

Thank you for joining us for the International Best Practice for Wheeling, and the Regulatory Framework for Wheeling in South Africa Webinar 22 July 2021

The webinar will being shortly....







Review of International Non-discriminatory Grid Access and Bilateral Trading Models to Develop Suitable Proposals for Improving the Regulatory Framework in South Africa



Overview of the **Current Project** >

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A quick introduction to the project, team and this session:

Introduction to the project

Introduction to the project team

What has been achieved, what is coming up, and why we're here?











CPCS and Norton Rose Fulbright are undertaking a project looking at grid access arrangements in South Africa

High-level aim is to leverage best practice and generate consensus among the industry on potential improvements to the framework.

The work is guided by a Working Group of industry players







national treasury

Department: National Treasury **REPUBLIC OF SOUTH AFRICA**



Department: Mineral Resources and Energy REPUBLIC OF SOUTH AFRICA





Stakeholder	International and
Engagement	National Experts
Capacity Building & Knowledge Transfer	Review of Best Practice



We assembled a team that includes International Power Market Experts and Legal Experts Practicing in the South African Power Sector

Key Experts		C I T Deuts	sche Gesellschaft	
Stephane Barbeau	Global Lead on Power Sector Reform.	GIZ für In Zusar	iternationale mmenarbeit (GIZ) GmbH	
Team Leader,	Over 25 years of experience in the development of competitive electricity	_		
Power Market Expert	markets and power projects.	The CPCS Tea	am of Experts	Miho Ihara
Matthew Ash	Projects lawyer based in Cape Town	Stephane Barbeau	Matthew Ash	Project Director
Legal Expert	focusing on energy and major infrastructure projects.	Team Leader	South African Lawyer (Expert 1)	(oversight & Hojett Direction)
Additional Experts				
lan Johnson	Regulatory and financial advisor with	lan Johnson	Lizel Oberholzer	
Tariff Expert & Project Manager	experience developing tariffs and advising Government agencies.	Tariff Expert & Project Manager	Legal & Regulatory Expert	
, ,				Legend
Lizel Oberholzer	Admitted attorney in South Africa with over 16 years' experience in the energy sector			Key Expert
Legal & Regulatory Expert	in Africa.	CPCS A	nalysts	Project Management & Additional Resource
Project Management				
Miho Ihara	CPCS Partner responsible for overall			
Project Director	project Direction.			



The Project has 4 Phases. Phase 1 is complete | We are now in Phase 2

Objective: to develop suitable proposals for improving the regulatory framework to allow direct contracting between GenCos and eligible consumers or via traders / suppliers.



WE ARE HERE

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Work Package #1 developed a firm understanding of the current context and initial proposals for changes

- A potential Road Map for a way forward was prepared in our WP#1 this was very high level and ambitious
- > Various studies will be starting soon which would influence Government decisions.
- **Eskom unbundling is the major unknown when will the ISTMO be operational ?**

1: Short-term (≤ 1 year)	2: Medium-term (1-3 years)	3: Medium-term (3-5 years)
Short term actions to improve current wheeling system	Finalize Eskom unbundling and creation of an independent market and system operator / creation of a CPA?	
Eskom unbundling (already on going)	Finalize the financial recovery plan for munics, build knowledge on procurement / supply / load, implement national methodologies for use of system charging	Increased liquidity in the markets, DISCOs able to procure higher % of their
Development of market design paper to further define and confirm the	Revision to the legal-regulatory framework	expected load
current Eskom plan and draft final market code	Implementation of day ahead and balancing market / revise mechanism for new generation	



Work Package #1 developed a firm understanding of the current context and initial proposals for changes

> Potential areas for improvement to the current framework in the short to medium term

Amplification and adjustment of the 3rd Party Network Charges Rules

Amendment of municipal distribution licences to reference to ERA open access clause

Standardization of municipality approach to wheeling

Make the tariff methodology in Distribution Code a requirement rather than guideline

Implement a billing system that does not require netting*

Develop an initial imbalance pricing regime, initial market code and revise current ancillary services tariff

Potential revision of trading license to be consistent with new generation license exemption

Investigate eligibility further, incl. legal basis for defining it and potential phasing – eligible for only a % of load like in Namibia?

Model use of system agreements



*This depends also on the time frame for the legal unbundling of Eskom and the creation of an ISTMO – it has been updated since the WP# 1

The Industry is Evolving in Parallel.

Various webinars, announcements, proposals and activities are occurring alongside the project work for this assignment. But overall, it does not change the exam question of key findings

Webinars and announcements	 Webinar on the ITSMO (NedBank) Webinar on "Wheeling frameworks and negotiating tenable PPAs in South Africa" (ESI/SAIPPA) Webinar on "Opportunities for Investment Available in the Energy Sector" (Fasken) Announcement of a further round of IPP tendering
Legislative proposal	 Proposed amendment to Schedule 2 of the Electricity Regulation Act to change the threshold for requiring generation licence. *Does not solve necessarily challenges with wheeling
Other related work streams / projects	 Different organizations (e.g. Eskom, NT/DMRE) looking a range of issues, such as the impact of electricity market reform, cost of service, etc. Eskom continues to progress with unbundling DBSA will launch a study to look at contingent liabilities and how to reduce State guarantees Treasury department will launch a study to look at various market models and assess the fiscal, financial and economic impacts

So why are we here?

	 Share knowledge with IPPs and large users on key electricity sector concepts that are important for wheeling now and in the future.
Objective of	 To discuss the challenges under the current SA wheeling framework.
this workshop	 To set out proposed reforms in South Africa, how wheeling could work in the future, and potential future challenges.
	 To discuss potential solutions and areas for improvement.

> This workshop is specifically targeted at IPPs and large users

- It should provide knowledge that helps stakeholders engage with ongoing industry issues and reforms
- It will also help with the development of potential avenues for support in this assignment.



Running order for the rest of the session.

1	Introduction		
2	Overview of the current SA Industry Structure and key problems for the development of a competitive electricity market/open access Keynote Speaker : Eskom Eskom market proposals including the role of the proposed CPA		
3			
4			
	Q&A		
	Break		
5 6	Principles of competitive electricity markets/open access		
	Improving wheeling in the Principles of Short-Term (and with the ITSMO)		
7	Keynote Speaker : SAIPPA		
8	Contracting by Municipalities & basic principles of network monopolies		
	Q&A		
	Break		
9	Adequacy of current transmission and distribution codes		
10	Recap and Closing Remarks		
	Feedback Questionnaire		



Key Challenges for the **Development** of a Competitive **Electricity Market** >

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... or simply increased wheeling!

Who are the main players?





The industry structure is dominated by Eskom & Munics.



- Dominant position in generation and retail
- IPPs are selling to Eskom with long term PPAs via tendering rounds
- Residential customers are small part of customer base





The industry structure is dominated by Eskom & Munics.

Munics

- Electricity distribution and retail (called "supply" in SA)
- Over 250 municipalities. Around 170 providing electricity services.
- Most are small 163 municipalities supply less than 30% of total munic customers.



- Most do not have experience in contracting directly with IPPs
- Likely that the large metros will start contracting directly (partly) in coming years



IPPs and Traders are still relatively niche.

IPPs

- Most power procured under REIPPPP with 20 year PPA.
- Mostly intermittent RES. Over 6000 MW (less than 200 MW of direct sales to customers).
- New IPPs need to fit within the IRP allocations (but recent license exemption!)
- RE IPPs cannot provide 24/7 power role of traders versus role of Eskom Genco?
- In future...?
- Will the 6th round be the last one with similar conditions Government wants to wind down sovereign guarantees
- Future ISTMO / CPA will likely still buy some power form IPPs (wholesale supplier) but more incentives for IPPs to sell directly to munic. or directly to consumers?
- Would banks lend to new IPPs selling into the market with only 3-5 years bilateral contracts (PPA) subject to market rules?





IPPs and Traders are still relatively niche.

Traders

- Buy electricity from IPPs using a PPA
- Sell to customers with offtake agreement
- Only one in the market PowerX. Another one possibly coming Energy Exchange.
- Not offering full supply contract
- Not subject to imbalances
- Role of traders\retailers is crucial in a competitive market.
- Future role will be different than the current one linked to organizing long term PPAs
 - It will depend when imbalance charges are introduced the key role of traders/suppliers is to build a portfolio of various energy products and sell to customers what they need – aggregation allows them to act in a role we call balance responsible parties versus the ISTMO
 - This is even more important given that solar and wind IPPs are not flexible and batteries are good for approx. max 4 hours at competitive prices currently



What is the current legal / regulatory framework for wheeling?



Open Access: Regulatory Framework



- "A licensee may not discriminate between customers or classes of customers regarding, amongst other things, access to the relevant distribution and/or transmission network"
- Section 2(f) of ERA one of the objectives of the Act is "to promote competitiveness and customer and end user choice" ...but usually, there is a gradual market opening.
- Empowered to issue licences; regulate prices and tariffs; issue rules and approve codes to implement electricity policy, legislation, and regulations; etc.
 - NERSA may facilitate the conclusion of an agreement to buy and sell power between a generator and purchaser of electricity.
- Has been known to intervene in price setting for bilateral contracts.
- Trading license is also not typical
- Distribution and transmission codes include references to providing nondiscriminatory open access. Key documents for transmission and distribution use of system charges (wheeling)
- Eskom licenses expressly reference open access requirement. Not all municipality licenses do, but this does not negate their responsibility under the ERA.
- 3rd Party Network Charges Rules exist, but outdated
- Recently: GenCo license threshold exemption and rules regarding eligibility of Municipalities

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The current SA Industry Structure is supportive of wheeling in theory, but issues persist that limit the development of increased wheeling / development of a competitive electricity market/open access



Structure of the market remains mostly a single buyer model (tenders for new capacity) ...however the law allows for wheeling – thus some limited trade happening.



Eskom is working on a Market Code but probably a need in short term for an interim market code and/or new 3rd Party Network Charges Rules

It is difficult to give customer choice (and allow municipalities to contract) without deciding on the overall market model and moving gradually from having 98% of the IPPs selling to Eskom – all the parts of the system need to work together

Good transmission and distribution tariff codes but not applied by municipalities

Specific SA challenges and issues:

- Need for new capacity would IPPs sell more to municipalities and customers without sovereign guarantee? Probably need to have also a default buyer (future ISTMO or CPA)
- Cross subsidies / issue of reticulation
- Need for capacity building given the new risk profiles in a market/wheeling context



Industry Structure has important implications.

 Relatively few existing generators that could enter into wheeling agreements. This means that, in the short-term, increasing the amount of wheeling would require new IPPs to come into the market. 	Energy traders could help expand the number of IPPs and customers that willingly enter into supply agreements, but this sector is in its infancy in South Africa.
- Bankability of new IPPs with industrial customers?	Removing barriers to expanding the role of traders in the market should be considered.
Large number of municipalities that operate autonomously, many of which have few customers.	The requirement for IPP procurement to follow capacity allocations as set out by ministerial decisions, based on the IRP, could be restraining the development of new IPPs (but the exemption up to 100 MW).

Material increase in volumes wheeled needs major changes to the market. BUT still some initial steps that could be taken to allow more transactions in the short term

The change in generator licensing threshold does not solve problems with the wheeling framework...

April 23 : DMRE publishes its intention to amend Schedule 2 of the ERA to exempt generation facilities of 10 MW or less from holding a generation license.

June 10 : President announces that the license exemption will apply to facilities of 100 MW or less.

Exempts generators from obtaining a licence from NERSA (and its interposition in establishing a price). It does not exempt them from needing to obtain permission to connect and complying with Grid Codes.

This removes one bottleneck – i.e. delays caused by the licensing process, and requirement to have a PPA in place to obtain such a license.

It does not address any other deficiencies in the wheeling framework (e.g. consistency and existence of munic arrangements) and will accelerate the need to implement a balancing framework (discussed later).

> NERSA's role will need to gradually change for generation/supply to focus on market power and abuse.



Keynote Speaker Keith Bowen



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Eskom market proposals

(including the role of the proposed CPA)

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Unbundling of Eskom seems to be gathering steam.



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Why the need for unbundling to develop a competitive market? To avoid conflict of interests

Transmission Grid	System Operator	Market Operator	Central Purchasing Agency
	Potentia	I bias in:	
 Grid maintenance (preference for maintaining lines connecting Eskom generators) Outage scheduling (scheduling outages that favour Eskom plant) Network access (preference for Eskom generators / customers for new connections) Resource allocation (expanding network in areas supporting Eskom customers or generators) 	 Dispatch instructions (curtailing non-Eskom plant in order to minimize cost impacts on Eskom generators) Outage scheduling (favoring Eskom generators in determining generator outage plans) Balancing decisions (allowing Eskom plant to reduce capacity without penalty to avoid costs) 	 Market access (providing smooth access for Eskom generators and retailers to the market and limiting non-Eskom customers or generators) Information access (providing information to Eskom generators or retailers to give an advantage in the market) 	<list-item></list-item>





Break Resume in 5 minutes

Up Next: Principles of Competitive electricity markets /open access

Principles of Competitive electricity markets open access >

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Idea of third party access (1) – key principles and benefits

- Is borne out of a desire to address the existence of a vertically integrated value chain, where the grid is owned by a producer/retailer
- Is defined by its key principle, which is to not discriminate among users of the grid (i.e. nondiscrimination).
- Requires network owners to grant access to parties other than their own customers on commercial terms comparable to those that would apply in a competitive market.
- ➤ Given that T & D are natural monopolies charges are regulated by the Regulator, NERSA.
 - In SA, complexities of having various types of use of distribution charges
- > Is a key instrument to bring competition in generation and retail parts of the value chain
- > General idea is this competition gives better prices and choices of products (via retailers)
- Competition in the market (through various bilateral contracts) avoid the need for sovereign guarantee and spread risks over the whole value chain.

A couple points to note...

- > We prefer the word "third party access" over "wheeling" (which is used more for regional markets)
- > Tendering for new capacity has brought better prices over the years



Idea of third party access – key principles

- In any country, the decision to implement TPA tends to mark a seismic shift in the development of its power sector.
- With TPA in place, sectoral opportunities, participants and processes are substantially different from those in the pre-TPA environment.
- Therefore, the introduction of a TPA framework requires careful design, detailed planning and a realistic impact assessment for each concerned party.
- Open access requires several technical and contractual elements to be in place, in order to allow market participants to have access to the transmission and distribution networks.
- In a final key point: the presence of multiple sellers and buyers (GenCos, suppliers, etc.) in the market is also a key prerequisite of a successful open access regime

SA approach is different – wheeling is already happening but various Studies are now looking at the big picture – not clear yet if current approach will continue or a more organized one will be developed (with changes to the Electricity law/regulatory framework)



Most likely future Trading Arrangements: Self-scheduled Decentralized Trading Arrangement

> Used in Europe, India, other parts of Asia, SAPP, etc.
> This is the model proposed in SA



Key characteristics

- Balancing market is combined with bilateral physical contracts, day ahead trading (simply 1 hour bilaterals settled through a Px)
- No need for long term PPAs
- Over time, financial contracts to hedge day ahead physical price
- Capacity markets in some countries
- Will evolve over time as there are more and more eligible customers

How the future SA market could work – basic features.



How a competitive market works? Example Notification in Namibia

	Name of Eligible Seller: Identification No of ES:	As printed on license	from Regulator]		
	License Type: Delivery Date: Published Date	[Generator, Trader or l [dd-mm-yyyy] [dd-mm-yyyy hh:mm]	Importer]		
		Contes	stable Customer(s) Allo	ocation	
Hour	Total Schedule (MW)	CC1 ID no.	CC2 ID no.	CC3 ID no.	
		% of Total	% of Total	% of Total	% of Tota
00-01					0.0%
01-02					0.0%
02-03					0.0%
03-04					0.0%
04-05					0.0%
05-06					0.0%
06-07					0.0%
07-08					0.0%
08-09					0.0%

Instead of following PPA technical rules, IPPs would (soon) need to follow grid code and market rules; If difference between meters and schedule = penalties (imbalance prices)

20 September 2019

MSB Market Rules & Wheeling Framework



How a competitive market works?

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- Namibia is developing a phased approach to market opening(wheeling)
- 1st Phase: DISCOs and industrial consumers can contract up to 30% of their capacity from new IPPs
- > Transparent market rules have been developed.
- Regulated imbalance prices but only GenCos are penalized in first phase; Nampower remains default supplier
- Various charges being paid also by eligible consumers: transmission tariff, losses, reliability, etc.
- In SA, a market code is being prepared but will deal with bilaterals but also day ahead and b.m.
- Should interim rules be developed combined with a revised 3rd Party Network Charges Rules?


The key function of supply (retail) in the future.

Bilateral transactions will eventually be subject to imbalance payments

RE GenCos **CANNOT** fulfill all DISCOs or customers requirements

Growing crucial role of traders/retailers to buy from many GenCos to build portfolio and resell + role of day ahead for participants to buy/sell

Suppliers will manage the imbalances within their portfolio of contracts – importance of load profiling

What Generators want to sell:



What Customers want to buy:

Full requirements = actual load





Improving wheeling in the Principles of Short-Term (and with the ITSNO)

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Potential interim arrangements: no balancing market but regulated imbalance prices.

- > Currently, Eskom balances the system in real time using its own resources.
- > Eskom provides full supply contract to municipalities and its own customers
 - Municipalities and customers don't have to manage their load
- Current wheeling arrangements are not subject to penalties if deviations because impact on the overall system is limited
 - However, with more trade, this will affect Eskom who might need to use more resources in real time – this has a cost.
- In the medium term (when Eskom is unbundled) the ISTMO would contract for regulated ancillary services with Eskom GenCo and maybe with some IPPs*
 - The ISTMO will invoice for these services
- > Parties out of balance (deviations) would pay a regulated imbalance price.
- > Should interim arrangements be developed before the ISTMO creation ?

Potential short-term arrangements

- Likely some forms of regulated imbalance prices, at least on IPPs
- Likely a higher ancillary service charge as well
- >But, less complicated trading license
- >No need for complicated long term PPAs
- Model bilateral contract for 3-5 years (local banks would need training to assess risks).
 - The market would grow but prices could be volatile

Could be facilitated through:

- Interim market rules with revised Third party access Rules (developed by NERSA ?)
- These rules would work **together** with the Grid and Tariff codes.
- Model use of transmission (and possibly distribution) system agreements

If no balancing market, can use:

- Regulated imbalance prices determined exante and approved by the regulator;
- There could be hourly prices (or monthly to start?) – different top up prices (peak and off peak) and one spill price;
- Prices could be re-calculated every month & seasonal basis

> Implications:

- If GenCos produce less than expected would pay a high penalty. If they produce more – could be paid a small price!
- Parties still need to pay for their bilateral contracts independently of what happens... They settle the difference with the ISTMO / Eskom
- **Problem**: these prices are known in advance and will affect participants behavior

Keynote Speaker Garth Greubel SAIPPA



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Contracting by Municipalities & **basic principles of network monopolies >**

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A number of agreements are currently required for wheeling electricity

- Connection and use of system agreements are an important part of the grid access arrangement
- > Wheeling annexures are used for generator use of system agreements
- > Customers need an amendment to their supply agreement.
- > But... there is no standard approach across municipalities for this.



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Public retailer regulation.

- > Distribution network function is a natural monopoly all consumers must pay the distribution charge
- > Public retailer function should eventually be unbundled from the distribution network business (not so easy!)
- Retailer buys from IPPs and/or Eskom GenCo
- > Since it sells to regulated consumers, must be regulated as well
- > Type of regulation?
 - Cost per customer should be the major financial performance indicator of a supply (retail) business
 - Largest cost: energy purchase (might buy freely from IPPs or at regulated prices if Eskom GenCo is too big / has market power)
 - If retailers buy freely NERSA must still monitor that they buy with prudence (cap price? day ahead reference price if there is one?)
 - Regulated consumers pay : G (regulated and/or market price) + T+ D + Retail
 - Transmission and Distribution network tariffs are also regulated



Importance of efficient Transmission pricing.

- There is already a very good transmission tariff established by NERSA
 - Eskom has clearly separated transmission charges in its tariff book.
 - But end-customers may not necessarily see this split out in their bill.
 - Based on revenue recovery, split 50:50 between load and generation.
 - Framework for GenCos connected to municipal network but selling outside of network unclear.
- In a liberalized competitive electricity market, transmission has tremendous impact on producers and consumers – it cannot be ignored anymore !
- Importance and complexity of transmission issues are exemplified by the many different "approaches" taken around the world

		Transmission		
Transmission zone	Voltage	network charges IR/kVA/m1 VAT incl		
< 200km	< 500V	R 12.18	R 14.01	
	≥ 500V & < 66kV	R 11.11	R 12.78	
\geq SUUKIII	≥ 66kV & ≤ 132kV	R 10.81	R 12.43	
	> 132kV*	R 13.69	R 15.74	
> 300km and ≤ 600km	< 500V	R 12.23	R 14.06	
	≥ 500V & < 66kV	R 11.24	R 12.93	
	≥ 66kV & ≤ 132kV	R 10.90	R 12.54	
	> 132kV*	R 13.82	R 15.89	



Objectives of Transmission Pricing.

CONFLICTS!

> Economic efficiency

(encouraging an efficient use of network, efficient location of new generation and customers, optimal network expansion);

Fairness and non-discrimination (same service – same price);

- Transparency and simplicity (easy to understand by newcomers);
- > Cost coverage

…and stability!

(bills must remain predictable)

*See Annex for various transmission tariff methodologies and who shall pay what?

*See Annex as well for congestion management and issues of losses



Use of Transmission (and distribution) System Agreement

- > Agreement (contract) between TSO (and DNOs) and each system user
- Agreement could provide for the Maximum Export Capacity (MEC) for GenCo or Maximum Import Capacity for load (MIC) = the maximum power, expressed in MW or kVA, under the terms of the connection agreement that a user can import from or export to the system at any given time.
- It places an upper limit on the total capacity that a customer can reasonably be expected to require of the network.
- > TUoS capacity charges (if any) shall be in accordance with its MIC and/or MEC.
- > Tariff schedule in the Annex
- > Requires a shift or standardization compared to existing agreements?

Are model agreements needed to encourage wheeling ??



In summary – use of System Charges and Settlement Issues

- Current system of netting with potential changes: e.g. imbalance charges can continue until Eskom is unbundled.
- > Post-unbundling, the ISTMO (MO department) will need to invoice imbalance charges
- > ISTMO would also invoice for:
 - Transmission tariff (to Gencos and suppliers & traders)
 - Transmission short-term constraints and auctions (one account) + regional wheeling if any
 - Transmission Losses (not invoiced separately currently)
 - Ancillary services (Capacity elements of reserves, reactive power, black start, voltage control)
 - Possibly extra costs of old PPAs + stranded costs
- In certain countries: use of system charge is included in transmission tariff, in others, it is invoiced separately
- > If all is included in the transmission tariff methodology is even more important !!!









Break Resume in 5 minutes

Up Next: Adequacy of current transmission and distribution codes

Adequacy of current transmission and distribution codes >>



Use of System Charges

- Price signals should reflect cost of transporting electricity to different customer groups.
- Requires solid understanding of cost structure and a cost allocation approach.
- South Africa has well developed Tariff Codes that sit within the Grid Code.
- No common approach comparison to markets like GB.

Distribution Tariff Code

- Open Access already embedded
- Requires unbundled cost reflective charges
- Subsidies / levies applied separately
- Provides a "guideline" for designing tariffs
- No specific approach is mandated.

Transmission Tariff Code

Similar statements about Open Access
Calculation procedure for charges is actually set out in the Code.

Rate Components as set out in the Distribution Tariff Code

	Energy	Admin	Customer	Network	Network	Network	Energy losses or
	costs	costs	service	capital	0 & M	overheads	geographic
			costs	costs	costs		differentiation
R/customer/day	×	~	~	×	×	×	×
based on std sizes							
Single c/kWh	•	×	×	×	~	~	~
TOU c/kWh	•	×	×	×	~	~	~
TOU seasonal c/kWh	•	×	×	×	~	~	~
Seasonal c/kWh	•	×	×	×	~	~	~
R/kVA – annual	×	×	×	~	×	~	×
utilised capacity							
R/kVA – monthly	×	×	x	×	~	~	×
capacity (could							
include TOU signals)							



Use of System Charges – Eskom's Approach

- > Use of System Charges are published.
- > Unbundled, except for retail charge.
- > Wheeling not allowed for LV customers / generators.
- Net billing arrangement is used for customers wheeling electricity
 - Full cost is charged.
 - Wheeled energy is credited.
 - Additional Admin charge.

Some challenges

- The net billing arrangement effectively back-calculates use of system charges.
- Creates a small additional administrative cost. Potentially discriminatory?
- Retail margin not excluded from wheeled energy.
- No penalties for being out of balance. Not a big issue with low volumes being wheeled, but will become important. Limits the amount of wheeling possible under this framework.

Use of System Charges – Munics' Approach

- **>** Tariffs are approved by NERSA
- > No common structure to tariffs.
- Very few cases of published use of system (wheeling) tariffs.
- Not clear the extent to which Munics are following Dx Tariff Code.
- > Very few cases of published approach to 3rd party access.
- > Customer eligibility defined by munics. Legal issue?

Some challenges

- Lack of understanding of cost of supply and accounting separation.
- Complexity of calculating charges.
- Perceived risk of revenue loss.
- Lack of capacity.
- Difficulties in negotiating 3rd party access

Some options for improvement

- Standardized eligibility criteria
- Standardized UoS agreements
- Standardized UoS charging structure / calculations.



Regulatory Rules on Network Charges for Third Party Transportation should be redrafted (outdated)

- > Includes many principles for Open Access, DUOS and TUOS charges.
- > Envisaged a balancing mechanism coming into effect at some point.
- Section 6 of the Third Party Network Charges Rules state that municipalities may not unilaterally refuse to enter into wheeling agreements.

Any load customer shall be free to go into bilateral arrangements with any third-party generator, i.e. non-Municipal and non-Eskom generator."

> Envisages separate retail functions and unbundled, cost reflective tariffs.

Many aspects are in need of updating and the overall implementation of these rules is unclear.



Recap and Closing Remarks



Work Package #1 developed a firm understanding of the current context and initial proposals for changes

- A potential Road Map for a way forward was prepared in our WP#1 this was very high level and ambitious
- > Various studies will be starting soon which would influence Government decisions.
- Eskom unbundling is the major unknown when will the ISTMO be operational ?

1: Short-term (≤ 1 year)	2: Medium-term (1-3 years)	3: Medium-term (3-5 years)	
Short term actions to improve current wheeling system	Finalize Eskom unbundling and creation of an independent market and system operator / creation of a CPA?	Increased liquidity in the markets, DISCOs able to procure higher % of their	
Eskom unbundling (already on going)	Finalize the financial recovery plan for munics, build knowledge on procurement / supply / load, implement national methodologies for use of system charging	expected load	
Development of market design paper to further define and confirm the current Eskom plan and draft final market code	Revision to the legal-regulatory framework		
	ket code Implementation of day ahead and balancing market / revise mechanism for new generation		

Work Package #1 developed a firm understanding of the current context and initial proposals for changes

> Potential areas for improvement to the current framework in the short to medium term

Amplification and adjustment of the 3rd Party Network Charges Rules

Amendment of municipal distribution licences to reference to ERA open access clause

Standardization of municipality approach to wheeling

Make the tariff methodology in Distribution Code a requirement rather than guideline

Implement a billing system that does not require netting*

Develop an initial imbalance pricing regime & initial market code and revise current ancillary services tariff

Potential revision of trading license to be consistent with new generation license exemption

Investigate eligibility further, incl. legal basis for defining it and potential phasing – eligible for only a % of load like in Namibia?

Model use of system agreements



*This depends also on the time frame for the legal unbundling of Eskom and the creation of an ISTMO – it has been updated since the WP# 1

Thank You!

Your feedback on the workshop is appreciated.

- Short survey
- Sent directly to Dave Long (<u>dlong.ies@gmail.com</u>) and/or lan Johnson (<u>ijohnson@cpcs.ca</u>)



Annex

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Scheduling – summary





Regulated imbalance prices example:





Final topic on markets – Issue of capacity markets...or not

- Sovernments and regulators are (often) concerned that an energy-only market might not provide the needed economic signals for the maintenance of installed capacity, and the construction of new capacity as needed (and when it is needed).
- In an energy only competitive market, future revenues are inherently uncertain, and thus expectations of revenue might not be sufficient to ensure that new investment is timely.
- In turn, under-investment (or late investment) can lead to very high prices in an energyonly market. In addition, prices in energy markets are usually volatile (even going negative in Europe lately at certain hours).
- The current system of tendering for new capacity might gradually be phased out Round 6 of tendering later this year maybe with less government guarantees?
- After a few more rounds of tendering under the current system, the system could eventually be replaced by some form of capacity payment



Issue of capacity markets...or not

- > A capacity payment mechanism aims to calm the volatility while ensuring supply adequacy.
- The best capacity market for a particular country is a function of the specific conditions of that country.
- > We can distinguish two main types of capacity markets:

Capacity obligations:

- Impose an obligation to contract for capacity, including a reserve margin on suppliers / customers, or just the reserve margin on a central buyer.
- Generators compete to provide capacity.
- Auctions may be used.

> Capacity payments:

- Make additional payment (above energy market price) to qualifying capacity.
- Administered payment or set through auctions.



How a competitive market works- with a balancing market

- > The System operator (SO) uses the balancing market to balance generation and load
- > When the market is 'short', the SO needs to buy energy (instruct a generator to increase)
- > When the market is 'long', the SO needs to sell energy (instruct a generator to decrease)
- > Generators submit bids to increase or decrease their generation
- > The SO uses these bids to balance the system in real time
- The cost of these actions is recovered through charging an 'Imbalance Price' to generators and customers who are out of balance
- > Generators and Eligible Customers contract in order to avoid paying the imbalance price
- > This creates incentives to minimise imbalances



The Two Sides of the Market.





Imbalance Price Options.

> In any hour there is a bid price stack:

• bids and offers stacked in price or 'merit' order





Imbalances Issues.

> Market jargon:

- A party short of energy must buy 'TOP UP'
- A party who is long (has too much energy) must sell 'SPILL'
- Top up is usually a high price (fuel cost plus some capacity cost)
- Spill is a low price (close to fuel cost)
- In a 'rational' market, contract price is mid-way between top up and spill



Imbalance Prices.

- There can be single imbalance price for energy in a settlement period (eg 1 hour) ...
- In or two prices (a price to buy and a price to sell) but :
- > This offers flexibility to market designers
- The market can start with 'soft' prices to encourage competition

- Two prices (top up and spill), marginal prices
- > 2 Two prices, average prices
- > 3 One price, marginal price in direction of imbalance
- 4 One price, average in direction of imbalance
- > 5 One price, average of net imbalance
- > 6 One price, both directions, simple average
- > 7 As option 6 but weighted average
- > 8 As option 6 but net average



Example of Buys and Sells in a Period

				Cumu	Cumulative	
	MWh	Price/MWh	Cost	MWh	Cost	Price/MWh
Buys	50	10	500	50	500	10.00
	100	11	1 100	150	1 600	10.67
	50	13	650	200	2 250	11.25
	30	15	450	230	2 700	11.74
	30	20	600	260	3 300	12.69
	30	22	660	290	3 960	13.66
	30	25	750	320	4 710	14.72
	30	26	780	350	5 490	15.69
	30	30	900	380	6 390	16.82
	30	50	1 500	410	7 890	19.24
	20	80	1 600	430	9 490	22.07
	20	150	3 000	450	12 490	27.76
Sells	-50	9	-450	-50	-450	9.00
	-100	8	-800	-150	-1 250	8.33
	-50	8	-400	-200	-1 650	8.25
	-50	7	-350	-250	-2 000	8.00
Nets				200	10 490	52.45
Totals (sum	of absolute	values)		700	14 490	20.70



Alternate Imbalance Prices.

Two-price options	o-price options Calculation		Price (€/MWh):		
		top-up		spill	
1. Marginal prices:	highest price in each direction	150.00	AND	7.00	
2. Average prices:	average of the prices in each direction	27.76	AND	8.00	
One-price system in direction o	when system is:				
		short		long	
3. Marginal price:	highest price in direction of system imbalance	150.00	OR	7.00	
4. Average price:	average of prices in direction of system imbalance	27.76	OR	8.00	
5. Average of net imbalance:	net revenue / net energy		52.45		
One-price system – both directions					
6. Average of averages, simple:	(System Buy Price + System Sell Price) /2		17.88	1	
7. Average of averages, weighted	$: (Rev_{buys} + Rev_{sells}) / (MWh_{buys} + MWh_{sells})$		20.70	1	
8. Net average price	Net revenue / $(MWh_{buys} + MWh_{sells})$		14.99	2	


Ancillary Services issues.

> Comprise:

- Reactive power
- Black start capability
- Frequency response
- Reserve:
 - Security reserve (standing or cold reserve)
 - **Spinning reserve** (hot reserve)
- > The first 3 are handled mainly in the Grid Code (might be provided free of charge or paid).
- Reserve (and also frequency response) results in changes in energy generation must be integrated with the energy market if there is one
- > Reserve could also be contracted on a yearly basis and paid.



TSO's Balancing Tools.

Daily Prescription	Power needed	Action delays	
PRIMARY : ANCILLARY SERVICES	~ XX MW	< 30s	Real time
SECONDARY (AGC) : ANCILLARY SERVICES	~ xx MW	< 15'	Real time
TERTIARY : Fast Complementary And more	xx MW xxx MW XXXX MW	13' 30' Longer delays	Real time and daily anticipation
Contracts			



Example of Revenue Formula for Public Supply business

Retail component

- > Usually, fixed costs represent 25% and Customer related costs 75% (= amount per customer)
- > Profit Margin (usually 1.5-2%) which is an amount per kWh
- The X factor (e.g. 1-2% per year) represents the annual change in cost per customer, in real terms.
- > This gives a supply (retail) price per kWh:
 - Supply (retail) Price = Allowed Fixed Revenue + Allowed Revenue per Customer +Allowed Revenue per Unit Sale (Profit)+ Correction Factor



Approaches to Transmission Tariff.

Two Basic Approaches

Transaction - Based Models	Network Service Models		
System users nominate individual transactions between a sink and a source.	System users nominate their injections (production) and extractions (consumption) at connection points. System users pay for injection/extraction at each		
All transactions are priced individually.			
MW-mile method, or	connection point.		
 Contract path approach 	Postage stamp method		



Transmission Pricing.

Two Basic Models





Postage Stamp.

> Most common is a Two-part postage stamp (capacity/energy)

- Capital and fixed operating costs recovered trough the "capacity charge"
- Variable operating costs (possibly including other TSO charges) recovered through the "energy charge" of the transmission tariff
- Is this the most efficient method? to be discussed...

> Postage stamp can be differentiated by category of users:

- Generation or load
- Voltage level



Who shall pay G or L? and is it better to have capacity or energy charges?

- > Reminder: Consumers will pay anyway!
- > Difficult to establish who benefits more
- > But the Regulator may want to influence the distribution of charges among consumers;
- > Gencos should be aware of transmission costs, otherwise they could build in the 'wrong' place
- > Gencos will not invest unless power prices cover total costs included transmission charges;
- MW charges have little short run impact but can have long term negative impact –reduce peak capacity and discriminate against renewable energy sources
- > MWh charges are better but...
- > A general MWh charge on all consumers has the same effect as a MWh charge on all Gencos



Congestion Management in time

> Capacity Allocation (Before Real Time)

- Pro-rata rationing
- Priority based rules (first come first served)
- Transmission Capacity Auctions
 - Explicit
 - Implicit: Zonal or Nodal (LMP)

Congestion Alleviation (Close to or during Real Time)

- Transmission Loading Relief (USA/NERC)
- Re-dispatch (single or multiple control areas)
- Market splitting
- Counter-Trade
- Pro-rata rationing









Other form of short term signals: e.g. Treatment of losses

- Should losses be centrally procured (by the TSO) or by each market participant individually (TLAF) ?
- > Should "losses" vary by node/region or be uniform throughout the country ?
- > Should "losses" vary over time or be uniform over a longer period (e.g. 1 year) ?

