

An institutional analysis and typology of hybrid markets



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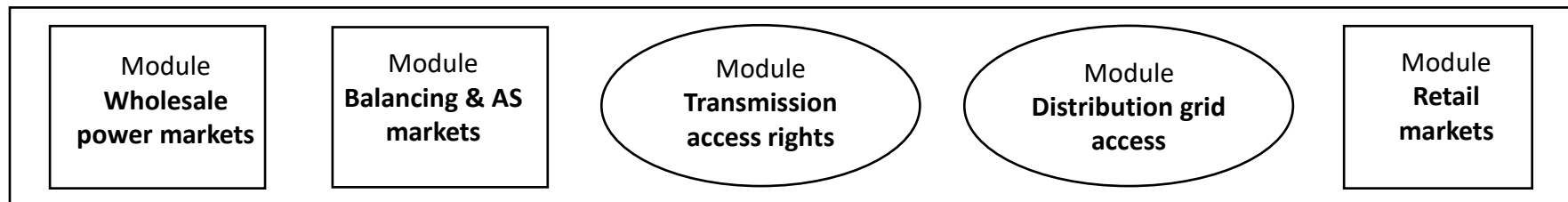
Content – introduction and motivation of the paper

- **There is a growing consensus that the canonical electricity market design (liberalised EOM) is not fit for purpose and that reform is needed to support investments required for decarbonisation.**
 - ✓ A number of countries with liberalised markets have taken steps to introduce some planning and contracting arrangements (e.g., CRMs / tenders of LT contracts for RES)
- **The literature on “hybrid markets” has mainly focussed on (e.g., Roques & Finon, 2013, 2017; Joskow, 2021; Keppler et al, 2021):**
 - ✓ The drivers of the introduction of such complementary planning and contracting mechanisms (e.g., theoretical issues with canonical model of liberalised markets, market and regulatory imperfections)
 - ✓ Possible alternative approaches to introducing contracting, de-risking or hedging schemes to protect consumers and foster investment
- **Yet, little focus on establishing a conceptual framework to explore the range of approaches for “hybrid markets” that have been used by policy makers and regulators to address the different issues with the EOM and support investment for decarbonisation.**
- **This paper addresses this gap in the literature and seeks to analyse the key common features of hybrid markets that are emerging across different countries and to provide a structured analysis and typology of “hybrid markets” [Work in progress].**



Methodology – An institutional economics approach

- This paper uses a conceptual framework inspired from the institutional economics literature to provide a common framework to analyse the various types of hybrid markets in different countries.
 - ✓ The “rational choice” strand of the institutionalist literature initially developed by Williamson (1996) and by North (1990) emphasizes economic gains in terms of social efficiency (including transaction costs).
 - ✓ Baldwin & Clark (2000) introduced the “modularity framework” regarding the design of rules in an industrial organisation.
 - ✓ Glachant & Perez (2009) used this “modularity framework” to analyse the complexity and variety of initial power industry reforms and identified a series of distinct functional and institutional modules along the electricity value chain.
 - ✓ Roques & Finon (2017) built on this framework and identified a number of new “modules” that characterise the evolution of electricity markets given security of supply (capacity mechanism module) and decarbonisation (LT contracts and support for clean technologies)



Core/legacy modules of canonical energy only market model



Introduction of two new modules in hybrid markets (1/2)

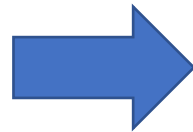
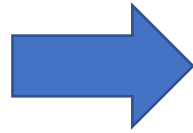
Two main long-term issues with EOM framework

Need for coordination

(short-term price coordination in EOM is not sufficient to drive investments/closures given exogenous policy objectives for decarbonization)

Need for long-term contracts or hedging arrangements

(that do not spontaneously emerge, or not at the adequate level, in an EOM)



Hybrid market modules to address these two issues

Quantity-based coordination and planning of long-term system needs

(e.g., some form of planning, decentralized quantity obligations)

Long-term contractual / hedging arrangements

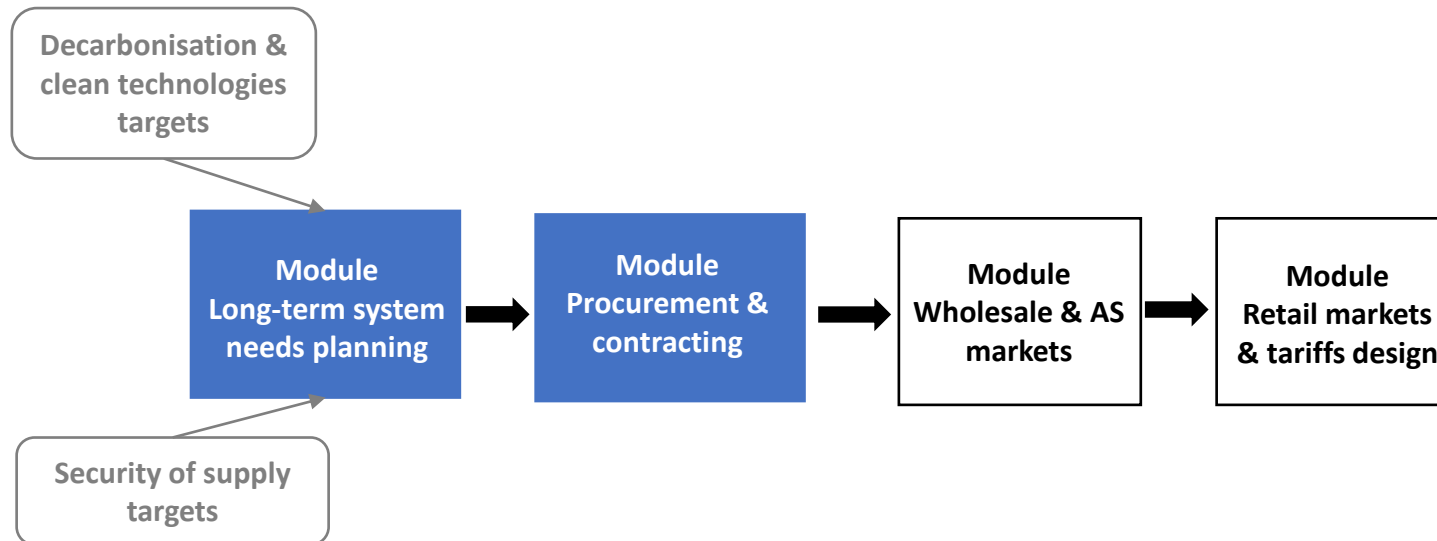
(e.g., obligations to contract, LT centralized auctioning, public long-term counterparty)

Depending on the intensity of these issues, different types of hybrid markets can be considered



Introduction of two new modules in hybrid markets (2/2)

- **Typology of emerging hybrid market models based on two new key modules:**
 - ✓ i) planning module defining the long-term system needs (quantity-based coordination tool);
 - ✓ ii) contracting/procurement module, which ensures the adequacy of investment to meet system needs, allocates risks efficiently, and leverages competition to bring down costs.

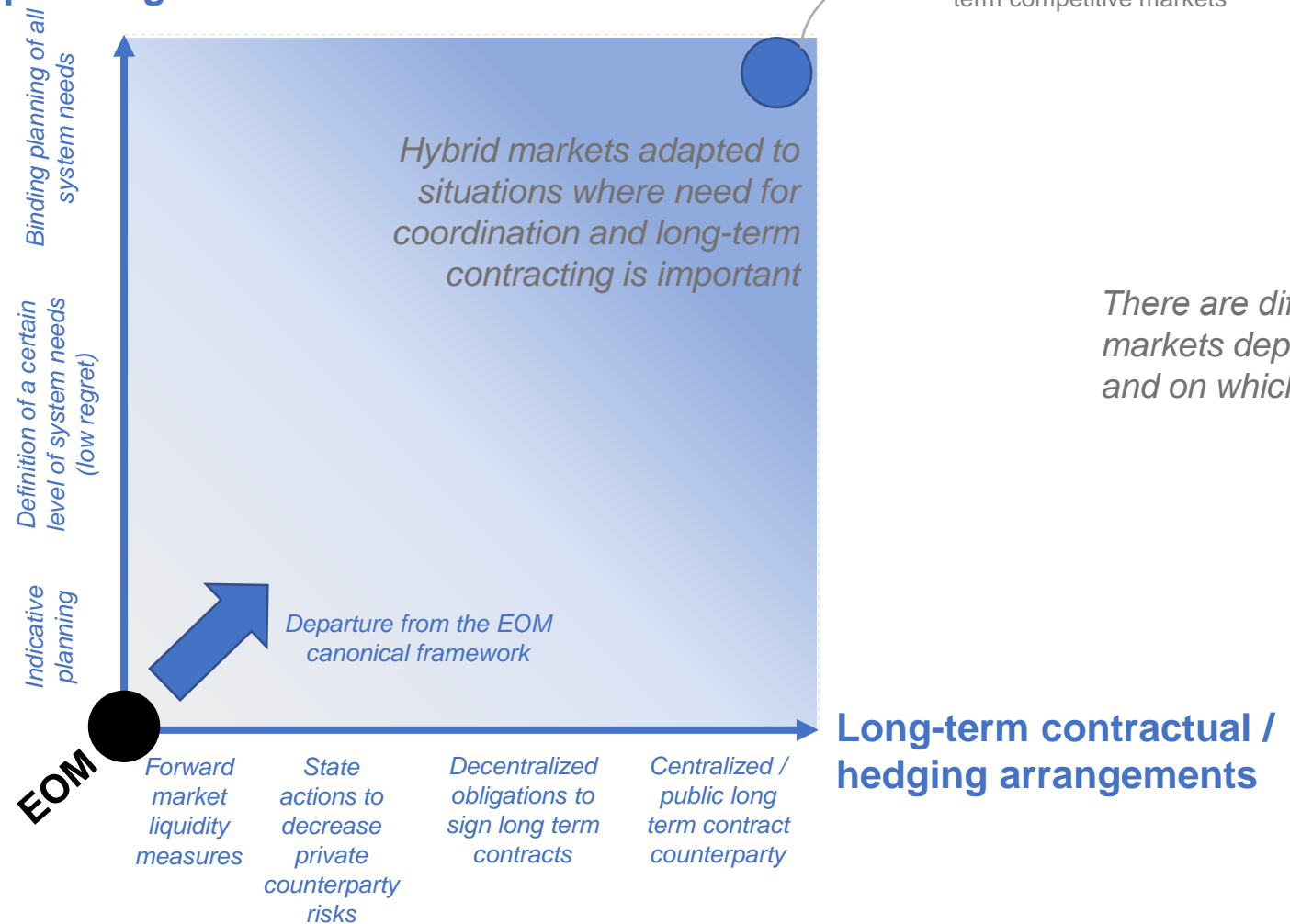


Key: Historical modules in EOM
Exogenous policy targets
New modules in hybrid markets



First tentative typology of hybrid markets (1/2)

**Quantity-based coordination /
system needs planning**

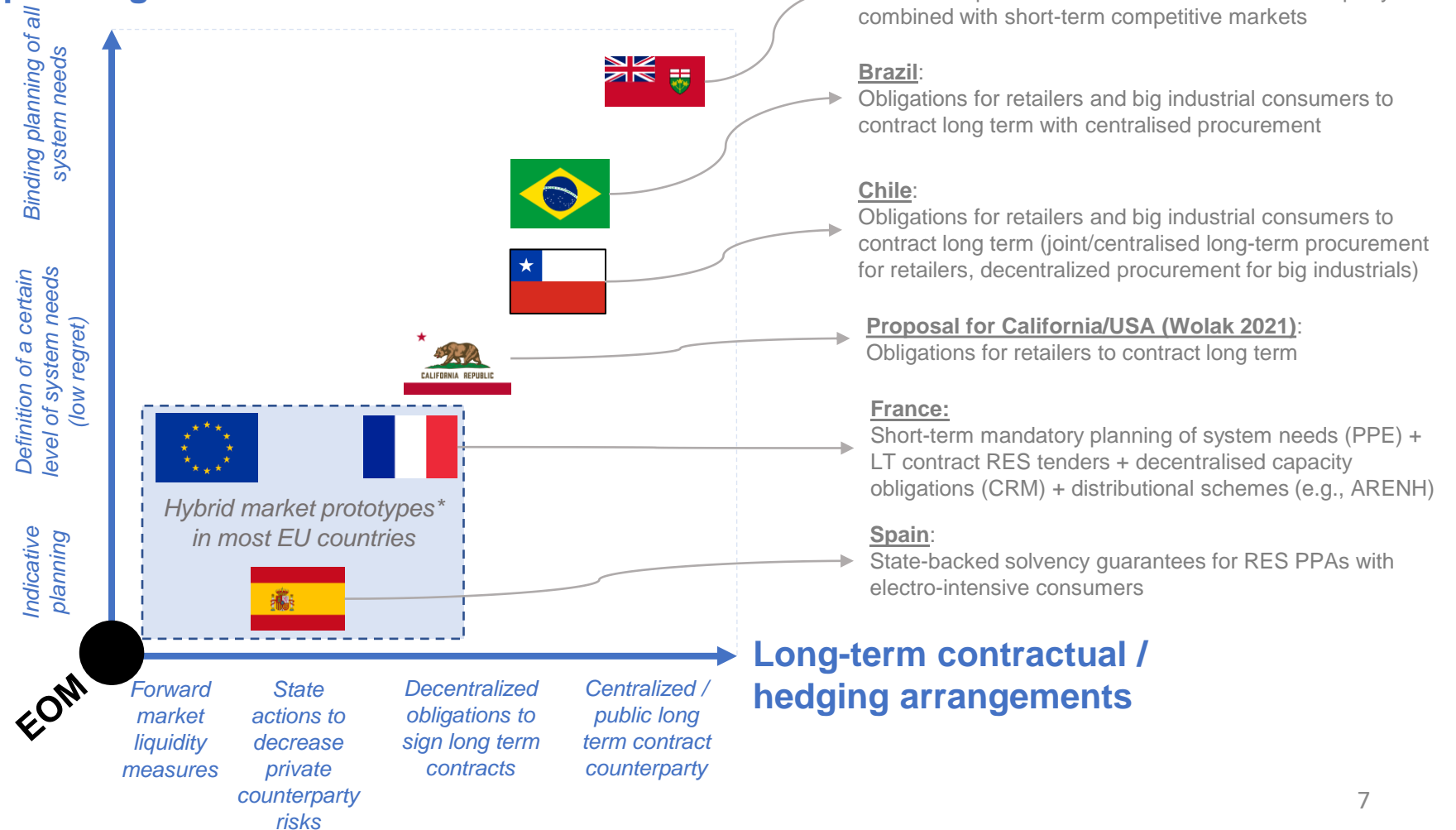


There are different "shades" of hybrid markets depending on local context and on which issues predominate



First tentative typology of hybrid markets (2/2)

Quantity-based coordination / system needs planning



**Prototypes: comprise hybrid design elements but added on top of one another without sufficient coordination or holistic approach from the start*



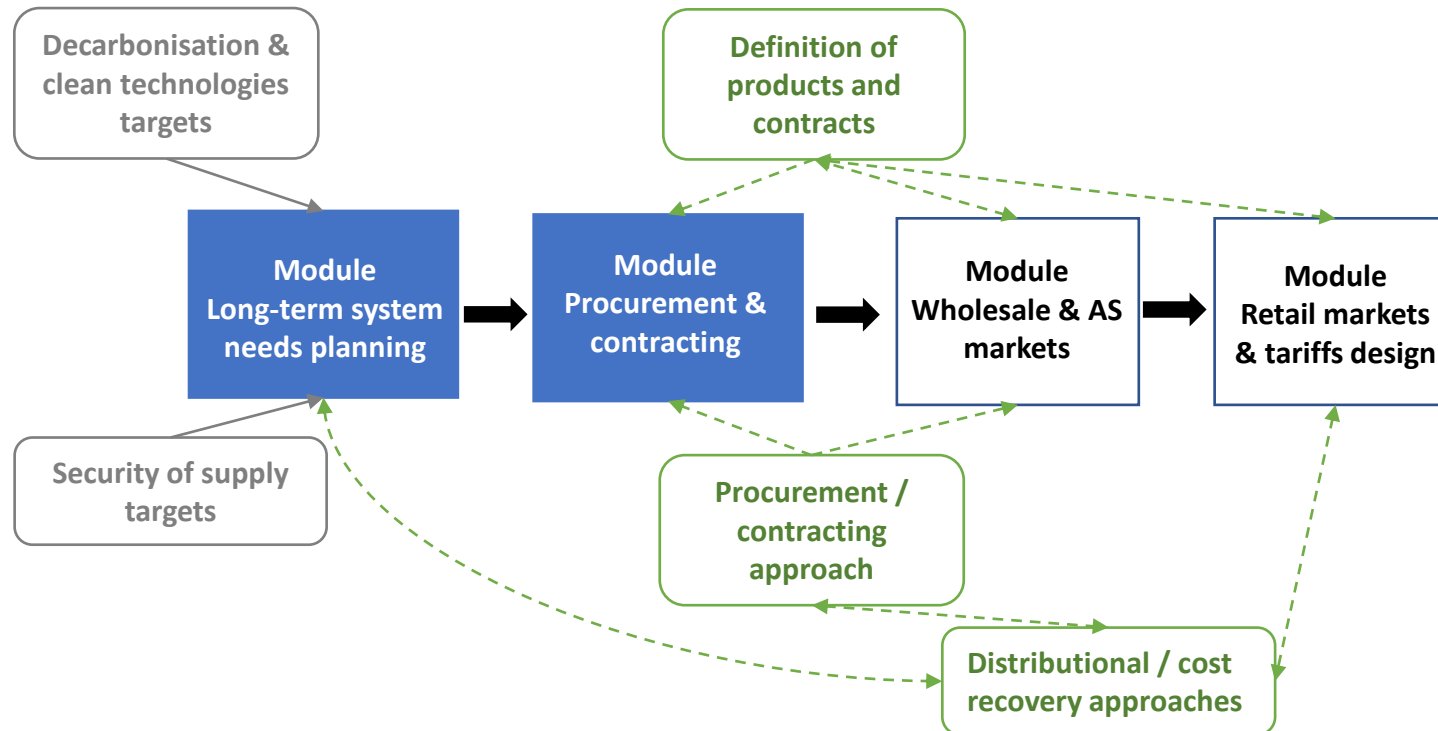
Key issues with the two new modules – Design trade-offs

- **The planning and definition of system needs to meet policy targets and maintain security of supply requires:**
 - ✓ A holistic approach for system planning including electrification of end uses and associated infrastructures
 - ✓ New approaches for planning under (deep) uncertainty to identify low-regret pathways
 - ✓ A rethink of the governance of the organisation / entity in charge of the planning

 - **Procurement and contracting: the forward contracting of some or all of system needs requires the definition of:**
 - ✓ The objectives and timing of procurement
 - ✓ The nature of the contracting process, either centralised or decentralised via the imposition of obligations on suppliers
 - ✓ The type of products and contracts used for forward contracting, their degree of standardisation (e.g., to support a secondary market), how they are auctioned / traded, whether there are state guarantees involved, the type of market clearing, whether there are specific market power mitigation approaches, etc.
- **Rich variety of design choices with important trade-offs to put in relation with policy objectives and contexts**

Key issues with the two new modules – Cross-module interactions

- The functions performed by new modules and how they interplay with legacy modules must be assessed carefully, for instance:
 - ✓ i) the ways in which short-term remuneration of the different resources in wholesale and ancillary services markets interplays with the contracting of different products;
 - ✓ ii) the articulation with retail competition, in particular the issues of allocating the costs associated with forward contracting to different categories of users, or ensuring efficient retail competition through the pass through of the contracting obligations.



Key:
 Historical modules in EOM
 Exogenous policy targets
 New modules in hybrid markets
 New processes / functions



Conclusion and next steps (work in progress)

- **The paper aims to address a gap in the literature by providing a structured analysis and typology of the key common features of hybrid markets that are emerging across different countries.**
- **The paper uses a conceptual framework inspired from the institutional economics literature to provide a common framework to analyse the various types of hybrid markets in different countries. The paper identifies two key new modules, namely:**
 - ✓ i) the planning module defining the long-term system needs (quantity-based coordination tool);
 - ✓ ii) the contracting/procurement module which ensures the adequacy of investment to meet system needs, allocates risks efficiently, and leverages competition to bring down costs.
- **The paper aims to build a typology of hybrid markets based on these two main dimensions and explore a number of case studies**
 - ✓ Still a work in progress
- **Further work will be needed to explore some of the other dimensions that could be included in the typology, for instance:**
 - ✓ Bundled vs. separated products defined by attributes (firm, low carbon, flexible)
 - ✓ Unique vs. several allocation instruments
 - ✓ Upstream-downstream articulation and pricing



Thank you!



Case studies – Analysis of hybrid markets based on typology

Main design elements of the hybrid markets based on the typology

	Brazil	Chile	Ontario
Planning	Independent planning agency EPE	Regulator and ministry	Transmission System Operator IESO
Procurement	Procurement by distributor companies through a centralized market-place	Regulator CNE procures on behalf of distributors who remain off-takers and counterparties.	IESO procures capacity through competitive tenders passing the cost of contracts to consumers
Auction process	Separate procurement of new and existing capacity as well as RES and reserves	Centralised auction with standardized products	Long-term PPAs for the existing generation, competitive tenders and negotiations for new generation
Auction product	Energy quantity products for hydro, PV and wind and energy availability contracts for thermal	Long-term contracts setting maximum amount of committed energy	CfD-like PPAs