*UNESCAP Bazaar of Ideas*

*First Session of the ESCAP Committee on Environment and Development*

*Bangkok, 4 December 2009*

# *Solar Lantern Rental System (SLRS): Paying for the service, not the hardware*

*By Andy Schroeter, Sunlabob Renewable Energy Ltd, Lao PDR*

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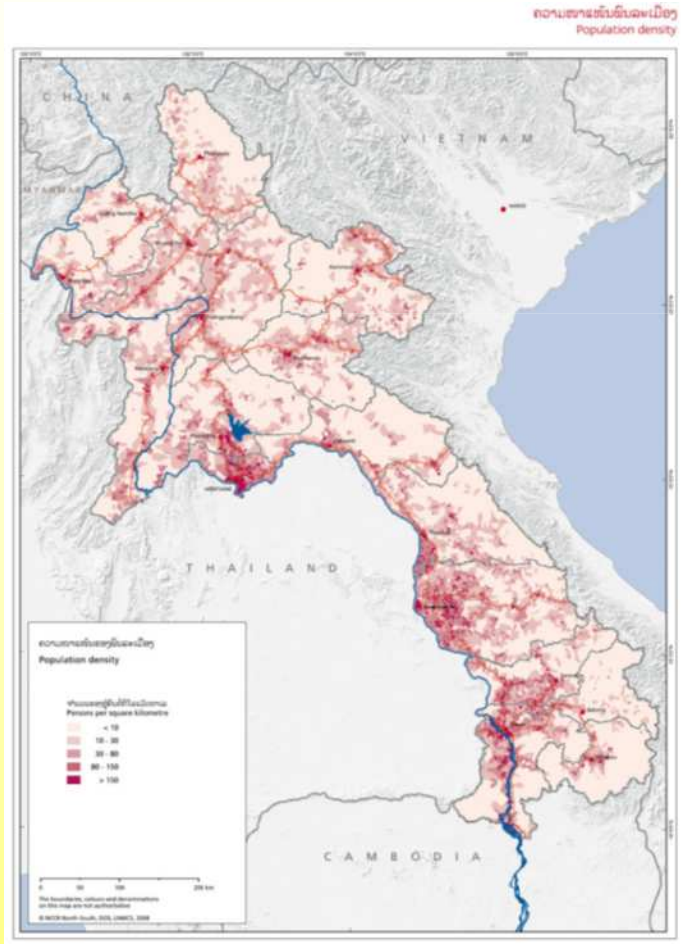
# Background (1)

**Lao PDR – Country Data**

- Geographical situation: 236,800 km$^2$, landlocked; mountainous
- Population: 5.6 million (2005); several sparsely populated remote regions; 50% of population under 20 years old
- Political regime: People's Democratic Republic, government began decentralising control and encouraging private enterprise in 1986
- Development : in group of LDCs, HDI=131/177
- Environment - current issues: UXO; deforestation; soil erosion; limited access to potable water

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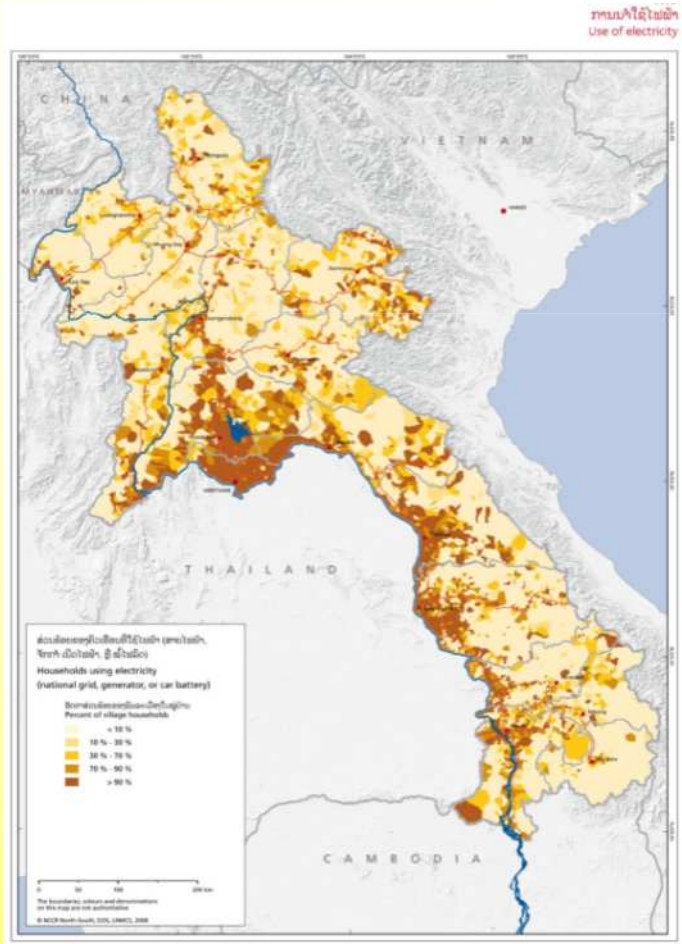
# Background (2)

**Energy situation in the Lao PDR**

- Electrification rate (2005) = 58% (50% national grid + 8% isolated mini-hydropower plants / solar PV systems / generators / car batteries)
  - highest = 96% in Vientiane Capital
  - lowest = 9% is in the province of Phongsaly
- Total installed power generation capacity = 673 MW (99.8% hydropower + 0.2% diesel generators and solar photovoltaic systems)
- Large exports and imports of power to and from the neighbouring countries
- No national transmission line → many towns receive electricity from neighbouring countries (Thailand, Vietnam, China)

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# Project Overview (1)

**Solar Lantern Rental System (SLRS)**

- Started in 2006
- **Objectives / Expected outcomes:**
  - replace kerosene lamps
  - selling a service
  - launch and sustain village enterprises
  - reduce poverty in rural off-grid areas

- **Barriers to expanding energy access:**
  - accessibility
  - low population density
  - poverty
  - ethno-linguistic diversity

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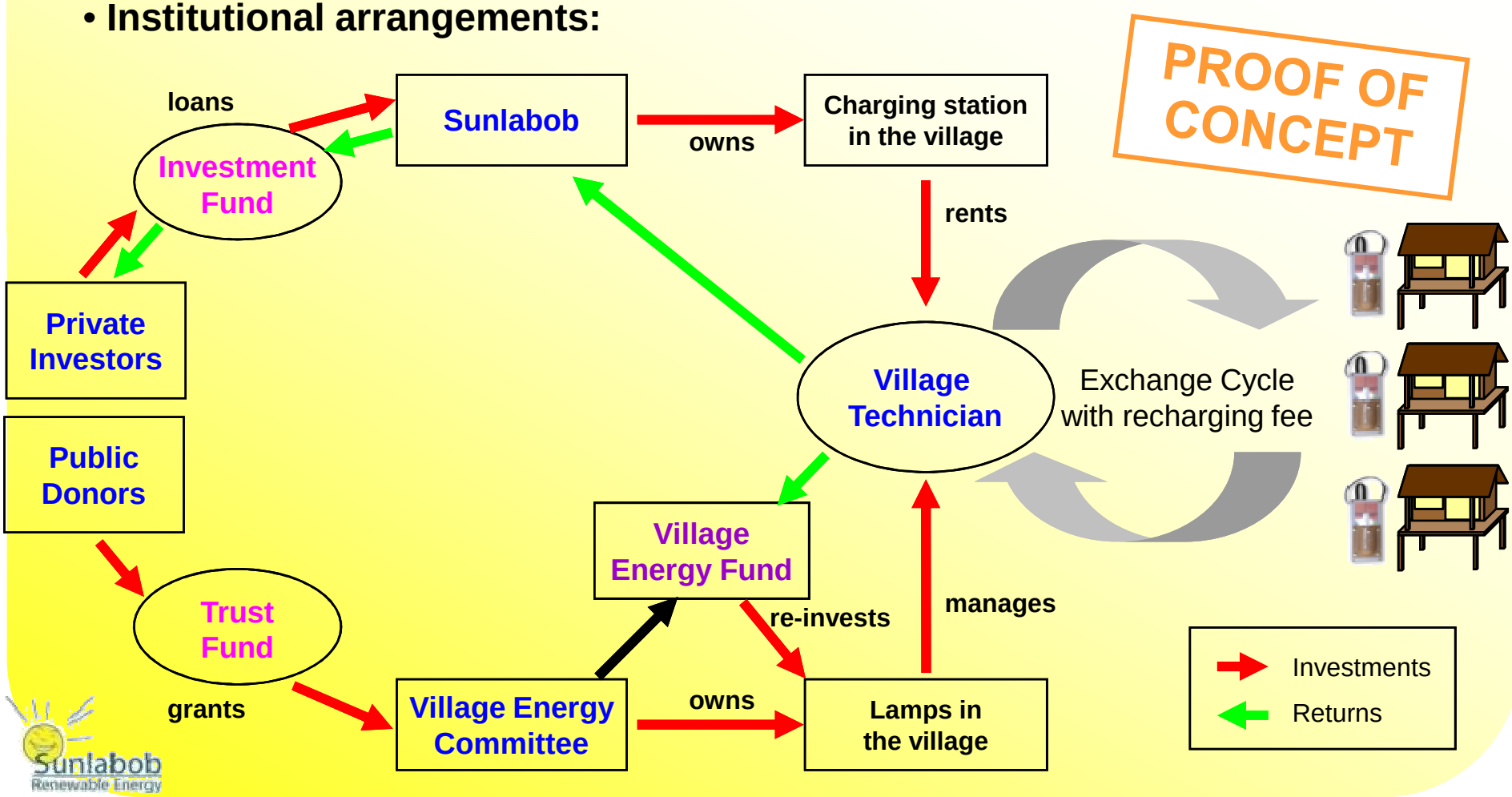
# Project Overview (2)

- **Institutional arrangements:**



# Project Overview (3)

**Solar Lantern Rental System (SLRS)**

- **Benefits:**
  - Reliable and cost-saving alternative to kerosene lamps: improved health (smoke reduction), cheaper than kerosene, saving fossil fuels, brighter lighting, safety
  - Central charging with guaranteed operating hours
  - Automated data collection allows for carbon accountability and entering the carbon markets

- **Target beneficiaries:**
  - Poorest off-grid households living in districts identified as poor & in areas where no grid extension is pending
    - end-users
    - village entrepreneurs and energy committees

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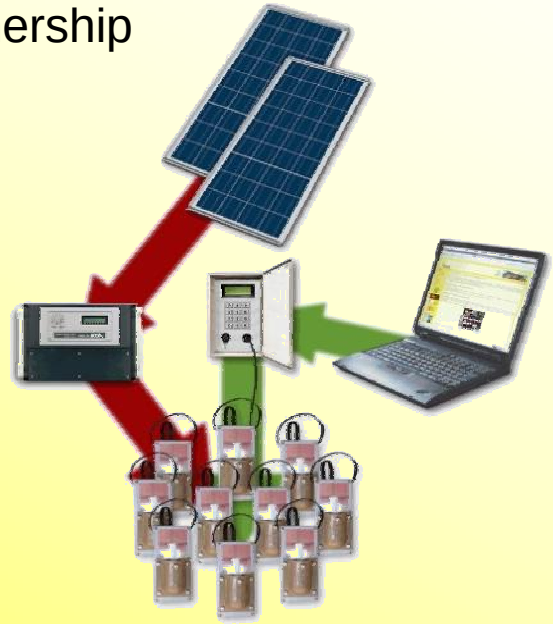
# Implementation Strategy (1)

**SLRS combines**

- State-of-the art technology
- Responsible supply chain
- Delivery method based on fee-for-service (rental)
- Innovative financing mechanism: Private-Public Partnership
- Involvement of local communities (local governance)
- Strong focus on capacity development



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# Implementation Strategy (2)

**State-of-the-art technology**

- Charging Station:
  - system control unit (SCU)
  - solar photovoltaic modules (300 Wp)
  - battery charging unit (STECA PL2085)
  - management software for data handling
- Lantern Units (50 per system):
  - 4W compact fluorescent lamp
  - sealed AGM-type lead-acid battery (12V, 7.5Ah)
  - microprocessor for data collection
  - stable housing
- Lantern design kept simple → System's "intelligence" placed in the SCU

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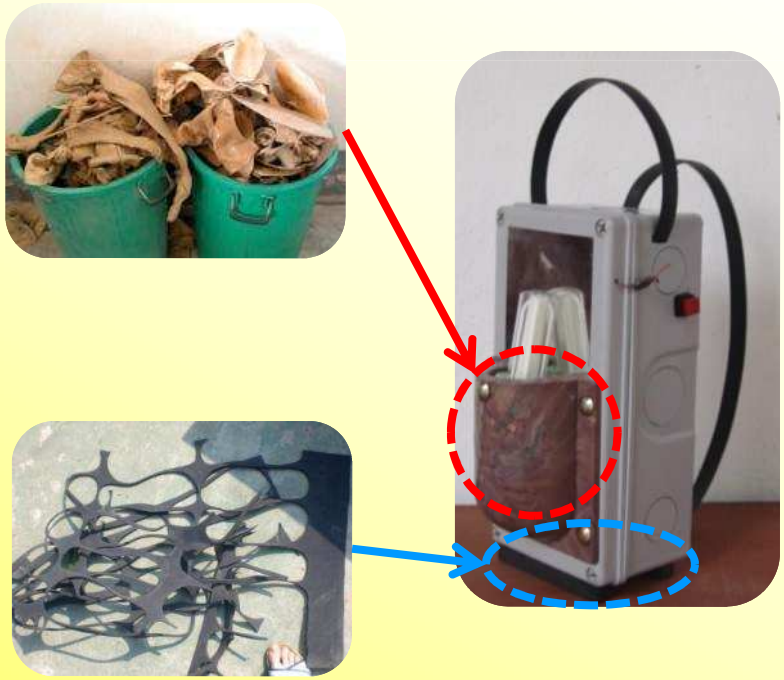
# Implementation Strategy (3)

**Responsible supply chain**

- Co-operative Orthotic and Prosthetics Enterprise (COPE):
  - manufacturing artificial limbs for victims of UXO (free of charge if patients cannot afford to pay)

    *NB: Laos is the most heavily bombed country in the history of warfare!*
  - scrap polypropylene used for lantern cover
- Local flip-flop factory
  - manufacturing flip-flops
  - scrap used for inside padding and feet of the lantern



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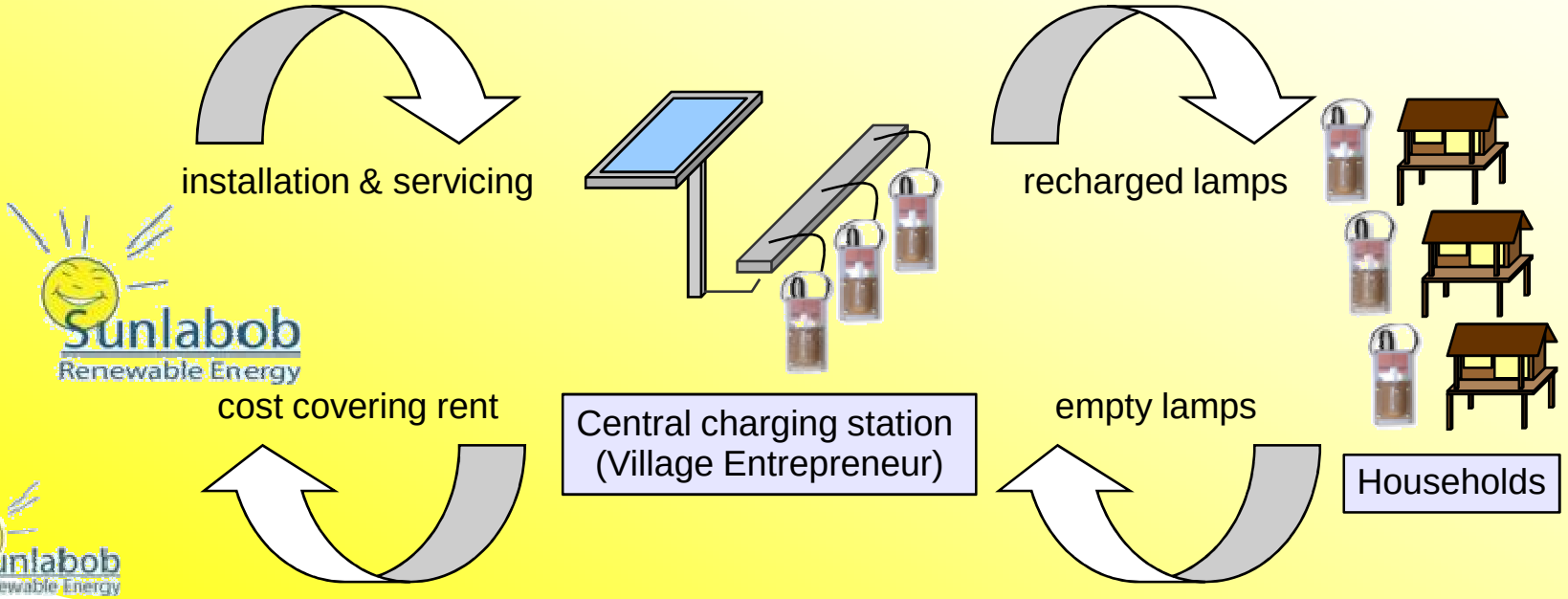
# Implementation Strategy (4)

**Delivery method based on fee-for-service (rental)**

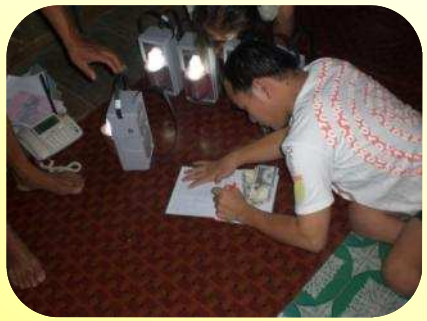
- Small entrepreneur in village rents a charging station and charges solar lanterns for a cost-covering fee
- Sustainability through commercial viability



# Implementation Strategy (5)

**Innovative financing mechanism**

- SLRS must be competitive with kerosene
- Collaboration with public donors: Public-Private Partnership
    - mutual leverage
        - private → charging stations
        - public → initial purchase of lanterns
- After initial investment, recharging fee alone can sustain the system, divided into 4 parts:
    - Maintenance fund (managed by VEC)
    - Village Technician's salary
    - Sunlabob (charging station rent)
    - VEC members' remuneration



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# Implementation Strategy (6)

**Involvement of local communities**

- Prior to intervention:
  - Consultation with villagers
- Management and operation of systems:
  - Village Energy Committee
    - Governing body
    - Platform for collective decision
  - Village Technician
    - Entrepreneur
    - Responsible for maintenance and servicing
- Feedback from end-users → design changes and technical improvements

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# Implementation Strategy (7)

**Capacity development** (supported by Sunlabob's Master Trainers)

- Training of Village Energy Committees
  - energy service management
  - basic book-keeping
  - maintaining transparency
  - community communications

- Training of Village Technicians
  - system operation
  - system maintenance
  - stocking spare parts
  - keeping records of the usage

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# Impacts (1)

**MDG 1: Eradicate extreme poverty and hunger**

- Creating local businesses
- Providing opportunities for income-generating activities
    - technical/admin training
    - additional hours of good-quality lighting
- Providing access to information (mobile/radio/TV)

**MDG 3: Promote gender equality and empower women**

- Employees: rehabilitation in partnership with an NGO
- Villagers:
    - VT micro-enterprise run as a family business
    - women = majority of the workforce in $^{2}/_{3}$ of villages

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# Impacts (2)

**MDG 7: Ensure environmental sustainability**

- Reducing kerosene consumption and $CO_2$ emissions
- Providing an affordable service with renewable energy
- Reducing indoor air pollution (smoke, fumes)
- Providing the opportunity to enter the carbon markets
- Reducing the risk of household fires

**MDG 8: Develop a global partnership for development**

- Meaningful interactions between Public and Private sector
- Involvement and empowerment of local communities
- South-South cooperation

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# Project Sustainability (1)

**Ensuring high (robust) quality of product**

- Market gap
- Using certified material for critical components
- High quality standards for assembly

**Matching the product with consumer behaviour**

- Developed in response to consumer demand
- Features affected by consumer choice
- Consumers in direct contact  with service provider
- Fee based on the level of use
- Replicates conventional behaviour

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# Project Sustainability (2)

**Local ownership**

- Village Technician: system operation and maintenance
- Village Energy Committee:  good governance

**A profitable business for everyone**

- End-users:
    - safer and brighter lighting for ≤ than kerosene
    - extension of the number of working hours
- Village Technician: micro-enterprise
- Village Energy Committee:  community development

**Transparent fee structure**

- Over ¾ of the money generated stays within the community

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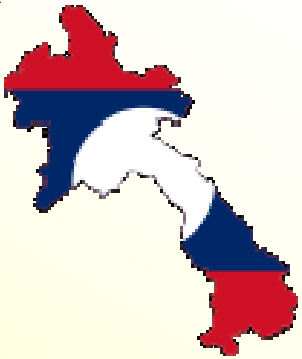
# Experiences / Expansion (1)

**Building on past experience**

- Sunlabob = 9 years of experience in rural electrification in Lao PDR
- Solar Home System rental scheme
- Local population involvement: franchise network
- Technical training provided
- After-sales & maintenance service
- Government relations (national / province / district level)



**Expansion**

- Pilot projects in Uganda and Afghanistan, with minor adjustments
- Replicable anywhere if:
  - there is adequate sunlight
  - populations can designate VTs/VECs
  - kerosene is expensive

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# Experiences / Expansion (2)

## Uniqueness

- Selling a service
- Empowerment of local actors
- System sustainability
- Accurate accountability for carbon trading

## Challenges and risks

- Villagers' concept of ownership → awareness on communal ownership
- Villagers compare RE prices with grid prices → awareness
- Lack of public sector support to cover initial investment→ more financing options
- Unfair competition for RE / Projects providing systems free of charge
- Grid extension → high connection fee / equipment can be dismantled
- Kerosene vendors' retaliation → often become VTs

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# Lessons Learned

**Recommendations**

- Robust and reliable product
- Profitable and sustainable model
- Good match with existing consumer behaviour
- Strong relationship with local operators
- Involvement of local authorities (requires capacity building)
- Consumer education

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# SLRS Highlights

Sunlabob won the **Ashden Award** in 2007 for the concept…


… the **Lighting Africa** Development Marketplace Award from the World Bank in 2008...

LIGHTING AFRICA
Winner 2008

… and the **UNEP Sasakawa Prize** in 2008!

UNEP
Sasakawa Prize
Winner 2008

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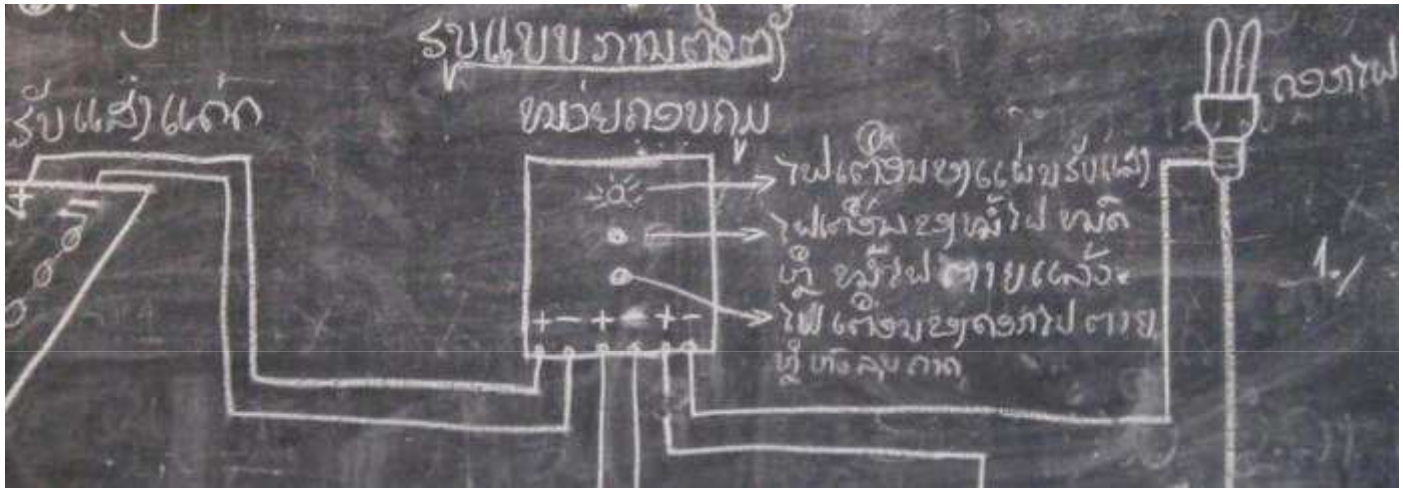


## *Thank you for your attention!*

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