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TOWARDS AN 'ENERGY PLUS' APPROACH FOR THE POOR

An agenda for action for Asia and the Pacific

UNDP/Energy Access for Poverty Reduction/the Philippines

United Nations Development Programme

ENVIRONMENT AND ENERGY

1. Introduction

Access to modern energy services ('energy access') is essential to economic and human development.[1] Lack of energy access ('energy poverty') and its impact on health, education and income continue to be a significant cause of chronic poverty in developing countries. Since poverty, in turn, inhibits access to essential energy services, a vicious cycle develops. Energy poverty and concomitant heavy reliance on biomass fuels have a disproportionate effect on women and children, who are forced to spend significant time collecting fuelwood and preparing meals in poorly ventilated kitchens.[2]

Universal energy access and its relationship with other national, regional and global concerns – from poverty alleviation to climate change – have gained greater importance and recognition in recent years:

> Access to sustainable energy is critical for making societies more equitable and inclusive, and for encouraging green growth and sustainable development overall. We advocate for equity, inclusiveness, resilience, and sustainability to be the guiding principles for efforts to achieve universal energy access.
>
> We recognize that different groups have different energy needs. Therefore governments need to balance the financing of large-scale energy projects with support for the off-grid, decentralized energy solutions which will help meet the needs of the poorest and most marginalised people. Cleaner cooking and heating fuels and motor power for productive activities are needed…
>
> The UN Secretary General's initiative on Sustainable Energy for All is building a coalition of support for energy access which can help establish the enabling conditions, and give confidence to investors to support ambitious energy expansion and make energy poverty history… Achieving sustainable energy for all will reduce energy poverty, and help combat climate change.
>
> Helen Clark, UNDP Administrator, December 2011[3]

The challenge, therefore, is to secure universal energy access, hence contributing to poverty reduction. To achieve this goal, it is essential that policy makers and development partners understand its importance and apply the most effective measures available.

Between 2009 and 2011 UNDP undertook a review of 17 energy access programmes in the Asia-Pacific region.[4] This Action Agenda Note presents a summary of the key conclusions and recommendations, providing guidance for policymakers and development practitioners on expanding energy access. The Note examines complex issues such as enabling policies, diffusion of low-emission energy technologies, financing, institutional frameworks, community empowerment, local entrepreneurship and market development.

2. The challenge of expanding energy access in Asia-Pacific

Over the last 25 years, developing countries in Asia-Pacific have made huge strides in terms of expanding basic energy services – cooking, lighting homes and heating – to their populations (see Box 1).

However, the scale of these initiatives has been insufficient to meet the energy needs of poor people in the region. Currently, almost 800 million people in Asia-Pacific have no access to electricity, with more than 1.9 billion depending on traditional use of biomass[5] for cooking and heating.[6] The proportion of energy-poor varies among countries (see Figure 1).

As agriculture, forests and wastelands face pressures from changing climates, poor people – who get their energy supplies directly from the ecosystem – are often hit hardest. Furthermore, climate change affects incomes of the poor, particularly of those whose livelihood is land-based, thus straining their ability to pay for energy services, increasingly forcing them to switch to inferior fuels.

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1 'Modern energy services' are defined as including (a) electricity; (b) modern fuels to meet cooking needs (electricity, liquid fuels including liquid petroleum gas, natural gas, kerosene, ethanol and biofuels, but excluding traditional biomass such as firewood, charcoal, dung, crop residues and coal); and (c) mechanical power for productive, non-industrial applications such as water pumping and small-scale agro-processing.

2 Biomass accounts for over 30 percent of the total energy consumption in many developing countries. As a result, smoke from inefficient stoves in poorly ventilated homes kills about 1.6 million people in developing countries each year, most of them women and children under the age of five. Indoor air pollution is the fourth-highest cause of death in developing countries.

3 From remarks by Helen Clark at the Energy Access for All Side Event, United Nations Climate Change Conference 2011, Durban, South Africa, (8 December 2011).

4 A list of reviewed programmes and projects is provided on pages 14-15.

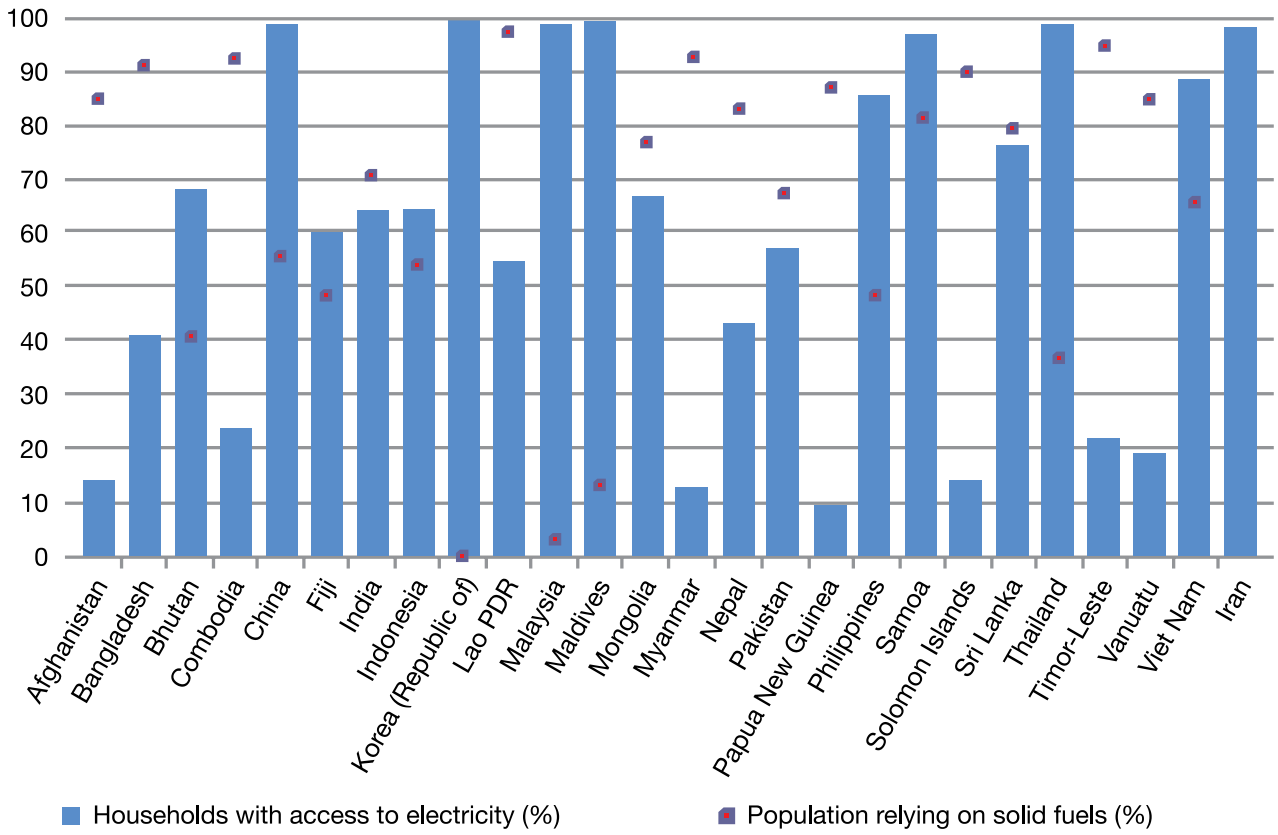
5 Traditional use of biomass refers to the use of such basic technology as a three-stone fire or other inefficient cookstove, and not to the resource itself.

6 International Energy Agency. 2010. *World Energy Outlook 2010.* Organisation for Economic Co-operation and Development (Paris, OECD/IEA).

Box 1: Successes: expanding energy access in Asia-Pacific

- The Development and Promotion of Biogas Utilization in the People's Republic of China (DPBURC) project built 30 million biogas systems, benefitting around 105 million people (2001-2010).
- The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) Programme extended electricity to 11.8 million households in the Republic of India (2005-2010).
- The Biogas Support Programme (BSP) in Nepal installed over 225,000 biogas plants, covering 1.36 million people (2003-2010).
- The Rural Electrification Programme in the Republic of the Fiji Islands increased the proportion of Fiji's rural population with access to electricity from 30.6 to 81.4 percent (1986-2007).
- The Rural Energy Development Programme (REDP) reached more than 550,000 people living in rural Nepal through micro-hydro systems, solar home systems (SHSs), biogas plants and improved cookstoves (1996-2010).
- The Renewable Energy for Rural Economic Development (RERED) project in the Democratic Socialist Republic of Sri Lanka enabled electricity access to 134,000 households (1997-2010).
- Shengzhou Stove Manufacturer disseminated around 100,000 improved stoves around the world in its first year of operation.

Figure 1: Energy access in selected Asia-Pacific countries



Source: UNDP, 2009b

Expanding energy access to poor families and communities is a complex development challenge. Rural areas – often the least accessible – continue to be the most deprived: globally, 85 percent of people who lack access to electricity live in rural areas.

The issue of affordability remains a key challenge. Rural poor often live in subsistence economies that do not generate cash surpluses, which limits their purchasing power and opportunities to shift to modern energy services. In addition, the poor tend to pay more than their urban counterparts for the same energy services due to inefficient conversion technologies, lack of economies of scale and higher transportation costs.

Cooking and heating fuels remain the primary energy need of poor households. The poorest families typically dedicate about 80 percent of household energy expenditure to fuels for cooking and heating, and only 20 percent for lighting. Despite this reality, government efforts to expand energy access have focused heavily on electricity, while the provision of clean cooking facilities has received relatively less attention.[7] The unsuitability of electricity for cooking in rural areas in developing countries means that these efforts do not address the energy need which affects people's lives most, in particular those of women and girls.

Most energy projects adopt a 'minimalist' approach, focusing on the basic energy needs of poor households (lighting homes, cooking, heating). While the importance of meeting these needs cannot be overemphasized, minimalist strategies are not effective in poverty reduction. Additional inputs are needed to raise incomes and improve livelihoods, thus making energy services potentially more affordable. Among other things, there is a need to develop capacity of poor households to apply energy services for productive and income-generating uses. To this end, more emphasis is required on measures such as improving access to information, market linkages, business development services and access to capital.

This Action Agenda Note seeks to provide practical guidance for policymakers and development practitioners on expanding access to energy services in the Asia-Pacific region in a manner that contributes to poverty reduction. It attempts to answer the following key questions:

a) What are the common features of energy access programmes and projects that have succeeded in providing access to clean, affordable and reliable energy services to the poor for cooking, heating, lighting, communications and productive uses?

b) What can governments and development partners do to further expand and upscale such programmes and projects?

UNDP/Energy Access for Poverty Reduction/Jagriti - India

Rural women carrying fuelwood to their homes. Project: Providing energy access to remote areas in India through women's empowerment - Jagriti, India.

UNDP/Energy Access for Poverty Reduction/Sengor - Bhutan

Electric rice cookers being used in Sengor village, Bhutan. Project: Community Micro-hydro for Sustainable Livelihoods - Sengor, Bhutan.

[7] Clean cooking facilities include clean cooking fuels and stoves, advanced biomass cookstoves and biogas systems.

3. Impact of reviewed energy access projects

The above-mentioned review found that energy access programmes and projects can bring significant improvements to the quality of life of poor families and communities in terms of income, health, education, communication and women's empowerment, thus contributing to the achievement of the Millennium Development Goals (MDGs). More detail on the projects' contributions to achievement of MDGs is provided in Table 1 and Box 2.

Table 1: MDG benefits of energy access: evidence from reviewed projects

MDG	Project outcomes
MDG 1: Reducing extreme poverty and hunger	■ Improved fuel efficiency reduces household expenditure on energy ■ Energy used for productive purposes increases incomes ■ Renewable energy projects create employment for communities ■ Electricity brings about lifestyle changes, and makes housework easier
MDG 2: Achieving universal primary education	■ Improved lighting enables children to study in the evenings ■ Freeing children from fuelwood collection enables them to study and attend school
MDG 3: Promoting gender equality and empowering women	■ Access to modern energy frees women's time formerly devoted to fuelwood and water collection ■ Electrification increases women's access to information through television and other media ■ Energy services bring new training opportunities for women and men
MDG 4: Reducing child mortality	■ The use of improved cookstoves and biogas plants reduces ailments among children through reduced indoor air pollution ■ Improved lighting reduces exposure to polluting kerosene lamps ■ Affordable energy makes it possible to boil water, making it safe for consumption
MDG 5: Improving maternal health	■ Reducing labour of fuelwood collection and reducing exposure to smoke from the burning of biomass fuels in kitchens improve women's health ■ Affordable energy makes it possible to boil water, making it safe for consumption
MDG 6: Combating HIV/AIDS, malaria, tuberculosis and other diseases	■ Electrification makes possible the refrigeration of vaccines and lighting for clinical services ■ Reduced exposure to smoke from inefficient burning of biomass and solid fuels in kitchens improves health outcomes
MDG 7: Ensuring environmental sustainability	■ Reduced fuelwood consumption has a potentially positive impact on forest resources ■ Reduced use of fossil and biomass-based fuels can reduce GHG emissions ■ Improved burning of biomass reduces indoor air pollution
MDG 8: Promoting global partnerships for development	■ Community-managed energy projects bring communities together to work towards common development goals ■ Electrification makes it possible for communities to benefit from new technologies, particularly those related to information and communications (television, radio and internet) ■ Energy programmes and projects can collaborate with other non-energy development programmes

Box 2: Achieving multiple MDG impacts: biogas in rural China

The DPBURC project in China promoted biogas plants using a 'one digester plus three renovations' approach, combining biodigester plant construction with renovating toilets, animal sheds and kitchens. This proved to be an effective means of sanitizing human and animal wastes, leading to reduced incidence of epidemic diseases in villages. The use of biogas plants, therefore, has brought out multiple benefits of poverty reduction, better health, improved hygiene, positive impacts on women and children, and increased awareness of environmental problems.

4. The basis for action: good practices and lessons learned

The design and implementation of successful energy access programmes and projects are a complex challenge. An in-depth review of 17 such programmes and projects in the region identified a number of common features that contribute to project success. These have been organized into three categories:

- energy service delivery;
- financing (project and end-user); and
- mainstreaming energy access into national development strategies.

4.1 Energy service delivery

Ensure that the energy solution is 'just right'. Energy products and services need to be pilot-tested extensively to ensure that they are physically robust, aligned with consumer behaviour and effectively address consumer needs, preferences and affordability (see Box 3, below, for an example from the Lao People's Democratic Republic).

Box 3: Paying for the service, not the hardware: solar lanterns in Lao People's Democratic Republic

The solar lantern rental system promoted by Sunlabob Renewable Energy Ltd. has successfully applied a pay-for-energy service model in the Lao People's Democratic Republic. In this model, solar lanterns are rented out to rural consumers and can be recharged at charging stations. The latter are set up and managed as businesses by rural entrepreneurs who are trained and assisted by Sunlabob.

The product and the delivery model are 'just right' for poor consumers in off-grid areas since they can provide lighting when consumers can afford it whilst offering a cheaper, cleaner, and safer alternative to kerosene lamps. Since the fee is based on usage level rather than a fixed monthly charge, users do not pay for the hardware (i.e. the lanterns) but for the service (i.e. the charging). The solar lantern design is simple and robust. The lantern is portable, can be hung up or stood and carried while being illuminated; it has a tamper-proof casing to protect internal components and the bulb; and the electronic components are repositioned to the top to avoid potential water damage. These features make the lantern suitable for rural use.

UNDP/Energy Access for Poverty Reduction/Sunlabob - Lao PDR

Woman weaving using the light of a solar lantern. Project: Sunlabob Solar Lantern Rental System – Lao People's Democratic Republic

Involve communities and address gender issues. Successful energy projects are usually embedded within existing local governance institutions, at the community or village level. This helps to obtain 'buy-in', increases local accountability and assures a degree of social sustainability. Project objectives and outcomes should also emphasize women, and project monitoring data should be disaggregated by gender.

Build commercially viable markets for energy products and services. This can be pursued in a number of ways:

- clustering dispersed markets helps make private sector participation and provision of energy services to poor communities (particularly in remote and scattered locations) more viable (see Box 4);
- building on existing supply chains and distribution channels can be a better alternative to creating new production and distribution chains, particularly in rural areas (see Box 5). Collaborating with existing distributors can help avoid high set-up costs, whilst allowing for the use of existing retail channels, marketing strategies, financing mechanisms and knowledge of local markets. This strategy also benefits local businesses and generates local employment; and
- establishing strict quality control systems has been a common feature in all energy access programmes that have been successfully expanded or replicated elsewhere. Measures to ensure provision of quality products and services include pre-qualification of technology suppliers (to make them eligible for subsidies and incentives); enforcement of guidelines and technical standards; inclusion of performance guarantees in contracts with suppliers; and education of consumers on obligations of service providers. In return, these programmes help the private sector by supporting market development (see Box 6).

Box 4: Clustering demand to reach the 'last mile': electrification of remote rural areas in the Republic of the Philippines

ACCESS (Accelerating Community Electricity Services using Solar) is a project that seeks to electrify remote and poor *barangays* in the Philippines.[8] This is achieved by 'clustering' *barangays* into viable units and ensuring a minimum baseload from community facilities (e.g. *barangay* halls, health facilities, schools and public streetlights) for each service provider. In return, the service provider has to electrify at least 25 percent of households in the *barangays* while meeting minimum equipment and service standards. This approach has resulted in the private sector servicing a market segment traditionally considered commercially unviable (remote *barangays* with poor populations, i.e. 'the last mile'). As of now, the Government is about to complete its 100 percent *barangay* electrification programme and is initiating its secondary objective of 90 percent household electrification.

Children playing around a solar lantern. Project: Accelerating Community Electricity Services using Solar (ACCESS) - the Philippines.

UNDP/Energy Access for Poverty Reduction/ACCESS - Philippines

Box 5: Innovative marketing and distribution models for dissemination of improved stoves

StoveTec uses a marketing strategy that relies on multiple distribution channels and partners, including electric utilities, microfinance institutions (MFIs), energy stores and humanitarian programmes in developing countries.[9] By doing so, it is able to reach remote markets in developing countries, rather than developing these *de novo*. For example, in India, Envirofit, a non-governmental organization (NGO), has sold over 100,000 StoveTec biomass stoves manufactured in China through a multi-tier distribution strategy involving dealers, distributors, village entrepreneurs and not-for-profit organizations. Envirofit has over 500 channel partners with roughly 1,500 outlets throughout southern India.

[8] *Barangays* are the smallest administrative divisions in the Philippines.

[9] StoveTec, a global supplier of energy-efficient stoves, is a partnership between US-based Aprovecho Research Center and China-based Shengzhou Stove Manufacturer.

Box 6: Carrot-and-stick approach to product quality assurance in Nepal

BSP in Nepal believes that satisfied customers make the best promoters of biogas technology. To ensure that the installed biogas plants function satisfactorily, BSP has instituted a number of quality measures to which the private sector suppliers are required to adhere. These include a standardized design; strict technical standards and warranty clauses incorporated in agreements with biogas companies; field monitoring of biogas plants; and performance-based penalties and rewards. BSP has so far installed more than 200,000 plants, about 97 percent of which are operational.

Monitor projects and systematically track their impacts. The managers of all 17 reviewed projects highlighted the importance of monitoring and impact assessment. The projects' monitoring and evaluation (M&E) systems need to incorporate indicators and measureable targets to capture the MDG benefits achieved. M&E systems should continually assess the impact on target beneficiaries, gauging their changing needs and aspirations while assessing overall project direction, strategy and results.

4.2 Financing (project and end-user)

Secure recurrent and sufficient government funding. Securing government funding for energy access programmes and projects is made easier by the presence of a long-term, well-articulated national policy on energy access. This policy should be pro-poor, gender-sensitive and is backed up by budgetary allocations. This point is discussed in more detail in Section 4.3.

Use appropriate financing mechanisms. Project financing needs to take into account affordability and the maturity of the energy technology market. Different financing options, alone or in combination, are needed to ensure that poor households are able to switch to modern energy services. In undeveloped markets, grant-based support for 'common goods' that build markets for energy services (including research, development of regulations and education of consumers) will be necessary. Other financing instruments such as targeted subsidies on capital costs for energy technologies, community-level financing mechanisms, in kind contributions by households in the form of labour, and micro-credit for the rapid expansion of energy services should be sequenced and combined as appropriate.

The most widely used financing option is a combination of subsidies, project loans and end-user micro-credit through specialized MFIs, women's self-help groups or community-managed funds. BSP Nepal, for example, combines a number of these instruments to enable consumers to build household biogas plants.[10]

Figure 2 shows the combinations of financing mechanisms used by some of the reviewed projects.

Figure 2: Combinations of end-user financing mechanisms in energy access projects[11]

Project	End-user financing mechanism used					
	User contribution	Direct subsidy	Micro-financing	Loan	Retailer finance	Fee for service
DPBURC China	●	●		●		
StoveTec	●		●		●	
TIDE India	●			●	●	
RGGVY India	●	●				●
IWM Nepal	●	●	●	●		●
BSP Nepal	●	●	●	●		
REDP Nepal	●	●	●	●		
RERED Sri Lanka	●	●	●	●		
Sunlabob Lao PDR	●					●

[10] Given its high upfront cost (approximately USD 600), a biogas plant is an expensive proposition for most poor households in Nepal. The regular BSP subsidy amounts to roughly 30 percent of the plant cost, while 20 percent of the cost can be contributed by the user in kind (e.g. unskilled labour or locally available construction materials). The remaining 50 percent of the cost must be paid by the user in cash; for this purpose, they are eligible for a loan provided through a Biogas Credit Fund. Poor, disadvantaged and remote communities are eligible for additional subsidies.

[11] Under RGGVY, a full subsidy is applicable only for households below the poverty line.

Establish necessary structures for effective microfinancing. Microfinancing can be instrumental in scaling up energy access for the poor (see Box 7). But effective microfinancing requires the following structures to be in place:

- refinancing facilities (provided by governments or development partners) which allow MFIs to offset the high transaction costs of operating large numbers of small-value loans in remote, dispersed markets;
- MFI knowledge of the basic technical aspects of the energy product/service provided;
- functional links between MFIs and technology suppliers; and
- involvement of NGOs and CBOs in facilitating roles such as mediating commercial bank credit, identifying beneficiaries, conducting credit checks, product promotion and information dissemination.

Box 7: Microfinance for energy access expansion: Sri Lanka and Nepal

In the initial years of the Energy Service Delivery (ESD) project in Sri Lanka, the uptake of SHSs was slow. The sales improved once MFIs – in particular, the Sarvodaya Economic Enterprise Development Services (SEEDS) – were brought in. SEEDS went on to finance around 44 percent of SHSs sold under ESD and more than 60 percent of credit sales under the follow-on RERED project.

Similarly, micro-credit has played a critical role in making biogas plants affordable for the poor in Nepal. BSP works with Grameen banks and other MFIs to extend loans of about USD 358 per biogas plant, at a maximum 14 percent interest rate and a three-year repayment period.[12] Around 30 percent of the users currently take loans, and this trend is on the rise.

Promote productive uses of energy. Provision of energy for consumption should be complemented with incentives and support for productive, income-generating uses. This can be an effective strategy in making energy access more affordable for the poor. For example, besides providing energy services, REDP in Nepal promotes the establishment of at least one micro-enterprise per household. This is supported through specialized skills training and loans for start-up (provided through community organizations). In fact, REDP positions itself more as a livelihoods enhancement and community empowerment programme than an energy project.

Gains from productive uses of energy are maximized when enterprise development and livelihood enhancement are strongly reflected in project goals, and energy service provision is complemented with additional inputs, carefully selected and tailored to meet the needs of entrepreneurs.

Provide start-up and working capital loans for technology suppliers and service providers. This has proven to be a useful strategy in the initial stages of market development. Capital subsidies on investment are particularly useful when high commercial interest rates are making investments in a new sector risky. For example, ESD working capital loans in Sri Lanka were instrumental in bringing in new technology suppliers and service providers for the solar photovoltaic market. Working capital loans extended to biogas companies to purchase plant accessories and appliances have also proven useful.

4.3 Mainstreaming energy access into national development strategies

The most important enabler for expansion of energy access programmes is a long-term, well-articulated national policy on energy access that is pro-poor and gender-sensitive. This policy should be inclusive of budgetary allocations and sub-national implementation strategies. Where such a policy is missing, its development can be initiated by incorporating a distinct component into an energy access project (see Box 8).

[12] Grameen banks cater mainly to rural populations.

Box 8: Long-term government commitment to energy access: Fiji and China

Between 1986 and 2007, the proportion of rural households with access to electricity in Fiji grew from 30.6 percent to 81.4 percent. This was made possible by increasing urbanization ('bringing people to electricity'), combined with a dedicated Fiji Rural Electrification Programme ('bringing electricity to the people'). The programme is backed by a well-articulated government target of 100 percent electricity access (pursued by successive governments) and implemented by a dedicated government institution. Consistent substantive allocations to the programme from the national budget (a yearly average of FJD 3.6 million between 1994 and 2007) have been complemented by resources from development partners.

The Capacity Building for the Rapid Commercialization of Renewable Energy (CRE) project in China played a seminal role in shifting supply-oriented, state-supported technology deployment to a demand-driven, investor- and consumer-friendly national market for RE technologies. In 2005, the National Peoples' Congress passed the Renewable Energy Law, which for the first time established a national framework for the development of all sectors of the RE industry. The project provided crucial support for the development of the law. This included providing key personnel and secretariat services to support the law's formulation, and undertaking advocacy activities. The passing of the law has led to an acceleration of new projects (particularly in wind, solar and biomass) and has achieved a dramatic shift in the political and social atmosphere regarding RE.

UNDP/Energy Access for Poverty Reduction/FREP - Fiji

A windmill for power generation.
Project: Fiji Rural Electrification Programme (FREP) - Fiji.

Ensure that energy access programmes support the overall national development strategy. Securing long-term financing for energy projects is easier when the projects clearly contribute to the broader national development agenda. REDP in Nepal complements the Government's electrification plan by extending electricity to areas unlikely to obtain access to the grid. Similarly, ACCESS Philippines clearly contributes to the Philippine Government's goal of 100 percent *barangay* electrification by 2009[13] and 90 percent household electrification by 2017.[14]

Establish and strengthen lead energy institutions. A strong national energy institution can ensure that good practices and lessons learned in individual projects are translated into sector-wide strategies and policies. In the 1990s, a number of countries in the region lacked public and private institutions dedicated to RE development. Institutions such as the Alternative Energy Promotion Centre in Nepal, the Sustainable Energy Authority (SEA) in Sri Lanka and the Chinese Renewable Energy Industries Association have since emerged as lead focal points in their respective countries. Projects such as BSP and REDP (Nepal) and ESD (Sri Lanka) were instrumental in setting up these institutions under the aegis of the national governments.

Develop capacities of all key stakeholders. The latter include project implementing agencies, technology suppliers, service providers, financial institutions, civil society organizations and final consumers, including women (see Box 9). Otherwise, energy access expansion is likely to be slow.

[13] It is envisaged that this target will be achieved by the end of 2011.

[14] In order to secure investment for this target, the Department of Energy collects a tax of one centavo (one-hundredth of a Philippine peso) per kilowatt-hour from electricity sales and directs the revenue towards the electrification of un-electrified rural areas. This complements the Global Environment Facility support to ACCESS Philippines.

Box 9: Multi-level capacity development in China via the CRE project

The CRE project in China, working towards commercialization of RE technologies, undertook sector-wide capacity development activities at the macro-, meso- and micro-levels.

Macro-level activities focused on the development of policies and regulations. The project provided support for the development of the Renewable Energy Law, the Biogas National Action Plan and guidelines for the wind power concessions programme that have since been adopted as China's national standards.

Meso-level activities focused on capacity development of key institutions and stakeholders, through international and local workshops and training.

Micro-level actions provided project developers and technology suppliers with technical knowledge of market-based approaches in village power hybrid systems, industrial-scale biogas and bagasse cogeneration.

Engage and consult stakeholders at all levels. Project information dissemination and continuous dialogue with stakeholders are necessary to ensure support for the project. They can also help achieve national consensus on the importance of energy access. REDP in Nepal, for example, kept stakeholders informed of the project's approach and achievements through newsletters, pamphlets and direct consultations. Inclusion of local-level functionaries (e.g. the District Development Committees and the Village Development Committees) played a key role in creating local demand for energy services. Simultaneously engaging with high-level policymakers helped secure government interest, commitment and funding, ensuring sustainability of activities after project completion and their integration into government development programmes.

5. Key recommendations

Given the findings of the review, what more can be done to achieve universal energy access in Asia-Pacific?

5.1 Institutional partnership framework for expansion

It is clear that achieving universal energy access calls for collaboration by key stakeholders, including central and local governments, development partners, the private sector, civil society organizations and in-country financial institutions (including MFIs). To this end, a simple institutional partnership framework is provided below.

Box 10: Who should do what: an institutional partnership framework for expansion

- Governments should create an enabling environment and regulatory framework.
- Development partners should finance 'common goods' that benefit the whole sector, including capacity development and technical assistance.
- The private sector should manufacture, sell and service energy infrastructure and products.
- Civil society organizations, including NGOs, should mobilize communities and disseminate information.
- Specialized financial institutions should support microfinancing.

UNDP/Energy Access for Poverty Reduction/Sengor - Bhutan

Discussions with the community. Project: Community Micro-hydro for Sustainable Livelihoods – Sengor, Bhutan.

A visual presentation of the framework for expansion, based on the good practices and lessons learned, is provided in Figure 3.

5.2 Adopting good practices and lessons learned

It is imperative that good practices and lessons identified in Section 4 are adopted by governments and development partners. One of the key findings is that programmes and projects which combine energy access with measures that further encourage income generation (through productive uses of newly acquired energy) are more effective in reducing poverty. Such measures include improving household access to information, links to markets, business development services and access to capital.

These and other responsibilities of governments and development partners in expanding energy access are outlined below.

5.3 Key recommendations – development partners

- Engage communities in energy projects through existing local governance institutions to obtain the necessary 'buy-in' and assure a degree of social sustainability
- Pilot-test energy products and services that align with the needs and behaviour of users (including women) prior to product launch
- Ensure that project objectives emphasize women and other disadvantaged groups
- Ensure that projects support overall national development strategies and contain clear poverty reduction, livelihood enhancement and women's empowerment goals
- Build commercially viable markets for products and services provided (e.g. by clustering dispersed markets, using existing supply and distribution channels, and establishing quality control systems)
- Establish locally appropriate financing mechanisms for the project
- Monitor projects and track their impact
- Promote productive uses of energy services provided to ensure greater poverty reduction

5.4 Key recommendations – governments

- Develop a national policy on energy access (including clear targets) within the framework of national development strategies
- Ensure that the policy is implemented through appropriate sectoral policies, programmes and projects
- Ensure that policy implementation is financed through targeted and well sequenced public finances (national and sub-national budgets) as well as bilateral and multilateral funds
- Provide a supporting regulatory environment for the expansion of energy access
- Ensure that energy access programmes include poverty reduction, livelihood enhancement and women's empowerment goals
- Establish and strengthen lead energy institutions
- Promote sector-wide capacity development for the public sector, private companies, financial institutions and civil society organizations
- In collaboration with development partners, provide re-financing facilities for MFIs involved in energy access projects

6. Conclusion

Access to energy services improves the lives of the poor communities and is a prerequisite for achieving the MDGs. However, energy service delivery on its own has little impact beyond subsistence household use. Experience in the Asia-Pacific region shows that strategies that pay equal, if not greater attention to improving income generation, can go much further in reducing poverty. Improved access to energy should therefore be accompanied by measures that generate income or improve livelihoods which, in turn, enhance the capacity to pay for energy services. Furthermore, access to energy programmes should be complimented by a suite of measures and services strengthening public infrastructure, including information and telecommunications, roads, schools, health facilities, rural enterprise development, agricultural extension services and access to markets.

Figure 3: Good practices and lessons learned in expanding energy services for the poor

Issues and Challenges

The issue

- 2.7 billion people – 40 percent of the global population – depend on biomass for cooking and heating; 1.93 billion are in Asia-Pacific
- 1.4 billion people – 20 percent of the global population – have no access to electricity; 800 million are in Asia-Pacific
- Under 2030 business-as-usual scenario:
  - 2.8 billion still using biomass for cooking and heating
  - 1.2 billion people still without electricity

Persistent challenges

85 percent of people who lack access to electricity live in rural areas.

- Difficult (expensive) to reach
- Affordability in rural areas a serious issue
- Result: the poor pay more dearly for 'poor quality' energy services

Energy strategies tilted towards grid electrification

- Poor cannot afford connections
- Remote communities left out
- Does not meet the primary household energy needs (cooking and heating), which affects women and children the most
- Result: indoor air pollution is the fourth-biggest killer in the developing world

The poor are hit the hardest by impacts of climate change

- Local communities – who get their energy supplies directly from the ecosystem – are more vulnerable
- Climate change affects incomes, straining the ability to pay for energy services
- Result: switch to increasingly inferior fuels

Good practices in expanding energy access for the poor

Core components

Energy service delivery

Good Practices

- Get the energy solution 'right'
  - Align product/service with consumer needs and behaviour
  - Test products extensively with users
  - Ensure that energy products are robust and tamper-proof
- Involve local communities
  - Align project institutional framework within local institutional frameworks
  - Engage women and other disadvantaged groups proactively
- Build commercially viable markets for energy products and services for the poor
  - Cluster dispersed markets
  - Build on existing supply chains and distribution channels
  - Build consumer confidence through quality assurance
  - Invest in market development and consumer awareness
- Monitor and evaluate energy access projects to track MDG impacts systematically

Mainstreaming into national development strategy

- Coordinated collaboration of key players: national government, donor, the private sector, civil society organizations and specialized financial institutions
- Support the development of a national government policy on energy access and make policy change an integral component of project strategy
- Ensure policy influencing is an integral component of project strategy
- Engage with stakeholders at all levels
- Capacity development strategy should be sector-wide and dynamic

Financing

Project | End-user

Enabling the poor to pay for energy services

- Offer consumers choice of locally appropriate financing options
- Use micro-credit to expand energy services for the poor
- Support local enterprise development and productive applications
- Provide start-up and working capital loans for technology suppliers and service providers

- Carbon markets as a source of finance

- Long-term government commitment in terms of financing is essential for expansion
- Situate energy-access projects within government policy framework

Energy access programmes and projects reviewed

Programme/Project	Institutional Setup	Energy Service Delivery Model
Accelerating Community Electricity Services using Solar (ACCESS) – Philippines (2006-2011)	Government-led energy programme (with donor support)	Electrification of *barangays* through SHSs
StoveTec Improved cookstoves – worldwide (2007-ongoing)[15]	Commercialization model	Centralized mass production, market development and worldwide sales of improved cookstoves
Building Economic, Social and Technological Opportunities and Foundations to Promote Renewable Energy Nationwide (BEST-OF-PREN) – Philippines (2006-2011)	Commercialization supported by civil society	Improving access to RE technologies for poor households through micro-credit
Biogas Support Programme (BSP) – Nepal (2003-ongoing)	Commercialization model	Dissemination of household-size biogas plants through provision of technical assistance and marketing support to the private sector
Development and promotion of biogas utilization in rural China (DPBURC) – China (2006-2010)	Government-led energy programme	Large-scale dissemination of domestic biogas plants
Capacity Building for the Rapid Commercialization of Renewable Energy (CRE) – China (1999-2008)	Government-led energy programme (with participation of the private sector)	Commercialization of RE through capacity development, facilitation of new policy initiatives and pilot projects
Fiji Rural Electrification Programme (FREP) – Fiji (1974-ongoing)	Government-led programme	Extension of rural electrification to Fijian islands
Improved Water Mill Programme (IWM) – Nepal (2003-2012)	Commercialization supported by civil society	Improvement of traditional water mills for agro-processing and electricity generation to improve rural livelihoods
Providing energy access to remote areas in India through women's empowerment – Jagriti, India (2002-ongoing)	Commercialization supported by civil society	Dissemination of energy-efficient cooking and water-heating devices through rural women's self-help groups
Rural Energy Development Programme (REDP) – Nepal (1996-2012)	Public-private partnership for community-based RE system	Enhancement of rural livelihoods through community-managed micro-hydro and other decentralized RE systems
The Energy Services Delivery Project (ESD) (1997-2002) and the Renewable Energy for Rural Economic Development (RERED) Project – Sri Lanka (2002-2011)	Government-led energy programme (with donor support)	Expanding energy access through off-grid and grid-connected RE solutions, using commercially viable delivery channels and microfinance
Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) – India (2005-2012)	Government-led energy programme	Provision of electricity access to poor households
Community Micro-hydro for Sustainable Livelihoods – Sengor, Bhutan (2005-2009)	Public-private partnership for community-based RE system	Community empowerment through livelihoods promotion and capacity development (community-based micro-hydro project)

[15] Manufacturing in China, sales worldwide.

Programme/Project	Institutional Setup	Energy Service Delivery Model
Sunlabob Solar Lantern Rental System (Sunlabob) – Lao People's Democratic Republic (2006-ongoing)	Commercialization model	Dissemination of solar lanterns in rural areas using a rental, fee-for-service model
Diffusion of biomass utilization technologies in the informal industries in Karnataka and Kerala, TIDE – India (1998-2008)	Commercialization supported by civil society	Support to entrepreneurs to build and sell energy-efficient devices to informal biomass-based industries
Participatory Rural Energy Development Programme (PREDP) – Timor-Leste (2004-2009)	Donor supported project	Piloting of low-carbon energy technologies in rural communities
Vanuatu's Community Powerhouse Rural Electrification Model, Vanuatu Renewable Energy and Power Association (VANREPA) – Vanuatu (2007-2013)	Commercialization supported by civil society	Provision of decentralized, wind and solar-generated electric power through a series of micro-grids and battery charging stations

September 2011

ISBN 978-974-680-301-4

Acronyms and abbreviations

ACCESS	Accelerating Community Electricity Services using Solar (Project)
APRC	Asia-Pacific Regional Centre
BSP	Biogas Support Programme
CBO	community-based organization
CRE	Capacity Building for the Rapid Commercialization of Renewable Energy (Project)
DPBURC	Development and Promotion of Biogas Utilization in Rural China (Project)
ESD	Energy Service Delivery Project
FJD	Fijian dollar (currency)
MFI	microfinance institution
MDG	Millennium Development Goal
M&E	monitoring and evaluation
NGO	non-governmental organization
RE	renewable energy
REDP	Rural Energy Development Programme
RERED	Renewable Energy for Rural Economic Development (Project)
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana (Programme)
SEA	Sustainable Energy Authority
SEEDS	Sarvodaya Economic Enterprise Development Services
SHS	solar home system
UNDP	United Nations Development Programme
USD	United States dollar (currency)

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