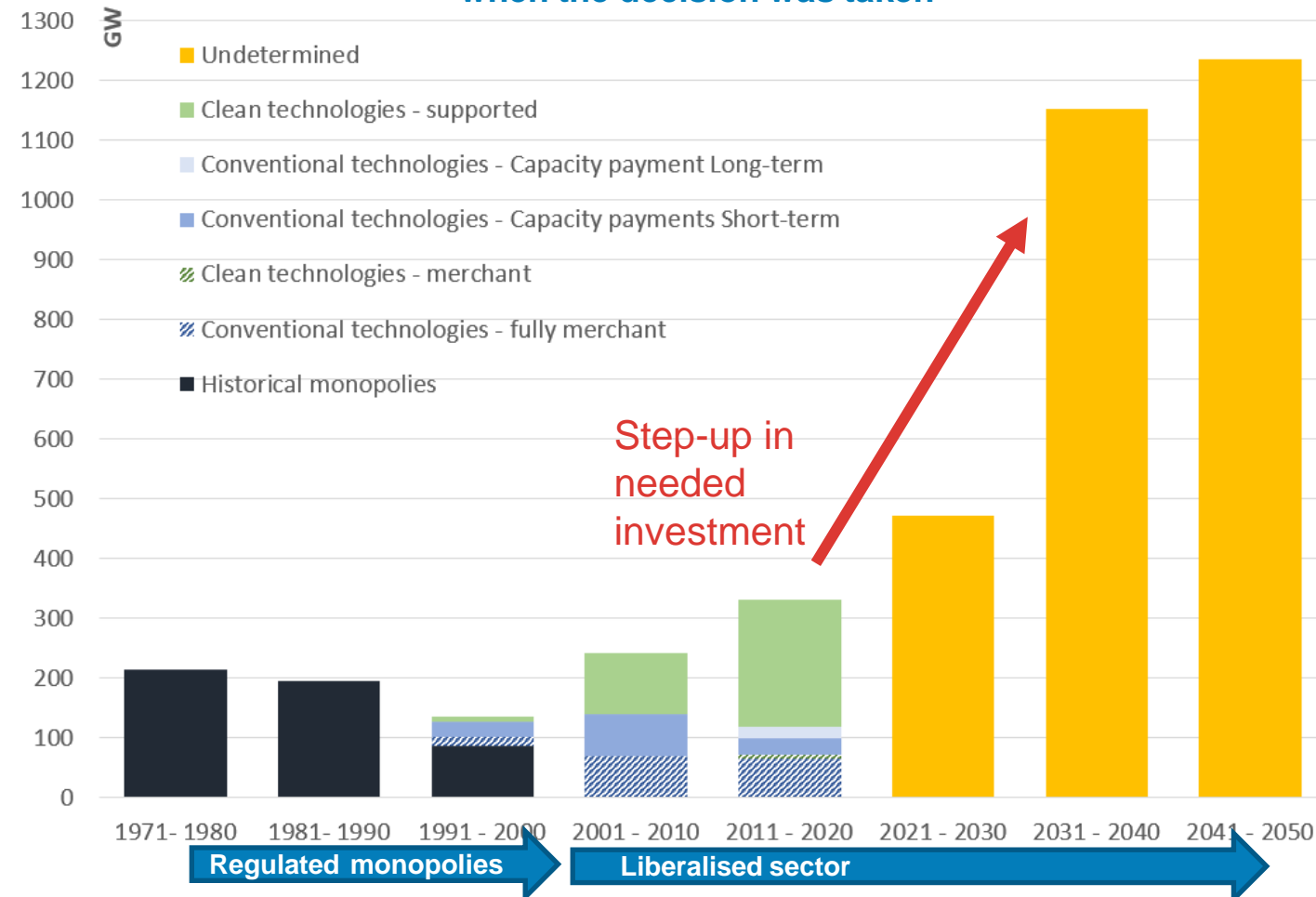
The Green Deal requires a step up in power sector investments

- 800 bn€ investments needed in power generation in the next decade, a significant increase compared to the previous decades

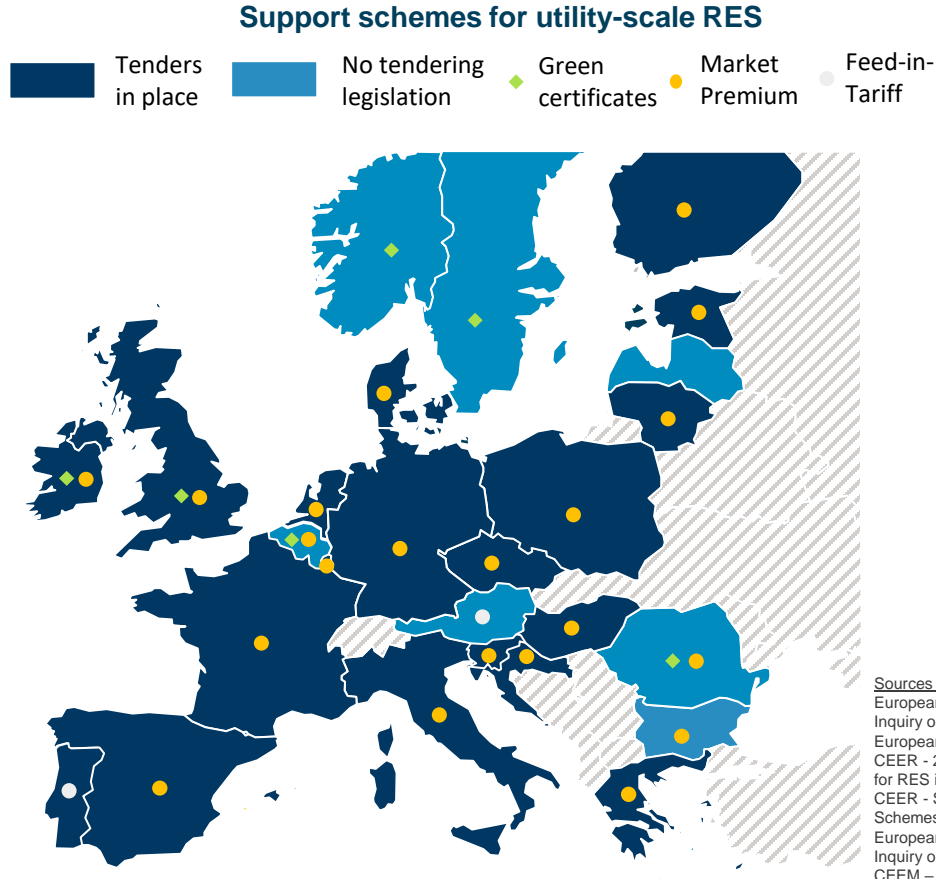
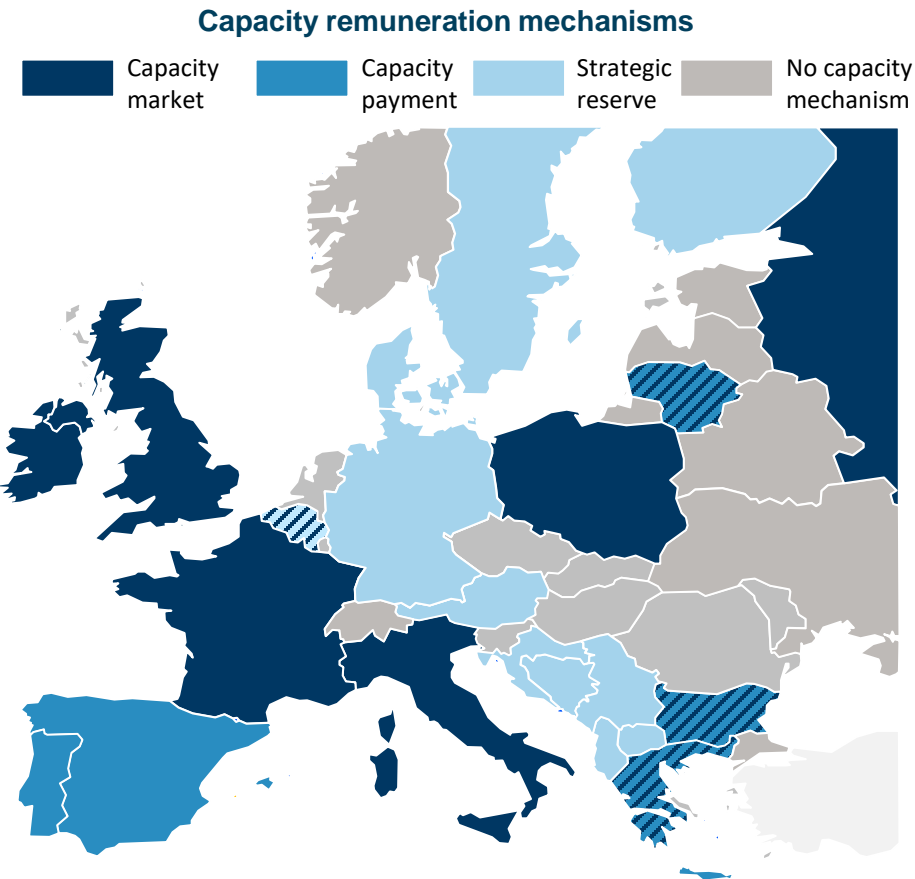
A framework to boost private investment is needed to support the economic recovery and energy sector decarbonisation

- Private investments in energy assets can play a key role in the economic recovery but requires a sound investment framework

Capacity additions in Europe based on the regulatory framework when the decision was taken



THE CURRENT SET OF PATCHY & TEMPORARY NATIONAL CAPACITY MECHANISMS AND RES SUPPORT SCHEMES LACK A COORDINATED AND CONSISTENT INVESTMENT FRAMEWORK

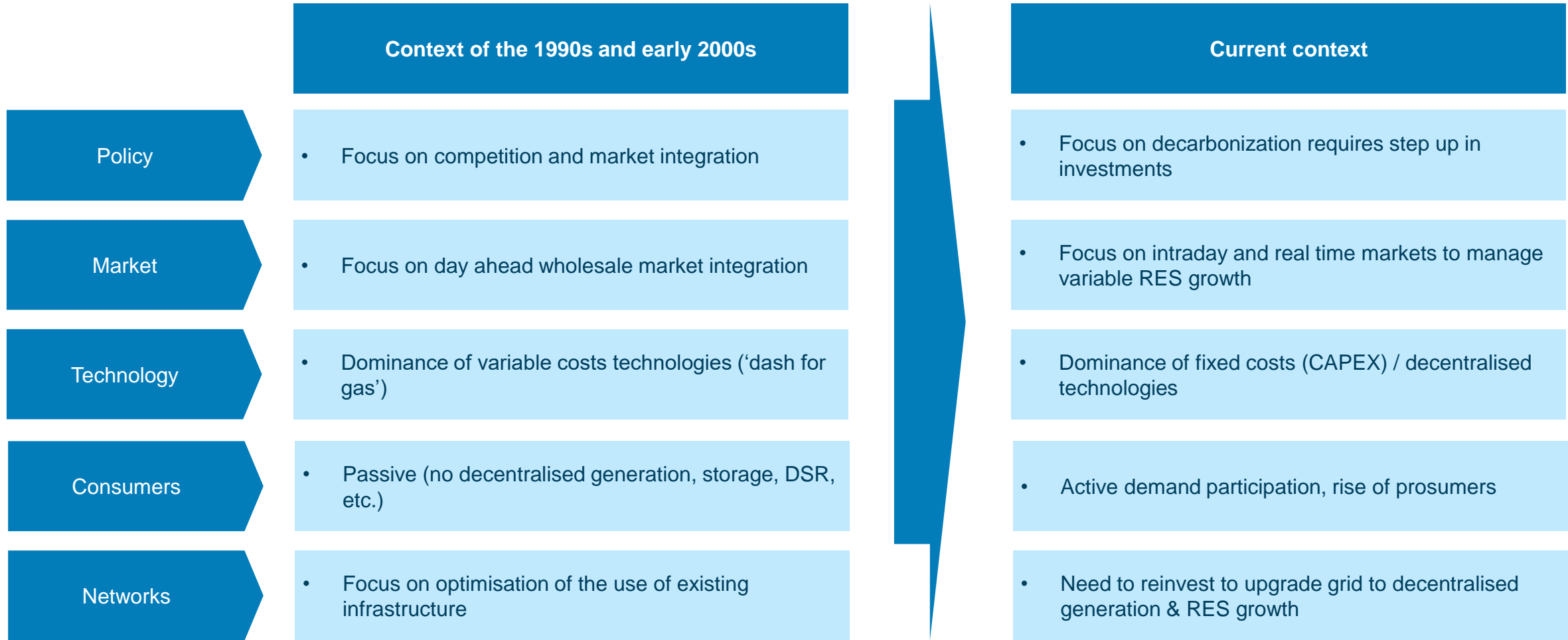


Sources :
 European Commission - Final Report of the Sector Inquiry on Capacity Mechanisms
 European Commission - RES Legal CEER - 2nd CEER Report on Tendering Procedures for RES in Europe
 CEER - Status Review of Renewable Support Schemes in Europe for 2016 and 2017
 European Commission - Final Report of the Sector Inquiry on Capacity Mechanisms
 CEEM – Capacity Remuneration in power markets : an empirical assessment of the cost of production

CL Intelligence

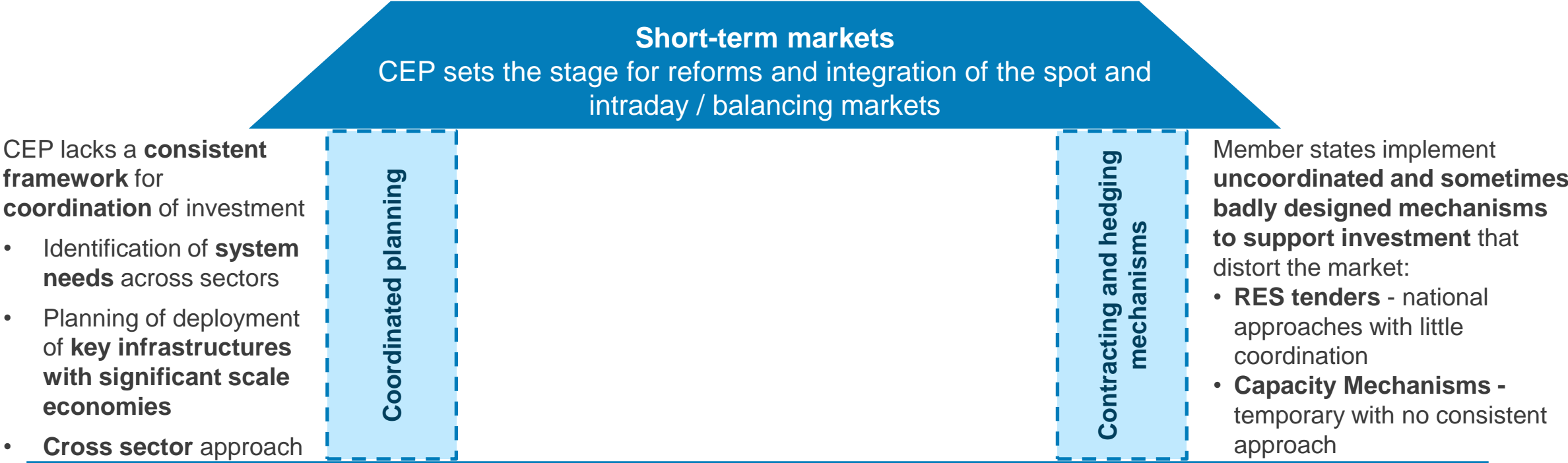
In practice most countries have put in place some form of tendering and/or long term contracts to support investment in clean technologies and/or dispatchable resources

THE CURRENT MARKET MODEL WAS DESIGNED IN A DIFFERENT CONTEXT AND FOR DIFFERENT POLICY OBJECTIVES



THE EU CLEAN ENERGY PACKAGE IS AN IMPORTANT STEP FORWARD BUT LACKS AN INVESTMENT FRAMEWORK TO DELIVER ON THE POLICY OBJECTIVES

- The **Clean Energy Package** sets out general principles to improve the EU electricity markets focusing on the existing set of short-term markets
- But does not provide an investment framework with a structured and coordinated approach for **planning across sectors** and **contracting/hedging mechanisms in order to deliver the investments required to meet the decarbonisation policy target**



B. Key features of an efficient hybrid market investment framework



THE IMPLICATIONS OF THE CHANGES IN CONTEXT AND POLICY PRIORITIES FOR ELECTRICITY MARKET DESIGN AND THE WIDER REGULATORY FRAMEWORK

Drivers of change

- Change in cost structure towards fixed costs
 - Impossibility to depoliticize choice of technologies as market entry / exit driven by out of market mechanisms
 - Policy and regulatory risks and uncertainties increasingly embedded in market price signals
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- Cross sector integration horizontally (between energy sources) and vertically (electrification of end uses)
 - Deep uncertainties on transition pathways with large economies of scale for some infrastructure (electrolysers, H2 network, etc.)

Need to decouple:

- Short term market and system operation signals based on marginal prices (static market efficiency)
- Long term investment / retirement coordination and cost recovery ensured by planning and long term contracts (dynamic efficiency through competition 'for' the market)

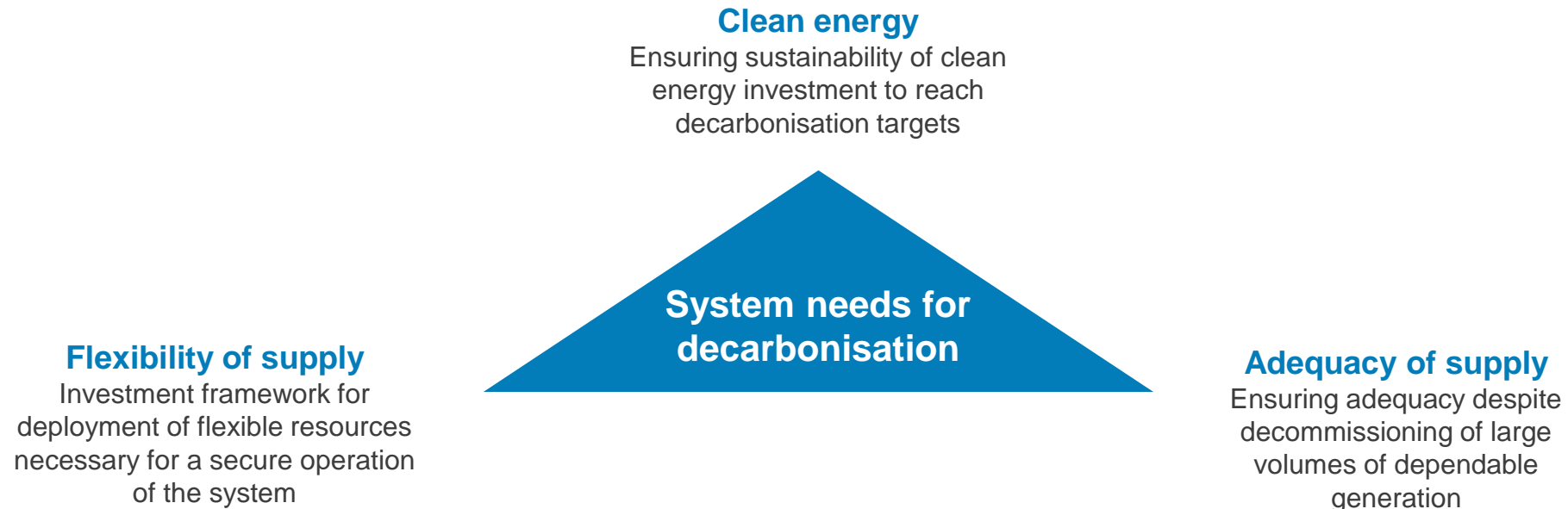
Need to coordinate deployment of critical infrastructures:

- Integrated planning of "low regret" infrastructures with significant economies of scale and generation investments
- Commitment from governments ensured through long term contracts / RAB approach to reduce cost of capital

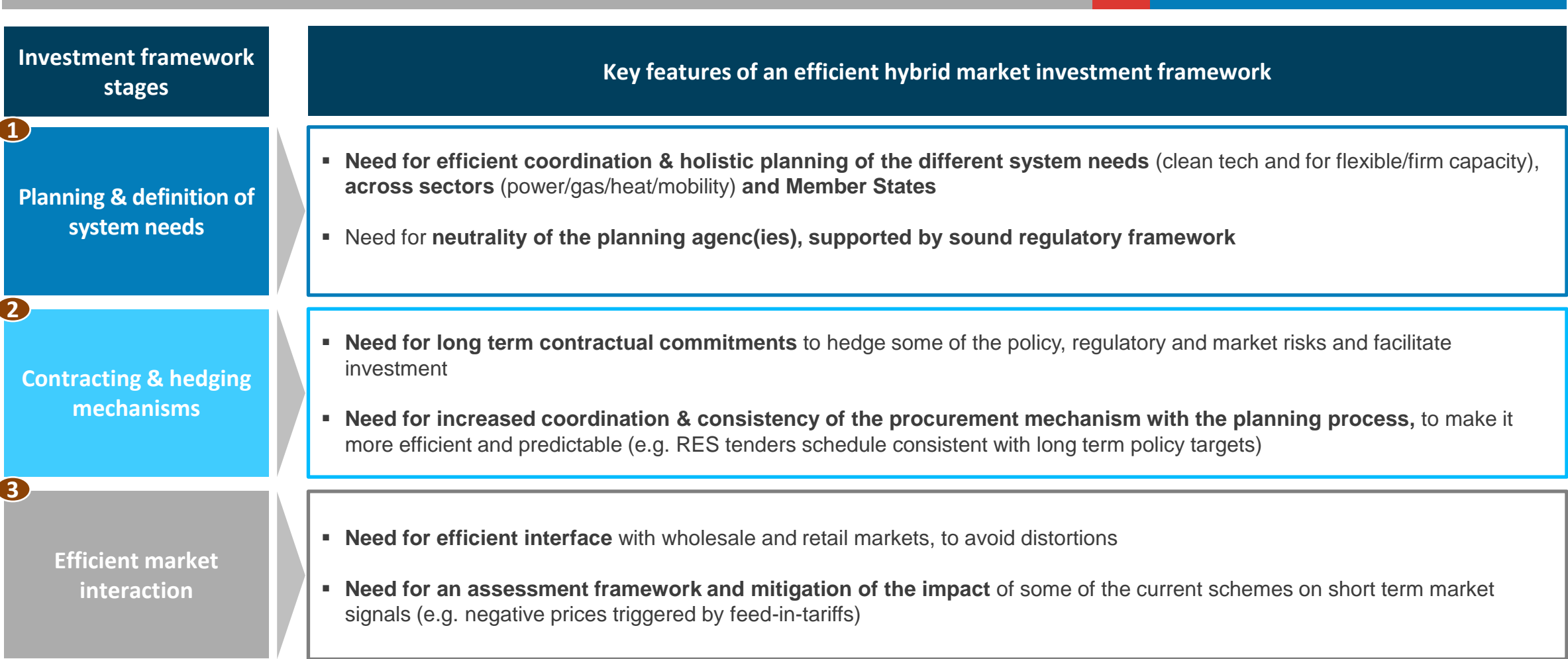
HYBRID POWER MARKETS SHOULD SECURE THE POWER SYSTEM NEEDS FOR DECARBONISED, FLEXIBLE AND DEPENDABLE ENERGY

The investment framework needs to address the different system needs stemming from the EU decarbonisation objectives

- The electricity sector is moving away from a single energy commodity approach towards differentiated system needs (firm capacity, flexibility capacity, green energy)
- The market design will need to reward resources based on their contribution to these different system needs and create a level playing field



THE THREE KEY MISSING ELEMENTS FOR AN EFFICIENT HYBRID MARKET FRAMEWORK: PLANNING, CONTRACTING AND EFFICIENT MARKET INTERACTION



C. Key design choices for a hybrid market investment framework



THE INVESTMENT FRAMEWORK NEEDS TO BE ARTICULATED IN THREE KEY SEQUENTIAL STAGES: PLANNING, CONTRACTING/HEDGING & MARKETS INTERACTION

A range of alternative market design approaches can be identified depending on some fundamental premises and trade-offs summarised by the questions below

Planning and definition of system needs

Need for coordination and planning (given uncertainty on technology evolution and costs)

- Is the planning done for **indicative purposes** or aims to **inform procurement of resources**?
- Does the planning focus on the **entire need** for investment or the **minimum (backstop) need** for investment?
- Does the planning imply a **centralised or a decentralised definition of the need** for investment?

Procurement and contracting

Need for long term contractual commitments to hedge some policy, regulatory and market risks

- Does procurement cover the **entire need** or the **minimum need**?
- Is the procurement based on **centralised auctions** or a **decentralised obligations**?
- How are the long-term contracts/arrangements defined?

Interaction with wholesale and retail markets

Need to ensure efficient interface with wholesale and retail markets

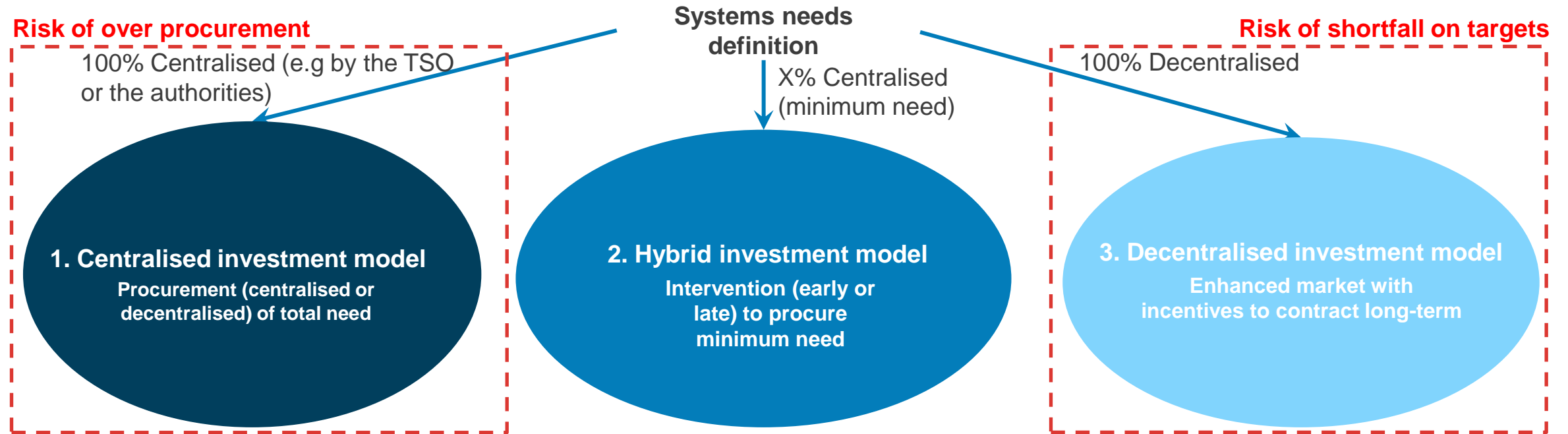
- How does the mechanism **define of the product(s)** procured?
- How does the mechanism defines the **interaction of the investment product with the spot market**?
- How does the mechanism articulate with **retail market and fosters competition**?

WE ASSESS 3 ALTERNATIVE HYBRID MARKETS APPROACHES

THE FIRST STAGE DEFINES THE ROLE AND NATURE OF THE PLANNING OF SYSTEM NEEDS

The first stage of the hybrid market starts with the definition of the role and nature of the planning process for the system needs – key questions include:

- Who is best placed to define the system needs? A centralised entity? Or market participants / consumers themselves?
- In case of central need definition, how much of it should be defined centrally? All of it? The minimum (“default service obligation”)?



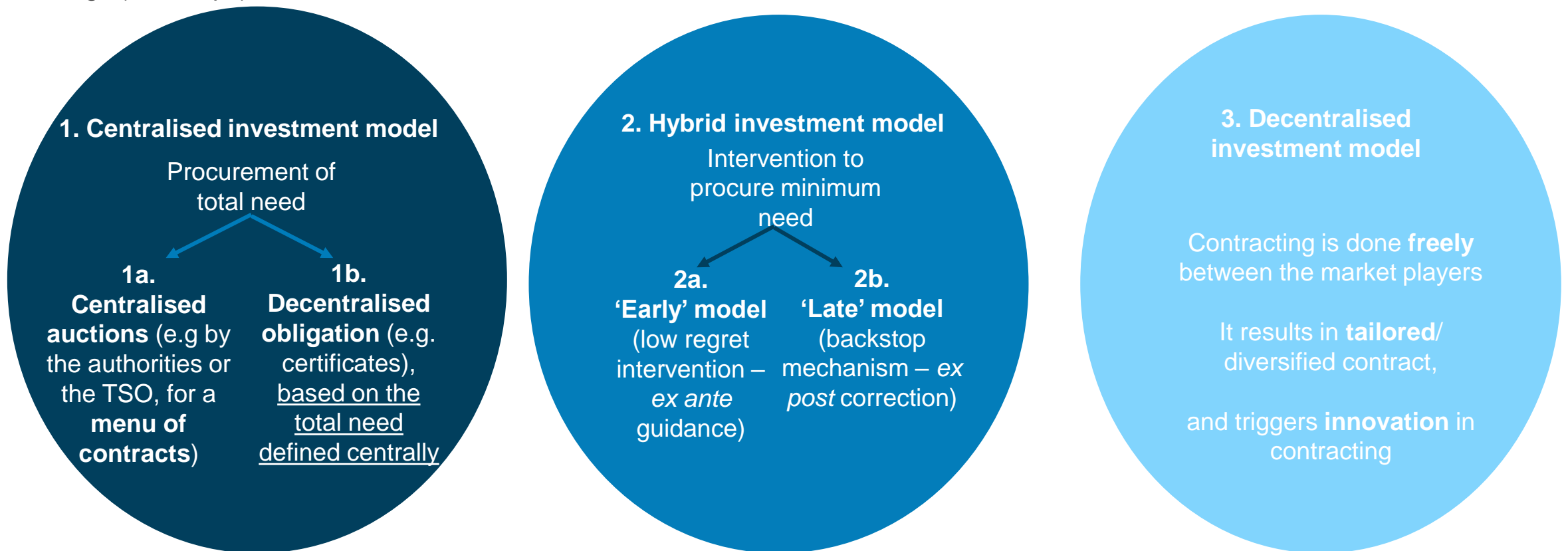
The hybrid investment model (where only the minimum system need is centrally procured) has many advantages to overcome the pitfalls of the fully centralised and decentralised investment models

WE ASSESS 3 ALTERNATIVE HYBRID MARKETS APPROACHES

THE SECOND STAGE IS THE PROCUREMENT AND CONTRACTING ARRANGEMENTS

The **second stage of the hybrid market** is the definition of the investment model focussed on the procurement mechanism and interface with the market involves two key questions:

- In case of centralised need definition, who is best placed to procure it? A **centralised** entity? Or market participants (**decentralised** obligation)?
- In case of centralised definition of the minimum need, when should the (limited) centralised procurement occur? At an **early** stage? At a **late** stage (backstop?)



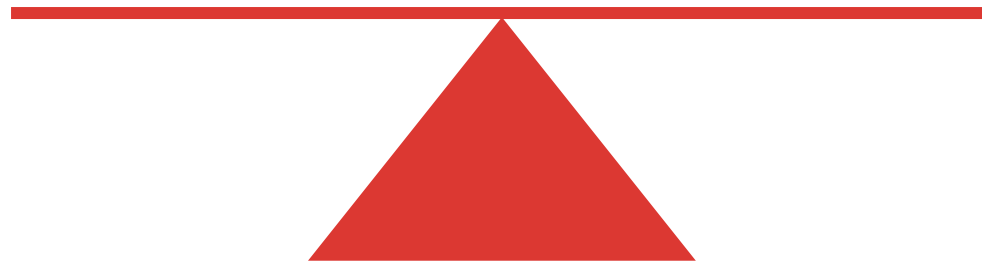
D. Impact assessment & conclusion on the recommended investment framework



WE ASSESS 3 ALTERNATIVE HYBRID MARKETS APPROACHES : KEY POLICY TRADE OFFS TO DETERMINE THE MOST SUITABLE AND EFFICIENT APPROACH

The design of the investment framework involves a set of trade-offs for policy makers at the national and European levels:

- Sufficient **certainty** on reaching the decarbonisation objectives?
- Risk of **over-procurement** versus cost of the **insurance**?
- Principles agreed at **EU level** but specifics set at **national level** to account for national specificities?
- Sufficient **freedom** and flexibility embedded in the investment framework to support **innovation**?
- Efficient **allocation of risks** to investors / state to minimize risks of **stranded assets**?
- Framework facilitating **financing** and deployment of **new business models**?



The preference for one of the three variants of the investment frameworks will depend on key policy choices defining the allocation of risks and degree of certainty on achieving the policy targets

IMPACT OF THE ALTERNATIVE HYBRID ELECTRICITY MARKET APPROACHES

Market design criteria	Impact on market design criteria	0. Current market model	1a. Centralised model – centralised auctions	1b. Centralised model – decentralised obligation	2a. Hybrid model – Early model	2b. Hybrid model – Late model	3. Decentralised model
1 Address policy objectives	<ul style="list-style-type: none"> Centralisation of definition of need and procurement guarantees achievement of policy objectives 	---	++	++	+	+ -	-
2 Efficient investment signals across generation and networks (DSO and TSO)	<ul style="list-style-type: none"> Centralisation of procurement through long-term contracts tends to provide clearer investment signals than decentralised options Stranded costs minimisation 	---	+	+	=	-	-
3 Efficient allocation of risk	<ul style="list-style-type: none"> Centralised definition of need may result in too much risk on customer Too much decentralisation may result in too much risk for suppliers and generators 	---	=	+	+	+	-
4 Minimise cost of capital	<ul style="list-style-type: none"> Centralised definition of need and procurement would tend to reduce exposure to market risk and reduce cost of capital 	---	++	+	+	=	-
5 Acceptability, complexity & compatibility with EU framework	<ul style="list-style-type: none"> Centralised long-term contracts is at odds with competition and state aid regulation Centralised approaches impact existing entities and governance (e.g. DSO and TSO) 	++	-	=	=	+	+

CONCLUSION: KEY MESSAGES OF THE STUDY

1. **The current EU power market design requires a rethink to step up investment** and deliver on the increased climate change mitigation ambition as it lacks a coordinated and predictable investment framework
2. **There is a gap between the perception and the reality of what is driving investment in power markets:** uncoordinated and sometimes distortive national interventions and support mechanisms are the norm rather than the exception
3. **The decarbonisation of the power sector raises new challenges that require an investment framework with two key features:**
 1. A more **structured and coordinated planning approach** across sectors at the local, national and EU level to deliver on policy objectives
 2. **Long term contracting mechanisms allocated competitively** (“**competition for the market**” followed by “**competition in the market**”) to allocate risks efficiently and facilitate financing and innovative business models
4. **This paper provides an attempt to provide a structured investment framework compatible with the current EU short term power markets, and based on a number of innovative concepts:**
 1. A **new approach to planning under uncertainty**, based on the concept of “**low regret pathways**”
 2. The goal to **combine “the best of both worlds” with enhanced coordination and planning mechanisms** working in synergy with market and competitive auctioning processes to support innovation and minimize costs
 3. The introduction of a set of **long term contracting and hedging mechanisms** to allocate risks efficiently, support innovation and new business models
 4. The development of a “**menu of contracts and products**” to create a level playing field between technologies and an efficient interface with existing markets
 5. The introduction of the concept of “**contractual obligations follows load**” when consumers switch suppliers to ensure compatibility with retail competition

If you have any question about this paper, please contact



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