

Opportunities in renewable Energy in South Asia

Tags: Climate Change, Energy, Evidence

The business case for large scale deployment of renewable energy technologies in developing countries is gaining momentum. There is growing awareness that renewable energy can play a key role in addressing climate change, creating new economic opportunities, and providing energy access to those living without modern energy services (IDS 2013, Practical Action 2013). Asia has abundant renewable energy resources, particularly solar and wind, although these are often costly to develop and mostly provide off-grid power in remote areas where alternatives such as diesel generators are expensive. Furthermore, unreliable electricity supply from the grid is highlighted among the primary bottlenecks to inclusive growth in all review countries. In Pakistan, for example, access to energy is a particular concern for the manufacturing industry for which consistent, reliable, and affordable power is a key driver of competitiveness. Similarly, in Bangladesh, textiles and garments sector that made up 90 percent of the country's exports in 2011, identifies power outages as a primary bottleneck to productivity, strengthening a business case for expansion of renewables, both to augment the total supply (by feeding into the grid) and for powering stand-alone applications and remote-off grid locations. A trend across Asia is for governments to integrate renewable energy into long-term, multi-sector strategies and policies, which provide a window of opportunity for expansion of renewables. For example Vietnam's Green Growth Strategy includes ambitious programmes for renewable energy development and more generally, for the development of green economy sectors. Similarly, the Myanmar National Rural Development and Poverty Alleviation Programme includes a Rural Electrification Plan which is currently being drafted and expected to be finalised in 2017 (Republic of the Union of Myanmar, 2015).

	RE target	Regulatory policies			Fiscal incentives		
		Feed-in tariffs	Electric utility quota obligation / RPS	Net metering	Capital subsidy, grant or rebate	Investment/ production tax credits	Reductions in sales, energy, CO ₂ , VAT, other taxes
Afghanistan	Y			Y			
Bangladesh	Y				Y		Y
Kyrgyzstan	Y			Y	Y	Y	
Myanmar	Y						Y
Nepal	Y				Y	Y	Y
Pakistan	Y	Y	Y	Y	Y		Y
Tajikistan	Y						Y

All review countries have adopted policies to encourage the deployment of renewable energy, including targets for renewable energy. Most have put in place well-elaborated strategies, financial support mechanisms and regulatory policies such as renewable portfolio standards, feed-in tariffs, and technology/fuel specific obligations. Fiscal incentives—such as loans, grants, and tax reductions—have also been used mainly in off-grid renewable electricity programmes to address the barrier of high upfront costs (REN 21, 2015). State-owned entities continue to be key players in renewables installation, equipment production, supporting infrastructure, new technology development, and investment. In recent years, the private sector and civil society are also playing a role.

Figure 1: Policies and incentives adopted. Source: REN 21, 2015.

Renewable energy deployment has been growing in off-grid locations, reaching energy to large sections of population, mostly rural, and at times, remote and is increasing finding a space in the overall energy mix (Liu et al 2013). Distributed renewable energy technologies are helping to provide essential and productive energy services in remote and rural areas across the developing world. Until July 2015, 20 million brand quality portable lights had been sold globally and 89 million people globally had at least one solar lighting product in their household (Bloomberg, Lighting Global and GOGLA, 2016). The experience of Bangladesh illustrates the strong potential for solar photovoltaic (PV) to extend energy access and employment to off-grid rural areas. Between 2003 and 2015, Bangladesh installed 3.8 million units of solar home systems, creating 115,000 jobs, principally in sales, installations, and maintenance, and benefitting 20 million people (SREDA 2015).

In spite of a good record of electrification, energy access for the poor continues to be a problem.

While 3.5 billion people, or 89 percent of the total population of Asia and the Pacific region have access

to electricity, an estimated 426 million continue to have no access (ADB 2015c). Populations without access are concentrated in South Asia, in Afghanistan, Bangladesh, India, Nepal, and Pakistan (REN 21, 2015).

Clean energy for cooking has not received a similar level of attention as electrification. While there have been notable advances in electrification, access to clean cooking continues to trail behind in Asia. From 2010 to 2012, The annual growth in access to non-solid fuels was negative 0.1 percent, and well short of the 1.7 percent target growth rate required to reach universal access by 2030 (ESMAP and IEA 2015). An estimated 2 billion still depend on solid fuels (ADB 2015c), 276 million of these in South east Asia (OECD/IEA 2015b). Among the study countries, large parts populations in Indonesia, Myanmar and Viet Nam still use solid biomass in traditional stoves for cooking. Indonesia alone has some 24.5 million households, approximately 40 percent of which are located in rural areas—relying on traditional biomass energy as their primary cooking fuel (ASTAE 2013). Among solid fuel users, improved biomass cookstoves cover only 11 percent of the population in South Asia, 21 percent in Southeast Asia and 85 percent users in East Asia (ADB 2015c).

The present use patterns have severe socio economic impacts for the poor, women and children.

Some of the burdens of lack of energy access that women are particularly affected by include physical injuries collecting fuelwood and the health impacts of indoor air pollution caused by use of solid fuels; the costs of fuel, stoves, and the time spent in collecting fuel and water and cooking and the resultant reduced time and opportunities for gainful employment and leisure. In some developing countries, girls spend more than 7 times as many hours collecting wood and water than adult males and 3.5 times as many hours compared to boys the same age. According to the WHO, out of the 4.3 million deaths worldwide attributed to indoor air pollution in 2012, 80 percent were in Asia and the Pacific (ADB 2015c). Women, because of their central role in food preparation for the household, are more vulnerable to indoor exposure to air pollutants. And children, who often assist their mothers in their household role, also bear some of the disease burden.

	Access to clean cooking fuels		Access to electricity	
	Percentage population relying on biomass	Population in millions	Electrification Rate 2012 (share of population with access)	People without access to electricity (2012 Pop. in millions)
Afghanistan	85		15.6	
Bangladesh	89	138	60	62
Kyrgyzstan	34		99.9	
Myanmar	93	49	32	36
Nepal	80	22	76	7
Pakistan	62	112	69	56
Tajikistan	34		99.9	

Figure 2: Source: REN 21 (for Afghanistan, Kyrgyzstan and Tajikistan. Source: IRENA 2013)

Catalysing Renewable Energy expansion: Future prospects

There is considerable ongoing discussion favouring a transition in LIC's towards a power system with a significant renewables-base. While the review countries have good potential for renewable energy, especially on solar and wind energy, and international interest is forthcoming, a number of measures need to be taken if these investments are to be sustained and the results meaningful. Global experience shows that for effectively expanding renewable energy power generation, governments need to put in place policies and strategies to increase the reliability, affordability and security of power systems, including demand side management to support system flexibility, energy efficiency policies to optimise investments in transmission and distribution networks, and smart grid technologies to reduce the costs of asset management (IRENA 2015).

The review showed that in all countries, the level of preparedness to meet these conditions needs to be improved. Several competencies need to be built, and there are systemic and sector-wide improvements that need to be instituted if this is to yield the desired results. The issues identified can broadly be divided into two categories, those related to enhancing the efficiency of the energy sector and larger economy level issues related to political volatility, governance and transparency.

- Among the review countries, Bangladesh, Pakistan and Nepal have volatile political situations, which influence their investment attractiveness. Tajikistan and the Kyrgyz republic are also encumbered with macro-economic and transition issues. After separation from the centrally governed Soviet Union, these countries are still in the process of developing themselves as market economies and sovereign authorities. An important energy sector issue is that these economies have no leverage over the neighbouring economies with which they were strongly linked and had shared energy systems (OECD/IEA 2015a).
- Nevertheless these countries are committed to increasing the level of RE, and have a desire to attract private sector investment, both domestic and foreign to facilitate the transition to a greater reliance on renewable energy. A way to do this would be through financing mechanisms that can assume some of the risks and through linking RE development with specific demand from businesses.
- In Tajikistan, the Kyrgyz Republic and Afghanistan, the power infrastructure is ageing and dilapidated (leading to high losses) and needs to be upgraded. System improvements and upgradation are constrained by the weak financial positions of the Utilities, and caused to a large extent by continuing, unsustainable subsidies, which the governments have found difficult to remove/ reduce, and pricing structures kept consistently below cost-recovery levels (OECD/IEA 2015a). Bangladesh too needs to address the cost recovery issue as a reliance on independent power producers (IPPs) and quick rental power plants (QRPPs) to meet emergency power shortfalls has meant that the generation cost of power has been way higher than the cost charged to the consumers.
- Energy access for the poor remains a critical issue. Majority of the population living without access live in rural areas, emphasizing the discrepancy between urban and rural electrification. In most countries, majority of urban areas have been electrified already, with Afghanistan with lowest urban electrification at 83 percent (World Bank and IEA, 2015). In central Asian countries, there are two major barriers to energy access: the reliability of energy supply and affordability. Poorly maintained Soviet-era infrastructure is the major constraint on the reliability of supply, and funds for investment are limited in many cases by prices that are below cost-recovery levels. While collection rates for household customers have increased substantially with the widely metered energy supplies, they have dropped for the public sector, where state-owned enterprises remain the largest debtors (OECD/IEA 2015a).

In all countries, investments need to be complemented with technical assistance to unlock development impacts. While each country offers different windows of opportunity, key ones are as follows:

- In most, hydropower potential is largely untapped. While a number of players including the ADB are already supporting the area, further investment would be justified.
- Encourage and mobilise investments in infrastructure necessary to improve the performance and efficiency of the energy supply chain. This will require an attractive business climate, a competitive and fair regulatory framework and market-price incentives.

- Investments to enhance the capacity of Utilities and other stakeholders are needed. Transmission and distribution system operators and energy planners need to develop or update their procedures to deal with supply-side variability, regulators need to consider the possibility of new entrants and a more proactive role of consumers, and distribution system operators need to become more active in managing reverse flows of electricity, providing additional system services, and controlling load locally due to distributed generation (IRENA 2015).
- An important area of work is to support the governments and the Utilities to rationalise the current tariffs, and transition towards more remunerative tariff structure to cost level. The phase-out of tariff subsidies should be done on a basis of affordability, with most vulnerable customers receiving the most support until the phase-out is complete.
- In some countries, systems for environmental and social safeguards for large infrastructure still need to be streamlined. A case in point is Myanmar where several large hydro projects were stalled because of protests against adequate addressing of environmental and social impacts of infrastructure projects.

Lack of access to efficient modern energy has a significant impact on economic development and small-scale enterprise, educational opportunities, gender equality and quality of life (IDS 2013). Renewable energy can play a role in bridging the currently existing energy access gap, especially in rural, remote areas and in reducing poverty. In Myanmar, Bangladesh and Nepal, large unconnected rural and remote populations provide a good opportunity for off-grid renewables. A recently published literature review explains how electricity access can decrease poverty. It however cautions that this link is not automatic and that ensuring that renewable energy benefits people living in poverty rests on four factors (IDS 2013):

- Once electricity is generated, it needs to be reliably fed into the system.
- This additional supply must be made accessible, and affordable, for poor people.
- Increased electricity consumption then needs to translate into poverty reduction.
- Increased electricity supply can indirectly reduce poverty by boosting economic growth

A central piece of renewable energy contributing to poverty reduction is to help communities go beyond the basic uses of lighting and cooking and to use energy for productive purposes, to increase incomes and to strengthen livelihoods. The review identified two strategies that need to be put in place to encourage productive uses for electricity.

- A clear set of criteria that helps prioritise rural areas with the highest potential to use electricity for income-generating activities. These would include communities with a large internal market and easy access to external markets; a pre-existing diverse and growing productive sector including agriculture, manufacture and services; a set of infrastructures conducive for business development, such as road and telecommunications networks; and easy and reliable access to exploitable resources such as agriculture and tourism.
- For more deprived areas with lower economic potential, electrification should be integrated with other development programmes that contribute to create the appropriate environment for productive activities. This could include support to purchase productive equipment and to develop the skills to efficiently use it; infrastructures (particularly roads and telecommunications) and social skills to access external markets; or support for the creation of businesses.

In utilizing renewable energy for energy access and poverty reduction, investments need to be supported with technical assistance in a number of areas. These include capacity building for project management; technology sourcing, development of business models and operation and management of systems. In order to support investments in the off-grid electricity sector, there is also a need to help the governments develop detailed implementation guidelines and standards, to promote private, off-grid electrification projects. There is also a need to develop financing packages that will enable the population to afford the purchase of renewable energy devices and to ensure availability of 'complementary inputs' like market linkages, finance facilitation and business development support.

For more information on climate-friendly energy programming contact the ICED Facility at:

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