Utilisation of Energy Storage Technologies in Namibia

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EAN * REIAoN * HSF

Virtual Launch – *Energy Storage Paper*

15 July 2021, 10h00 to 11h30

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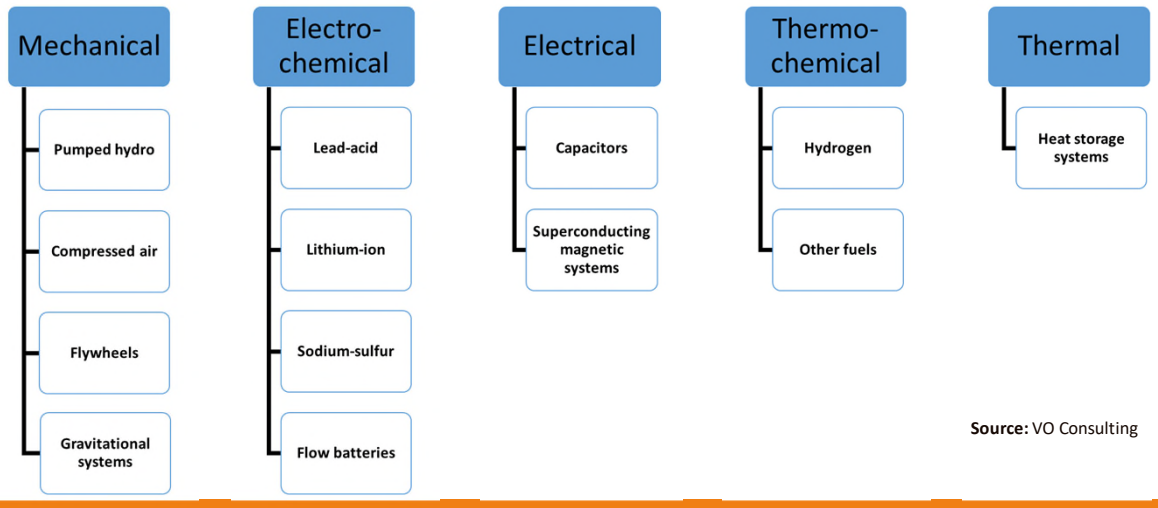
Energy Storage Types



Source: VO Consulting

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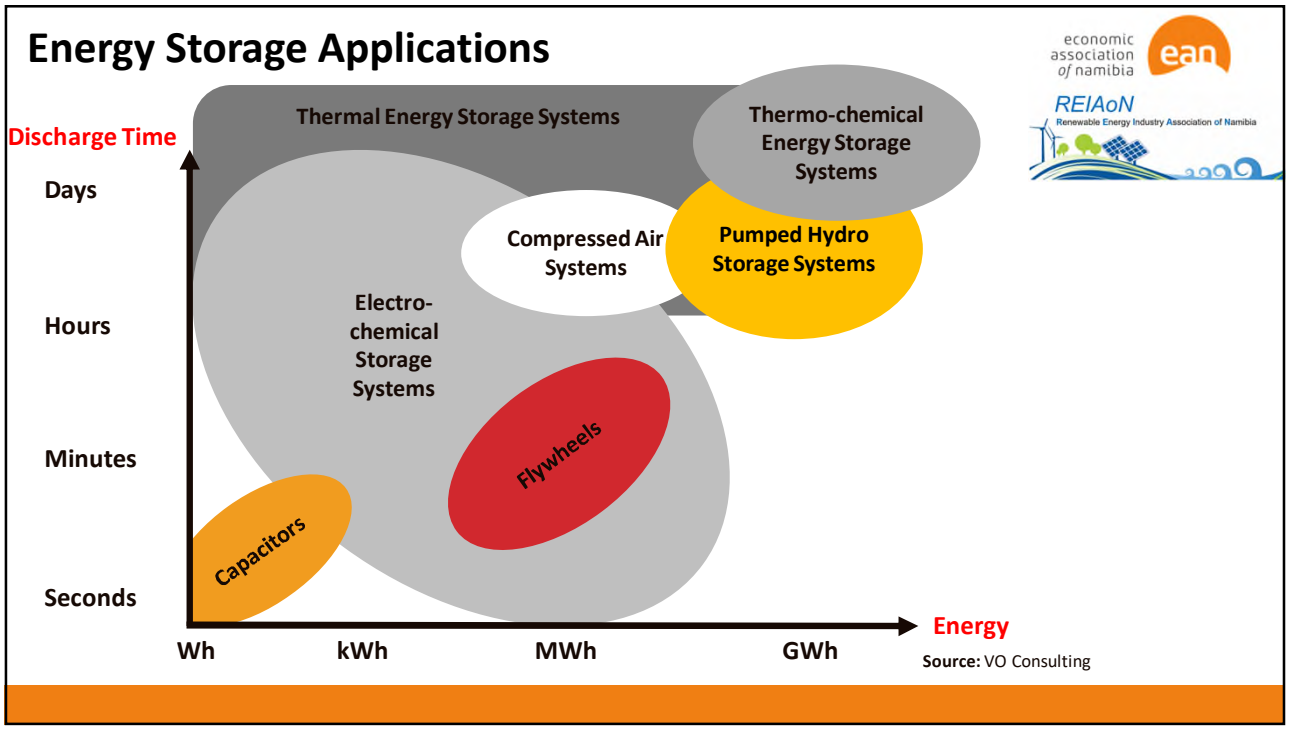
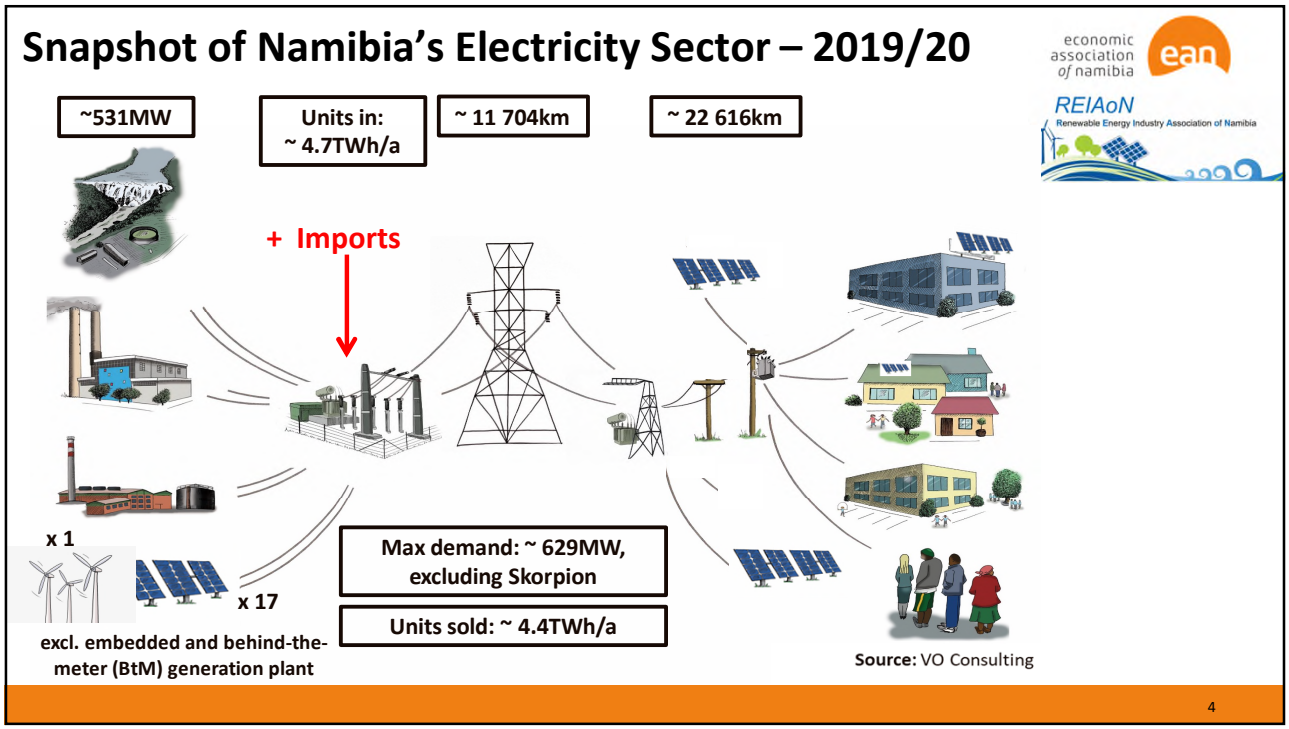

Energy Storage Applications
economic association of namibia
ean
REIAoN
Renewable Energy Industry Association of Namibia
Discharge Time
Days
Hours
Minutes
Seconds
Thermal Energy Storage Systems
Thermo-chemical Energy Storage Systems
Compressed Air Systems
Pumped Hydro Storage Systems
Electro-chemical Storage Systems
Flywheels
Capacitors
Wh
kWh
MWh
GWh
Energy
Source: VO Consulting

3


Snapshot of Namibia's Electricity Sector – 2019/20
economic association of namibia
ean
REIAoN
Renewable Energy Industry Association of Namibia
~531MW
Units in: ~ 4.7TWh/a
~ 11 704km
~ 22 616km
+ Imports
x 1
x 17
excl. embedded and behind-the-meter (BtM) generation plant
Max demand: ~ 629MW, excluding Skorpion
Units sold: ~ 4.4TWh/a
Source: VO Consulting
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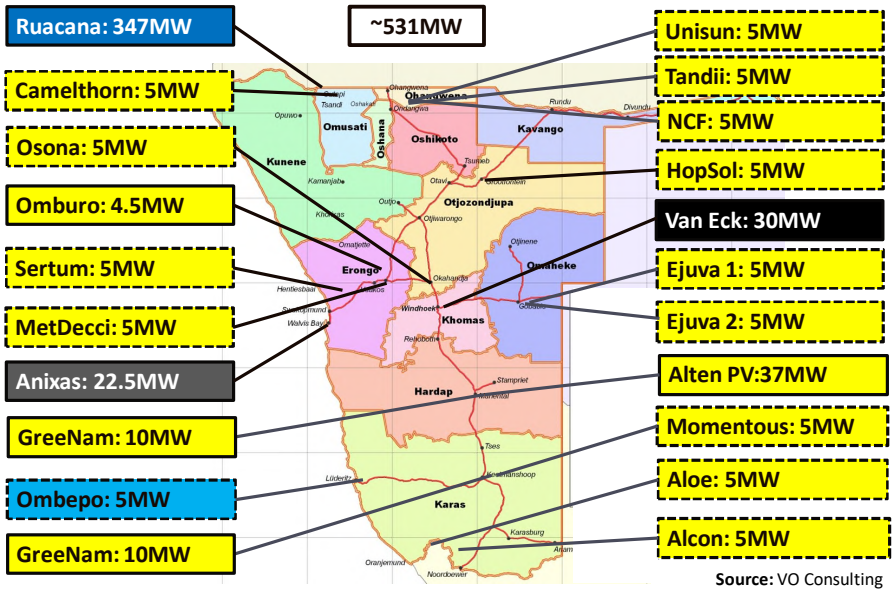
Namibia's Gx Capacity– *excl. embedded & BtM plant*



Source: VO Consulting

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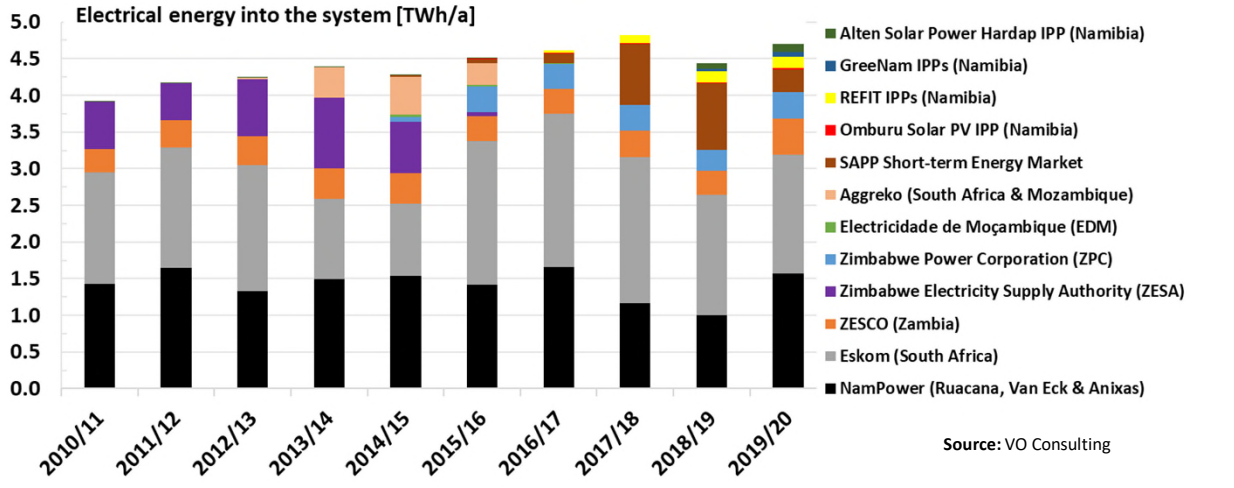
Namibia's Electricity Supplies – 2010 to 2020



Source: VO Consulting

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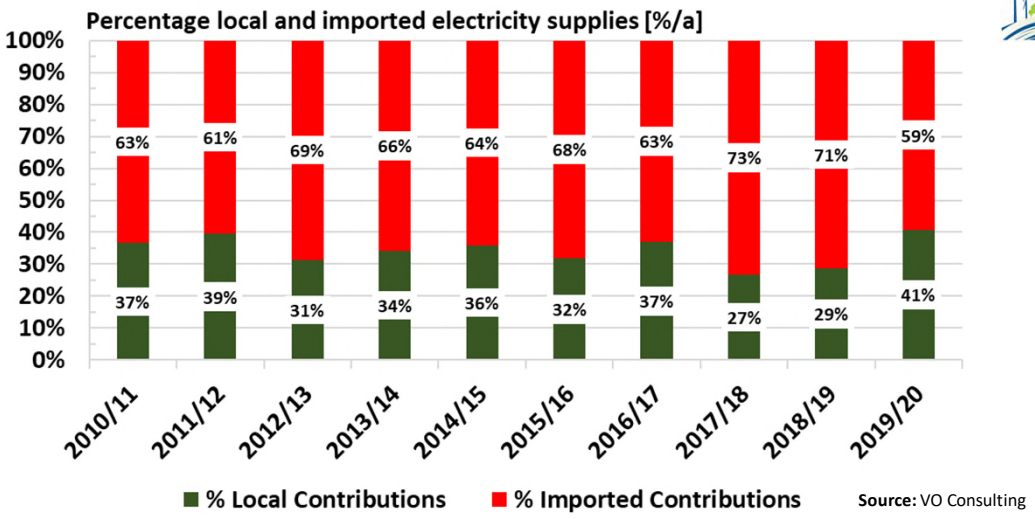
Local & Imported Supplies – 2010 to 2020



Source: VO Consulting

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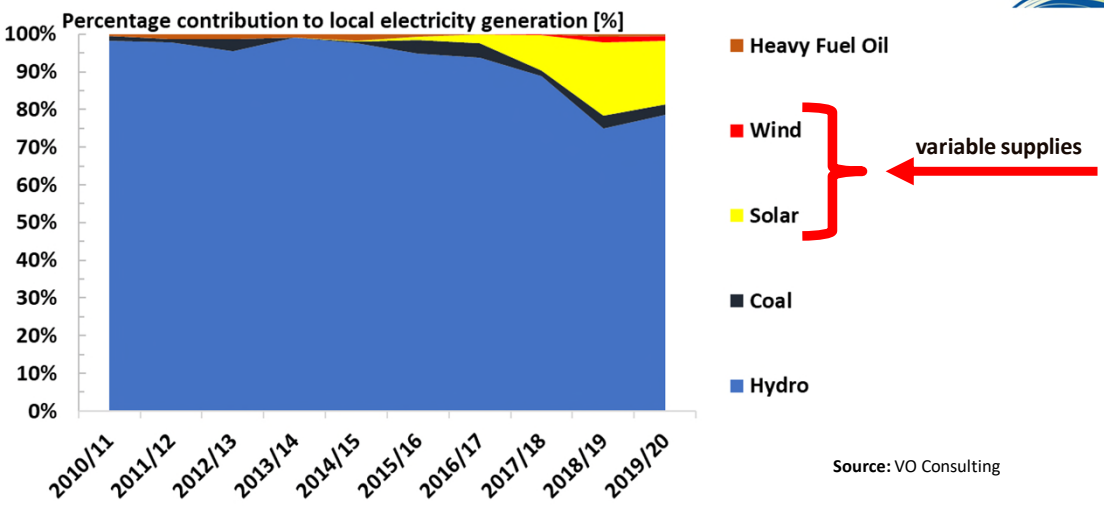
Local Electricity Supplies – 2010 to 2020



Source: VO Consulting

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Potentials for Electricity Storage in Namibia's ESI

Domestic & Commercial Users:

- Electrical energy storage
- Emergency power & UPS capacities
- Maximum demand control
- Off-grid supplies

and, increasingly, also for

- electric mobility / transport and others.

Large Power Users & Utilities:

- Time shifting & peak shaving
- Spinning / supplemental reserve
- Voltage regulation & frequency control
- Black-start capabilities
- Delay of infrastructure investments, and others.

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Domestic Applications of Energy Storage Tech

Grid-connected uses

Tesla PowerWall (example)

7 kWh/day

~US$ 6 000 (USA)

Source: Tesla

Electric mobility

Nissan Leaf (example)

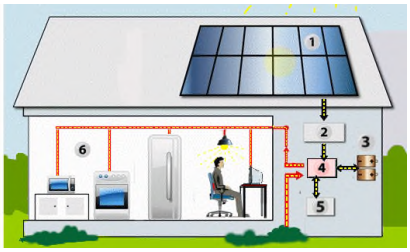
30+ kWh battery energy storage

170+ km range

~N$ 450 000

Source: Nissan

Off-grid applications



Stand-alone & off-grid uses

Example: 10.6 kW solar PV plus 8kVA Li-ion storage

~N$ 150k (PV) + N$ 300k (storage)

Source: Namibian supplier.

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Utility Applications of Energy Storage Tech

Electricity Generation

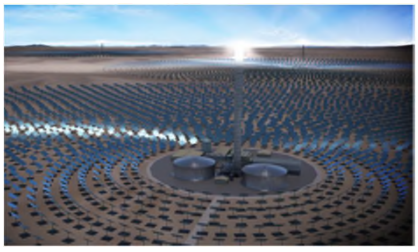
Port Augusta, South Australia

150 MW CSP (Aurora project)

1.1 GWh storage (8 hours)

USc 6.14/kWh

CO2-neutral RE Generation



Tarapacá Region, Chile

450 MW CSP (Tamarugal)

5.8 GWh storage (13 hours)

USc 6.3/kWh

Substation Support

Mira Loma, California, USA

80MW PowerPacks supporting substation operations

Source: Tesla

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Commercial Opportunities for Energy Storage Tech

Value proposition:

- **Strengthen emergency power / uninterrupted power capacities**
- **Optimise self-consumption from own generation supplies**
- **Enhance and extend resource availability**
- **Shift time of demand/supply to derive extra benefit from time-of-use tariffs**
- **Maximise the value of the electric vehicle fleet**
- **Increase demand response capabilities and capacities**
- **Deliver support services to the grid operator, and others.**

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Namibian Opportunities to Advance Storage Tech

Opportunities and potentials:

- **Mineral endowments for production of storage technologies, incl. Li, Co, Cu, Ni, graphite & various rare earth elements**
- **Local exploration and mining: Uis tin, Okanjande graphite, Karibib lithium, Kunene Region's rare earth elements, cobalt close to Opuwo, zinc close to Swakop**
- **However: local manufacturing capacity & skills base remains underdeveloped and local high-volume cutting-edge technology ventures have a poor track record**
- **Hydrogen, for own consumption and export – *but realism remains essential.***

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How can Namibia benefit from energy storage?

- ***Create legal and regulatory provisions*** **for the uptake of energy storage technologies, specifically for use across the electricity value chain**
- ***Create pricing/tariff mechanisms*** **for multiple services to be provided by storage tech**
- ***Adopt international best practices*** **to guide the uptake and use of storage technologies, incl. as part of planning, e.g. NIRP, Tx Masterplan (MP), Dx MP, Electrification MP etc.**
- ***Design transmission & distribution infrastructure by taking*** **storage options into account**
- ***Offer energy storage technologies*** **to commercial, industrial & private electricity users**
- ***Avoid investments*** **that turn obsolete once XXL storage arrives.**

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Take Away Messages

1. Energy storage technologies *add value* to local renewable energy (RE) endowments;
2. Local appetite for uptake and use of RE & energy storage technologies exists;
3. Increasingly cost-effective storage further incentivises the uptake and use of solar PV and wind;
4. Namibia must prepare for the arrival of cost-competitive storage tech, incl. the legal, regulatory and statutory provisions – ECB is currently developing regulations;
5. Rapid decline of RE & storage costs profoundly impacts non-renewable generation assets;
6. Energy storage is expected to affect the business models of all electricity utilities;
7. Numerous opportunities exist for suppliers & installers of RE & storage tech;
8. Namibia's storage market is small – solutions that reduce the cost of energy hold further potentials;
9. A handful of local companies have the capacity to implement large RE systems including storage; and
10. Capacity development to benefit from the uptake of RE & storage remains essential – ***REIAoN***.

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Thank you!

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