



# South Africa – Japan Innovation in Business Forum

25 November 2014



## Green Energy Workshop:

Where is the energy system going in South Africa and the opportunities it presents to Japanese Companies.

Presented by Mashudu Ramano, Chairman of Platinum Trust of South Africa and Mitochondria Energy Company

Date: 25<sup>th</sup> November 2014

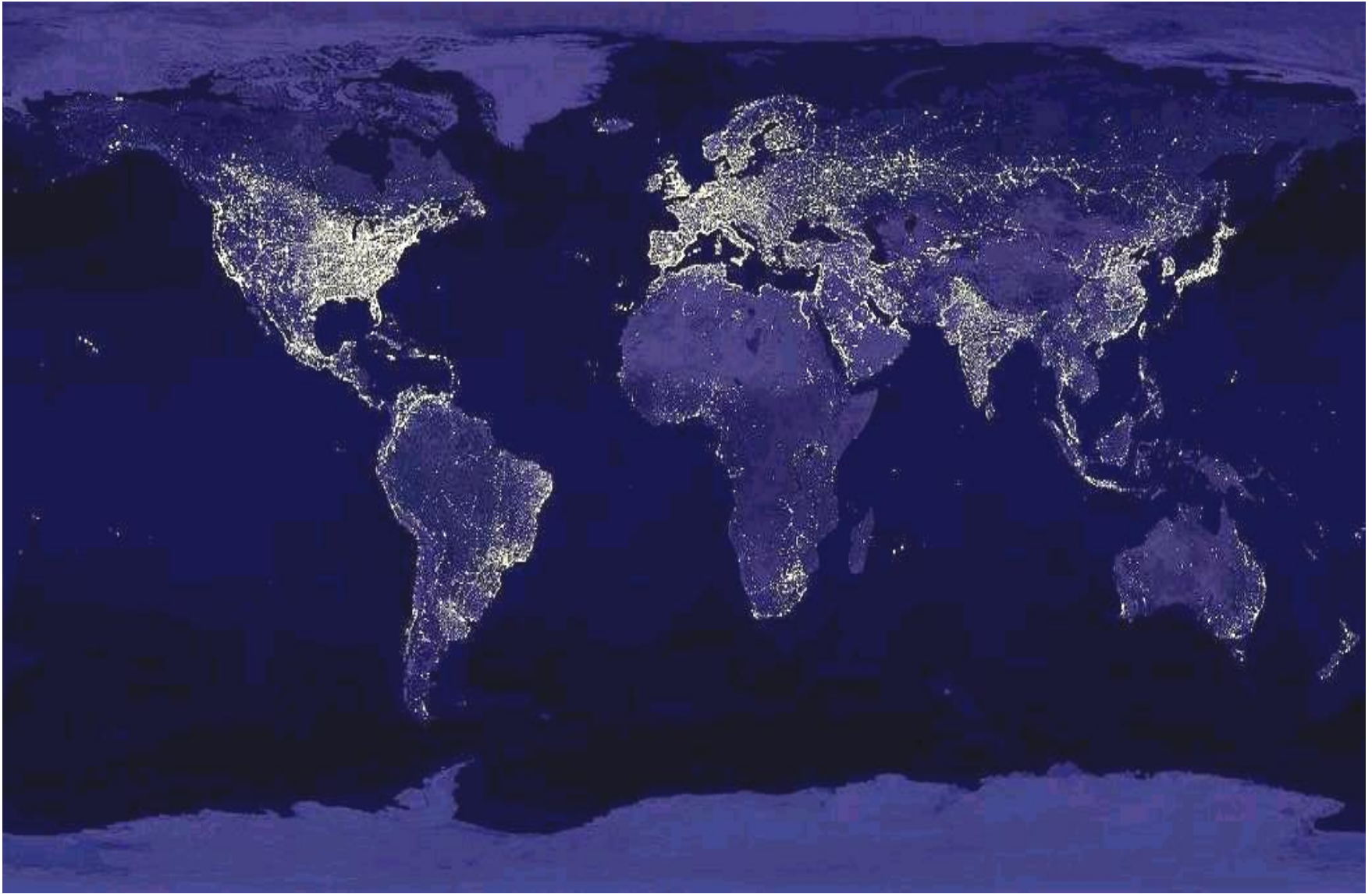
Venue: Grand Hyatt Hotel, Tokyo, Japan



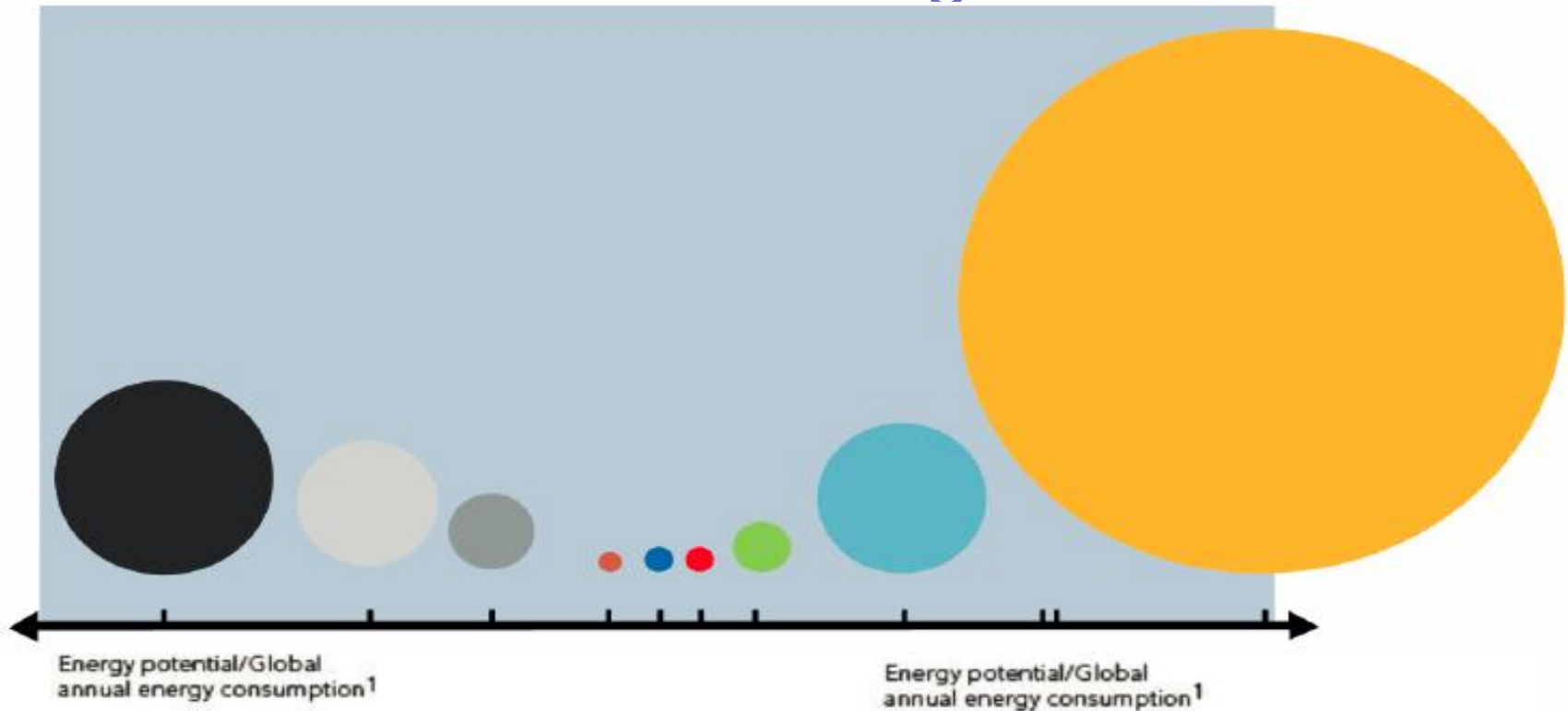
# Objectives

- To share some high level thoughts on where the energy system is going in South Africa and potential opportunities for Japanese Companies

# The African Energy Challenge



# The Energy Resources Are There to Meet the Challenge



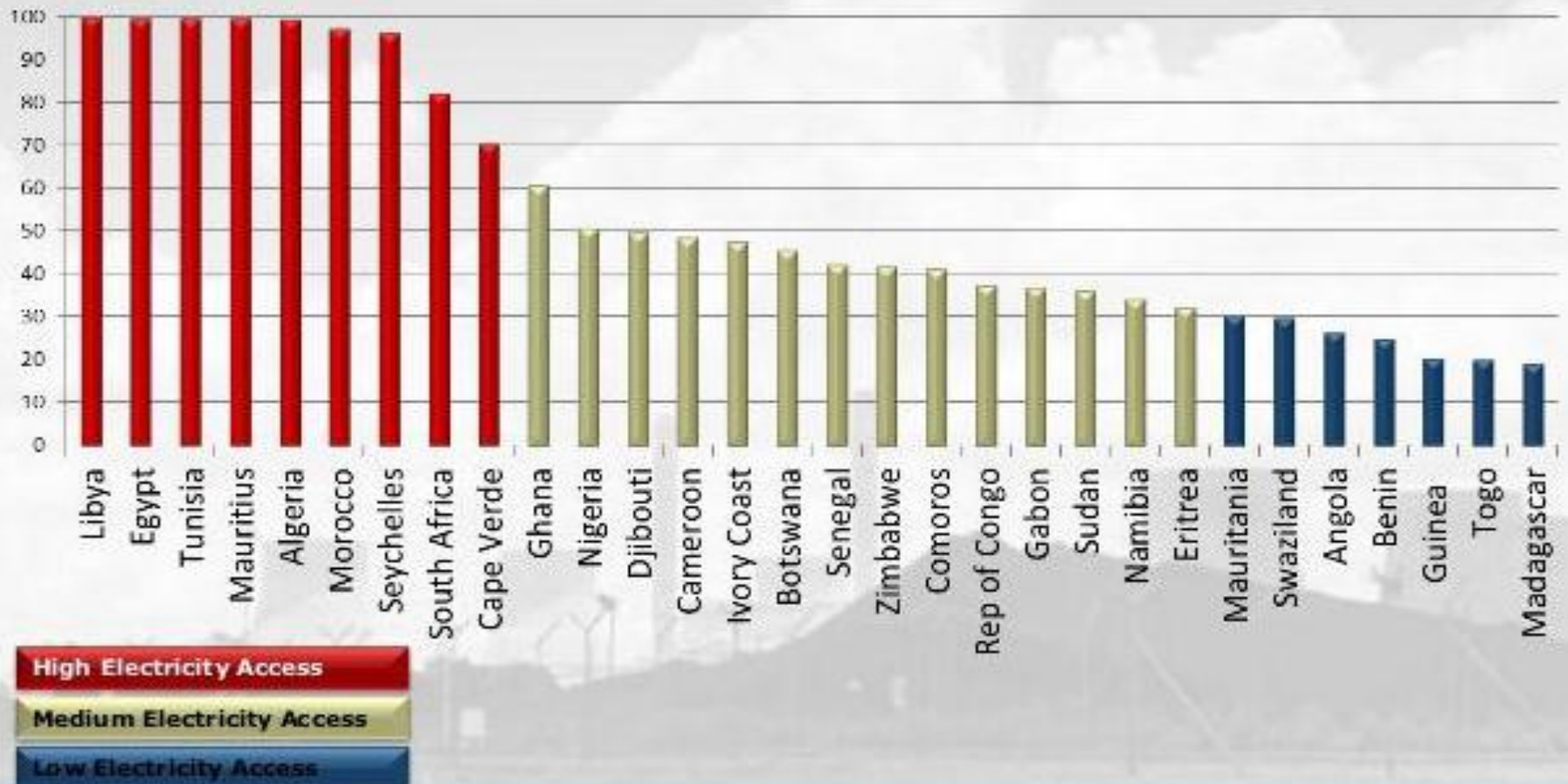
	Energy potential Reserves/Resources <sup>2</sup>	Thereof conventionally utilizable <sup>2</sup>
Coal	~ 135.000 EJ	
Natural gas	~ 60.400 EJ	~ 12.000 EJ
Crude oil	~ 23.000 EJ	~ 9.800 EJ

Global energy demand 2006: ~ 470 EJ

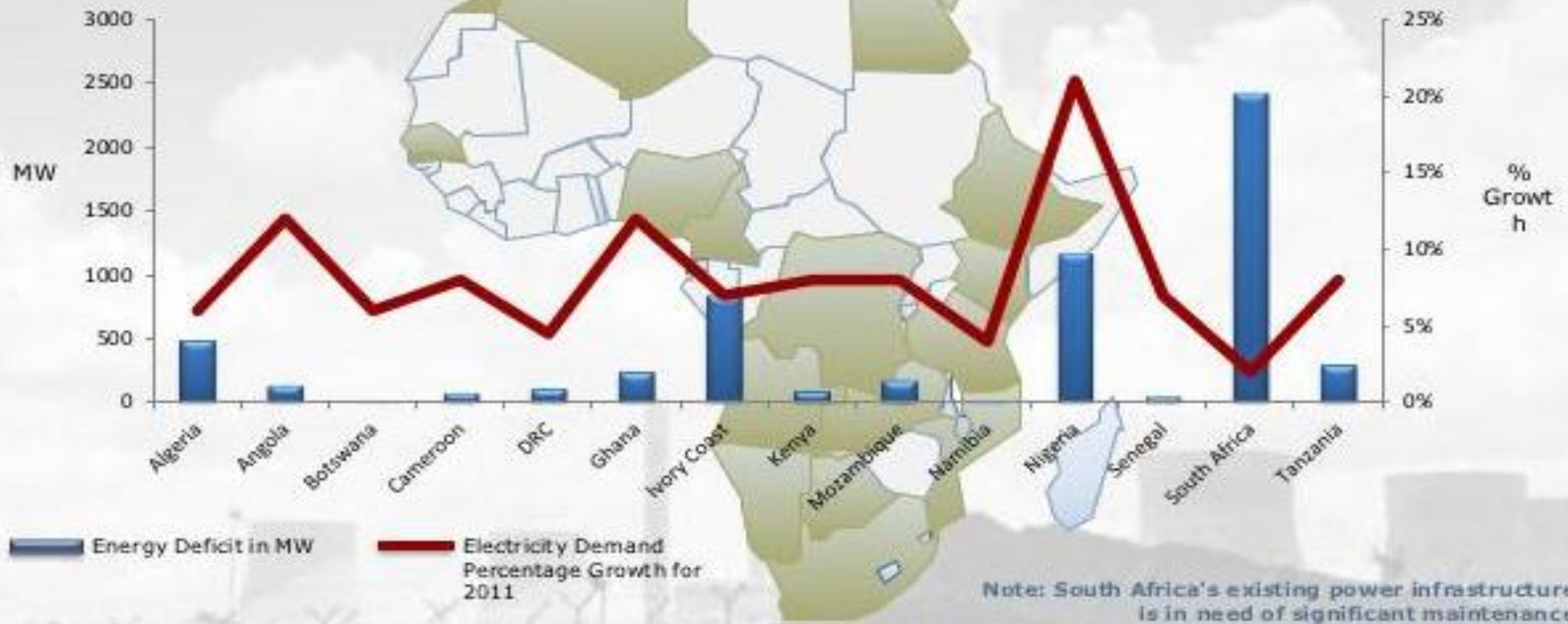
	Energy potential (amount of energy p. a.) <sup>2</sup>	technologically utilizable (state of the art) <sup>2</sup>
Solar radiation	~ 1.111.500 EJ	~ 1.482 EJ
Wind energy	~ 78.000 EJ	~ 195 EJ
Biomass	~ 7.800 EJ	~ 156 EJ
Geothermal	~ 1.950 EJ	~ 390 EJ
Hydro/tide power	~ 1.170 EJ	~ 78 EJ

# The Response to the Challenge has been mostly centralized generation

## Levels of Electrification in Selected African Countries



# Africa's Energy Market – Where are the Gaps

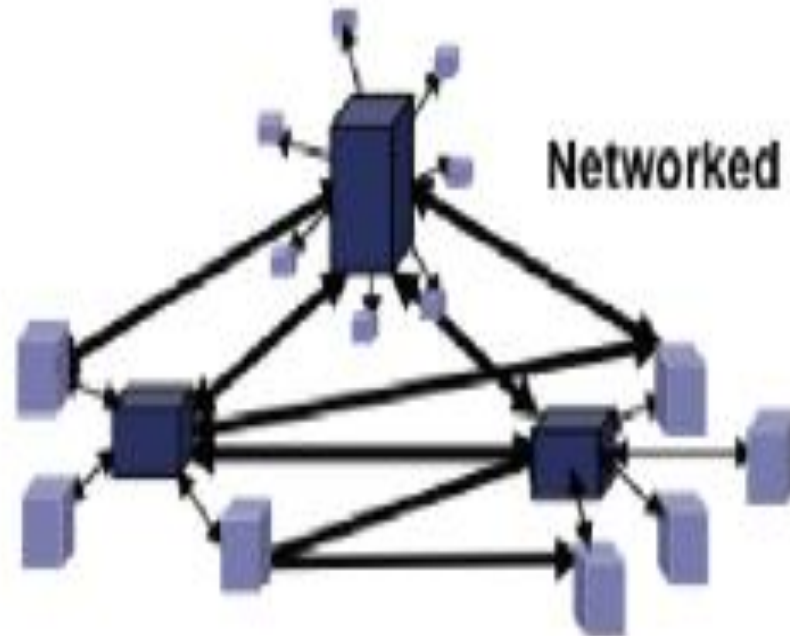


**Africa's fast growing markets have significant deficits in their electricity supply, a gap which is necessary to fill to fuel its economic growth**

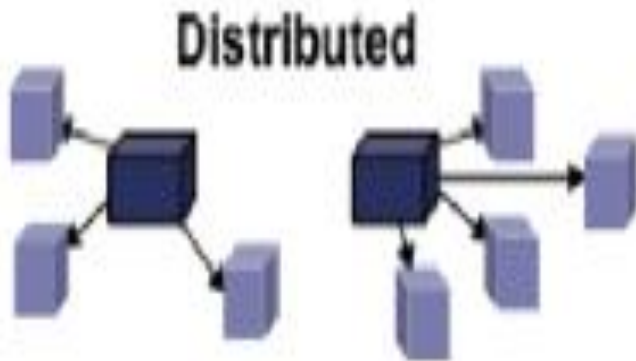
We think while centralized generation has a role, the future is distributed



**Centralized**



**Networked**

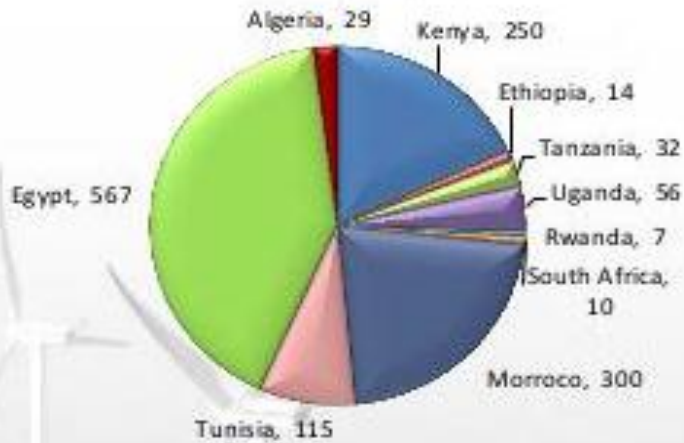


**Distributed**



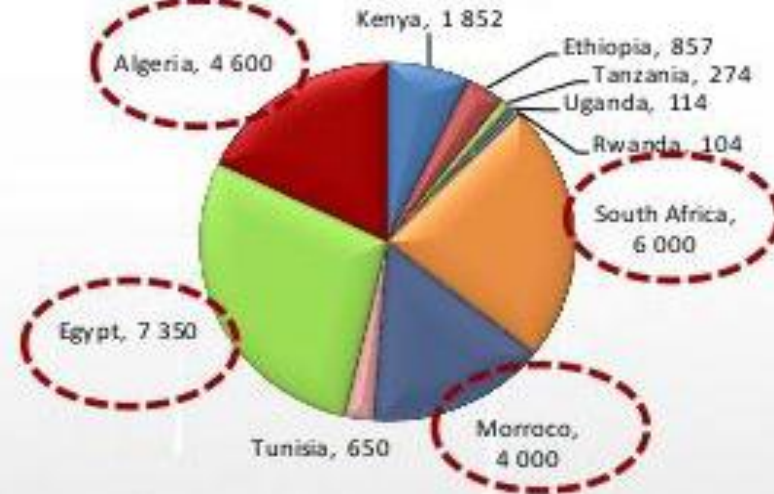
# Where is the Energy System Going in South Africa- Planned Renewables

**Installed Capacity 2011**

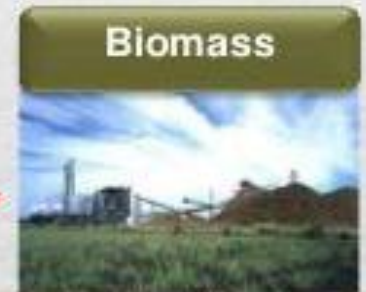


**1,380 MW**

**Planned Capacity by 2020**



**25,800 MW**



# Where is the Energy System Going in South Africa – Renewable Energy

## South Africa – Focus

### Eskom 5 year \$40 billion Investment Budget -

13% Transmission  
55% Generation  
13% Distribution  
8% Other

### 2030 - 9.6GW Added Nuclear

In excess of \$50 billion expected before 2025  
Significant opportunity for nuclear equipment suppliers  
Significant opportunity for local manufacturers

### Renewable Energy: 17GW by 2030

Solar: PV and CSP a combined target of 9.4GW  
Wind: 8.4GW target with a key focus on localisation  
Other: 1000MW of small hydro, municipal waste to energy and biomass

### New IPP's Licenced in 2012: 31 RE Projects

3,725 MW is up for allocation at present with more bidding rounds expected shortly

### Distribution Backlog (2012): \$4.3 Billion

Poor infrastructure management the past 15 years has created a significant opportunity  
Key focus on transformers, switchgear, smart metring and cables



# Where is the Energy System Going in South Africa- Gas is Next

■ Opportunity to pursue immediately

*Phase I: Reduce system pressure (2015-18)*

- 600 MW

*Phase II: Replace ageing coal fleet (2018-23)*

- 5,000 MW

*Phase III: Gas-enabled industrialisation (2023-40)*

- 18,000 – 60,000 MW

## New capacity

## Objectives for the country

- Add capacity that is:
  - **Quick** to build
  - **Flexible** to account for renewables
  - **Economical** to avoid subsidies or reduce costs
- Begin replacement of ageing coal fleet with **sustainable and economic generation capacity** that can support country growth
- Drive **industrialisation** with **improved competitiveness** of key industries (e.g., petrochemicals)
- Complete **replacement of coal fleet** with sustainable and economic capacity

## Gas options to support objectives

- 1 600 MW of power generated in **Mozambique**, potentially from Buzi block gas
- 2 **Floating LNG** regas to supply gas to OCGTs in the Western Cape - multifuel
- 3 5,000 MW capacity in Maputo, supplied by pipeline from **Rovuma** gas field
- 4 Potential supply from **Ibhubesi** gas field in the Western Cape
- 5 Develop **shale gas** for the balance of the gas mix in power generation and the rest for direct consumption
- 6 Build 400 MW capacity in Waterberg based off **CBM** reserve

# Where is the energy system going in SA- Gas to replace Current Coal Generation

## Plants approaching end of life



### • Camden

- **Arnot - 740 MW**
- **Camden – 1140 MW**
- **Grootvlei – 180 MW**
- **Hendrina – 1330 MW**
- **Komati – 300 MW**
- **Matimba – 60 MW**
- **Tutuka – 60 MW**

- **Acacia – 180MW<sup>1</sup>**
- **Arnot – 1480MW**
- **Duhva – 1160MW**
- **Grootvlei – 900MW**
- **Hendrina – 560MW**
- **Kendal – 60MW**
- **Komati – 600MW**
- **Kriel – 2880MW**
- **Matla – 1740MW**
- **Port Rex – 180MW**

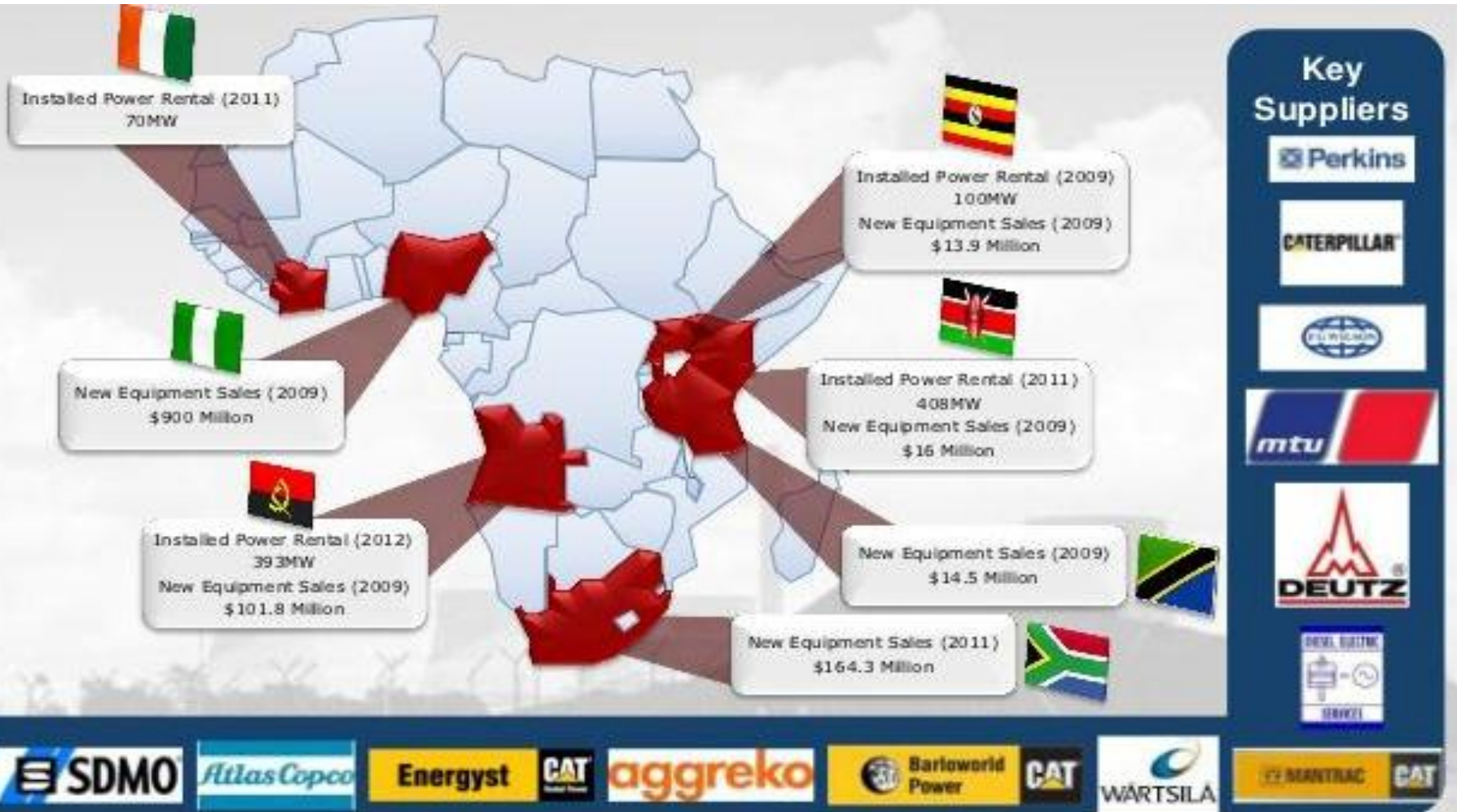
- **Ankerlig - 1350MW**
- **Duhva – 2320MW**
- **Gourikwa – 750MW**
- **Kendal – 3780MW<sup>1</sup>**
- **Koeberg – 1860MW**
- **Lethabo – 3540MW**
- **Majuba – 3170MW**
- **Matimba – 3600MW**
- **Matla – 1740MW**
- **Tutuka – 3480MW**

- Given the long lead times to commission new plants, Eskom must decide soon on how this capacity will be replaced
- Life extensions and environmental retrofits will require R50-R260bn in capex spend which could be spent on gas instead

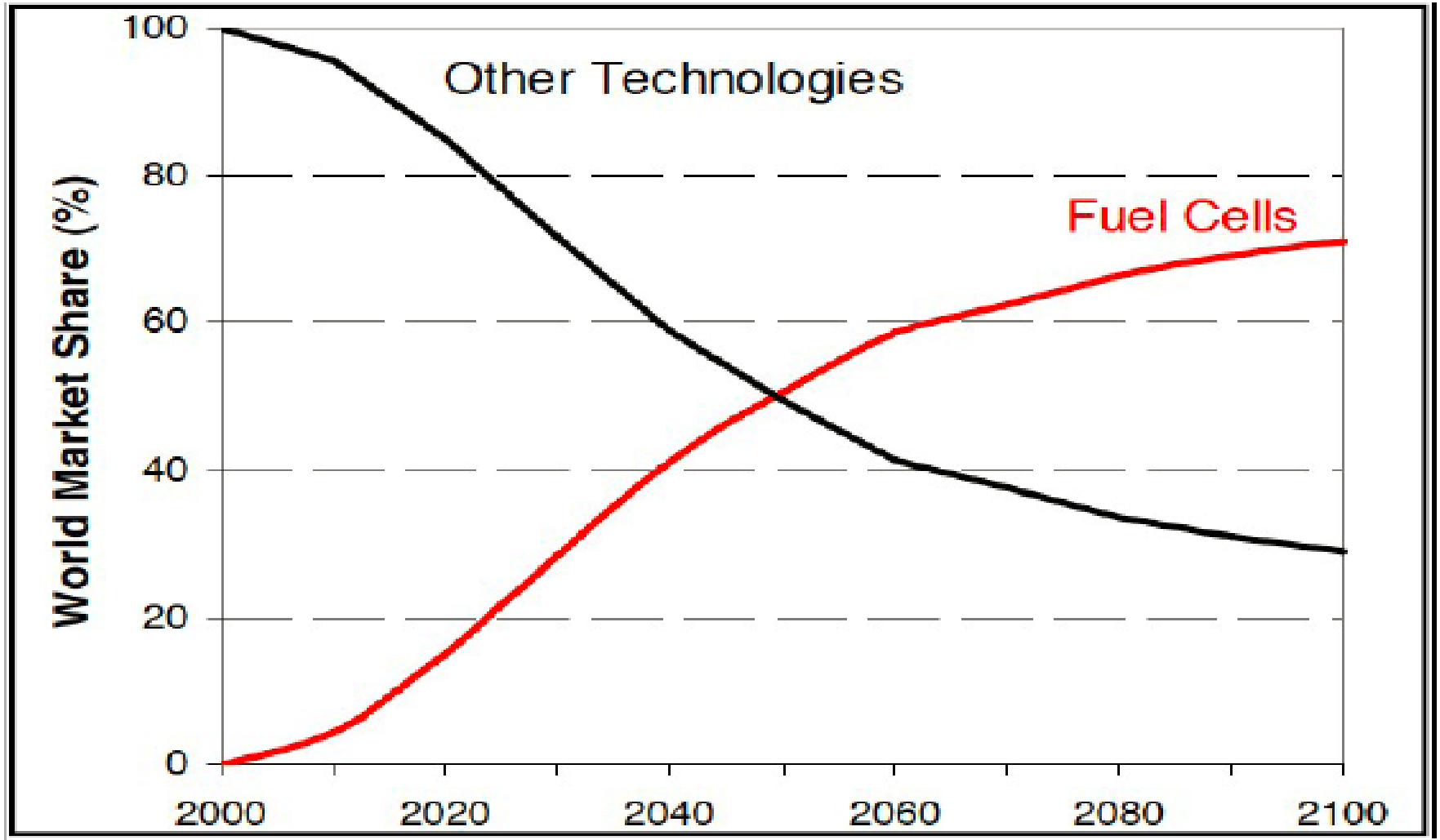


<sup>1</sup> Stations still required for grid stability

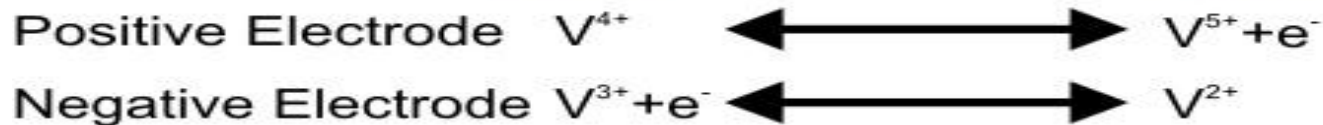
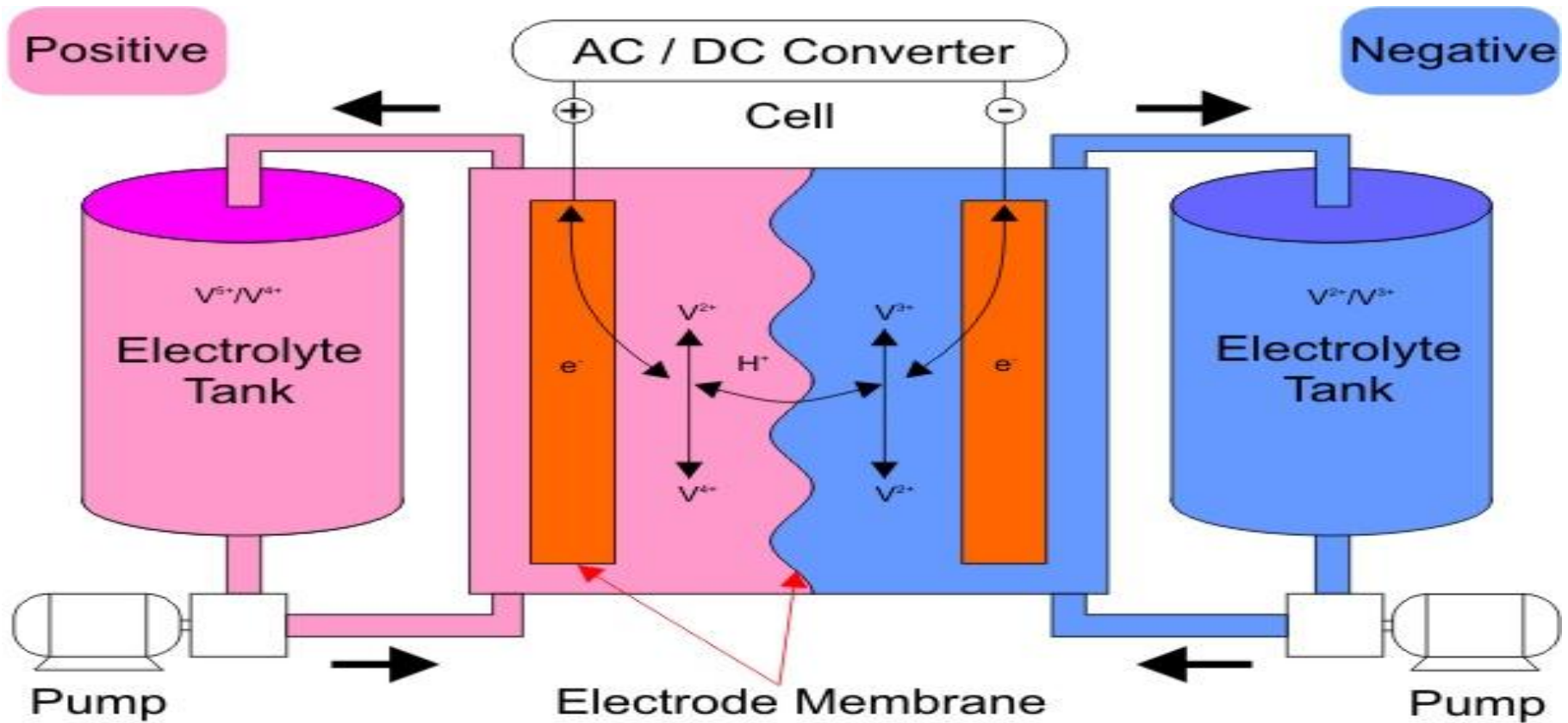
# Where is the Energy System Going in Africa- Current Distributed Energy



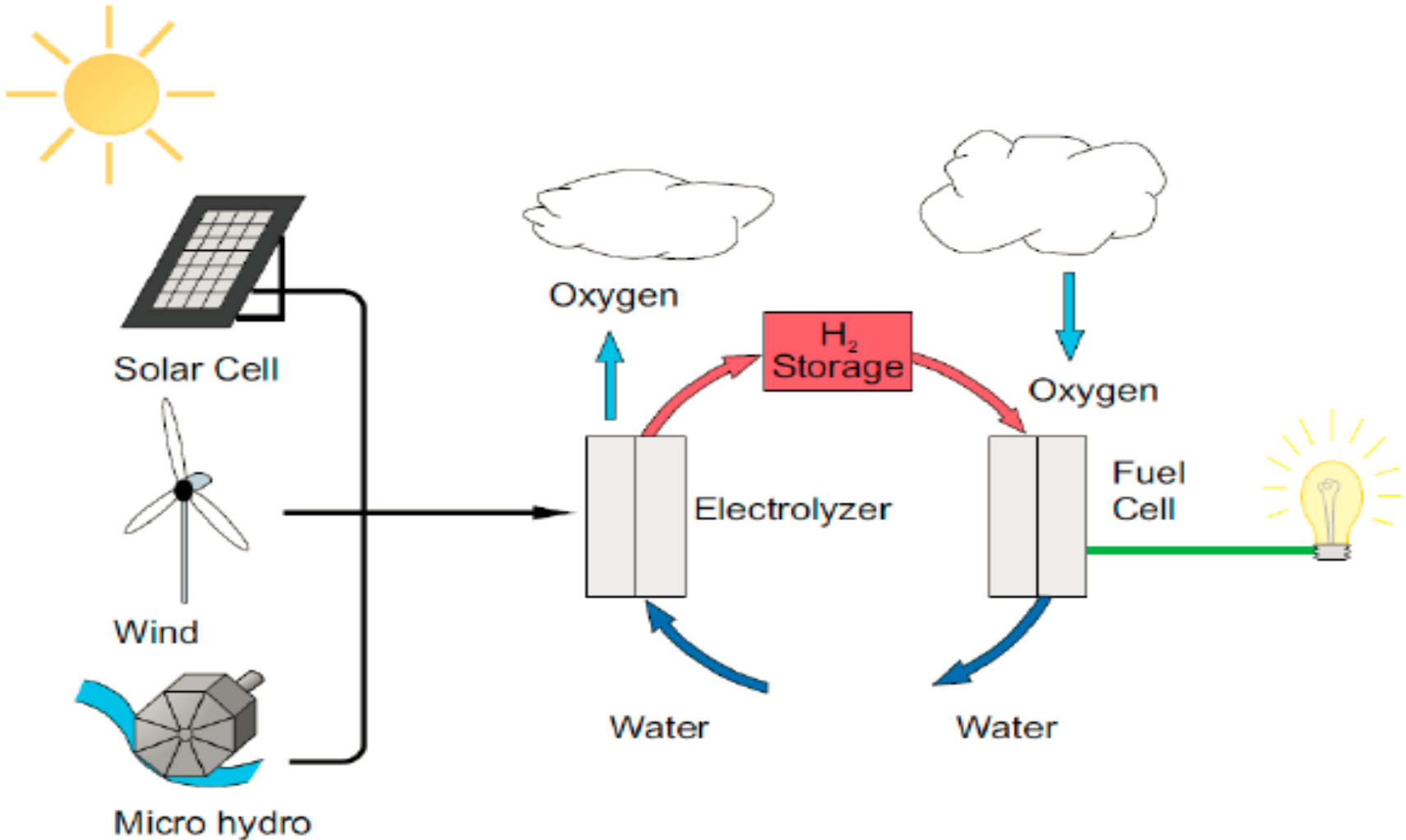
# Where is the Energy System Going in Africa – Clean Technologies



# Where is the Energy System Going in SA - Energy Storage



# Where is the Energy system going in SA-Clean Integrated Energy generation







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