Thematic Fiche No. 2
Modern Energy Access for Socio-Economic Development

Energy and the Need for Development

With approximately 1.4 billion people, 25% of the population of the developing world, living below the new poverty line of $1.25/ day[1], the need to stimulate development is particularly pressing. Poverty reduction, economic growth and enhanced quality of life are goals which are often targeted as means to promote socio-economic development. This thematic fiche will focus on ***improving socio-economic development by providing access to modern energy***, a strategy which contributes to the three afore-mentioned goals. Energy is necessary for both economic growth and poverty reduction however ***incentives*** may be required in order to stimulate socio-economic development as access to energy does not appear to be a sufficient catalyst in itself.

Since the World Summit on Sustainable Development[2] of 2002 it has been recognized that one of the greatest limitations to development has been the inequitable access to modern energy services – electricity, natural gas, modern cooking fuel and mechanical power. It was noted that access to modern energy services is fundamental to fulfilling basic social needs, driving economic growth and fuelling human development. Currently 2.5 billion people are heavily reliant on traditional biomass fuels for cooking and 1.6 billion people are lacking access to electricity due to reasons of availability and affordability.[3] Though there has been an increase in access to modern energy over the last 25 years, distribution and consumption have increased in an unbalanced manner, targeting those whose financial capabilities allow for it. This creates a vicious cycle of under-development.

Low levels of access to modern energy can be attributed to many factors, though of particular significance are:

- low income levels in rural or un-served populations,
- lack of political will and commitment,
- unequal distribution of energy services,
- deficiency of government and private sector investment.

[1] World Bank—statistics taken from 2005 www.worldbank.org

2 See www.johannesburgsummit.org and www.un.org/esa/dsd/

[3] Gaye, Amie. Access to Energy and Human Development--Human Development Report 2007/2008--HDR Office--Occasional Paper. Working paper no. 2007/25. UNDP. http://hdr.undp.org/en/reports/global/hdr2007-2008/papers/gaye_amie.pdf

Productive Uses of Energy

As the discussion on development and the access to modern energy is further examined, it becomes necessary to distinguish the value of physical energy versus the economic development value of productive use investments. But, does the simple provision of electricity to a rural and un-served population promote the basis for development? Are economic and social developments a mere consequence? Providing communities with access to energy is only half the battle; if development is to be the end goal, giving assistance to use it in a productive manner is the other half.

When energy is used for creating goods/services for production of income or value then it can enhance the overall potential for increasing development and reducing poverty. Therefore when providing access to energy, the focus should not only be on ensuring that energy is accessible but also to provide the services people need to become productive through an integrated approach.

Energy access can be used for many productive purposes as outlined in table 1 below.

Table 1 – Productive uses of energy[4]

Processing	Heating and Cooling	Water-related	Communication	Miscellaneous
- Meat and fish drying - Edible flower drying - Rubber drying - Spice drying - Cereal grain - Coconut fiber processing - Gypsum processing - Grain mills - Sawmills - Silk production - Silkworm rearing - Textile dyeing	- Air conditioning - Commercial stove and ovens - Ice making - Milk chilling - Refrigeration of medicine - Water heating	- Desalination - Pumping for irrigation - Pumping for potable water - Purification	- Broadcast - Cinema - Distance education - Internet - Navigational aids - Receiver - Telephone - Video	- Battery charging - Brick making - Carpentry - Cathodic protection - Electric fences - Environmental monitoring - Fish hatcheries - Handcraft production - Power for medical equipment - Sewing - Welding - Wood working - Workshop- hand tools

However, there may be other definitions of what is “productive”. An example often discussed is the provision of electricity for lighting in bar. Is this productive? Without energy supply a bar has difficulties operating as a business, thus reducing income-generation and employment opportunities. Whereas a bar provides a place for social gathering where ideas and information can be exchanged between community members, it also promotes the spending of a household’s income in an unproductive manner that does not benefit or endorse the overall well being of the household.

[4] White, Ron D. *GEF/FAO Workshop on Productive Uses of Renewable Energy: Experience, Strategies, and Project Development*. Publication. 2002. http://www.hedon.info/docs/GEF-FAO_productive_uses_workshop_summary.pdf

Income spent at a bar instead of on education, productive investments (i.e. starting up a business or buying energy efficient technologies) or food for the family, can be seen as a hindrance to development. Ultimately, it is the type of benefits that are yielded from a specific activity which will decide the overall productive use of energy. Some services, such as mobile phone access can be used for productive or unproductive purposes.

Though the occurrence of productive use energy projects is on the rise, external conditions surrounding the target groups are just as important. Table 2 provides an overview of some of the conditions that should be considered when promoting access to modern energy for socio-economic development:

Table 2: Conditions to be considered – access to modern energy for socio-economic development

Condition	Concept	Project applications
Affordability	Access to energy should be affordable to all members of the target group—including cost of connection fee, tariffs, and energy efficient technologies	A major consideration should be that services provided do not actually increase costs to households, due to unexpected or hidden costs in distribution, operation and maintenance. Certain projects thus offer subsidized connection fees to address this.
Willingness/ Acceptance	Commitment to the aims and goals of a project creates a successful environment for implementation. Acceptance is a major factor that promotes willingness	Acceptance can be enhanced by addressing basic needs such as reducing time and labour needed for household activities through energy efficient technologies. Some projects use 'ambassadors' to show neighbours that their daily chores have been alleviated, through e.g. efficient stoves
Awareness/ Understanding	Sufficient dissemination of information to the target group provides a platform not only for acceptance, but motivation to commit to the ideals of the project based on an understanding of the purpose and its benefits	Awareness raising activities should be included in the project design to stimulate the creation of new business opportunities.
Proper Training	Without proper training of local member regarding the technologies and their associated operation and maintenance needs, sustainability and capacity development becomes improbable	Specific budget lines for adequate training and capacity building should be included. In many improved stoves projects, maintenance of the stoves is being ensured as re-fresher courses are provided to the trainers not only on how to make the stoves, but also how to repair them, improving overall capacity of the target group.
Knowledge and Development of Business Skills	Having the necessary skills, tools and resources enhances opportunities for development	The focus on the development of business skills should be apparent. For example, one project in Kenya includes setting up a mentoring facility. The same project "Developing Energy Enterprises Project East Africa" helps establishing business plans.
Conducive business environments and models	A favourable business environment with the appropriate financial, regulatory and legislative framework is required to guarantee sustainable operation and management of the business	Establish schemes with (micro)-financing institutions to ensure there is access to debt financing. Demonstrate the need for business diversification in communities in order to avoid that all are undertaking the same type of activities i.e. mobile phone charging or selling light bulbs.

Some Positive Impacts of Energy Access on Development

Productivity: Accessible energy impacts on efficiency and the ability to use improved technologies thereby resulting in greater productivity. Modern energy can improve agriculture and fisheries in regards to irrigation, crop / catch processing and storage. Freezing capacity allows fishermen to harvest beyond the immediate demand, thus enabling fishing industry to distribute further away. Women and girls can be freed from some of the burden that is an inherent part of food processing, so they can pursue other activities such as attending school on a regular basis.

With the income generated from production, small businesses have the ability to emerge into national and international markets and the opportunity to positively impact a country's overall GDP.

Example: BEST RAY – Bringing Energy Services to Tanzanian Rural Area

An example of an Energy Facility project which aims among other at improved economic conditions due to time and money saved on fuel and start-up of new energy-related business. 66 women have been trained on food processing and conservation, energy saving technologies and basic business management and 64 out of these graduated and were awarded certificates.
Picture taken during a Women training course on food conservation, Mkuru Training Camp.

Health: Effective delivery of health services is facilitated by access to energy through the capacity to provide services which would otherwise be unavailable. This includes the longer operation hours, life support and diagnostic equipment which can be utilised as well as more hygienic cleaning and preservation. Hospitals and clinics have the opportunity to refrigerate vaccines and operate under bright light during childbirth, thereby improving the long-term health of communities within the catchment area.

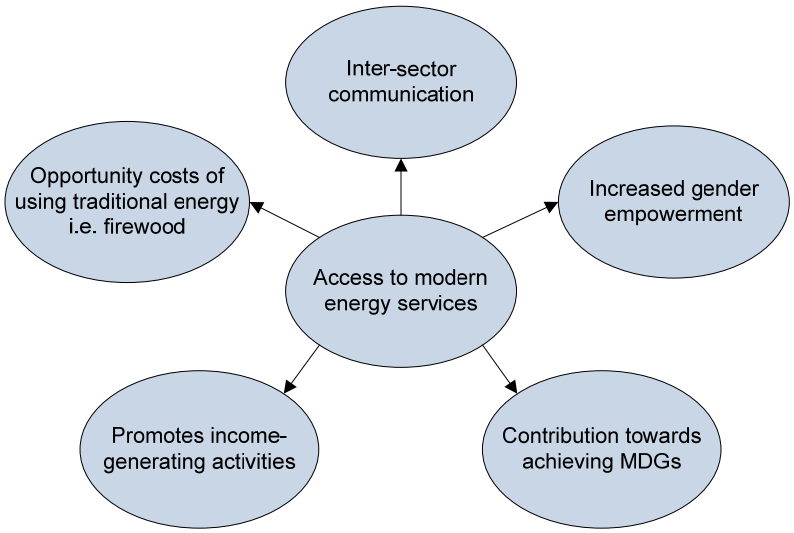
Modern energy can also reduce the exposure of women and children to a major public health hazard by providing an alternate cooking method. Indoor air pollution, caused by traditional methods such as the burning of biomass using traditional stoves has been linked to increased accounts of acute respiratory infections in children. The improved stoves projects financed under the Energy Facility, for example the *Msamala Sustainable Energy Project* in Malawi, have reported reduction of pollution and health complaints as the modern energy stoves reduce smoke and the quantities of harmful gases (e.g. CO) and particulates.

Education: With increased modern energy access schools can have light to provide extended opening hours for adult education, as well as equipment for teaching physics, or technologies such as computers which will enhance the overall education curriculums. With energy access in the household studying hours for children are not limited to the daylight hours. The *"Community Managed Renewable Energy Project in*

Ethiopia" is installing and using solar powered devices to bring energy to local community schools, thus enhancing the overall quality of education.

Communication: With increased modern energy, access to communication technology and the resultant dissemination of information can be improved at the community and individual level, as well as within and between district, regional and national bodies. With this enhanced facility, the transfer of knowledge and skills becomes easier. Examples could be to appoint village representatives to act as liaisons between members of the community and local and district authorities, thereby creating a two-way dialogue and enhancing the relationship between communities and authorities.

The following diagram illustrates impacts from promoting access to energy.



Incentives

What can a project do?

Incentives for promoting modern energy access to improve socio-economic development can be geared towards governments, NGOs, donor agencies/institutions, industry, financial investors and target groups. The project can provide the necessary tools to each of these actors in order to secure the productive use of energy/ and the access to energy for local development.

The project and...

The Government: Inadequate awareness of local needs on the part of the government is a major issue. In order for government policies regarding energy to best reflect the needs of a project, communication between both parties needs to be established. Projects interacting with governments and institutions can raise sufficient awareness to help secure additional funding or improved policy reforms. The project

can facilitate dialogue with government bodies and community members if for example, increased public funding allocations are needed to facilitate the extension of the electricity grid, or to subsidize the connection fees, which will ultimately lower the capital costs for the consumer. Working **with** national authorities enhances the impact of energy access on local development.

The project **"Up-scaling Access to Integrated Modern Energy and Services for Poverty Reduction"** in Tanzania, invited the local government to a capacity building workshop, which was aimed at enhancing capacity on good governance and accountability to local authorities, civil and private society organizations. This helped in understanding how to align energy activities with local government authorities' activities such as Districts Sustainable Energy Clusters.

Financial institutions/ micro-credit agencies: Productive uses of energy may require initial investment, yet financing institutions are reluctant towards lending to perceived high-risk, rural and un-served populations. The project can facilitate meetings with micro-credit institutions in order to advise them of the low-risk and short payback period of the investments. Packages can be set up, as is being done by the "*PAMENU"* project in Uganda, where a financing scheme is being established between solar PV equipment vendors and a local bank. The project *"Community Assisted Access to Sustainable Energy Project (CARE)"* in Rwanda has worked on linking the target beneficiaries with local micro-financing institutions in order to facilitate access to the purchasing power needed to produce and market improved cooking stoves, which will in turn allow for income-generating activities to take place.

Non-governmental organizations: Local development can be seen as a community initiative and effort. Interaction and collaboration with other NGO's or projects can provide clear lines of communication and harmonization of ideas, in order to avoid duplication. Agency forums provide an effective medium to discuss and exchange ideas regarding energy efficiency and possible new technologies, as well as the spreading of best practices so that energy is used in the most effective manner to promote local development. Good cooperation with grassroots organizations and NGOs working at local level is important in relation to ensuring the locals' acceptance of and participation in the project and their willingness to pay. This would increase the projects' potential sustainability.

Energy sector: Important losses of energy must be avoided, at production and distribution level to avoid that consumers have to pay for losses, as well as at the level In collaboration with the energy sector, including suppliers, systems can be devised that will provide affordable energy to local consumers, e.g. through pre-paid meters. Pre-paid meters allow the individual to select the amount of money they want to spend on energy, and with proper education regarding energy usage, they can decide which are the most 'energy worthy' activities. Network losses must be avoided.

Target group/ beneficiaries: With the introduction of new ideas and technologies regarding the use of energy, what can often be lacking is a clear understanding of these new tools. The project can therefore take steps through education, campaigns, awareness raising, mentoring, etc. to provide the necessary knowledge to the target

groups, equipping them with a sense of purpose and empowerment to adopt new practices. As fuel and the rising cost of energy is a major factor to consider, the focus on **energy efficiency** has become more prevalent. Through the use of energy efficient stoves, which reduce the amount of firewood needed by 50%-70% and reduce the time used to collect firewood, time and funding is made available for other activities that could promote socio-economic development.

Testimony

"We knew we were walking longer and longer distances to fetch firewood, but it never occurred to us that we can do something about it. The Project has empowered us to plan and act on our current and future energy challenges." Chairman for the Chambo Village Forest Committee, Malawi

One of the biggest incentives for promoting the access to and use of modern energy to facilitate development is the opportunity cost of using traditional sources of biomass such as wood fuel, agriculture residues and animal dung, which people in the developing world are highly dependent on. Due to inefficiency, pollution and unreliability of these sources "the poor in developing countries pay much more in terms of their health impacts, collection time and energy quality for the equivalent level (or less) of energy services as their counterparts in the developed world".[5]

The Role of the ACP-EU Energy Facility

As an umbrella programme for 74 energy projects, the ACP-EU Energy Facility promotes socio-economic development by facilitating the necessary funding for energy projects that target communities, districts and even entire regions. Many projects use an integrated approach, which is unique and specific with objectives that address identified needs based on local circumstances and available resources. Projects cover a wide range of services from introducing energy efficient stove making by women's co-operatives, to equipping schools, clinics and local institutions with increased energy capacity via various sources such as grid connection, or local energy generation from hydro, solar or wind sources. Projects focus on bringing renewable energy to rural populations and capacity building in energy planning and management. The goal of these projects is to provide the tools and services required, through enhancing access to modern energy services, in order to promote development while equipping communities with the resources, skills and knowledge to achieve real sustainable impacts. The following case studies demonstrate examples of how the ACP-EU Energy Facility has promoted modern energy access for socio-economic development.

Providing Access to Modern Energy for Northern Uganda (PAMENU) - 9 ACP RPR 49/11
Location: Northern Uganda
Overall Objective: Poverty reduction and improvement of quality of life in rural areas of Northern Uganda. Specific Objective: Provide access to modern energy services ("energy packages") for rural households, social institutions as well as SMEs

[5] Johnson, Francis X., and Fiona Lambe. *Energy Access, Climate and Development*. P. 1 Rep. Commission on Climate Change and Development, 2009. www.ccdcommission.org

Impact on development: With the dissemination of improved stoves to over 150,000 households to date the target group has experienced a considerable reduction of energy expenditures (time, labour, and cash). Solar PV system users will enjoy savings on dry-cell batteries, kerosene/candles and petrol for generators. These savings can be indirectly translated into additional expendable income for the target groups. Small energy businesses have begun to be established, for example stove builders that are selling improved stoves, though increased effort is needed on business development to ensure sustainable income.

For more information on this project visit:
http://www.energyfacilitymonitoring.eu/index.php?option=com_acpeu_contacts&id=20

Somalia Energy and Livelihood Project - 9 ACP RPR 49/01
Location: Somalia
Overall Objective: To alleviate poverty in Somalia through development and use of alternative energy services. Specific Objective: Increased access to energy services in rural areas of Somaliland and Puntland.
Impact on development: A project component introduces improved energy efficient stoves. The project estimates that 80% of the already produced stoves (more than 7500) are used by the target group in Somaliland and Puntland. Calculations show that the cook stove producers have gained a profit allowing for an estimated per capita income equivalent to around $500 which is double the average per capita income in both Somaliland and Puntland. Those who have purchased the improved stoves are saving at least half of the wood normally consumed, and therefore energy expenditures have decreased.

For more information on this project please visit:
http://www.energyfacilitymonitoring.eu/index.php?option=com_acpeu_contacts&id=23

Msamala Sustainable Energy Project - 9 ACP RPR 49/29
Location: Malawi
Overall Objective: To contribute to the eradication of extreme poverty and hunger of poor rural people in Balaka District in Malawi. Specific Objective: Improved sustainable access to and use of energy in TA Msamala.
Impact on development: Vulnerable and disadvantaged groups like women and children have seen a reduction in their burden of collecting firewood (in terms of distance and frequency) by 30% due to energy efficient stoves. The installation of PV systems will increase the safety and the hours of teaching time for 8,860 students and 66 teachers. 34 small scale business groups have been mobilized and trained in *stove production and marketing, beekeeping and mushroom growing*. Income generated is invested in household asset growth such as livestock, or purchase of food to supplement the recent harvest. The project is also very ambitious in raising awareness on energy issues, and providing opportunities for knowledge sharing through their REFLECT literary circles, while also organizing trainings and workshops on sustainable business and energy efficiency.

For more information please visit:
http://www.energyfacilitymonitoring.eu/index.php?option=com_acpeu_contacts&id=62

Up scaling the smaller biogas plants for agricultural producers and processes - 9 ACP RPR 49/9
Location: Kenya
Overall Objective: 1) Additional options for appropriate energy supply are available in rural areas and 2) A framework for sustainable dissemination of Biogas technology is established. Specific objective: Small to medium rural livestock farmers, pastoralists and other beneficiaries have improved their living conditions and adequate supply of energy through use of Biogas technology.
Impact on development: There is strong emphasis on capacity building, raising awareness, institutional structures, financing, standards and sustainability, where these elements provide a basis for successful project implementation. Staffs from over 30 companies have been trained to construct biogas plants, and new business opportunities have been established. With the construction of around 150 biogas plants, allowing biogas to be used for cooking, indoor air pollution has decreased, and fuel consumption has decreased significantly, leading to savings on fuel-wood and fertilizer in the household budget. Some new activities based on biogas and slurry include a bakery using biogas for baking; a plant providing 4 hotels with biogas for cooking; 2 clients use biogas to run generators for water pumping (irrigation) and chaff cutting; and 6 academic institutions are using biogas to cook for students.

For more information please visit:
http://www.energyfacilitymonitoring.eu/index.php?option=com_acpeu_contacts&id=19

Testimony

"*30- year- old Farhiya Mohamed is a beneficiary of the EU Energy Project. The project has installed a solar water pump for Farhiya's community. She says the project has enabled her to access clean water within a short time, from a distance of 1 km to 50 metres, reducing time taken to draw water from 1hour to 15 minutes. This has enabled her to get time to do all her domestic chores considering that women are involved in fetching water for almost all productive activities in this community*." Promoting Use of Alternative and Sustainable Energy in Wajir District, Kenya

Conclusion:

With close to 1/6 of the world population having little or no access to energy and electricity services, the need to promote modern energy access for socio-economic development can certainly not be denied. To many the solution may seem simple - money! Money can pay for the infrastructure, money can supply the energy, money can create new businesses…. however, money is only one tiny fragment of the overall picture. Just as important is educating the population, communities and individuals on how and why access to energy is beneficial for socio-economic development. Clearly showing the linkages between access to energy and the elements of development can ensure understanding/ awareness and commitment. By doing this the necessary skills, tools and knowledge can be provided creating a medium where eventually the outcome can be achieved - helping people to help themselves.

Useful Links:

1. COM(2002) 408 Final: Communication from the Commission to the Council and the European Parliament - "Energy cooperation with the Developing Countries" (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52002DC0408:EN:HTML).
2. Women and Productive Uses of Energy: Some light on a shadowy area http://www.serd.ait.ac.th/ep/epkas/presentation/Papers/Women%20and%20Productive%20Uses%20of%20Energy%20Clancy%20%20Soma-final.pdf
3. GEF/FAO Workshop on Productive Uses of Renewable Energy http://www.hedon.info/docs/GEF-FAO_productive_uses_workshop_summary.pdf
4. Tackling the Rural Energy Problem in Developing Countries http://www.imf.org/external/pubs/ft/fandd/1997/06/pdf/barnes.pdf
5. Contribution of Energy Services to the MDG and to poverty alleviation in Latin America and the Caribbean http://www.eclac.org/publicaciones/xml/0/38790/lcw281i.pdf
6. Energy for a Sustainable Future-The Secretary-General's Advisory Group on Energy and Climate Change http://www.un.org/wcm/webdav/site/climatechange/shared/Documents/AGECC%20summary%20report%5B1%5D.pdf
7. Delivering Energy Services for Poverty Reduction: Success Stories from Asia and the Pacific—UNDP Regional Energy Programme for Poverty Reduction
8. Environment fact sheet: Energy for Sustainable Development http://ec.europa.eu/environment/climat/pdf/energy_fact_sheet.pdf
9. Energy Indicators for Sustainable Development: Guidelines and Methodologies http://www-pub.iaea.org/MTCD/publications/PDF/Pub1222_web.pdf
10. Renewable Energy Technologies for Rural Development http://www.unctad.org/en/docs/dtlstict20094_en.pdf

Thematic Fiche No. II. "Incentives - Modern energy access for socio-economic development"

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Monitoring of the ACP-EU Energy Facility - 1st Call for Proposals
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