Low Carbon Development: Implications for Climate Resilient Development in Africa

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Presentation Outline

- What is Low Carbon Development (LCD)?
- Rationale for LCD in African Development
- Development Opportunities & Challenges in LCD Pathways
- Mechanisms for Transition to LCD
- The Imperative for Global Collective Action
- Conclusions & Policy Options

What is LCD?

- A development pathway which: reduces carbon dioxide (CO_2) emissions while ensuring economic growth (Islam, 2010); utilizes less carbon to promote economic growth (Mulugetta and Urban, 2010), or substitutes fossil fuels with low carbon energy while promoting economic growth and human welfare (EREC, 2008).

Characteristics of LCD Pathways

- Low Carbon Economy (LCE):

  *"An economic growth pathway which aims to attain sustainable development through **technical innovation**, **systems innovation**, and **industrial transformation** towards the development of **sustainable energy options** and other **policy interventions** to **reduce the consumption of carbon energy** and **reduce the emission of GHGs, with a specific focus on CO_2**" (Xing et al., 2010).*

- ✓ Resource efficiency & resource productivity
- ✓ Low carbon technologies & innovations
- ✓ Decoupling CO_2 emissions from GDP Growth

2. Rationale for LCD in Africa

- "The Development First Agenda"

1. Climate change impacts on key sectors of the African economy economies are compelling

2. LCD is a growing development paradigm offering opportunities industrial competitiveness in future

3."Development first" versus "de-growth" or "reductions in surplu consumption" – "***relative*** *versus* ***absolute decoupling***"

4. BAU scenarios as a loose-loose scenario for Africa

- CC impacts on the poor are disproportionately high and increases with global temperature rises
- Poor competitiveness in current development paradigm:
  - Resource Use and Income Growth (**Figure 1**)
  - Ecological Footprints and Human Wellbeing (**Figure 2**)
  - Poverty & CO_2 emissions are mutually reinforcing – EKC Hypotheses
  - Historical path dependence: Comparative Primary Resource Advantage & the Resource Curse hypothesis (cf: **Figure 3**)
- The cost inaction will be higher in the medium term (2030) than cost of decisive action to mitigate now.

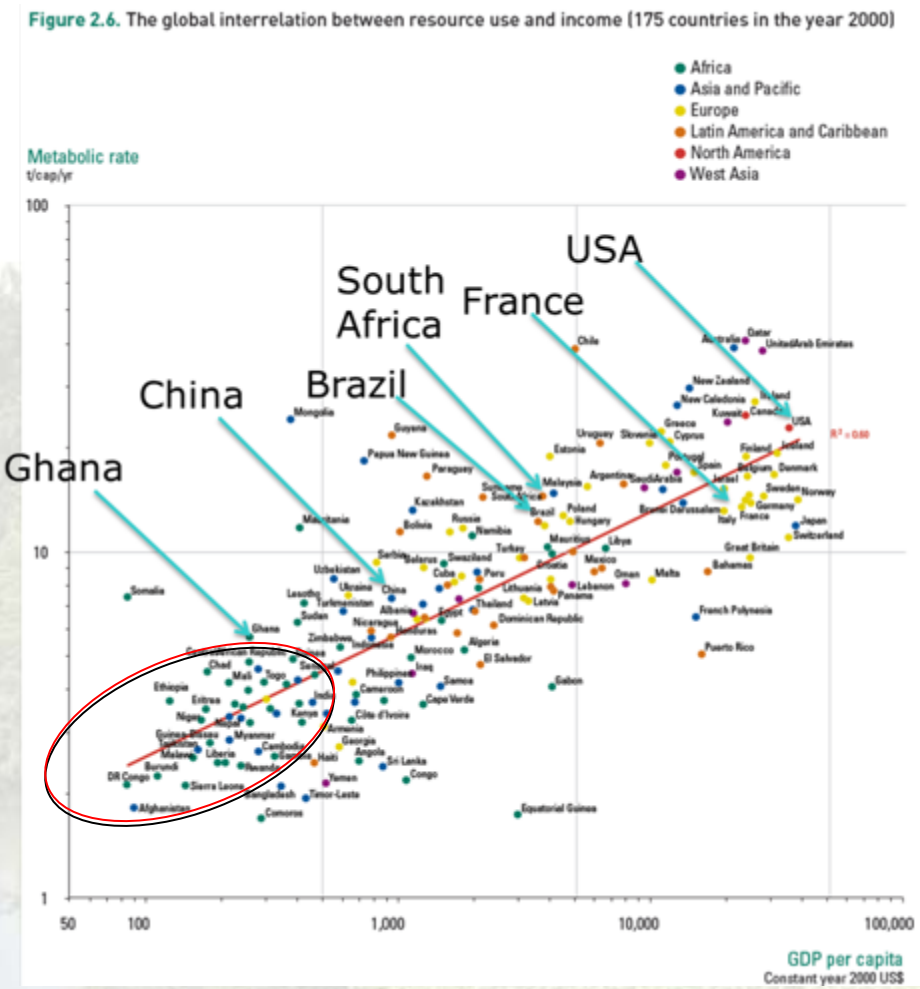


Figure 1a: Interrelations between resource use and income growth, 175 countries in the year 2000.

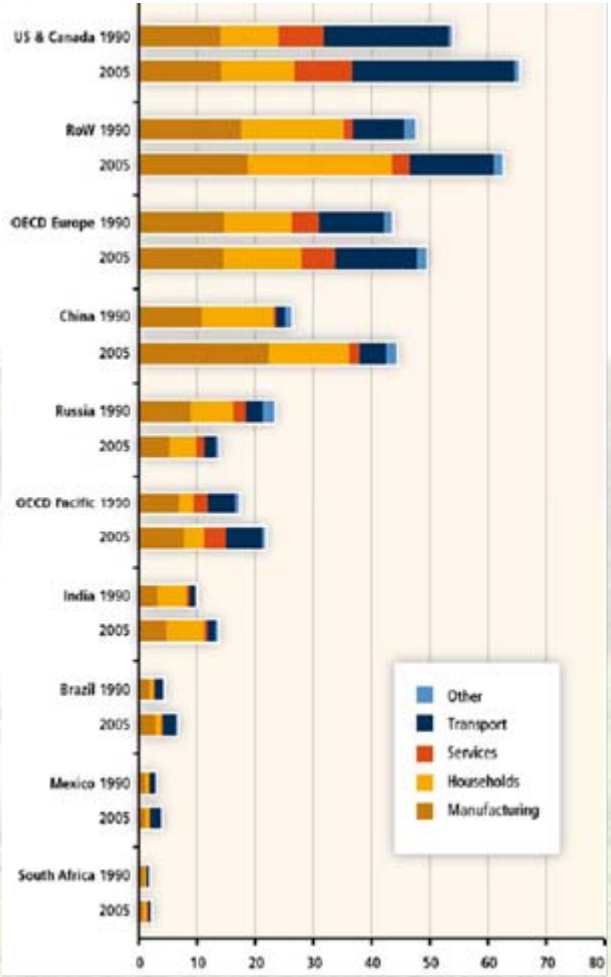
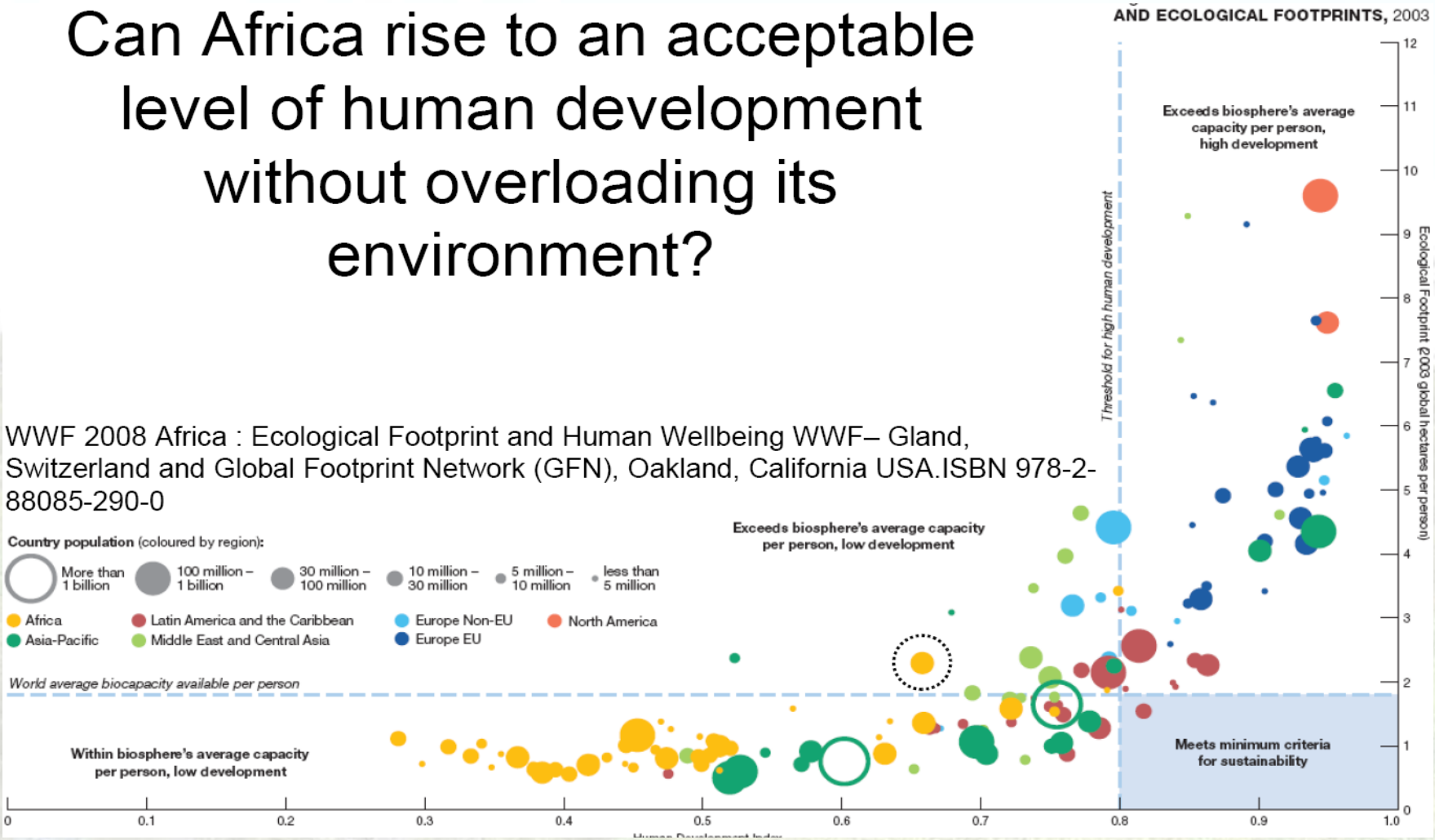


Figure 1b: Energy use (EJ) by economic sector (Arvizu et al, 2011, p. 127)

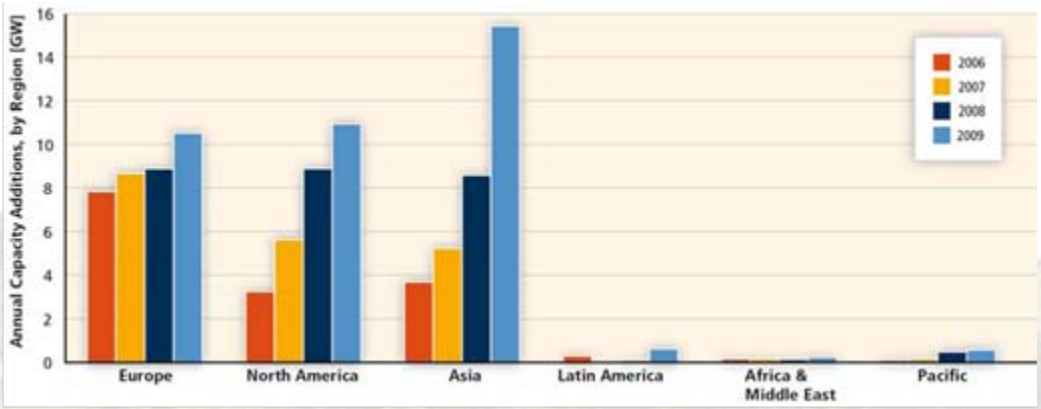
Can Africa rise to an acceptable level of human development without overloading its environment?



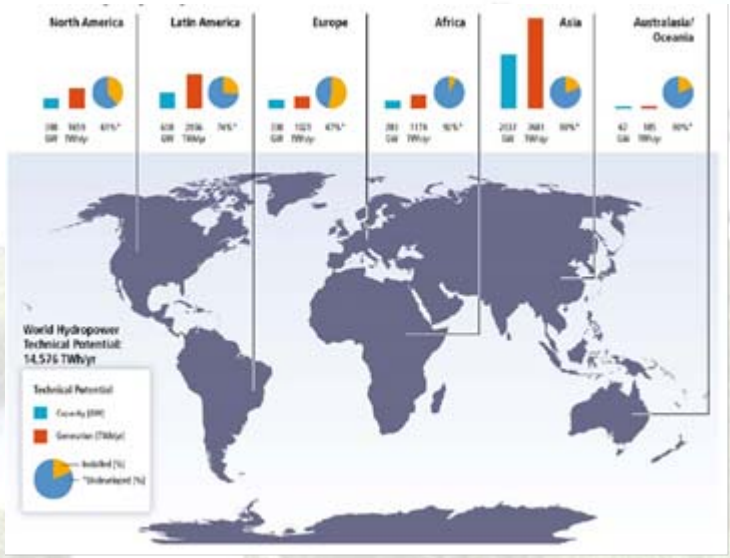
WWF 2008 Africa : Ecological Footprint and Human Wellbeing WWF– Gland, Switzerland and Global Footprint Network (GFN), Oakland, California USA.ISBN 978-2-88085-290-0

Most countries that rate high on the Human Development Index also have high ecological footprints (i.e. they are resource and energy intensive). The Latin American countries, which tend to cluster more closely around the nexus between lower ecological footprints and high human development indexes, can provide useful models for an alternative development pathway to the one selected in developed economies (especially Europe and North America).

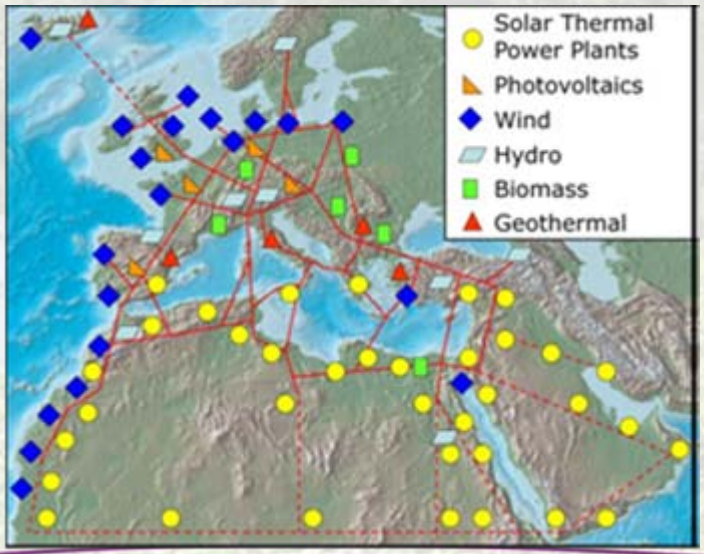
Figure 3: Africa's Unutilized Potentials in LCTs



Annual wind power capacity additions by region (Source: Arvizu et al. 2011)



Regional hydro power technical potential



Euro-Supergrid with a EU-MENA-Connection: Sketch of possible infrastructure for a sustainable supply of power to EU-MENA

3a. Opportunities in LCD for African Development

- Leveraging Climate Finance for economic development & poverty reduction
- Improved energy access & human wellbeing
- Energy security and reduced environmental impacts
- Avoiding technology-lock in to HCTs
- Climate change adaptation and mitigation of GHGs, including CO_2 emissions

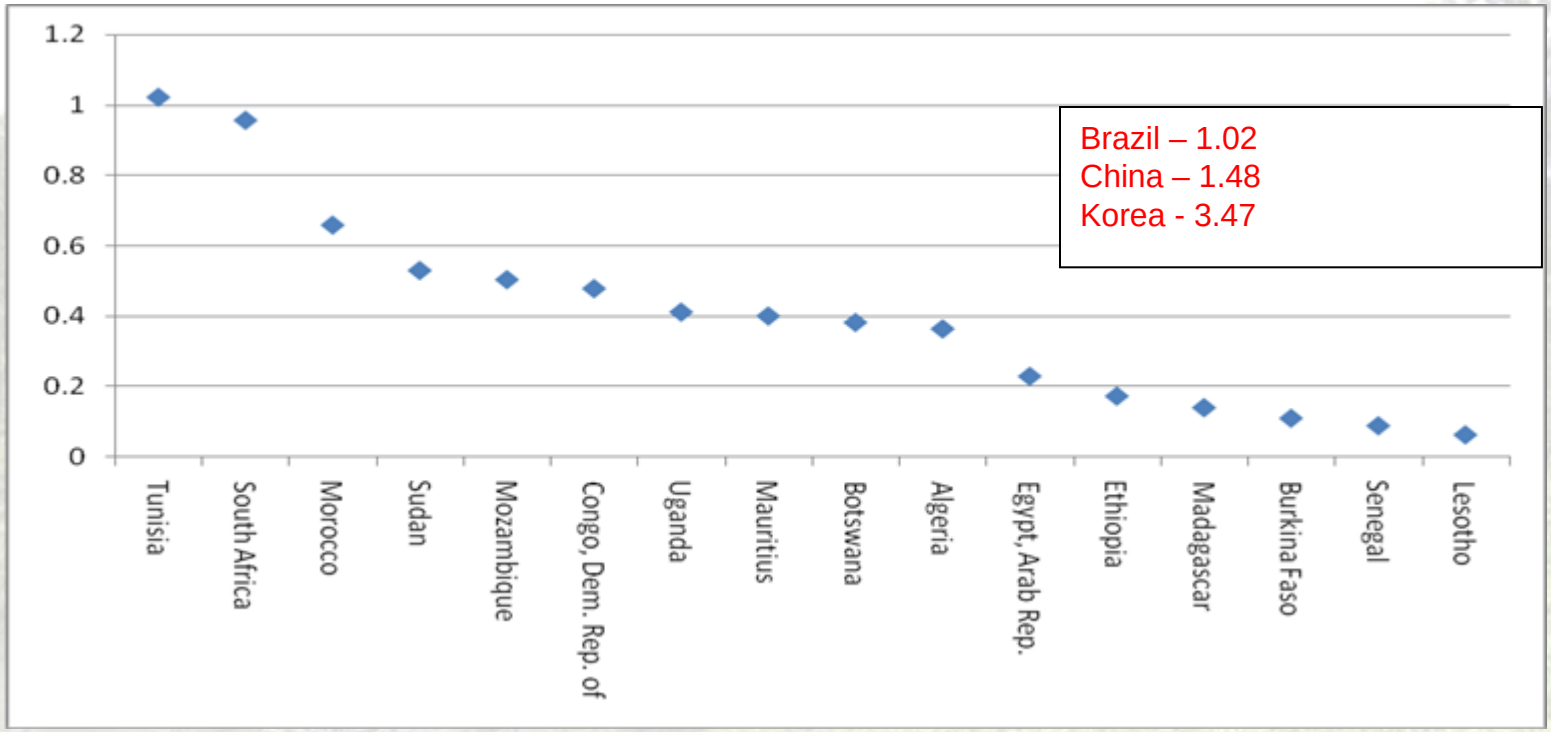
Co-Benefits

- Opportunities for innovation
- Employment creation
- Avoiding future mitigation costs of BAU
- Reduced vulnerability

3b. Barriers to LCD

Market failures	**1. Underinvestment in STI, invention and innovation.** **2. Un-priced environmental impacts and risks** **3. Monopoly powers in the energy markets & other sectors** **4. Initial investment cost & choice of social discount rates** **5. Availability of capital and financial risk** **6. Allocation of government funds and other climate finance mechanisms** **7. Trade barriers & Intellectual Property Rights**
Information and Awareness Barriers	1. Data gaps – on adaptation / mitigation costs and co-benefits, externalities, & costs of BAU. 2. Skill gaps in human resource capacity 3. Public and Institutional awareness
Socio-cultural barriers	1. Social acceptance, attitudes & behaviours 2. Land use (tenure, practices, etc.)
Institutional Barriers	1. Existing energy infrastructure / market regulation 2. Industry structure 3. Technical and financial support 4. Existing Policy frameworks
Perceptions & other barriers	1. Fear of potential impacts on industrial competitiveness and economic growth 2. Uncertainties about who should take action and the cost of action / inaction 3. Under-pricing of natural resources use and pollution

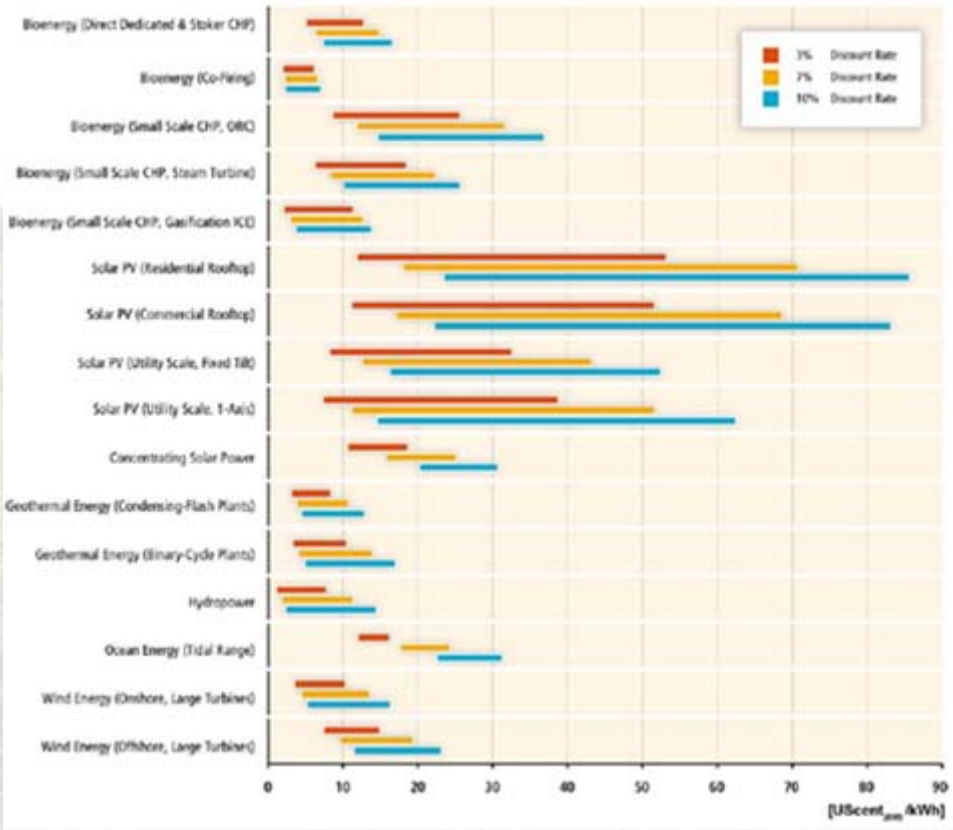
3b.(ii): Low R&D Investments as % of GDP in Africa



Source: World Development Indicators, 2010

See also: Figure for full data on Sub-Saharan Africa (Urama et al, 2010, UNESCO Science Report)

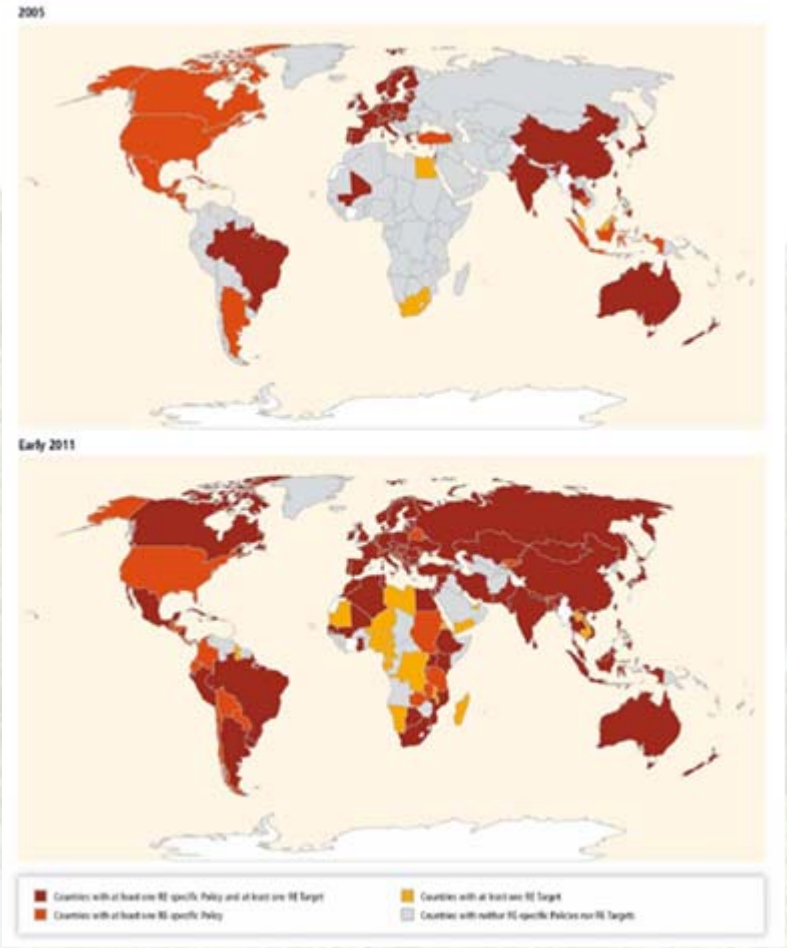
3b.(ii): The Cost of LCTs



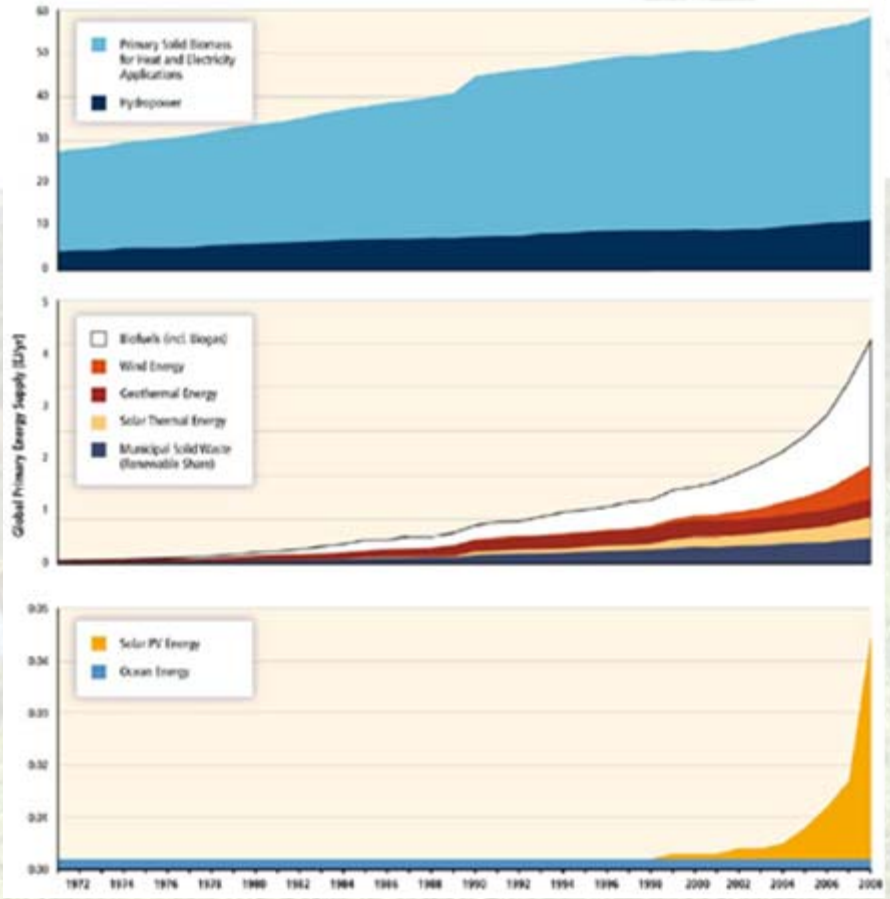
Levelized cost of electricity for commercially available RE technologies at 3, 7 and 10% discount rates (Source Arvizu et al. 2011, p 155).

Price variability is crucial as it caused significant shocks to already fragile economies. Limited understanding & information asymmetry limits our ability to fully internalize external costs today. Choice of social discount rates also discredits future generations.

3b. (iii): Policy Environment & Political Will



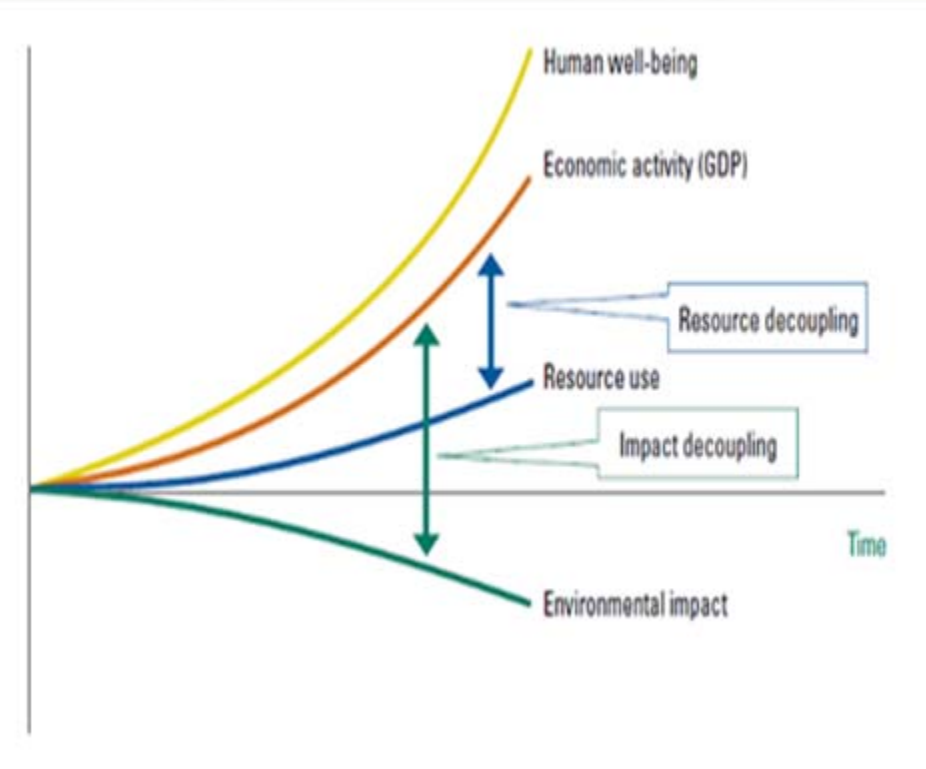
Countries with RE targets and/or two or more RE policies, mid-2005 and early 2010

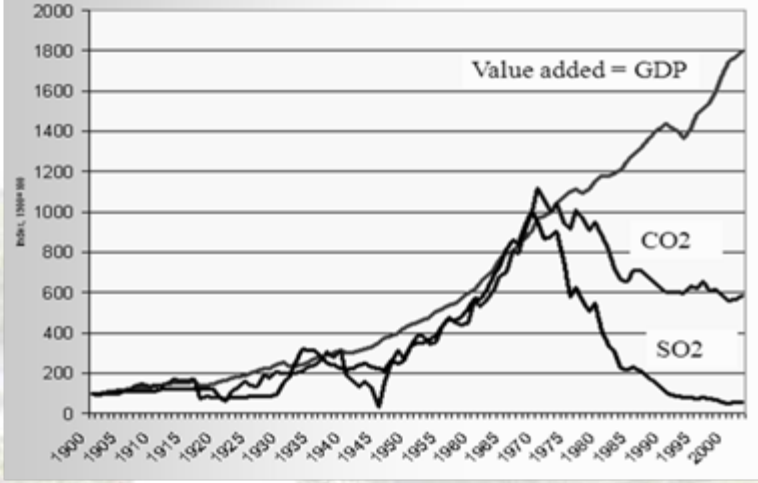


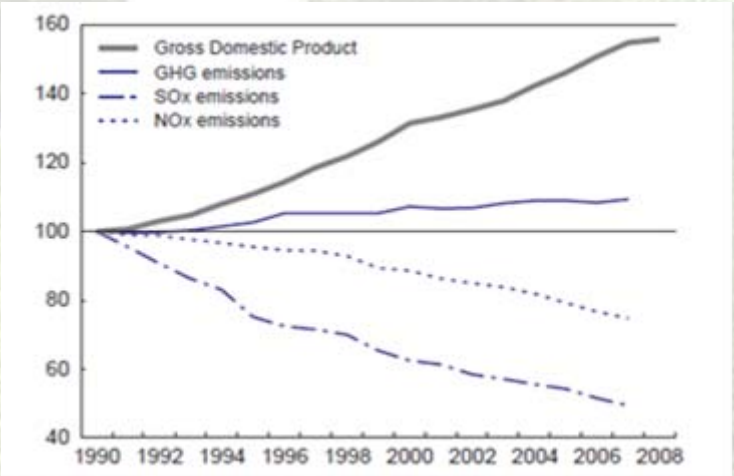
Historical development of global primary energy supply from renewable energy from 1971 to 2008. Data Source: IEA (2010b) cited in (Moomaw et al., 2011).

4. Mechanisms for Transition to LCD

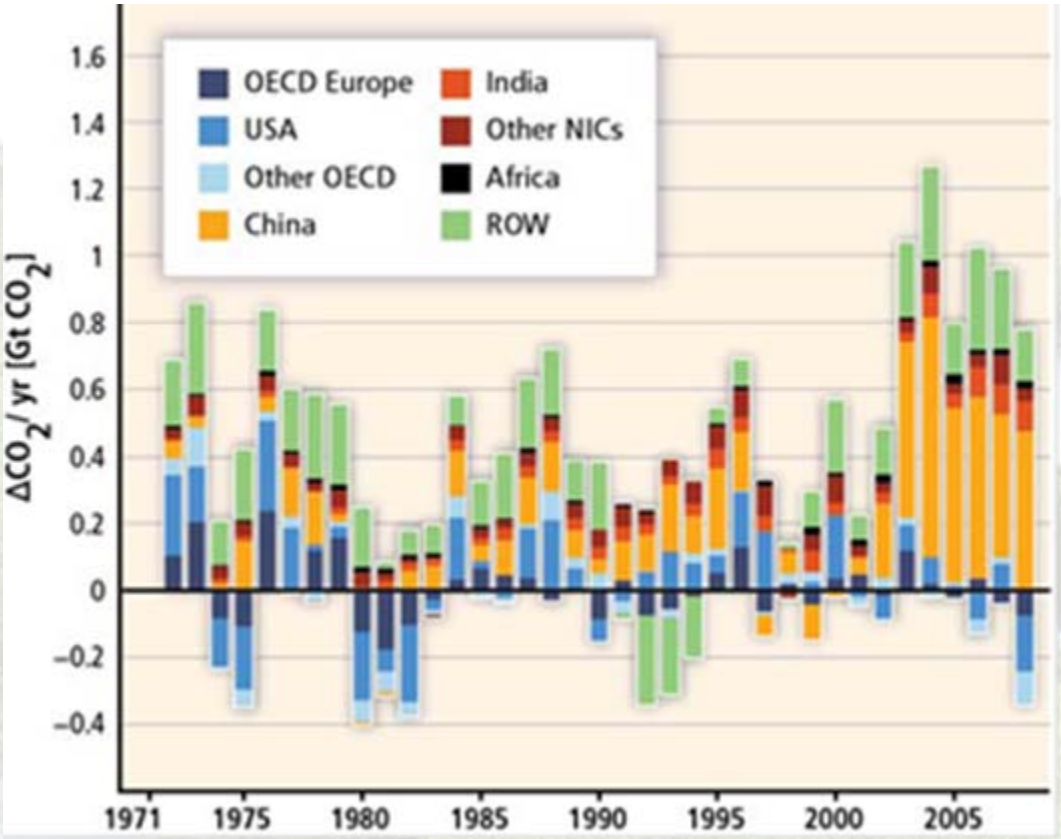
- Resource Efficiency and Resource Productivity
- Decoupling
- Green Economy







5. Need for Collective Global Action



1. Environmental governance & Ethics – the PPP and the moral imperatives of sustainable poverty and pollution abatement principle

2. The Spaceship Earth – No political or geographical boundary

3. The urgent risk to avoid a shipwreck – should Africa tow the path of HCD,(cf: the impact of China on GHG growth).

Influence of selected countries and country groups on global changes in CO_2emissions from 1971 to 2008. ROW: rest of world. Data source: IEA (2010

5. Conclusions & Policy Options

- **Diversification & reduced vulnerability**: LCD offers an opportunity for Africa to diversity development portfolio in various sectors through integration of LCTs

- **Opportunities for Innovation**: LCD is effectively a new race for new form of industrial revolution through LCTs and innovations. Africa stands to gain by going the race now rather than latter to avoid a repeat of history – the resource course hypothesis

- **Resource Efficiency & Productivity**: LCD pathways offers opportunities for improving resource efficiency, resource productivity, and decoupling of GDP growth from GHGs. It is therefore an economically viable strategy for Africa

- **Poverty and Cost Limitations**: The initial investment costs of LCTs are higher that fossil fuel option (at least in the short run). Achieving Co2 emission reduction) at the lower levels of development is challenging.

- **Development first**: Pursuing economic development to attain minimum per capita incomes and human wellbeing to foster adaptive and mitigation capacities of is a useful strategy for addressing Climate Change including reductions in GHGs in Africa.

- **Collective Action:** There is need for global action to support transitions to LCD pathways in Africa to avoid the risk of catastrophic rise in GHG emissions if African countries continue BAU.

- **Multiple pathways:** LCD pathways may differ among countries in Africa & elsewhere. While Industrialised economies may pursue a policy of "**de-growth**", "**cuts in resource consumption"** and "**emission targets**" (***absolute decoupling***), less developed countries needs to increase consumption, economic growth but reduce the rate of GHG emissions (***relative decoupling***).

Policy Options for Transitions to LCD

- Investments in relevant STI in priority sectors
- Fiscal incentives at country levels
- Regulation (national & global levels).
- Diversification of development portfolio
- Regional / international cooperation
- Communication
- Structural shift in priority sectors:
  - From high to low GHG energy carriers
  - Improve demand & supply side efficiency
  - Invest in relevant STI
  - Change behaviours

Higher investments in relevant STI would transform Africa's *resource-intensive* economies into *knowledge-intensive* economies, reducing depletion of natural resources and CO_2 emissions, and reinforcing the virtuous cycles of economic growth, social equity and human development.

Better institutions represent one of the most effective conditional variables for higher economic growth and the convergence between economic growth, social equity and environmental sustainability.

Finally, transition to LCD requires building/strengthening **appropriate** capacities in the required type of ***Science, Technology, Innovations, Institutions, and Policy (STIIP).***

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