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Winter College on Optics and Energy

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Solar energy strategy in AFRICA

A. Wague
*University Cheikh Anta Diop
Dakar
SENEGAL*

SOLAR ENERGY STRATEGY IN AFRICA

Presentation at the LAM Network Meeting for Discussion
17 January 2010

A. Wague

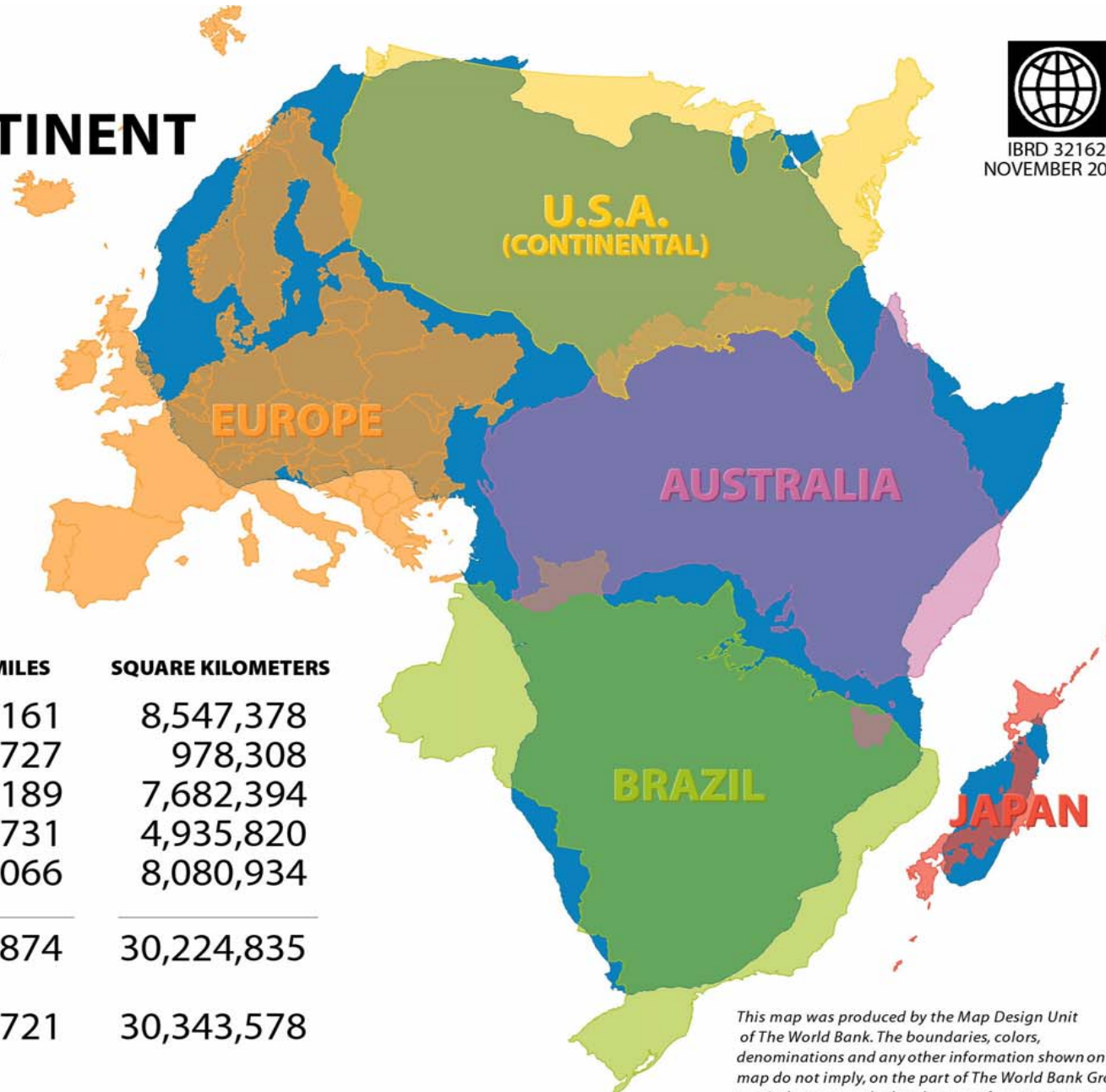
University Cheikh Anta Diop
Dakar , Senegal

Winter College on Optics and Energy
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SIZE OF THE AFRICAN CONTINENT COMPARED TO OTHER LAND MASSES



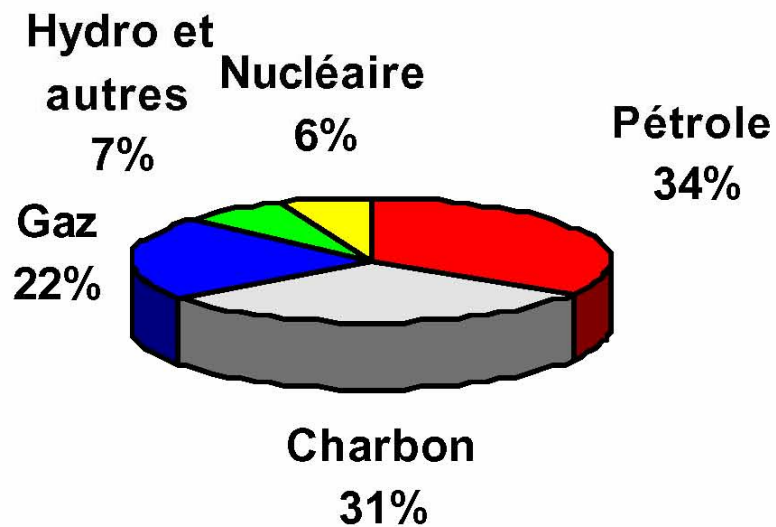
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	SQUARE MILES	SQUARE KILOMETERS
BRAZIL	3,300,161	8,547,378
JAPAN	377,727	978,308
AUSTRALIA	2,966,189	7,682,394
EUROPE	1,905,731	4,935,820
U.S.A. (Continental)	3,120,066	8,080,934
TOTAL	11,669,874	30,224,835
AFRICA (including MADAGASCAR)	11,715,721	30,343,578

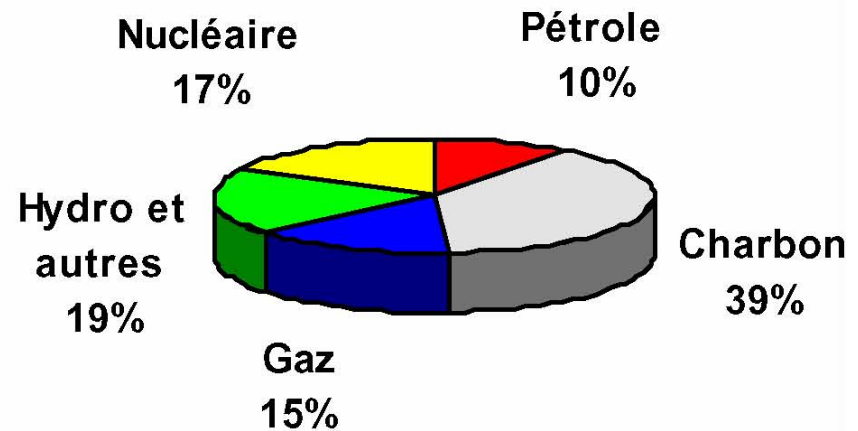
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Energie dans le monde



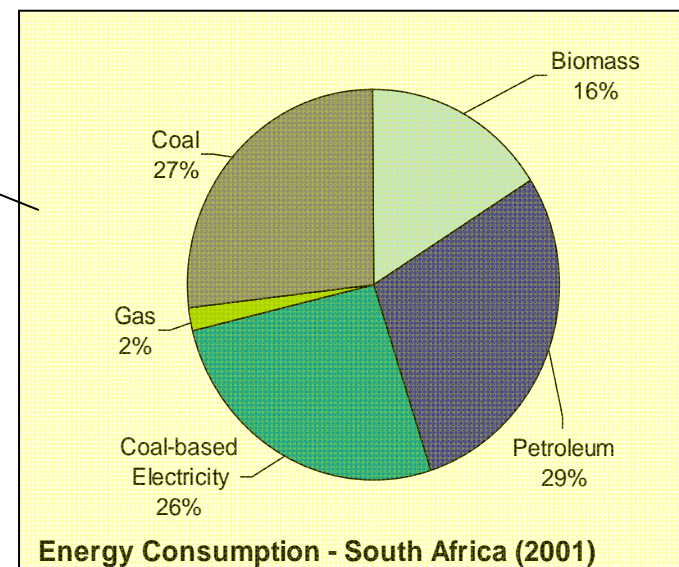
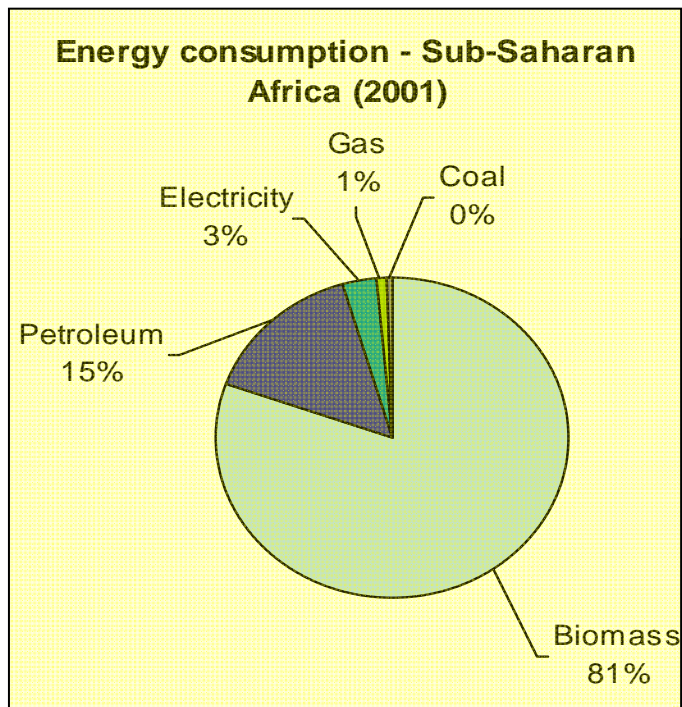
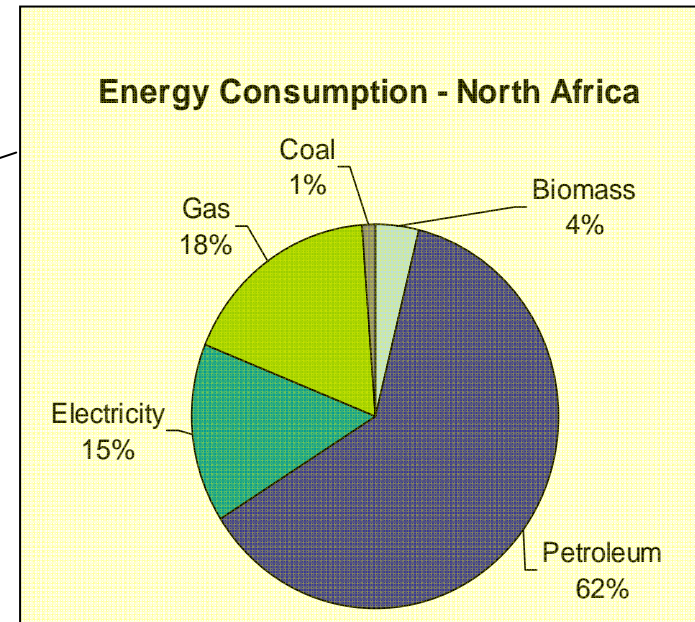
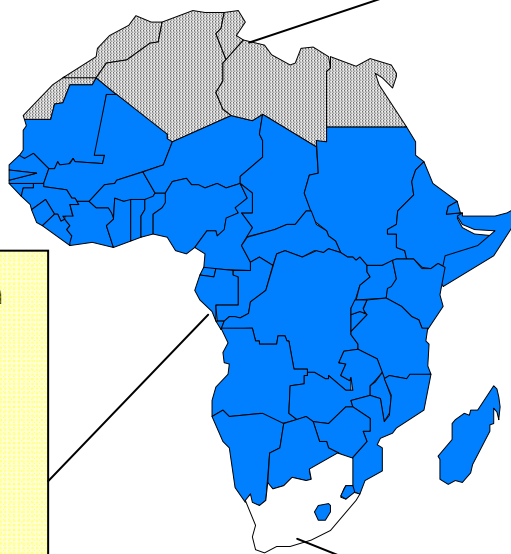
source OCDE

Electricité



African Energy Demand Sector – 3 distinct regions (Working group in Energy, ICSU ROA)

- North Africa – oil and gas sub-region
- South Africa – coal sub-region
- Sub-Saharan Africa – biomass region
 - West – Oil & Gas
 - East - Geothermal, Hydro
 - Central – Hydro
 - South - Coal



SOLAR RESOURCE IN AFRICA

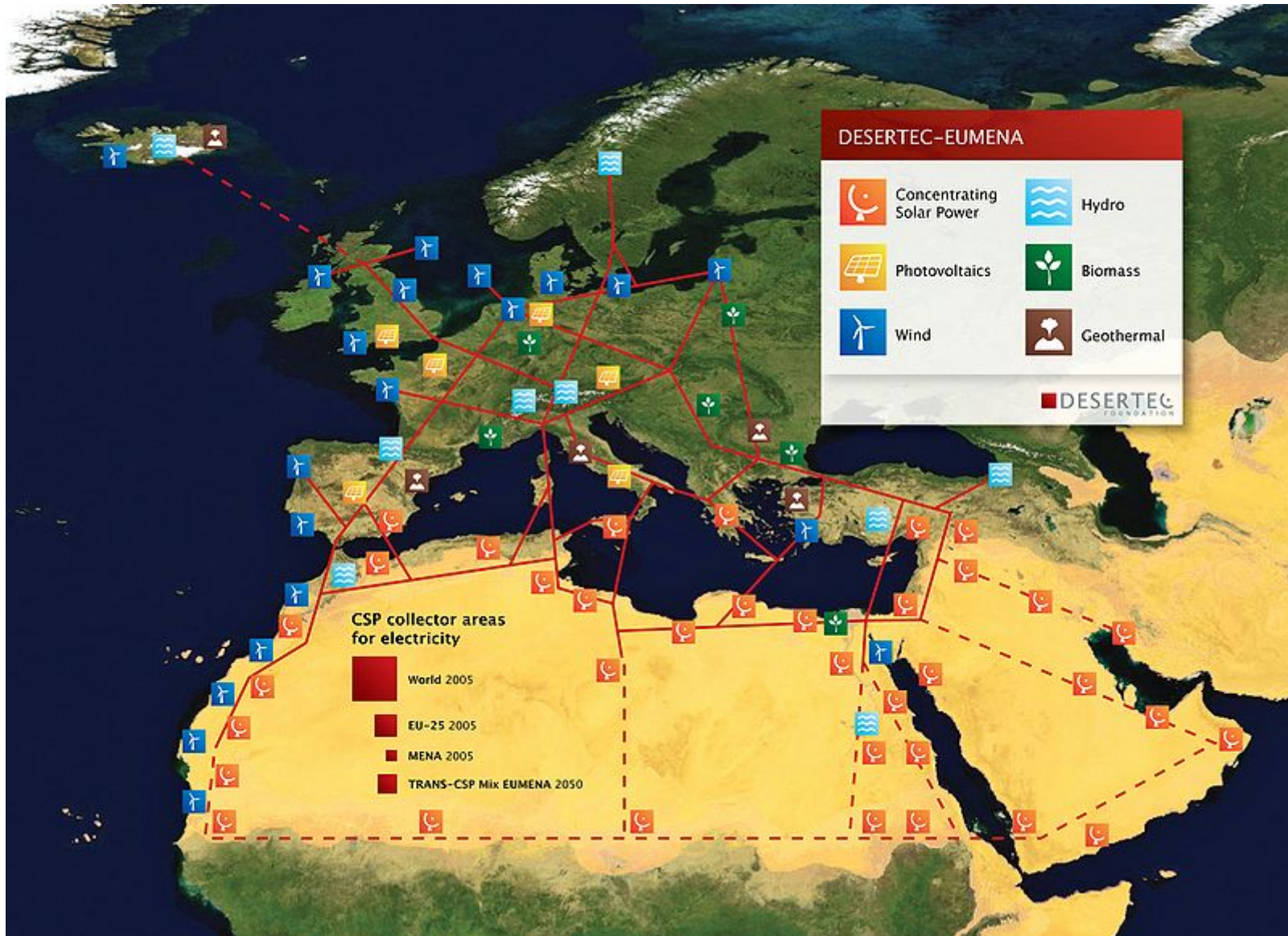
- Many African countries receive on average 325 days per year of bright sunlight. This gives solar power the potential to bring energy to virtually any location in Africa without the need for expensive large scale grid level infrastructural developments.
- The distribution of solar resources across Africa is fairly uniform, with more than 80 percent of their landscape receiving almost 2000 kW·h per square meter per year. A recent study indicates that a solar generating facility covering just 0.3% of the area comprising North Africa could supply all of the energy required by the European Union

- Currently, several African countries already have small-scale solar, wind, and geothermal devices in operation providing energy to urban and rural populations.
- These types of energy production are especially useful in remote locations because of the excessive cost of transporting electricity from large-scale power plants. The application of solar energy resources has the potential to alleviate many of the problems that face Africans every day, especially if done so in a sustainable manner .
- One such project - to generate electricity for local consumption and for export to Europe is Desertec

Desertec Project

- **Desertec** is a concept for making use of solar energy and wind energy in the deserts in North Africa and Middle East proposed by the Desertec Foundation. This concept will be implemented by the consortium DII GmbH/ Desertec Industrial Initiative (formed by a group of European companies and the Desertec Foundation. The Desertec concept was initiated under the auspices of the Club of Rome and the German Trans-Mediterranean Renewable Energy Cooperation

- Under the proposal, concentrating solar power systems, PV systems and wind parks would be located on 6,500 square miles (17,000 km²) in the Sahara Desert. Produced electricity would be transmitted to European and African countries by a super grid of high-voltage direct current cables.
- It would provide continental Europe with 15% of its electricity. By 2050, investments into solar plants and transmission lines would be total €400 billion.



Key Challenges for Energy Development in Africa

(Working group in Energy, ICSU ROA)

- Reducing upfront cost of Renewable Energy systems
 - Dedicated funding for poor and vulnerable that live in remote areas
 - Reducing transaction cost in energy projects
- Energy Infrastructure for viable energy sector
 - Weak national and regional institutional capacity
 - Inadequate human resource
 - Poor information base
- Energy RD&D
 - Poor integration between energy R&D agenda and development objectives
 - Inadequate interests in fossil fuels

Key Challenges for Energy Development in Africa

(Working group in Energy, ICSU ROA)

- Linking global and local environmental issues
 - Search for win-win solutions
 - Search for trade-offs
- Substantial increase in energy access
 - Abundant proven economic reserves
 - Search for technologies appropriate to local conditions
 - Search for financial investments
- Energy security
 - Control outside interests
 - Inadequate regional systems
 - Linking to environmental security

Solar Energy for the needs of all Africa

- **Proposal from President of Senegal**

- 100,000 MW power to be install in the Sahara desert
- Estimate cost 350 B US\$

Challenges to accomplish this proposal

- Technology innovation,
- Involvement of African Scientists, possible role of African Physical Society, LAM network for
- Creation of Association “Sciences Without borders”