



UNITED NATIONS
UNIVERSITY

UNU-WIDER

World Institute for Development
Economics Research

Green Growth

Opportunities and challenges for
development

Copenhagen University

Sustainability Lecture

Finn Tarp

31 January 2011

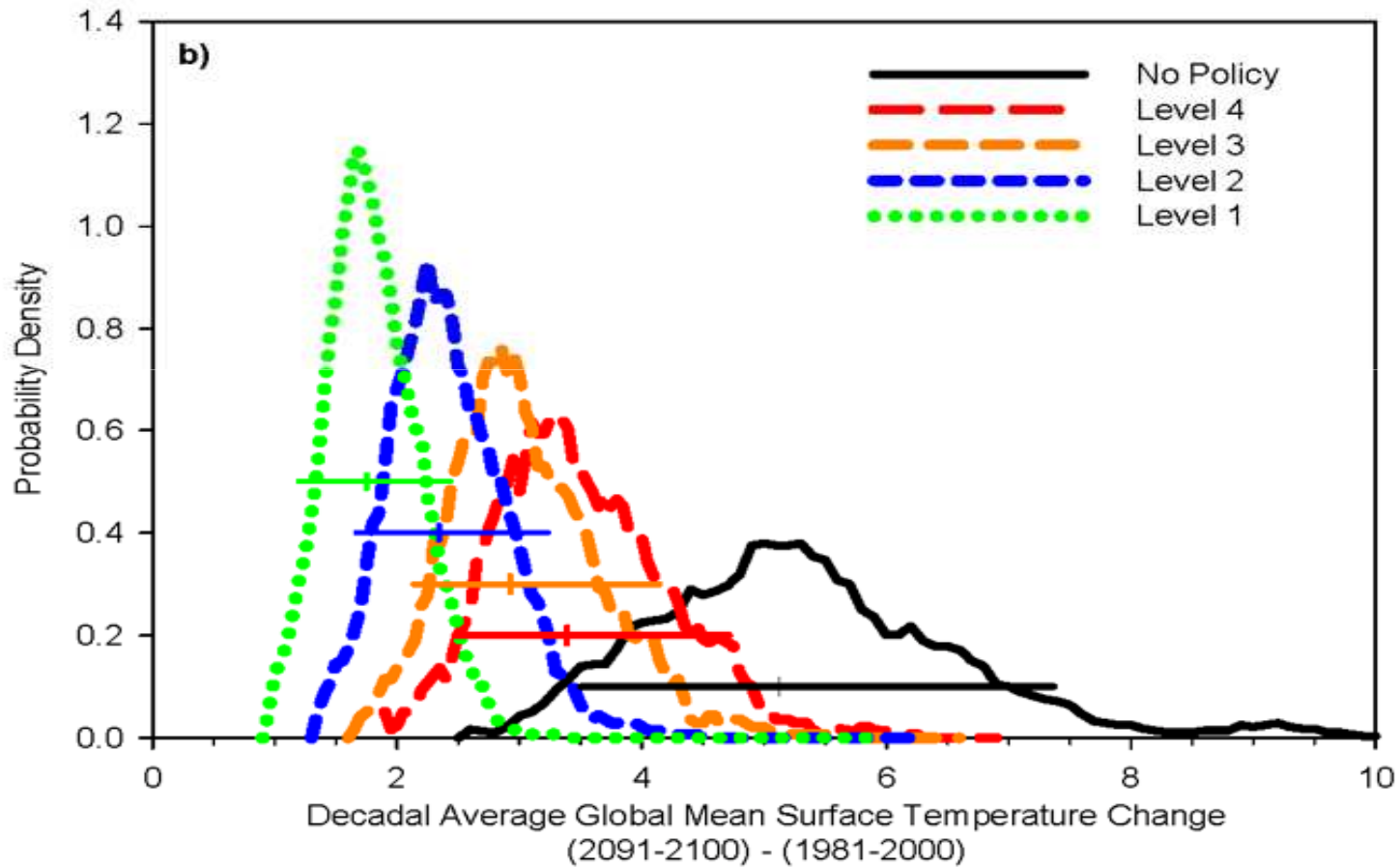


Setting the scene

- ✦ Recall the **need** for development
- ✦ Global economy facing a series of crises which **interact** in ways we are yet to fully understand
- ✦ Also: growing recognition of the importance of **extreme events**
- ✦ And recent experiences have heightened **uncertainty**

Shifting means and variation

Change in global average surface temperature

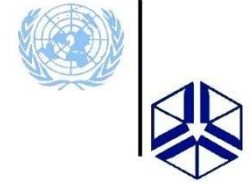


Source: MIT Joint Program Report #180
Webster et al. (2010)

Two UN Initiatives



- ✦ The 17th conference of the parties of the United Nations Framework Convention on Climate Change (UNFCCC)
 - ✦ COP17 in Durban 2011
- ✦ UN Conference on Sustainable Development (UNCSD)
 - ✦ Rio+20 Earth Summit in 2012



Three basic questions/topics

- ✦ What does “low-carbon” mean for development?
- ✦ How should we approach new “green technologies” in developing countries?
- ✦ What does green growth mean for existing development objectives?

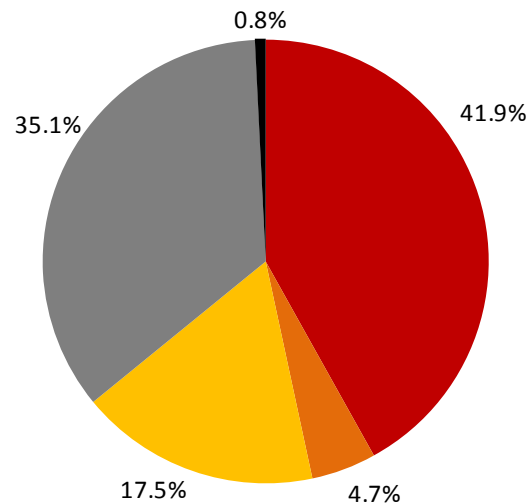


1. Low carbon development

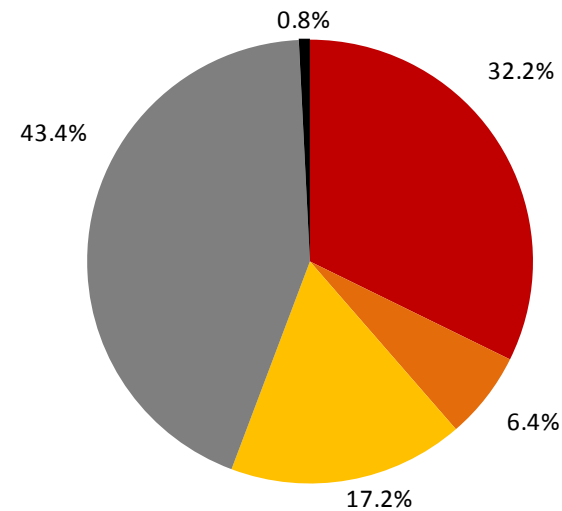
Past and future carbon emissions (CO₂ equivalents)

- ✦ On a per capita basis most emissions currently come from the OECD countries
- ✦ But most emission growth come from developing countries
- ✦ Finding low-carbon growth paths is crucial

Current CO₂ emissions, 2007



New CO₂ emissions, 1960-2007



Source: WIDER "Green Growth in Development" (Davies et al., 2011)

1. Low carbon development

Energy use vs. Carbon emissions



Emissions per capita =

Energy use per capita x Emissions per energy unit

So countries may have high emissions per capita when they...

Use a lot of energy (i.e., electricity and petroleum)

AND/OR

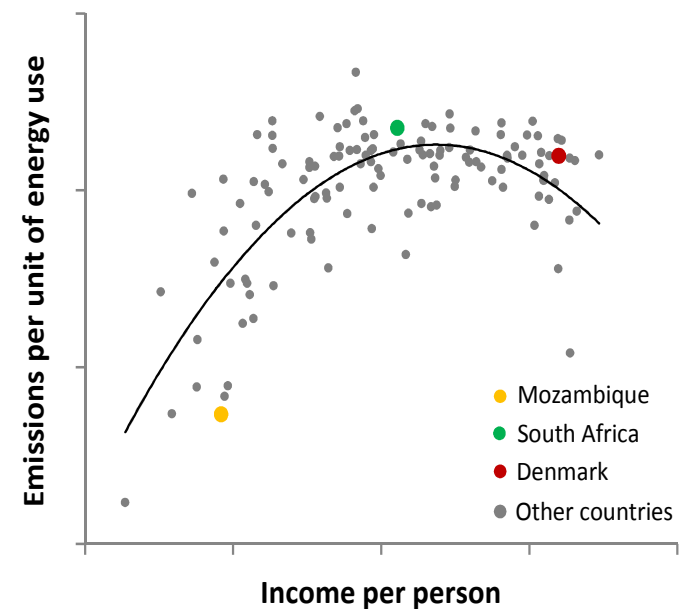
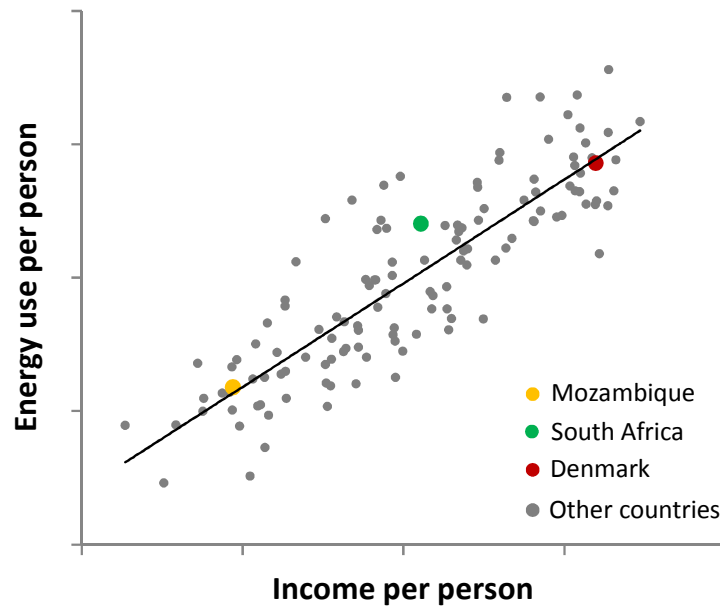
Use 'dirty' energy (i.e., coal, crude oil and gas)

1. Low carbon development – stylized facts about *Energy use vs. Carbon emissions*



- ✦ Energy use rises with income
- ✦ So reducing energy use in low-income countries means stalling development

- Emissions rise then fall with income
- Poor emit little
- Industrializing countries use cheap and dirty energy
- Rich can afford cleaner energy



Source: WIDER "Green Growth in Development" (Davies et al., 2011)

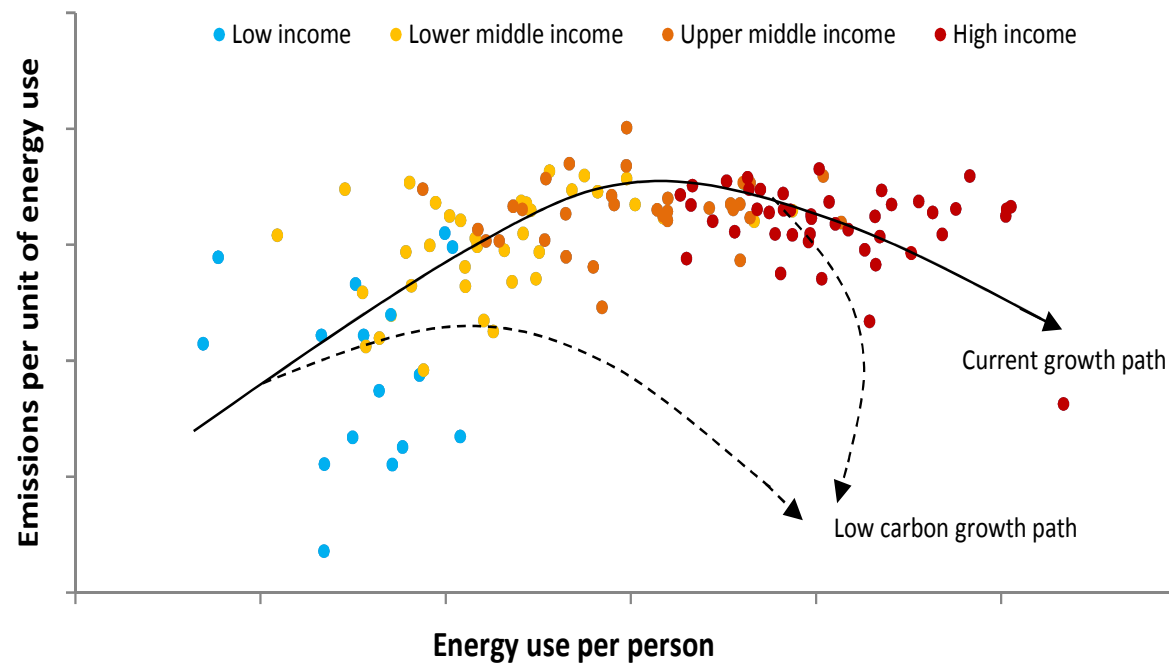
Note: Energy use in oil equivalents. Income is log of per capita GDP; Energy and Emissions are deviations from mean logged values

1. Low carbon development

Finding a new growth path



- ✦ Economic development means that global energy use will definitely rise
- ✦ A key emphasis must be on clean energy options for low-income countries



Source: WIDER "Green Growth in Development" (Davies et al., 2011) Note: Energy Use and Emissions are deviations from mean logged values.

1. Low carbon development

Challenges



- ✦ We are asking developing countries...
 - ✦ To use cleaner energy early in their industrialisation process
 - ✦ BUT this has expensive start-up and opportunity costs
 - ✦ To rely on imported technology
 - ✦ BUT this raises cost of operations and maintenance
 - ✦ MORE leakages in the growth multiplier process
 - ✦ Not to use their natural resources (i.e. comparative advantage)
 - ✦ IF market mechanisms are to be relied on this involves difficult carbon taxes

2. Green technologies

New opportunities



- ✦ Green technologies are already supporting development efforts in many low-income countries



- ✦ There is scope to scale-up cost saving green technologies in ways that complement development

2. Green technologies

Some challenges



- ✦ But green tech is not always the cheapest investment option
- ✦ Green investments should be subjected to the same criteria as other investments in low-income countries:
 - ✦ Foreign technology
 - ✦ Imported materials
 - ✦ Knowledge transfer
 - ✦ Foreign ownership
 - ✦ Subsidies and public investments to support green sector

2. Green technologies

Way forward



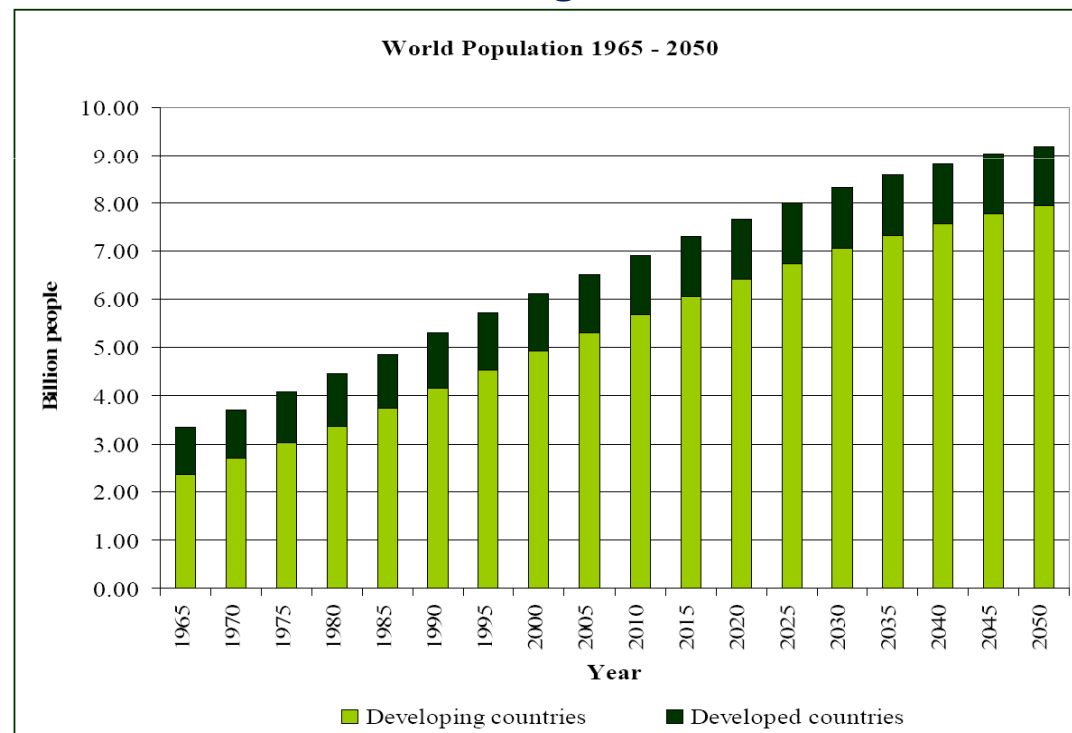
- ✦ Need to engage the private sector to limit public sector costs and promote local industries and employment
- ✦ Fostering local innovation will be key
- ✦ Foreign aid has a role to play
 - ✦ Compensate countries for not using their own natural resources
 - ✦ Facilitate knowledge transfer when helping finance clean energy investments

3. Trade-offs with development

Food security



- ✦ Food security is a major goal for developing country governments
- ✦ Population growth and urbanization are increasing food demand
- ✦ Agricultural production must double by 2050 to feed the world
- ✦ BUT agriculture generates a third of global emissions



Source: UN-DESA (2007)

3. Trade-offs with development

Food security vs. Green Growth



Food security strategy	Advantages for food security	Disadvantages for Green Growth
Using fertilizers to enhance soil fertility	Raises crop yields (e.g., “Green Revolution”).	Accounts for a third of agriculture’s GHG emissions
Using irrigation to manage water resources	Doubles crop yield relative to rain-fed agriculture.	Worsens water scarcity if water is used beyond replenishment.
Promote high-value exports (e.g. horticultural and floricultural products)	Higher incomes for smallholder farmers.	Requires refrigeration and irrigation, and produces large emissions when exported to developed countries by plane.

3. Trade-offs with development

Achieving food security without compromising Green Growth



- ✦ We can try to address these trade-offs through technology and incentive-based mechanisms
- ✦ But these often just create additional trade-offs...
- ✦ E.g., Genetically Modified crops (GMOs) may reduce the need for pesticides and irrigation, BUT...
 - ✦ They may limit developing countries' sovereignty over their seed stocks
 - ✦ Developing countries may lack bio-safety legislation and regulation capacity

3. Trade-offs with development

Remaining questions



- ✦ How can we respond to short-term food crises while fostering long-term, green agricultural development?
- ✦ Should we emphasize biotechnology or alternative farming approaches?
- ✦ What does the Green Growth agenda imply for foreign aid in low-income countries?
- ✦ How do we ensure that the (scarce) resources available to invest in agricultural production are augmented, rather than supplanted, by the Green Growth agenda?



Concluding remarks

- ✦ Finding greener growth paths for low-income countries is clearly a global necessity, but it does create a number of new challenges.
- ✦ There will inevitably be trade-offs between green growth and existing development objectives.
- ✦ While green technologies may complement development, must appraise these investments – not always optimal.
- ✦ Green growth must be incorporated into – but should not replace – existing poverty focused development strategies.
- ✦ There is a strong case for foreign aid.