



Using Green Technology to solve problems

Edward Allen



The largest Renewable Energy and Resources institute in Lao PDR with the largest Bio-energy research team in Laos and perhaps the most diverse CDM Program and leading RE Policy expertise

Edward Allen

- BA Oxford, Geography, MSc Production in Tropical Environments, Imperial College
- 5+ years in Lao PDR
- Focus: tropical soils, pigs and pig diseases, agronomy, Climate Change, Boundary layer climates,



Towards a viable renewable energy sector for the Lao PDR

LIRE

- Lao Institute for Renewable Energy
- A Lao Non-Profit Organisation
- 6 yrs old, 60+ reports done, for over 20 different clients, c. 15 staff, based in Vientiane
- All RE technologies covered, + waste water treatment, CDM, Climate Change, Urbanisation, Mobility
- “Technology Neutral ethos”



Towards a viable renewable energy sector for the Lao PDR

Overview

Renewable Energy Overview

RE: Real Efficiencies

RE: Real Environmental

Benefits

RE: Real Economic Benefits

The Mega Trends

How to approach the technologies?



Big Picture Message

Even if there were zero environmental benefits, zero CDM potential, and even if there were zero other external benefits, Renewable Energies are still an intelligent part of the energy mix. They replace nothing, but should not be replaced either. The regions in the world with the most successful and robust energy policies are actively embracing both large and small Renewable Energies, **the Mekong Region should not be left behind....**



Leading innovation in Renewable Energy in Lao PDR

RE: Real Efficiencies

- Power where people are
- Reduce transmission losses
- Balance out peak demand/peak load
- Waste to Energy Opportunities
- Grid redundancy: less impact of power plant shut downs
- Solar=ultra predictable for power planning



Some numbers

- Power system losses Lao PDR 2010 14%, Thailand 2007 6.01%
- Malaysia 2004 15%, Cambodia 2011 12.5%, Vietnam 2011 11%
- **Can the current transmission systems cope with the increase in power demand?**
- Power demand annual increase ADB 2008 7-16% :strong economic growth



RE: Real Environmental Benefits

- Less land taken up by large hydro dam lakes
- In Lao PDR Small hydro potential (<15MW) estimated at over 2000 MW, with goal of 650 MW by 2025
- Very often systems are zero/near zero waste: eg Biogas
- Positive for GHG emissions: often zero emissions and often Carbon neutral
- Basin and environmental impacts smaller
- Less disruptive to local area



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Land Losses –some numbers

- Land losses from large hydro projects: (MRC 2010) loss of c. 30,886 ha of forest land (mostly degraded forest) and 15,786 ha of agricultural land, inc 829 ha of irrigated land.
- The report estimates that 11,966 ha of riverbank gardens will be submerged by the reservoirs and wetland loss may amount to about **7% of the wetlands** or 73,500 ha within a 50 km corridor of the mainstream Mekong.
- **71,769 ha of replacement farmland will be necessary** to maintain current levels of agricultural production.

RE: Real Economic Benefits

- RE systems can be cost competitive with large power systems
- Reduce the need for grid extension to remote communities
- Usually RE has strong CDM potential
- Cheaper to install with less complex regulations, eg no EIA often required



Some numbers

Technological Choice	Costs in USD/KWh		
	REMP	PDP	WB Study Sub-Saharan Africa
Centrally Planned Large hydropower	0.05	0.03-0.045	-
Small & Pico Hydropower		-	0.12 -0.14
Solar Photovoltaic System	0.36	-	0.51
Electricity Production from vegetable and agriculture wastes	-	-	0.57- 0.83



*Sources: The Lao PDR Rural Electrification Master Plan (Nippon Koei, 2010),
Lao PDR Power Development Plan (EdL, 2007),
The Economics of RE expansion in SS Africa (WB, 2010)*

- Wide variation in costs, but small hydro relatively close in cost to large hydro
- PV ultra-durable c.25yr life ++ with low maintenance

RE: Risk Evaluation

- Generally very low political and technical risks: off-the shelf technologies, sub-scale, and often provincially approved
- Some known structural risks eg solar panels don't produce power at night, wind variability
- **The biggest risk of all is that the financial support is not in place to permit the development of this sector within countries.**
- **No support = No RE**



Understanding technologies

- Huge range of technologies at different levels of maturity, research, and government support
- Technologies only work when integrated into community structures
- Technologies are usually only part of the solution
- : bring the community with you



Mature technologies

- Huge numbers of very mature technologies available: over 500 Improved cook stove designs
- Huge numbers of biogas approaches
- PV Solar panels and systems
- PV Grid Power stations
- Quality control issues inevitably



Research and Pilot technologies

- Biomass to liquid fuels (BTL)
- Anything involving the Fischer-Tropsch process
- (Micro-)gassification, though well established at 5 MW+
- Bio-Butanol
- Bio-jet fuel



Some Mega Trends

- Climate Compatible Development
- Nexus of food-energy-water
- New funding and income platforms such as CDM-type markets
- More data focus
- Climate Change Adaptation issues
- Reallocation of Aid and Development budgets



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Unrivalled research, R&D, CDM, data collection and local partner services in Lao PDR

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