PCC Energy Dialogue: Electricity Market and Pricing Reform

Market basics and how an electricity market works

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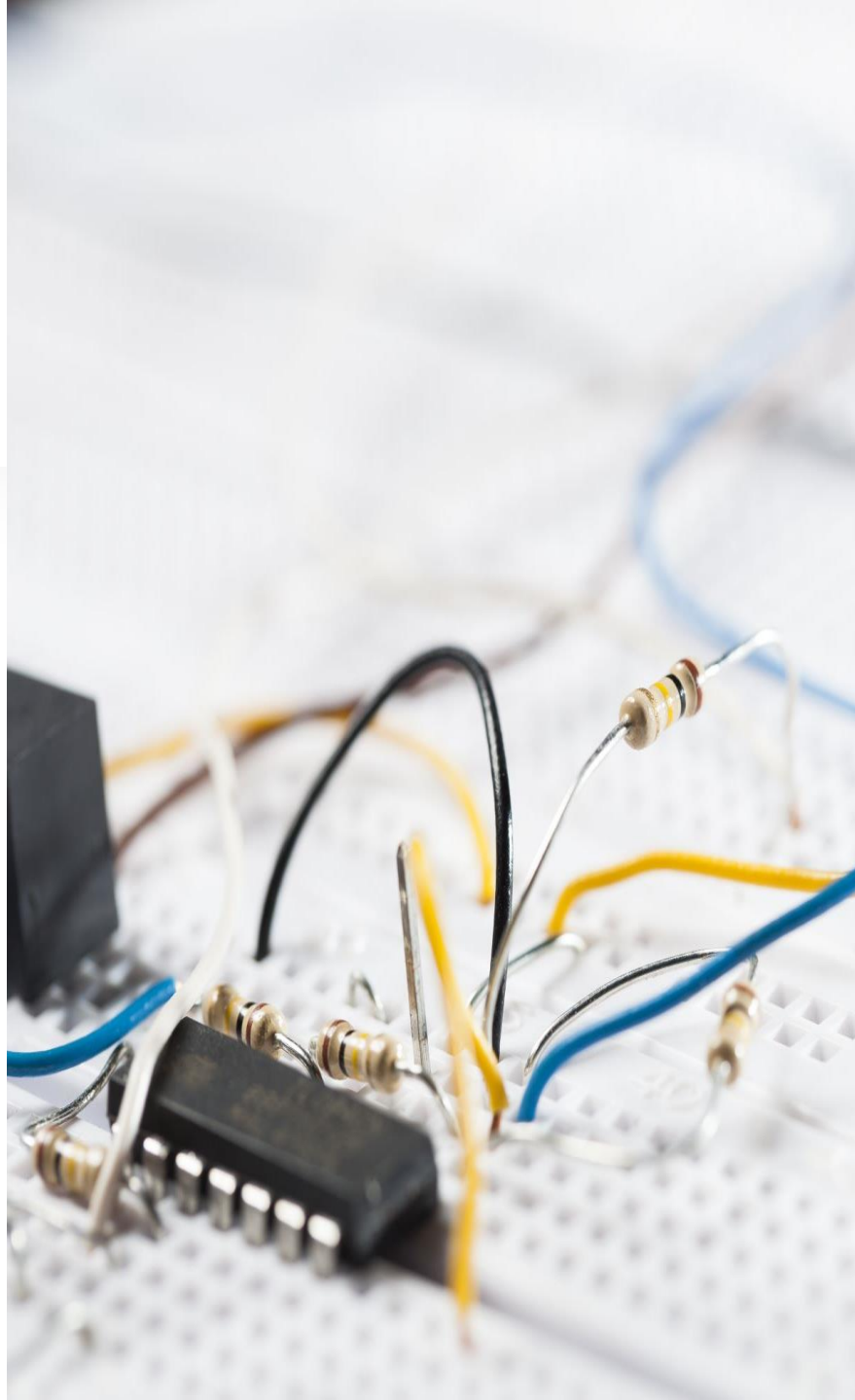
5 Questions to consider in this presentation

1. The rational -benefits of the market
2. The market in the SA context
3. What is a market and what is a market not?
4. Requirements for a market
5. The consumer in this?

Developments around the world

- Electricity systems globally are shifting from *centrally planned, supply-driven models* to *flexible, demand-oriented – decentralised* systems.
- This transformation is largely driven by the *rapid rise of variable renewable energy (VRE), energy storage*, and smart technologies, which enables *decentralised* and *prosumer* participation
- The global transition is driven by efficiency and environmental sustainability with drivers that include *grid reliability and/or access*. It offers the *cheapest energy in the long run* and greater opportunities for *wider participation in the industry* (democratisation).
- Experience across the world is that *governments lack behind with regulatory support* and that that these changes are often *driven by economic realities*.



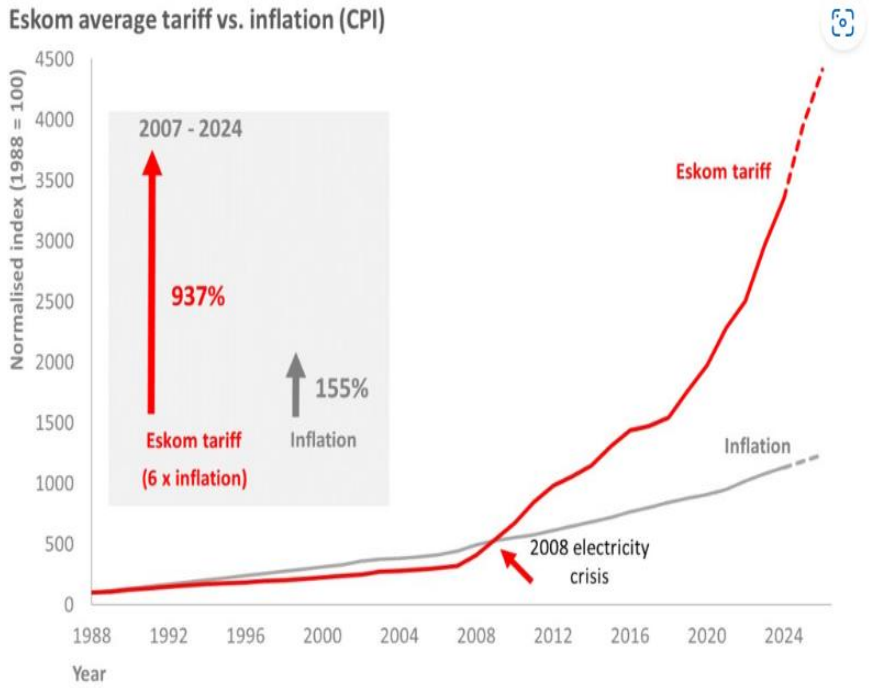
1. The Rationale
Benefits of the market

We are aware of the current supply challenges in SA…

Why a market?

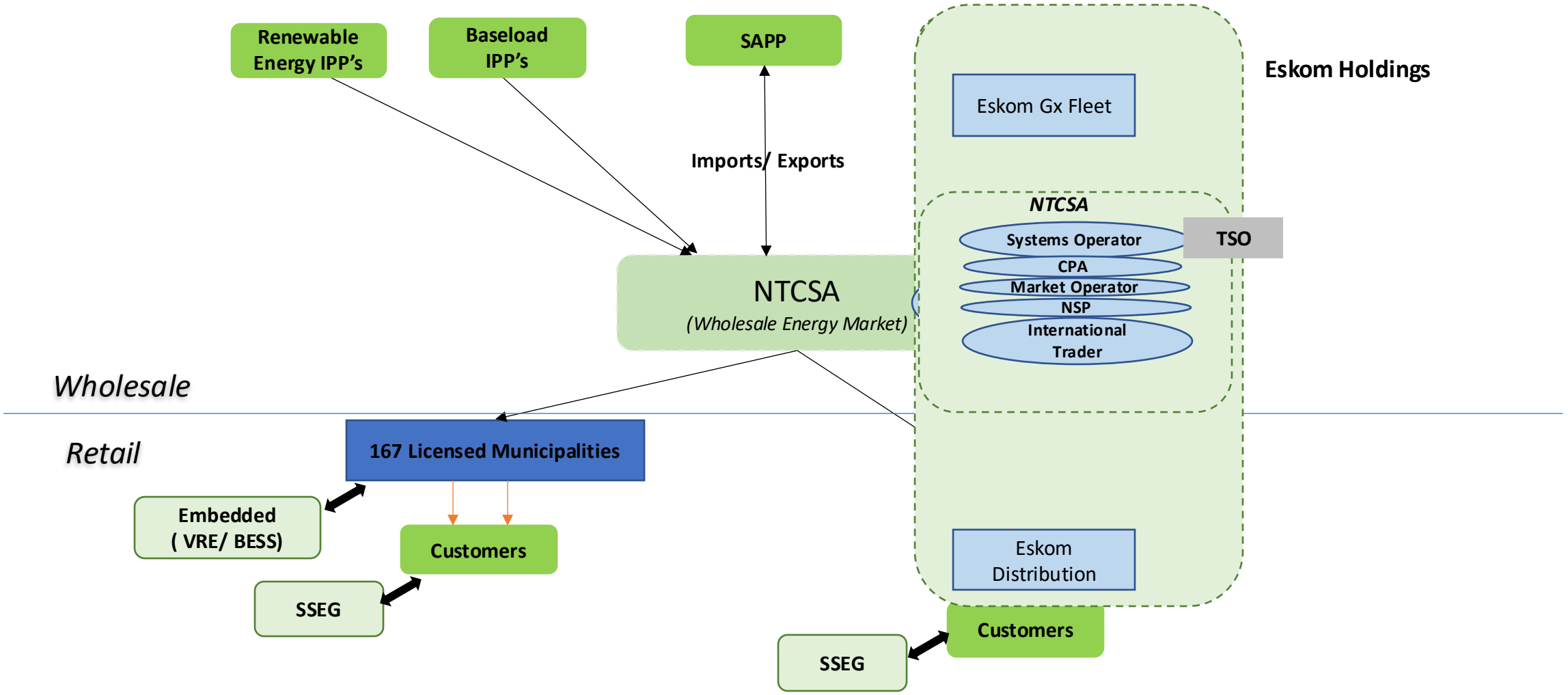
- In a *competitive market*, investment *risk lies with developers, not the state*
- *Over time*, this competition *drives system costs down* and shifts the mix *toward cheaper energy sources*
- *New options like VRE offer a lower-cost path &* address the *critical* local and global *pollution* challenges posed by our coal dependence
- *Least cost power* supply critical
- The SA electricity system *urgently requires significant capital investment*.
  - The state cannot anchor the investments required.
  - The introduction of a wholesale market can attract the required investment and deliver important efficiencies.
- On the one hand, a market should ensure the most efficient pricing outcome

The graph below shows the **Eskom tariffs from 1988 to 2024**, plotted against CPI (Consumer Price Index) or inflation over the same period. It also shows **projections up to 2026**, based on inflation projections and Eskom's planned applications to NERSA (and assuming NERSA only grants half their requested increase of 36.15% for 2025).



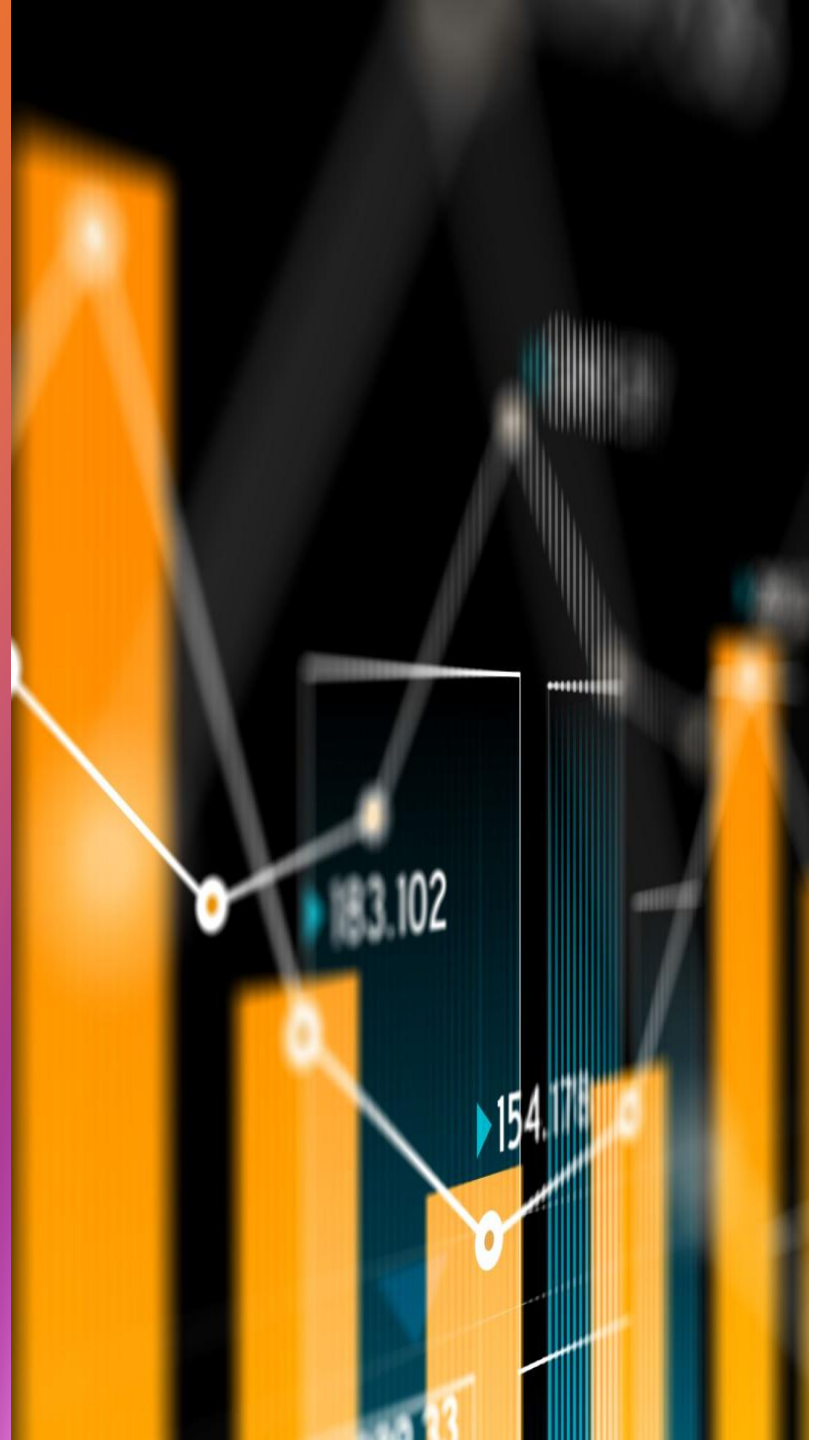
2. The market in the SA ESI

The market in relation to the Current SA Energy Landscape



3. What is a market and what is a market not?

- Markets designs
- The merit order
- How are prices sets in market?
- Is the market risk free?

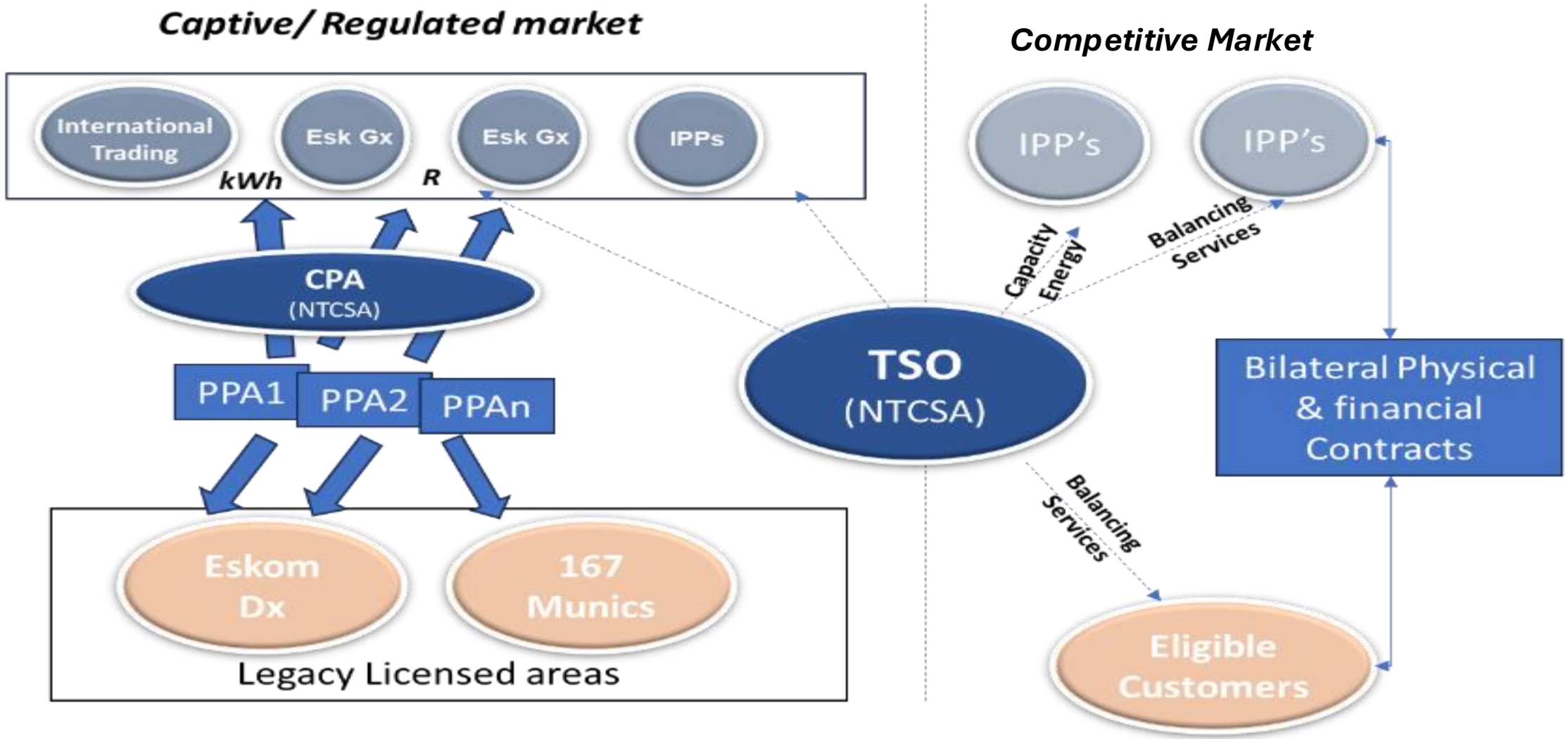


3.What is a market and what is a market not?
(Continue)

- 3 Market design pathways world-wide
  - **Centralised Dispatch**: The *system operator* decides which power plants generate electricity and when – based on price bid into *central market*.
  - **Decentralised (Self-Scheduled)**: *Individual generators* decide when to produce, based on price bid into a (usually) *central market*. [This system resembles South Africa's current context of bilateral contracts decentralised decisions]
  - **Hybrid Models**: A combination of both. Some generators are centrally dispatched, while others operate independently.

- Each model has trade-offs.
  - **Decentralised** markets appeal more to private investors because of their transparent pricing, but they are more complex and less stable.
  - **Centralised** systems are simpler and more secure but may slow down innovation.
  - **Hybrid models** provide a balance of these approaches and can evolve.

Hybrid market



3.What is a market and what is a market not?

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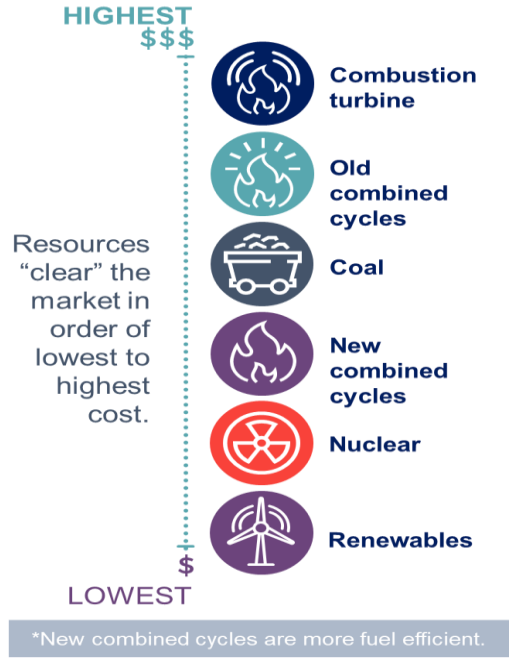
- <u>How is prices formed in a market</u>?
  - *Price signals* rather than central planning shape the energy mix
  - Typically, the *merit order* is solar, hydro, wind, nuclear, coal, gas, diesel
    - *Abundant solar power* during the day drives prices down, sometimes even into negative territory
    - As *variable renewable energy penetration increase*, the providers of constant inflexible power (coal and nuclear) will not be competitive at all times of the day.



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How electricity markets work

3.What is a market and what is a market not?

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Market risk free?

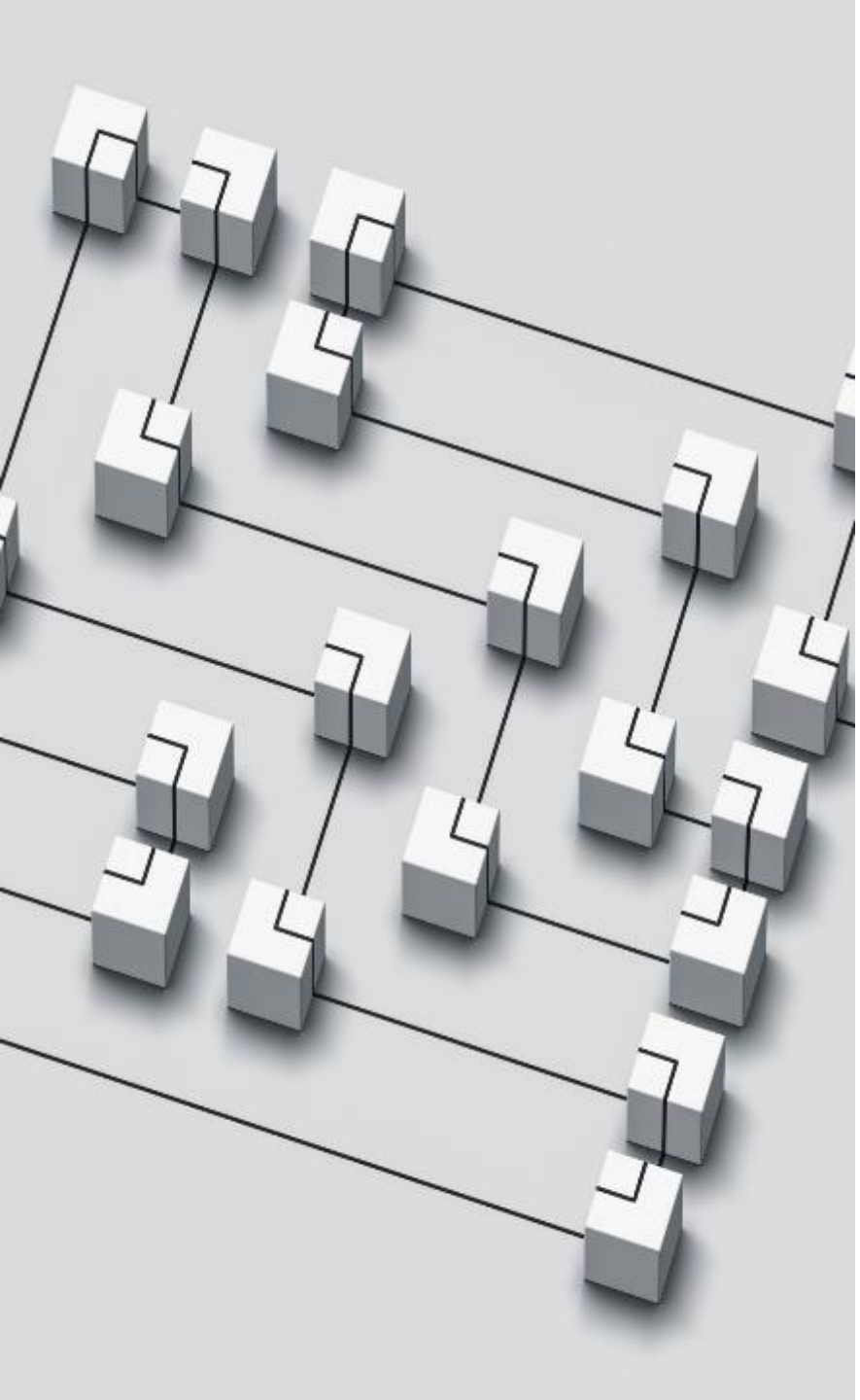
- Price *volatility and price spikes* - suite of *mechanisms* can be deployed to mitigate
- *Retail customers-* households and small businesses will not face direct price volatility. They will remain *'captive customers'*, receiving electricity at *regulated tariffs.*

Does SA have the skills & capacity to manage such a complex system?

- *Core market operation* skills (e.g. dispatch and balancing) are already well-established within Eskom Transmission – now the *NTCSA*
- *Grid stability* will be enhanced in a market through *mandatory reporting requirements* related to production and consumption held in contracts outside of the market
- Distributors will be required to take *balance responsibility*

4. Requirements for a market

What needs to be in place for a market to work?



Prerequisites for a market

- Having *excess generation capacity (Sufficient energy capacity to meet demand*).
- *Well-defined market structure* and design, with *clear rules,* regulations, and market mechanisms.
- Separation of the electricity network from generation and electricity supply.
- Allowing for *non-discriminatory* (i.e., open) access to the grid.
- Sufficient grid / network capacity.
- *Adequate market depth/players.*
- Timely payment and *financial settlement amongst market participants*.

5. The customer in all of this?

Protecting the customer

Market oversight

Protect the customer

Market rules

- *Price floors can protect renewables from collapsing prices*, as their marginal cost is almost zero, and this may result in a market clearing price of zero if renewables are able to meet all demand in a time interval.
- *Price caps can protect consumers from extreme spikes*. In such a case, all bidders are paid at the price cap, except for accepted bidders that have a higher marginal cost (to ensure they do not provide electricity below cost).
- *Long-term contracts or bilateral PPAs supplement short-term markets to provide financial certainty and ensure cost recovery.*
- CPA and *vesting/hedging contracts* in the market in transitional period

Market Oversight

- *A strong regulatory framework, beyond market design, is essential* and must address our local context. Clear policies and competent institutions are needed to prevent *market manipulation* and build trust among investors and the public.
- *NERSA must be empowered to set and enforce rules in a complex political environment* (The regulator's capacity is of critical concern)
- The *poor and vulnerable must be shielded* from price volatility.
- There are also unique barriers to be addressed, particularly in relation to *institutional weaknesses*.
  - The *independence* of the transmission system and market operator *(NTCSA)* are critical to ensure oversight.
  - Municipalities(in general) lack the *skills, tools and financial stability* and regulatory frameworks to operate in a real-time market.
  - *Non-payment risks by municipal distributors* could place massive strain on the system.
  - *Market prerequisites*: We need sufficient players in the market; non-discriminatory (i.e., open) access; Sufficient grid / network capacity etc

End