LOW CARBON
ENERGY FOR DEVELOPMENT
NETWORK

UNDERSTANDING SUSTAINABLE ENERGY SOLUTIONS (USES) PROJECTS

USES WORKSHOP, NAKURU, KENYA
7TH—9TH DECEMBER 2017

THE USES NETWORK

The USES network is an EPSRC and DFID-funded network designed to bring together the 13 projects funded under the Understanding Sustainable Energy Solutions (USES) research programme, which is working in collaboration with a range of partners in developing countries. The USES programme is a major UK government research initiative aimed at understanding sustainable energy solutions to poverty-related and low carbon issues in the global south.

The programme is intended to increase clean energy access, resilience and wealth creation in developing countries (particularly for the urban and rural poor), through high quality research that improves the understanding and evidence-base of opportunities and challenges associated with clean energy for development. This research is focused on five themes – energy systems and decentralized use; solar; bioenergy; urban and transport; and energy efficiency.

Each of the projects funded under the USES programme is intended to contribute to a longer term goal of increased clean energy access, resilience and wealth creation for low-income households and communities in developing countries. They take very different approaches to doing this, but all have the broad general aim of delivering an outcome of high quality research to improve understanding of the opportunities and challenges associated with scaling up clean energy for development.

The overall goal of the programme is that it will lead to:

- Improved understanding of clean energy options and opportunities for developing countries.
- Improved understanding of the social, market and political economy aspects of scaling sustainable energy access for poor people.
- Strengthened developing country research capacity on clean energy.
- Improved access to practical and policy-relevant knowledge on the challenges and opportunities for sustainable energy solutions in developing countries.

Project outputs are available from the LCEDN Website: https://www.lcedn.com/initiatives/category/USES-Network

Research Councils UK Energy For a Low Carbon Future

Department for Business, Energy & Industrial Strategy

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Agro-Industries and Clean Energy in Africa (AGRICEN)

The Project

AGRICEN looks at how agro-industries in sub-Saharan Africa can position themselves to become important players in the delivery of clean energy services. The project combines new approaches to political economy analysis with business development, innovation systems, financial engineering and participatory approaches, to understand the potential role that agro industries can play in widening energy access to rural communities.

Key Findings

Detailed scoping studies have been carried out on the potential role of agro-industries for widening energy services in various countries. Further the team has completed country case studies mapping out agroindustries and energy issues in the four countries along with a synthesis report, consisting of policies and institutions as well as a situation analysis of the relevant agroindustries in each country. Currently under development is also country-focused deep dive for specific agro-industries, state & health of the industry, expected future developments, energy and resource flow situation at the plant, community energy needs, and technology benchmarking. These are being developed along with detailed feasibility studies in collaboration with agroindustry enterprises (companies) across the four study countries. The purpose these two blocks of work is both to acquire new knowledge in policy and financing from the journey but also support firms, cooperatives or entities in concrete ways towards developing bankable projects that would allow them take advantage of funding opportunities.

Selected Publications

To, LS, Seebaluck, V, Leach, M (2017) Future energy transitions for bagasse cogeneration: Lessons from multi-level and policy innovations in Mauritius,Energy Research and Social Science, ISSN: 2214-6296. DOI: 10.1016/j.erss.2017.10.051.
To, LS, Kwapata, K, Masala, L, Alonso Navarro, V, Batchelor, S, Mulugetta, Y, Barnett, A, Karekezi, S (2017) Policy perspectives on expanding cogeneration from bagasse in Malawi, Journal of Energy in Southern Africa, 28(1), pp.45-53, ISSN: 1021-447X. Full text: http://journals.assaf.org.za/jesa/article/view/1420/1720.
Karekezi S (2014), Status of Cleaner Energy Development in Agro-industries of Eastern & Southern Africa, AFREPREN/FWD working paper 409

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Understanding the barriers to the introduction and uptake of clean/improved cookstoves in Southern Africa (BARRIERS)

The Project

Improved cook stoves have been promoted by charities and governments in developing countries since the late 1940s. A range of approaches have been tried, including 'build-your-own stove' projects, community-focused schemes, manufacturing stoves in remote villages and more recently, market-based activities. In some countries, these new stoves have been well-received. In Kenya, 80% of urban families use a metal 'jiko' charcoal stove for cooking, which uses 50% less fuel and also decreases cooking time. The cost of the stove can be recovered in fuel savings in just a few months and it is estimated that the widespread uptake of the jiko stove saves 206,000 tonnes of wood per year. In other countries, progress has been less spectacular. Schemes have failed for a whole range of reasons which are only partially understood.

Key Findings

So far, the project has collected 210 household questionnaires, 35 policy interviews, 35 value chain interviews and 20 finance interviews. Preliminary results highlight a few key themes:

– Inconsistent use of terminology around stoves and fuels make it harder for end-users to understand varying ICS interventions

– Varying degrees of commitment and a lack of formal policy on stoves has meant that it has largely been left to the donor community to champion a market-based approach with mixed results.

– A mis-understanding of the broader role of the stove within in a household/ community accounts for only partial not exclusive use of ICS

– Parallels from other sectors such as sanitation can draw lessons on how to improve uptake of ICS.

Selected Publications

Ray, C., Clifford, M. & Jewitt, S. (2014). The introduction and uptake of improved cookstoves: Making Sense of Engineers, Social Scientists, Barriers, Markets and Participation. Boiling Point 64, 2-5.

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The Great African Cook-Off: https://www.youtube.com/watch?v=M5S2ujl-57U
https://www.nottingham.ac.uk/research/groups/etri/themes/renewableenergy/bioenergy/improved-cook-stoves.aspx

Project Partners

University of Nottingham, Practical Action (UK & East Africa), Energy Research Centre (UoCape Town), CEEEZ (Zambia), LUANAR (Malawi), Ashden Awards (UK), HEDON

Clean Energy from Rice Straw

The Project

Rice is the staple food crop in Asia, where 91% of it is grown and consumed. For every 4 tonnes of rice grain, 6 tonnes of straw is produced, which in Asia amounts to about 550 million tonnes of straw and 110 million tonnes of husks each year. In most agricultural systems, crop residues can be returned to the soil beneficially, but not in the intensive flooded rice systems that predominate in Asia since 2 or 3 crops are grown each year, with insufficient time for residues to break down and their incorporation would hinder soil preparation and the development of the next crop and long term trials show soil carbon levels can be maintained without needing to return straw to the soil. Therefore rice straw is often burnt in the fields, resulting in airborne emissions hazardous to human and ecosystem health.

Key Findings

It is technically feasible to produce a positive energy balance from digestion of rice straw with positive climate change, environmental and health impacts. However, there are huge challenges associated with implementation. Local people pay high prices for electricity access but do not feel "energy insecure". The key challenge therefore is in finding business models and modes of implementation that deliver community benefits and make commercial sense. Two follow up projects are therefore exploring farmer responses to rice-straw to energy concepts and developing a pilot plant to visibly demonstrate feasibility

Selected Publications

Nguyen et al (2016) Generating a positive energy balance from using rice straw for anaerobic digestion. Energy Reports, Vol. 2, pp. 117—122

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http://ricestraw.irri.org/rice-straw-energy/

Project Partners

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Energy and Low-Income Tropical Housing (ELITH)

The Project

This research programme is intended to identify, and then begin to propagate, methods of reducing the energy consumption of low-income housing in tropical countries. The topic of 'energy efficient', 'sustainable' or 'eco' housing has attracted huge interest in Europe and rich countries generally since about 1990. This has lead to new designs, materials, publications and regulations. For tropical housing however, in which energy usage is not dominated by winter heating, very little has been done to improve energy-sustainability.

Key Findings

Within the study of embodied energy, the programme will identify scope for reducing the energy intensity of building materials by changes in their method of production. This is particularly needed in Africa, where two of the partners are located. So there the programme will conclude with piloting the training of artisanal manufacturers in less energy-intensive methods of producing building materials. Project activities have included household surveys, field experiments with minimising use of energy/emissions-intensive materials (e.g. cement), sensitisation of developers and civic authorities, training of architects and builders as well as research-skills development of (African) partners. 2-day workshops/conferences have been held in Bangkok (2014, 2016) and Kampala (2016). Several urban modelling studies were conducted to optimise energy use of residential community layouts in China. The focus was at the urban design level, by considering floor area ratio (FAR), surface coverage (SC) and density. Several publications are generated from these urban-level studies

Selected Publications

Hashemi, A., Cruickshank, H. & Cheshmehzangi, A. (2015). Environmental Impacts and Embodied Energy of Construction Methods and Materials in Low-Income Tropical Housing, Sustainability, 7(6), 7866-7883
Cheshmehzangi A. and Butters, C., eds., (2017) Designing Cooler Cities - Energy, cooling and urban form: the Asian Perspective. Palgrave Series in Asia and Pacific Studies, London: Palgrave MacMillan.

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ESCO Box: Smart monitoring, billing and control for pro-poor access to energy services

The Project

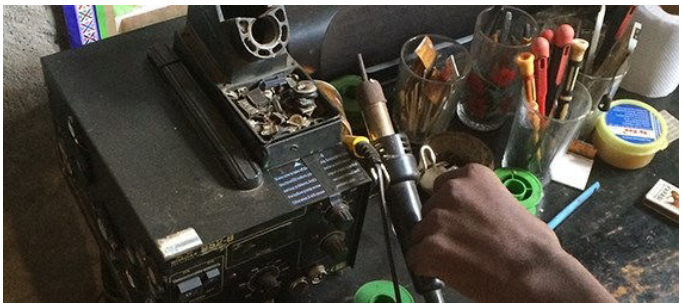
The ESCoBox project introduced 'smart grid' techniques to mini-grids in Developing World applications. It provided both software and hardware tools that can help to reduce the cost of providing energy access in off-grid communities while improving the reliability of mini-grids. The system is intended to facilitate productive and wealth-creating uses of electricity to act as anchor loads for mini-grids. It employs price incentives to encourage the scheduling of commercial loads to match the availability of renewable energy supply, thereby reducing dependence on batteries that are expensive and unreliable. ESCoBox provides a Decision Support Tool (DST) to designers and operators of mini-grids that incorporates novel battery models and load analysis algorithms and offers remote monitoring, control and customer interface options.

Key Findings

Analysis of the needs of mini-/micro-grid operators and their customers indicates that the systems can perform more efficiently, reliably and cheaply if certain loads can be incentivised to run at specific times of the day or year. The ESCoBox DST helps the system manager to decide when, and at what price, to offer discounted time-slots, especially to larger loads, in order to achieve this. The relevant circuits are switched on at the allocated times by ESCoBox's remote control units and can integrate with other systems, such as the cloud-based management and cashless payment facilities of project partner SteamaCo. Field trials of ESCoBox reveal the delicate balance to be struck between accommodating existing patterns and encouraging modest behaviour change in consumers.

Selected Publications

Boait, P. et al. (2017) ESCoBox A Set of Tools for Mini-Grid Sustainability in the Developing World. Sustainability, 9 (5), 738
Gammon, R., Boait, P. and Advani, V. (2016) Management of Demand Profiles on Mini-Grids in Developing Countries Using Timeslot Allocation. Proceedings of the IEEE PowerAfrica 2016 Conference, Livingstone, Zambia, pp. 41-45
Boait, P., Advani, V and Gammon, R. (2015) Estimation of demand diversity and daily demand profile for off grid electrification in developing countries. Energy for Sustainable Development, 29, pp. 135-141



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Green Growth Diagnostics for Africa

The Project

Our project starts by acknowledging that the vast potential of renewable energy is failing to be realised in many African countries, in spite of the many pledges made by donors and international financiers. This is not due to a lack of policies supporting investment. Many African countries have renewable energy targets, feed-in-tariffs (FiT), renewable energy auction schemes or import duty exemptions. However, in some cases these policies are not fully implemented, or when they are, they don't achieve their intended objectives. In order to be effective, policies need to target the most important constraints to investment, and to be politically viable. Our research develops the Green Investment Diagnostics methodology to support policymakers to better target policies to the key constraints for renewable energy investment. The methodology draws upon the original Growth Diagnostics developed by Hausmann, Rodrik and Velasco (2004) to identify the most binding constraints to economic growth in developing countries. We adapt that approach to the particular case of the energy sector, so that we can identify the main bottlenecks faced by renewable energy investors in a particular country. We start by asking: for this particular country, at this particular time, what is preventing higher levels of investment in renewable energy generation technologies for which there is an economic rationale? To answer this question we follow a systematic approach, which starts with a decision tree analysis and continues with the cumulative building of evidence to back up potentially binding constraints.

Key Findings

We apply the new methodology to two Sub-Saharan African countries, Kenya and Ghana, but this exercise could be replicated in any other context. In Ghana, we look for the reasons for underinvestment in renewable generation capacity. We find that renewable energy investments provide low returns in the country, disproportionate with the very high risks coming from an unreliable offtaker, poor regulation, macroeconomic imbalances and corruption. Furthermore, there is insufficient access to finance due to scarce domestic finance and high returns expectation for short-term loans. In Kenya, we first look for factors behind the successful attraction of investment for large-scale renewables, mainly wind and geothermal. We then focus on the constraints to future investment, particularly in flexible, smaller-scale technologies more appropriate for increasing electrification rates in rural areas. Kenya offers generous returns to investment in renewables and least cost generation from geothermal and wind. However, it faces high system costs due to a lack of networking infrastructure and an inflexible generation mix. It also presents regulatory constraints at the planning and procurement stages and serious problems of social acceptance.

Selected Publications

Pueyo, A., Spratt, S., Bawakyillenuo, S. and Hoka O, H. (2017) Green Investment Diagnostics for Africa: What are the Binding Constraints to Investment in Renewables in Kenya and Ghana?. IDS Research Report 83 https://www.ids.ac.uk/publication/green-investment-diagnostics-for-africa-what-are-the-binding-constraints-to-investment-in-renewables-in-kenya-and-ghana

Pueyo, A. and Bawakyillenuo, S. (Eds.) (2017) Green Power for Africa: Overcoming the Main Constraints. IDS Bulletin. Volume 48 (5–6) November 2017 http://bulletin.ids.ac.uk/idsbo

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LCT: Low cost energy-efficient products for the bottom of the pyramid

The Project

In recent years, we have seen an increase in activity to provide energy to low-income households and communities in developing countries, through micro-grids and other methods of distributed energy resources. While studies have shown some improvement in people's lives as a result of the incremental increase in access to lighting, there have been few studies evidencing broader improvement due to energy access. However, access to energy itself cannot change people's lives; rather, it is what people use the energy for that does change lives. Currently, the limited understanding and attention provided to the many market segments represented by the global poor, and of what types of powered appliances and products might change the quality of their lives (and, ideally, their economic condition) is extremely scarce.

Key Findings

The project has several major findings to date. On low cost energy efficient cooking solutions: 1) More understanding of how people cook is essential to understanding what new technologies will break through in a low innovative market. There is currently a dearth of knowledge in this area but pilot research from our project shows that energy use is different depending on what people cook. 2) There is increasing evidence that we will soon be at a time where cooking with electric using solar PV will be possible; pilot trials are necessary to better understand how to design the business model that will work given the size and cost of the technology. 3) Theoretically, this study has highlighted a series of learning with regards the relationship between inclusive innovation, demand side factors for innovation and sustainable development.
On the health side of the project: 1) A "500 watt" Universal Clinic, a delivery platform for primary healthcare has deployed its first set of clinics and is going to market with Nairobi Women's Hospital in Kenya and the Tata Trusts in India. 2) Results from rigorous clinical trials for an ultra-low-cost (<$20) infant warmer for providing lifesaving warmth to premature/low-birth-weight infants, for 8 hours at a time, for 50-100, are highly encouraging. 3) A solar "direct-drive" vaccine refrigerator for small health facilities in rural, off-grid areas has successfully undergone internal tests to meet WHO requirements, a key hurdle to overcome. ITT is planning to submit to WHO for final approval within the next 3-4 months. This fridge costs <25% of current options on the market.

Selected Publications

Mourine Cheruiyot, Rebecca Hanlin, Simon Batchelor and Nigel Scott (2017). Demand side contextual drivers of inclusive innovation: the case of Kenya's energy efficient appliances sector. SETUSA Conference Paper, Accra, Ghana, 19-20 June 2017

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Effective energy efficiency policy implementation targeting “new Modern Energy CONsumers” in the Greater Mekong Sub-region

The Project

MECON was a two year research project, which ran from 2013 to 2015. The MECON project investigated the potential for increased energy efficiency amongst ‘new Modern Energy CONsumers’ (MECON) households. These were defined as households that were connected to the electricity grid, and which have a daily income of US$ 2-5. A continuous rise in average incomes and an increasing middle class in Asia have elevated the importance of energy efficiency in the residential sector. The emerging middle class is a critical factor in economic and social development, and also leads to an increase in sales of household appliances, as well as domestic energy consumption.

Key Findings

The results of the MECON project can be used by policy makers in order to develop locally appropriate policy instruments targeted at increased investment in energy efficiency measures. Since policy recommendations are addressing low income households, a reduction in energy consumption of this part of the population is expected. But, more importantly, the expectation is that these low income households will soon transition to become middle income households, firstly in countries such as Thailand and Vietnam and later in the other GMS countries. By targeting these low income households with information about energy efficiency and possibly financial incentives, the expectation is that increasing energy demand in the GMS can be curbed in the long term.

Selected Publications

Piyasil, P. (2014) The MECON research project: how to increase energy efficiency by addressing low income households? Available at: http://meconproject.com/reports/

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Energy Efficient Rural Food Processing Utilising Renewable Energy to Improve Rural Livelihoods (RE4FOOD)

The Project

In sub-Saharan Africa significant food losses occur as a result of a number of factors which include insufficient drying, inadequate storage, insufficient cooling and poor transport – all of which rely on high levels of energy input. Decentralised, distributed food processing supported by distributed energy supply can not only improve food security but also provide employment and income generation in rural communities. The project has conducted research to support rural livelihoods through the utilisation of renewable energy and optimising food processing to minimise loss and waste for fruit, vegetables, maze, fish and other food products.

Key Findings

The project investigated the opportunities and barriers to the use of renewable energy for rural food processing and explored the possibility to add value to food products. The research team assessed the losses for the products chosen in Kenya, Sierra Leone and Ghana and identified low carbon and energy efficient crop storage, drying, cooling and refrigeration and other processing technologies. Demonstration systems and facilities were subsequently constructed for use in rural communities to take advantage of renewable energy sources in a cost-effective way. The researchers engaged widely with stakeholder during the course of the project and have disseminated the research outcomes and carried out knowledge transfer to demonstrate the possibilities to reduce post-harvest losses and support rural livelihoods.

Selected Publications

Ndirangu SN, Kanali C, Mutwiwa U, Kituu G, Kamwere M, Mung'atu J (2017) Determinants of postharvest losses among high moisture content vegetables traders in Kenya. Journal of Postharvest Technology, 5(2)
Kallon A, Lebbie A, Sturm B, Garnett T, Wadsworth R (2017) Comparative studies of fish smoking and solar drying in the Sierra Leone artisanal fishing industry. Journal of Stored Products and Postharvest Research, 8 (3)

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Energy Literacy for Decentralised Governance (READ)

The Project

Over the last ten years African governments have moved increasingly towards decentralized budgets, giving local authorities increased powers and budgets to govern areas that include both rural and urban population. There has, however, been precious little research done on exploring the relationship between this process of decentralization and energy governance and it is this major gap which this research project sought to address. The primary objective for the project was to scope the implications for energy governance caused by the political process of decentralisation occurring across African states.

Key Findings

There are many potential advantages to the decentralisation of energy governance. These include better coordination of energy services with other service provision infrastructures, better coordination of the wide variety of actors involved in the energy sector, more effective targeting of national energy policy and provision of support services and networking opportunities. Political decentralization could also encourage local people to play a more active role in articulating local solutions to the challenges which they face including energy. Our findings from research in Rwanda, Kenya and more recently Malawi sug- gest that, in reality, much depends upon national/local context and the capacity, legitimacy, levels of resourcing and legislative authority held by local administrations and the inter-relationships between different branches of territorial government and other actors (and between different scales of government).

Our outputs include: A series of working papers, academic journal articles (current under review), a series of YouTube Videos, a report for the Malawi government (conducted jointly with Strathclyde University, Mzuzu University and Community Energy Malawi), a connected EPSRC funded PhD studentship and inputs into the development of Kenya's SE4All hub.

Selected Publications

Ngugi, W. and wa Gathui, T. (2014) Kenya Stakeholders Workshop Report, Nakuru County. Available at: http://thereadproject.co.uk/wp-content/uploads/2014/10/READ-Stakeholders-Workshop-Report-_Kenya_Final-15.10.14.pdf

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Supporting Sub-Saharan African Municipalities with Sustainable Energy Transitions (SAMSET)

The Project

Urbanisation rates in Africa are the highest in the world, and in most Sub Saharan countries service delivery is inadequate to keep up with the needs. African populations remain amongst the poorest in the world, and efforts to achieve the energy-related dimensions of the Millennium Development Goals have in most cases not had significant impact on urban populations. This research project aims to "design, test, and evaluate a knowledge exchange framework to facilitate the implementation of an effective sustainable energy transition in Africa's Sub-Saharan urban areas", and includes a strong action research component which involves close partnering with six cities in three African countries (two each in Ghana, Uganda and South Africa) to foster a deeper understanding of the dynamics and constraints that policy and strategy implementation faces in Sub Saharan African cities.

Key Findings

SAMSET's Sub-Saharan African project partners has formed networks of municipal planners, government officials and other interested actors in the sustainable urban sphere in their countries, and this led to the project partnering with six municipalities in Sub-Saharan Africa: Cape Town and Polokwane in South Africa, Jinja and Kasese in Uganda, and Ga East and Awutu Senya East in Ghana. Research has focused on the production of state of energy and sustainable energy strategy reports for the partner municipalities, as well as direct support for sustainable urbanisation activities through capacity-building and training, as well as consulting with municipal representatives at SAMSET network meetings.

Selected Publications

Tait, L., Euston-Brown, M., (2017) What role can African cities play in low-carbon development? A multi-level governance perspective of Ghana, Uganda and South Africa, Journal of Energy in Southern Africa, Vol 8 (3): 43-53.

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Solar Nano-Grids (SONG): An appropriate solution for meeting community energy needs?

The Project

The Solar Nano-Grid (SONG) project aims to investigate how viable the option of nano-grid systems are for small off-grid communities in Bangladesh and Kenya. It aims to investigate the extent to which small rural communities would benefit by linking up to a communal solar power system that could also be connected to an agricultural or industrial application, like an irrigation system. These "nano-grid systems" could supply enough electricity for each household's needs as well as generate an income for the community, reducing the cost of energy for each family. The project set out to evaluate the potential of nano-grids as an alternative to solar home systems (SHS) or fully-fledged larger mini-grid systems and to develop effective business models for scaling up, considering country and region specific contexts.

Key Findings

The project has established four functioning nano-grid systems (two each in Kenya and Bangladesh). Lesson learning has focused on: the technical performance of different variants of the nano-grid; community engagement and consultation; different models of nano-grid governance and the management of stakeholder relationships; the development of business models, particularly for productive uses and different options for financing future developments. One of the key features of the Kenyan experience has been the growing ownership of the project that the two local communities have developed following a very difficult period which saw the insolvency of the original project partner. Currently our attention is focused closely on future governance arrangements and business planning in the four communities.

Selected Publications

Cloke, J., Mohr, A., and Brown, E. (2017) Imagining renewable energy: Towards a Social Energy Systems approach to community renewable energy projects in the Global South. Energy Research and Social Science, Vol. 31, pp. 262—272

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Sustainable Thermal Energy Services Partnerships (STEPs)

The Project

The provision of clean, sustainable thermal energy services in rural areas of developing countries is an area so far neglected by academia, however it is projected that more than 2.6 billion people will remain without such services by 2030. The research undertaken in this project has studied existing experiences of providing thermal energy for cooking, space heating and sanitation using different approaches, particularly the "fee-for-service" business model. In this model, users pay for the energy services delivered to them, relying on service provision from a private provider for a small monthly fee. They can benefit from energy services without having to incur large up-front costs, which is of particular importance in rural areas of developing countries where household income and access to credit is generally low.

Key Findings

The production of a STEPs project resources guide for thermal energy services, on both a business and policy level, is being finalised with the production of working chapters for a number of thermal energy technologies, including Liquefied Petroleum Gas, biogas digesters, solar water heaters and improved cookstoves. Partnerships are being built with South African stakeholders and a UN and government project providing thermal energy services in Afghanistan. Main findings are that - under a number of conditions - business models and policies developed for off-grid electrification companies can be extended to thermal energy services

Selected Publications

Lemaire, X, (2015) Energy access and development in the 21st Century. Chap 8. In P. Ekins, M. Bradshaw, J. Watson (Eds.), Global energy: Issues, Potentials and Policy Implications, Oxford University Press, (2015)

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LOOKING FORWARDS—BEYOND THE USES NETWORK

Looking into the future beyond the USES project timeframes, some of the partnerships forged through the USES programme are being taken forward under DFID's new Transforming Energy Access programme. The LCEDN has been playing a coordinating role in facilitating partnerships and developing capacity building activities under the TEA initiative.

The objective of DFID's new Transforming Energy Access initiative is "(to) deliver new technologies and robust evidence on the critical barriers hampering systemic change and scaling up energy access, working with Southern researchers and entrepreneurs to drive locally relevant innovation and delivery." TEA is aimed at having a transformative impact on the design and deployment of renewable energy solutions across the Global South, especially in Africa.

The LCEDN has been funded to deliver an integrated 18 month 'Partnerships for Skills Development' programme of activities designed to fast-track TEA activity under its Developing Skills and Expertise workstream via two major streams of work:

(i) An LCEDN Programme of Skills Development and Research/Innovation Integration - mobilising and developing energy and development capacities and expertise across research and innovation communities in North and South, at the same time as focusing on strengthening the coordination of UK energy and development research and innovation.

(ii) Specific Capacity Building Alliances with key partners and stakeholders through which specific knowledge and skills can be nurtured and developed, including the Africa-EU Renewable Energy Cooperation Programme (RECP), the Africa Sustainability Hub (ASH), the ENERGIA international network on gender and sustainable energy, Energy 4 Impact (E4I), Engineers Without Borders UK (EWB-UK), the International Conference on Developments in Renewable Energy Technologies (ICDRET), the Knowledge Transfer Network (KTN), Practical Action (PA), the Royal Academy of Engineering (RAEng), the Smart Villages Initiative (SVI) and the UK Collaborative on Development Sciences (UKCDS)

WORKSHOP DELIVERY PARTNERS

The African Centre for Technology Studies is a leading independent, non-partisan, inter- governmental Pan-African development policy research organization, working to harness applications of science, technology and innovation for accelerated sustainable development in Africa.

ACTS was recently ranked among the top 3 climate change think tanks globally in the 2016 International Centre for Climate Governance think tank ranking, which is based on cutting-edge research in the field of climate change economics and policy. ACTS are partnering with us in the delivery of the USES workshop, are also partners with the LCEDN under the Transforming Energy Access (TEA) initiative where we are collaborating in the delivery of a further two workshops in East Africa over the coming months focusing on the theme of energy governance.

The **Africa Sustainability Hub (ASH)** (https://steps-centre.org/global/africa/) is a North -South and South-South Partnership hosted at ACTS with the aim of bringing together leading think tanks in Africa and the UK to pursue coordinated and complementary evidence based research and capacity building on pathways to pro-poor energy access. The hub further provides a platform for building for African researchers and policy makers to debate sustainable development issues affecting Africa.

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Africa Technology and Policy Studies (ATPS)

Programme outputs are available from the ASH website here: https://steps-centre.org/global/africa/#publications

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