

Energy, Climate Change & Developement in NAMIBIA

presented by Harald Schütt

AMUSHA

Consultancy Services

commissioned by

Desert Research Foundation of Namibia

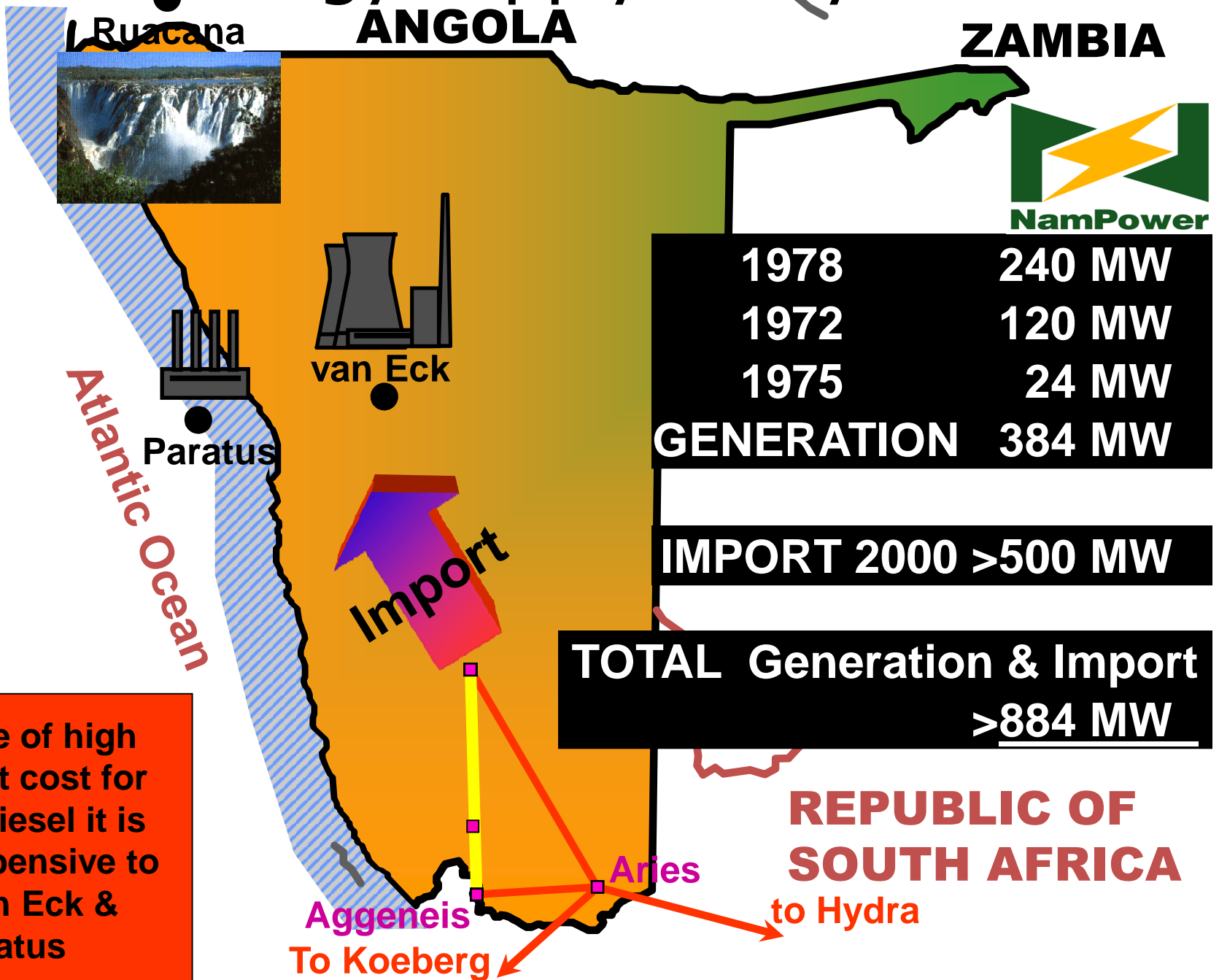
Namibia: at a glance

- Population: (2001) **1.8 million (now > 2million)**
- Population density: **2.4 People/ km²**
- Rural Population: **62% (1.2 million)(2001)**
- Households on Grid : **~ 60% urban, ~ 11% rural**
- Population growth: **3.15% per annum**
- Rural->urban migration: **5% per annum ! ! !**
- Unemployment: **> 50% => youth >60%**
- Clinics without electricity: **50% (of 603)**
- Schools without electricity: **58% (of 1 470)**
- Alphabetisation: **76%**

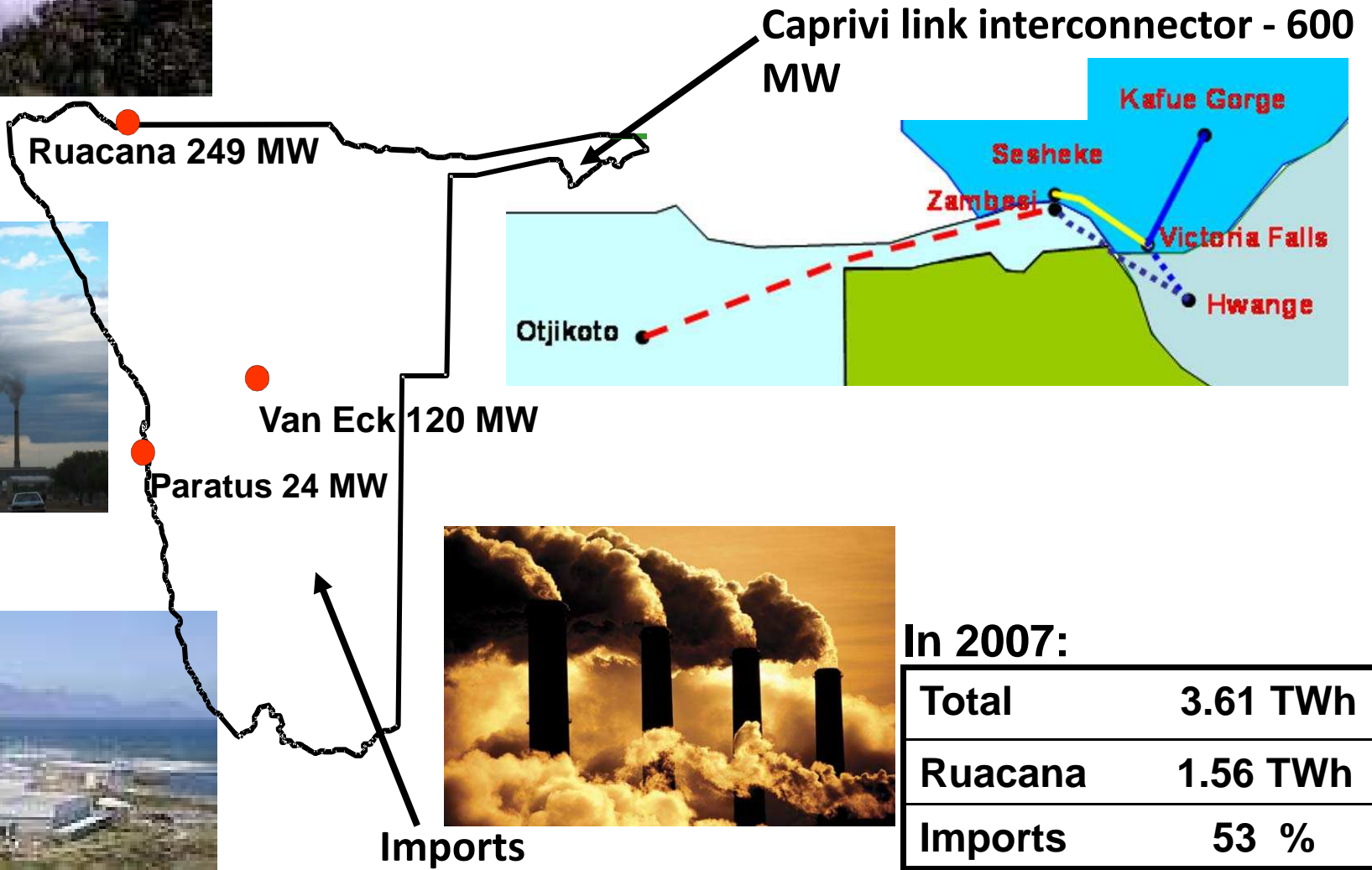
Electricity

- Ruacana River-Flow: **240 MW** (40 - 60% of the time)
- Van Eck coal fired: **120 MW** (R 0.50/kWh)
- Diesel generator W-Bay: **24 MW** (additional 50 MW planned)
- Import Eskom: **400 kVA** (700 – 1,700 GWh/Jahr)
- Import Zimbabwe: **150 MW** (until 2012 – long transport)
- Import Zambia: **200 kVA** (not yet fully operational)
- Usage: **~2,800 GWh/year** (470 MW Peak)
- Price range household: **R 0.30 - R 0.80/kWh**
- Generation, Trade **AND** Transmission: **NamPower**
- Distribution: **5 regional entities (REDS etc)**
- Households on Grid : **~ 60% urban, ~ 11% rural (approx. 1/3)**
- Regulation: **Electricity Control Board**

Energy supply today



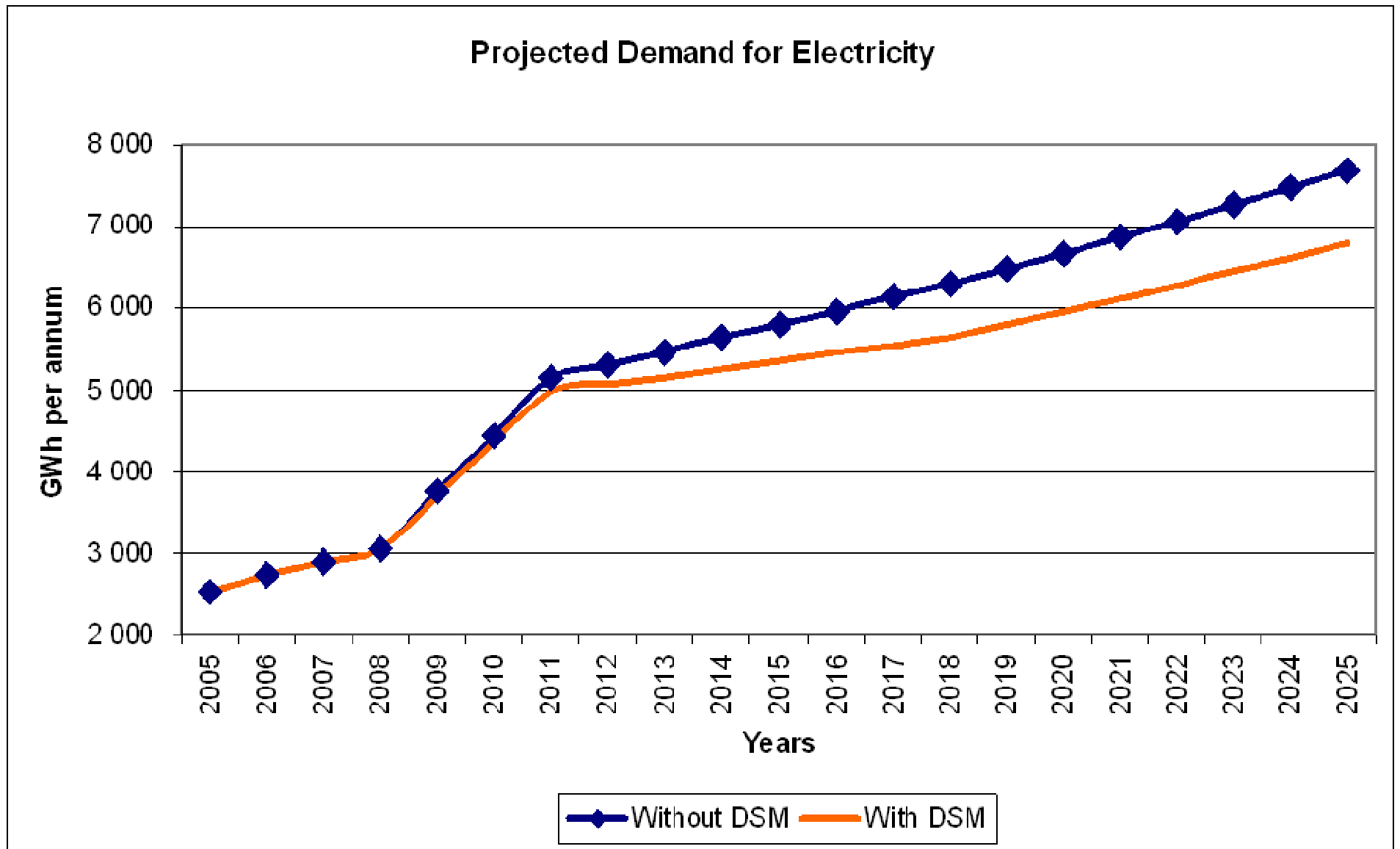
Energy supply 2007



In 2007:

Total	3.61 TWh
Ruacana	1.56 TWh
Imports	53 %

Projected Demand



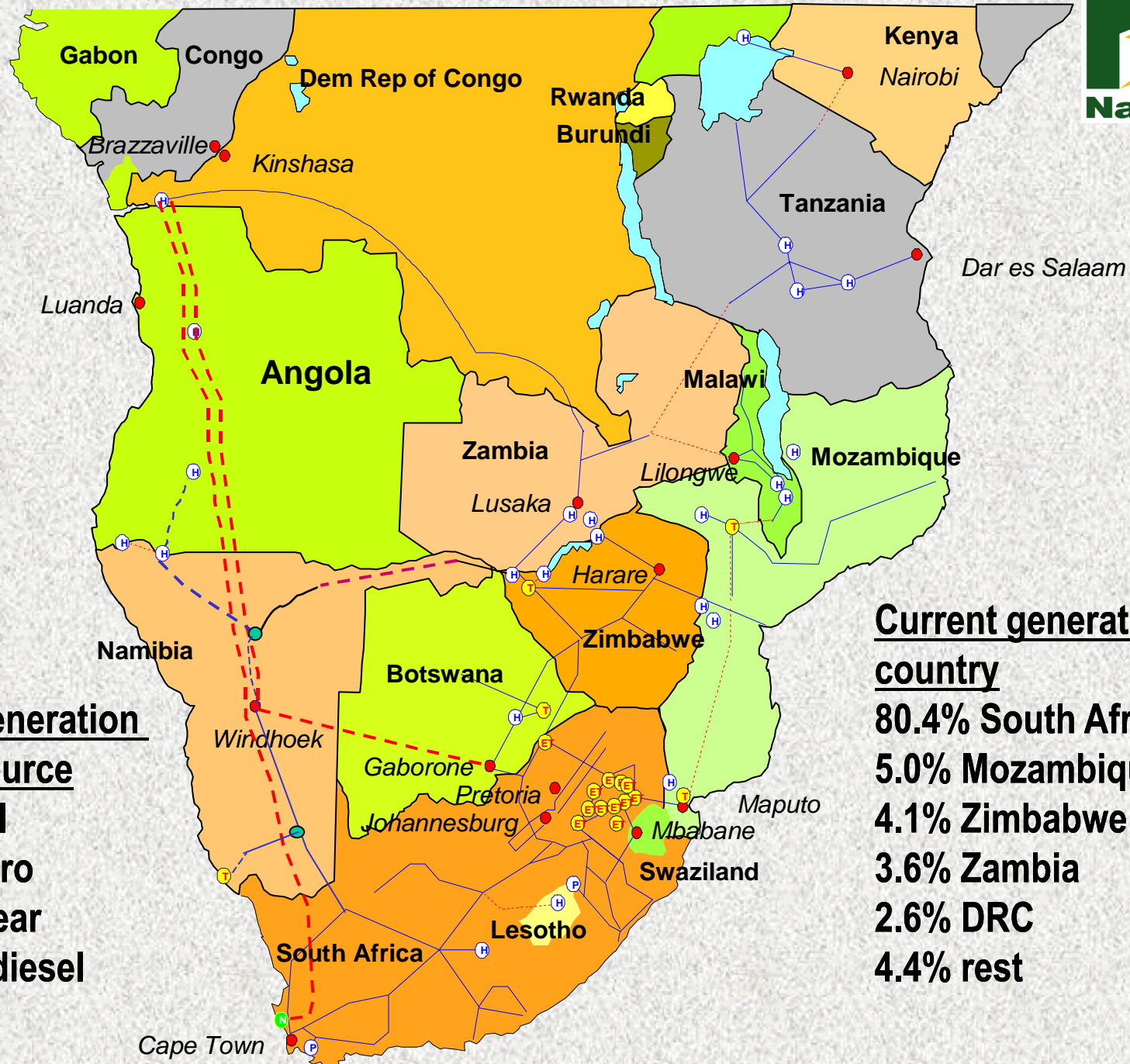
Options

	MW	output GWh/yr (est)	ZAR cent/kW h	lead time yrs	Limiting Factor
Baynes Hydro	360/540	1'147	42	10	water
Biomass	0.5/60	6.3-756	38	2	grid
Coal	175/700	1'103-4'414	53	5	coal trp
CSP	50/300	220-1'320	100	3	cost + storage
Kudu Nat Gas	400/800	2'830-5'660	46	5	Gas reserve
pebble bed nuke	165	1'300	57	16	Cost + techn.
PV	1-40	1.7-68	150	2	cost + storage
Wind	30/60	84-168	45	2	grid

Source: REEECAP, 2007

CCS in Namibia

- No easily exploitable coal reserves
- No assessment of storage formations
- DNA established
- No CDM Projects registered (yet)
- Namibia is a net sink of carbon until
- Major Cement Project to start in 2011



Current generation by fuel source
74.3% coal
20.1% hydro
4.0% nuclear
1.6% gas/diesel

Current generation by country
80.4% South Africa
5.0% Mozambique
4.1% Zimbabwe
3.6% Zambia
2.6% DRC
4.4% rest

European Solution for African Problem



How to Manage the Future

We can **not** solve the problems we have today, when we apply the same way of thinking that has caused them.

(Albert Einstein)

RE & EE in NAMIBIA

**THANK YOU,
PLEASE LET ME HEAR YOUR
QUESTIONS AND COMMENTS**

Harald Schütt

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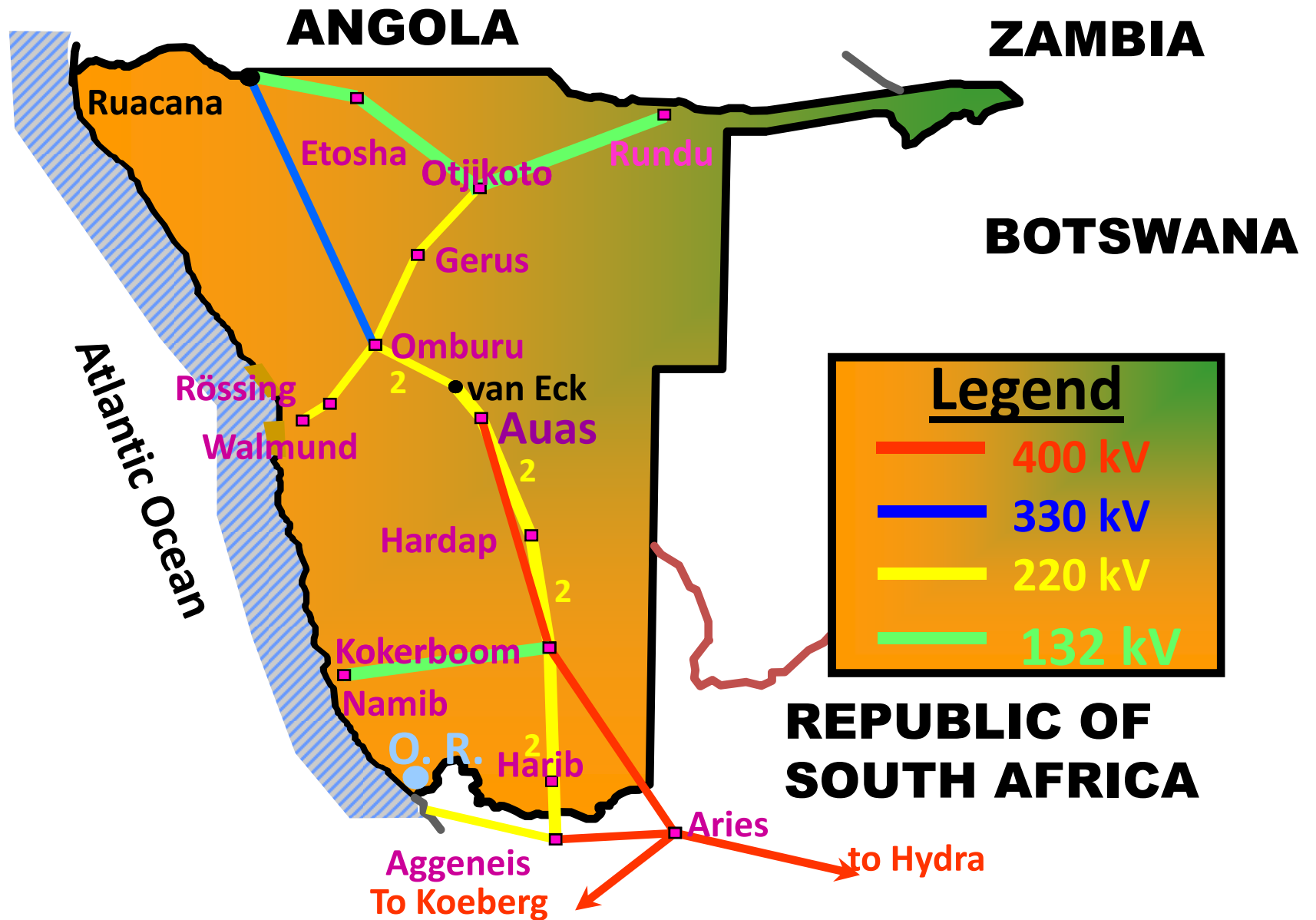
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amusha@iway.na

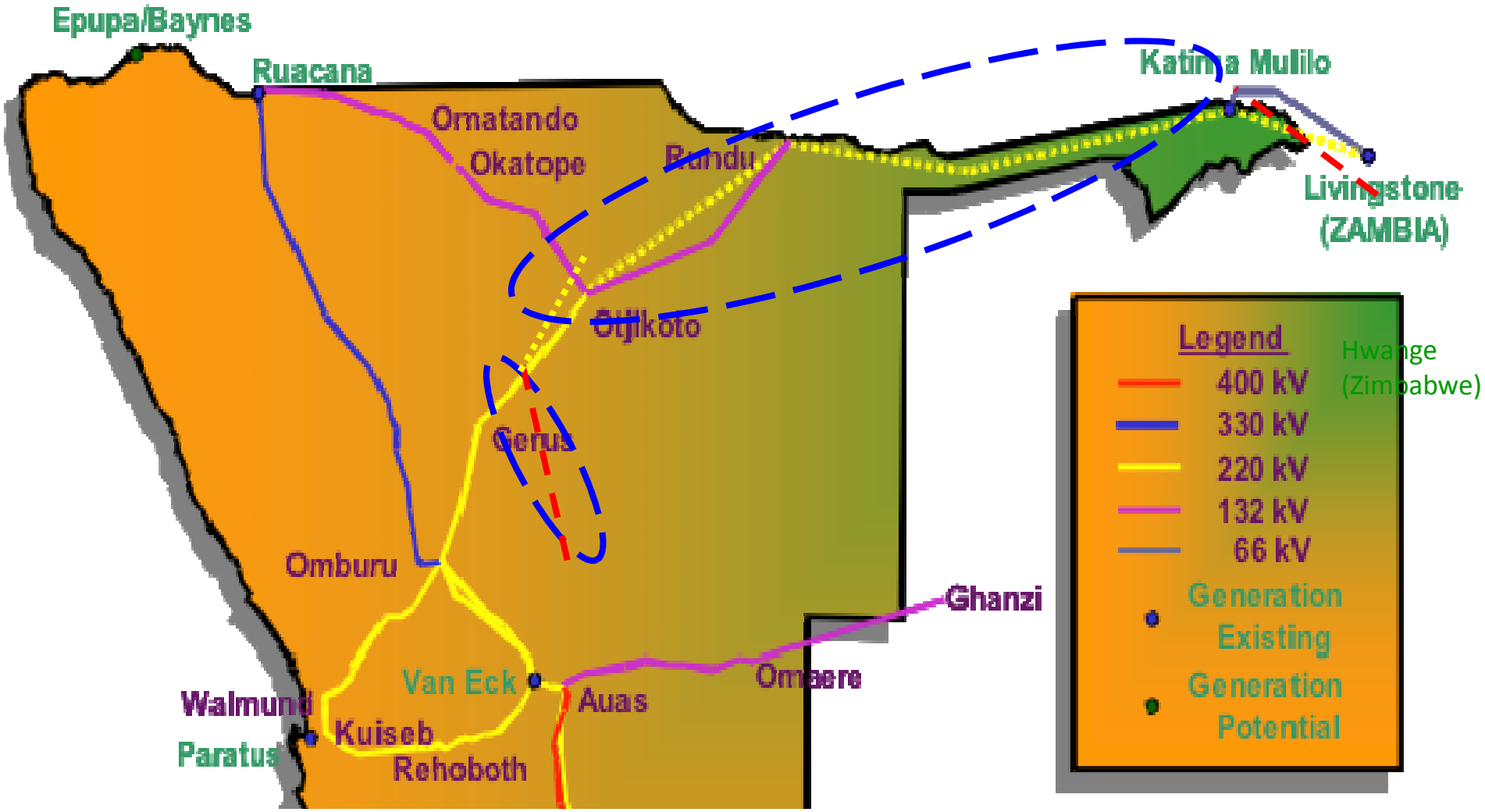
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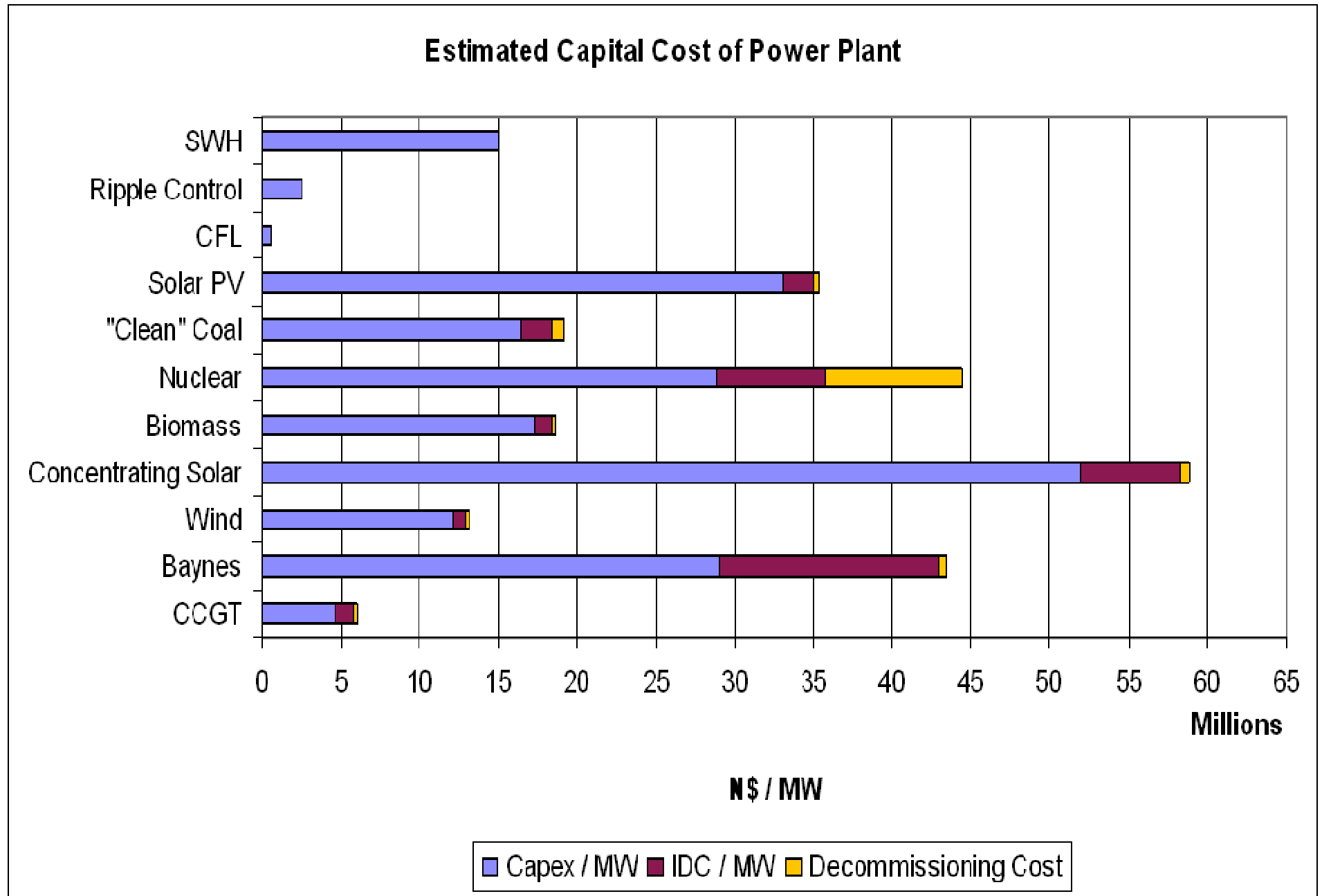
Central Energy Supply Today



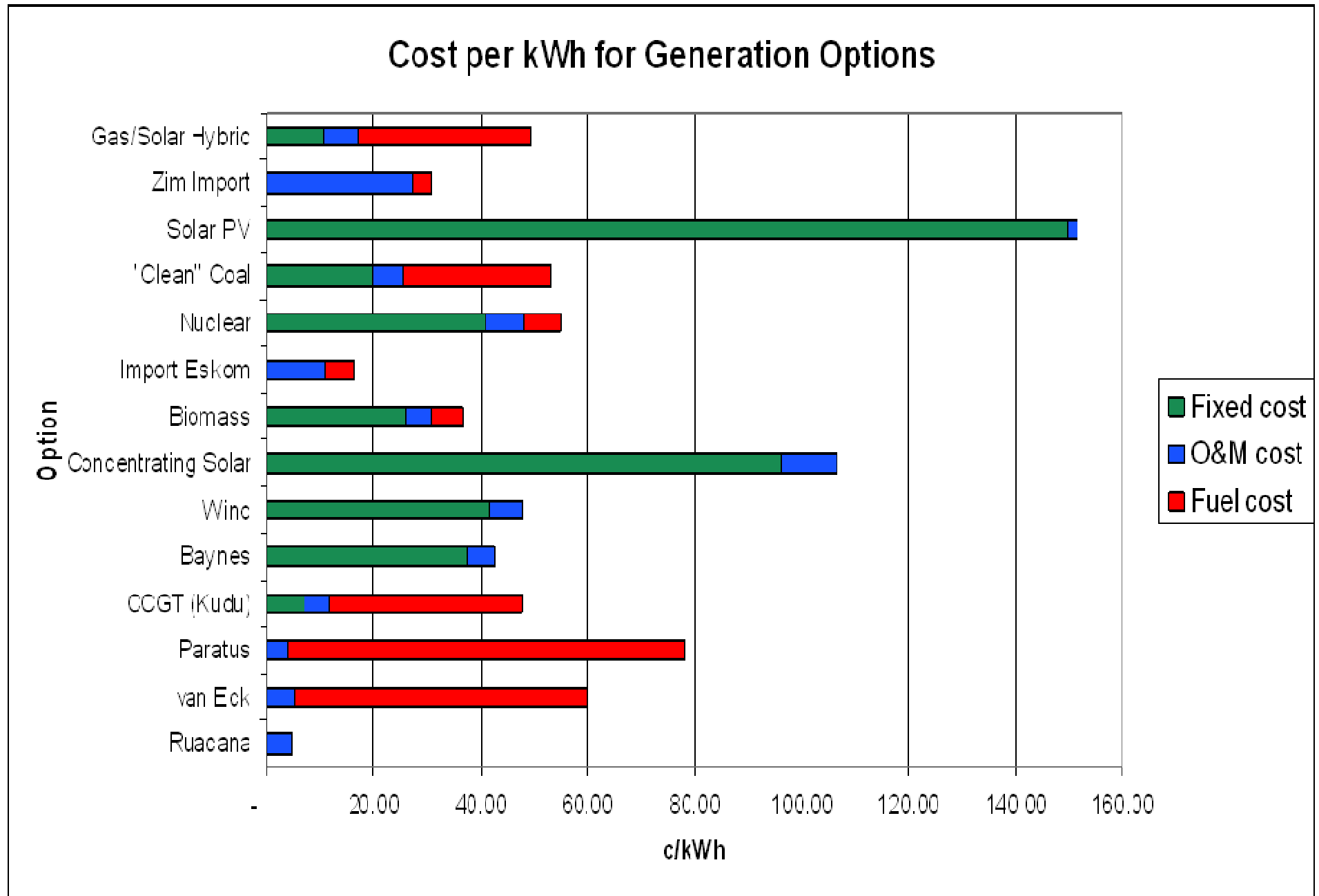
Caprivi Link Interconnector 200/400MW



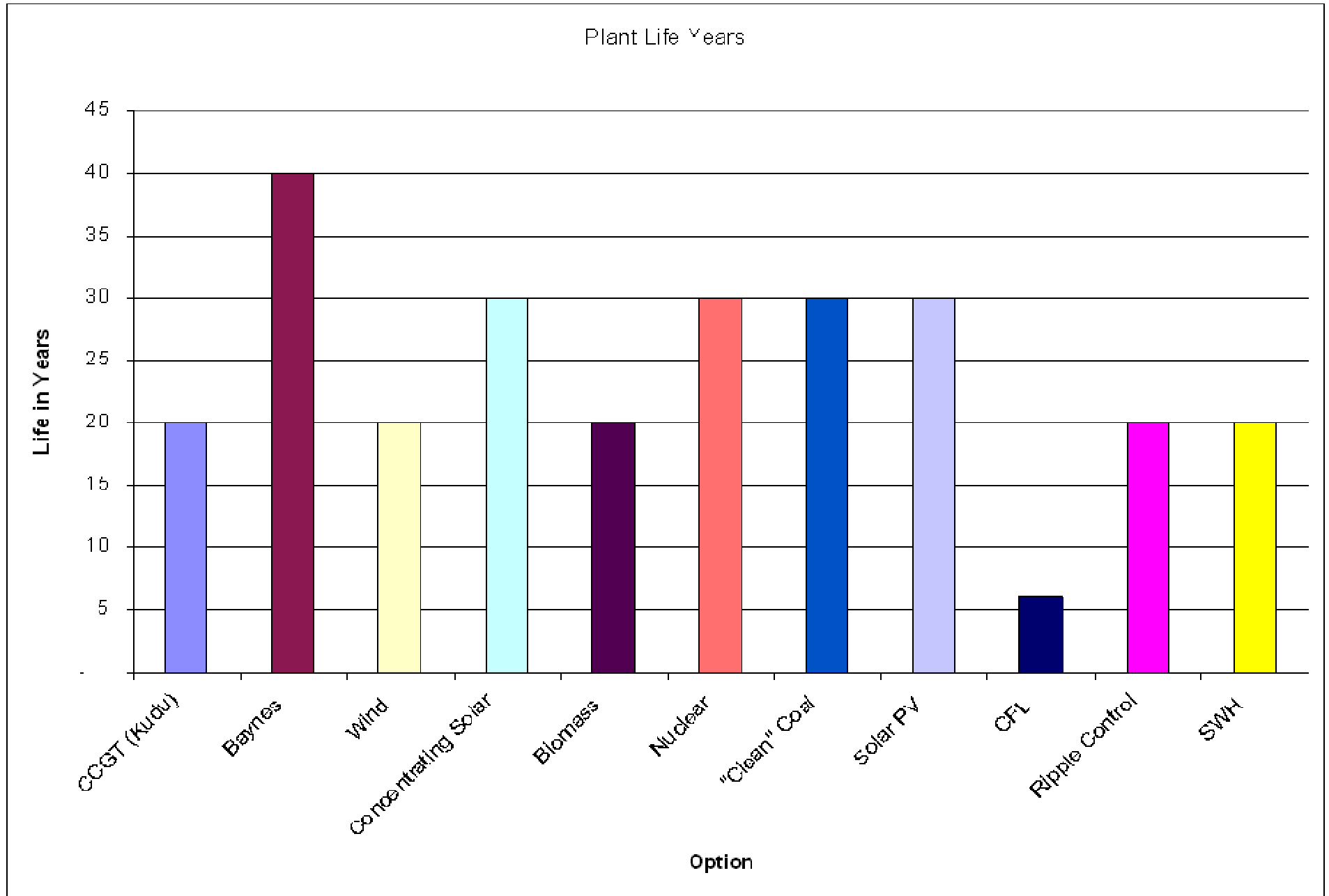
Investment (N\$Million/MW) projected 2007



Unit Cost (NCent/kWh) projected 2007

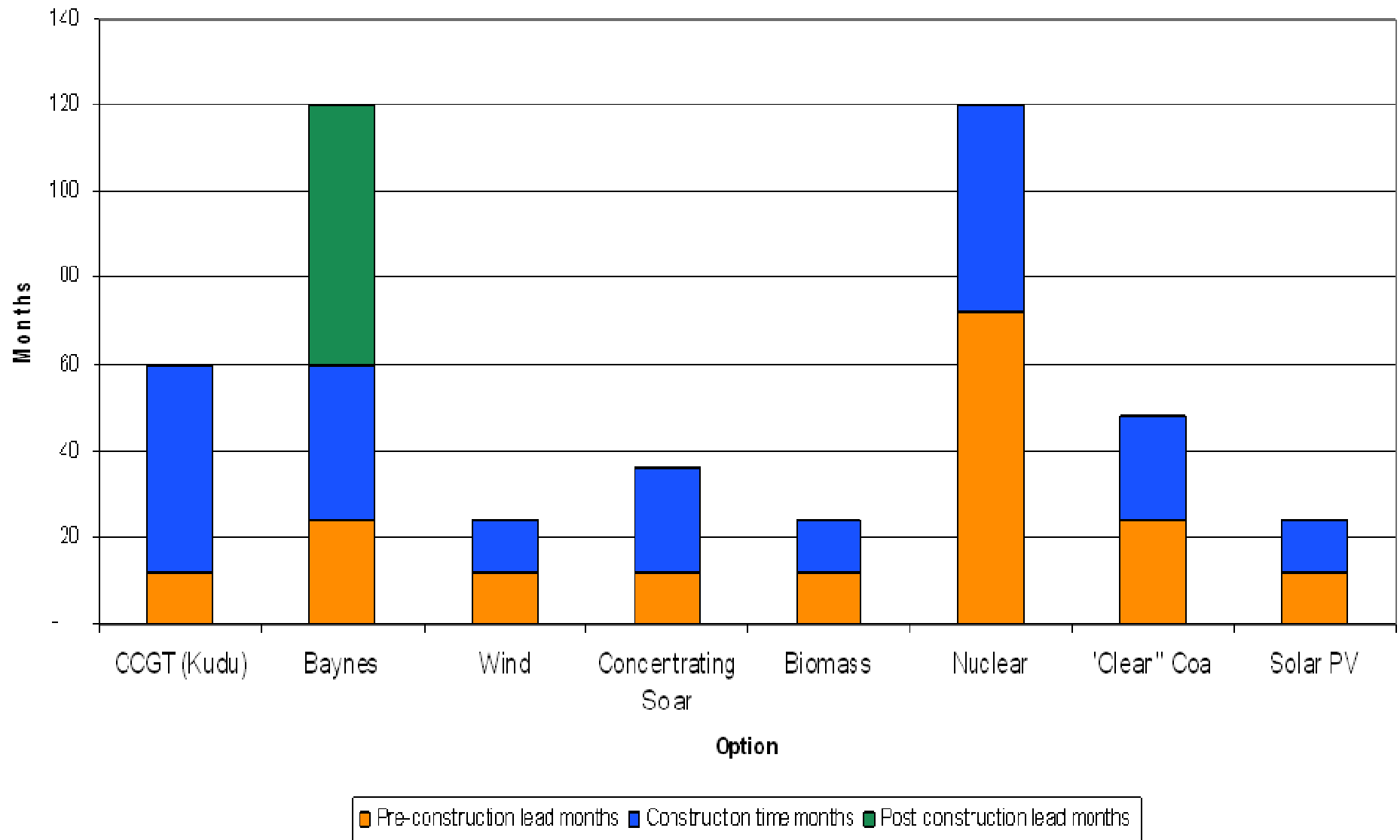


Lifespan in years projected 2007

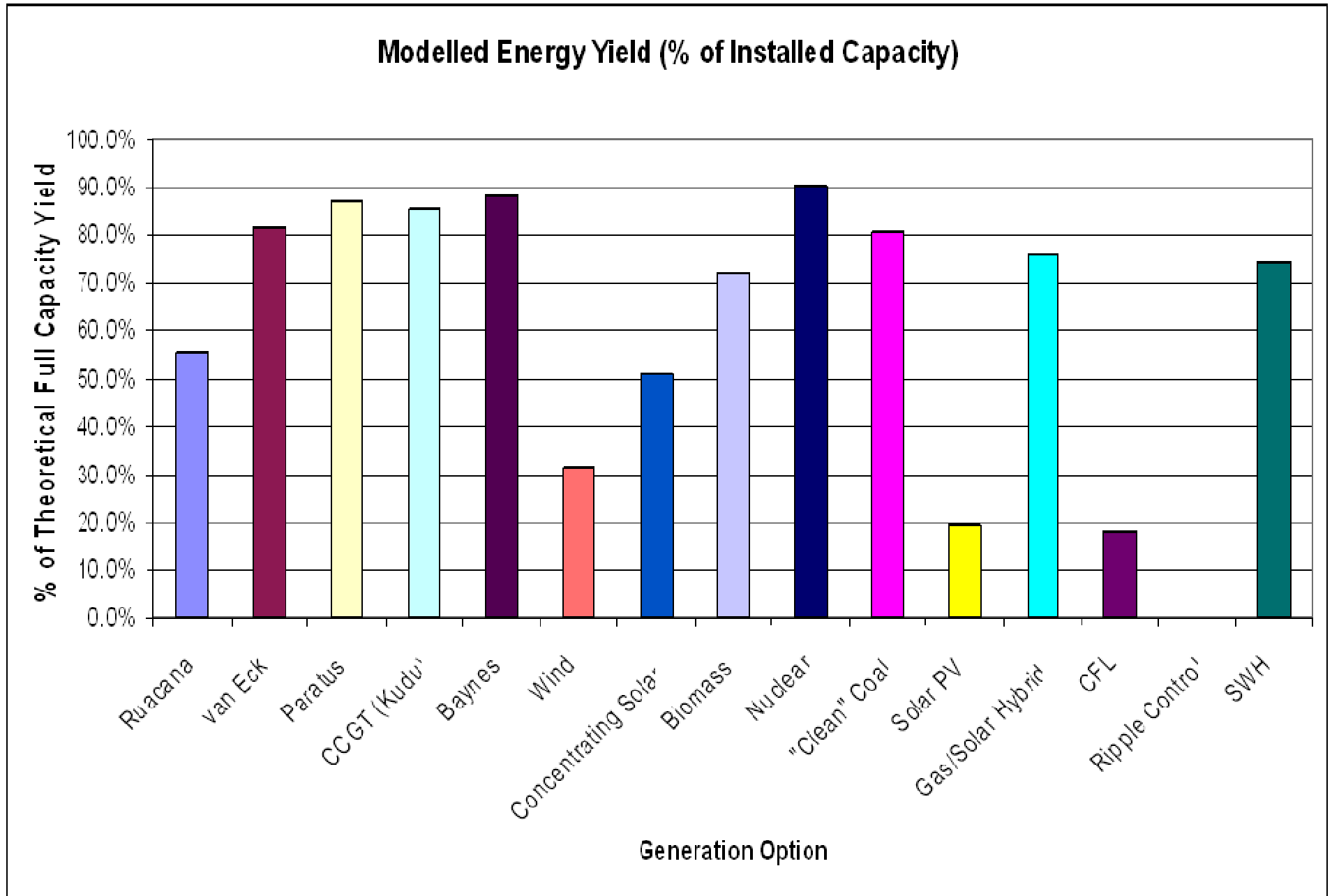


Leadtime in months

Construction Lead Times



Power supply (%)



Large Scale Power Generation

