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CLIMATE CHANGE AND DEVELOPMENT

CONSULTATION ON KEY RESEARCHABLE ISSUES

SECTORAL ISSUES
SECTION 2.7. ENERGY
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Climate Change and Energy

Energy and mitigation were not the focus for this scoping exercise, but as the following text boxes illustrate, energy obviously plays an important role for development and opportunities to mitigate climate change.

Emerging priority research themes

Fuel poverty, adaptation and mitigation for the poorest. Decarbonisation strategies have often had significant impacts on fuel availability for the chronically poor, particularly through changes in health and well-being. Analysis of the interactions between fuel use, health, technological change and gender and social aspects of decarbonisation strategies should focus on how the trade-offs between increased prosperity and consumption, and environmental health are negotiated.

Pathways of decarbonisation for emerging economies. Research in this area should examine transitional decarbonisation pathways in key developing countries and develop assessment tools for mitigation technologies. Consideration of prospects for 'clean' development in countries poised to become major emitters, including China, India and Brazil, is vital.

Source: Katrina Brown and Neil Adger, Tyndall Centre

Energy, Poverty and Climate Change Mitigation

Harald Winkler

Energy is critical to economic and social development, but depending on the way it is produced, transported and used, it can contribute to both local environmental degradation, such as air pollution, and global environmental problems, principally climate change (Farinelli 1999; Davidson & Sokona 2001; Johannson & Goldemberg 2002; Spalding-Fecher et al. 2005). Providing affordable, adequate, and reliable modern energy supplies to the vast majority of the world's population remains a major challenge: these supplies are still beyond the reach of some two billion people (UNDP et al. 2000).

The fact that two billion people live in energy poverty (UNDP et al. 2000) is the most compelling evidence that a new approach is needed – one that can mobilise significantly more financial resources and direct them in a way that will have the greatest effect on development. Analogous to the Millenium Development Goal of halving poverty (UN GA 2000), a target is needed provide modern affordable energy services to half of the two billion people who currently do not have access to them by 2015 (Africa Group 2002; WEHAB Working Group 2002).

The challenge outlined in the Johannesburg Programme of Implementation is twofold: first, to dramatically increase access to affordable, modern energy services in countries that lack them, especially for poor communities; and, secondly, to find the mix of energy sources, technologies, policies, and behavioural changes that will reduce the adverse environmental impacts of providing necessary energy services. Providing cleaner energy is a critical contribution to mitigating climate change (Spalding-Fecher et al. 2005).

The linkages between adaptation and poverty are increasingly explored, and a substantial literature has emerged on mitigation and sustainable development. But the link between mitigation and poverty remains “largely unexplored”, as recognised by the IPCC's Third Assessment Report.

A large proportion of the world's population lives in poverty, often outside a cash economy, and does not have access to modern fuels. Even when the poor are part of a cash economy, they are often deprived of access to financial

instruments that require collateral. (IPCC 2001: chapter 5.1).

At the project level, the CDM set out to address local sustainable development as well as emission reductions. However, this potential has not been fully realised in CDM energy projects and approaches need to be developed to improve on this, and to explicitly address poverty. There has been some thought given to baselines for suppressed demand, and growth baselines, but the emerging CDM portfolio is focused on carbon credits, not *local* sustainable development benefits, not to mention poverty specifically. Projects that focus on industrial trace gases dominate the early CDM portfolio, rather than energy efficiency and renewable energy projects (Ellis et al. 2004).

Finding linkages between energy, poverty, sustainable development and climate change is critical to the global mitigation effort. (Davidson et al. 2003) Researching this question will become even more urgent as the next round of negotiations seek to broaden participation by developing countries in mitigation. The more mitigation can actually contribute to poverty alleviation, the more likely that even the poorer developing countries might have some interest in joining the global effort.

The question is to what extent poverty reduction and climate mitigation represent a trade-off, and where there are synergies. The intersecting set may be small, but it will be important.

What might such research look like in my country, South Africa? Well, four-fifths of GHG emissions are from energy supply and use. Thus synergies and trade-offs need to be investigated in the energy sector. What measures exist that can meet the multiple goals of reducing energy poverty (mainly by providing energy for productive uses), providing energy for household energy services (lighting, cooking, water heating) *and* using low-carbon fuels or renewable energy sources. Even at the outset, it seems clear that key parameters will include the costs of renewable energy technologies and the conditions under which they can meet the needs of poor people – particularly through distributed energy systems. Given high levels of unemployment, the employment potential of renewable energy and energy efficiency is also likely to feature prominently.

At a policy level, the critical challenge is how to get onto lower-emission development paths, e.g. SRES B1 rather than A1FI. We already know from the SRES work and

the TAR findings that development paths *even without climate policy* can lead to much lower emissions. We need to research what factors might move a country onto a lower-emissions *development* path. Key factors identified by Yohe (2001) include the availability of technological and policy options, and access to resources to underwrite undertaking those options. Mitigative capacity, however, also depends upon nation-specific characteristics that facilitate the pursuit of sustainable development – e.g., the distribution of resources, the relative empowerment of various segments of the population, the credibility of empowered decision makers, the degree to which climate objectives complement other objectives, access to credible information and analyses, the will to act on that information, the ability to spread risk intra- and inter-generationally, and so on (IPCC 2001). These factors are known in general, the research question is how they might be applied to implementing mitigation policy in a particular country. We need more practical example of sustainable development policies and measures (Winkler et al. 2002), and the factors that can make them happen.

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Renewable Energy a research priority for International Scientific Co-operation with Developing Countries (INCO-DEV)

Dr Rainer Janssen, WIP

Energy is a key component of any poverty eradication and sustainable development strategy and is critical to the achievement of the Millennium Development Goals as is acknowledged by 'The European Community's Development Policy' (COM(2000) 212). The energy sector is also of vital importance in cooperation with the developing countries since problems such as limited access to energy sources, the very widespread use of traditional biomass and dependence on imported energy sources constitute a significant obstacle to social and economic development.

Better access to sustainable energy services for the more than 2 billion 'energy poor' of our planet is a prerequisite for fulfilling development objectives within health,

education, light, heating, transport, agriculture, industrial production and modern means of communication. Today, it is widely accepted that Renewable Energies (RE), i.e. wind energy, geothermal and solar thermal systems, small hydro and modern forms of bioenergy, have a large potential to contribute to the strengthening and development of national sustainable energy infrastructures in developing countries by securing better energy independence through the mobilisation of domestic RE resources, especially in rural areas.

Most developing countries are blessed with ample RE resources which are barely exploited today. It is therefore the purpose of International Scientific Co-operation with Developing Countries to give new impulses to the development of appropriate policies as well as technologies and services under local conditions and to set the scene for their deployment which must be economically and socially sustainable. Building upon the wealth of experiences and good practice in the EU, International Scientific Co-operation projects need to address the following barriers which are today hindering the exploitation of RE for poverty eradication and sustainable development in developing countries:

- Lack of well integrated RE programmes and policies
- Lack of co-ordination between stakeholders
- Lack of knowledge by potential users
- Low market stimulus due to unattractive and unreliable conditions for private investors

International Scientific Co-operation in the field of RE will support the aim of the EU Energy Initiative for poverty eradication and sustainable development (EUEI) launched at the World Summit on Sustainable Development (WSSD), namely to contribute to the achievement of the Millennium Development Goals (MDGs) through the provision of adequate, affordable, sustainable energy services for the poor. This support will focus on institutional capacity building, transfer of knowledge and skills, market development as well as technical co-operation. Thereby, these international co-operation activities will be fully in line with the objectives of the EUEI as well as the EU development co-operation and several EU Member States' bilateral development co-operation programmes aiming at strengthening the role of RE in national and regional policies and strategies (e.g. PRSP) for the reduction of poverty in developing countries.

'Renewable energy research priorities' which were brought to the agenda of two EC co-funded projects coordinated by WIP, namely the 'Global Network on Bioenergy LAMNET' and the project 'Partners for Africa'.

Dr Rainer Janssen, WIP

A) Detailed evaluation of the potential for renewable energy exploitation in African countries (biomass, wind, solar)

Reliable data on the RE potential which can actually be exploited is of very large interest for policymakers in order to develop suitable policies for the promotion of renewable energies. Often reliable data is missing today. For South Africa, Government representatives have voiced the need for a thorough assessment of the potential of biomass residues in the paper and sugar industry in order to prepare policies on biomass based co-generation and liquid biofuels. A similar need will certainly be present in a large variety of other African countries.

B) Life cycle assessment of renewable energy applications (e.g renewable transport fuels)

Even in Europe, there is currently considerable uncertainty about the full energy and GHG emission balance of liquid biofuels use as transport fuel.

Due to the favourable climatic conditions, liquid biofuels may be an interesting option to substitute gasoline and diesel in many African countries.

But, what is needed is a detailed life cycle assessment including the actual impact on GHG emissions, job creation, the environment etc.

C) Assessment of efficiency improvements of traditional biomass use (e.g. improved stoves, alternative fuels (LPG, liquid biofuels))

In many African countries, traditional biomass use accounts for the majority of the total energy use. Saving natural resources, reducing the health impact, etc are important results of improving the efficiency of household energy use.

D) Field research on new energy crops

A variety of new energy crops (e.g. Sweet Sorghum, Jatropha) promise a large potential for application in Africa. Until today there have been scattered field research activities with these crops, but a more coordinated approach (including large scale demonstration, breeding of optimum plant species) is certainly needed in order to exploit the potential of these new energy crops.

E) CDM for financing RE projects

There have been a few successful examples of CDM financing for RE projects in Africa, but certainly this financing option is not being exploited to a satisfactory extent. A variety of African countries is still lacking sufficient capacity in the field of CDM