Universal Access to Modern Energy Services and Clean Energy Development

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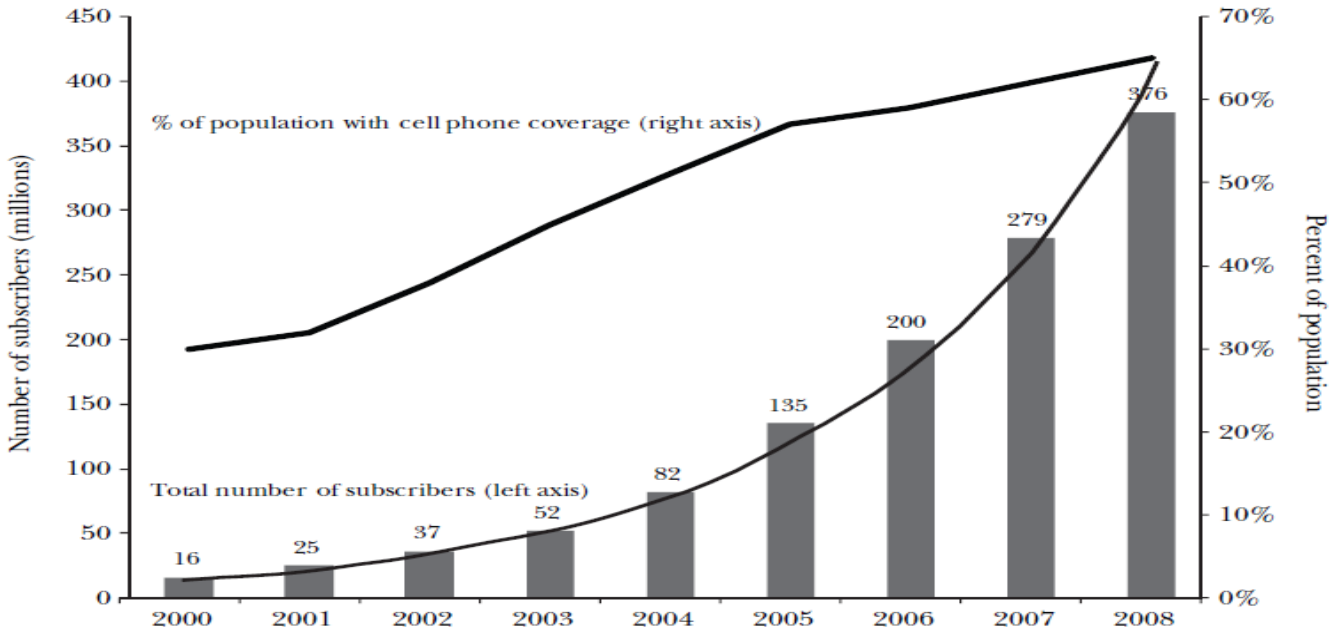
Rural Electrification and Clean Energy – sustainable source of supply

- Universal access to electricity has gone hand in hand with clean energy development, in particular, hydropower, and more recently, solar and wind

  - US experience: preference (through legislation) given to rural co-ops and municipals for the power generated by the big federal dams (Bonneville, Grand Coulee, and Hoover dam) built during 30s to 40s.
  - China's success in rural electrification is largely built on small hydro

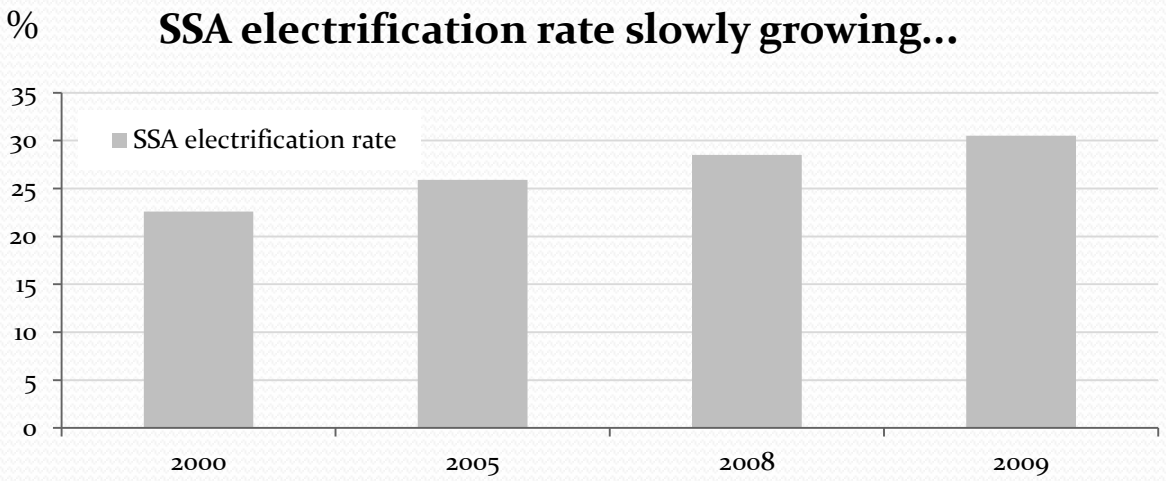
Cell phone story – is there an equivalent in the energy sector?

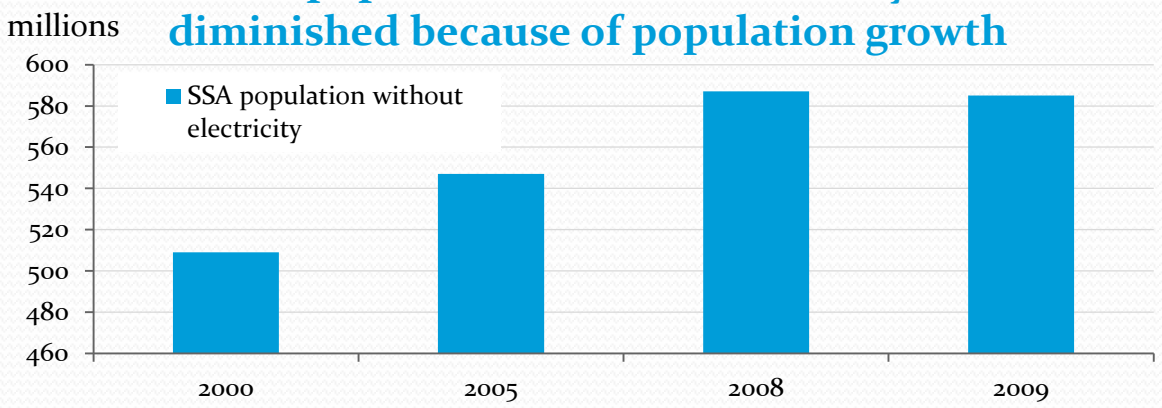
Number of Cell Phone Subscribers and Cell Phone Coverage in Sub-Saharan Africa, 2000–2008



Sources: Mobile phone subscription data are provided by Wireless Intelligence. The percentage of the population with mobile phone coverage is provided by GSMA.
Notes: "Mobile phone subscribers" are active SIM cards rather than individual subscribers. One individual could have multiple SIM cards for different cell phone service providers, thereby potentially inflating the total number of individual users within a particular country. "Cell phone coverage" refers to having cell phone service in one's area (being able to get a signal.)

Electricity access story – (so far) less optimistic





Source: International Energy Agency

Clean Energy Development in Rural Electrification Programs

- A number of East Asia countries have achieved great success towards universal access over a period of about 10-15 years
  - China, 66% to 99% from 1989 to 2000
  - Vietnam, 50% to 94% from 1996 to 2008
  - Lao PDR, 16% to 74% from 1995-2011
  - Indonesia, geothermal power development to support island rural electrification
- Key to success:
  - Strong government commitment
  - Right balance between financing, subsidy and cost-reflective tariff
  - Utility-led planning and implementation
  - Community participation – Rural cooperatives
  - Sustainable energy sources of supply and financing

Expanding Access to Modern Energy Services Experience from Laos and Cambodia

- Laos – Utility led rapid rural electrification
  - Population: 6.3 million
  - GNI/capita: $1130 (2011), $880 (2009), $740 (2008)

- Cambodia – Improvement of cooking stoves and household biodigesters
  - Population: 14.3 million
  - GNI/capita: $830 (2011), $650 (2009), $600 (2008)

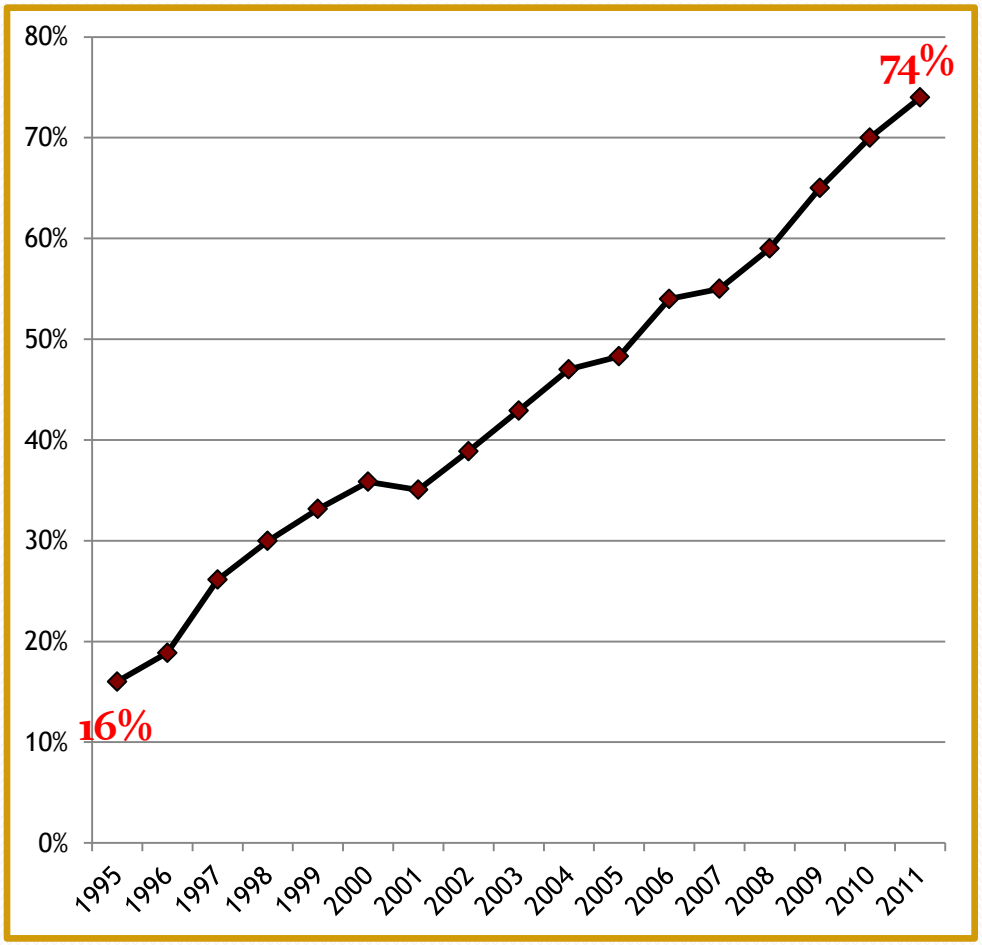
Rural Electrification in Laos

Socio-Economic Context

- GDP per capita: $1010 in 2010
- Population: about 6.5 million, 1.3 million households in 2011
- Poverty incidence: 28% below $1.25/day in 2008

World Bank Support:

- Five (5) rural electrification projects since 1987



Lao Rural Electrification – How?

1. **Government commitment:**
   - Clear targets: **70%** by 2010; **80%** by 2015 and **90%** by 2020
   - Striking a balance between financing, subsidy and cost-recovery tariff
     - Concessional lending to EdL for grid extension, Hydropower export revenue dedicated to rural electrification (eg. NT2)
     - Tariff reforms
     - Settlement of circular debts (mostly governmental agencies)

2. **Utility-led grid extension:** by Electricité du Laos (EdL) and achieved fast expansion of grid coverage
   - Corporate culture dedicated to accountability for results, from headquarters to branch offices
   - Strong implementation capacity, as a result of **capacity building** for planning, design, and implementation to deliver

Lao Rural Electrification – How?

3. Power to the poor (P2P) program –targeting the gender dimension of rural electrification

- **Village Screening** - Maximize social economic impacts
- In villages electrified, **20-40%** of households not connected to the grid because they can't afford the connection charges (**$80-100**) as shown by 2004 Survey

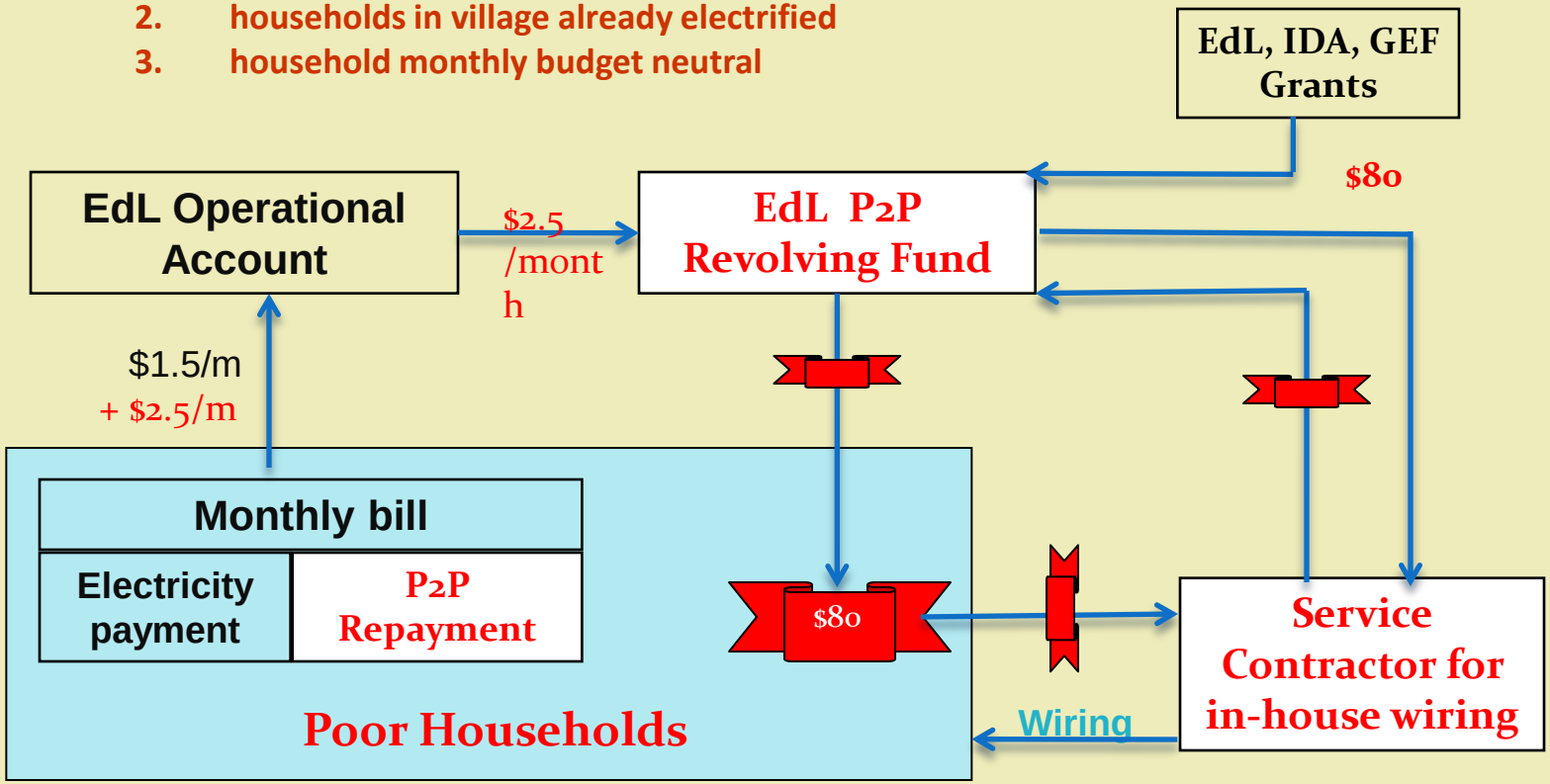
4. Off-grid Electrification – based on solar photovoltaic, micro-hydro, and biomass and implemented by both the public and private sectors.

- **Innovative lease-purchase scheme.** Households have a choice of a range of solar PV sizes and pay an installation fee (lowest US$16), then lease the system and make a monthly payments of about (US$1-3) over five or ten years. They become the owners of the system at the end of the leasing period.
- Small amount of electricity provided by solar PV systems are changing their lives, including enabling significant levels of increased income generation.

Power to the Poor – Ideas

Targeting the poor

1. interest-free credit
2. households in village already electrified
3. household monthly budget neutral



Power to the Poor - Results

Example: Phosaad Village

- Grid to village in 2002
- 270 households
- 63 not connected by 2008
- Power to the Poor: connected all the 63 households in in one month (02-03/09) in 2009, ahchieved100% connections in the village

Power to the Poor – Results

- **Power to the Poor:** pilot in 2008 and mainstreamed into the EdL's rural electrification projects since 2009.

- **Results:** by June 2011

  - Implemented in **488 villages**

  - **Average access rate** increased from **80%** to **98%**

  - Connected **16,632** poor housheolds, including **1,042 female-headed** households.

Cambodia Household Energy - Key Messages

1. Build on existing efforts in the country
2. Focus on commercialization of the supply chain – scaling up
3. Work with NGOs
4. Empower women

Household Energy in Cambodia

where do we stand ?

1. Rural household energy sources: **90% from wood and charcoal**

2. Time spending for energy-related activities (collecting wood): **3-4 hours / day**

Cookstove Program in Cambodia

1. **ESMAP supported introduction of Neang Kongery Stove (NKS) in Cambodia In 2007-2008.**
   - developed by a French NGO (GERES-Cambodia) in 2001
   - Energy efficient: 60% less wood and 22% less Charcoal
   - Affordable: $0.47 production cost, $1.5 retail price
   - Require the same skills and materials (clay) for production - traditional skills & materials in Cambodia rural areas for stoves

2. **About 8,000 NKS were sold. Key challenges:**
   - **Mixed quality** of the NKS produced
   - **Insufficient supply** to meet demand

Cookstove Program in Cambodia

ASTAE Supported Technical Assistance

1. **To respond to high demand, in 2008 ASTAE-supported TA for creation of Model Production Facilities and business model in one province, for replication throughout Cambodia.**

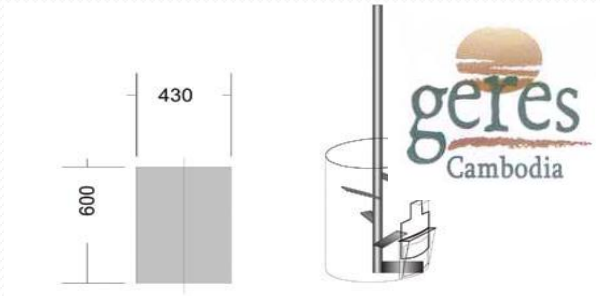
   - **improving the quality & production capacity of NKS**
   - **Creating sustainable business models for production and distribution**
   - **Empowering women to participate**

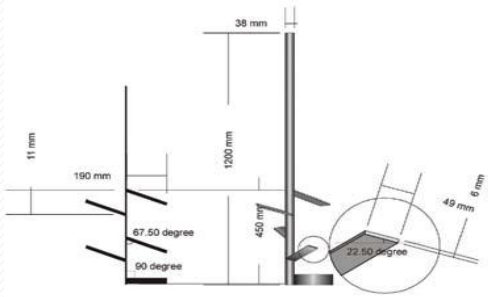
Note: ASTAE (Asia Sustainable and Alternative Energy Program), a Trust Fund supported by Netherlands and Sweden

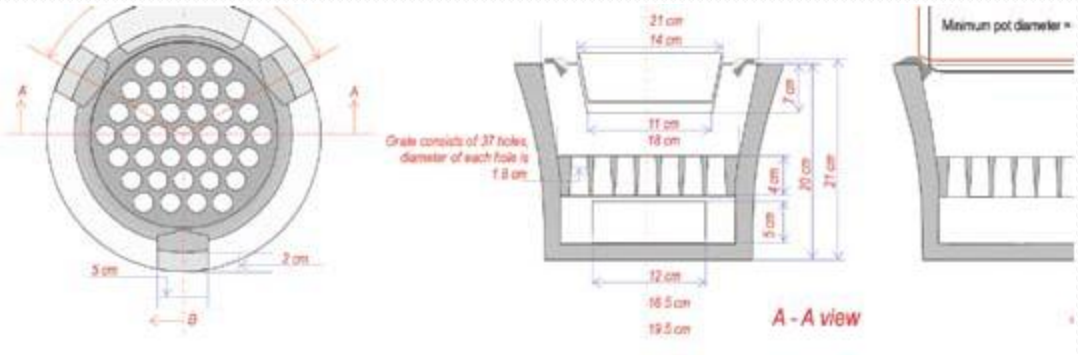
Improving Quality & Production Capacity

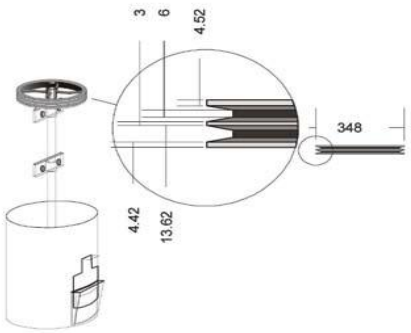
The TA supported:

- Develop and test **technologies** to increase productivity
- Develop **standards** for improved quality
- Create **model production facilities**
- Pilot **production** following the technologies and standards









Create Sustainable Business Model and Empower Women

The TA supported:

- train SMEs/Producers, especially women producers, in rural areas for management and marketing
- set up microfinance mechanism for the producers
- share production facilities among the producers
- Share Knowledge through learning, producing and sharing production documentations

Cambodia Cookstoves Program – Outcomes

ASTAE-supported Pilot Project:

1. 10 SMEs created, producing 3,000 NKS per month;

   - Women trained are producing 2,000 NKS per month, each making average $2.5/day ($60-70/month)

Replication:

2. The Government formulated the National Efficient Cook Stove Program, following the pilot commercialization experience:

   - 65 SMEs created and operational

   - About 900,000 clean cookstoves were sold since Jan 2010.

ASTAE-supported Biodigester Programs in Cambodia

1. Government launched a National Biodigester Program (NBP) in 2006,
   - Supported by SNV Netherlands Development Organization
   - Biodigesters installed at about 100 rural households during 2006-2008

2. ASTAE supported a similar TA for commercialization of installation of household biodigesters in 2008-2009
   - Value chain development
   - In close cooperation with SNV

Technical Assistance to Cambodia NBP

Outcomes by 2009:

1. **21 SMEs (Biodigester Construction Companies) were created in rural areas**

2. **5,600 Biodigester were installed at rural households, each avoiding burning 2 tons of wood annually.**
   - **600 times of the biodigesters installed in 2006-2008**

Target by 2012: installation of 18,400 units

Thank You !

Q and A