AMEU/SAIEE joint virtual webinar

"THE DIGITAL MUNICIPAL Dx ELECTRICTY UTILITY OF THE FUTURE"

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Session 3 -Evolving business models for a sustainable SA Municipal DX electricity utility

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Agenda

Purpose: Review electricity market elements and corresponding impact on South African municipalities

1. The Various Types Of Competitive Electricity Markets
2. Overview Of Competitive Electricity Markets Globally
3. Current SA Electricity Sector Context
4. Overview Of Complexity In Current Proposed Design
5. Impact On Municipalities

1. The Various Types Of Competitive Electricity Markets

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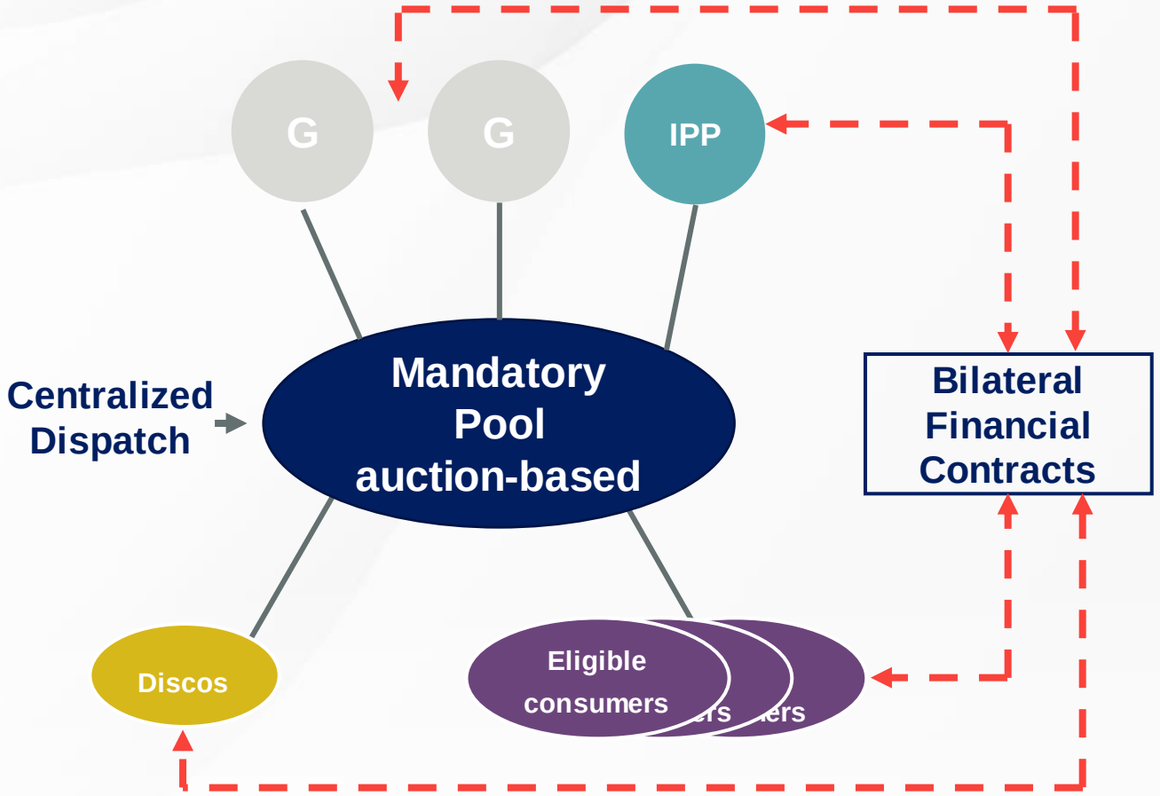
Types of Competitive Electricity Markets.

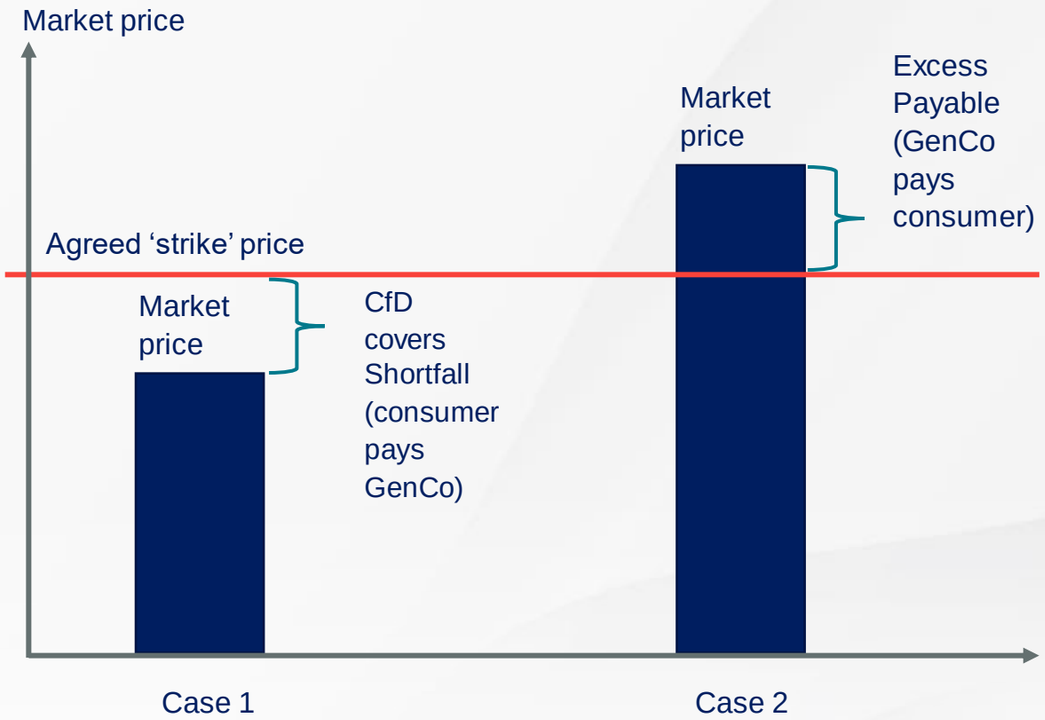
1. Mandatory Pool (Central Dispatch)
2. Self – Scheduled Decentralized Trading Arrangement
3. Hybrid Market Model (Multi - Market Model)

Mandatory Pool. (Centralised Dispatch)

- Mostly used in Latin America and USA.; All GenCos bid into a pool.
- Price risk is hedged by financial contracts.
- Wide differences in implementation: some have nodal pricing, some have bilateral physicals, etc.

Genco pays the buyer

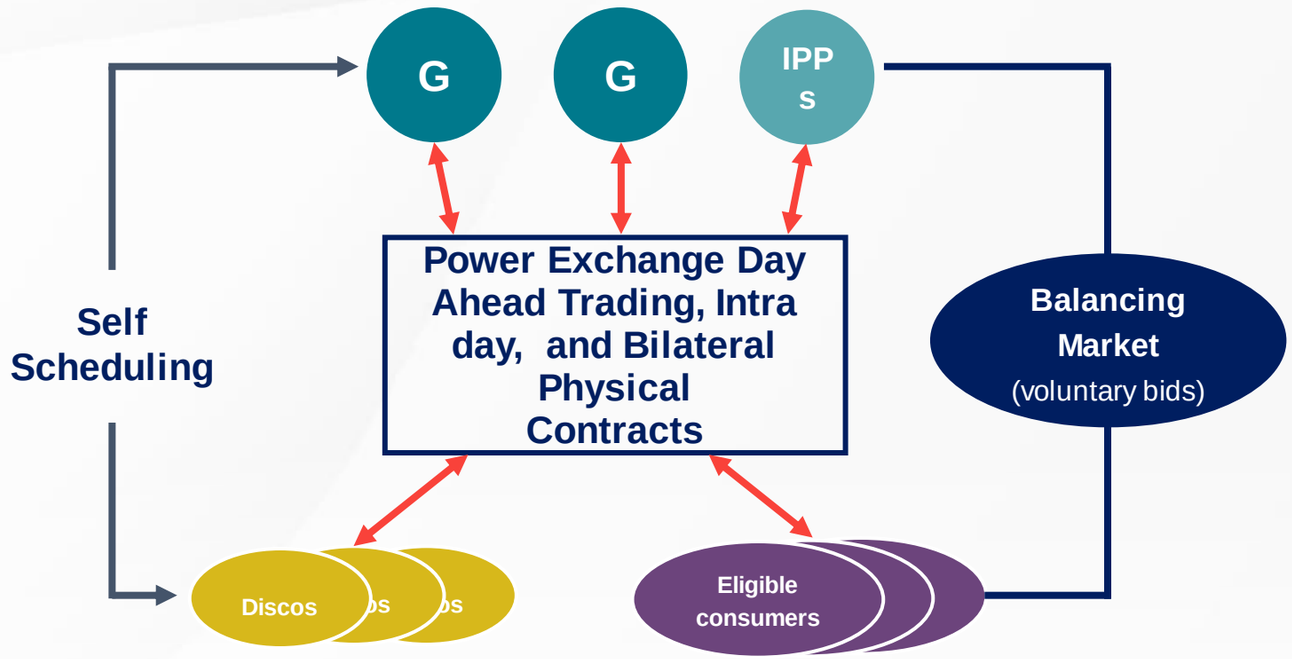




Self-Scheduled Decentralised Trading Arrangement.

(Can Also Be Called A Multi-market Model)

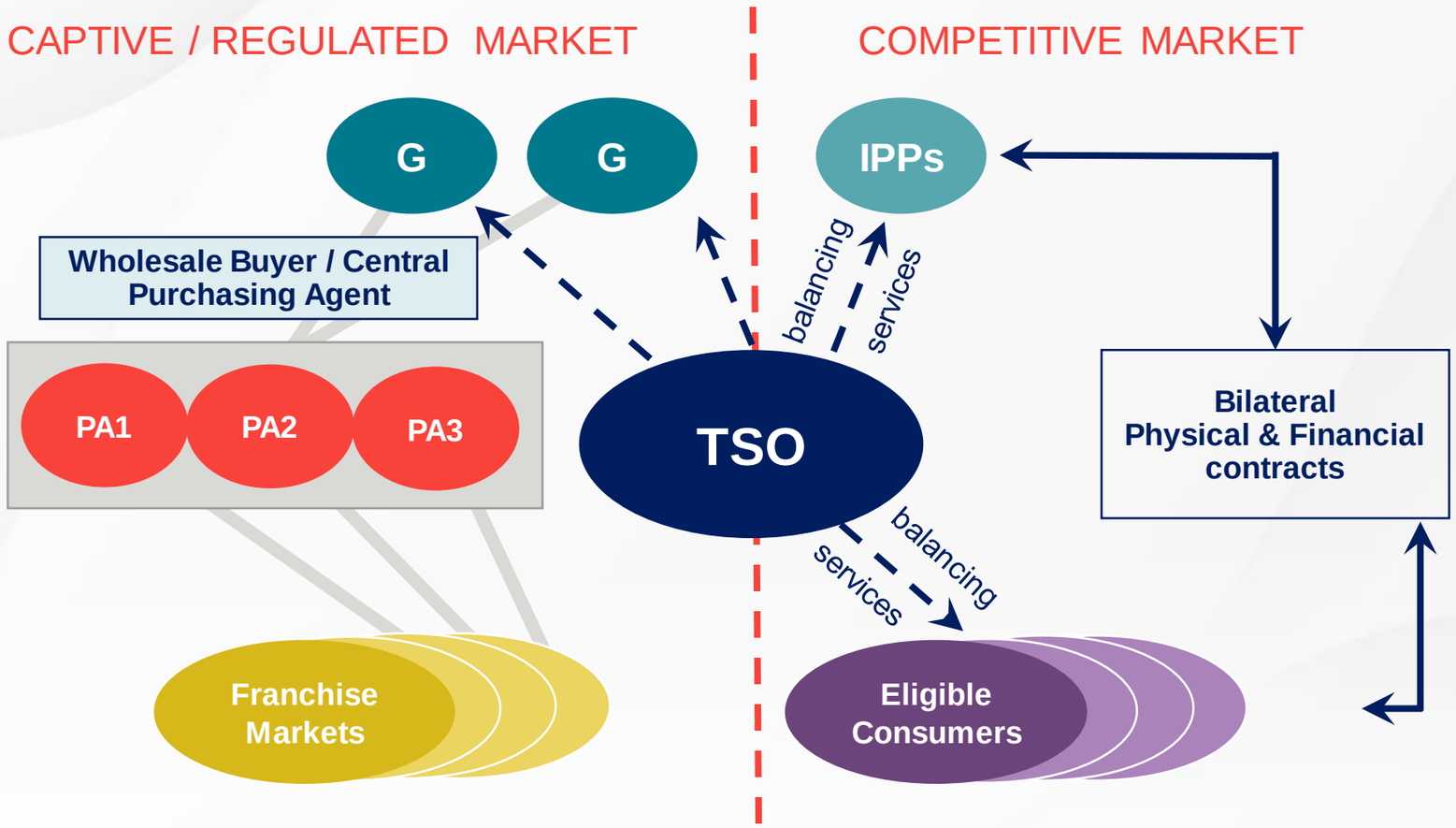
Used in Europe, India, other parts of Asia, SAPP, etc.



Key characteristics

- Balancing market is combined with bilateral physical contracts, day ahead trading (simply 1-hour bilateral trades settled through a Px)
- No usual need for long term bilateral PPAs but renaissance in Europe due to CSR and financing
- Over time, financial contracts to hedge day ahead price (needs to be convinced that the day ahead price is the real one and for this, need sufficient volumes traded in the physical market)
- Separate Capacity markets now in some countries
- Usually evolve over time as there are more and more eligible customers and independent retailers.

Most Common Market In Emerging Markets – Hybrid Market Model For 10-20 Years Until Residential Customers Become “Eligible”



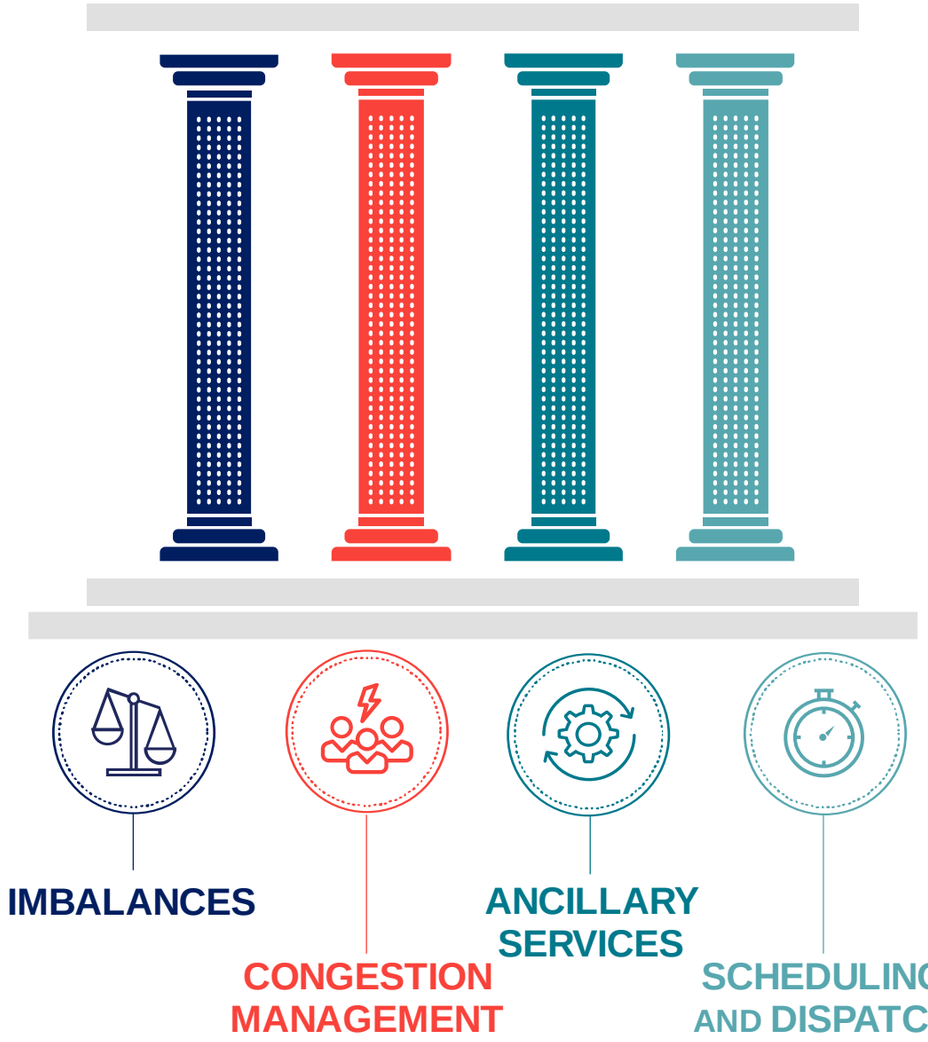
Key Principles Of Market Design.

Architecture Of The Market

- Centralised (tightly controlled pool like in Latin America or old England pool) versus decentralised (self-scheduled) markets based on bilateral contracting + voluntary short-term markets: day ahead, intra day, balancing, etc.
- Methods to remove transmission congestion: might be important in future in SA
- Nodal pricing (PJM), zonal (Norway) or others; from first-come, first-serve to explicit and implicit auctions. There can be long term or short term congestions

These pieces must work together!

4 PILLARS OF MARKET DESIGN:



What is Regulated and What is Not in a Competitive Market?

Generation and trading/retail can be competitive but usually a transition period

- For eg 5 years initial bilateral contracts between Gencos and Disco for the regulated customers (thus some are not eligible usually at market opening (eg residential)

New IPPs can sell to Eligible customers (like in SA now but usually subject to market rules)

Use of transmission system charges is regulated: it can include separate ancillary service charges, potential stranded costs charges, potential separate capacity charges, etc. Paid by Gencos and/or loads

Use of distribution system charges is regulated (and retail to regulated customers can be regulated separately if unbundled)

2. Survey of Competitive Markets Globally

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Where Are There Competitive Electricity Markets And What Type Of Markets?

- Europe: All European Union members need to follow European Directives – de facto a self scheduled dispatch model with every country needing to belong to a day ahead market
- Energy Community: countries in Europe outside the EU: Albania, Bosnia, Macedonia, Serbia, Moldova, Georgia, Turkey, etc.
- All of Central and Latin America with mostly centralised dispatch with CFDs, but some bilateral physicals allowed into some markets
- Canada: only in Ontario and Alberta
- Asia: India (Self dispatch, Malaysia (Central dispatch), Vietnam(Central dispatch), etc.
- USA: in mostly half the States via regional markets such as PJM, NY ISO, New England ISO

What Is Happening Now In Competitive Markets?

- Very high electricity prices due to high gas prices (war) but also 40% closure of nuclear in France, less rain in Southern Norway, etc. (see supplemental slides)
- For now, European Union keeps the same market design, but Greece has already proposed to separate low and high cost Gencos and to have average wholesale prices.
- The Dutch TSO has presented key principles going forward.

Increasing Interconnection is key	Location, location, location.	Unbiased price signals and grid tariffs.	Demand follows price signals.
Full market integration of RES	Resource adequacy as a product in the market	Imbalance price as most important signal.	Trading closer to real - time

3. Current SA Context

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Current SA Electricity Sector Context.

- While load shedding continues, Eskom and other stakeholders are preparing for a paradigm shift in how the sector is organized.
- Eskom is well advanced in its unbundling:
  - A independent transmission and system operator will be operational within the next (1-3 years?)
  - A lot of prerequisites are however needed from approval of our new market design by DMRE, to various new tariff methodologies to be developed and approved by NERSA
  - ...and the market train has already left the station: from 400-500MW of wheeling to more than 70 deals and over 5000 MW already financed or being negotiated. No more 100 MW limit (but Eskom is still providing peak power to these deals at subsidized low prices !)
  - A peculiarity of these bilateral physical contracts is there is no Real Scheduling based on market rules and grid code and no penalties for deviations between Schedules and meters (what is called an imbalance)

4. Overview of Complexity in Current Design

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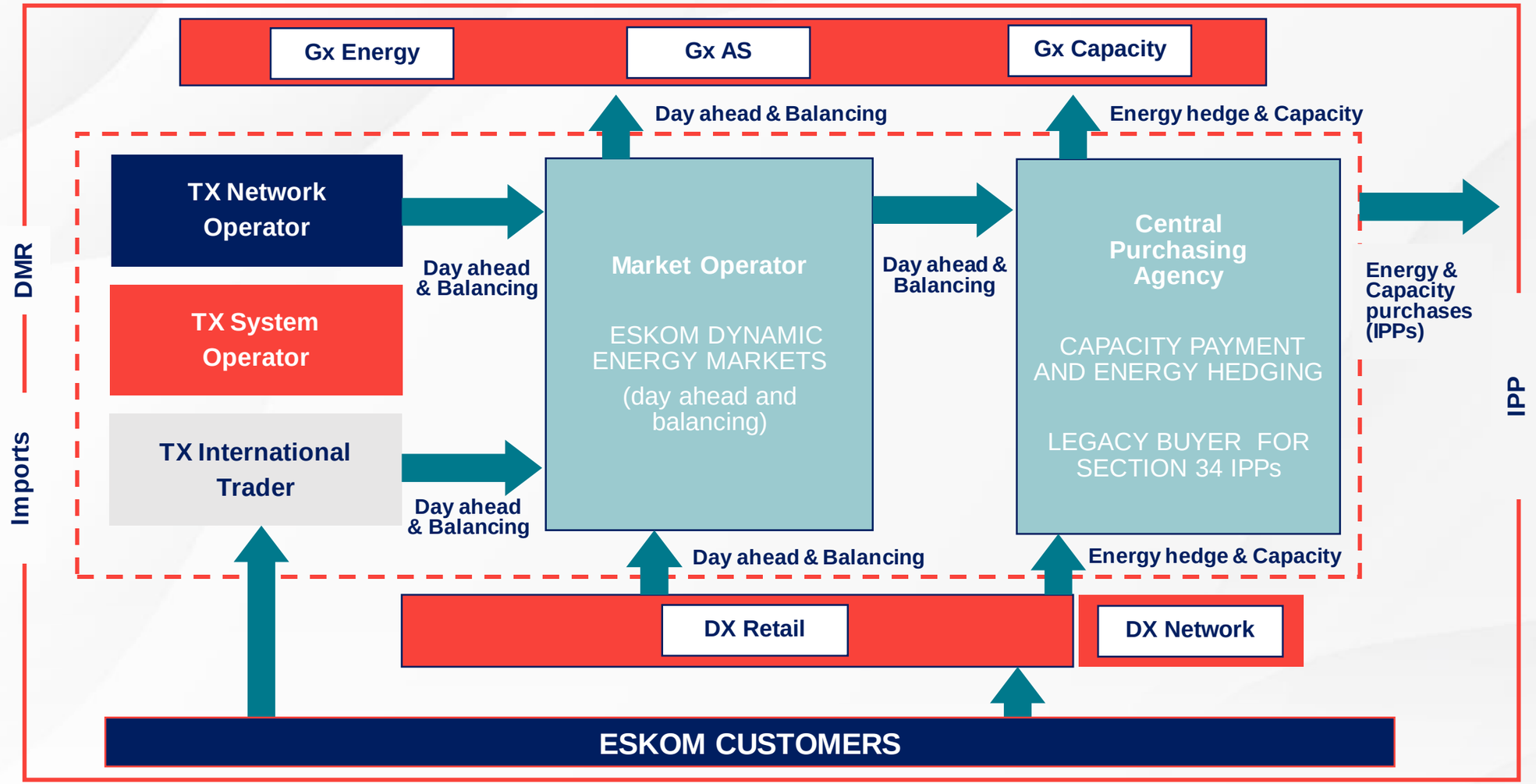
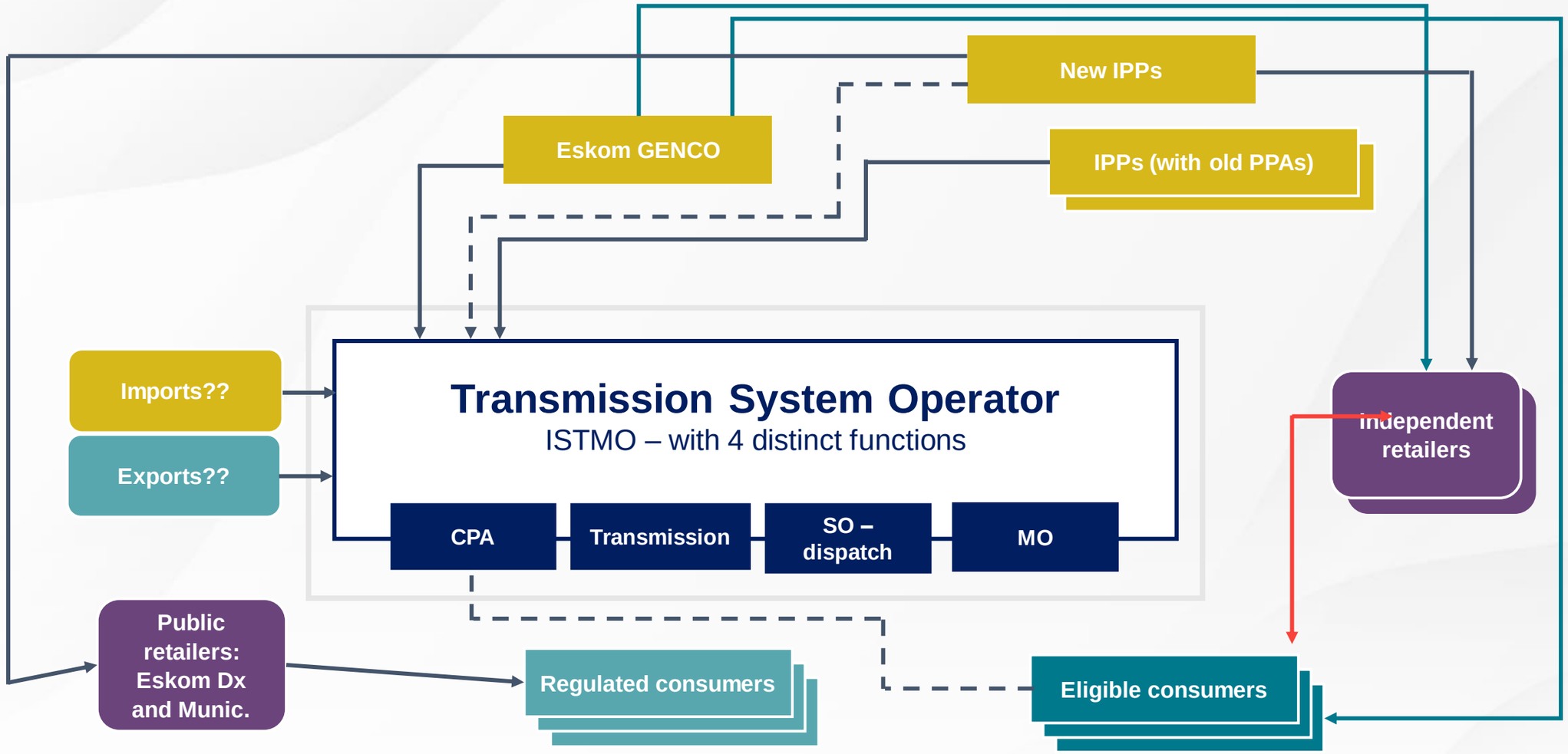
Proposed ITSMO Market Design. (Draft)



A Simplified View of the Proposal.



Eskom Is Contemplating The Following (1)…

Gencos to sell reserves into a combined day ahead and balancing market

Bilateral physicals are allowed and are scheduled before real time

Eskom DX and (some) municipalities buy from the day ahead (or via bilaterals)

Old PPAs are transferred to a new Central purchasing agent (CPA) who rebid them into the day ahead

Who is selling to municipalities not able to contract directly? TBD

Eskom Is Contemplating The Following (2)…

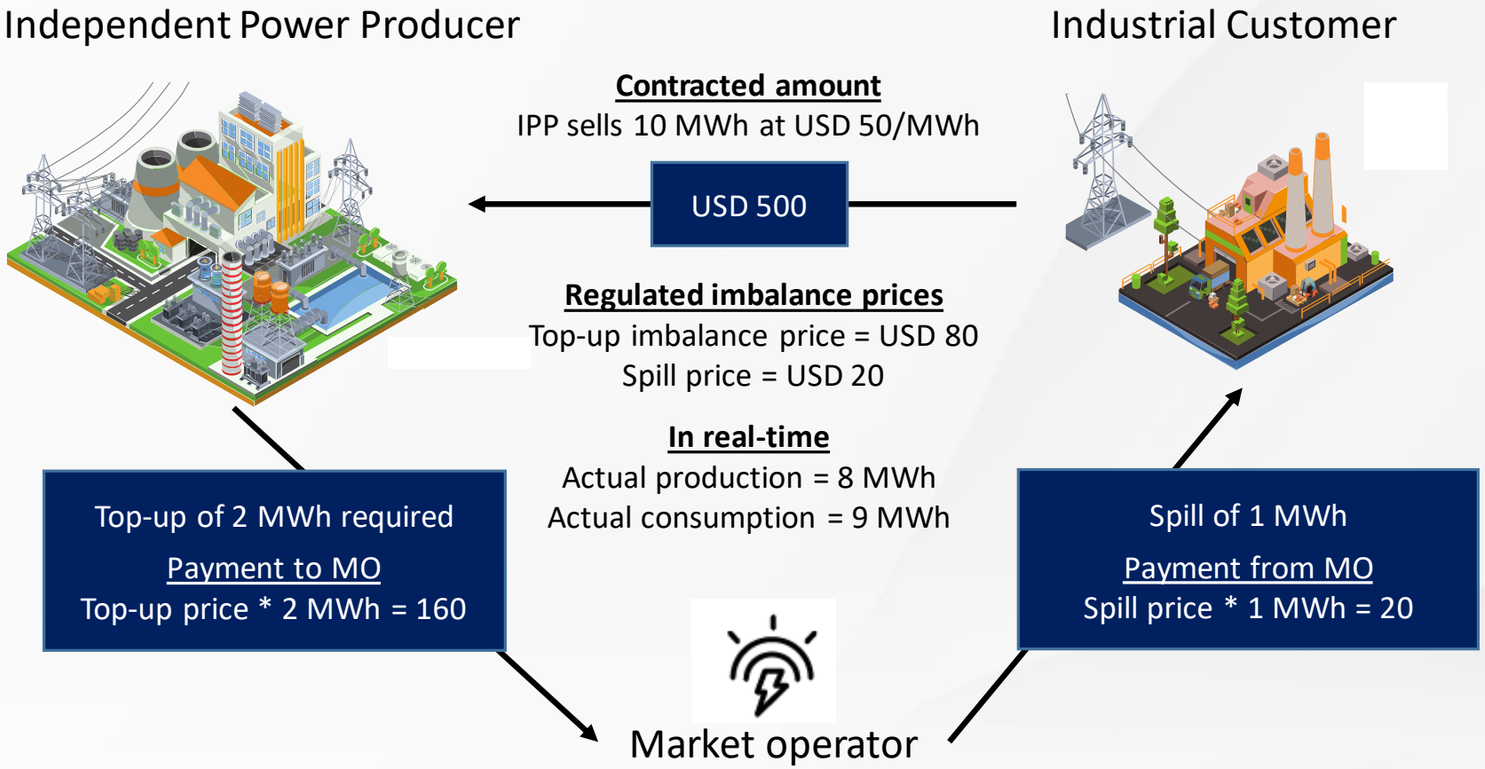
Deviations between Schedules and meters are penalised – thus the role of traders or so-called Balance responsible parties are very important

Flexible generation or Demand side response will also become very important

To ensure a smooth transition, financial hedges are in place for some times linked to real wholesale energy price at market opening (Between Eskom Gx and CPA, Between Eskom Disco and CPA?, and offered to other buyers

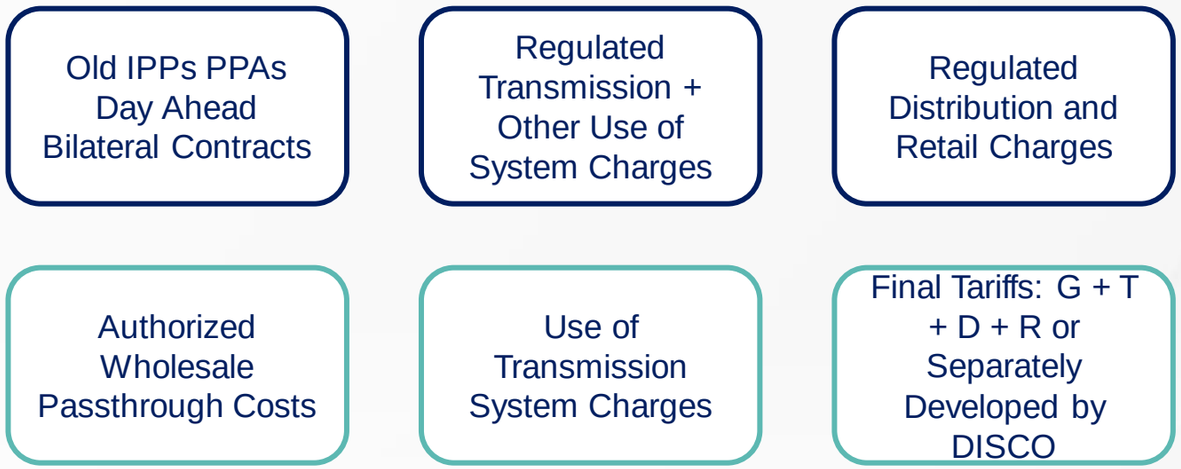
Short-term Option: Regulated Imbalance Prices.

- No time line for the Eskom proposal : Up to 5 years for ITSMO ?
- In mean time, there might be a need for transitional arrangements
- SO and NERSA to agree on regulated imbalance prices which are defined **ex ante**
- Could be one price or two prices, updated periodically (e.g. monthly)
- Bilateral contracts (IPP and customer) settled their bilateral contract separately.



Captive Customers.

- In the case of South Africa… there may not be specific rules or ***enough alternative traders/retailers*** for a residential customer to switch from their incumbent supplier at least in short term.
- This means customers are captive. The sales of the monopoly retailer (i.e. incumbent DISCO) will need to be monitored and most likely regulated.
- This will require tariffs to be unbundled along the value chain.



How to regulate pass-through generation?

Review of power contracts (ex ante or ex post)	• Regulator reviews all individual power contracts and makes a judgment as to its "reasonableness" in terms of prices, risk allocation, and other contractual terms • **Would not be possible to implement with a day ahead market**
Administratively set benchmarks	• Regulator tries to define a "reasonable" cost for power purchases using administratively established estimates of investment and operating costs • **Would not work with a day ahead market**, given that the day ahead prices are likely to be very volatile and probably quite different than any proposed benchmark

Mandated competitive procurement for physical or financial contracts	• Similar to the current tendering system for RE in South Africa
	• Mandated competitive procurement for financial contracts has been adopted in most countries in Latin America, where mostly centralised pools have been established.
	  • Could possibly be developed if some municipalities are not allowed to buy directly from the day ahead for various reasons.
	  • The future CPA (or a new principal buyer) could have the responsibility of preparing and organizing tenders for competitive contract procurement on behalf of those municipalities, under the supervision of the regulator
	• Capacity auctions could be organised by the ITSMO and these capacity payments further invoiced (passed-through) to all traders/retailers separately
	• Combining capacity obligations and auctions: the example of Brazil
	  • Various types of capacity auctions for contracts from 1 to 15-20 years are organised based on the DISCOs' long-term capacity needs.
	  • DISCOs need to provide payments in escrow accounts to ensure financial bankability for the new RE projects.

How to regulate pass-through generation costs?

Market Benchmarks	• Benchmarks based on the price of power traded between generators and DISCOs in the bilateral contracts market or on a day ahead market • Could be combined with some form of tendering by municipalities in SA (for capacity and/or for energy) • NERSA will also need to ensure that there are no cross-subsidies between the regulated and eligible consumers. • The most common way to do so would be to require municipalities to create a separate trading/retail business to sell to eligible customers

5. Impact on Municipalities

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What Does All That Means For Distribution (Eskom Dx & Municipality) Business Models?

- Some Municipalities Will Buy From The Market, Others (Not In Good Financial Standing) Are Likely To Buy Their Power From The Future Central Purchasing Agent (CPA) At Regulated Prices.

Municipalities allowed to buy directly

- Will need change to the legal/regulatory framework to give more flexbility (eg buying short term)
- Will need to schedule their trade to the ITSMO
- Will need to pay for deviations post gate closure
- Will need to post collaterals to the MO for imbalance settlement as well for participation if any in a day ahead market
- NERSA to approve yearly(?) generation pass through costs to regulated customers
- Sign on to a Model use of distribution agreement (for wheeling)
- Sign on to a General cost of service methodology for distribution network and regulated retail charges.

Municipalities buying from CPA

- Will get all their power from the CPA
- No need for scheduling and paying for deviations (to be handled by CPA) in short term but might need new rules with the CPA over time (collaterals to CPA?)
- NERSA approve ex ante CPA sales to those municipalities (but quarterly fuel costs and other parameters adjustments?)
- Sign on as well to a Model use of distribution agreement (for wheeling)
- Target milestones for cost of service methodology implementation\network and bill collection improvements, etc.
- Once parameters improved, allowed to contract directly as well

Thank You!

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