Expedited Bid Window Programme Access Risk Assessment

(Regarding risk to connect to the transmission grid for respondents to the registration request)

Eskom, Transmission, Grid Planning

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This document provides a proactive network access risk assessment on the REBIB Expedited Bid Window programme. The high-level assessment of the risk of connection to the transmission grid for the IPP developers is based on the requested non-compulsory registration for the ñExpedited Bid Windowò programme from the IPP Office. The objective of the risk allocation is to inform IPP developers of the relative risk of infrastructure constraints and of being unable to connect within the programme target date.

A request was issued by the IPP Office for registration of interested developers for an Expedited Bid Window programme in June 2015. The understanding is that the IPP projects must be connected by the end of December 2019 and will have to rely on the expected transmission and distribution infrastructure that will or could be in place by that time. The GCCA-2022 document has been used as a guideline only to determine the potential available connection capacity at the MTS substations by the end of 2019 as well as other project information which was not included in the GCCA-2022. Thus connection capacities indicated are likely to be different to the values provided in the GCCA-2022 and are only estimated values at present.

The location and MW plant size only of the respondents were provided to Eskom. These were mapped and then allocated to the relevant MTS substation supply areas in order to identify the clustering and possible accumulative impact of the IPPs. The IPP developers must refer to the GCCA-2022 in order to identify under which MTS supply area their projects are likely to be allocated.

Disclaimers

There has been no proper capacity assessment of the sub-transmission or distribution network within the MTS supply areas to connect the IPPs. This is for the risk of the IPP developer to determine and mitigate by contact with the relevant distribution operator.

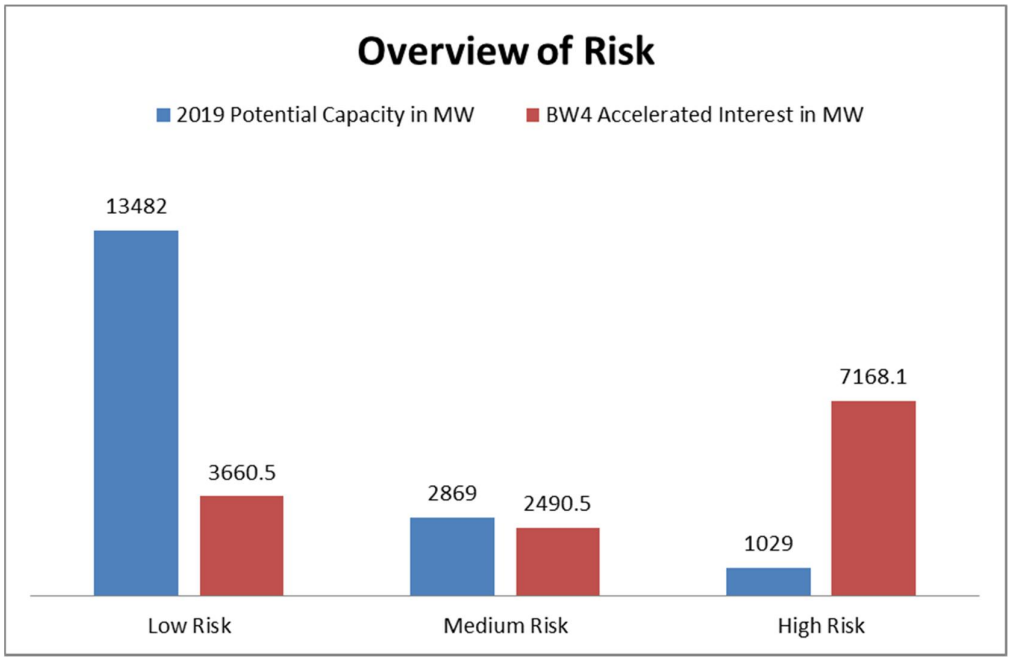
Allocation to an MTS supply area is done purely on engineering judgment based on a relative geographical allocation to the existing transmission MTS supply areas and may be different when the connection application is made.

The ability to connect is classified by risk in terms of high, medium and low. The risk is considered in terms of the interest exceeding the available capacity or specific infrastructure constraints. Allocation of the risk does not imply that projects will be either automatically rejected or accepted for connection to the grid.

The risk allocation is merely to inform the potential IPP developers of the level of potential competition and possible infrastructure constraints that should be taken into consideration in the preparation of their bids. Every connection request will be considered on formal application and the risk assessment will have no bearing on the response to the request.

Summary of Risk

The bar graph below provides a summary of the risk assessment in terms of the MW value of interest against the MW available capacity in the MTS substation supply areas.



Points of clarification

The objective of the risk allocation is to inform IPP developers of the relative risk of infrastructure constraints and of being unable to connect within the programme target date.

Further extension of the 220 kV and 66 kV networks in the Namaqualand region of the Northern Cape and in the Eastern Cape is discouraged. The strategic intent is to phase out the 220 kV and 66 kV networks, which were originally selected to supply small loads over long distances and not for the collection and transport of generated power. These networks are planned to be upgraded to 400 kV and 132 kV, respectively, in order to facilitate the collection of large renewable energy generation over long distances and create power corridors for the transportation of the future generation to the load centres.

The Risk Assessment

The risk assessment of the IPP response is shown in the table below, which is grouped by province alphabetically and then the MTS substation supply areas are listed alphabetically. The anticipated potential MW connection capacity by 2019 is given and the accumulated IPP interest in MW within that MTS supply area is given. The reason for the risk allocation is provided in the last column.

Access Risk Assessment Table

Province	MTS Substation Supply Area	2019 Potential Capacity in MW	BW4 Accelerated Interest in MW	Ability to Connect Risk	Comments on Risk to Connect
E Cape	Delphi	138	392.5	High Risk	Interest exceeds capacity. Large cluster of interest around 80 km away. New 400/132 kV substation and 400 kV lines required.
E Cape	Grassridge	359	186.5	Medium Risk	Capacity available on 132 kV busbar, but access to substation may be constrained.
E Cape	Jeffreys Bay Area	0	166.6	High Risk	No existing capacity. New 400/132 kV substation (Thyspunt) and new 400 kV lines required.
E Cape	Pembroke	436	34.5	Low Risk	Capacity available on 132 kV or 66 kV busbar.
E Cape	Poseidon	95	415	High Risk	Interest exceeds capacity. New 400/132 kV substation (Poseidon B) closer to IPP clustering and 400 kV lines required.
Free State	Everest	980	150	Low Risk	Capacity available on 132 kV busbar.
Free State	Harvard	670	225	Low Risk	Capacity available on 132 kV busbar.
Free State	Leander	975	150	Low Risk	Capacity available on 132 kV busbar.

Free State	Mercury	284	75	Low Risk	Capacity available on 132 kV busbar.
Free State	Theseus	975	150	Low Risk	Capacity available on 132 kV busbar.
Gauteng	Esselen	353	1.2	Low Risk	Capacity available on 132 kV Dx network
KZN	Bloedrivier	155	140	Low Risk	Capacity available on 88 kV busbar.
KZN	Impala	528	10	Low Risk	Capacity available on 132 kV Dx network
KZN	Tugela	344	4.1	Low Risk	Capacity available on 132 kV busbar.
Limpopo	Matimba	0	115	High Risk	May be able to connect via 132 kV even though a power station, but Matimba and Medupi voltage stability may be an issue.
Limpopo	Merensky	490	25	Low Risk	Capacity available on 132 kV busbar.
Limpopo	Spitskop	472	150	Low Risk	Capacity available on 132 kV busbar.
Limpopo	Tabor	953	75	Medium Risk	Capacity available on 132 kV busbar, but cluster +/-80 km away and 132 kV network may be limiting factor. Close to new Nzhelele 400/132 kV substation in 2022.
Limpopo	Warmbad	245	75	Low Risk	Capacity available on 132 kV busbar.
Mpumalanga	Camden	320	10	Low Risk	Can connect via 88 kV even though a power station.
Mpumalanga	Marathon	619	10	Low Risk	Capacity available on 132 kV busbar.
N Cape	Aggeneis	121	505	High Risk	Interest exceeds capacity and a high risk of throughput overload from the 220 kV network connected to Aggeneis (932 MW). Aggeneis will require 400/132 kV transformation and a possible 400 kV line.
N Cape	Aries	0	520	High Risk	Limited to 30 MW capacity on 22 kV busbar. Aries will require 400/132 kV transformation if the level of interest is to be catered for.
N Cape	Boundary	266	1384	High Risk	Interest exceeds capacity. New 400/132 kV substation and 400 kV lines required.
N Cape	Ferrum	882	525	Low Risk	Capacity available on 132 kV busbar, but 132 kV equipment upgrade is required for fault level.

N Cape	Gamma	0	115	High Risk	No existing capacity. New 400/132 kV substation and loop-in of 400 kV lines required.
N Cape	Garona	74	86	Medium Risk	Interest just exceeds 132 kV capacity. May receive support from new Nieuwehoop 400/132 kV substation, otherwise 400/132 kV plus 400 kV loop-in at Garona required.
N Cape	Gromis	78	140	Medium Risk	Interest exceeds capacity. Limitation of 220 kV network will require acceleration of the 400 kV strengthening project and possible 132 kV busbar.
N Cape	Helios	146	360	Medium Risk	Interest exceeds capacity, requires 2nd 400/132 kV transformer.
N Cape	Hydra - De Aar Area	80	1084	High Risk	Interest exceeds capacity. New 400/132 kV substation (Hydra B) closer to the IPP clustering and 400 kV lines required.
N Cape	Hydra - Middelburg Area	0	300	High Risk	No existing capacity. Large cluster of interest about 120 km away. New 400/132 kV substation (Hydra C) and loop-in of 400 kV lines required.
N Cape	Kangas	107	120	Medium Risk	New BW4 220/132 kV substation and line. Interest close to available capacity. Risk is completion of substation.
N Cape	Kronos	250	600	Medium Risk	2nd 400/132 kV transformer installed for BW4. Interest exceeds available capacity and 3rd transformer and 400 kV line may be required.
N Cape	Nama	150	80	Medium Risk	Interest is less than substation capacity, but dependent on 220 kV network with Aggeneis 400/220 kV limit of 121 MW.
N Cape	Nieuwehoop	245	225	Low Risk	Capacity available on 132 kV busbar, but this is a new MTS substation and connection is dependent on completion.
N Cape	Olien	54	816	High Risk	Interest exceeds capacity. New 400/132 kV substation and 400 kV lines required.
N Cape	Oranjemund	100	140	High Risk	Interest exceeds capacity. Dependent on 220 kV network and Aggeneis 400/220 kV limit of 121 MW. New 400/132 kV substation and 400 kV lines may be required.
N Cape	Paulputs	69	67	Medium Risk	Interest is at substation capacity, but dependent on 2nd 200/132 kV transformer and 220 kV network with Aggeneis 400/220 kV limit of 121 MW.

N Cape	Ruigtevallei	169	260	High Risk	Substation has been downgraded to 132 kV and evacuation of power an issue. New 400/132 kV and 400 kV line may be required.
N Cape	Upington	6	955	High Risk	New substation and 2nd transformer increases capacity to 483 MW. Less than interest and will require 3rd transformer and a 400 kV line to increase to 970 MW.
North West	Hermes	291	225	Low Risk	Capacity available on 132 kV busbar.
North West	Mookodi	485	460	Low Risk	Capacity available on 132 kV busbar.
North West	Watershed	172	300	Low Risk	Interest exceeds 172 MW 275 kV N-1 evacuation limit, but there is additional 353 MW capacity via the 132/88 kV if daytime PV generation.
W Cape	Aurora	735	321.4	Low Risk	Capacity available on 132 kV busbar.
W Cape	Bacchus	888	170	Low Risk	Capacity available on 132 kV busbar.
W Cape	Droërivier	234	355	Medium Risk	Interest exceeds capacity.
W Cape	Juno	234	49.9	Low Risk	Capacity available on 132 kV busbar.
W Cape	Kappa (new)	380	281	Medium Risk	New BW4 400/132 kV substation and line. Capacity will be available on 132 kV busbar. Risk is completion of substation.
W Cape	Koeberg	490	90	Low Risk	Can connect via 132 kV even through a power station, but line access to substation may be an issue.
W Cape	Komsberg	69	140	Medium Risk	New BW4 400/132 kV substation. Interest exceeds capacity and 2nd transformer may be required.
W Cape	Muldersvlei	729	4.4	Low Risk	Capacity available on 132 kV busbar.
W Cape	Proteus	485	80	Low Risk	Capacity available on 132 kV busbar.