

NamPower Transmission Master Plan

Presentation to AEDU Namibia

NamPower | March 2019



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Background

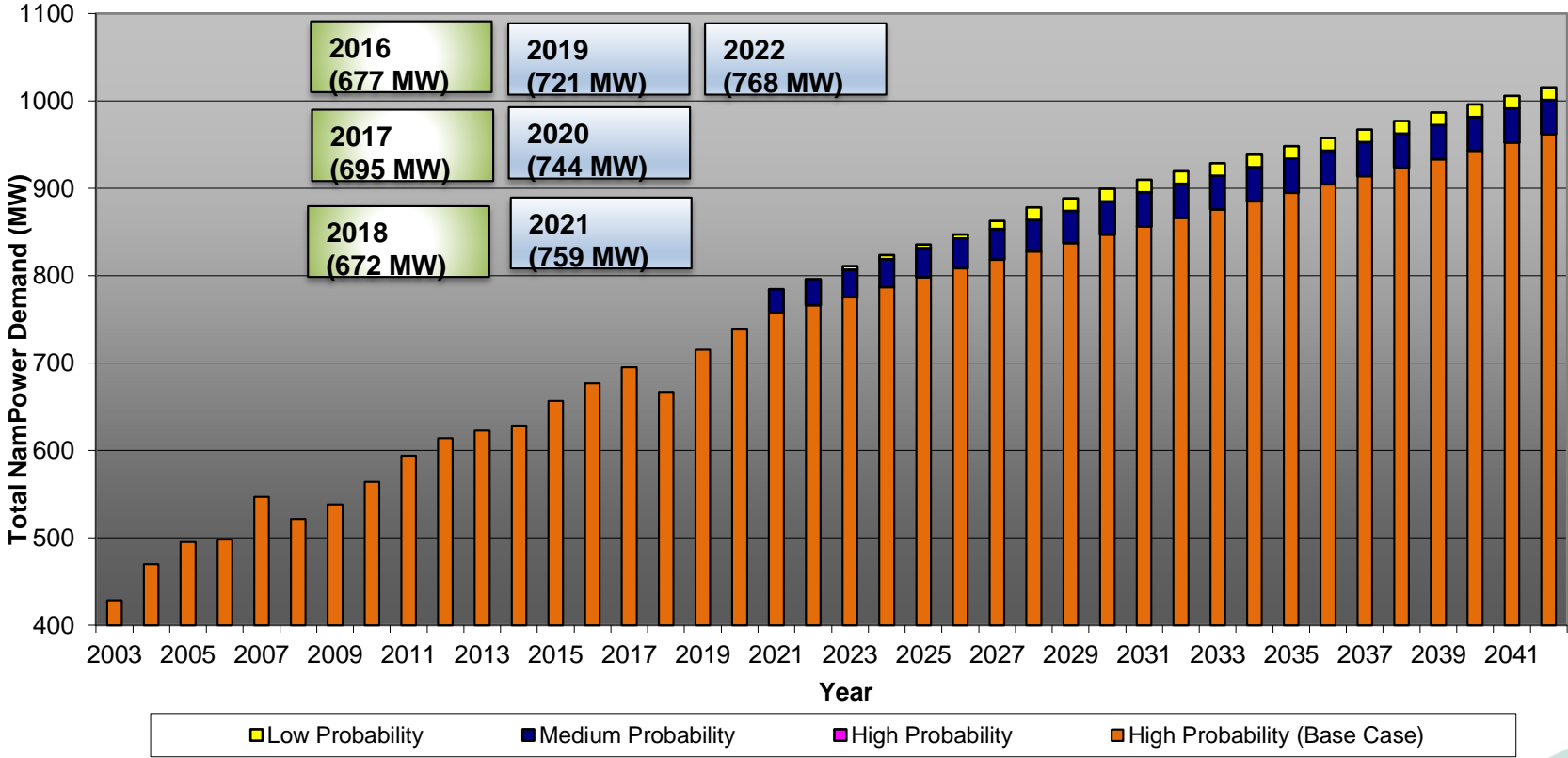


- Annual update of Transmission Master Plan Development
 - Based on updated peak demand load forecast / generation scenarios
 - Update the transmission infrastructure requirements
 - Establish changes / additions to previous Master Plans
 - Study period 2019 – 2023
- Proposed new developments are included in the Transmission Capex budget submission

Maximum Peak Demand Load Forecast



Namibian Electricity Load Forecast 2018- 2042
(Including System Losses)



Existing Generation and Imports



Generation scenarios

Generation / Source	MW
Ruacana	347
Van Eck	10
Anixas	22.5
ZPC, Zimbabwe	80
ZESCO, Zambia	50
REFIT Programme	14 plants (PV, wind) of which 3 still outstanding Each limited to 5 MW Total 70 MW
Omburu PV, Omburu	4.5
Greenam	20
Hardap PV	37
ESKOM, South Africa	200MW firm and 300MW non-firm

New Generation beyond 2020



Generation scenarios

Generation / Source	MW
* Diaz Wind Farm, Lüderitz	44
* Otjikoto Biomass	40
New Wind	$(40 + 50) = 90$
New PV	$(20 + 20) = 40$
New Firm Generation	50
Baynes Hydro Power Plant, Kunene region	300

Backbone Network Studies



- Backbone network development are planned to meet the capacity requirements for load growth, generation options, security of supply, system stability, system reliability and wheeling.
- Adherence to Grid Code compliance by resolving both substation and line deviations.
- Determine new network infrastructure requirements to sustain and allow future load demand growth
- Determine new network infrastructure requirements to integrate new generation (NamPower and IPPs)

Backbone Network Projects



Approved projects:

- Auas – Gerus 400kV
- Auas – Kokerboom 2nd 400kV
- Obib – Oranjemond 400kV / 220kV

Budgetary provision required for recommended projects:

- Otjikoto – Masivi 220kV
- Erongo 220/66kV 90MVA substation

Summary – NamPower Initiated



Project name	Expected completion / commissioning dates									
	2019		2020		2021		2022		2023	
Ruacana-Hippo 330 kV										
Ohama 132/33 kV, 20 MVA Trfr including in/out arrangement										
Kunene-Omatando 400 kV project										
Omatando 132/66 kV transformers										
Okapya-Okatope feeder bay										
Masivi & Shiyambi substations, Masivi DVSD										
Rundu 132/11 kV 40 MVA Trfr										
Otjikoto – Masivi 220 kV Line										
Erongo 220/66 kV 90 MVA substation										
Brakwater substation										
Leutwein 66/22 kV, 5 MVA substation upgrade										
Auas-Gerus 400 kV										
Auas-Kokerboom 2 nd 400 kV line										
Nabas 5 MVA transformer										
Warmbad substation										
Khurub-Aussenkehr 132 kV										
Obib-Oranjmond 400 kV / 220 kV										

Summary – Customer Initiated



Project name	Expected completion / commissioning dates									
	2019		2020		2021		2022		2023	
Calueque Pumping 5 MVA substation										
Okapyá 66/33 kV 5 MVA Trfr										
Okapyá SS with Temp 2.5 MVA Trfr										
Omatando 66/11 kV 20 MVA Trfr										
Rehoboth 132/11 kV, 20 MVA substation										
Otjiwarongo 20 MVA Trfr & upgrade										
Okombahe substation upgrade										
Karibib 66/22 kV 10 MVA Substation										
Lithops 132/33 kV & 3 rd 220/132 kV										
Sekelduin 132/33 kV & 132/66 kV										
Ruby 10 MVA transformer										
Okahandja 20 MVA Trfr & Upgrade										
Okomita Substation (Interim)										
Khomás 220/66 kV substation										
Hardap 3 rd 40 MVA Trfr										



2019/2020
2020/2021
2021/2022
> 2022

Botswana

South Africa

- Legend**
- Sub Station
 - 66 kV
 - 132 kV
 - 220 kV
 - 330 kV
 - 350 kV DC
 - 400 kV

60 30 0 60 120 180 240
Kilometers



Thank you

