Promoting Renewable Energy Development (and energy efficiency) in Africa

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Outline

- Background and stylized facts
- Opportunities for renewable energy (RE) development in Africa
- Challenges
- Policy options
- Concluding remarks

Background

- Africa's huge infrastructure deficit
  - $9 billion/year over the next decade
  - 15% of LICs' GDP
  - Financing gap of $35 billion
- Energy by far Africa's biggest infrastructure challenge

Electrification rates in Africa lowest in the world

	Total	Urban	Rural
Africa	37.8	67.9	19.0
Developing Asia	72.8	86.4	85.1
Latin America	90.0	98.0	65.6
Middle East	78.1	86.7	61.8
Developing countries	68.3	85.2	56.4
Transition economies/OECD	99.5	100.0	98.1
World	75.6	90.4	61.7

Source:
Energy Outlook 2006

Background

- Electricity production capacity very unevenly distributed across Africa.
  - South Africa: 45%; North Africa: 31%; Rest of Africa: 24%
- Even countries with huge production potential have very low electrification rates
  - **Mozambique:** Almost all electricity produced by the Cahora Bassa Dam. 60% used by Mozal aluminium plant; 30% exported to SA; only 10% used in MOZ where 88% of people don't have access to electricity!
  - **Nigeria**: One of Africa's biggest producers of oil, and largest producer of natural gas. Yet, 53% of Nigerians are without electricity!

The dark continent

Data source: Foster/AICD (2008)

Background

Consequences of low electrification:

- At 124 KWh per capita, electricity consumption in Africa is about one-tenth the developing-world average.
  - Most of SSA in 'electricity poverty' (<120 KWh/year) if SA excluded.
- An estimated 589 million people in Africa do not have access to electricity.
- Over 30 countries report regular power shortages.
- Power outages lead to loss of working days (13 on average in 2009)
- … and cause firms to lose about 5% of the sales.
- For informal firms, the loss is even higher – at 20%.

Background

Urban-rural divide

- 80% of people living in rural areas in Africa don't have access to electricity; 90% if SA excluded. 60% of Africa's population live in rural communities.
- Failure to provide adequate levels of electricity to the majority of the population.
- Electricity consumption confined to commercial and industrial enterprises and to the urban rich.
- Low electricity access is a potent cause of chronic poverty (as well as a consequence of it).

Background

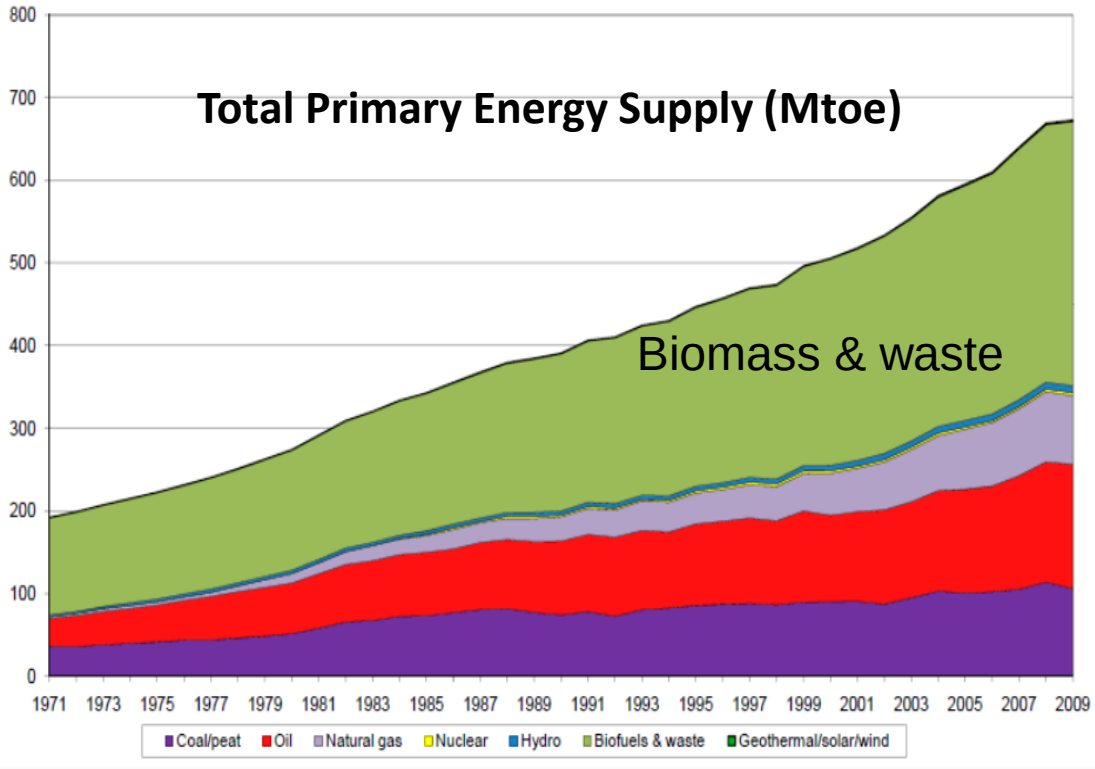
The poverty dimension of poor access to electricity

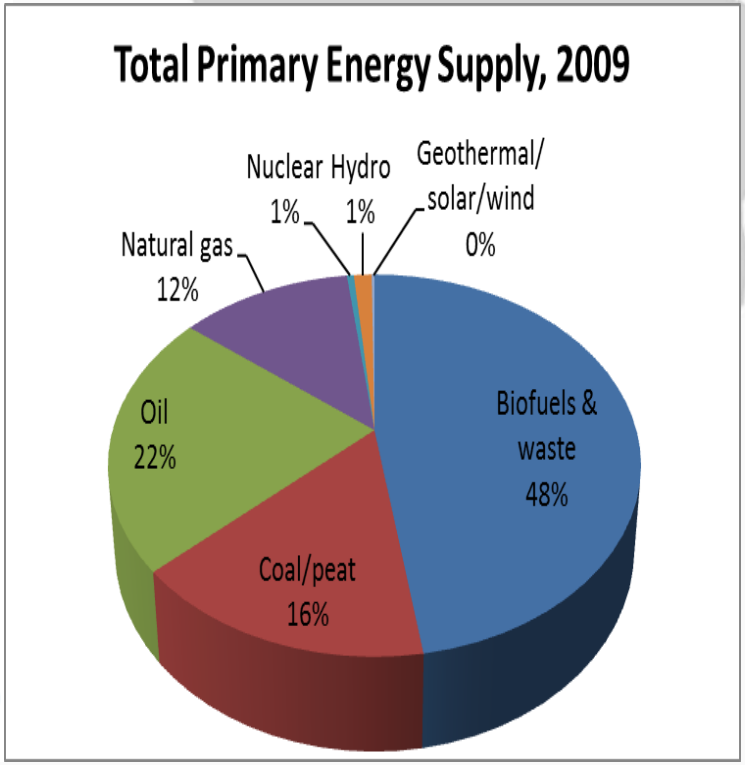
Students in Guinea studying for exams under street lamps at the airport.

Courtesy: Paul Romer's website

Background

Poor electricity access, esp. in rural areas, force people to resort to dirty sources of energy, primarily biomass and waste.





Source: OECD/IEA (2011)

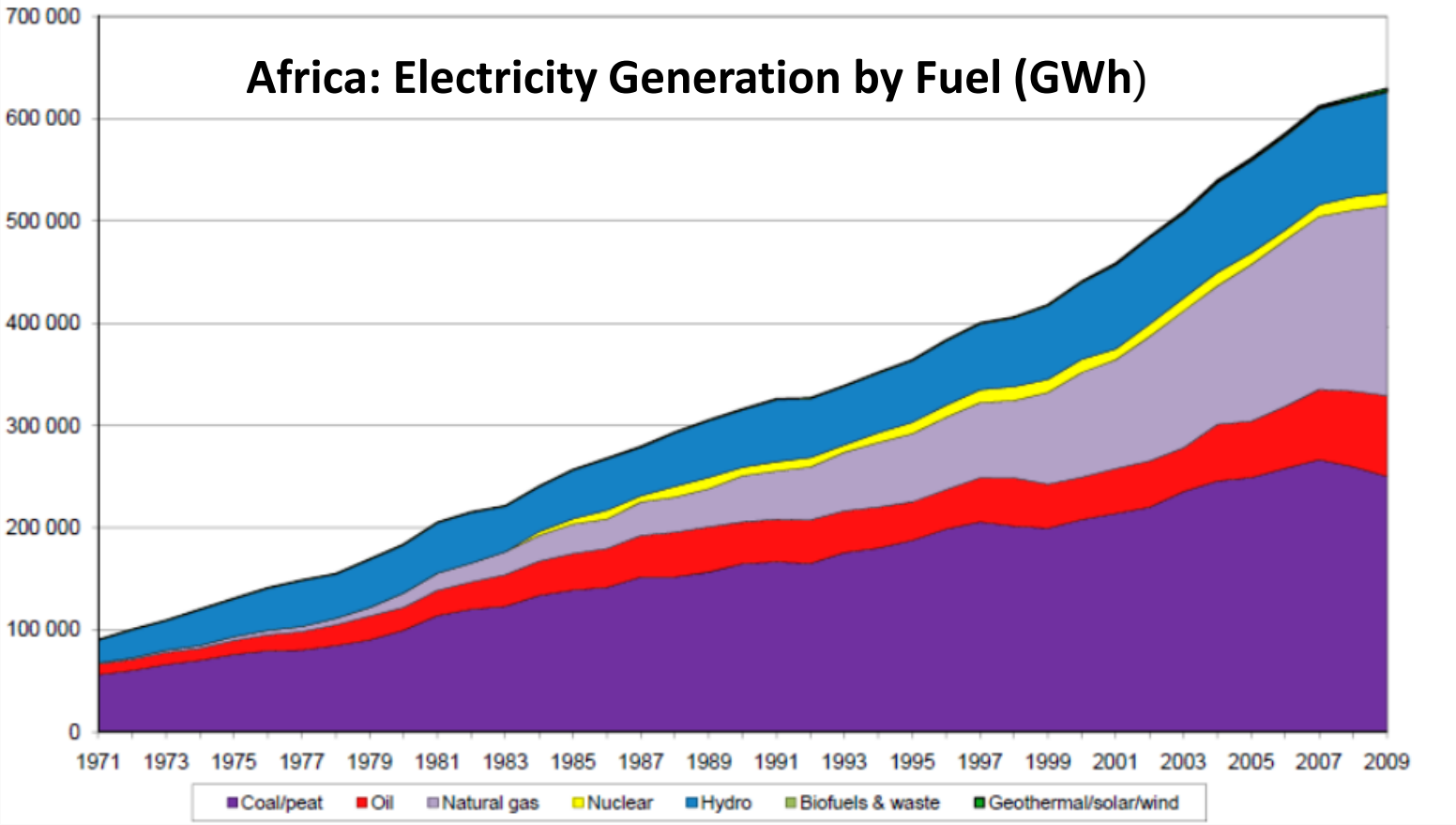
Background

- Around 3 billion people worldwide cook and heat their homes using open fires and stoves burning biomass and coal.
- Nearly 2 million people die prematurely from illness attributable to indoor air pollution
- About 50% of pneumonia deaths among children under 5 due to indoor air pollution

(WHO)

Background

Renewables virtually absent in current electricity generation…



Source:
OECD/IEA (2011)

Background

Why we are in this situation?

- Energy sectors in many African countries focused on surviving today's energy crisis. Lack of long-term resources or vision.
- Donor-led investments in decentralized off-grid solutions v. grid-connected renewables markets in the rest of the world
- Renewable energy projects foundered because they were isolated, small-scale and unattractive to international players.
- Africa's energy sector haunted by centralized coal, petroleum and large hydro projects.

Opportunities

Africa's energy poverty persists despite the continent's enormous potential in RE:

- 325 days of strong sunlight
- 15% of world hydro-power potential (less than 10% of which is currently tapped)
- Significant potential in wind (e.g., Mauritania) and geothermal energy

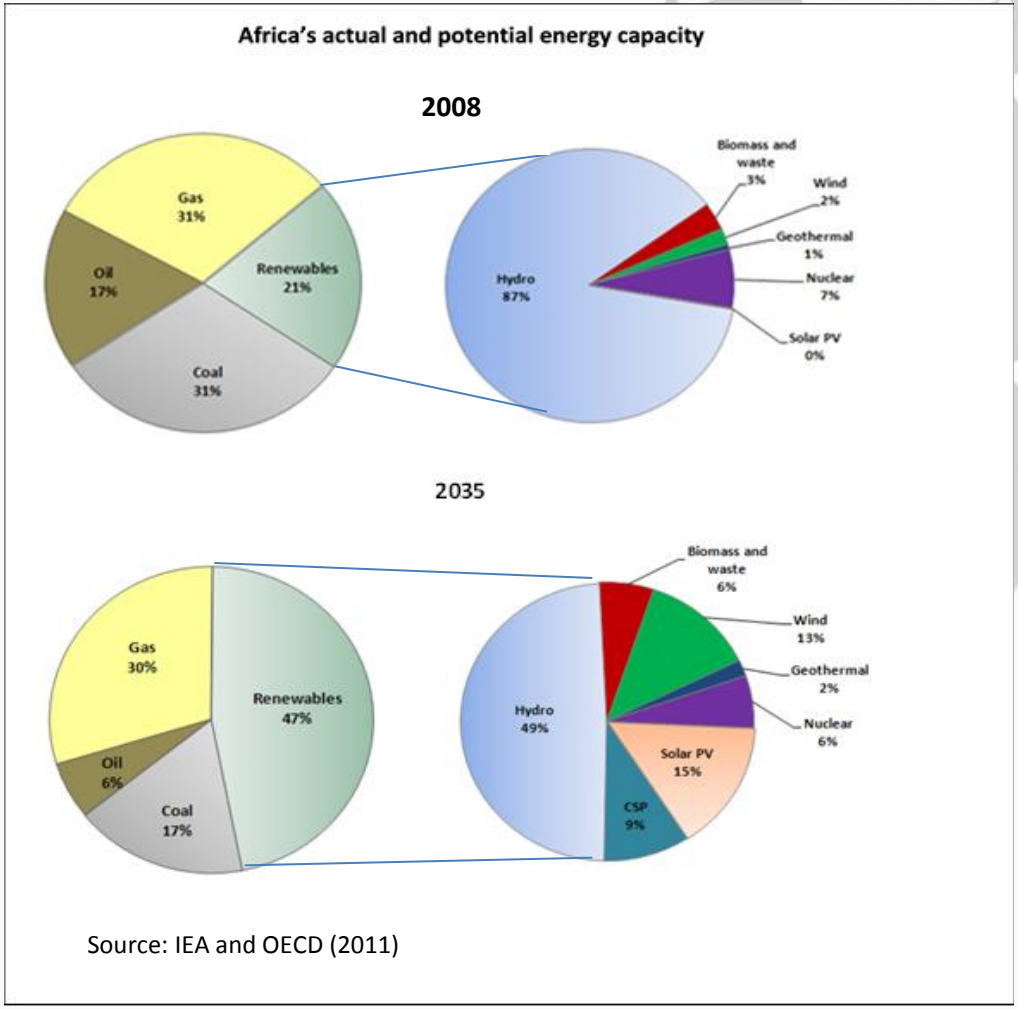
Table 1: Number of countries by region with highest RE potential

Region	Total	Solar	Wind	Hydro	Geothermal
Sub-Saharan Africa	17	21	6	11	7
East Asia/Pacific	4	5	3	6	4
Europe/Central Asia	3	0	6	5	14
Latin America/Caribbean	7	5	8	9	3
Middle East/North Africa	2	3	3	0	2
South Asia	0	0	1	1	0
All Regions	**33**	**34**	**27**	**32**	**30**

Source: Buys et al. (2007)

Opportunities/2

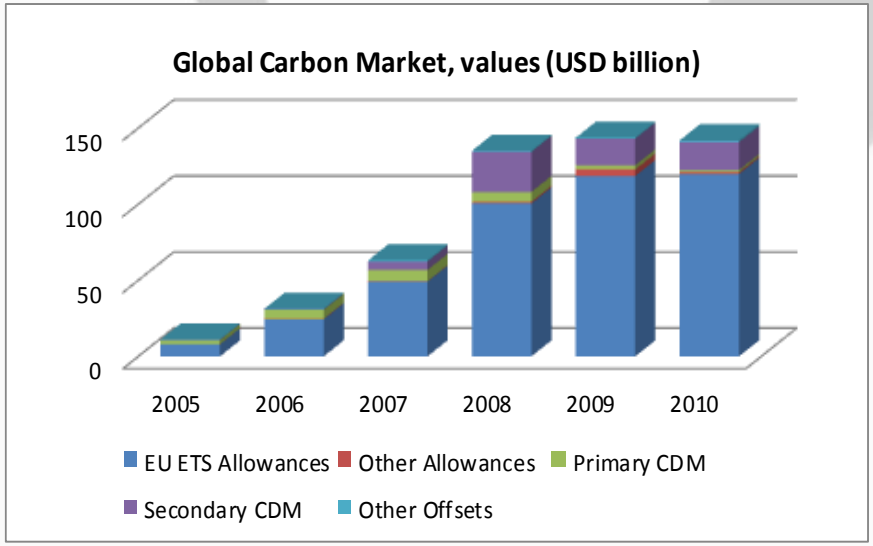
- Share of renewables simulated to increase from 21% of total electricity generation in 2008 to 47% by 2035.
- Distribution of renewable energy sources is also expected to undergo a radical change, with wind and solar power gaining further ground.



Source: IEA and OECD (2011)

Opportunities/3

- RE development can unlock new opportunities for 'green growth' in Africa.
- Africa has the opportunity to leap-frog to more efficient infrastructure and technologies.
- The global urgency to limit GHG emissions means that Africa is now in possession of an economic asset: *carbon*!
  - Benefits from PES and REDD+ schemes.
  - Development of carbon market in Africa.
  - Yet, Africa received only 7% of CDM global market share, and this is unlikely to change in the foreseeable future.

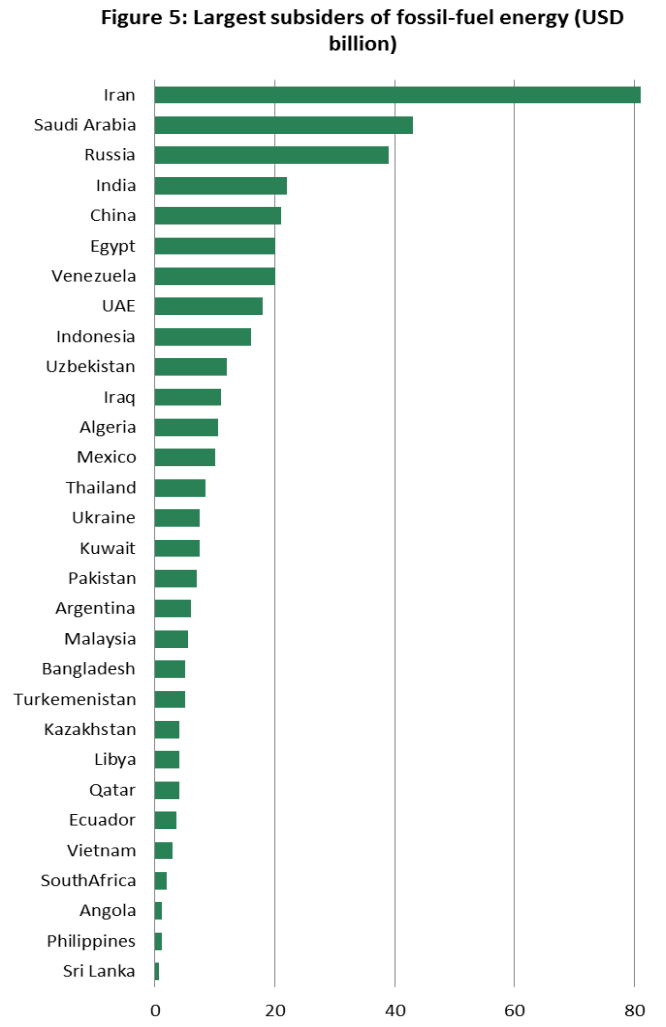


Challenges

- Financing – arguably the most important constraint to RE development.
  - RE projects involve huge upfront investments while payoffs are spread out into the future and are uncertain.
  - Too risky or beyond the means of any single financier or investor.
  - African countries with high perceived risk find it even more difficult to attract low-carbon finance at commercially viable interest rates.
  - Policymakers too focused on short-term costs
  - Uncertainty with existing financing mechanisms, including CDM; others not easily accessible.

Challenges/2

- Regulatory challenge: how to curb fossil fuel subsidies?
  - Africa's oil-producing countries spend billions on subsidizing fossil-fuel energy.
  - Egypt – 6th largest subsidizer in the developing world – spends US$20 billion annually.
  - Powerful vested interests help perpetuate economic dependence of fossil fuels.
  - Political challenge of reform – case of Nigeria.



Policies to promote RE development

- At the fundamental level, attitudes towards renewables must change!
  - African leaders must fully appreciate the potential of renewables in:
    - Improving access to electricity
    - Enhancing energy security and saving foreign exchange
    - Creating ‘green jobs’ and alleviating poverty
    - Promoting a ‘green economy’ transition in Africa

Policies to promote RE development/2

- Government must establish a set of enabling conditions to speed up RE development. Policy should aim at:
  - Addressing inconsistent policies (misconceived, incomplete or weak)
  - Gradually phasing out subsidies on fossil fuels. Oil-rich countries can use part of the proceeds from fuel exports to invest in renewable energy projects, as in Egypt.
  - Addressing market failures through the provision of incentives (e.g., feed-in tariffs) and appropriate regulatory frameworks, including taxes and standards.
  - Strengthening market infrastructure and market-based mechanisms such as the Africa carbon market and the CDM.
  - Boosting public investment in renewable energy, and providing an environment conducive to attracting private investment, including FDI.
  - Enabling appropriate technology development, transfer and adoption (through enhanced capacity building).

Policies to promote RE development/3

- Regional entities and the international community have a crucial role to play.
- Regional entities should:
  - Coordinate investment promotion efforts to avoid a “race to the bottom”.
  - Develop policies for regional power sharing.
  - Target funding to help member states harness their RE potential.
  - Make concerted efforts to develop an Africa carbon market and an Africa Green Fund. Loan syndication (to allow several investors to band together to finance a single large project) can also help
- The international community must:
  - Deliver on its pledges.
  - Make sustained efforts to agree on a global climate deal favourable to poor countries, and to Africa.
  - Move fast to operationalize the Green Climate Fund.
  - Work together to ease African countries’ access to global climate finance mechanisms such as the WB’s CIF.

What hope for renewables in Africa?

- RE projects are more costly compared to conventional (fossil fuel-based) projects. But:
  - Costs are falling rapid and RE technology is becoming increasingly affordable and available.
  - Benefits are much bigger if the positive externalities are factored in.
  - RE projects can attract investors because they are profitable. For this to happen, though, African countries must provide the proper business climate.

Concluding remarks

- Things are changing…
  - NEPAD Energy Initiative, Desertec, international efforts (e.g., GCF)
  - Green economy awareness
  - Better access to finance?
  - Etc.
- But more needs to be done for Africa to catch up with the delay…

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