AMEU/SAIEE joint virtual webinar

"THE DIGITAL MUNICIPAL Dx ELECTRICTY UTILITY OF THE FUTURE"

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Session 5 (Theory/Case Study)

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Introduction

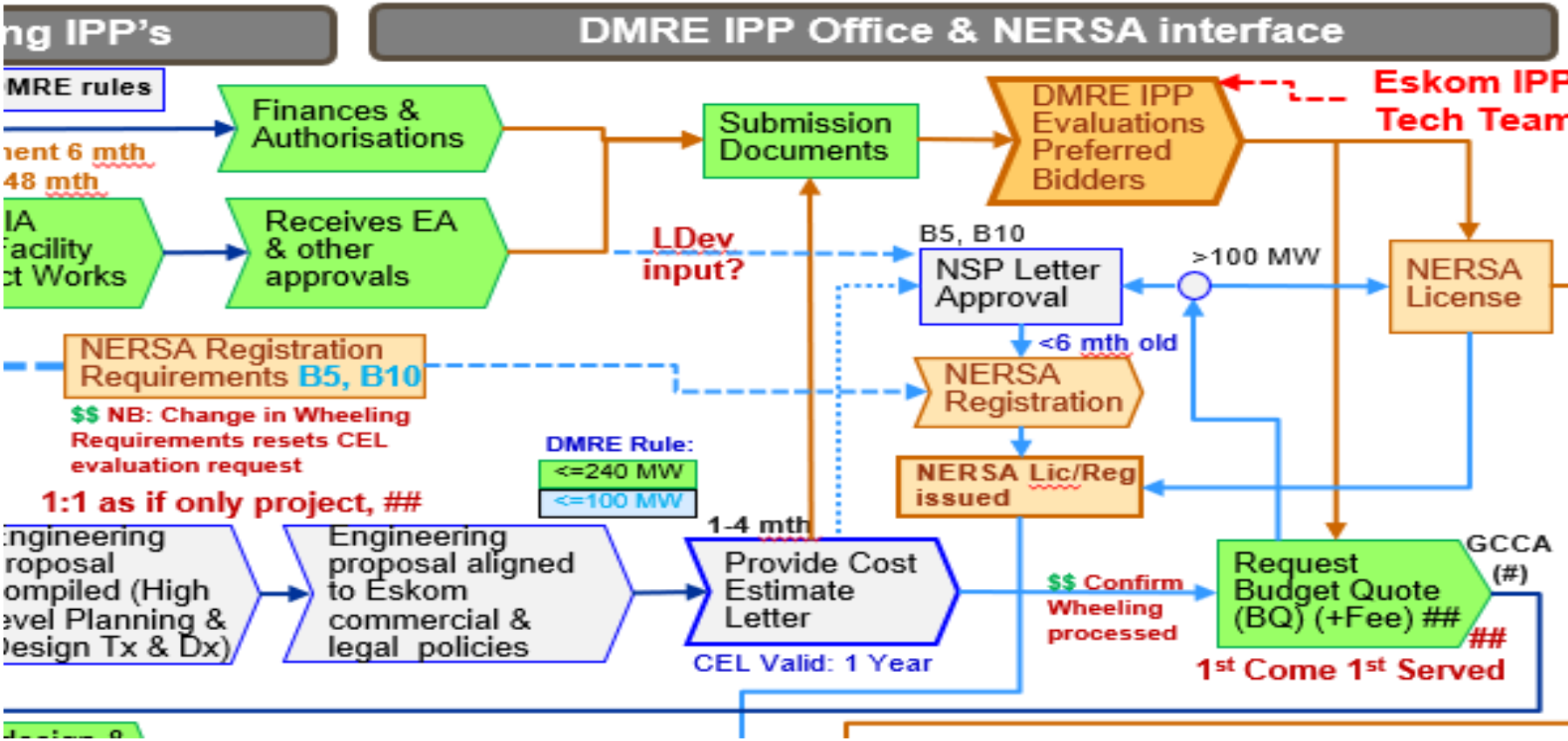
The prevailing energy supply shortages in South Africa require a new approach to accelerate the deployment of new generation capacity into the Grid…Some of the challenges that we need to overcome include:

- **Generation constraint** in South Africa calling for an accelerated rollout of the IRP 2019 Plan. Accelerated IPP Bid Window timeframes are experienced.
- Current Transmission **Grid Capacity constraints** as published in the GCCA 2024 document
- **Dearth of Wires infrastructure** (DX and TX) in areas of high DER resource capacity e.g. Northern Cape
- Distribution network infrastructure build has historically followed expected **load profile** growth patterns
- **Reservation of capacity rules** unclear at each of the sites
- Delays in issuing **CEL and BQ** to potential investors

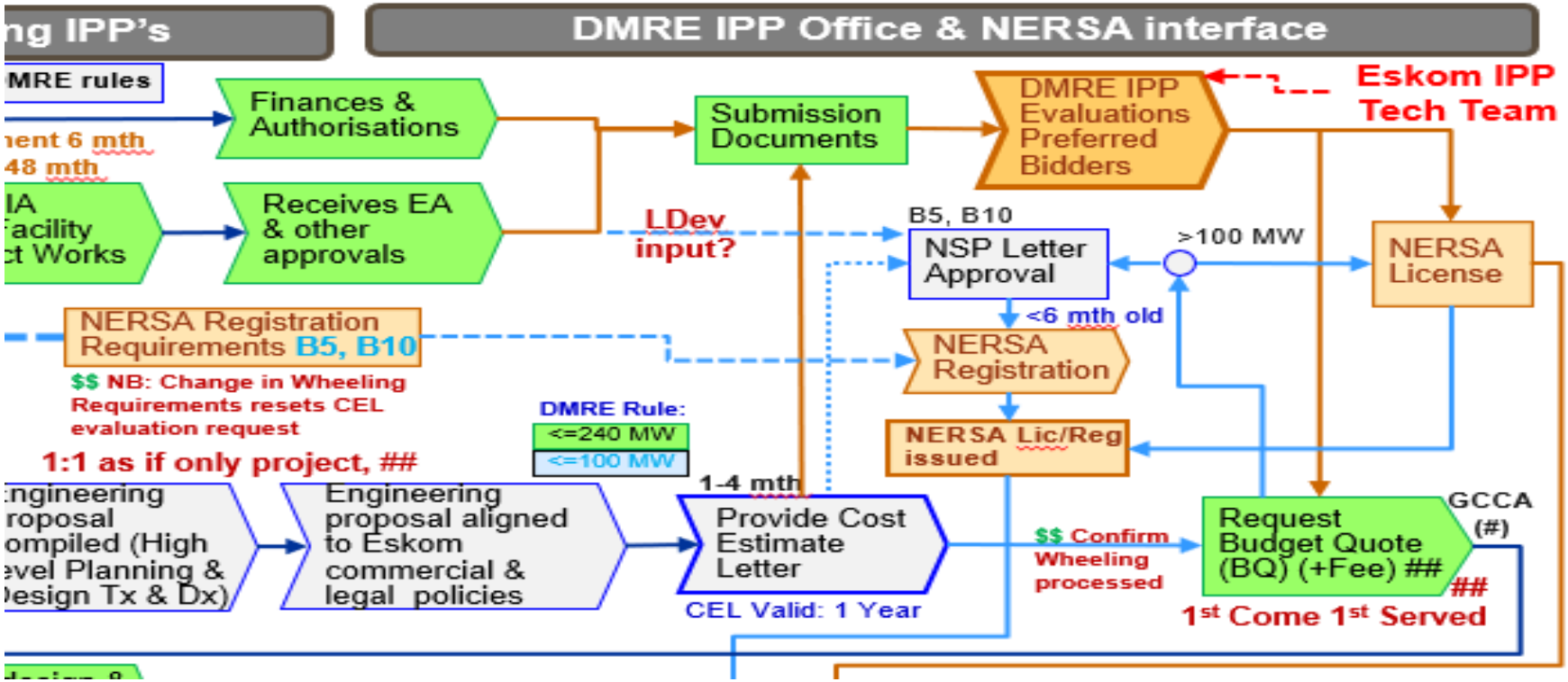
Framing Challenges

- Understanding the concept **of Hosting Capacity**
- Dealing with the **unlocking of generation evacuation** potential
- Expectation that the grid has unlimited potential to evacuate the power from DG's
- **Schedule 2 ERA amendments** opening self-generation, offset and wheeling options for dedicated customers
- Principle of issuing same scope of work at a CEL level i.e., treating each applicant as the only one to be considered.
- Arbitrage and manipulation of any queuing rules to be developed i.e., the rules being used for "unfairly" reserving capacity with no intention of developing it. This must include dispute resolution mechanisms.

The Predicament



The predicament



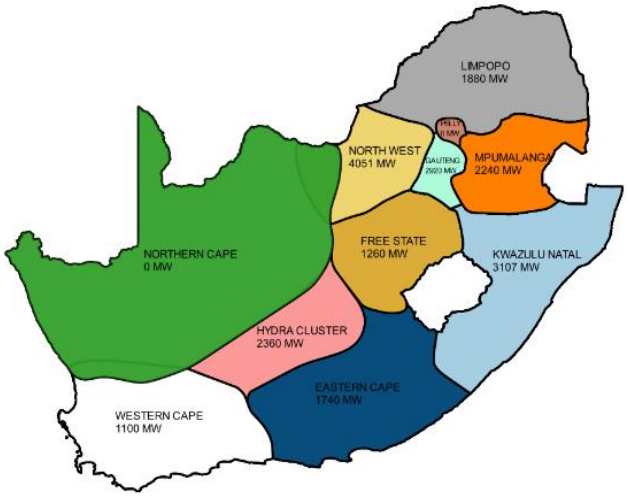
- Differentiation between **Registration and Licencing** requirements?
- **Wheeling** arrangements
- **Allocation of capacity**
- Hogging capacity

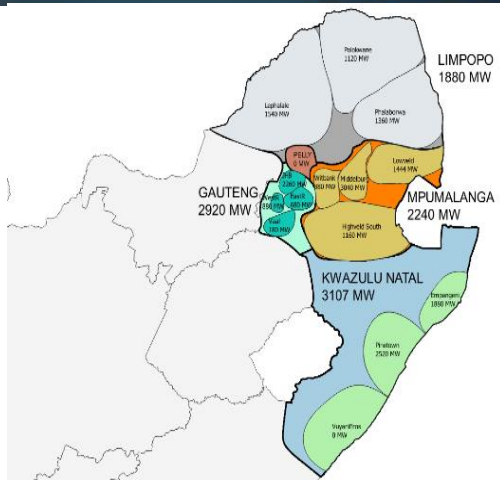
Eskom is a big battery to which an infinite capacity and energy may be connected…

Consider the Following

- How can the Network Service Provider (NSP) enforce **improved interconnection** processes and ensure accountability among developers and utilities alike?
- Who gets to **access grid data**, and what does it really mean to gain greater visibility into our distribution system?
- How do we keep **costs reasonable** amid rapidly increasing demand for interconnections? And who should pay for what (and when)?
- What is the role for interconnection as we move toward a more modern and sophisticated electricity grid?
- What should we do when **conflicts arise**?
- What about **storage**? How do you connect energy storage to the grid?
- How do we deal with **flexibility management** and curtailment options, where applicable?

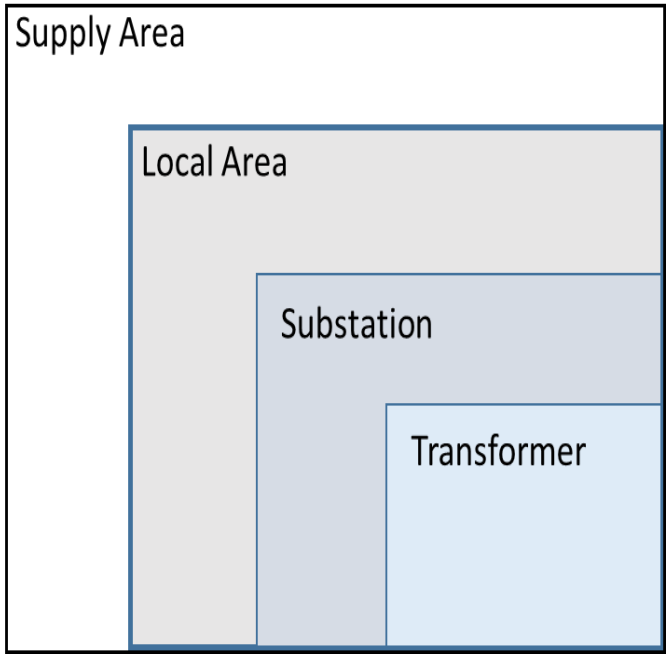
Managing Capacity





- The proximity of the DG to existing load centers
- Current capacity of the network to service the load requirements in an area
- Capacity of the network to evacuate the power generated at the preferred sites
- Expression of interest within a particular MTS: load and generation evacuation requirements within the area

GCCA Principles



Voltage Levels:

- 66kV, 88kV and 132kV
- 220kV, 275kV and 400kV

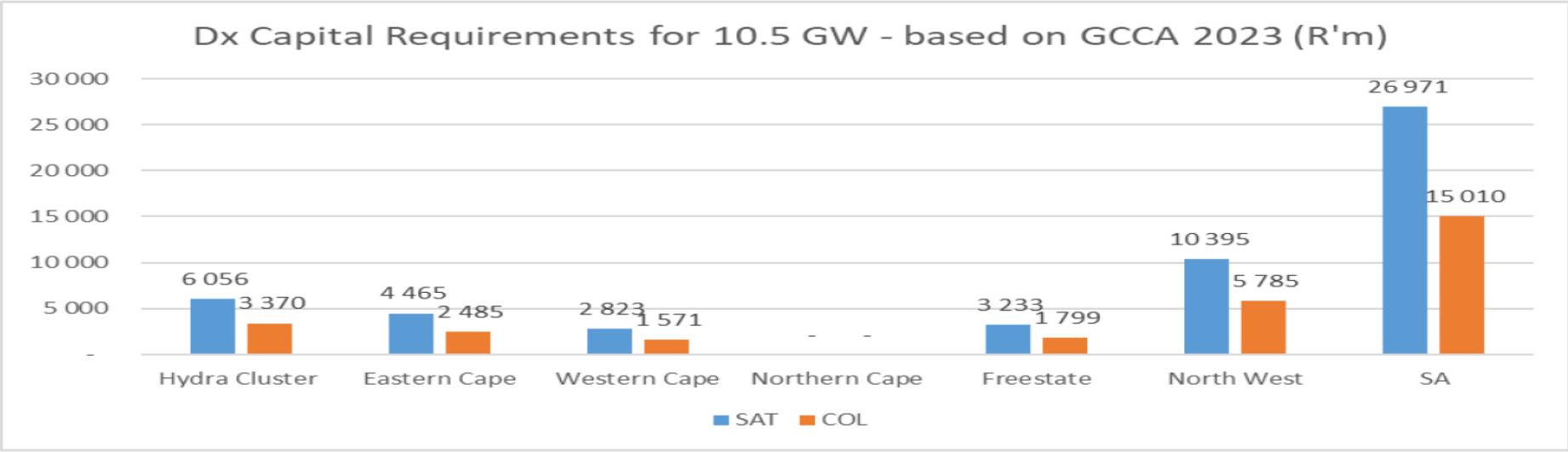
The assessment entails:

- Evaluating each substation's transformer capacity.
- Export capacity ,network integrating per substation
- Evaluating the export capacity of the local area
- Evaluating the export capacity of a supply area

Local and supply area.

- Where generators are connected acts as the source
- Two Customer Loads outside the supply area act as sinks

Financing: Elephant in the Room



Unlocking the Value Chain

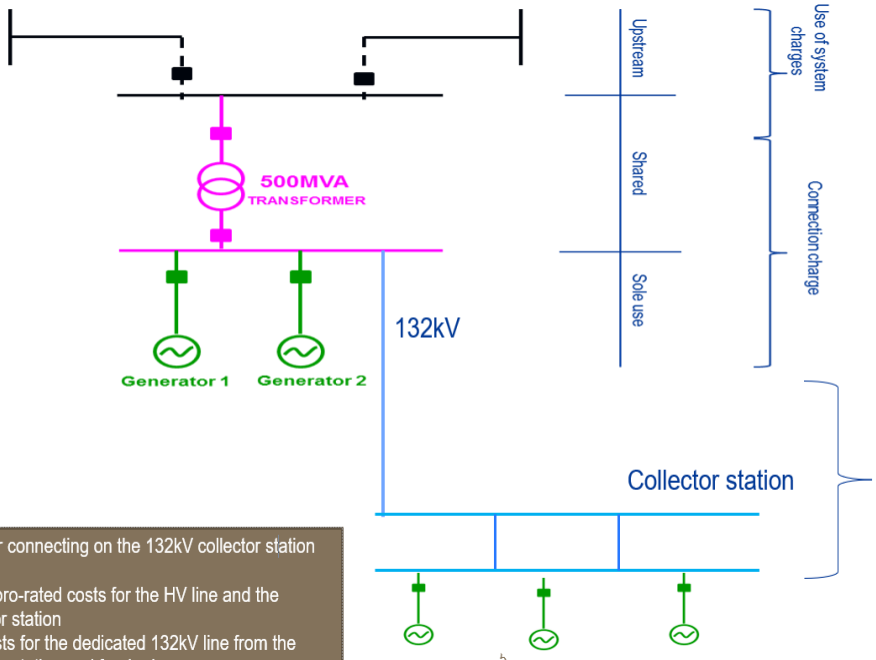
- Consultant Capacity
- Specification Control
- Knowledge Management and access to ESKOM

  Standards and Procedures
- Procurement practices
- Supplier capacity and localisation
- Project Management capability
- Contractor availability for HV line build

Self Build Agreements (SBAs)

- Policy change to use non-Eskom accredited Contractors
- Ability to deal with Joint Ventures (Parent Company)
- Joint Ventures with joint and several liability
- Refund mechanisms

Pricing Policy Decisions



Generator connecting on the 132kV collector station will pay:

- SNC / pro-rated costs for the HV line and the collector station
- Full costs for the dedicated 132kV line from the collector station and feeder bay

- Finalisation: **Shared Network Cost**
- Costs associated with aggregation of applications: upstream costs
- **"Rrefunds"** for developers
- Dealing with the concept of "**free riders**"

Queueing Principle

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Defining the QUEUEING Principles

Applicability of the principles

Understanding the queueing concept

Adopting principles for the QUEUE for DG integration.

Principles for Developers with reserved capacity in the queue

Rules for cost allocation

Queueing Process

- Being adopted and shared with the Industry Associations for acceptance: transparency, web-based application to be part of GAU, etc.
- Development of automated platform for a “real time” management of the queueing process
- Alignment of Developers, TX and DX : unlocking capacity
- Evolution of SBA:. shared network infrastructure, JVs, etc
- **Grid Code changes:** stakeholders engagement
- **Flexible Pricing mechanism** agility and NERSA support
- Nodal Pricing: longer term, investigate the options of integration of DER in remote areas.