



Transmission Engineer, Procure and Construct (EPC) Supplier Engagement Forum - Agenda



Time	Item	Responsible Person
09:00 - 09:05	Opening and welcome	Program Director: Sharon Mushabe
09:05 - 09:10	Safety and evacuation	Venue Co-ordinator
09:10 - 09:25	Keynote address	Segomoco Scheppers: Managing Director Transmission Division
09:25 - 09:40	Setting the scene	Naresh Singh: General Manager Transmission Projects Delivery
09:40 – 10:10	TDP overview & 10-minute question time	Leslie Naidoo: Senior Manager Tx Grid Planning
10:10 – 10:40	Transmission EPC approach & 10-minute question time	Makgwanya Maringa: Senior Manager Tx Projects Delivery
10:40 – 11:10	TEA BREAK	
11:10 – 11:40	EPC Engineering approach & 10-minute question time	Elli Lechtman: Manager Engineering Integration
11:40 – 12:10	Expansion projects – Project Development pipeline &10-minute question time	Leonard van der Walt: Senior Manager Projects
12:10 – 12:40	Refurbishment plan and project opportunities & 10-minute question time	Atha Scott: Senior Manager Asset Investment Planning
12:40 – 13:40	LUNCH AT THE UMGENI RESTAURANT	
13:40 – 14:20	EPC procurement and opportunities & 10-minute question time	Ezekiel Thuntsane: Senior Manager Procurement & Supply Chain Management
14:20 – 14:40	EPC project list and commodity forecast	Zizo Mkhize: Senior Manager Contracts Resource & Performance
14:40 – 15:40	Industry discussion	All
15:40 – 16:00	Closing remarks	Naresh Singh: General Manager Tx Projects Delivery



Transmission EPC Supplier Engagement Forum

Keynote address by Managing Director: Transmission Division

Segomoco Scheppers

Date: 30 May 2023





Transmission EPC Supplier Engagement Forum

Setting the Scene by General Manager:
Transmission Projects Delivery, Transmission
Division
Naresh Singh

Date: 30 May 2023





Transmission EPC Supplier Engagement Forum

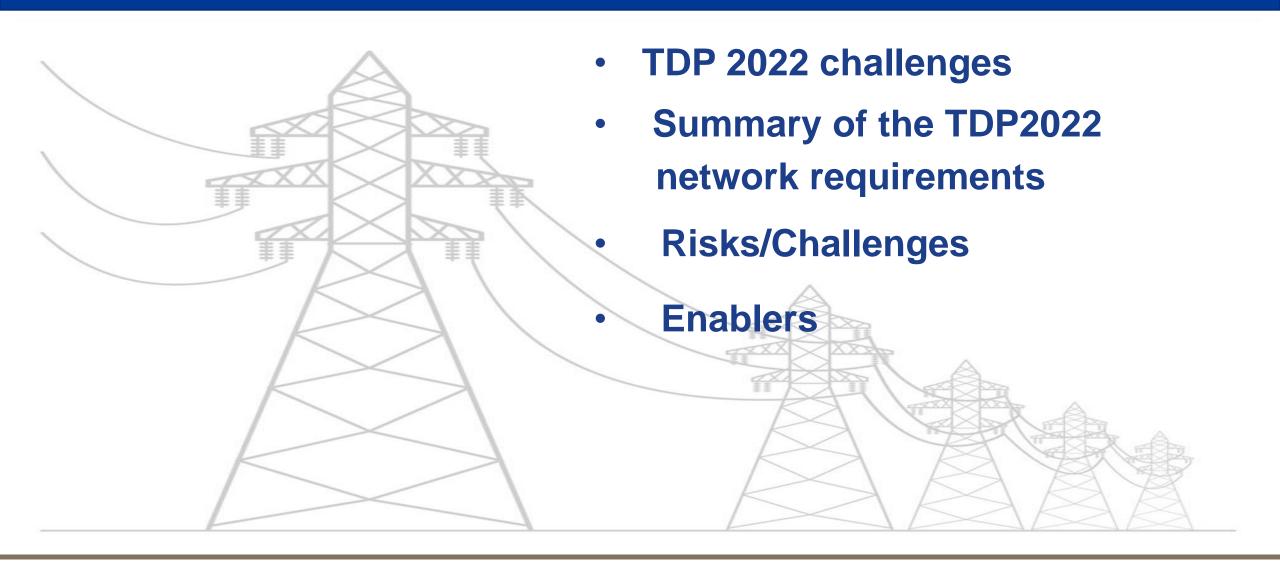
Eskom Transmission Development Plan 2023 to 2032 (TDP 2022)

Leslie Naidoo

Date: 30 May 2023







The TDP challenges



Current situation

- The IRP 2019 that was gazetted in November 2019, proposes ~ 30 GW of new generation capacity to be connected to the system by 2030. When considering the Eskom 2035 Corporate strategy, applications processed via the DMRE procurement programmes, non-DMRE applications and engagements with RE associations, ~ 53GW of new generation capacity will be required by 2032. Failure to deliver will lead to an increased risk to the security of electricity supply for the country.
- Current network reliability constraints (N-1) as well as meeting the anticipated demand growth also requires significant new network infrastructure.
- This will require an acceleration of investments in Transmission infrastructure by development of new corridors and substations, and strengthening at existing substations over the period 2023 2032 to address both the new generation capacity as well as the network strengthening requirements across the country for security of supply
- The budget for the next 5-year capital requirements has been granted



Problem statement

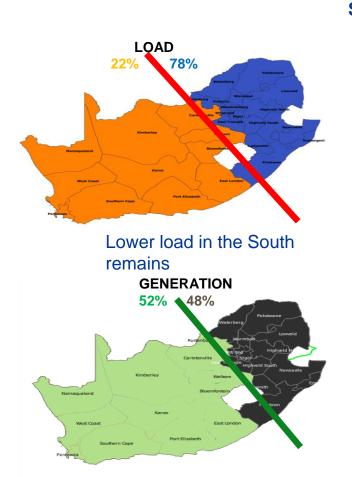
- The grid strengthening required to accommodate this aggressive renewable integration as well as ensuring the sustainability of the network requires significant investments
- Timelines to implement Transmission Infrastructure take ~ 8 – 10 years to build due to servitude challenges
- The resource capacity in the country across the EPCM value chain is limited
- The capital requirements in the later years of the TDP is substantial and is currently limited by the Eskom's balance sheet

Electricity value chain



What does this mean for the Transmission network?





Significant transmission development is required in the northern, central and southern corridors

Generation increase in the South

Summary of Transmission infrastructure requirements over the TDP 2022 period 2023 - 2032



Transmission Assets Nationally		New Assets expected	Total New Assets:			
	2023 - 2027	2028 - 2032	2023 - 2032			
Power lines (km)						
765 kV	200	6128	6328			
400 kV	2679	5019	7698			
275 kV	14	178	192			
Total length (km)	2893	11325	14218			
Transformers						
Number of units	60	110	170			
Total capacity (MVA)	26970	78 895	105865			
Capacitors						
Number of units	11	29	40			
Total capacity (MVar)	560	2 140	2700			
Reactors						
Number of units	6	46	52			
Total capacity (MVar)	600	14 113	14713			

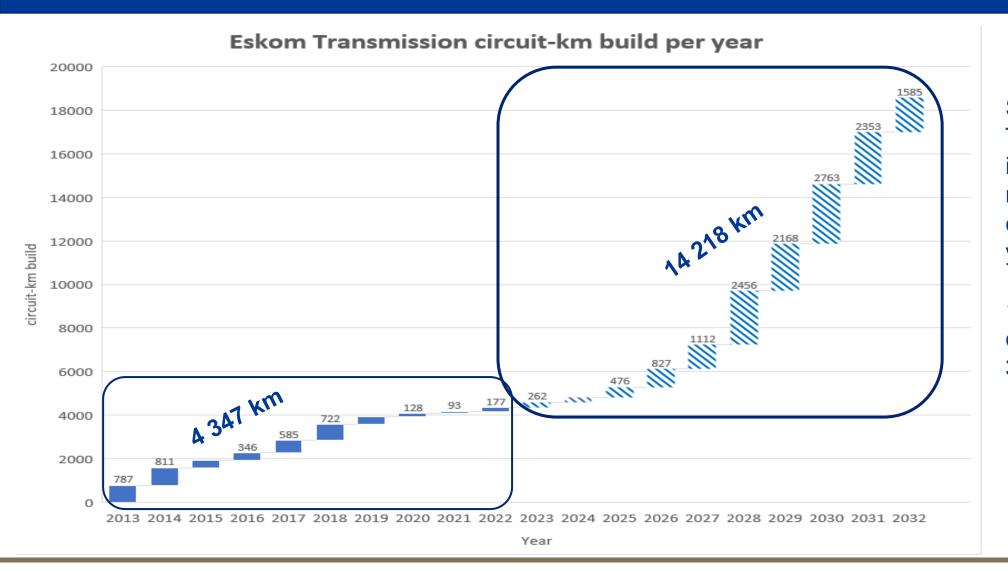
Network requirements:

Assumptions: Capex, servitudes, resource capacity and capability across the EPCM value chain are resolved.

While this is a huge challenge, The immediate focus is in the Next 5 years!!

10-year historical and 10-year future power line physicals 4 347 km versus 14 218 km of overhead transmission lines



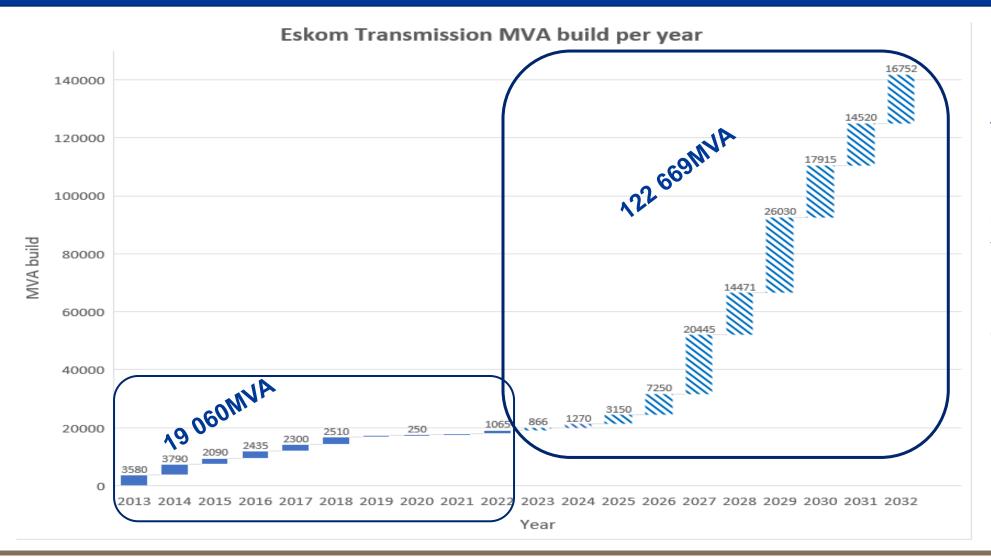


Sharp increase in Transmission infrastructure in the next 10 years, compared to last 10year actuals

14 218 km is <u>43%</u> of current 33 000 km total

10-year historical and 10-yr future transformation physicals 19 060 MVA, and 122 669 MVA of transformation capacity





Sharp increase in Transmission infrastructure in the next 10 years, compared to last 10year actuals

122 669MVA is **77%** of the current 160 019MVA total

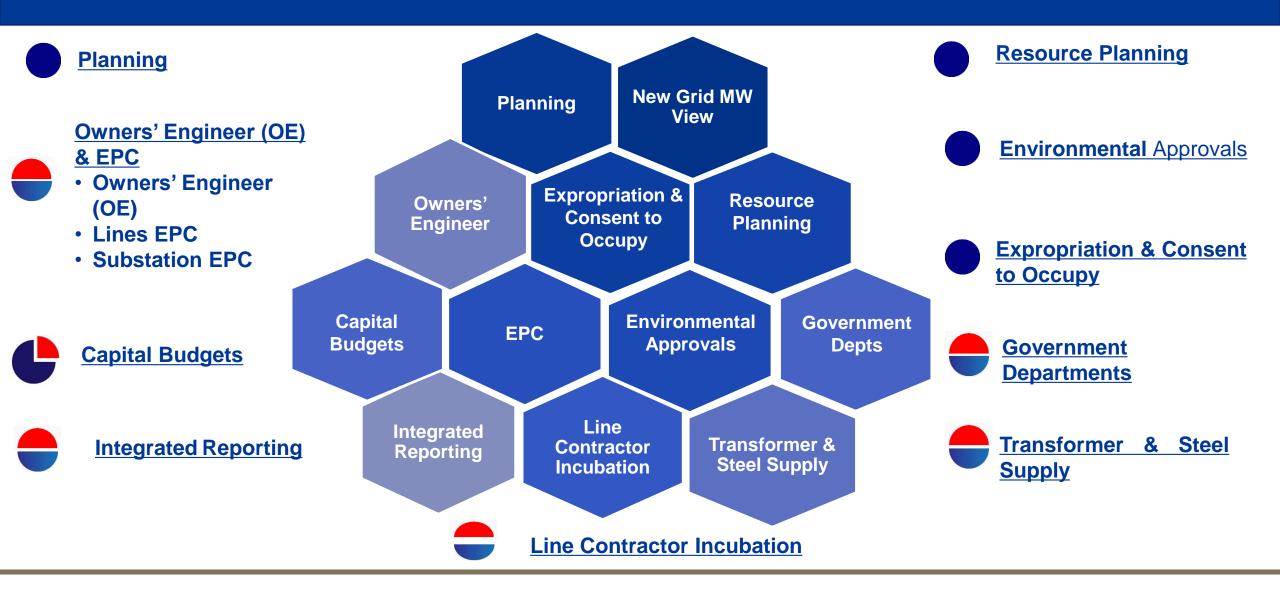
Challenges / risks



- Network capacity constraints especially in the Northern, Western and Eastern Cape regions require significant network augmentations in terms of 765kV corridors across many provinces
- Capex requirements beyond the Corporate Plan period to fund the new network infrastructure and replacement of inadequate assets
- The major risks in implementing the TDP 2022 are:
 - Time taken to acquire servitudes
 - Constrained resource capacity in the country across the engineering, procurement, and construction value chain to execute the plan

Enablers: Priority initiatives being implemented to increase delivery





Enablers: external support required



Continuous support from DFFE to further expedite and streamline the **EIA** approval process

Ongoing support from DPWI to expropriate rights/properties where required and streamlining/fast tracking this process

Ongoing support for access to government-owned land and Tribal owned land

Continuous support from DWS to further expedite and streamline the process obtaining water use authorizations Water (WUL/GA confirmation)

Market capacity in areas of constraints (transformers, fabricated structural steel, insulators, etc.)

Assist Eskom to minimize the impact of intimidation and community disruptions during construction



Questions – 10 minutes



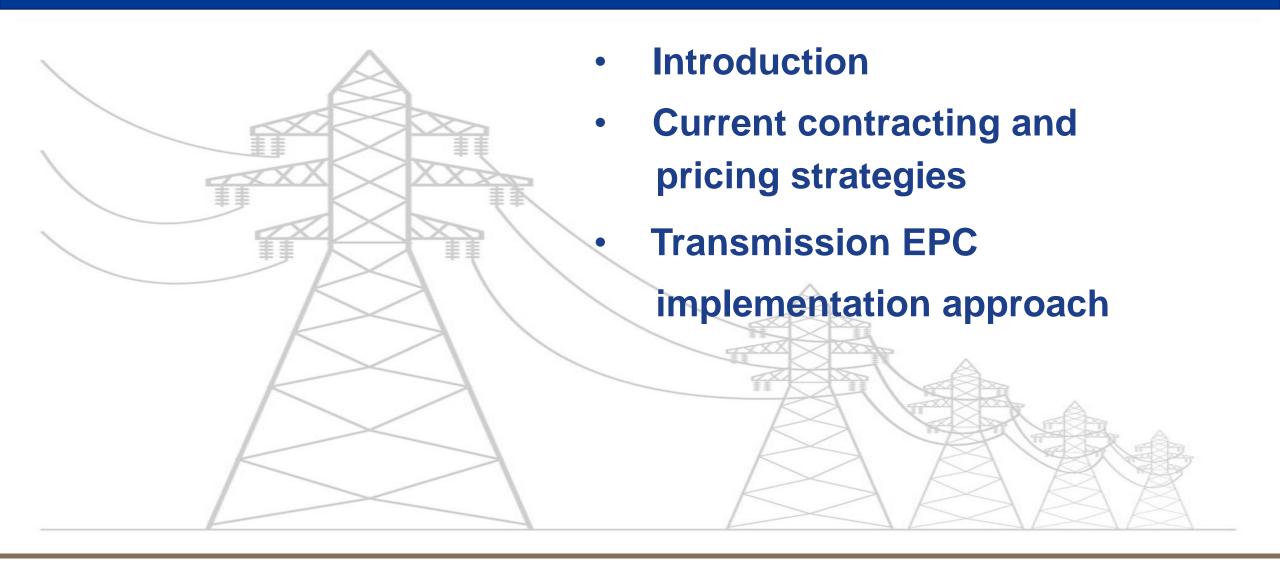


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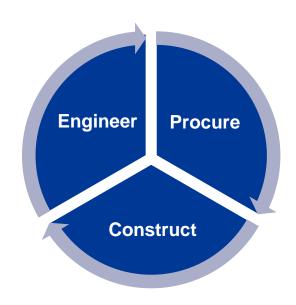


Engineer, Procure and Construct (EPC)



Engineer, Procure and Construct (EPC) is an outsourcing approach and delivery method in the construction industry.

- Entities that deliver EPC projects are commonly referred to as EPC Contractors.
- An EPC Contractor:
 - ✓ carries out the detailed engineering design,
 - ✓ procures all required equipment and materials,
 - ✓ performs construction and commissioning work,
 - ✓ delivers a functioning asset to the Owner.



Owner's Engineer (OE)



An Owner's Engineer is a professionally registered engineer, or, a team of appropriately registered built environment professionals, appointed to provide project development, oversight of the project's design, and project management on behalf of the Owner.

Scope: The OE contract shall be responsible for:

- Development and Engineering
 - ✓ Environmental, engineering survey,
 - ✓ Route selections,
 - ✓ Negotiation for servitude and land rights, geotech studies,
 - ✓ Obtaining statutory approvals
 - ✓ Concept design
- Procurement
 - ✓ Preparation of EPC tender packages
- Project management
 - ✓ Management of the project throughout the project lifecycle



Companies who are using EPC























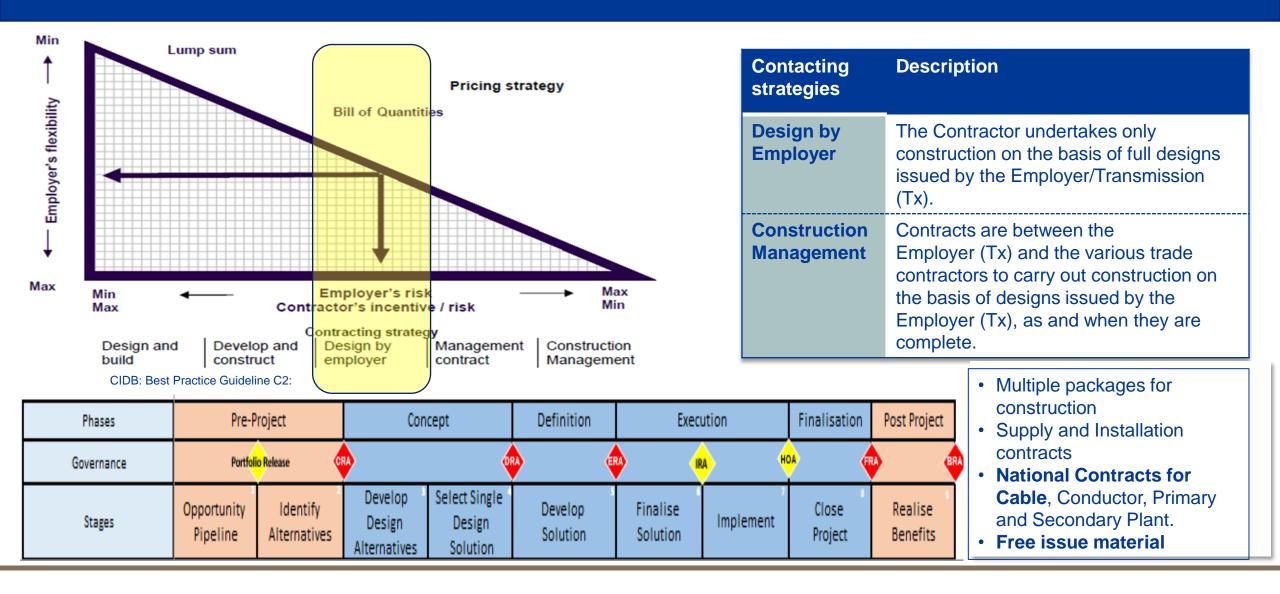






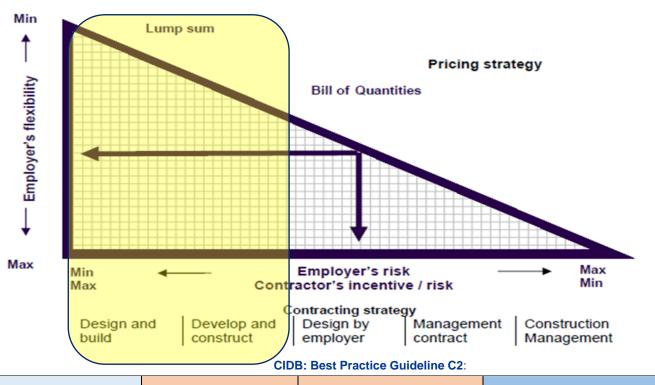
Current approach - Contracting and Pricing strategies





EPC Approach - Contracting and Pricing strategies





Contacting strategies	Description
Design and Build	The Contractor undertakes most of the design and all construction in accordance with the Employer's brief and a detailed tender submission, usually at a lump sum price.
Develop and Construct	Similar to design and build, except that the Employer issues a concept design on which tenders are based.

- Pre-Project Execution Finalisation Post Project Phases Concept HOA Portfolio **EPC Contract scope** Governance Select Single Identify Develop Design Develop & Finalise Realise Opportunity Close Implement Stages Design Solution Benefits Pipeline **Alternatives Alternatives** Project Solution
- Single EPC contractor for:
 - Detailed designs
 - Supply of materials
 - Construction
 - Commissioning
- Front End Engineering and Design (FEED) by Employer or Owner's Engineer (OE)

EPC Implementation Approach – per phase



CRA

ERA



Pre-Project

Tx Role:

- Select the delivery approach (EPC/multiple packages) based on;
 - scope
 - project type
 - risk
 - cost
 - complexity
 - constraints
 - resource requirements

Concept Phase

Tx and Owner's Engineer Role:

- Develop concept design
- Develop functional and technical specifications
- Obtain statutory approvals (Environmental Authorization, Water Use License, etc.)
- Geotechnical studies
- Land/ Servitude rights
- Detailed contracting and procurement strategy
- Develop EPC enquiry package
- Develop corporate social investment risk and stability plan

Execution Phase

Tx and Owner's Engineer Role

- Governance approvals (Technical, Investment and Procurement)
- Procurement of EPC contractor
- Project and contract management
- Monitoring and assurance for compliance
- Provide handover specification
- · Commissioning interfaces

EPC Contractor roles:

- Provide detailed design, procure material, construction and commissioning.
- Act in accordance with the contract conditions
- Presentation of design for acceptance at Design Review Team (DRT)
- EPC to utilise approved, technically compliant vendors
- Hands-over fully functional and compliant asset to the Owner

Finalization Phase

Tx and Owner's Engineer

- Transfer obligations
- Evaluate project performance
- Project close-out

CRA – Concept Release Approval

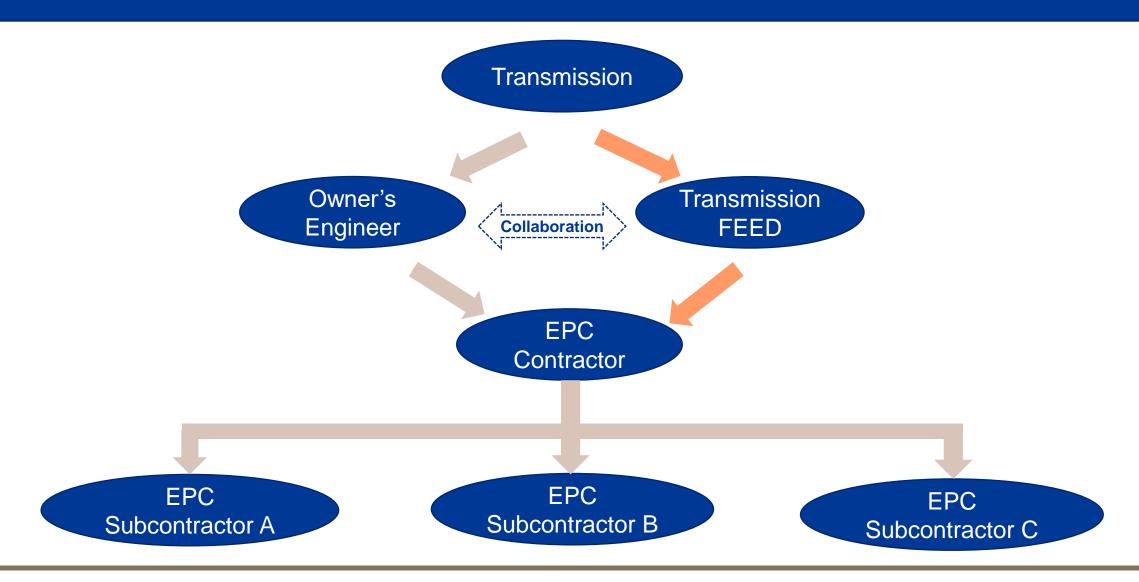
DRA - Definition Release Approval

ERA – Execution Release Approval

FRA – Finalization Release Approval

EPC Relationships



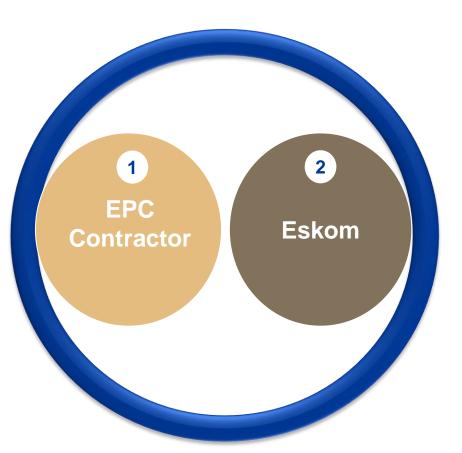


Risk allocation





- Inefficiencies/changes of designs during execution
- Delays in project completion time
- Project cost escalation
- Industry supply capability
- Construction quality risk
- Safety risk management



- 2
- Land & Rights (Route Selection and Servitudes)
- Environmental Impact Assessments (EIA)
- Technology
- Equipment standardization



Questions – 10 minutes



Transmission Engineer, Procure and Construct (EPC) Supplier Engagement Forum



Tea Break – Duration 30 minutes



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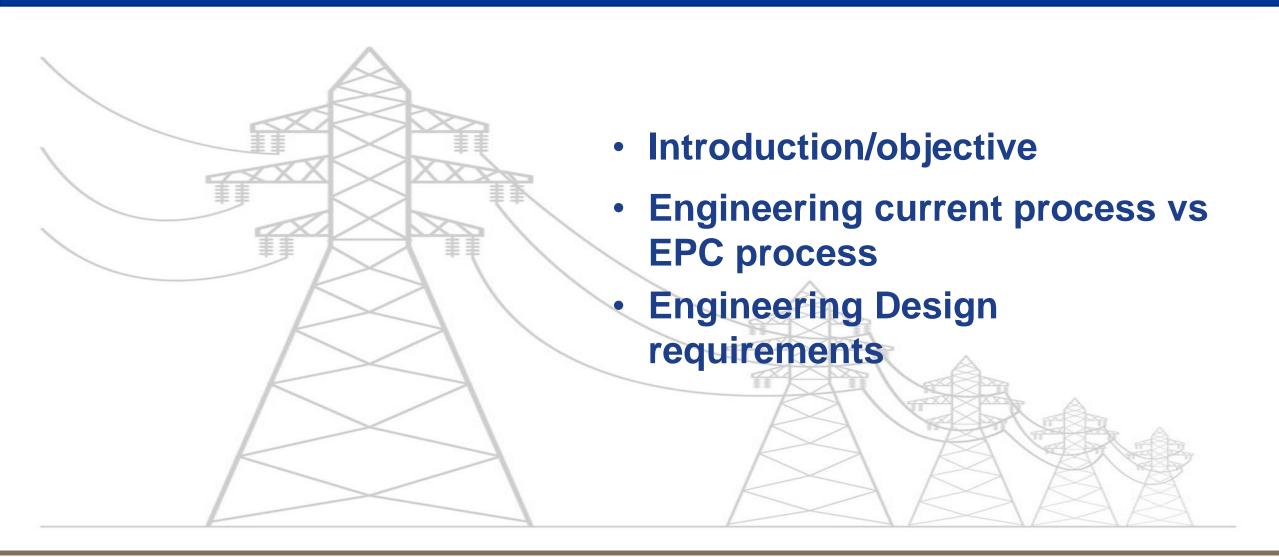


Transmission EPC Supplier Engagement Forum

EPC Engineering Approach





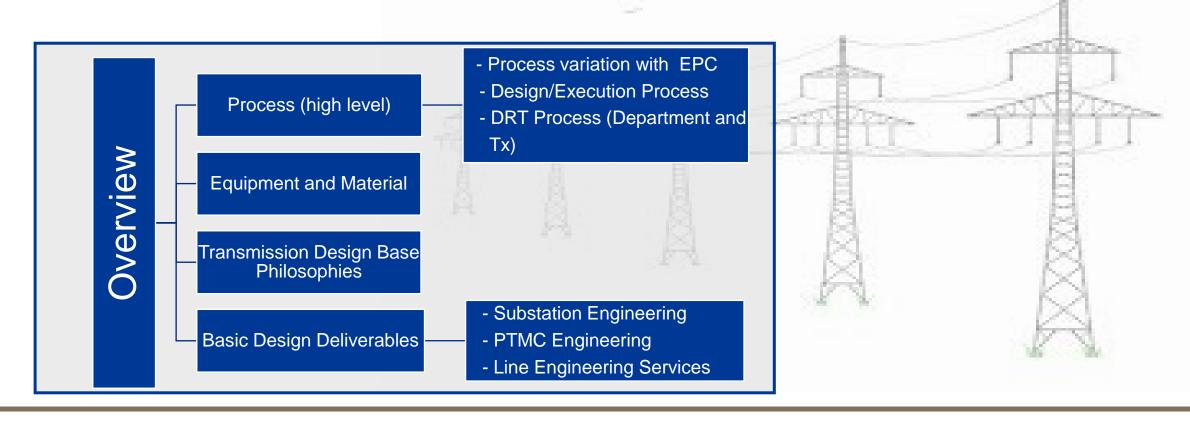


Objective



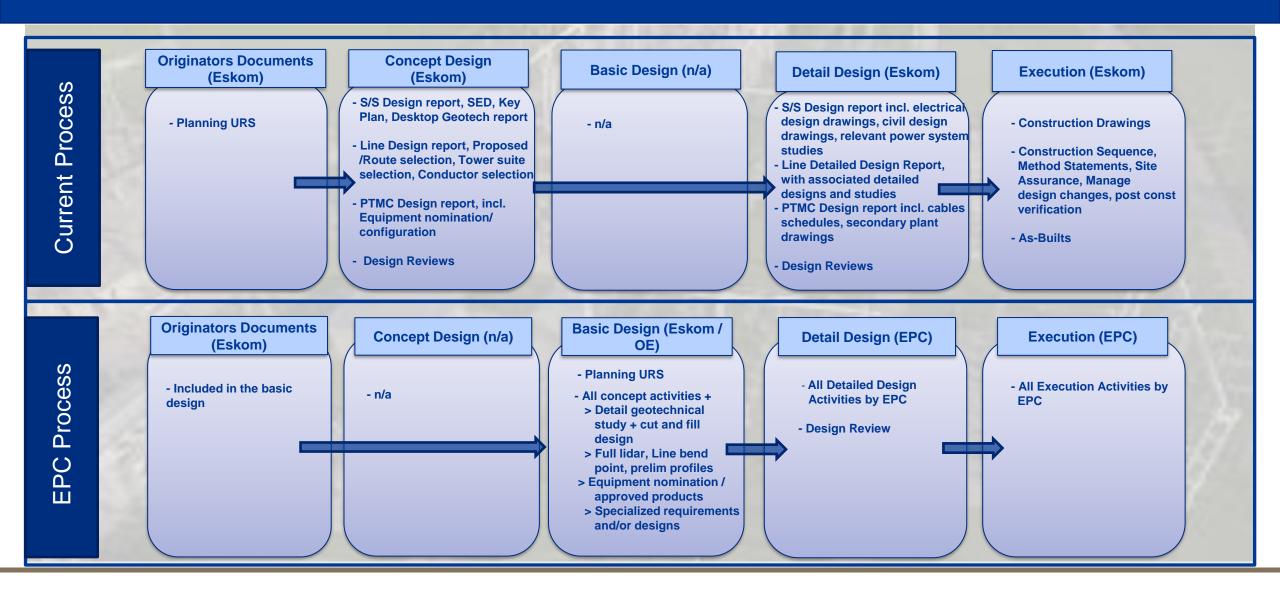
Expected EPC contractor engineering / design services to support the upcoming capital program.

Requirements in terms of the Process, Equipment and Material, the Transmission Design Base philosophies and the proposed Basic Design deliverables for a successful EPC contract.



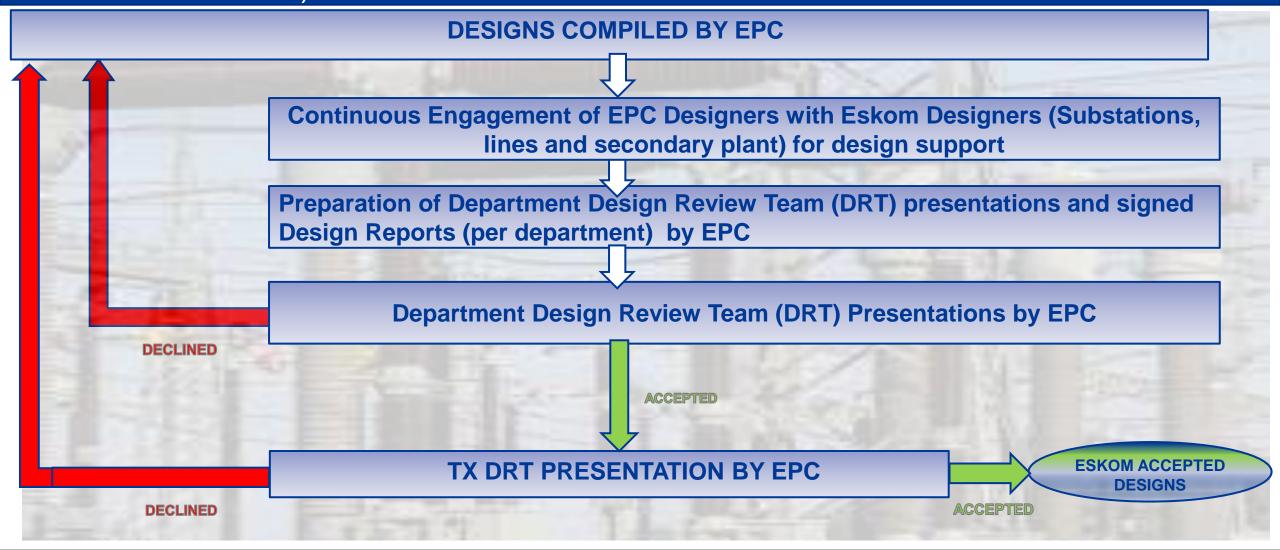
Process Input and Output Comparison





Design Review Team (DRT) Process Flow (Department DRT's and Tx DRT)





Engineering Design Requirements: Equipment and Material



Requirements

Nominated HVP equipment

Based on existing or pre- approved product list and / or pre-approved suppliers where available

Approved suppliers for material:

[Busbars, conductor, clamps, etc. (Substations); Hardware, insulators, conductor, etc. (Lines)]; Approved suppliers / based on existing or previously approved products.

If no approved suppliers available – <u>functional specification</u> for the components

Considering <u>functional specification</u> for some components to cater for production capacity limitations

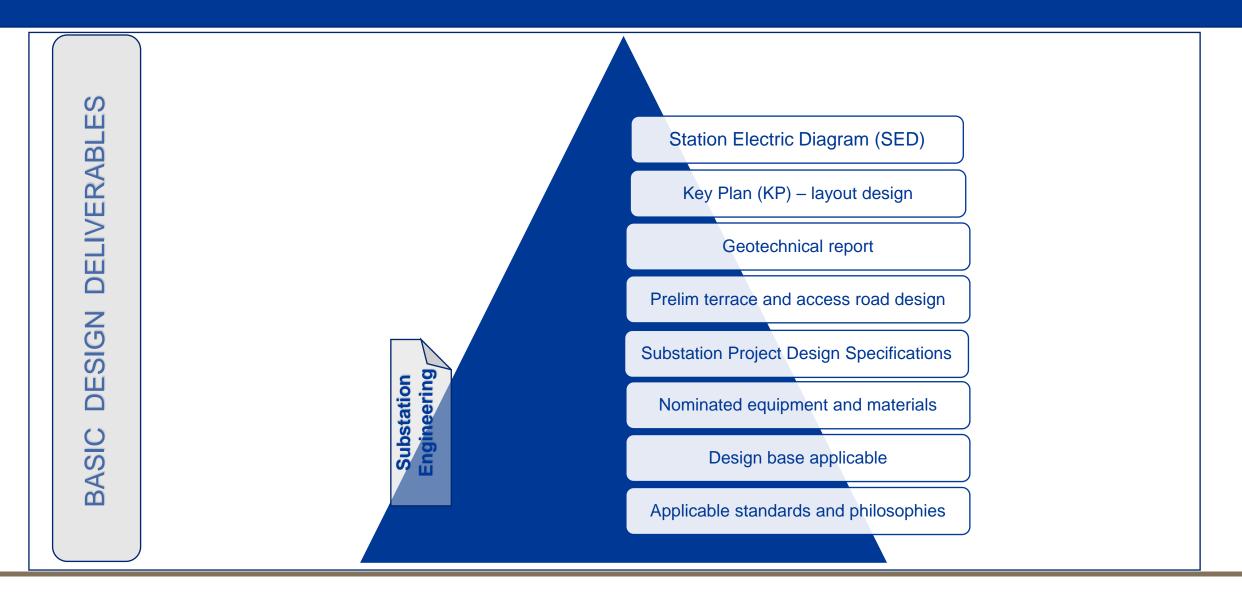
Engineering Requirements: Tx Design Base to be used





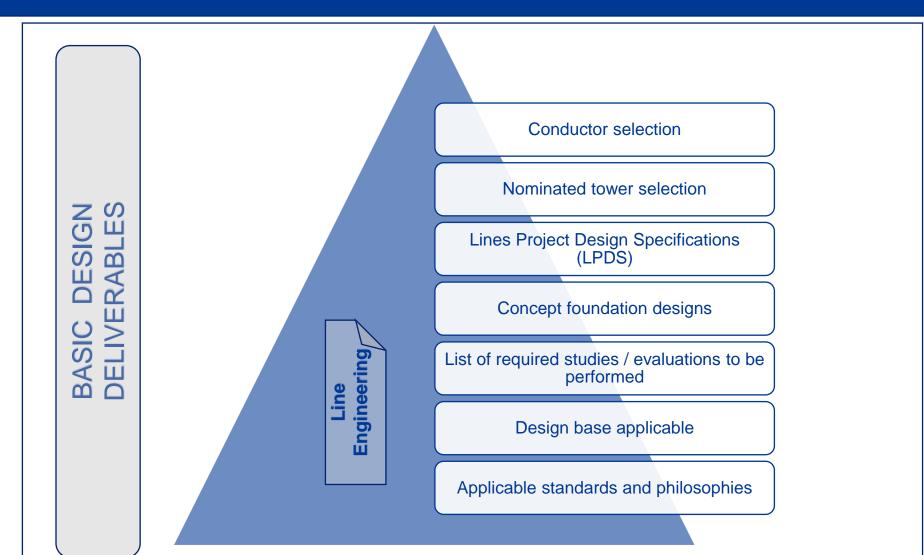
Substation Engineering Design: Basic Design Deliverables to include & & Eskom





Line Engineering Design: Basic Design Deliverables to include







PTMC Engineering Design: Basic Design Deliverables to include



ഗ DELIVERABL SIGN Ш BASIC

PTMC Project design specifications (PPDS):

Scope of work

Master drawings

Bill of materials including equipment nominations and configurations

Typical telecontrol database

Typical interlocking rules

Typical cable blocks

Typical IDF layout

Typical control / carrier room layout

Functional security specifications

Applicable design base

Engineering

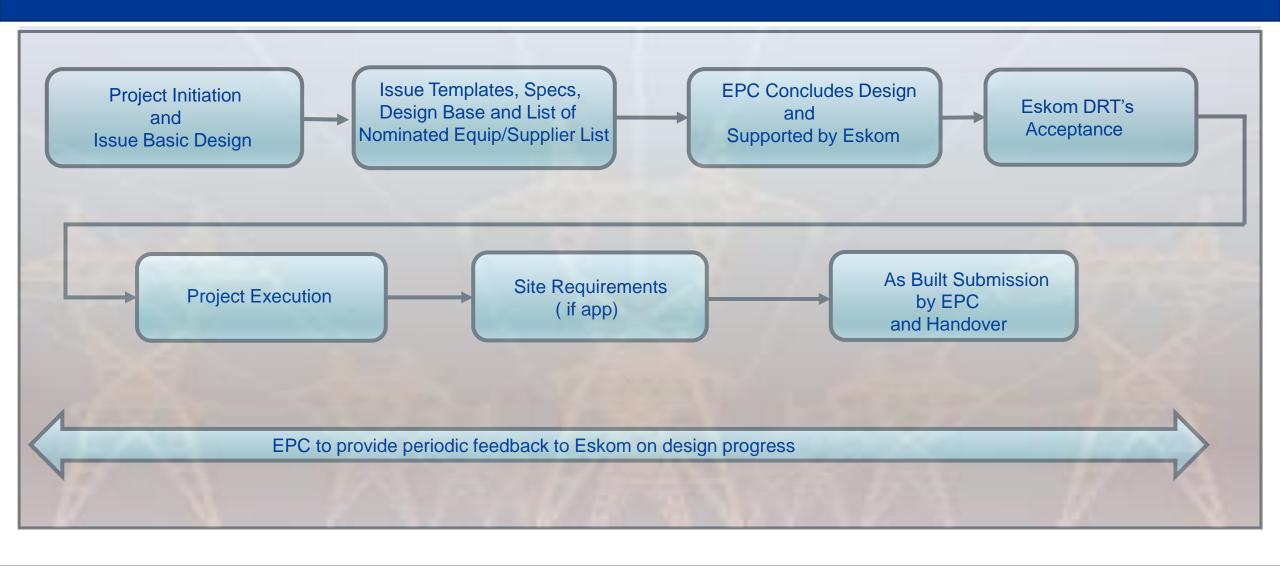
PTMC

Applicable standards, philosophies and specification



High Level Process - Eskom and EPC Interface







Questions – 10 minutes





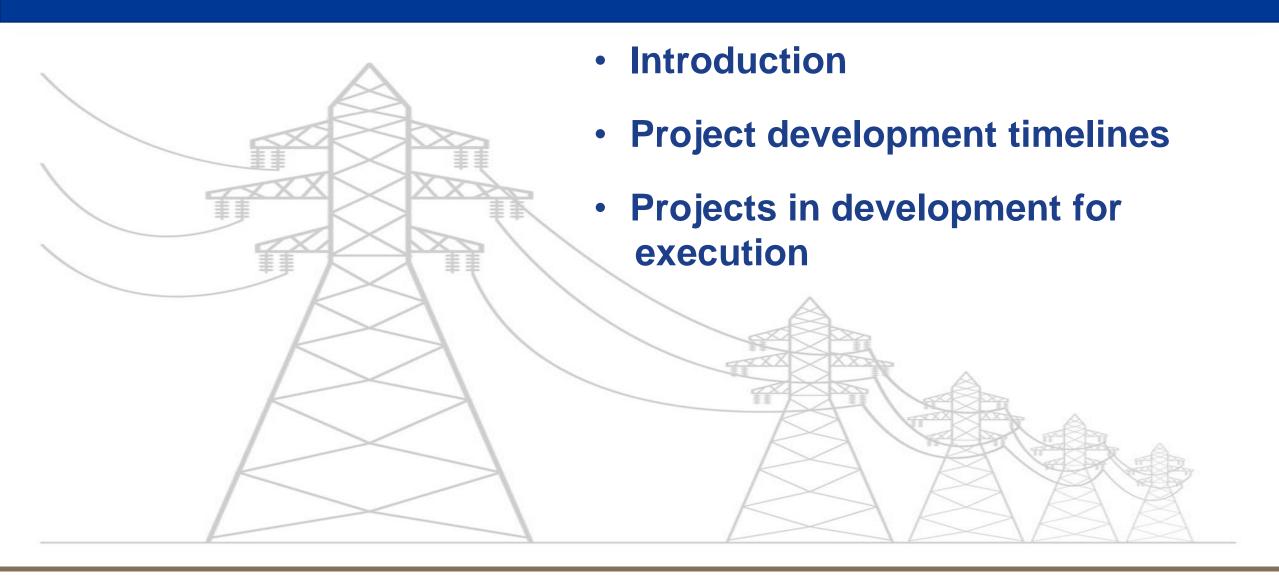
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Expansion Projects – Project Development Pipeline

Leonard van der Walt







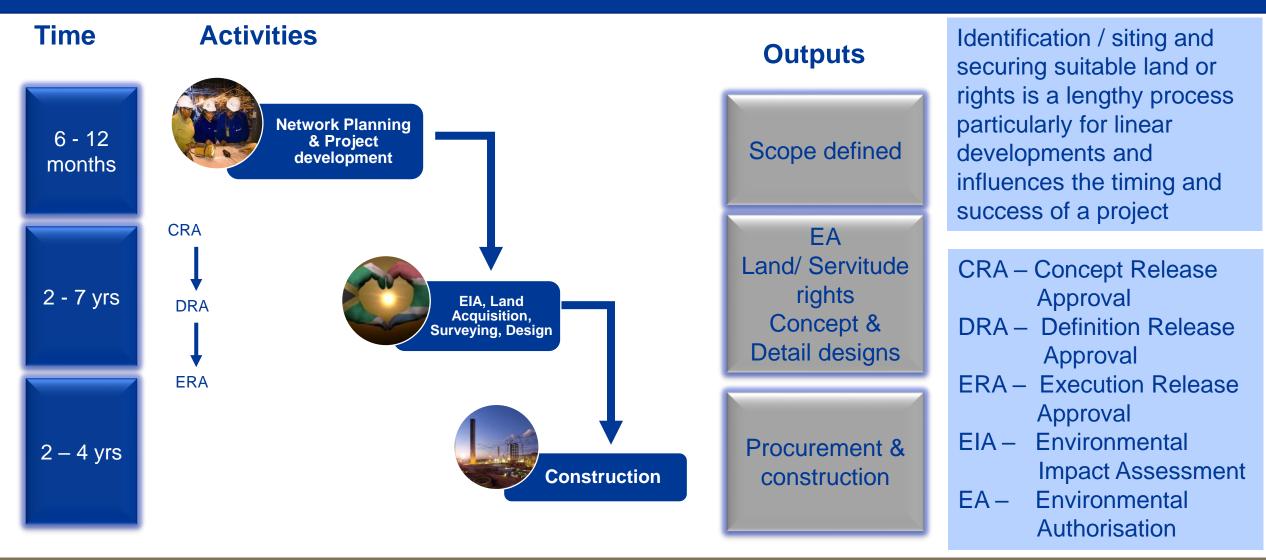
Introduction



- This presentation provides an overview of the current Transmission expansion projects in development, focusing on the projects going into execution from Financial year FY24 (1 April 2023 to 31 March 2024) to FY 26.
- No self-build projects are shown in this presentation.
- These projects are as per the 5-year Eskom Tx Corporate plan and is an extract (and refinement) of the 10-year Transmission Development Plan (TDP)
- The Execution Release Approval (ERA) dates shown are the current planned dates, these are subject to change depending mainly on:
 - Environmental authorization;
 - Servitude Acquisition;
 - The customer accepting their Budget Quotes (BQ's) and fulfilling all the BQ conditions for customer projects (including Eskom Distribution)
- Eskom aims to issue tenders within 2 6 months of the ERA date.

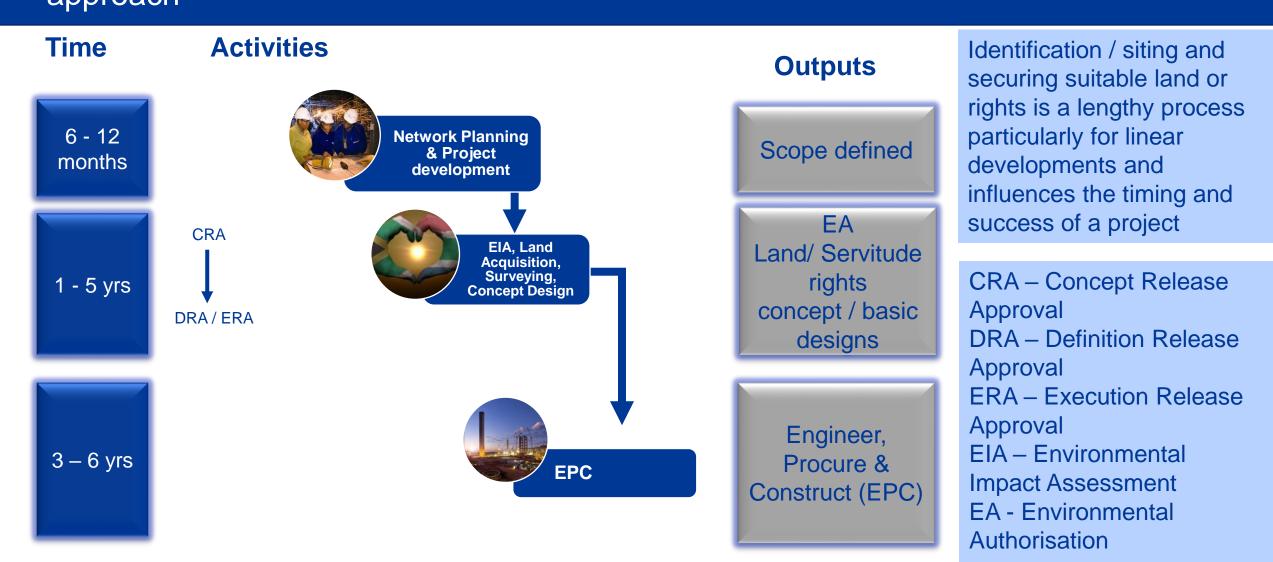
Typical Transmission project timelines (assuming no hurdles) – Traditional or Multiple Packages approach





Typical Transmission project timelines (assuming no hurdles) – EPC approach





Projects with ERA's planned for FY 2024



					No of	km
Project Name	Province	FY2024 FY2025 FY2026	FY2027	FY2028	Trfrs	Line
Mercury 3rd 500 MVA 400/132 kV Trfr	FREE STATE				1	0
Theseus 3rd 500 MVA 400/132 kV Trfr	FREE STATE				1	0
Emkhiweni 400/132kV S/S Integr Ph 1A	MPUMALANGA				2	12
Gumeni 2nd 400/132 kV Trfr	MPUMALANGA				1	0
Cape Corridor Phase 4: 1st Perseus – Zeus 765 kV line	MPUMALANGA				1	430
Emkhiweni 400/132kV S/S Integr Ph 1B	MPUMALANGA				0	107
Gumeni 300 MVA Customer Project	MPUMALANGA				2	0
Mookodi 1x 500MVA 400/132KV Transformer - IPP	NORTH WEST				1	0
Upington Str: Ferrum-Upington 400kV line 1 - IPP	NORTHERN CAPE				0	260
Kronos Transformation Ph 3 - IPP	NORTHERN CAPE				1	0
Helios Strengthening ph 2 - IPP	NORTHERN CAPE				1	0
Aggeneis-Paulputs 400KV Line	NORTHERN CAPE				0	94
Paulputs 3rd Transformer: 1st 400/132kV 500 MVA	NORTHERN CAPE				1	0
Asteria 400/132kV S/S integration	WESTERN CAPE				2	3
Juno 3rd 400/132 kV Transformer	WESTERN CAPE				1	0
Acacia Koeberg 2nd 400kV line	WESTERN CAPE				0	0
Erica MTS + Phillipi-Erica 400kV Line	WESTERN CAPE				2	10
Droerivier 500MVA 400/132kV trfr 3 - IPP	WESTERN CAPE				1	0
Kappa 500 MVA 400/132kV trfr 2 - IPP	WESTERN CAPE				1	0
Komsberg Ext 3rd 500 MVA 400/132kV Transformers - IPP	WESTERN CAPE				1	4
Agulhas 400/132kV S/S Integration	WESTERN CAPE				2	4
Galenia Ext 2nd 500 MVA 400/132 kV Trfr	WESTERN CAPE				1	0
Total					23	924

The light green blocks are the FY's between ERA approval and Commercial Operation.

Projects with ERA's planned for FY 2025 - Slide 1 of 2



					No of	km
Project Name	Province	FY2025 FY2026 FY2027	FY2028	FY2029	Trfrs	Line
Dedisa Ext 3rd and 4th 500 MVA 400/132 KV Transformer	EASTERN CAPE				1	0
Grassridge 3RD 400/132kV TRFR & BB	EASTERN CAPE				1	0
Delphi 1st 500MVA 400/132kV Trfr	EASTERN CAPE				1	0
Igesi (Makalu B) 275/88kV S/S Integr	FREE STATE				2	14
Artemis 3rd & 4th 500 MVA 400/132 kV Trfrs	FREE STATE				2	0
Mercury 1st 2000 MVA 765/400 kV Trfr	FREE STATE				1	0
Etna Strengthening: 3rd 315MVA 275/88kV Transformer	GAUTENG				1	0
JHB East: Mesong Integration	GAUTENG				2	3
Carmel S/S Upgrade: 3rd 275/132kV Trfr	GAUTENG				1	0
JHB East: Jupiter B Integration Ph1	GAUTENG				0	306
Soweto Ph 2 - Quattro 275/132kV	GAUTENG				2	0
Soweto Ph1: Quattro 275/88kV Integr	GAUTENG				0	30
West Rand Ph2A: West Rand Cap Banks	GAUTENG				0	0
West Rand Strength - Westgate 400kV	GAUTENG				1	36
KZN Customer project	KWAZULU-NATAL				3	6
Manogeng- Sekhukhune 400kV line 1	LIMPOPO				0	60
Waterberg Stbl: Borutho-Silimela 400kV	LIMPOPO				0	160
Acornhoek 3rd 125 MVA 275 / 132 kV transformer	LIMPOPO				1	0
Majuba 400/88 kV Trfr Upgrade	MPUMALANGA				2	0
Alpha 400/132 kV Substation Extension	MPUMALANGA				2	20

Projects with ERA's planned for FY 2025 - Slide 2 of 2



			No of	km
Project Name	Province	FY2025 FY2026 FY2027 FY2028 FY2029	Trfrs	Line
Hendrina 3rd 400/132 kV Trfr	MPUMALANGA		2	0
Marathon 400 kV Integration	MPUMALANGA		1	101
Majuba 400/132 kV Ext	MPUMALANGA		2	0
Kimberley Str Ph4: Boundary 400kV Str	NORTHERN CAPE		1	83
Gamma Str : 2nd 500 MVA 400/132 kV transformation	NORTHERN CAPE		1	0
Aries 400/132kV 500MVA trf - IPP	NORTHERN CAPE		1	0
Ruigtevallei MTS Transformation - 3RD 132/66kV 20MVA	NORTHERN CAPE		1	0
Korana Int Ph1: Korana 400/132 kV S/S - IPP	NORTHERN CAPE		1	2
Gamma Str: Gamma 765/400 kV trfr - IPP	NORTHERN CAPE		1	0
Kimberley Ph 3 : Hermes - Mookodi - Ferum 400kV line	NORTHERN CAPE		0	460
Hydra B 400/132kV S/S Ph1 - IPP	NORTHERN CAPE		1	6
Hydra B 400/132kV S/S Ph2 - IPP	NORTHERN CAPE		1	14
Hydra B 400/132kV S/S Ph3 - IPP	NORTHERN CAPE		1	0
Hydra-Kronos-Aries 400kV line 2 - IPP	NORTHERN CAPE		0	352
Kimberley Str Ph4: Boundary - Ferrum 400kV line	NORTHERN CAPE		0	230
Helios 132/66kV Reliability	NORTHERN CAPE		1	0
Koring Ext 2nd 500 MVA 400/132 kV Trfr	WESTERN CAPE		1	0
Bokkom 400/132 kV Substation Integration (Phase 1)	WESTERN CAPE		0	50
Cape 765 ph4 Gamma-Kappa 765kV no. 2	WESTERN CAPE		0	400
Total			39	2333

Projects with ERA's planned for FY 2026



						No of	km
Project Name	Province	FY2026 FY2027 FY202	8 FY202 9	FY2030	FY2031	Trfrs	Line
Greater East London Strength Ph 4	EASTERN CAPE					2	162
Grahamstown 400/132kV MTS - IPP	EASTERN CAPE					1	166
JHB North: Apollo-Lepini 275kV	GAUTENG					0	30
West Rand Ph2C:Taunus 400kV Int	GAUTENG					2	6
Sesiu 400/88kV S/S Integration	GAUTENG					3	22
Sisimuka Phase 1B 275/88kV & lines	GAUTENG					1	6
West Rand Ph2B:Westgate-Pluto 400kV line	GAUTENG					1	43
Brenner Ph2A: Matla-Jupiter loop-ins	GAUTENG					0	5
Brenner Ph2:Lesokwana 275/88kV S/S	GAUTENG					2	6
Spencer 2x36MVar Capacitor Banks Installation	LIMPOPO					0	0
Tabor 2x36MVar Capacitor Banks Installation	LIMPOPO					0	0
Leseding 3rd 500 MVA 400/132 kV transformer	LIMPOPO					1	0
Khanyazwe 2nd 275/132 kV Transformer	MPUMALANGA					1	0
Ararat-Trident 2x88kV line uprates	NORTH WEST					0	0
Bighorn Reactive Compensation (2x72 MVAr 132 kV and 3	NORTH WEST					0	0
Dinaledi Reactive Compensation (3x72 MVAr 88 kV Shunt	NORTH WEST					0	0
Marang Reactive Compensation (5x48 MVAr 88 kV Shunt 0	NORTH WEST					0	0
Mahikeng Integration ph1	NORTH WEST					1	180
Hydra Substation 2 x 400/132 kV Trfr Upgrade	NORTHERN CAPE					2	0
Gromis 400/132kV 500 MVA trfr - IPP	NORTHERN CAPE					1	0
Nama Str: Aggeneis-Nama-Gromis 400kV - IPP	NORTHERN CAPE					0	180
Hydra 2nd 2000 MVA 765/400 kV Trfr	NORTHERN CAPE					1	0
Total						19	806



Questions – 10 minutes







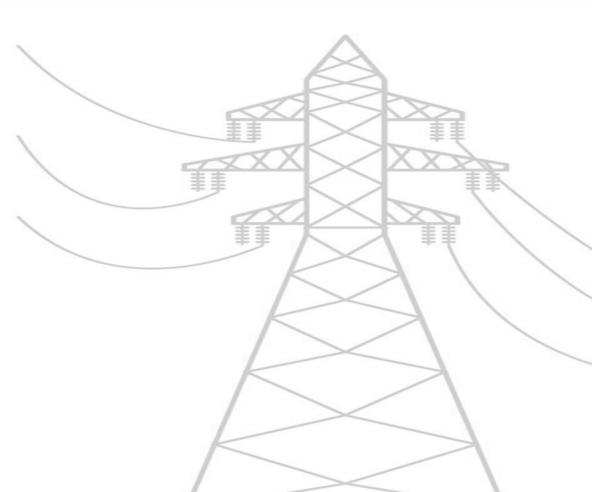
Refurbishment Plan & project opportunities

Atha Scott



Content





- Introduction
- Transmission capital funding allocation
- Refurbishment plan content and focus areas
- Asset replacement plan
- Substation refurbishment projects
- High risk transformer replacement
- Protection replacement requirements
- EPC opportunities

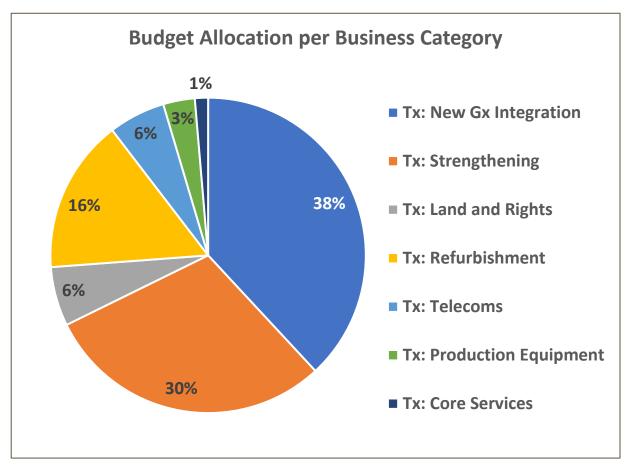
Introduction

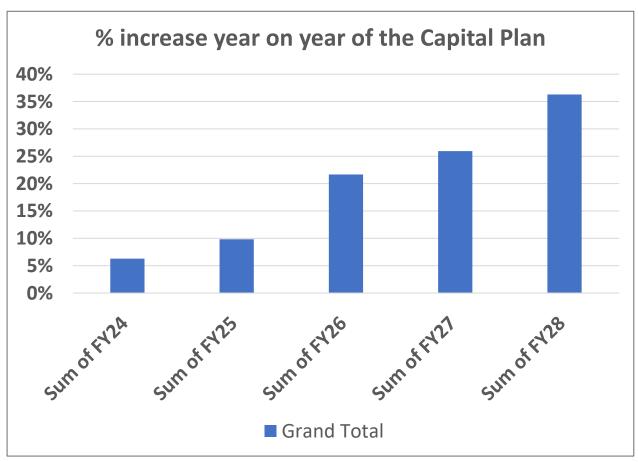


- The sustainability of the Transmission business requires capital investment in network expansion and augmentation as well as refurbishment of the existing infrastructure.
- The grid currently comprises of approximately 33 247ckm (circuit kilometers) of high voltage transmission lines and 171 substations in total.
- This is done by removing risks from the network through the replacement of poor condition assets, with consideration of network constraints. The refurbishment plan incorporates the following requirements:
 - Asset renewal (replacement) and/or refurbishment of network assets
 - Comply to fault level changes and ensure safe operation
 - Reduce operational costs
 - Ensure end-to-end communication
 - Comply with legislative and statutory requirements
 - Acquire an adequate level of capital spares
 - Eliminate risks of security breaches and theft
 - Improve network performance

5-Year Budget allocation per business categories







Consolidated view of the refurbishment work catered for in the plan



Main categories and project types

Substation Refurbishments

Addressing all equipment that have deteriorated and where spares are obsolete.

Line Projects

• Re-insulation, waterlogged towers, anchors and stays refurbishment, bird guards, Adlash replacement with OPGW, etc.

Secondary Plant and Other specific plant

DC, Protection, Surge Arrestors, CB's, Aircons, Cap Banks, GL312 Breakers, JB's and Line traps, etc.

Security projects

66 x National security projects

System Operations related projects.

The above list is not exhaustive but covers prominent areas

Refurbishment Plan focus areas for the next 10 years



Transformers and Reactors:

Targeted replacements and phased approach based on network risk

Protection Schemes:

 Certain schemes need to be replaced due the unavailability of spares and obsolescence, currently phases 1-4 have been identified as focus areas

Current Transformers (CTs):

CTs that have been identified as high risk across the network and a big number of projects are already in execution

Powerline Hardware and Foundations:

A full Lines assessment has been done and the refurbishment plan updated with 76 projects

Powerline Insulation:

Line Insulation is the least reliable of the line components and has the shortest longevity. Line re-insulation projects thus form
most of the current line asset replacement portfolio

Fibre:

 Fibre Wrap (e.g. Adlash) installed on some line earth-wires have exceeded their expected lifespan and are now impacting on the line performance. These need to be replaced with Optical Ground Wire (OPGW) which generally are outage dependent

Mitigation of network risk



Operational Risks:

- Equipment Performance Requirements addressed by Asset Renewal
- Flashover mitigation by re-insulation or coating at highly polluted areas
- Protection Replacements, thereby enhancing secondary plant performance
- Line refurbishments addressing deteriorated hardware and foundations

Statutory Risks:

- Compliance Requirements in terms of Fault-level exceedances equipment ratings enhancement
- Environmental compliance in terms of Asbestos and PCB phase-out, Oil Containment standards

Infrastructure Risks:

- Addressing statutory fencing requirements for safety, operating and proximity
- Security upgrades to address breaches and theft

The Plan: Assets to be replaced over the next 10 years



CATEGORY	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Grand Total
CAPACITOR	2	2	7	2	2	4	7	2	4	7	39
CIRCUIT BREAKER	46	121	52	48	22	89	76	84	166	148	852
CURRENT TRANSFORMER	138	472	143	267	181	353	441	406	499	447	3 347
DC & STANDBY	147	75	8	-	-	-	4	8	5	-	247
ISOLATORS	102	412	146	144	80	268	285	292	631	526	2 886
PROTECTION	32	103	102	152	227	276	258	235	253	257	1 895
REACTOR	-	-	-	-	2	1	6	2	2	2	15
SURGE ARRESTER	55	273	84	110	148	239	291	262	539	420	2 421
TRANSFORMER	-	5	-	2	5	11	12	13	19	15	82
VOLTAGE TRANSFORMER	26	100	48	117	52	149	178	132	298	241	1 341
Grand Total	548	1 563	590	842	719	1 390	1 558	1 436	2 416	2 063	13 125

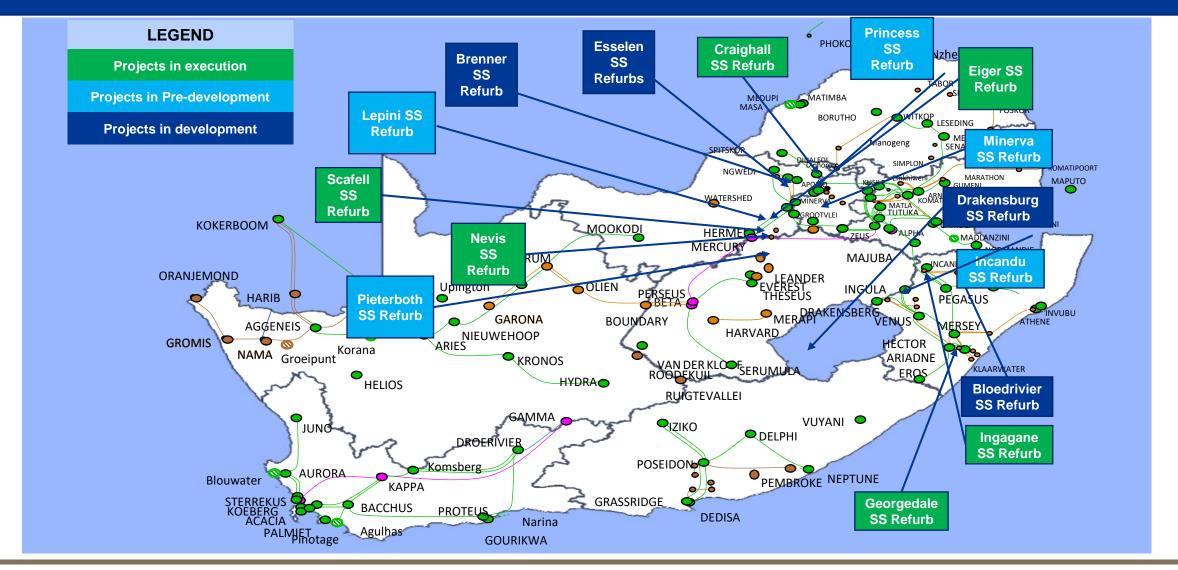


- The Refurbishment Plan is developed by identifying assets that require replacement based on condition and criticality, consolidating into projects and approving the resulting capital investment that would ensure that the network conforms to the required performance levels.
- A large quantum of assets require replacement: Specifically, Voltage Transformers, Surge Arrestors and Current Transformers
- These have been initiated as targeted replacements of the high-risk assets in the network, with the rest being packaged into substation refurbishments. The table and graph on the right indicates the refurbishment planned for the next planning cycle of 10 years.

(Blue indicates the first 5 years and orange the latter 5 years)

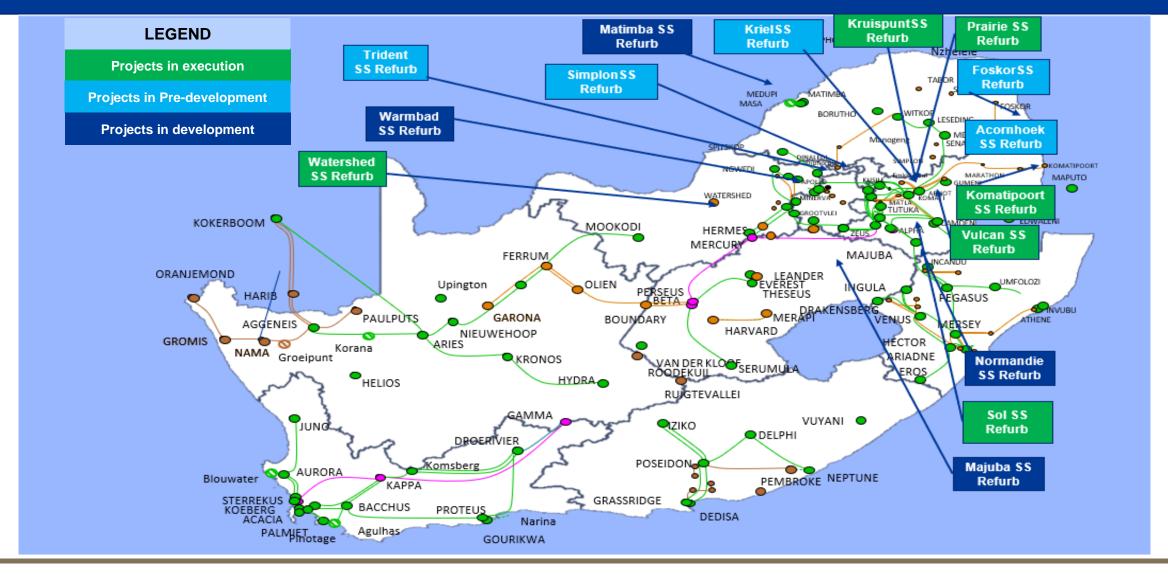
Major Refurbishment Projects: FY2024 – FY2033 (Central & East Grids)





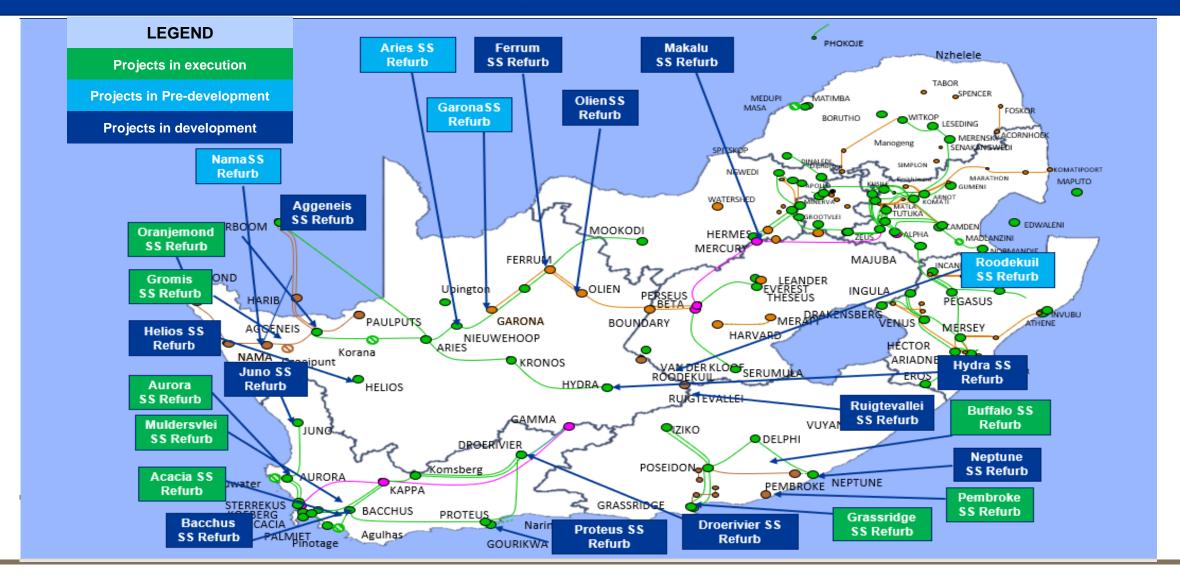
Major Refurbishment Projects: FY2024 – FY2033 (NE, N & Apollo Grids)





Major Refurbishment Projects: FY2024 – FY2033 (Western & Southern Grids – Covering 4 Provinces)





Transformers: Upcoming Replacements in Refurb Projects (Top 20)



No.	TRANSFORMERS ON SUBSTATION REFURBS	MVA	PROVINCE	YEAR
1	Acacia No5 Trfr Bay 132kV - 33kV Trfr	80	WESTERN CAPE	2025
2	Acacia No6 Trfr Bay 132kV - 33kV Trfr	80	WESTERN CAPE	2025
3	Aurora No12 Trfr Bay 400kV - 132kV - 22kV Trfr	250	WESTERN CAPE	2025
4	Muldersvlei No8 Trfr Bay 66kV - 11kV Trfr	20	WESTERN CAPE	2025
5	Vulcan No3 Trfr Bay 400kV - 132kV - 22kV Trfr	500	MPUMALANGA	2025
6	Eiger No2 Trfr Bay 275kV - 88kV - 22kV Trfr	315	GAUTENG	2027
7	Watershed No2 Trfr Bay 132kV - 88kV Trfr	180	NORTH WEST	2027
8	Olien No2 Trfr Bay 275kV - 132kV - 11kV Trfr	150	NORTHERN CAPE	2028
9	Proteus No1 Trfr Bay 400kV - 132kV - 22kV Trfr	500	WESTERN CAPE	2028
10	Proteus No13 Trfr Bay 132kV - 66kV - 11kV Trfr	80	WESTERN CAPE	2028
11	Proteus No2 Trfr Bay 400kV - 132kV - 22kV Trfr	500	WESTERN CAPE	2028
12	Watershed No4 Trfr Bay 132kV - 88kV Trfr	180	NORTH WEST	2028
13	Acacia No11 Trfr Bay 400kV - 132kV - 22kV Trfr	500	WESTERN CAPE	2029
14	Acacia No12 Trfr Bay 400kV - 132kV - 22kV Trfr	500	WESTERN CAPE	2029
15	Acacia No8 Trfr Bay 66kV - 11kV Trfr	20	WESTERN CAPE	2029
16	Apollo CS DC Pole No2 Bridge No2 107kV - 275kV Trfr B-Ph	90.8	GAUTENG	2029
17	Apollo CS DC Pole No2 Bridge No2 107kV - 275kV Trfr R-Ph	90.8	GAUTENG	2029
18	Apollo CS DC Pole No2 Bridge No2 107kV - 275kV Trfr W-Ph	90.8	GAUTENG	2029
19	Juno No21 Trfr Bay 132kV - 66kV - 22kV Trfr	40	WESTERN CAPE	2029
20	Juno No22 Trfr Bay 132kV - 66kV - 22kV Trfr	40	WESTERN CAPE	2029

Upcoming High Risk Transformer Projects to be approved as planned and replaced over the next 5 years

MAY 2023	ERA	High Risk TRFRS PH2 – Matla No1 400/275kV (NE)
JUN 2023	ERA	High Risk TRFRS PH2 – Impala No1 275/132kV (EC)
JUL 2023	ERA	High Risk TRFRS PH2 – Impala No3 275/132kV (EC)
AUG 2023	ERA	High Risk TRFRS PH2 – Chivelston No1 400/275kV (KZN)
OCT 2023	ERA	Phased Replacement of High Risk TRFRS PH3 – NE (3)
OCT 2024	ERA	Phased Replacement of High Risk TRFRS PH3 – NC (2)
MAY 2025	ERA	Phased Replacement of High Risk TRFRS PH3 – CG (3)
AUG 2025	ERA	Phased Replacement of High Risk TRFRS PH3 – NG (1)

An estimated 82 Transformers planned to be replaced over the next 10 years

High Priority Protection Schemes planned over the next 10 year



BAY Type	Sub Category	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	Total
BUS COUPLER	Protection Scheme	3	16	10	23	37	37	40	31	33	38	268
BUS ZONE	Protection Scheme	9	7	9	9	17	25	28	23	26	16	169
FEEDER	Protection Scheme	13	58	55	95	108	144	116	92	125	119	925
TRANSFORMER	Protection Scheme	3	12	14	5	30	40	32	48	44	39	267
SHUNT CAPACITOR	Protection Scheme	2	2	8	9	9	14	13	5	7	6	75
BUS SECTION	Protection Scheme	2	8	5	11	18	12	23	16	15	30	140
SHUNT REACTOR	Protection Scheme	0	0	1	0	5	3	3	9	2	2	25
LINE REACTOR	Protection Scheme	0	0	0	0	2	0	3	4	1	7	17
SERIES CAPACITOR	Protection Scheme	0	0	0	0	1	0	0	4	0	0	5
svc	Protection Scheme	0	0	0	0	0	1	0	3	0	0	4
		32	103	102	152	227	276	258	235	253	257	1895

EPC Considerations



Resulting considerations are mainly infrastructure related, Power lines, GIS, Cap Banks, Protection and Transformers

5 x GIS Projects	8 x Security Projects
7 x Capacitor Bank Projects	7 x OPGW Projects
24 x Power line related Projects	11 x Buildings and Facilities Projects
9 x High Risk Transformer Projects	3 x Access road Projects
21 x Protection Scheme Projects	5 x Systems & Tools Projects
3 x Breakers Projects	2 x Telecomms Projects
1 x Reactor Project	11 x Civil Projects
1 x SVC Project	1 x Filter Project
5 x General Substation Projects	

Way forward



- The current constraints with regards to the refurbishment of the network are placing the sustainability of Transmission at risk. *Refurbishment of the network* has been identified as a *high priority* and funds have been secured to address this requirement.
- We have adopted an Asset Management approach to *optimise the asset life* and mitigating strategies are in place to ensure stability of the network.
- Great progress has been made in the *implementation of asset management principles and asset renewal assessment and planning* specifically, that confirms a sound Refurbishment Plan.
- The total Capital Plan will be optimised and assessed based on a *Value Framework* that assesses each project by merit and makes provision to incorporate critical projects.



Questions – 10 minutes





Transmission Engineer, Procure and Construct (EPC) Supplier Engagement Forum

LUNCH at Umgeni Restaurant

Duration: 60 minutes



Transmission Engineer, Procure and Construct (EPC) Supplier Engagement Forum - Agenda



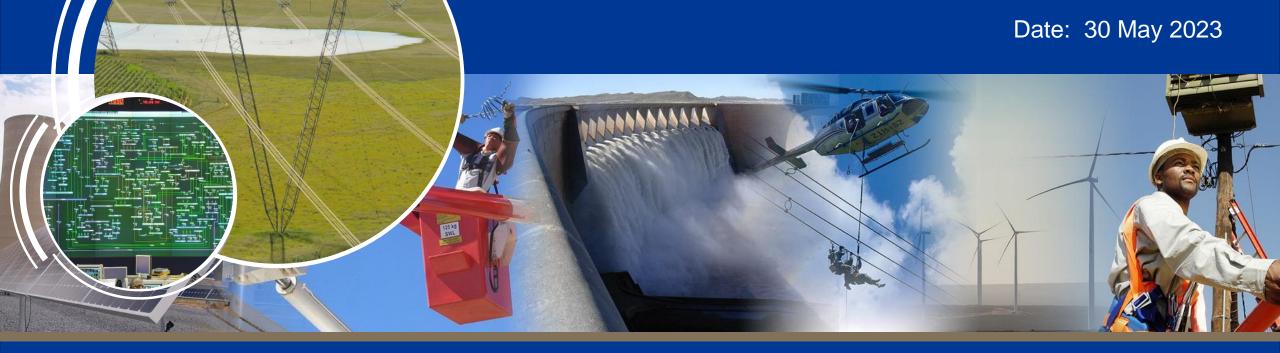
Time	Item	Responsible Person
09:00 - 09:05	Opening and welcome	Program Director: Sharon Mushabe
09:05 - 09:10	Safety and evacuation	Venue Co-ordinator
09:10 - 09:25	Keynote address	Segomoco Scheppers: Managing Director Transmission Division
09:25 - 09:40	Setting the scene	Naresh Singh: General Manager Transmission Projects Delivery
09:40 – 10:10	TDP overview & 10-minute question time	Leslie Naidoo: Senior Manager Tx Grid Planning
10:10 – 10:40	Transmission EPC approach & 10-minute question time	Makgwanya Maringa: Senior Manager Tx Projects Delivery
10:40 – 11:10	TEA BREAK	
11:10 – 11:40	EPC Engineering approach & 10-minute question time	Elli Lechtman: Manager Engineering Integration
11:40 – 12:10	Expansion projects – Project Development pipeline &10-minute question time	Leonard van der Walt: Senior Manager Projects
12:10 – 12:40	Refurbishment plan and project opportunities & 10-minute question time	Atha Scott: Senior Manager Asset Investment Planning
12:40 – 13:40	LUNCH AT THE UMGENI RESTAURANT	
13:40 – 14:20	EPC procurement and opportunities & 10-minute question time	Ezekiel Thuntsane: Senior Manager Procurement & Supply Chain Management
14:20 – 14:40	EPC project list and commodity forecast	Zizo Mkhize: Senior Manager Contracts Resource & Performance
14:40 – 15:40	Industry discussion	All
15:40 – 16:00	Closing remarks	Naresh Singh: General Manager Tx Projects Delivery



Transmission EPC Supplier Engagement Forum

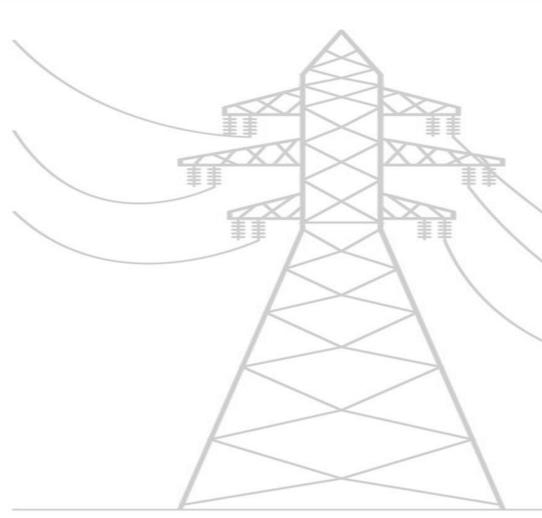
EPC Procurement & Opportunities

Ezekiel Thuntsane



Content





- Introduction
- Eskom projects
- TDP Procurement execution strategies
- Panel establishment process
- Panel execution process
- Second stage objective criteria
- Award consideration
- Panel member augmentation
- Transactions in the procurement space

Introduction



Eskom has over the years executed projects using various Procurement and Contracting strategies:

Lump Sum Turnkey (LSTK)

A single procurement contract for the complete functional power station.

Limited Multiple Contracts (LMC)

Approximately 10 separate contracts

Several Multiple Contracts (SMC)

Usually 17 - 30 separate contracts

Multiple Contracts (MC)

More separate contracts than SMC (up to 100)



Eskom Projects



Koeberg Power Station

- 2 x 970 MW Nuclear Power Plant located 30 km North of Cape Town in Melkbosrand
- Limited Multiple Contract Strategy
- Main contractor for the reactor Framatome
- Construction started in 1976
- Commissioning date 1984

Sere Windfarm

- 105.8 MW (46 wind turbines, 2.3 MW each) WindFarm Project at Koekenaap, Western Cape
- EPC contract with Siemens
- Owner's Engineer Gas Natural Delnorte (formerly SOCOIN)
- Form of Contract Bespoke FIDIC (World Bank)
- Started around 2006/7, contract in Feb 2013
- Commissioned in December 2014



Eskom Projects (continued)



Project Alpha (Medupi Power Station)

- 6 x 794 MW Dry Cooled Coal Fired Generation Plant, near Lephalale, Limpopo Province
- Contracting approach ranged from EPC to Multiple Package comprising 60 to 80 packages
- Ultimate strategy was a 30 to 40 Multiple Contract Strategy
- Fleet approach for the Boiler and Turbine
- Owner's Engineer PB Power
- Form of Contract FIDIC
- Started as far back as 2006, contracts in 2008/9
- Commissioned in the first Quarter of 2015

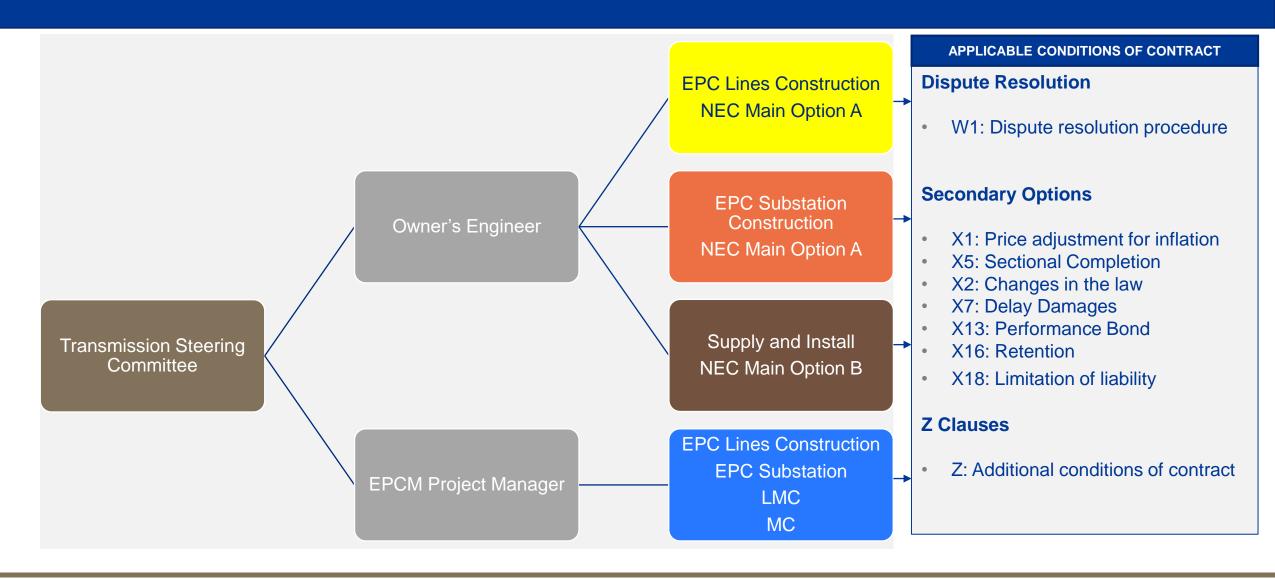
Project Bravo (Kusile Power Station)

- 6 x 900 MW Coal Fired Generation Plant 10 Km North of Kendal PS in Mpumalanga
- Contracting approach ranged from EPC to Multiple Package comprising 60 to 80 packages
- Ultimate strategy was a 30 to 40 Multiple Contract Strategy
- Fleet approach for the Boiler and Turbine
- Owner's Engineer Black & Veatch
- Form of Contract FIDIC
- Started as far back as 2006
- Boiler and turbine contracts concluded in 2007
- Construction started in August 2008
- First units synchronized to the Grid in March and July 2017



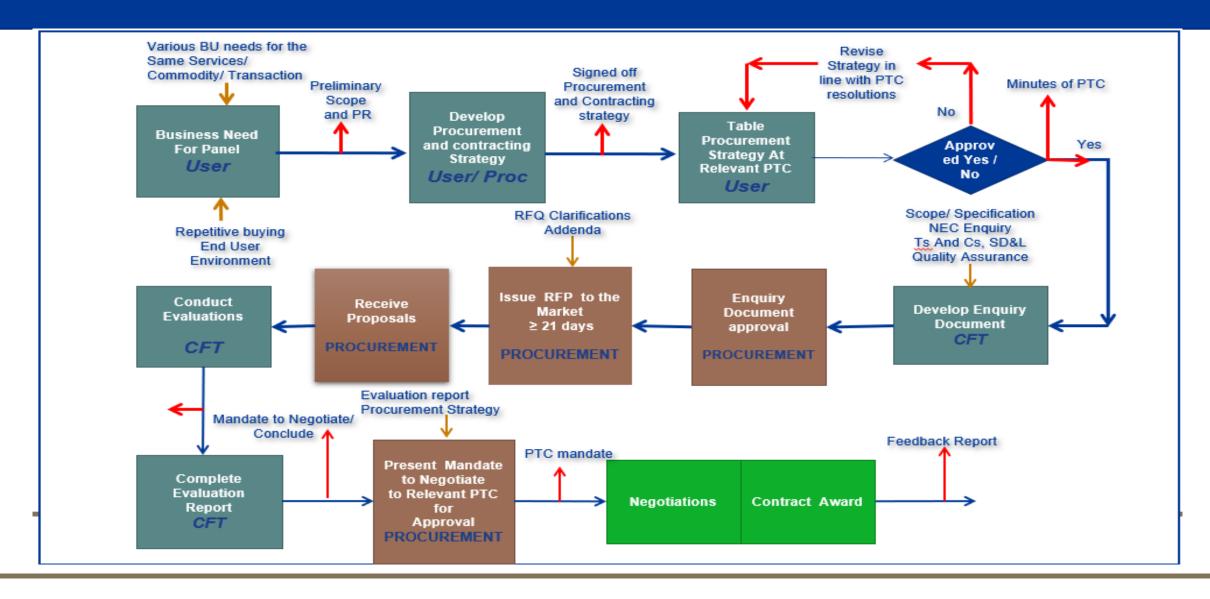
Procurement strategy for the various TDP projects





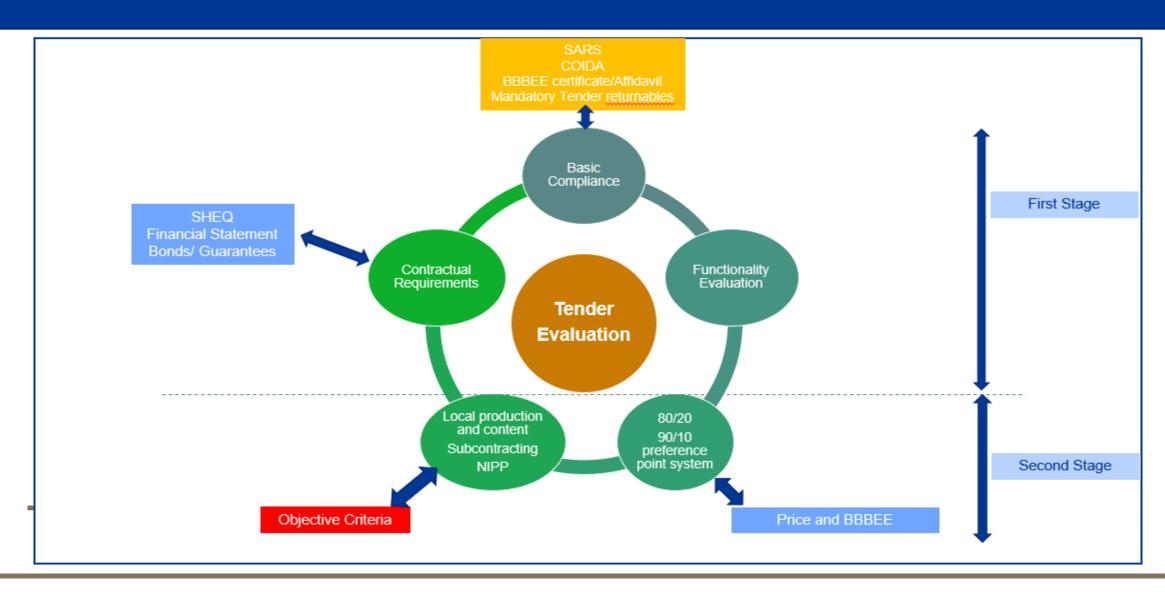
First Stage of the panel execution process





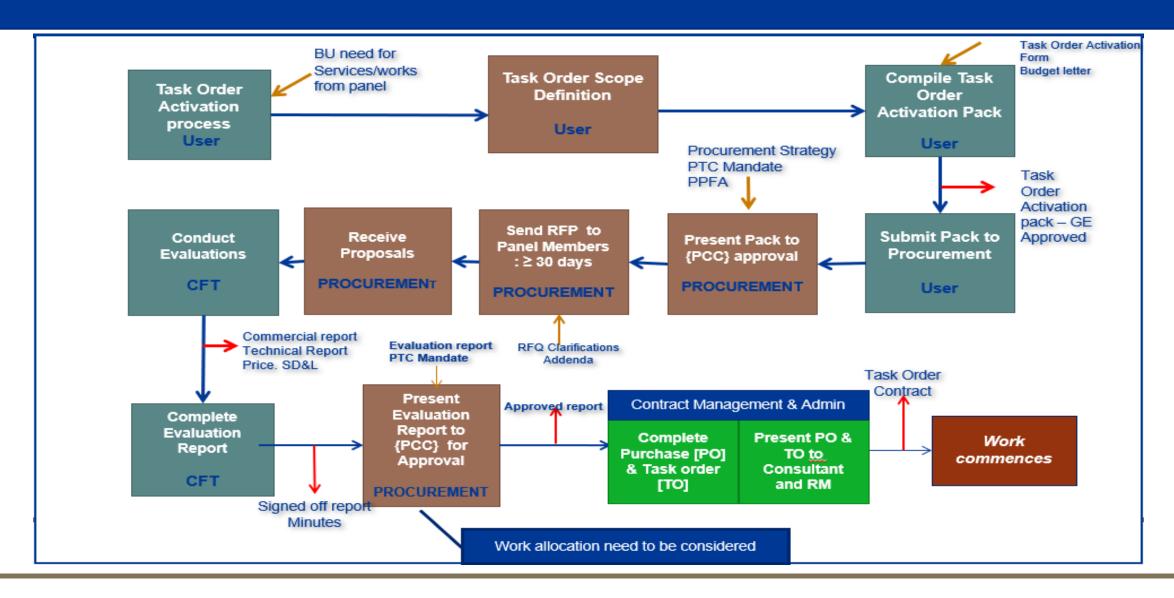
First and Second Stage evaluation





Second Stage of the panel execution process





Second Stage - Objective Criteria (Lines and Substations)



 Objective Criteria applicable in terms of Eskom Policy In support of government's industrialization programmes for the Lines and Substations contracting environment includes:

Local Content and Production

- All designation in terms of the dtic designated commodities still applicable
- In partnership with the dtic for compliance
- Objective Criteria and not in terms of 2017 PPR

Subcontracting

- 30% of contract value for contracts with value greater than R30 Million
- Notwithstanding the minimum 30% compulsory sub-contracting provision, Transmission may identify procurement opportunities for participation of designated groups in contracts or projects below R30 million.
- National Industrial Participation Programme (NIPP)
 - Government programme towards Economic development
 - Used globally (30 countries) to offset Major state purchases
 - approved by means of a Cabinet Memorandum 10/1966
- SDL&I Objectives in line with implementing RDP Goals



Local Content and Production



Supply and Install

Local Content and Production

- Line Construction
 - Steel (100%)
 - Cables (90%)
 - Cement (100%)
 - Power pylons (100%)
 - Line Hardware (100%)
- Substation
 - Steel (100%)
 - Cables (90%)
 - Cement (100%)

Lines EPC

Local Content and Production

- Line Construction
 - Steel (100%)
 - Cables (90%)
 - Cement (100%)
 - Power pylons (100%)
 - Line Hardware (100%)

Substation EPC

Local Content and Production

- Substation
 - Steel (100%)
 - Cables (90%)
 - Cement (100%)



National Industrial Participation Programme (NIPP)



Eligible Contracts/ Task Orders

- Single Task Order
 - Imported Content US\$5 million or above
- Multiple Task Orders
 - Multiple Task Orders awarded to one Supplier over a 2-year period, equalling US\$5 million & above
- Contracts with Renewable options
 - Renewable option is exercised
 - Revised Imported Content exceed US\$5 million

National Industrial Participation Programme (NIPP)

- Applicable to ALL government purchases
- Imported Content is US\$5 million & above
- Attract Minimum of 30% NIP obligation
- Formalized through NIP Obligation Agreement
- Requires a 5% Performance Guarantee

NIPP EXAMPLE

- Transmission contract US\$100 million
- Local Content US\$20 million
- Imported content US\$80 million
- NIP Obligation value of US\$24 million (30%)
- Performance Guarantee US\$ 1,2
 million (5%)

Award Considerations



- Objective Criteria is not criteria for disqualification
- If the tenderer does not meet objective criteria; it **may** lead to the second-ranked tenderer being recommended for award
- Transmission will review Tenderers proposals on objective criteria
- Decision to award will be based on localisation objectives, costs, market conditions, etc.
- Where exemption is required, dtic to support
- SDL&I Objectives will be centred around
 - Skills development
 - Enterprise development
 - Job creation
 - Skills transfer
 - B-BBEE improvement or retention plan



Panel Member Augmentation



- During the life of the panel, suppliers that could not be placed on the panel during its inception will be afforded the opportunity to apply for placement on the panel and for consideration of work from the panel.
- The process for application to be placed on the panel following its establishment will be opened to the market on an annual basis and will be advertised on the Eskom Tender Bulletin and National Treasury website, and CIDB website.
- The invitation to Tender documents will be the same documents used to establish the panel. The tenders will close at the identified tender office to formally observe the submission process.
- Once the documents are released from the tender office, tenderers will be evaluated by the crossfunctional team with a recommendation made to the Delegated Approval Authority, in this case the Transmission Board, on the recommended suppliers to be added to the panel.
- Suppliers can only be considered for RFQs issued on the panel once appointed on the panel.

Transactions in Procurement Space - EPC



Item #	Panel Description	Planned Procurement Strategy Approval Date	Enquiry Period	Planned Evaluations Completion Date	Planned Contract Award Date
1	Construction of the 400kV GIS, Transformer 3 and control building at Philippi Substation	Jun-22	Feb-23 Apr-23)	Jul-23 (Oct-23)	Jan-24 (Jan-24)
2	Koeberg 400kV GIS Busbar Reconfiguration and Transformers Replacement / Weskusfleur	Jul-22	Feb-23 (May-23) (Jun- 2023)	Jul-23 (Oct-23)	Jan-24 (Jan-24)
3	Construction of 400kV, 500MVAR, Dynamic Reactive Power Compensation at Aries substation	Jun-22	Mar-23 (May-23) (Jun- 23)	Sep-23 (Nov-23) (Dec- 23)	Dec-23 (Feb-24) (Mar- 24)
4	Owners Engineer Panel Establishment/ EPCM	Jan-23 (Feb 23)	Apr-23 (Apr-23)	Jul-23 (Aug-23)	Sep-23 (Oct-23)
5	EPC Panel (Lines Construction)	Mar-23 (May-23)	Jul-23 (Sep-23)	Oct-23 (Nov-23)	Mar-24 (May-24)
6	Aries Upington	Dec-22 (Jan-23)	May-23 (Jun-23)	Nov-23	Dec-23
7	EPC Panel (Substation)	July 2023	Sept -23	Nov-23	March- 24
8	Upington Str: Ferrum-Upington 400kV line 1 - IPP	Mar-23 (May-23)	May-23	Aug-23	Feb-24

Transactions in Procurement Space



Item #	Panel Description	Planned Procurement Strategy Approval Date	Enquiry Period	Planned Evaluations Completion Date	Planned Contract Award Date
9a)	Emkhiweni 400/132kV S/S Integr Ph 1A - Transmission Line (12km)	Apr-23 (May-23)	Jun-23 (Aug-23)	Oct-23 (Nov-23)	Feb-24 (Mar-24)
9 (b)	Emkhiweni 400/132kV S/S Integr Ph 1A - Substation Works	May-23 (Jul-2023)	Jun-23 (Aug-23)	Oct-23	Feb-24
10	Asteria 400/132kV S/S integration	Mar-23 (Jul-23)	Aug-23 (Oct-23)	Feb-24 (Feb-24)	Apr-24 (Apr-24)
11	Construction of Umfolozi-Mbewu 765kV Line and Umfolozi Fdr	Jan-23	Mar-23 (May-23)	Jul-23 (Aug-23)	Feb-24 (Mar-24)
12	KZN Empangeni Strengthening Project – for the design, engineering, manufacture, supply, delivery, install, construct, testing, and commissioning of 400kV Mbewu GIS substation near coastal town Empangeni KwaZulu Natal region	Feb-23 (Feb-23)	May-23 (Jun-23) (Aug- 23)	Nov-23 (Dec-23) (Jan- 24)	Mar-24 (Mar-24) (May- 23)
13	Igesi (Makalu B) 275/88kV S/S Integr	Sep-23	Nov-23	Mar-24	Jun-24
14	Waterberg Stbl: Borutho-Silimela 400kV	Dec-23	Feb-23	Jun-24	Sep-24
15	Aggeneis-Paulputs 220kV Line	Sep-23	Nov-23	Mar-24	Jun-24

Transactions in Procurement Space



Item #		Planned Procurement Strategy Approval Date	Enquiry Period	Planned Evaluations Completion Date	Planned Contract Award Date
16	Mookodi 1st 500 MVA Trfr	Sep-23	Nov-23	Mar-24	May-24
17	Ariadne-Eros: Manufacture, Supply and delivery of Steel Towers for Ariadne Eros Lines	May-23	Aug-23	Nov-23	Feb-24
18	Ariadne-Eros: Provision of Security Services, for the Ariadne Eros 132/400 KV multi circuit line	Apr-23	May-203	Aug-23	Sep-23
19	Medupi Witkop Line A, B & C	Aug-22	Dec-22	May-23 (21-Jun-23)	Aug-23 (Oct-23)
20	Ariadne-Eros : Assembly Erection of Towers and Stringing	Apr-23	Jun-23	Aug-23	Oct-23
21	Ariadne-Eros: Redruming Conductor	Mar-23	May-23	Jul-23	Aug-23
22	Project Management Services Panel	Mar-23 (Jun-23)	Apr-23 (Jul-23)	Jul-23 (Oct-23)	Nov-23 (Feb-24)
23	Civil works at Pembroke Substation	April-23	Jun-23	Jul-23	Aug-23
24	Erica MTS + Phillipi-Erica 400kV Line	Jul-23	Nov-23	Mar-24	May-24
25	Cape Corridor Phase 4: 1st Perseus – Zeus 765 kV line	Jan-24	Mar-24	Jul-24	Sep-24



Questions – 10 minutes

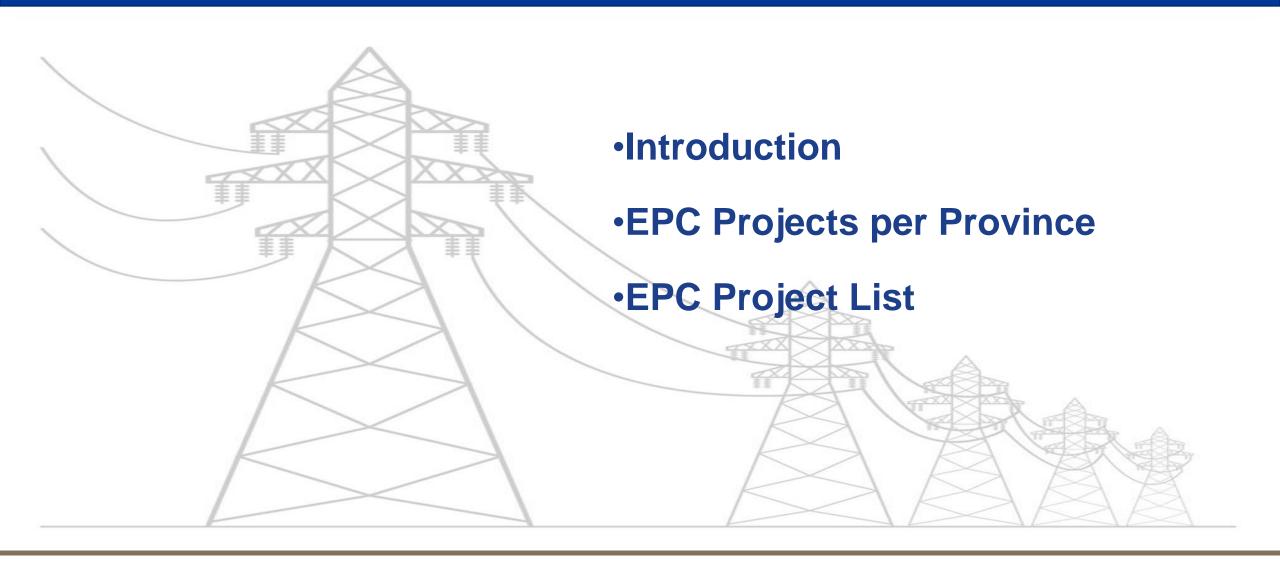




Transmission EPC Supplier Engagement Forum







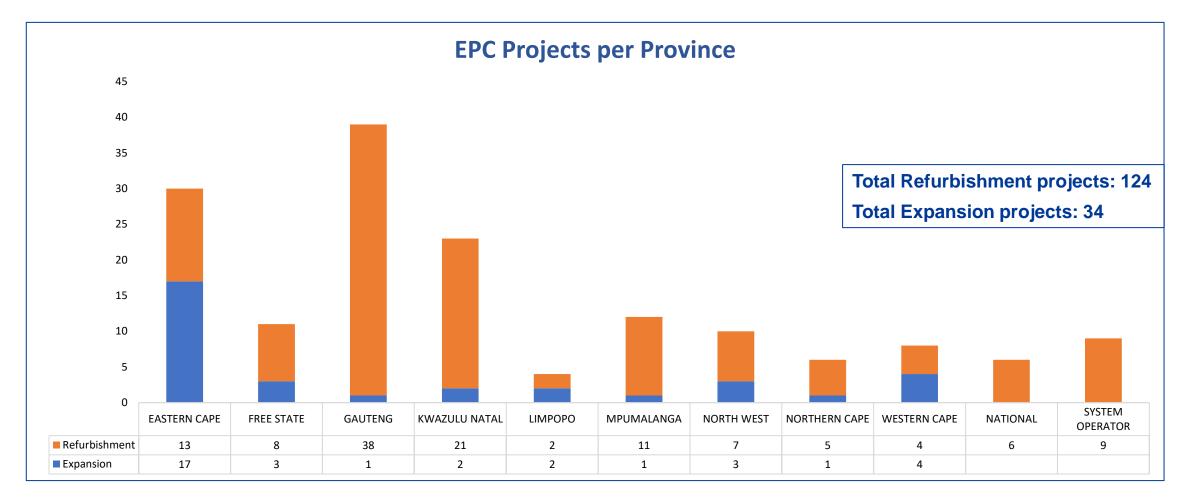
Introduction



- Transmission has identified projects to be executed under the OE/EPC strategy
- The evaluation of projects is ongoing and the project list below might change depending on the execution challenges.
- The project list includes both Expansion and Refurbishment projects per province as contained in the TDP2022.

EPC Projects per Province





EPC expansion project list Total: 34 EPC Projects with 19 335 MVAs and 2 179 KMs



Gauteng (1)

 Etna Strengthening: 3rd 315MVA 275/88kV Transformer

Free State (3)

- Theseus 3rd 500 MVA 400/132 kV Trfr
- Mercury 3rd 500 MVA 400/132 kV Trfr
- Mercury 1st 2000 MVA 765/400 kV Trfr

KZN (2)

- eThekwini Strengthening -Inyaninga
- KZN 765kV:Isundu 400kV Switching Stn

Limpopo (2)

- Spencer 2x36MVar Capacitor Banks Installation
- Tabor 2x36MVar Capacitor Banks Installation

Mpumalanga (1)

Gumeni 2nd 400/132 kV Trfr

Northern Cape (1)

Hydra B 400/132kV S/S Ph2
 - IPP

North West (3)

- Bighorn Reactive Compensation (2x72 MVAr 132 kV and 3x 48 MVAr 88 kV Shunt Capacitors)
- Dinaledi Reactive Compensation (3x72 MVAr 88 kV Shunt Capacitors)
- Marang Reactive Compensation (5x48 MVAr 88 kV Shunt Capacitors)

Western Cape (4)

- Kappa 500 MVA 400/132kV trfr 2 - IPP
- Droerivier-Narina-Gourikwa 400kV
- Droerivier-Narina-Gourikwa 400kV
- Erica MTS + Phillipi-Erica 400kV Line

EPC expansion project list Total: 34 EPC Projects with 19 335 MVAs and 2 179 KMs



Eastern Cape (7)

- Coega Gas Integration Ph1 (Coega-Dedisa No1 400kV Line
- Coega Gas Integration Ph2 (Coega Grassridge No1 400kV Line)
- Coega Gas Integration Ph2 (Coega Ps Poseidon No1 400kV Line)
- Grahamstown 400/132kV MTS IPP (Grassridge -Makhanda No1 400kV Line)
- Grahamstown 400/132kV MTS IPP (Makhanda -Poseidon No1 400kV Line)
- Grahamstown 400/132kV MTS IPP (Makhanda)
- East London Voltage Support: 100 MVar Shunt Cap Banks at Pembroke, Neptune, and Vuyani

Eastern Cape (10)

- Eastern Cape-Kwazulu-Natal 765 kV Link (Delphi Eros No1 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Eros -Isundu No1 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Eros)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Isundu)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Delphi Eros No2 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Gamma -Zanokhanyanyo No1 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Grassridge -Zanokhanyanyo No1 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Delphi -Zanokhanyanyo No2 765kV Line)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Delphi)
- Eastern Cape-Kwazulu-Natal 765 kV Link (Eros -Isundu No2 765kV Line)



Gauteng (38)

- Apollo CS: HVDC Refurbishment Phs 2: Bridge 2&4 Transformers
- Apollo CS Replace problematic bypass Breakers
- Apollo CS: Breakers 11kV Replacement (ERA)
- Apollo CS Ln Divider Replace & Relocation
- Apollo CS: Replacement of Pole 1 533kV Reactor (Dev)
- Apollo upgrade DC Harmonic Filters (ERA)
- Apollo Deluge System Water Storage Tank replacement (Million Litre) (DEV)
- Apollo Permanent Bipole Bypass (ERA)
- Apollo Cs Repeater Station Pietersburg Battery System
- Apollo Aux transformer bund walls
- Apollo CS: Wastewater treatment upgrade

- Apollo CS: HVDC System Ref Upgrd Phs 3
- Apollo Deluge System Water Storage Tank replacement (Million Litre)
- Apollo Install new earth Electrodes
- Apollo CS Replacement of Bridges 1,3&7 TransformersProblematic Protection P3 - Central
- Problematic Protection P4 -Central
- Craighall SS Refurbishment (GIS Portion) (ERA)
- Craighall SS Reliability Improvement (ERA includes Dx portion)
- Warehouse Initiative project (W1-4) (Dev)
- Phased Replacement of High Risk TRFRS PH 3 - CG

- Central Grid Access Road Repairs At Kwagga, Rigi, Kookfotein, Verdun, Benburg, Taunus
- NSP4 Security Build 1: Snowdon CRA
- NSP3 Security Build 1: Glockner CRA
- NSP4 Security Build 1: Pieterboth CRA
- Central Grid OPGW for Protection: Croydon - Jupiter
- Central Grid OPGW for Protection: Hera - Midas
- Central Grid OPGW for Protection: Jupiter - Fordsburg
- Central Grid OPGW for Protection: Taunus - Etna
- National Storage Facilities

- Asset Investment Planning & Management Tool (AIPM)
- Asset Performance Management Tool (APM)
- Central Grid Substation Access
 Control refurbishment
- Croydon SS: GIS Bypass
- Central Grid Access Road Repairs At Kwagga, Rigi, Kookfotein, Verdun, Benburg, Taunus (Dev)
- Craighall SS Refurbishment (GIS Portion) (Dev)
- Central Grid OPGW for Protection
- Esselen Sinkhole project



Eastern Cape (13)

- Problematic Protection Ref. P2 South
- Problematic Protection P3 South
- Neptune SS: Covered Parking for HDV
- Buffalo-Pembroke 3-132kV Line Refurbishment (Hardware, Insulators & Earthwire)
- Buffalo-Port Rex 132kV Line Refurbishment (Hardware & Insulators)
- Buffalo-Leaches Bay 132kV Line Refurbishment (Hardware & Insulators)
- Buffalo-Neptune 1-132kV Dual circuit Refurbishment(Hardware, Insulators & Anti-climbs)
- Buffalo-Neptune 2-132kV Dual circuit Refurbishment(Hardware, Insulators & Anti-climbs)
- Grassridge SS: Covered Parking HDV

- Hydra-Poseidon 1&2 Lines Hardware Anti-vandalism mechanisms installation
- Port Rex-Leaches Bay 132kV Line Refurbishment
- Poseidon Water Reticulation system
- Southern Grid OPGW replacement of Adlash

KZN (21)

- · Hector SS Refurbishment: Kiosks
- Problematic Protection P3 East
- Problematic Protection P4 East
- Drakensberg SS Refurbishment P2: GIS Fdr bays & Duct
- KZN SVC Refurbishment Athene SVC
- Georgedale Illovo 275kV Sediver'93 Insul. rplc (Dev)
- Invubu SS Refurbishment
- Avon Durban 275kV Sediver'93 Insul. rplc (Dev)
- Invubu SS: GIS Bypass (ERA)
- KZN SVC Refurbishment Athene SVC (Dev)
- Tugela Oil dam
- Impala Invubu No1 275kV Sediver'93 Insul. rplc
- East Grid S&S HPF Breaker refurbishment
- Athene & Impala Re-design 132kV Capbank

- Athene 400kV Lines Guyed Anchors (Phase2)
- Athene Cap Bank Reactors
- Drakensberg SS
 Refurbishment P3: OPGW
 (Venus)
- Georgedale Illovo 275 EW HW Rplc
- Georgedale Illovo No.2 275kV line Silico
- Impala Invubu 275kV Sediver'93 Insul. rplc (Dev)
- Invubu Rabbit 275kV Sediver'93 Insul. rplc (Dev)



Limpopo (2)

- Problematic Protection P3 -North
- Phased Replacement of High Risk TRFRS PH 3 - NG

Mpumalanga (11)

- Problematic Protection P3 –
 North-East
- Problematic Protection P4 North-East
- Phased Replacement of High Risk TRFRS PH 3 - NE
- NEG Access to substation buildings for disabled
- Various Lines: Tower Earthing Scope Def
- NEG Water supply: various SS and depots
- Camden Oil Dam Relocation
- Arnot Upgrade Storm Water Drainage
- NEG Access to substation buildings for disabled
- Phased Replacement of High Risk TRFRS PH 3
- Various Lines: Tower Earthing & Install

North West (7)

- Pluto Cap Banks 1Ab
- Pluto Cap Banks 1Ab (Dev)
- Problematic Protection P3 -NWest
- NSP2 Security Build 1: Pluto
- NSP3 Security Build 1: Watershed
- NSP4 Security Build 1: Ararat
- Midas Access Road Refurbishment

Northern Cape (5)

- Problematic Protection P3 -NCape
- Problematic Protection P4 -NCape
- Phased Replacement of High Risk TRFRS PH 3 - NC
- Ferrum Nieuwehoop Fibre Loopin to Garona & Lewensaar SS
- Water Drainage Problems (Hydra, Ruigtevallei & Roodekuil)



Western Cape (4)

- Problematic Protection P3 West
- Bacchus M-vlei No1 400kV Line Re-conductor & Replace E-Wire
- Bacchus Proteus No1 400kV MKII insulator replacement
- Koeberg Muldersvlei No1 400kV Line Re-conductor

Free State (8)

- Luckhoff CS problematic equipment
- Luckhoff CS problematic equipment (Dev))
- Problematic Protection P3 Free State
- Problematic Protection P4 Free State
- Alpha Beta No2 765 kV Twr 629 foundations
- Free State Lines Soil Erosion Rectification
- Mercury SS: Ref of Cap Bank 1&2
- Rplc Capacitor units @ Beta, Perseus, Hyd

National (6)

- Performance Improvement Of Internally
 -Fused Capacitor Bank
- NATIONAL TX SECURITY PH 2
- Capacitor Bank Refurb Ph2
- Phased Replacement Of High Risk TRFRS Ph 4
- Capacitor Bank Refurb Ph3
- Phased Replacement Of High Risk TRFRS Ph 5

System Operator (9)

- Meter Data Management System
- Relocation of Duvha SOC (ERA) (Sys Ops part only not Eskom realestate portion)
- TPSCM Duvha SOC building works (ERA)
- TPSCM Telecoms Infrastructure (ERA)
- Duvha SOC DTS Training Facility
- Upgrade of the Rear projection system for National Control
- NCC Data Energy Centre 3 UPS-A Dual Battery Bank
- Tx Power System Control and Monitoring (TPSCM): New EMS (TEMSE) Systems for NCC & SOC
- National Control Room upgrade



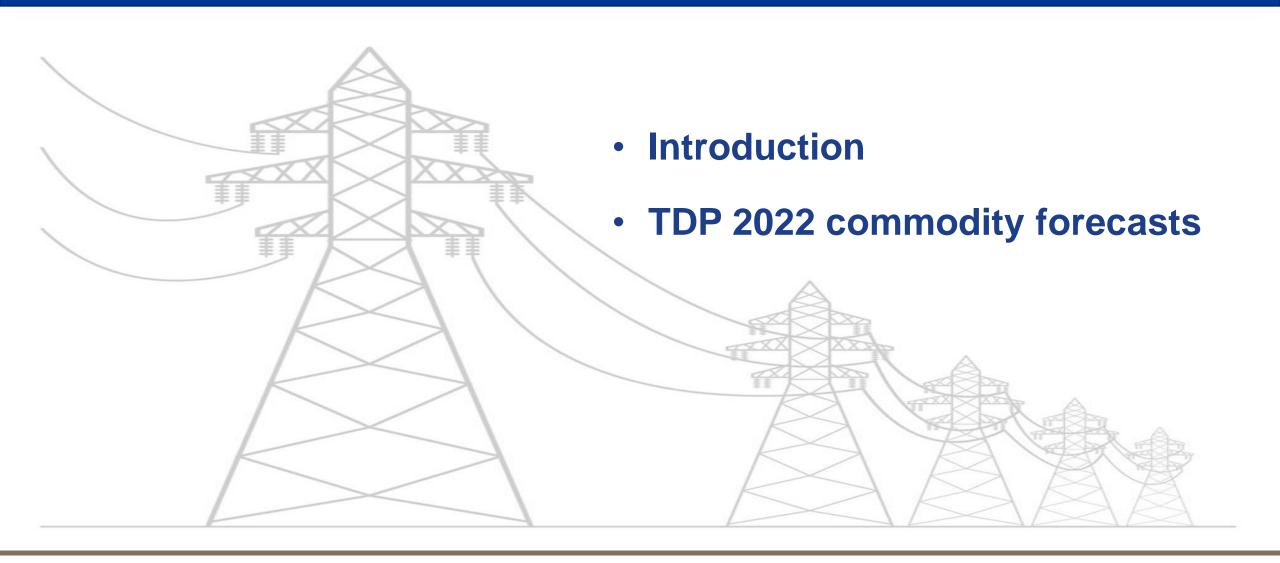


EPC Expansion Project List



PROJECT	MVA	KM
Gumeni 2nd 400/132 kV Trfr	500	
Theseus 3rd 500 MVA 400/132 kV Trfr	500	
Mercury 3rd 500 MVA 400/132 kV Trfr	500	
Etna Strengthening: 3rd 315MVA 275/88kV Transformer	315	
Kappa 500 MVA 400/132kV trfr 2 - IPP	500	
Hydra B 400/132kV S/S Ph2 - IPP	500	
Coega Gas Integration ph1	0	8
Coega Gas Integration ph2	0	15
Coega Gas Integration ph2	0	120
Droerivier-Narina-Gourikwa 400kV	0	180
Droerivier-Narina-Gourikwa 400kV	0	70
Mercury 1st 2000 MVA 765/400 kV Trfr	2000	
Grahamstown 400/132kV MTS - IPP	0	83
Grahamstown 400/132kV MTS - IPP	500	
Grahamstown 400/132kV MTS - IPP	0	83
eThekwini Strengthening - Inyaninga	1000	
Eastern Cape-KwaZulu-Natal 765 kV Link	0	400
Eastern Cape-KwaZulu-Natal 765 kV Link		160
Eastern Cape-KwaZulu-Natal 765 kV Link	4000	
Eastern Cape-KwaZulu-Natal 765 kV Link	4000	
Eastern Cape-KwaZulu-Natal 765 kV Link	0	400
Eastern Cape-KwaZulu-Natal 765 kV Link	0	20
Eastern Cape-KwaZulu-Natal 765 kV Link	0	20
Eastern Cape-KwaZulu-Natal 765 kV Link	0	300
Eastern Cape-KwaZulu-Natal 765 kV Link	4000	
Eastern Cape-KwaZulu-Natal 765 kV Link	0	160
Erica MTS + Phillipi-Erica 400kV Line	1000	
Helios 132/66kV Reliability	20	0
Waterberg Stbl: Borutho-Silimela 400kV	0	160





Introduction

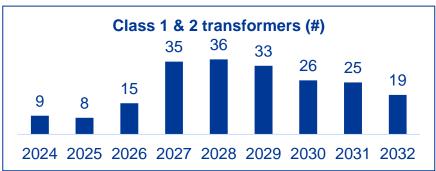


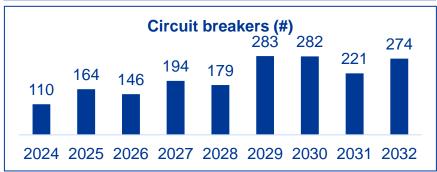
- An external resource capacity assessment was conducted on the Transmission Development Plan (TDP) for the period 2023-2032
- Key Transmission services and commodities were assessed and forecasted based on the TDP2022
- Requirements for key commodities and services were analysed, year on year, which considered business requirements for the TDP, critical and strategic spares, telecommunications and projects in execution
- Forecasts were conducted for key commodities and services including those for Primary Plant, Secondary Plant,
 Overhead Lines and Telecommunications
- Any use of these estimates provided by Eskom would be entirely at the supplier's risk and no liability can be attached to Eskom

Primary plant equipment commodity requirement forecasts



Primary plant equipment commodity requirement forecasts

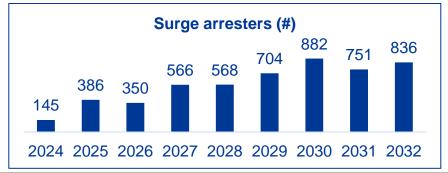














Key insights

- The following primary plant equipment will be required between 2024 and 2032
 - 206 class 1 & 2 transformers
 - 182 class 3 & 4 transformers
 - 1 852 circuit breakers
 - **6 054** isolators
 - 6 298 current transformers
 - 5 188 surge arresters

Secondary plant and telecommunications equipment commodity requirement forecasts

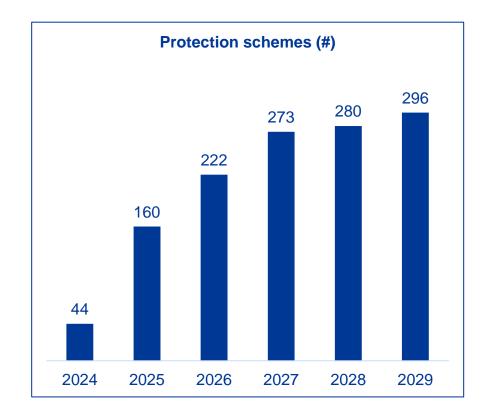


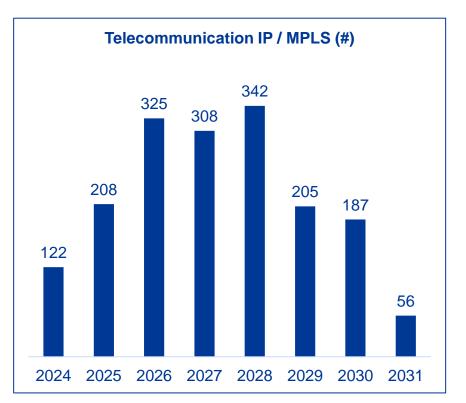
Secondary plant and telecommunications equipment commodity requirement forecasts



Key insights

- The following secondary plant equipment will be required between 2024 and 2029
 - 1 275 protection schemes
- The following telecommunications equipment will be required between 2024 and 2031:
 - 1 753 Internet
 Protocol/Multi-Protocol
 Label Switching
 (IP/MPLS)



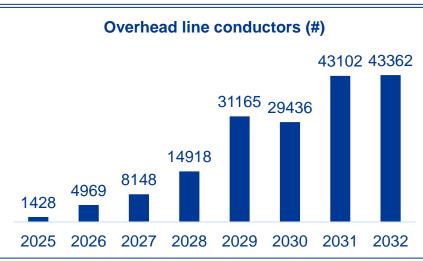


Overhead line equipment commodity requirement forecasts

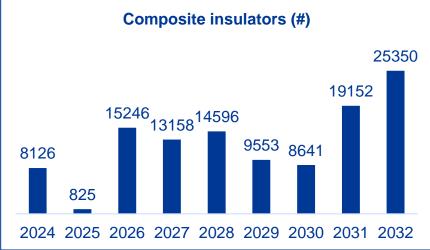


Overhead line equipment commodity requirement forecasts









Key insights

- The following overhead line equipment will be required between 2023 and 2032
 - 14 218 km of lines
 - 452 174 tons of tower steel (2025 to 2032)
 - 176 528 overhead line conductors (2025 to 2032)
 - 114 647 composite insulators (2024-2032)

Conclusion



- The quantities presented are estimates based on the best available information and is subject to change.
- The forecast presented above indicate a large demand forecast for commodities which is aligned to the aggressive TDP programme
- This is for information sharing to prepare the market for successful roll out of the programme





Back Up Slides



Power Transformers Forecast

Туре	2024	2025	2026	2027	2028	2029	2030	2031	2032
Trfr Class 1: 11kV - 132kV, 1.25MVA - 160MVA	7	6	13	32	33	30	22	22	12
Trfr Class 2: 220kV - 275kV, 40MVA - 315MVA	2	2	2	3	3	3	4	3	7
Trfr Class 3: 220kV - 400kV, 360MVA - 1000MVA	13	8	11	30	23	19	22	20	17
Trfr Class 4: 420kV - 800kV, 40MVA - 2000MVA	0	0	0	1	4	4	4	5	1

Circuit Breaker Forecast

Voltage	Project Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
132kV	Expansion and Spares	50	22	43	70	54	66	54	39	27
22kV	Expansion and Spares	0	1	0	0	0	0	0	0	0
275kV	Expansion and Spares	5	5	6	8	7	12	11	0	0
400kV	Expansion and Spares	7	13	43	66	79	99	104	47	35
66kV	Expansion and Spares	2	2	2	1	5	3	4	5	1
765kV	Expansion and Spares	0	0	0	1	12	14	33	46	45
11kV-765kV	Refurbishment	46	121	52	48	22	89	76	84	166
Total		110	164	146	194	179	283	282	221	274



Current Transformers

Voltage	Project Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
132kV	Expansion and Spares	119	72	137	231	138	198	162	114	81
22kV	Expansion and Spares	0	9	0	3	0	0	0	0	0
275kV	Expansion and Spares	12	18	19	24	39	36	33	0	0
400kV	Expansion and Spares	41	73	179	248	252	336	339	150	114
66kV	Expansion and Spares	7	9	3	3	3	3	0	0	0
765kV	Expansion and Spares	1	0	0	0	15	30	27	72	36
88kV	Expansion and Spares	3	6	0	0	3	0	0	0	0
11kV-765kV	Refurbishment	138	472	143	267	181	353	441	406	499
Total		321	659	481	776	631	956	1002	742	730

Isolators Forecast

Voltage	Project Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
132kV	Expansion and Spares	75	32	94	178	120	179	155	109	73
220kV	Expansion and Spares	0	2	0	0	0	0	0	0	0
22kV	Expansion and Spares	0	2	0	0	0	0	0	0	0
275kV	Expansion and Spares	15	8	26	33	29	47	59	0	0
400kV	Expansion and Spares	48	27	138	212	303	333	375	167	128
66kV	Expansion and Spares	0	4	1	1	4	4	4	5	1
765kV	Expansion and Spares	0	0	0	4	46	62	144	227	216
88kV	Expansion and Spares	4	0	0	0	0	0	0	0	0
11kV-765kV	Refurbishment	102	412	146	144	80	268	285	292	631
Total		244	487	405	572	582	893	1022	800	1049



Surge Arrester Forecast

Voltage	Project Type	2024	2025	2026	2027	2028	2029	2030	2031	2032
11kV	Expansion and Spares	3	0	0	0	0	0	0	0	0
132kV	Expansion and Spares	36	19	94	168	99	150	144	171	105
22kV	Expansion and Spares	6	15	39	78	66	57	51	33	21
275kV	Expansion and Spares	5	10	13	24	27	24	30	0	0
33kV	Expansion and Spares	0	12	0	21	36	24	36	45	9
400kV	Expansion and Spares	28	33	108	141	168	171	273	135	81
6.6kV	Expansion and Spares	3	0	0	3	0	0	0	0	0
66kV	Expansion and Spares	0	0	3	0	3	0	0	0	0
765kV	Expansion and Spares	9	0	9	3	15	36	51	99	81
88kV	Expansion and Spares	0	24	0	18	6	3	6	6	0
11kV-765kV	Refurbishment	55	273	84	110	148	239	291	262	539
Total		145	386	350	566	568	704	882	751	836



Telecommunication IP/MPLS Forecast

Туре	2024	2025	2026	2027	2028	2029	2030	2031
IP/MPLS	122	208	325	308	342	205	187	56

Line Composite Insulator Forecast

Туре	2024	2025	2026	2027	2028	2029	2030	2031	2032
COMP INSULATOR 132kV - 120kN	405		270	111			45		
COMP INSULATOR 132kV - 210kN	2280		504	168			72		
COMP INSULATOR 275kV - 120kN	168		852	66	576	156	18		
COMP INSULATOR 275kV - 210kN	504		1536	264	3072	96	48		
COMP INSULATOR 275kV - 300kN									
COMP INSULATOR 400kV - 120kN	1812	201	2263	3416	4670	3786	3756	2358	252
COMP INSULATOR 400kV - 210kN	2957	624	4033	3499	4676	5375	2988	3044	480
COMP INSULATOR 400kV - 300kN			106			140			
COMP INSULATOR 400kV - 400kN									
COMP INSULATOR 765kV - 300kN			3762	3738	1050		1126	9084	8802
COMP INSULATOR 765kV - 400kN			1920	1896	552		588	4666	15816
Total Requirement	8126	825	15246	13158	14596	9553	8641	19152	25350

Tower Steel Forecast

Туре	2025	2026	2027	2028	2029	2030	2031	2032
TOWER STEEL (Tons)	2718	12446	22015	63181	59896	106026	104480	81412



Overhead Line Conductor Forecast

Туре	2025	2026	2027	2028	2029	2030	2031	2032
OVERHEAD LINE CONDUCTOR	2047	3986	11440	31165	29436	43102	43362	22121

Line Construction Forecast

Туре	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
LINE CONSTRUCTION	262	216	476	827	1112	2456	2168	2763	2353	1585



Transmission EPC Supplier Engagement Forum





Transmission EPC Supplier Engagement Forum







Conclusion