

The provision of access to clean and affordable energy forms a key component of the post-2015 development agenda. The designation of 2014-2024 as the United Nations Decade of Sustainable Energy for All (SE4ALL) further highlights the increased global emphasis on the provision of sustainable energy, especially for the poorest. As part of the SE4ALL initiative, the UN has set a target to achieve universal access to modern energy by 2030. Meeting these targets means that around two billion people in the global South will, for the first time, have access to new kinds of energy services and technologies.

Traditional biomass remains a key source of energy for many people in the global South. There are a variety of uses to which biomass can be put, across multiple scales. However, the development of modern bioenergy has to date been limited by poor conversion efficiency, (in)appropriate technologies, feedstock availability, access and affordability, and the need for supportive policies and effective implementation strategies. The increased use of bioenergy also has potential for negative impacts on environments, communities and livelihoods as evidenced by controversies over (in)direct land use change, food vs. fuel, and land grabs (see Box 1). Research on bioenergy requires an integrated and systemic approach in order to understand the nexus outcomes i.e. on water, land and food.



Box 1. Global drivers, local outcomes: biofuels in Guatemala

EU is seen as a market that goes 'hand in hand' with sustainability, but does this governance framework capture the issues that matter most to rural communities in Guatemala? Three issues emerged as key: land access, labour conditions and local environments.

"Before I worked on the sugarcane plantations, I worked on the land, on my own harvest. I rented perhaps two hectares and I grew maize and all sorts of vegetables. But the company has taken all the land, there's no longer land available to rent, but there's a lot of sugarcane" (Don Jose, Escuintla, April 2012)

The EU approach aims to incentivise more sustainable production, but my research raises questions about:

- The role of the state
- The risk of legitimising unsustainable practice
- Simplistic interpretations of complex and interconnected systems
- How to make certification schemes both broadly relevant and locally specific?

Subsequent research has used the debate on Food vs. Fuel as a lens to examine the interdependencies between the multiple end-uses of feedstocks and the multifunctionality and stewardship of land in the UK and Guatemala.

UK Capability

Providing access to low carbon, modern energy requires not only an understanding of the technical and engineering challenges, but also of the political economic, governance and cultural contexts within which energy technologies will be implemented. This calls for **interdisciplinary research** that is able to develop appropriate, yet innovative solutions to address these challenges – something the UK is extremely well placed to deliver.

Research highlights

The EPSRC, DfID and DECC-funded *Understanding Sustainable Energy Solutions* (USES) programme has funded eight research projects that investigate sustainable energy solutions to poverty-related and low carbon issues in the Global South. See Box 2 for information about the MECON project, a 2 year project funded through the USES

programme.

USES has links to a number of other RCUK programmes, including:

- Nexus Network (ESRC)
- Rising Powers and Interdependent Futures (ESRC)
- The Supergen Hubs (EPSRC)
- The UK Energy Research Centre (RCUK)

This field of research has **impact on research, policy and practice** across all three dimensions of the energy trilemma – low carbon energy supply, energy security, and energy access and affordability. The UK has already proved a leader in academic excellence in this field, and there is considerable potential for both job creation and economic growth in the global North and global South.

Box 2. Energy efficiency amongst Modern Energy Consumers in the Greater Mekong Subregion

The MECON project investigates how energy efficiency (EE) might be increased amongst the 'New Modern Energy CONsumers (MECON)', defined as those who have access to grid electricity and who live on US\$ 2-5 per day, in the GMS (Cambodia, Laos, Myanmar, Thailand and Vietnam). A survey was carried out to establish an evidence base on energy use, and to identify the opportunities and barriers to the adoption of energy efficient technologies, measures and policies amongst the MECON.

Results:

- Most households use more than one cooking appliance (see Fig 1).
- Households used multiple methods of lighting their homes, although fluorescent lamps were

most common.

- 95% of households own one or more TVs, 88% own mobiles and electric fans, 64% own a refrigerator and electric irons.
- Friends, family and neighbours are the most important source of information; the internet is only important in Vietnam.
- The initial price of an appliance was the most important factor in decision making (87%), operating costs were important to 78% of respondents.
- 54% had seen EE labels, but only 33% knew what information the labels conveyed.

Respondents were aware of the long-term benefits of more energy efficient appliances, but the initial price of a product (i.e. the capital cost) remained the most important factor.

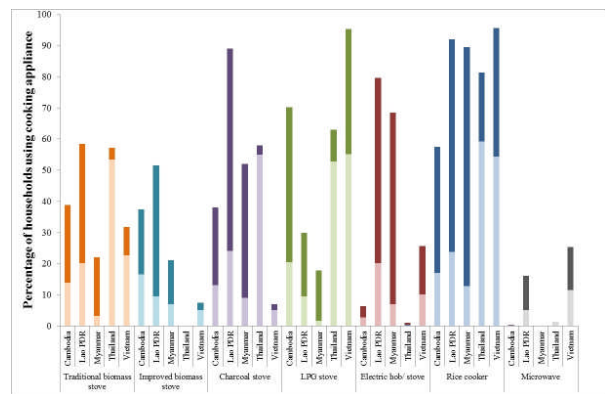


Figure 1. Cooking appliances used by the MECON.

The darker shades show the percentage of urban households, while the lighter colours show the percentage of rural households. Percentages do not add up to 100 because of fuel stacking.

Key **research challenges** centre on developing appropriate technologies that meet the energy (and other) needs of the poorest. Biofuels provide an example of how a failure to understand the political economic contexts of producer countries can lead to negative impacts on marginalised and vulnerable people, and local environments (see Box 1). Many **critical research gaps** remain, including:

- The design of inclusive bioenergy systems across multiple scales, that provide multiple services and which meet the needs of the poorest;
- Better understanding of the inter-linkages between bioenergy/ water/ food, and

how these can be made to deliver social, environmental and economic benefits for all.

- Research at the meso-level (e.g. micro-grids); most research has to date focused on the micro (e.g. solar lanterns, improved cookstoves) or macro (e.g. large hydro, waste to energy).
- Greater understanding of the contribution of energy to economic development, and how these costs and benefits are distributed across different social groups.