

# LAOS: The land of RENEWABLE ENERGY OPPORTUNITY

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## Introduction

**L**ao People's Democratic Republic (Lao PDR), situated between Thailand and Vietnam, has plenty of renewable energy opportunities to offer across a range of technologies. With a growing economy (6-9 per cent growth annually over the past 5 years) and a great location for exporting power, thanks to an ever-increasing power requirement of neighbouring countries, Lao PDR is swiftly opening up.

Laos is a landlocked country that is among the Least Developed Countries (LDCs) worldwide. The population of Lao PDR was around 6.13 million in 2009, and is expected to grow by about 2.1 per year<sup>1</sup>. Having an estimated per capita income of \$890 and a land area of 236,800 km<sup>2</sup>, the population density of 23 persons per square kilometer is the lowest in the region.

The Government of Laos aims to exit the status of LDC by the year 2020 and



Solar power is one source of renewable energy that Laos is looking to utilise to ensure sustainable economic growth

has set itself the target to provide electricity to 90 per cent of the households by then. Overall electrification rates in the country have increased from 16 per cent in 1995 to 63 per cent in mid-2009; the latest source mentions 72 per cent for 2011<sup>2</sup>. On the other hand, although about 80 per cent of the population lives out-side the towns, the rural electrification rate remains at just 38 per cent. Generally speaking, rural electrification has largely been pursued by expanding the grid. According to the recent Rural Electrification Master Plan (2010), with the connection ratio increasing from 80 per cent to 95 per cent of the households, it would be possible to assume an electrification target of ~90 per cent households with electricity from the grid and 5 per cent with electricity from off-grid sources, mainly solar and micro-hydro by 2020; this is a more ambitious target than the government's original goal.

The chosen strategy can result in development of energy-intensive projects in the near future. The majority of rural population at present depends primarily on biomass (fuel wood and charcoal) for domestic energy needs such as cooking, heating, lighting, electricity generation and productive uses such as water-pumping and rice mills. Although grid expansion is being carried out in remote territories, the

cost of extension has gone up and opportunities for connections are diminishing. It is expected that as much as 20 per cent or more of the population will remain beyond the reach of the grid for a foreseeable future. In order to overcome the limitations in grid expansion, the government has developed a complementary policy for off-grid rural electrification. This began with the introduction of solar home systems, but more recently has also included small-hydro systems.

The government's current priority for electricity generation is to increase hydro-electric capacity. This is to enable an increase in power export to neighbouring countries, in particular, Thailand. Secondly, it is being done to expand and unify the domestic grid (which currently consists of four unconnected regional sub-grids).

RE investment opportunities are high in Lao PDR. Solar energy and the micro/pico hydropower are the most suitable RE energy sources, especially to feed into the grid. Solar energy has a large number of applications and receives government support. Pico-hydropower is the most widely used form of off-grid rural electrification system, especially in the northern part of Lao PDR where there is mountainous terrain and numerous water courses. Table 1 indicates the size of RE potential in Laos.

<sup>1</sup> ADB 2009: Lao People's Democratic Republic Fact Sheet

<sup>2</sup> Department of Electricity (DoE), Presentation of Bio-energy Decree, 25-26 July 2011

## Challenges to Development of Clean Energy

Challenges are numerous when considering that as many as 40 per cent of households prefer not to connect and procure power from the electricity grid even if it passes through their village. Hence, depending on decentralised renewable electricity production may help the government to reach its ambitious target of electrifying 90-95 per cent households by 2020 and generating 30 per cent power from RE sources by 2025, as well as potentially saving on investment costs. Another key issue hindering the growth of RE sources is the need for clarity on the roles of the government as regulator and the Electricity du Laos (EdL) as operator. Until now the government has had a powerful influence over EdL's operating practices. This has historically had a negative impact on EdL's commercial performance and created a vacuum regarding the operator's position in the electricity sector. The issue is now being studied and addressed in detail.

As part of the incentives to promote RE, the Department of Electricity (DoE) in the Ministry of Energy and Mines (MEM) in Laos has announced numerous sops to facilitate foreign investment such as zero import duty on production vehicles, machinery, equipment and raw materials or the permission to expatriate earnings. During the last decade Lao PDR has

opened up to new opportunities, from increasing awareness about RE to answering the need for alternatives to conventional energy practices.

### The LIRE Initiative

The Lao Institute for Renewable Energy closely works with RE stakeholders and develops projects in partnership with local players, especially in the solar energy sector. One such example is Sunlabob Renewable Energy Ltd. Almost 10 years ago, Sunlabob anticipated the need for rural electrification in Lao PDR and was one of the first to propose and install solar home systems in areas not connected to the national grid. The company has since expanded, and generates majority of revenue via direct sale of hardware, in particular, solar water purification systems, solar water pumps, and solar lights. It also offers micro hydro-electricity, and undertakes training and consultancy in energy audits, which is at the base of best energy use. The business model that is of greatest potential benefit to the rural poor, however, is the solar lantern rental system.

### Wind Power Potential

The potential for wind power in Lao PDR is limited but does exist in specific areas of the country. There are currently no wind power systems in place in Lao PDR. As shown in Table 1, its potential has yet to be tapped. This is, however, slowly changing as recently a wind power proposal was

accepted by an international Scandinavian funder. The Laos government foresees a diversification of energy supply, which includes wind energy. According to a World Bank mapping resource, the south of Laos, in the provinces of Khammouane and Savannakhet, is the most suitable area for large-scale wind power development and, therefore more in-depth research and feasibility studies should be conducted there. For village-scale wind power generation the World Bank survey has identified south-central Laos. Both south and central provinces share a border with Vietnam, while the Savannakhet province also shares its western boundary with Thailand. There are possibilities to export wind power and this would be done in line with all relevant national and international policies.

### Conclusion

Laos PDR is a land full of opportunities due to its extremely rich resources. However, the primary logistical issue lies in the transmission and supply of power to remote areas. Although the government has a rural electrification policy that is supported by donor funding, its effect has been to favour quasi-private schemes that have not sustained themselves and engender poor quality and reliability of the connected grid. As such, Lao PDR is still looking for the best model to adopt, keeping the doors open for public private partnerships as well as foreign investment.

Table 1: The size of RE potential in Lao PDR

Sector	Current	Planned by 2020
Small Hydro (less than 15 MW)	11 MW under operation, 12 MW under construction, 250 MW under development	Potential 800 MW, Planned 650 MW
Wind	0 MW	Theoretical potential 800 MW, Planned 90 MW
Biomass	Minimal	175 MW
Biofuels, Bioethanol, Biodiesel	Extremely limited actual production	Bioethanol: 266 million litres by 2025 Biodiesel: 525 million litres by 2025
Solar	20,000 solar heating systems installed for households + a current installed capacity of 285 kW	100 MW
Biogas	2,000 home biogas digesters	5,000 + home biogas digesters
Geothermal	Minimal Potential	Minimal opportunity