"Mini-Grids as New Market Opportunities: Experiences from Science and the Private Sector" February 26th 2013, Berlin

"Operating a Mini-Grid Profitably: Myth or Reality?"

Teodoro Sanchez

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Issues liked to implementation and operation of micro grids for rural electrification in isolated rural areas

- Micro grids are suitable and generally applied to rural electrification, isolated from the large size grid
- Require higher investment cost per unit power installed (US$/kW installed) compared with the investment costs for large grid systems
- Users of micro grids have a low consumption (20 to 50 kWh/month)
- Most people in rural areas in developing countries are poor and have little access to cash
- Very few opportunities to use energy for productive uses

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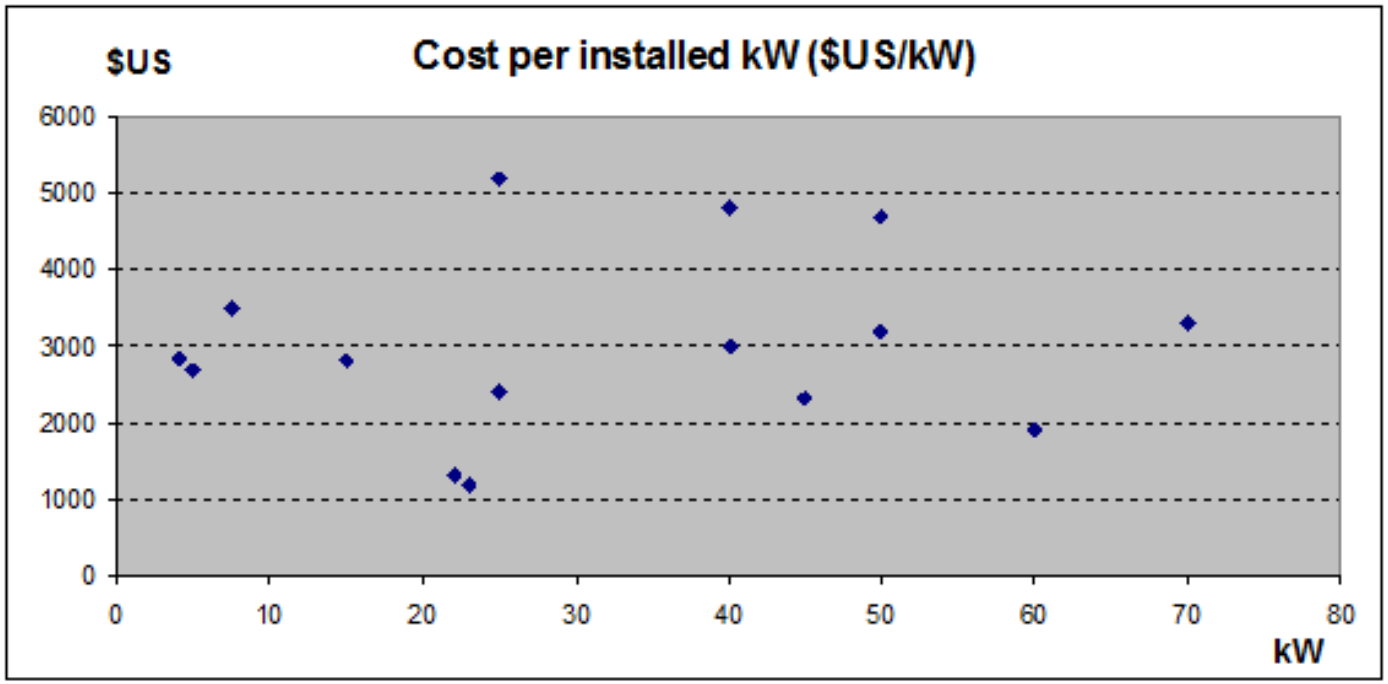
Examples of investment costs and energy consumption

Example1:implementation of small hydro plants in rural Peru



Source: Designing and building micro and mini hydropower plants (book: L Rodriguez T,. Sanchez, Practical Action Publishing, UK, 2011

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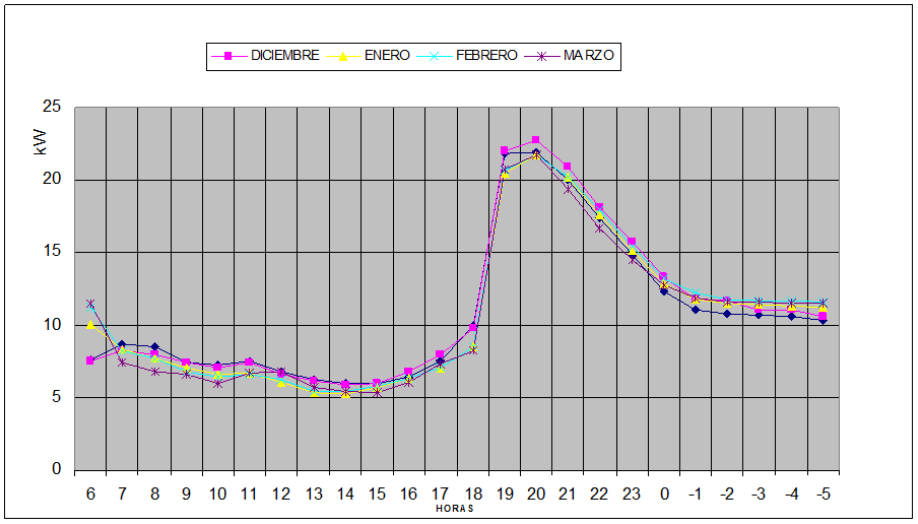
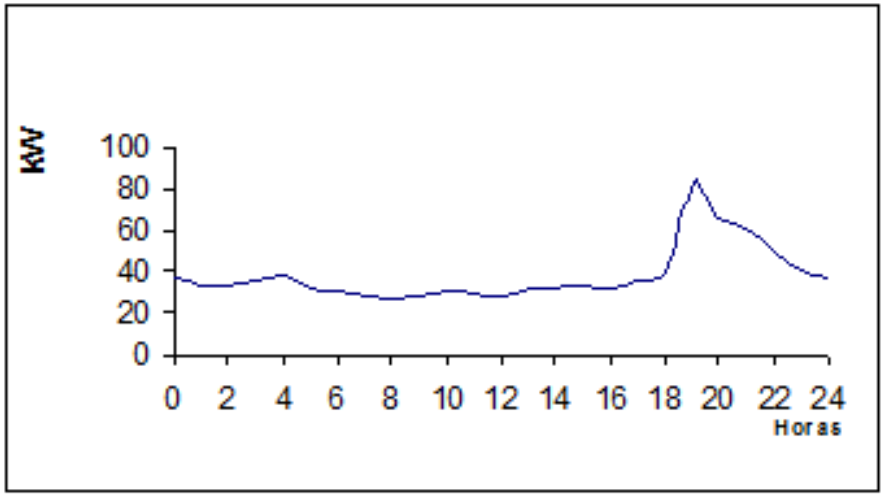
Typical load in rural populations



Micro hydropower plant “Conchan”, Peru, 120 families.
Installation cost, approximately US$ 150,000



Mini hydropower plant Posuzo, Peru
Year 1997, About 150 families
Installation cost (no information)

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Example 2: Load Orinoco/Marshal microgrid, Nicaragua

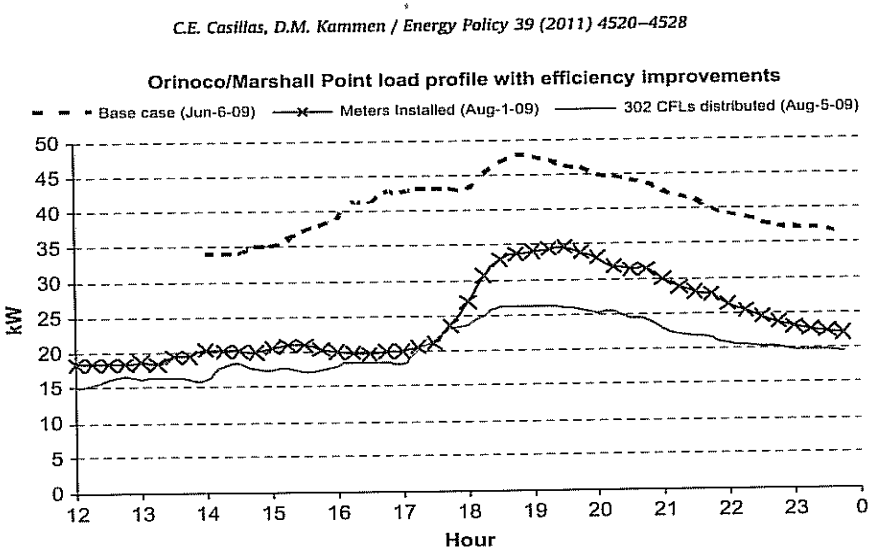

Fig. 1. Load profile before and after demand-side measures were implemented.

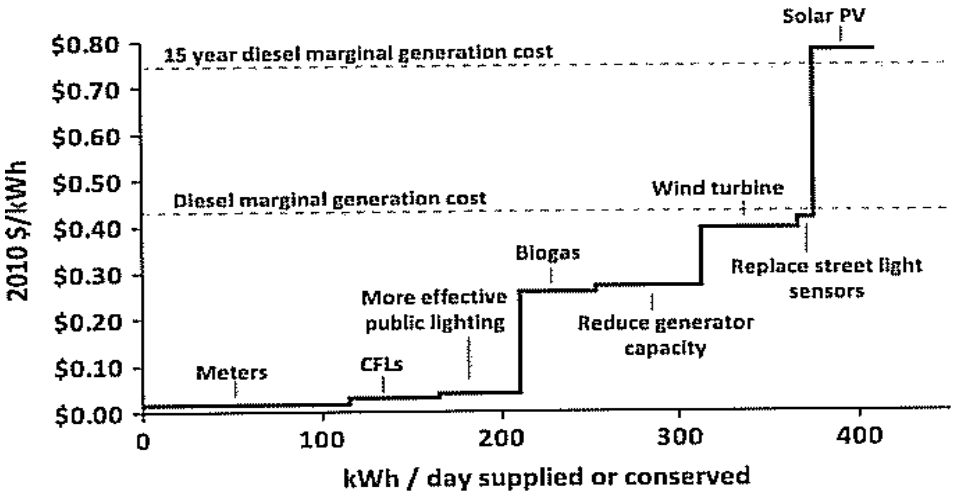

Fig. 2. Energy supply curve.

- 110 kWh Diesel plant providing energy to 186 clients, operated by ENEL (2009)
- Fuel consumption, 150 litres per day
- Operated 12 hours a day (12:00 to 24:00 hours)
- In 2009 the installation of meters lower the consumption by 28% and the change of incandescent to compact fluorescent lights lowered by 18%

http://202.114.32.103/ctdb/UserFile/Inspect/20110627014645 25.pdf

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Example3: Micro wind energy systems installed in the community El Alumbre, in the north Andes of Peru
32 family units (100W), and 2 systems for schools (500W)

Energy for lighting, radio, TV and small in rural areas require small amounts of energy which can be easily attend with tiny systems such as 50W wind or PV. Lighting can have a very good impact on education, health and communications and local people appreciate it very much

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measures could help to overcome these challenges

The Tungu-Kabiri Micro Hydro Power

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Capacity to pay

1) Poverty in rural and isolated areas

- The population of the developing world is still more rural than urban: some
- 3.1 billion people, or 55 per cent of the total population live in rural areas
- there are still about 1.4 billion people living on less than US$1.25 a day, and close to 1 billion people suffering from hunger

2) Scarcity of cash

- High percentage of rural inhabitants live on self sustaining agriculture
- Cash income is not in a regular basis
- Competing needs for cash

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Conclusions

- Microgrids is the most obvious option for rural electrification, in most cases the most cost effective solution
- Operation costs of micro grids can be low only if local capacity is developed, so that the operation is made by locals
- new management models are required to operate efficiently and fairly
- The implementation of micrgrids and more widely rural electrification requires substantive investments of the governments
- Productive uses of energy can contribute to financial viability of microgrids, but hardly to make them financially viable
- The use of single or multiple sources/technologies should be based on case feasibility studies

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Policy and influencing

Project: Energy access for the poor in Sub-Saharan Africa

It is a cross-European project, dedicated to raising the public and political profile of energy access for the poor, and particularly in Africa.

Project partners

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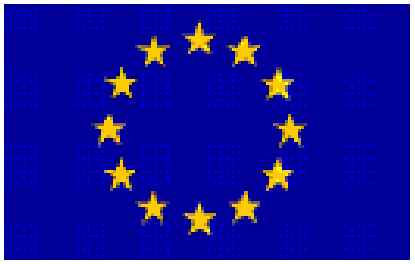

Project funded by the EC

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Thank you

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