

Shining examples?

By **GLADA LAHN**

RESEARCH FELLOW, ENERGY, ENVIRONMENT AND RESOURCE GOVERNANCE, CHATHAM HOUSE



GLADA LAHN is a Research Fellow in the Energy, Environment and Development programme at Chatham House, specialising in energy security and energy sector issues in developing countries. She holds an MA in Near and Middle Eastern Studies from the School of Oriental and African Studies (SOAS) in London.

Ten years after the Millennium development goals (MDGs) were agreed – and in spite of almost full rural electrical connectivity in China – it is likely that one quarter of the world’s population still have no access to network electricity; many more are blighted by power cuts, voltage fluctuations and fuel pollution. The UN Millennium Project acknowledged in a 2005 report that “much wider and greater access to energy services is critical in achieving all of the MDGs”. This has been tempered with the fear that our planet cannot sustain the developing world going through the same phase of high-carbon industrialisation that advanced nations have.

Squaring this circle is fraught with contradictions, manifest in the World Bank’s simultaneous efforts to pursue a climate strategy and fund large scale coal-fired power stations in India and Africa. In its 2008 report, the Bank states “financing for adaptation and mitigation must not divert resources from the core development needs and actions towards achieving the Millennium Development Goals.” But are the two necessarily in conflict? Recent successes in poverty alleviation employing renewable energy generation may hold the key.

Vicious circles of energy poverty and conflict

Energy poverty comes in many forms. Poor rural communities in particular suffer from a reliance on biomass and kerosene, often with deleterious effects on people’s health – on women in particular – and the environment. In low-income countries a vicious circle emerges in which subsidised energy prices – and often non-payment of bills – cripple investment in infrastructure. This leads to inefficient services or delays in connection which acts as a disincentive to entrepreneurship and increased productivity, and keeps poorer communities vulnerable to any hike in energy prices. For example, in Yemen, plans to substitute gas for oil in electricity generation have been delayed for over a decade due to administrative failures and lack of technical capacity. This contributes to critical macro-economic deficits from both the diesel subsidy bill and the reduced volumes of oil available for export, which in turn exacerbate political instability.

Energy iniquity also matters. A lack of reliable power coupled with gross inequalities in access to power evidently contribute to damaging cycles of poverty and instability in parts of Africa, South Asia and the Middle

East. The effects are accentuated in oil and gas exporting countries like Nigeria, Yemen and Iraq where perception of unequal resource distribution is acute. In the near future, water iniquity will be increasingly linked to energy iniquity in places like the Arabian Peninsula and horn of Africa where energy is needed to desalinate, pump and transport water. But linking rural areas to a central grid is not necessarily the panacea that aid agencies and multilaterals thought it was from the mid 1970s onwards. Various assessments show that efforts to improve living standards and speed up economic development through extending power lines alone had negligible results.

Because electrification was treated as the ends rather than the means, simpler, cheaper and more sustainable ways to meet local needs such as lighting and pumping water were often ignored. Demand usually fell below the anticipated level as poor rural households are unlikely to quickly acquire energy intensive appliances. The costs of extending the grid to remote areas and losses in transmission tended to make each unit of energy used more expensive and less efficient than potential alternatives. In several cases, even though the capital for a project is provided by a development agency, the long-run costs of subsidisation and maintenance add to government burden. More importantly, the energy will not always reach the poorest families due to home connection costs they cannot afford. Where success is measured purely in terms of grid extension, a lack of accountability can result in wasted expense. For example, power lines in India often reach the village border but no effort is made to connect them to individual homes.

The rural renewable revolution

In the early 1990s, attitudes began to change based on this experience and global acceptance of the need to cut CO₂ emissions. The World Bank, German development agency GTZ, Bangladesh’s Grameen Shakti, USAID and others began to develop small scale renewable energy projects in rural areas, thereby postponing the need to extend the national grid and capitalising on local sustainable energy resources such as the sun, wind and waste products.

It is early days for some of these projects which tend to be small scale and high capital. Some have failed where financing ran out, equipment fell into disrepair and no spare parts or skills were available, or where locals stripped facilities of precious metals.

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But a learning curve is prompting greater attention to long term investment sustainability, overcoming ‘technological strangeness’ and generating local jobs.

In terms of recuperating costs, there are some creative approaches. In India, some schemes use solar power for mobile phone masts and link phone and electricity bills working on the assumption that people would rather pay than have their mobile cut. In Bangladesh, the not-for-profit enterprise, Grameen Shakti, has pursued a market based solution to rural areas bringing light and power to over 200,000 homes. The Bangladeshi government provides Grameen Shakti with the initial loan and a small subsidy for each solar panel supplied – this is then repaid to the government through collection of small payments from villagers over three years. The initiative in turn provides employment, often to women, through a scheme in which locals receive training on installation and repair of solar panels and wind generators.

Successful models won’t necessarily travel well. For example, while Yemen could benefit from the experience of Grameen Shakti in Bangladesh, it would have to be adapted to the more tribal structure of communities, the lack of government administrative capacity, and the comparatively lower prices for conventional fuel.

Given the success of projects emphasising local buy-in, longer-term employment and decision-making prospects are part and parcel of several new initiatives. In Pakistan, a commercial project pitching for financing from the UN’s Clean Development Mechanism (CDM) aims to create waste-derived-fuel, thereby addressing both the energy deficit and waste hazard problems, and generating jobs with better conditions for rag pickers. The World Bank is funding the US-based National Rural Electric Cooperative Association (NRECA) to assist with a model ‘electrical cooperative’ in Yemen’s Ibb Governorate where people will be trained and eventually be able to invest in and help regulate off-grid generation facilities. Such cooperatives – private electric utilities owned by the members they serve – have proved popular in many remote areas of the US.

Low-carbon leapfrogging

One salient idea is that very poor countries can ‘leapfrog’ developed nations in terms of energy systems, much in the same way as some African countries are jumping from zero telephony to modern information and communications technology. As the US and Europe spend billions to reconfigure their transmission and distribution grids, making them ‘smarter’ – and adding more decentralised, decarbonised power generation to the mix – dismantling the systems in place and accompanying vested interests presents a serious challenge. Those regions lacking an existing system at least have a ‘clean sheet’ advantage in the transition to a low carbon economy.

Technocrats from these countries who are tackling both immediate local needs and a GHG emissions reduction agenda increasingly recognise the need to manage energy differently. For example, the chairman of the Indian government’s Expert Group on Low Carbon Economy, Dr Kirit Parikh, recently called for “a centralised approach” to “scaling up decentralised energy models” which would mean coordinating bottom-up energy initiatives to meet national goals. A pilot is already underway in India to create ‘smart mini-grids’ from existing village-level renewable generation charging centres. Smart grids enable greater penetration of intermittent renewable supply technologies by directing excess energy to where it is needed. In theory, the greater the interconnection, the greater the level of energy utilisation can be so the aim is to eventually connect these mini grids to regional smart grids.

However, sustainable finance to see through such visionary infrastructures will need private sector investment. Countries and companies are beginning to take advantage of funding through the CDM – for example, carbon credits from this market-based scheme are helping to pay for the construction of a 100.25 megawatt wind farm in China’s impoverished Inner Mongolia.

Measures such as the ‘feed-in tariff’ (where renewable energy has a fixed price per kilowatt hour) in Denmark, Germany and Spain can also help mobilise investment. This policy innovation has been remarkably influential with emerging economies including China, Brazil, Kenya and some states in India which have introduced versions of it into national legislation. As is evident in Europe, these kinds of policy innovations demand a strong national commitment to a clean energy future as payback periods for initial investment or government subsidy are long. Many developing countries also lack robust state institutions to manage this kind of regulation.

A vision of ‘energy for society’ is key

The failure of rural electrification projects that focused on grid extension, added to international pressure to cut CO₂ emissions, has encouraged governments, multilateral agencies and the private sector to consider small-scale renewable energy solutions. While governance and finance issues remain an obstacle to greater uptake, inclusion of the societies who will benefit from better energy services is proving a common factor in success. This more holistic approach, which considers how services will improve health and equality as well as economic development, is key to meeting both environmental and poverty reduction objectives. Developed countries trying to re-engineer their economies towards progressively lower GHG emissions may eventually draw lessons from some of these innovative pilots. ■