EXPERIENCE WITH SWER ELECTRIFICATION IN NAMIBIA

AEI Practitioner Workshop
Dakar 2011

Presented by:

Henk Meyer

Senior Electrical Engineer

Meyer Consulting Engineers - Namibia

Nov 14, 2011

SWER (Single Wire Earth Return) Electrification in Namibia

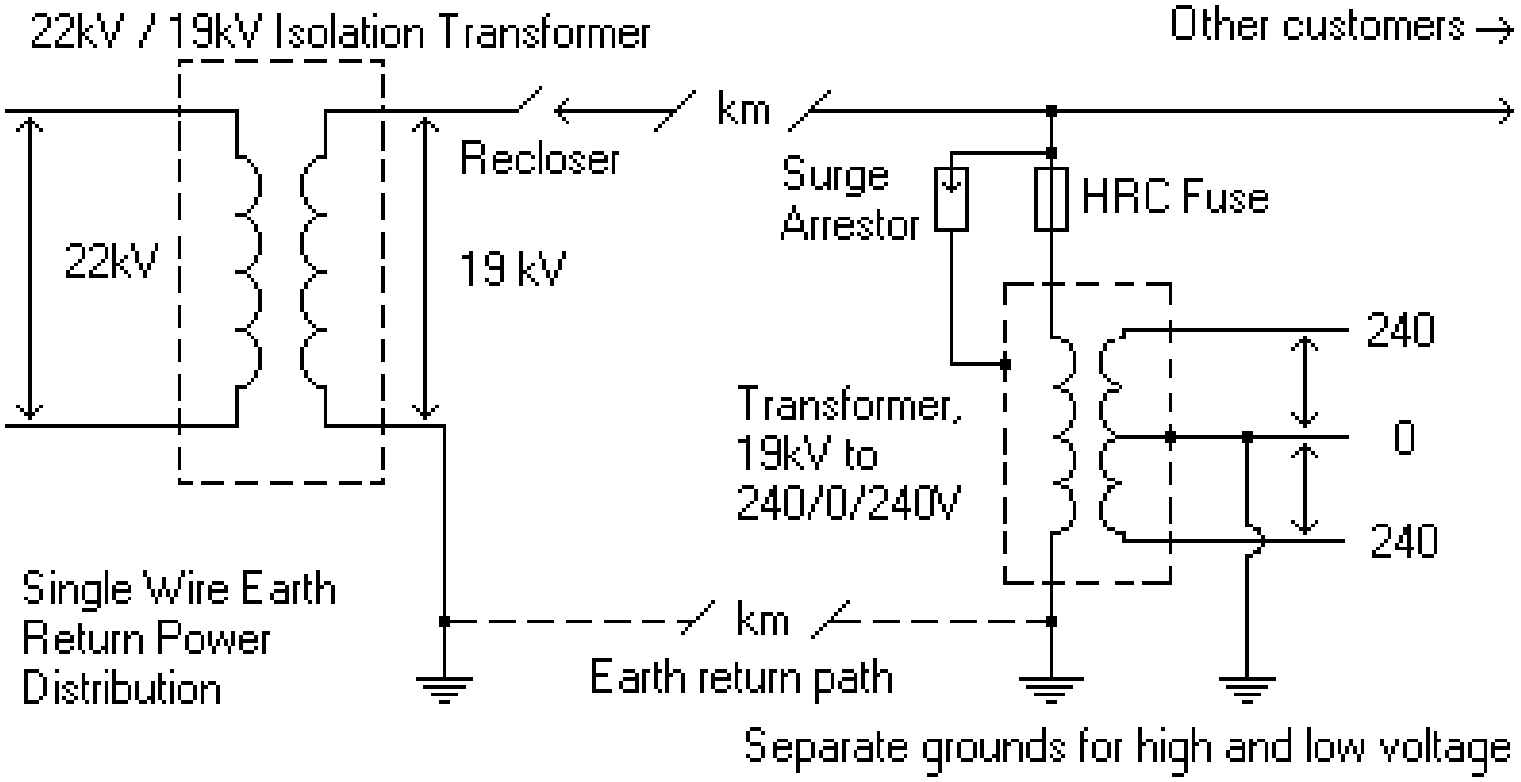
NAMIBIA - GENERAL INFORMATION

- **Independence: 21 March 1990**
- **Current population: 2.15 million**
- **Rural electrification (RE) program since: 1991**
- **Current budget: N$100 million (U$ 14.5 million)**
- **Rural electrification according to a Master Plan**
- **Master Plan updated every 5 years**

SWER (Single Wire Earth Return) Electrification in Namibia

RURAL ELECTRIFICATION TECHNOLOGY
Initial Phase (1991): Three Phase Technology

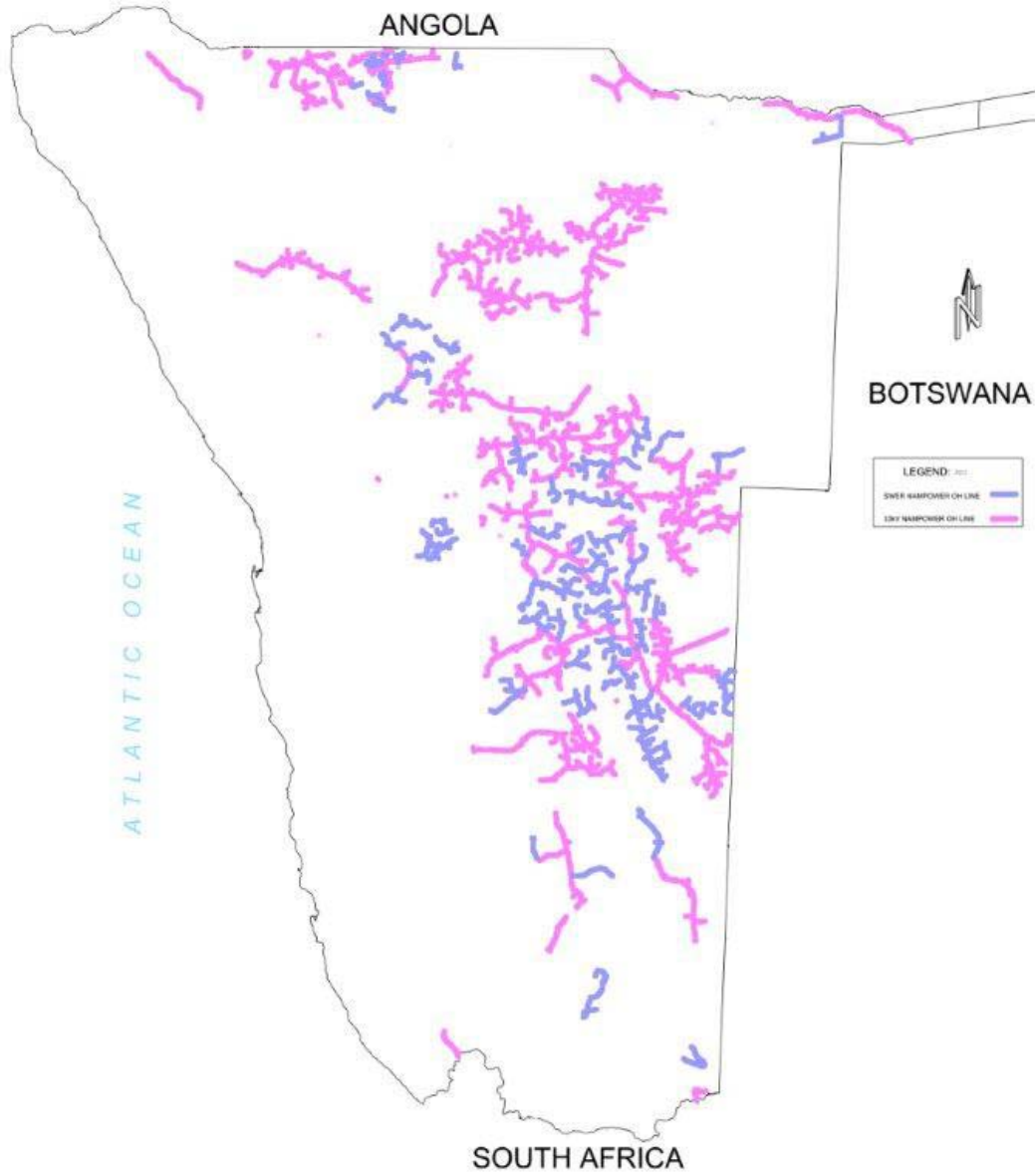
Second Phase: Low Cost RE (LCRE), SWER Technology (1998)



STANDARD PARAMETERS FOR SWER IN NAMIBIA

- **Rated Voltage: 19.1kV phase to earth**
- **Isolation Transformers: 100kVA or 200kVA**
- **Customer Transformers: 19.1kV/230V, Single Phase, 16kVA and 32kVA Dual Phase**
- **Conductor: “Magpie” (Aluminium conductor steel reinforced)**
- **Maximum unbalance: 3 %**
- **Minimum fault current: 60A**
- **Material: similar to 33kV, 3-Phase lines**

SWER (Single Wire Earth Return) Electrification in Namibia

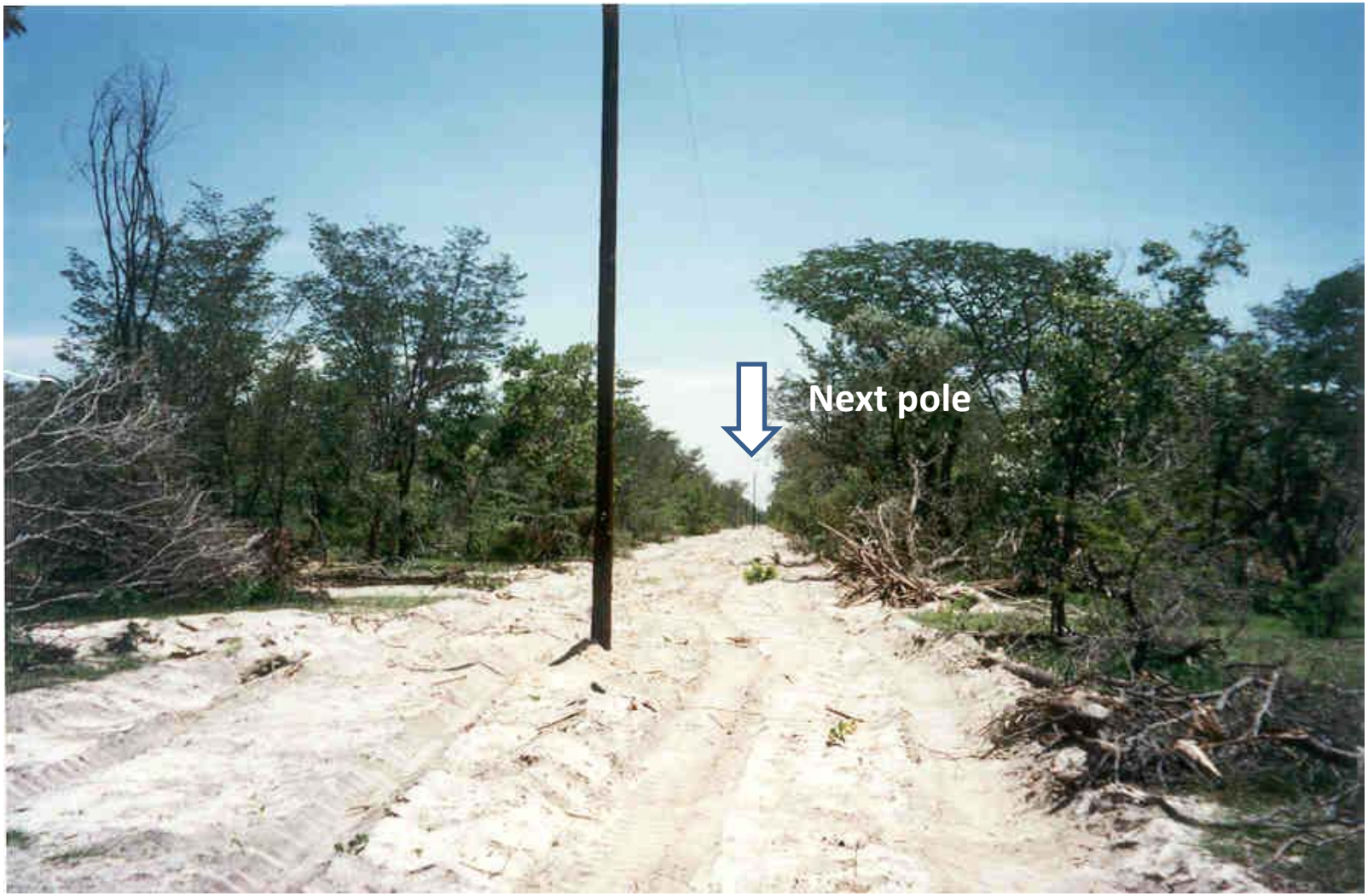


DISTRIBUTION LINES:
33kV lines: 11,281 km
SWER lines: 4,334 km

Cost Driver: Single conductor

SWER (Single Wire Earth Return) Electrification in Namibia

Cost Driver: SWER pole spacing 240m



SWER (Single Wire Earth Return) Electrification in Namibia

SWER Advantages

- **Simplicity**
- **Low capital cost**
- **Lower maintenance costs**
- **Reliability**

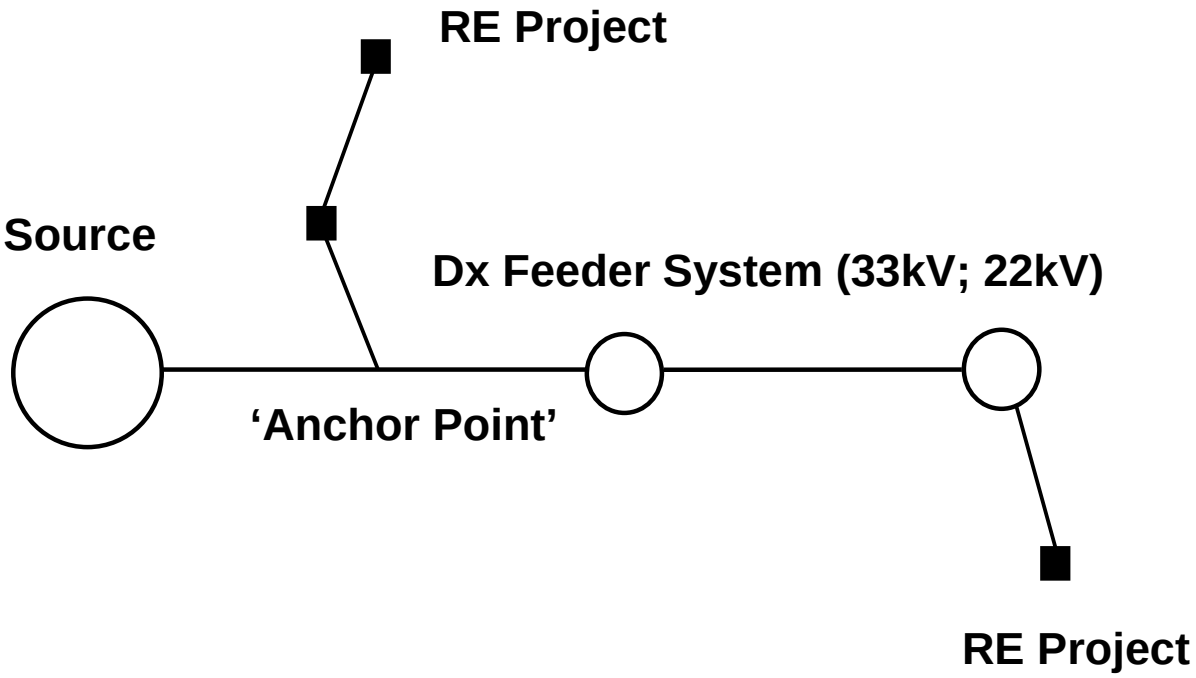
SWER Disadvantages

- **Low power transfer**
- **Single phase**

SWER (Single Wire Earth Return) Electrification in Namibia

TECHNICAL DIFFICULTIES EXPERIENCED:

- **Mills, pumps – special electrical motors required**
- **Lightning damage**
- **Earthing of consumer transformers**
- **Available fault levels (limit LCRE feeder reach)**



SWER (Single Wire Earth Return) Electrification in Namibia

CONSUMER DIFFICULTIES EXPERIENCED:

- **Perception of 'inferior' power supply**
- **Consumer education required**

IMPLEMENTATION POLICY:

- **Only for remote rural areas with low loads**

CONCLUSION

- **SWER is an important tool in the electrification toolbox for cost effective rural electrification**