

Power to the poor: sustainable energy at the base of the pyramid

Four billion people – over half of humanity – live on less than US\$2 a day, effectively forming the bottom of the world economic pyramid. This majority may have minimal access to cash but they need, and will pay for, essential goods and services – including energy. ‘The fortune at the bottom of the pyramid,’ a 2002 article, argues that if global corporations target this 4 billion, they can reduce poverty and make profit. That the private sector is already playing a key role in meeting development challenges, such as energy poverty, is increasingly recognised. ‘Inclusive’ and ‘shared value’ business approaches have begun to multiply.¹ International energy companies, including hydrocarbon and renewable energy producers, can (and do) facilitate local access to energy in poorer regions of the world. To reach the poorest and to effectively contribute to sustainable local development in the long term, however, standard business models need to be modified, and alliances forged with government, local enterprises, donors and NGOs. Smaller local firms are often the ones that reach the poor more effectively. They just need the right support.

Policy pointers

- **Market potential for** affordable, sustainable energy services is huge in low-income countries.
- **Global energy companies** can play a key role both in providing energy services and promoting market opportunities for local companies.
- **Small and medium-sized** firms, large domestic companies, and social enterprises are often more effective at designing and implementing business models that serve the poor than global companies.
- **Successful interventions** require effective partnerships between business and government, NGOs, local entrepreneurs and communities.
- **A key challenge is targeting** support for starting up and scaling up business activities that are aimed at the poorest.

Energy poverty and market potential in poorer countries

Poverty does not preclude people’s role in the market, as C.K. Prahalad and S.L. Hart recognised in ‘The fortune at the base of the pyramid’. This 2002 article, which frames the global economy as a pyramid based on the 4 billion poorest people, was something of a wake-up call for the private sector. Since then the concept has evolved, and although it has its critics it remains current.

Energy is a key area for the ‘base of the pyramid’ (BoP) approach. Around 1.6 billion people in low-income countries lack access to electricity. Some 2.4 billion use highly inefficient forms of biomass as primary cooking and heating fuels.² Poor people are already spending money on energy, but not necessarily on the cheapest, healthiest or cleanest products and services. The market potential for clean, affordable energy is huge. The basic energy needs of the poor include safe lighting, healthy cooking and heating fuel,³ communications, crop irrigation, enterprise operations (such as market kiosk lighting), public services (school computers or

Nigeria’s untapped potential

About 60% of Nigerians (90% in rural areas) have no electricity. With abundant natural gas and, potentially, renewable energy such as solar, Nigeria could satisfy its people’s needs. Yet well over 70 million cubic metres of gas a day are flared in the country, due to lack of infrastructure to utilise it. Solar energy is not widely used, and there is negligible investment in other alternative energy options. The World Resources Institute and International Finance Corporation’s report *The Next 4 Billion* estimates that Nigeria’s potential household energy market is worth US\$5.1 billion.⁴

clinic refrigeration, for example) and transportation. Many countries in Asia, Africa and Latin America possess abundant energy resources, including solar, wind and hydro-power, mineral resources and biofuels. As ‘Nigeria’s untapped potential’, above, shows, that country offers a striking illustration of a nation with vast resources that is also suffering a crippling energy crisis.

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An evolving 'business case'

There is an evolving 'business case' for global energy companies to facilitate access to sustainable energy for the poorest. The potential benefits are many: addressing government and community expectations of development benefits, recruiting and retaining reliable local staff, mitigating political risks and avoiding conflict. Companies

may, however, be concerned about their international image, long-term legacy in host countries and competitive edge in the eyes of host governments regarding future contracts. BoP initiatives may take the form of for-profit business

activities, or support for smaller-scale enterprise. In some cases, there might be opportunities to deliver energy to local markets on a for-profit basis. Using the gas normally wasted through flaring (to reduce pressure in the pipes) to generate power is one example. International oil companies could invest in a number of areas, from large-scale gas-fired power stations to smaller-scale community-based gas-to-power facilities, the distribution of liquid petroleum gas in canisters for household cooking, or other products, such as gas-derived fertilisers.

Business opportunities are also growing rapidly in the renewable energy sector, including solar, wind, hydropower, biofuels, biomass (such as wood used as fuel) or biogas. New market players are emerging, including large companies from emerging market economies (an example is the Chinese companies exporting solar panels to Africa) and small and medium enterprises (SMEs) that produce for local markets in developing countries. There are further BoP opportunities in providing support to smaller enterprises through procurement, supply chain development and social investment support (see below).

The partnership priority

Whether market involvement is direct or indirect, partnerships are key to successful BoP initiatives. Global energy companies need to design and implement BoP models in partnership with local governments, national and local enterprises, community-based organisations, donors and NGOs. Partnerships may take the form of joint ventures, public-private partnerships and social enterprises. They bring into play local knowledge of consumer preferences, marketing networks, supplier reliability and labour markets. And they can mobilise capacities that markets may not provide, such as access to credit for consumers and enterprise start-up.

Local communities become involved as entrepreneurs and decision-makers, not just as energy consumers. Governments can enact policies which provide incentives and create a favourable investment climate. Financial service providers can offer start-up assistance and establish affordable payment schemes for consumers. International donors and NGOs can provide start-up

or scale-up investment to help stimulate innovation and mitigate risk, along with skills in project design, community engagement, monitoring and evaluation.

Tata BP Solar (see below) is a successful partnership between global energy company BP and Tata Power Company, a major national company in India.

Tata BP Solar: India

The partnership venture Tata BP Solar commands 30% of the Indian solar market,⁵ producing domestic and industrial solar water heating systems, home lighting, water pumps and streetlights. The venture provide a long-term service to customers, underpinned by contractual relations with local government; and benefits from government subsidies and tax incentives for solar photovoltaics (solar cells). Users are charged for installation and maintenance, while local residents are trained in operations and maintenance skills. Tata BP Solar have reached some of the poorest and most isolated communities in India. In the Himalayan region of Ladakh, for instance, the venture worked with government agencies to provide solar home systems to 80 mountain villages. In the northwestern state of Punjab, they collaborated with the Punjab Energy Development Agency to deliver 225 solar water-pumping systems to farmers.

Promoting local companies

Domestic companies, including SMEs, have demonstrated great potential in the energy sector. Beyond energy services, they provide opportunities for local enterprise development, jobs, learning and industrial growth. They often demand external financial, management, and/or technical support at the start-up or scale-up phases, however. A case in point is the Nicaraguan company Tecnosol (see below).

Tecnosol: Nicaragua

Tecnosol sells and installs distributed solar photovoltaics (PV), wind and hydropower systems to mostly rural Nicaraguans lacking access to electricity. Tecnosol's success is due to its in-depth knowledge of the local market and focus on good quality and customer service, including post-installation maintenance. They have generated word-of-mouth publicity, overcoming scepticism about new technologies. Tecnosol initially benefited from the support of E+Co, a rural energy finance company set up with help from US-based philanthropic organisation the Rockefeller Foundation. Tecnosol focuses on customers who can more easily afford their systems (mainly farmers and landowners), but they also offer a 14-watt PV system for poorer customers.

Global companies engaging in BoP interventions need to avoid undermining market opportunities for local companies or creating dependency on their patronage. Rather, they should promote local enterprise development through procurement and investment.

The role of social enterprise

Social enterprises fill a niche in serving BoP markets. As operating costs are subsidised, they are able to reach the lowest-income end of the market often missed by for-profit enterprises. Financial sustainability is essential in the long run but profit margins are not important. There is a strong focus on local ownership and on building local people's capacity to take responsibility for managing their own enterprises. The work of SolarAid (see below), a charity established by the UK-based solar energy company Solarcentury, is a case in point. Grameen

SolarAid: East Africa

SolarAid⁶ supports household solar energy provision through a business-based approach in Kenya, Malawi and Tanzania. Initially producing small products such as kerosene lamps converted to LED light, they now work with Chinese producers on large-scale delivery of solar products to African markets. The priority is better access to solar energy for the poor. For them, distribution has emerged as a barrier. SolarAid recognise local entrepreneurs as the driving force behind initiatives. Market research identified the importance of cultural preferences (such as the status of having a light bulb), the optimal price people are prepared to pay, and the seasons when they can pay. SolarAid is now exploring carbon markets and other mechanisms to fund a new scale-up phase. They have set up a commercial arm in Africa, Sunny Money, and are expanding through a micro-franchising approach.

Shakti's success (see below) hinges on access to sustainable finance and good knowledge of local markets.

Grameen Shakti: India

Renewables company Grameen Shakti⁷ (GS) has developed a market-driven approach to delivering energy services, with a financing system based on Grameen Bank's micro-credit programme. They have an in-depth understanding of the local market and emphasise good quality and ongoing support service. GS link renewable energy technologies with other income-generating activities and train local entrepreneurs in maintenance skills. Innovative payment methods include supplying livestock on credit. Direct subsidies are avoided, but low-interest loans are provided to reduce costs. R&D, community monitoring and good communication aim at improving services and keeping costs down.

Targeted corporate social investment

Globally, oil and gas multinationals may spend over US\$160 million a year on social investment projects. If this investment strategically targeted small-scale development projects, including sustainable energy provision, it could have a major impact on poverty reduction. A key challenge is to tackle corruption and misuse of funds, through transparency and open contracting processes; and to avoid political pressure to spend money on politicians' pet projects.

Social investment might be closely tied to a core business activity, such as the Bonny Utility Company in the Niger Delta (see below).

Bonny Utility Company: Niger Delta

Bonny Utility Company (BUC) is a community-centred operation providing energy to the population of Bonny Island in the Niger Delta, the site of a liquefied natural gas (LNG) plant. BUC is a partnership between the people of Bonny Kingdom and Nigeria LNG Limited (made up of the Nigerian National Petroleum Company and energy giants Shell, Total and Eni), who upgraded the existing distribution infrastructure and provided seed capital. BUC provides electricity to local consumers free of charge up to a limit, with differentiated tariffs beyond that for households and businesses. The company is responsible for distribution and sale of electricity to the community and employs 75% local staff.

Global energy companies can also support community energy projects independently of their core business, but still within the energy sector. Such support can focus on social enterprises and NGO-led projects, for example via sustainable financing mechanisms, training and awareness raising, start-up grants, seed funding and transfer of skills (such as through employee volunteering). One example is Solarcentury and SolarAid, as we've seen. Another is the Germany-based company Energiebau (see below).

Energiebau: Africa

German company Energiebau provides solar systems to customers in Germany and Europe, and also a project department delivering off-grid solar systems to African communities. The company partnered with the German development organisation InWEnt to provide off-grid energy to rural communities in Tanzania.⁸ Solar systems are supplemented by generators powered by oil derived from the biofuel crop jatropha to cover peak usage times and bridge periods of bad weather. The jatropha is locally grown, providing income for the farmers.

With social investment projects, companies will generally need to build in an 'exit strategy' from the outset, handing over management to local companies and entrepreneurs, perhaps in partnership with local authorities.

Mixing business and development 'DNA'

The examples we've looked at in this briefing underline the need for BoP business models that combine both business and development skills, capacities and approaches in their design and implementation.

Pioneering an enterprise-based approach to reducing poverty, the Shell Foundation – a UK-based charity set up by energy giant Shell in 2000 – urges development practitioners to apply 'business DNA' (business management skills and market principles) to solving development issues.⁹ But business also needs to understand the importance of 'development DNA' – that is, the knowledge and skills that deliver development benefits. Effective interventions that can be replicated at different scales depend on the successful marriage of these two types of 'DNA', along with the collaboration of business and development actors.

A BoP business activity should be designed around local needs and capacities, not the promotion of a specific product or technology. Robust monitoring and evaluation processes must be built into any BoP business plan, starting with an assessment of impacts, needs and opportunities. Systematic case study analysis is required to better identify drivers of success.¹⁰

In the current era of climate change and commodity squeezes, strategies to simultaneously address poverty reduction and environmental sustainability must incorporate a focus on greatly increasing access by the poor to sustainable energy. To do this effectively, a new level of collaboration is needed among a wide range of actors, and that includes both global and local business.

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Further reading & websites

Geoghegan, T., Dixon, B. and Anderson, S. 2008. *Opportunities to Achieve Poverty Reduction and Climate Change Benefits through Low Carbon Energy Access Programmes: A review of the portfolio of the Ashden Awards for Sustainable Energy, for the Department for International Development.* Ashden Awards, GVEP International, IIED, London. See www.ashdenawards.org/files/reports/DFID_report.pdf. ■ Hammond, A. *et al.* 2007. *The Next Four Billion: Market size and business strategy at the base of the pyramid.* World Resources Institute and International Finance Corporation, Washington DC. ■ Modi, V. *et al.* 2005. *Energy Services for the Millennium Development Goals.* UNDP, World Bank and ESMAP, New York/Washington DC. See www.unmillenniumproject.org/documents/MP_Energy_Low_Res.pdf. ■ Prahalad, C.K., and Hart, S.L. 2002. The fortune at the bottom of the pyramid. *Strategy and Business*. Issue 26, first quarter. ■ Shaad, B., and Wilson, E. 2009. *Access to Sustainable Energy: What role for international oil and gas companies? Focus on Nigeria.* IIED, London. ■ Shell Foundation. 2007. *Down to Business: New solutions to old problems.* Shell Foundation, London. See www.shellfoundation.org.

Notes

■ ¹ See, for example, www.bop-protocol.org, www.growinginclusivemarkets.org and www.inclusivebusiness.org. ■ ² Modi, V. *et al.* 2005. *Energy Services for the Millennium Development Goals.* UNDP, World Bank and ESMAP, New York/Washington DC. p53. See www.unmillenniumproject.org/documents/MP_Energy_Low_Res.pdf. ■ ³ According to the World Health Organization, around 1.5 million people die each year from indoor air pollution. See www.shellfoundation.org. ■ ⁴ Sources: Hammond, A. *et al.* 2007 (see www.eia.doe.gov/cabs/Nigeria/Full.html) and ESMAP. 2004. *Strategic Gas Plan for Nigeria.* UNEP and World Bank, Nairobi/Washington DC. ■ ⁵ See www.tatabpsolar.com. ■ ⁶ See www.solar-aid.org. ■ ⁷ See www.gshakti.org. ■ ⁸ Sources: www.energiebau.de; www.inwent.org/E+Z/content/archive-eng/03-2007/inw_art2.html ■ ⁹ Shell Foundation. 2007. *Down to Business: New solutions to old problems.* Shell Foundation, London. See www.shellfoundation.org. ■ ¹⁰ See, for example, The Ashden Awards site for case studies and analysis: www.ashdenawards.org/case_studies.

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