Security of Supply & Supply Outlook

AMEU/AEDU Namibia Technical Conference

March 2025

AGENDA

- Corporate Strategy
- Supply and Demand Outlook
- Projects Update

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Corporate Strategy

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NamPower Strategy Map
2020 - 2025

ENSURING SECURITY OF SUPPLY

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Vision

"To be the leading electricity solutions provider of choice in SADC."

Mission

"To provide innovative electricity solutions, in an evolving market, which satisfy the needs of our customers, fulfil the aspirations of our staff; and, the expectations of our stakeholders in a competitive, sustainable and environmentally friendly manner."

Strategic Pillars & Objectives

Unlocking the value of electricity sector collaboration

- Support the development of the electricity industry and the economy
- Develop new products and services (Solutions)
- Support the acceleration of electrification

Ensuring security of supply

- Optimally expand Generation capacity
- Optimally expand transmission capacity
- Leverage regional trading opportunities
- Ensure least-cost electricity supply mix

Optimising financial sustainability

- Increase Sales/revenue (growth)
- Ensure Sound Liquidity
- Grow Shareholder Value
- Maintain Profitability

Driving organisational & operational excellence

- Develop additional capabilities to meet the competitive market requirements
- Achieve and retain top employer status
- Build an ethical, engaging and high-performing culture

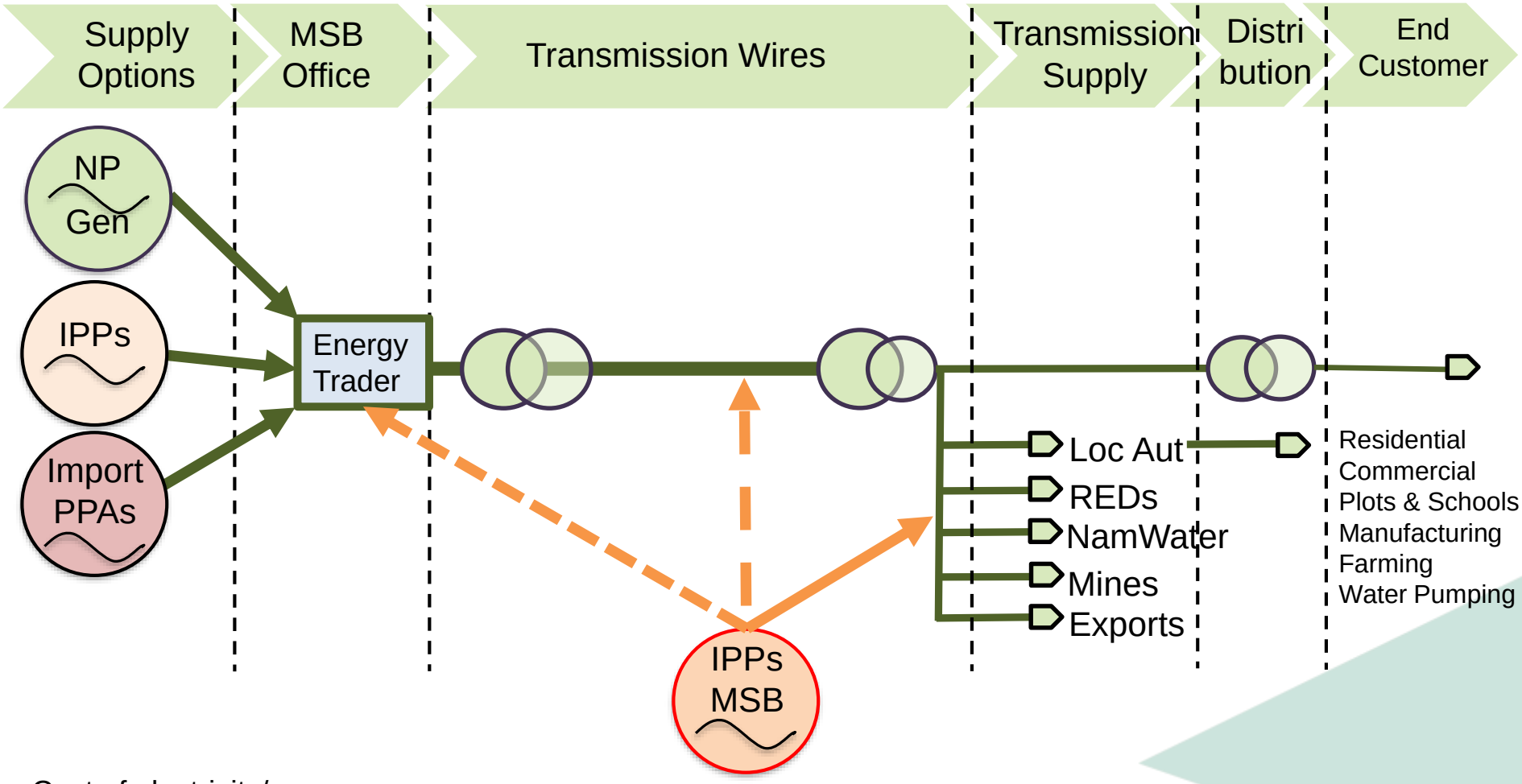
Values

Customer focus; Integrity; Teamwork; Accountability; Empowerment; Safety, Health, Environment

National Policy and Guidance

- NamPower's operating environment is rapidly changing, and the company's strategy requires more agility:
  - National Energy Policy (NEP)
  - Independent Power Producer's Framework (IPP)
  - Renewable Energy Policy (REP)
  - Modified Single Buyer Model (MSBM)
  - National Integrated Resource Plan (NIRP)
  - Disruptive technologies (i.e. GH2/ BESS/ etc.)
- Continues updates in more aggressive environmental commitments:
  - Paris Agreement at COP21 (limit global warming to below 2 ºC)
  - Intended Nationally Determined Contributions (INDC 2015)
  - Updated NDC 2021 (updated BAU base case)
  - Updated NDC 2022 for COP 27 held in November 2022

Supply Chain of Energy



Supply & Demand Outlook

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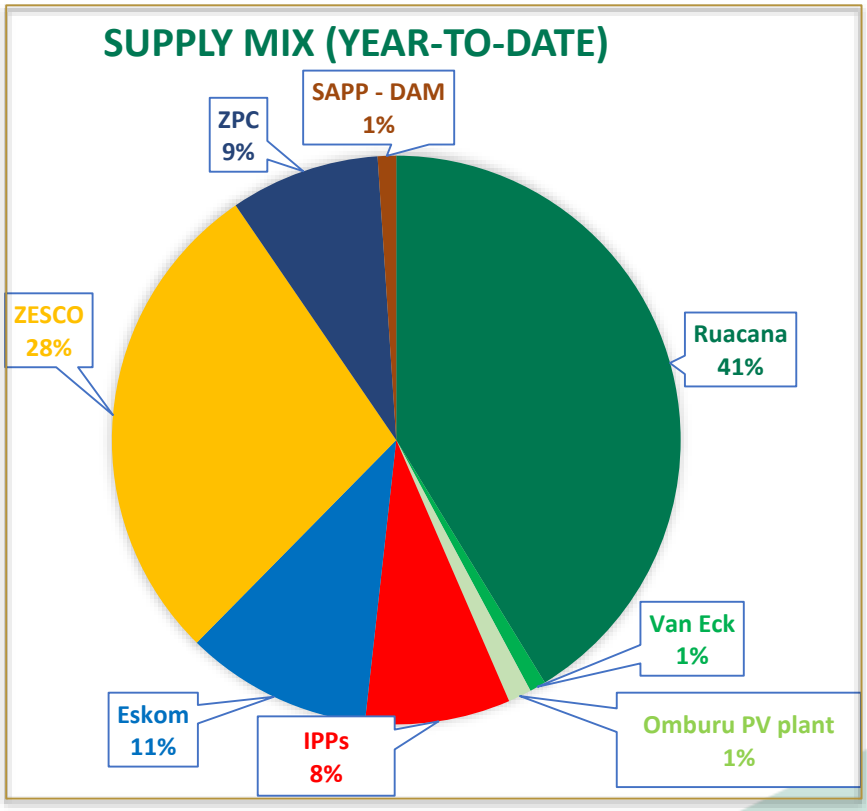
Current Supply Overview

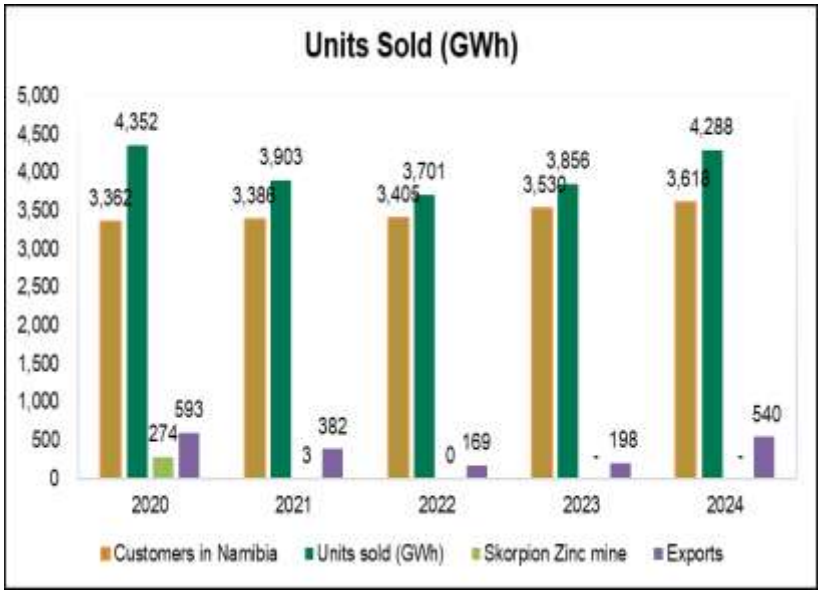
- ESKOM – 2022 to 2025/27
  - 170MW firm
  - Curtailment with Load Shedding
  - Ancillary services
- ZPC – 2015 to 2025
  - 80MW firm (load factor of 70%)
- ZPC – 2025 to 2030
  - Option to terminate
  - 50MW firm (load factor of 50%)
- ZESCO (1) – 2020 to 2030
  - 100MW firm
  - Minimum Load factor of 70%.
- ZESCO (2) – 2022 to 2027
  - 80MW firm (currently curtailed)
  - Minimum Load factor of 92.5%. (Load factor of 100% for 6-months & 85% for 6-months)

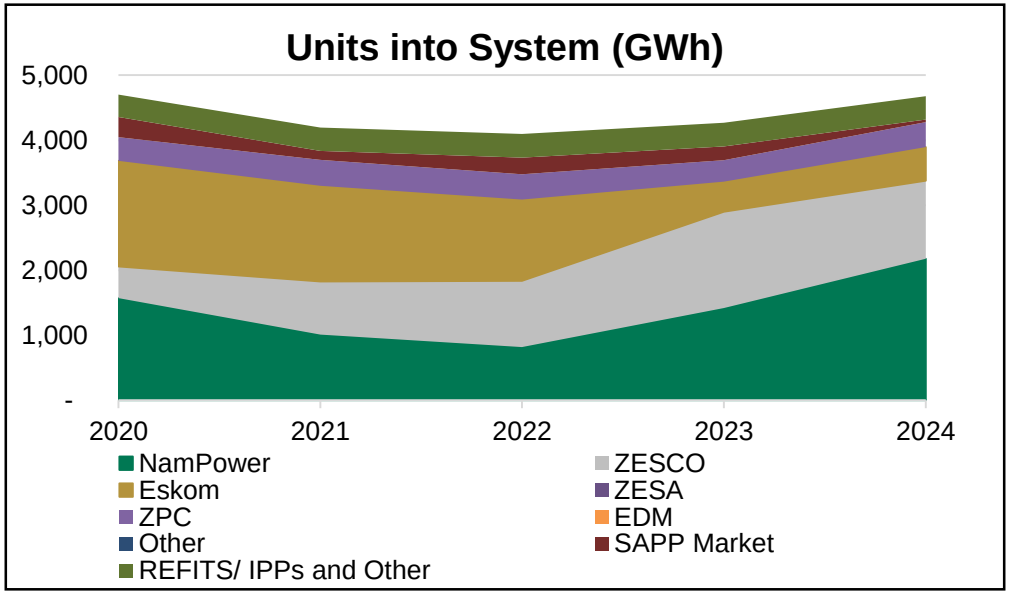


Although there are various supply restrictions in the region – supply and load balance are being maintained

Supply FY2024

Historic supply portfolio





Salient points from supply portfolio:

- No clear demand growth – very low growth rate expected and forecasted
- NamPower diversified from Eskom imports to Zambia (ZESCO) imports (security of supply)
- Ruacana Hydropower Station still plays a significant role to meet demand (seasonal)
- Anixas II 50MW (HFO) added to portfolio
- 2019 MSB Market was officiated with 30% of demand allocated for private supply
- 2019-2024 (Y-t-d) no significant uptake to meet 30% MSB threshold
  (± 20MW solar PV currently operational with ±40MW solar PV planned for next fin year)
- Clear objective under the MSB Framework to export energy (± 60~300MW)

Supply Forecast

Financial Year	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	FY-31	FY-32 to FY-46
NAMPOWER									
Ruacana	347	347	347	347	347	347	347	347	347
Van Eck	68	68	68	68	68	68	68	-	-
Anixas I	23	23	23	23	23	23	23	23	23
Anixas II	-	50	50	50	50	50	50	50	50
Omburu PV	20	20	20	20	20	20	20	20	20
Rosh Pinah	-	-	-	70	70	70	70	70	70
NP Biomass	-	-	-	-	40	40	40	40	40
BESS (Omburu)	-	-	-	50	50	50	50	50	50
BESS (Lithops)	-	-	-	-	-	45	45	45	45
Total NamPower	**457**	**507**	**507**	**627**	**667**	**712**	**712**	**645**	**645**
EXISTING IPPs									
InnoSun	5	5	5	5	5	5	5	5	5
REFIT PV	65	65	65	65	65	65	65	65	65
REFIT Wind	5	5	5	5	5	5	5	5	5
Hardap PV	37	37	37	37	37	37	37	37	37
GreeNam	20	20	20	20	20	20	20	20	20
Khan PV	-	20	20	20	20	20	20	20	20
Diaz Wind	-	-	-	44	44	44	44	44	44
Cerim Wind	-	-	-	-	50	50	50	50	50
Total IPPs	**132**	**152**	**152**	**196**	**246**	**246**	**246**	**246**	**246**
PLANNED									
Rosh Pinah PV	-	-	-	30	30	30	30	30	30
Omburu PV	-	-	-	-	80	80	80	80	80
IPP PV	-	-	-	-	120	120	120	120	120
Total new Gx	**-**	**-**	**-**	**30**	**230**	**230**	**230**	**230**	**230**
Total Local Capacity	**589**	**659**	**659**	**853**	**1,143**	**1,188**	**1,188**	**1,120**	**1,120**
Namibia Peak Demand	**672**	**686**	**694**	**706**	**717**	**734**	**744**	**753**	**758 -->**

Development Targets:

- Security of Supply
- 80% Self-sufficiency - 2028
- 70% Renewable - 2030

Installed capacity 2028:

- Total installed = 1 143 MW (159% of Peak demand)
- Available at Peak = 671MW (94% available at peak)
- Total renewables 953 MW (83% of installed capacity)

Energy Supply Forecast

Development Targets:
- Security of Supply
- 80% Self-sufficiency - 2028
- 70% Renewable - 2030

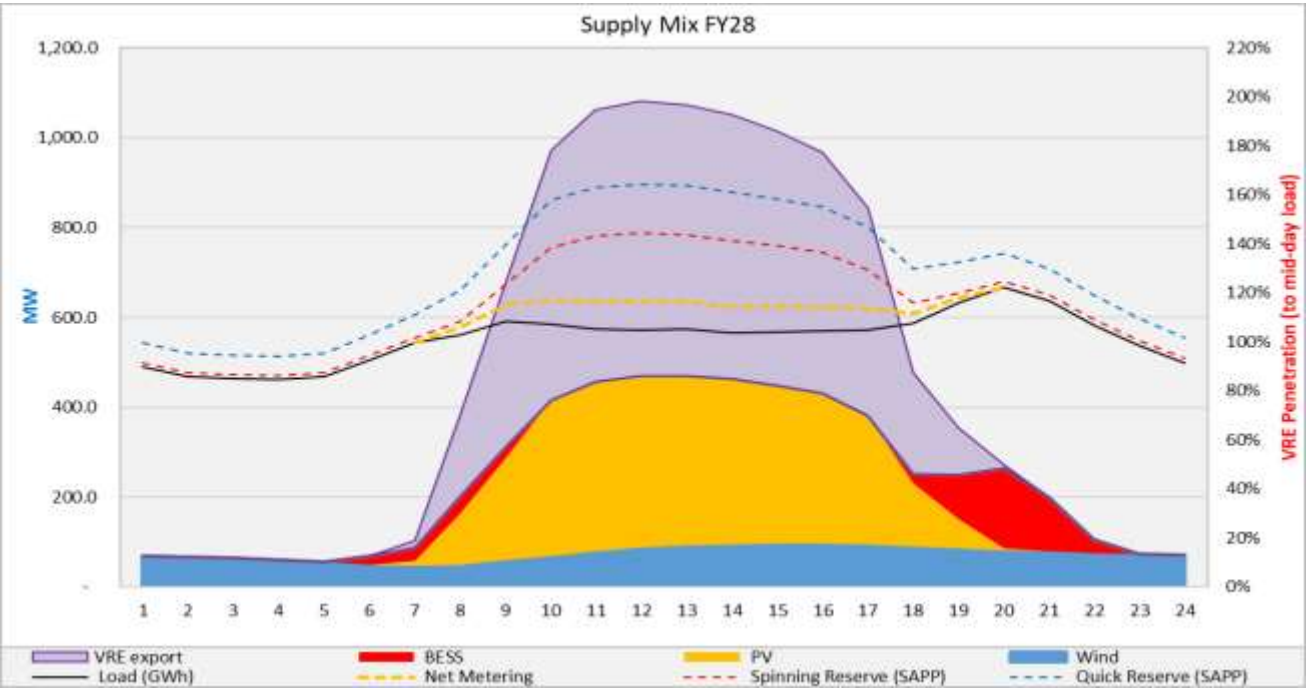
Energy:

Financial Year	FY-24	FY-25	FY-26	FY-27	FY-28	FY-29	FY-30	FY-31	FY-32 to FY-46
Hydro	2,067	992	957	961	886	860	904	908	911
Thermal	50	36	21	14	187	180	199	243	233
NP: PV	60	60	60	321	532	531	531	531	532
BESS	-	-	-	11	13	36	36	36	36
IPP: PV	339	356	417	417	785	784	784	784	785
IPP: Wind	22	22	22	203	410	409	408	408	410
Imports	2,139	2,532	2,484	2,013	1,247	1,193	1,125	1,044	1,078
MSB Supply	28	155	233	307	381	550	616	648	654
Total Energy	**4,705**	**4,153**	**4,193**	**4,246**	**4,439**	**4,542**	**4,603**	**4,600**	**4,639**
Local Energy	**55%**	**39%**	**41%**	**53%**	**72%**	**74%**	**76%**	**77%**	**77%**
Imports	**45%**	**61%**	**59%**	**47%**	**28%**	**26%**	**24%**	**23%**	**23%**

Energy Target 2028:
- Local Energy = 3 193 MWh (72% of total energy requirement)
- Renewable energy = 3 006 MWh (68% renewable of total energy)

Energy Target 2030:
- Renewable energy = 3 278 MWh (71% renewable of total energy)

Renewable Energy Concerns



Potential export scenario:

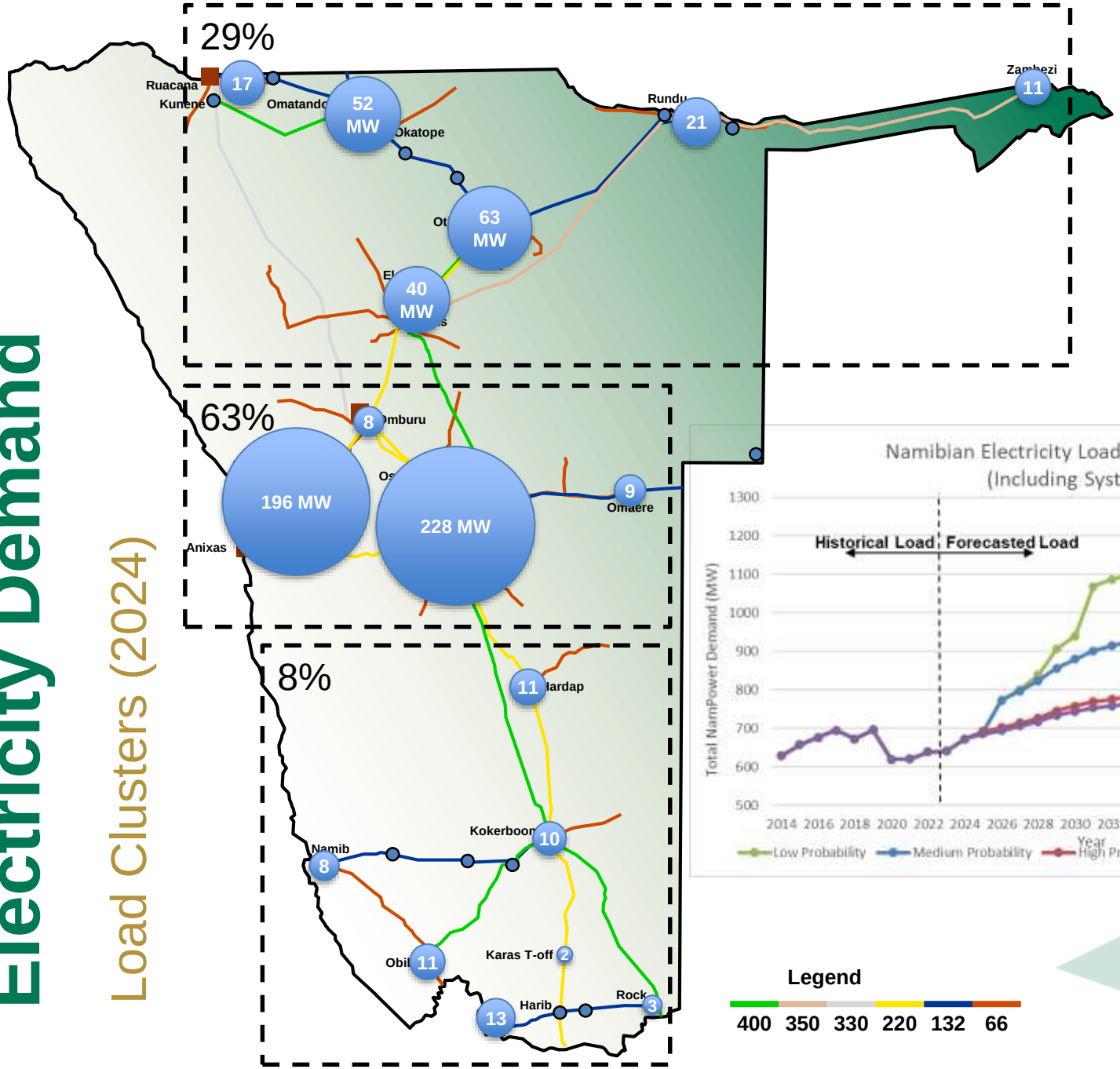
- 600MW solar PV exports
- Impact on Standby Generation Reserve 70MW → ±125 MW
- Impact on Spinning Reserve 38MW → ±250MW
- Existing transfer limitations with Eskom interface at border within the Northern Cape Province

Insight into the current and planned grid:

- NamPower Renewable Energy to meet local demand only
- Significant investment required (not accounted for) to accommodate Renewable Energy Exports
- Impact on Ancillary Services and Reserve Requirements

Electricity Demand

Load Clusters (2024)

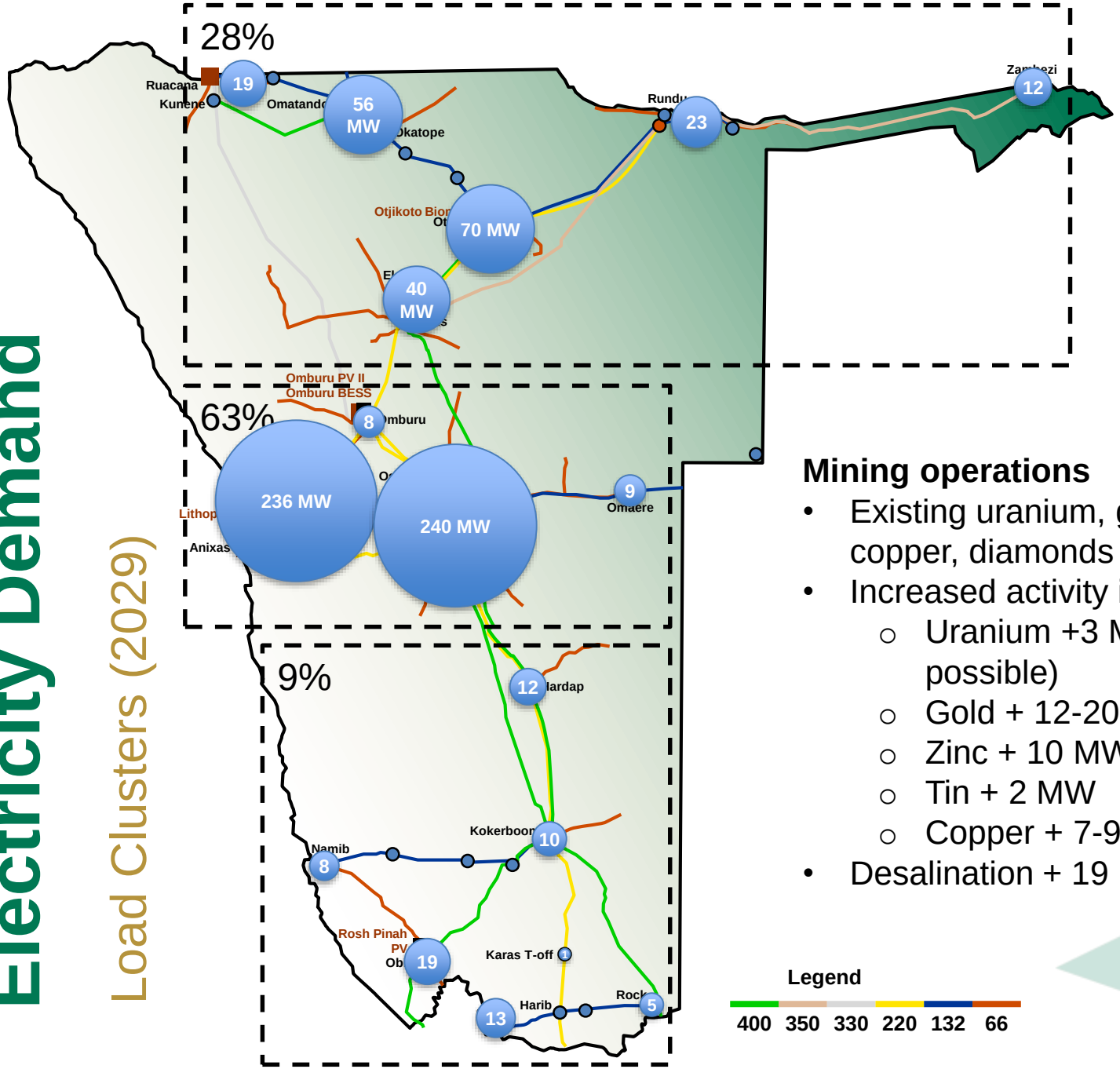


Legend

400 350 330 220 132 66

Electricity Demand

Load Clusters (2029)



Mining operations

- Existing uranium, gold, zinc, tin, copper, diamonds
- Increased activity in
  - Uranium +3 MW (+ 75 MW possible)
  - Gold + 12-20 MW
  - Zinc + 10 MW
  - Tin + 2 MW
  - Copper + 7-9 MW
- Desalination + 19 MW

Projects Update

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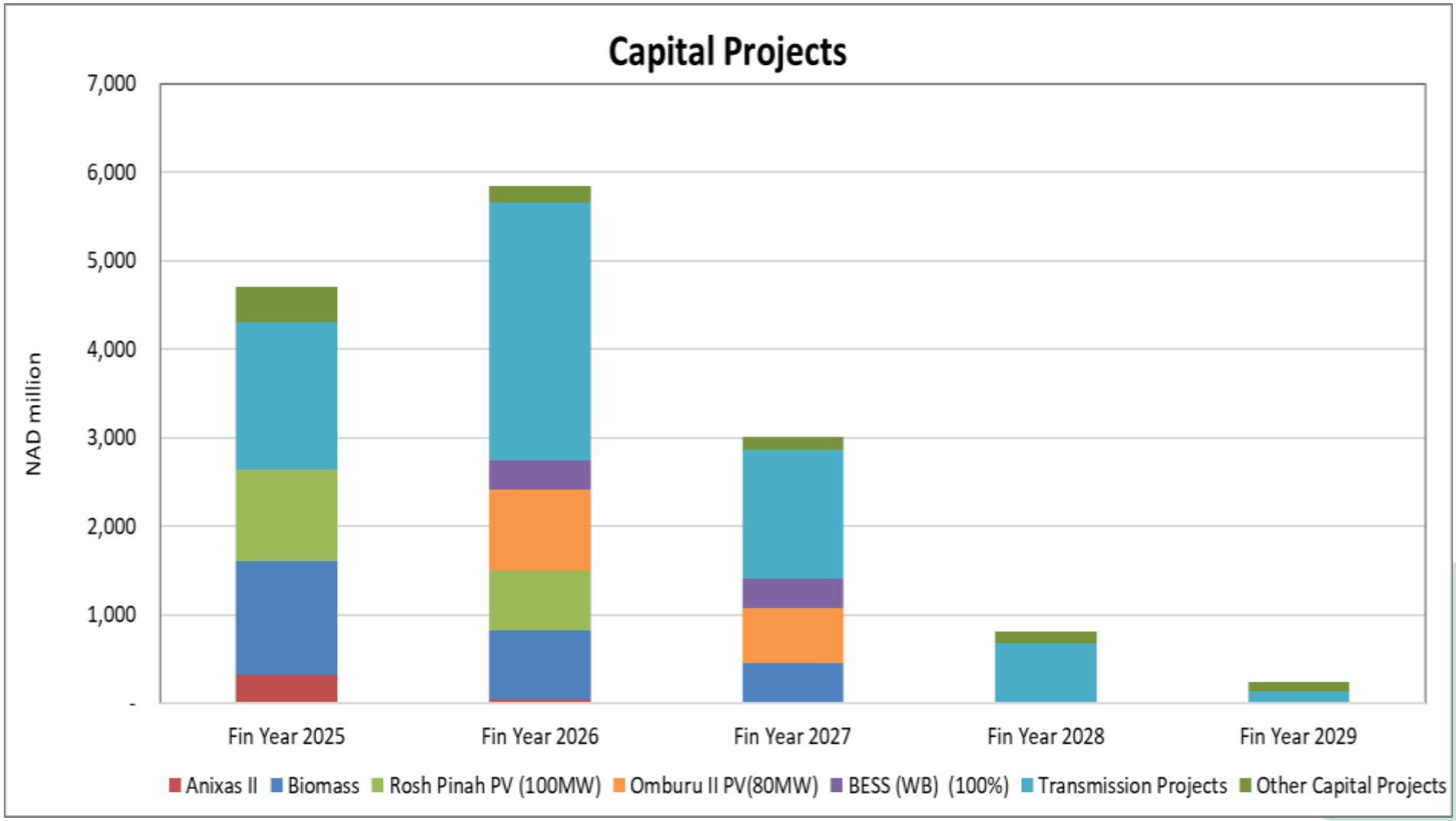
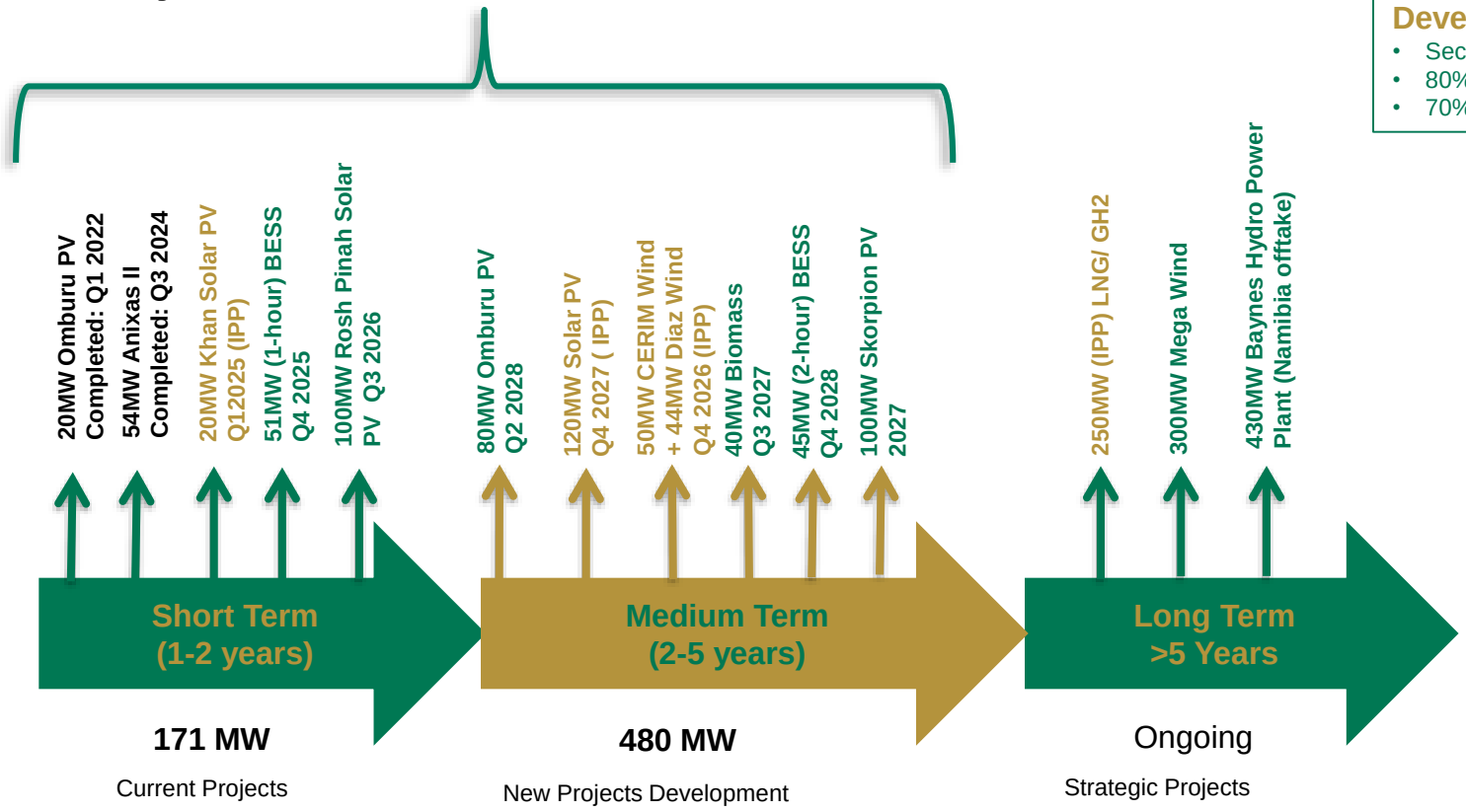
Capital Projects



Generation Projects

Projected 2025-2029 ±N$ 6.8 billion

Development Targets:
- Security of Supply
- 80% Self-sufficiency by 2028
- 70% Renewable Energy by 2030



Ministerial Determination:
- IPP PV: 120MW
- Rosh Pinah PV: +30MW, total 100MW
- Omburu PV II: 80MW
- Skorpion: 100MW

Implementation Plan not finalised, to be informed by:
- NamPower Integrated System Plan
- NamPower Transmission Master Plan
- Variable Renewable Energy (VRE) Study
- NamPower Funding Plan

Anixas II Firm Power Project

Project Description

Technical:

- Plant Net Capacity: 54 MW_{el}
- 3x MAN 18V51/60DF (18.5 MW_{el})
- Fuel: Liquid fuel (HFO/Diesel/

Natural Gas

- Lifetime: 25 years
- Location : Walvis Bay(Next to Anixas I Power Station)

General:

- Commercial Operation : 20 Nov 2024
- EPC Cost: N$1.27 billion
- EPC Contractor: FK Namibia/PHIM JV

Indicator	Target	Actual
Employment creation during construction	150	210
Local Content spend	N$ 181 million	N$ 175 million up to Jan 2025 (final Amount to be confirmed)

Omburu BESS Project

Project Description

- **Technical:**
  - Power Capacity: 51 MW
  - Energy Capacity: 51 MWh
  - Technology: Lithium-Ion
  - Lifetime: 19 years (10 years warranted)
  - Utilization: 365 cycles per year
  - Round-Trip Efficiency: 75% (Yearly)
  - Location: Omburu Substation

- **General:**
  - Technical Advisor: Fichtner
  - EPC Contractor: SDEE&NARADA JV
  - Grant Funding (KfW): EUR 20 million
  - N$ 100 million NamPower contribution (TA/ER, Local and Import Taxes, and Interconnection costs)
  - COD : October 2025
- **Progress Update:**
  - Design review in progress.
  - Manufacturing of battery and Power Conversion System(PCS) in progress

Rosh Pinah PV Project

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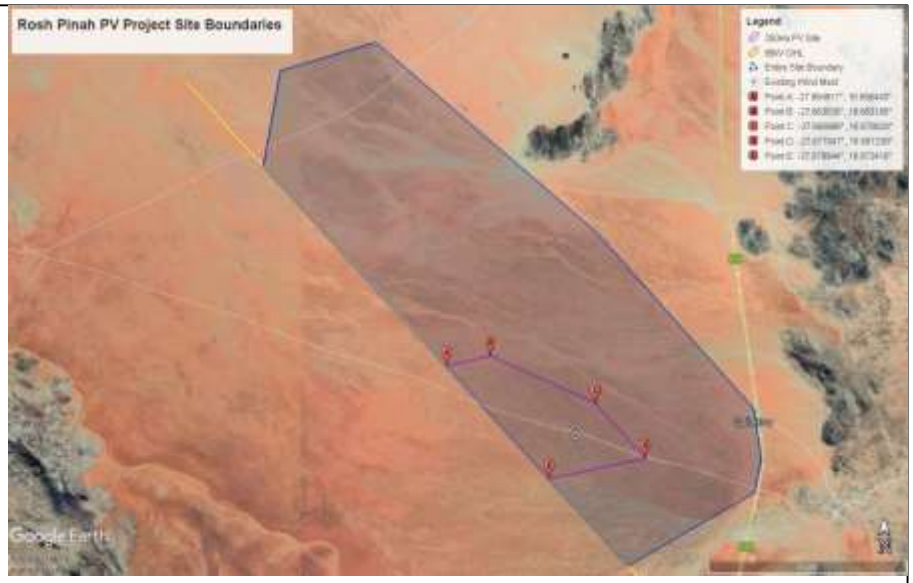
Site Characteristics:

- Solar Resource : GHI – 2395 kWh/m^2
- Specific Energy Yield : 2592 kWh/kWp
- Nearest Town : Rosh Pinah (± 33km)
- Project Site Area : 2300 ha (250ha for 100MW)



Technical:

- Export Capacity (AC) : 100 MW at PF = 0.90, DC/AC ≥ 1.3
- Capacity Factor (CF) : ≥ 35%
- Estimated AEP : ≥ 300 GWh (P95)
- Availability : 99%
- Lifetime : 30 years
- Modules : Bi-facial PERC
- Mounting-Structure : 1-axis tracking with back-tracking
- BESS : ready or PV-BESS Hybrid

Commercial:

- Contract Signing : 09 September 2024
- COD : June 2026
- CAPEX : N$1.52bill
- EPC Procurement : OIB [KfW procurement guidelines are adopted]
- Contract Suite : FIDIC EPC/Turnkey (Silver Book)

Omburu PV-II Project

Site Characteristics:

- Solar Resource : GHI – 2379 kWh/m^2
- Specific Energy Yield : 2577 kWh/kWp
- Nearest Town : Omaruru (± 12km), next to the existing Omburu 20MW PV Plant and NamPower Omburu Substation (S/S)
- Project Site Area : Available 258 ha

Technical:

- Export Capacity (AC) : 80 MW at PF = 0.90, DC/AC ≥ 1.3
- Capacity Factor (CF) : ≥ 35%
- Estimated AEP : ≥ 183 GWh (P90)
- Availability : 99%
- Lifetime : 30 years
- Modules : Bi-facial PERC
- Mounting-Structure : 1-axis tracking with back-tracking
- BESS : ready or PV-BESS Hybrid

Commercial:

- COD : June 2028
- CAPEX : N$1.3bill
- Procurement : Open National Bidding
- Contract Suite : FIDIC Plant & Design Build (Yellow Book)

Omburu PV-II Project

Otjikoto Biomass Project

Site Characteristics:

- Location: Tsumeb
- ±100 km harvesting radius (± 3.1 mil ha available)
- Only 12.8% of harvesting area to be used
- Harvesting in accordance with FSC principles
- Fuel Requirement: 180 000 – 245 000 t/yr
- 4 long-term Harvesters (7-year Contracts)
- Short-term Harvesters (under development 2-3 years Contracts)

Technical:

- Size : 40 MWe
- Grate fired boiler technology; 2 Boilers
- Fuel : Encroacher Bush Wood Chips
- Availability: 85~92%
- Capacity factor: (CF): 60~85%
- Energy: 210-300 GWh
- Lifespan: 25 years

Commercial:

- Dongfang Electric International Corporation
- Contract Signing : 24 May 2024
- COD : 2027
- CAPEX : N$ 2.34 bil (N$19.04/USD)
- EPC Procurement : Open Internation Bidding
- Contract Suite : FIDIC EPC/Turnkey (Silver Book)

Progress

- Ground breaking : 15 November 2024
- Site clearance and establishment in progress
- Construction of temporary facility in progress
- Design review in progress

Lithops BESS Project

Project Description

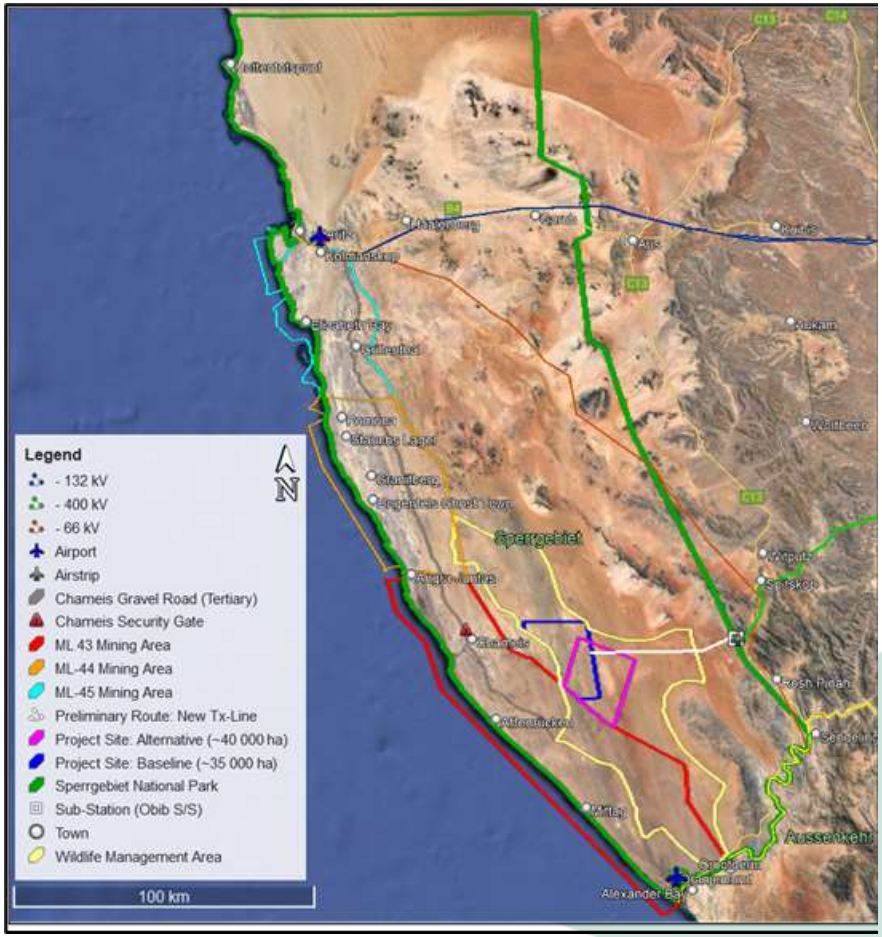
- Technical:
  - **Power Capacity:** 45 MW
  - **Energy Capacity:** 90 MWh
  - **Technology:** Lithium-Ion
  - **Lifetime:** 19 years
  - **Round-Trip Efficiency:** 85%
  - **Utilization:** 533 cycles per year
  - **Location:** Lithops Substation, Erongo Region

- General:
  - **COD:** November 2028
  - **Capex:** USD 35 million
  - **Funding Source:** World Bank (20 mil GCF Loan + 15 mil GPG Grant)
  - **EPC Procurement Method:** Open International Bidding (OIB)

300MW Wind Park

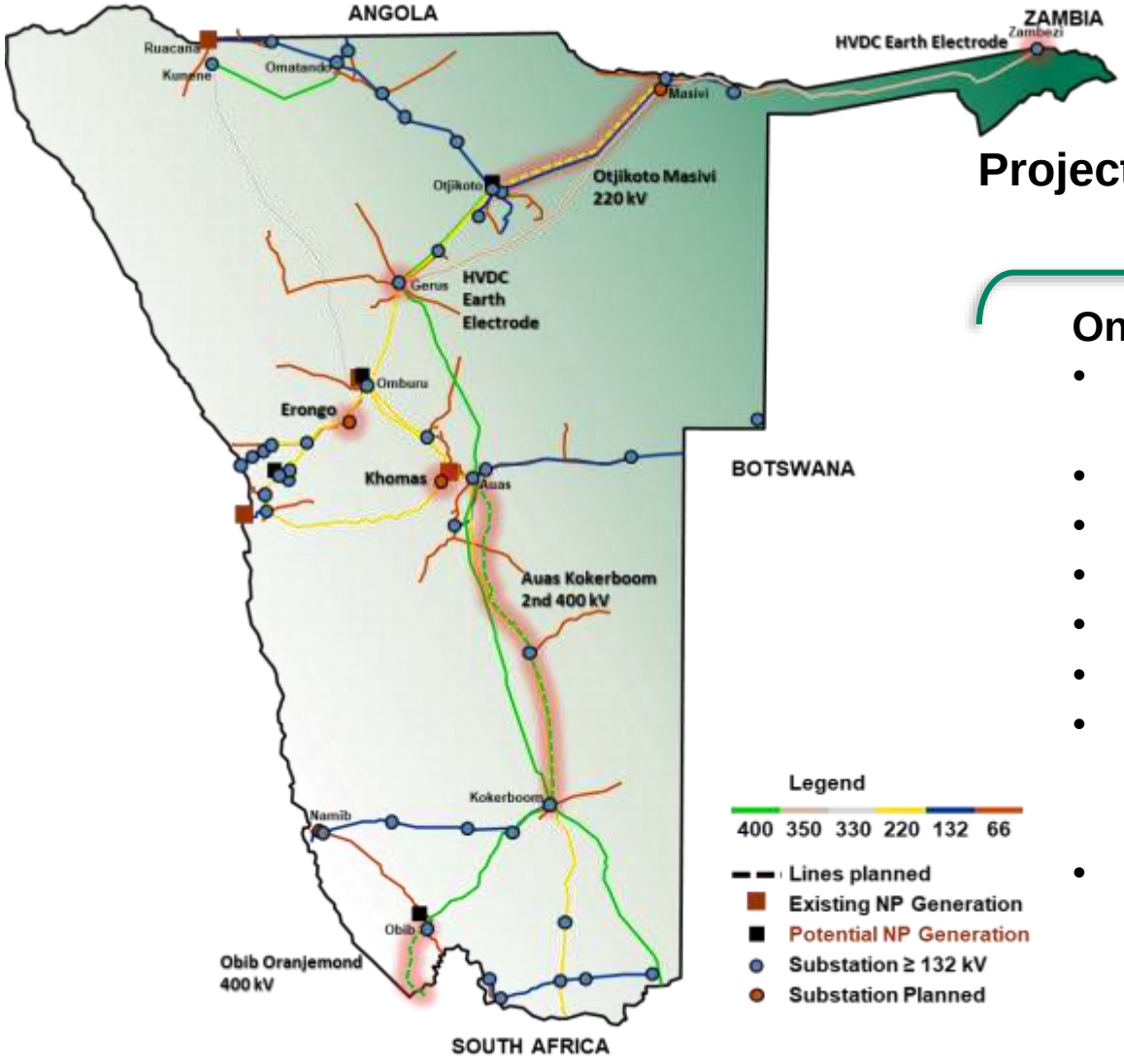
Project Concept

- Technical:
  - Project Size: 300MW Wind Power Plant
  - Location: Sperrgebiet, South of Hyphen Sites
  - Land size: 8 000 to 10 000 ha (≤0.03MW/ha)
  - Constraints: Terrain, buffer zones, environmental, Tx, etc.
- CAPEX:
  - Power Plant: ≈N$ 7.5 billion
  - Transmission: ≈N$ 2 billion
- Schedule:
  - Development Phase: 2.0 years (Land. Feasibility, Resource Measurement, ESIA, Geotech, Transmission - Tx, etc.)
  - IPP/EPC split to be confirmed
  - EPC Procurement: 1 Year
  - Construction Phase: 2.5 years (>60 WTGs, 400kV Tx - lines)



Transmission Projects (Base Case)

Recent and Ongoing Backbone Expansion



Projected 2025-2029 ±N$ 7.0 billion

Ongoing

- 400kV Obib–Oranjemond (Interconnector with RSA)
- 400kV Auas–Kokerboom
- 220kV Otjikoto–Masivi Line
- New Erongo Substation
- New Khomas Substation
- HVDC Earth Electrodes
- Various grid strengthening and Substation upgrades in the north

- *Excluding Master Plan Updates:*
  - *ANNA (Angola - Namibia)*
  - *400kV Otjikoto-Omatando*
  - *Baynes Integration*

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thank you