CAT PROJECTS

CASE STUDY

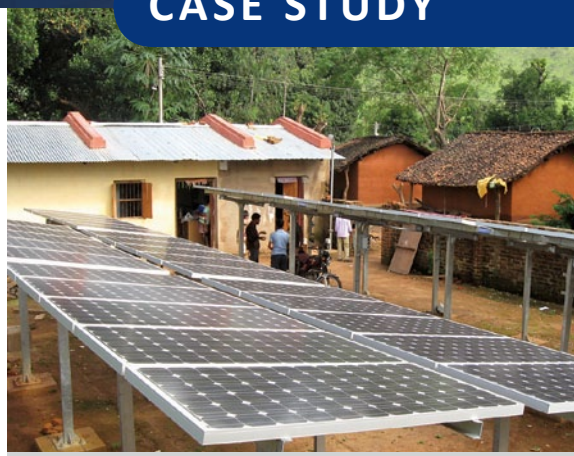
MALIGAON

Maligaon is a small village located on the eastern edge of the Indrāvati Dam, in Thuamul Rampur Block, Kalahandi District, Orissa, India. The population of the village is approximately 300 persons of mixed caste and tribal (Adivasi) backgrounds with 48 households, 2 small shops, a Panchayat office (local administration), school and Anganwadi (child/mother care) centre. The community's primary livelihoods are subsistence agriculture, wage labour and cash cropping. The geographical location of the village and indeed the whole Panchayat of which this village is the headquarters, is such that access is limited to small local boats for around one third of the year while the one road in is unsuitable for use by heavy vehicles due to its poor condition. Being so remote the area is poorly serviced with the nearest medical centre being in the Block headquarters of Thuamul Rampur, two hours away by car and many more by bus, the government school teacher visits only a few weeks of the year and the village is 30km from the nearest point of connection to the main grid, with no prospect of being connected to it in the foreseeable future.

Prior to the commencement of the Bushlight India project, energy use within the community was limited to wood for cooking purposes, kerosene lamps, candles and torches for lighting and a handful of battery operated appliances, with milling and grinding predominantly accomplished through manual means. The community water supply was through four stand pumps scattered across the village.

The project was implemented in Maligaon by Gram Vikas (a local grassroots development agency and project partner) with training and support provided by CAT Projects. The Village Energy Service Delivery Model (VESDM) was the implementation model used. Developed in collaboration with Bushlight India project partners, the VESDM is a documented, fixed set of activities, processes and tools for working with communities to plan, design, manage and maintain decentralised energy systems. The VESDM begins with a detailed village selection process (including resource survey), followed by an intensive Village Energy Planning (VEP) process. This detailed planning work, which involved household energy budgeting, determined a total energy demand in Maligaon of ~23kWh/day (including additional

During the VEP every household determined its own daily energy budget. The average budget in Maligaon is 265Wh/day. The energy budget for the house on the left can be seen on the poster above the door: 30 blue stars, equal to 600Wh/day. Urja bandhus (right) are individually programmed to limit energy consumption to the selected daily energy budget.



BUSHLIGHT INDIA VILLAGE SOLAR ENERGY SYSTEM - MALIGAON

- 9.65kWp solar array
- 60 x 1200Ah C120 2V, flooded cell batteries - maximum design output approx ~23kWh/day
- 10kW Hybrid Power Conditioner from Optimal Power Synergy (Kolkata)
- Programmable Logic Controller based System Control Board with four individually monitored outgoing lines and automated load shedding
- 230V AC power distributed to 47 houses, two shops, one temple and 15 streetlights via overhead distribution network
- Armoured cable used for all service wires and internal wiring for user safety and to deter power theft
- Consumer energy management via Urja Bandhus with programmable daily energy budgets and budget display.*
- Every building provided with one Urja Bandhu and switchboard, two fixed luminaires and one portable lantern with 8m extension cord
- Electricity supply hours: 24/7
- Service fees:

  200Wh/day = Rs 85/month

  300Wh/day = Rs 123/month

  400Wh/day = Rs 160/month

  500Wh/day = Rs 198/month ...etc

*UBs programmable with budgets up to 10,000Wh/day

The poor can and do pay for basic services. Average monthly household expenditure on kerosene, batteries and candles for lighting alone was Rs 87, indicating the people of Maligaon place a high value on this energy service. The Bushlight system provides reliable, 24 hour access to electricty which can support a range of local livelihoods from the domestic to the economic.

capacity for growth). Subsequent life cycle costing analysis showed that with no existing biomass or hydro resources, a centralised solar energy system represented the most technically and economically feasible option for supplying the electricity demands of the village.

CAT Projects then developed a system design which formed the basis of the supply and installation contract. Detailed technical specifications were also developed to ensure all equipment and installation was to a high quality. CAT Projects carried out the design, tendering and contract management for the project.

As documented in the system support component of the VESDM, an initial five year Annual Maintenance Contract (AMC) has been established between Gram Vikas, the system support agency and Tata BP Solar. This specifies an annual check of the system and the provision of unscheduled maintenance services at a pre-agreed fixed cost per visit.

The Bushlight India financial modelling tool was used to estimate the anticipated costs for operating and maintaining the system over its 15 year design life and by extension the income required to meet these. To ensure the long term affordability of electricity supply, costs associated with the expected battery bank replacement and the initial five year AMC were capitalised and the funds deposited in the system bank account upon commissioning. Monthly service fees cover the costs of employing a local system operator and maintanance support for the remaining 10 years of the system life. These arrangements are designed to ensure the system is fully funded over its design life, thus guaranteeing its financial sustainability.

With power now at their fingertips and a new reliable water supply system almost in place, Maligaon is a village transformed, where many of the obstacles to a productive future have been removed.

Bushlight India systems use high quality, standardised hardware, intuitive user interfaces and image based operation and maintenance manuals in local language to ensure systems are easy to use and maintain by both local operators and technical support agencies.

VILLAGE ENERGY PLANNING

March 2009: Village Selection carried out in Maligaon Panchayat. Maligaon selected due to the level of leadership and the diversity of livelihoods there including the cultivation and processing of sugarcane and vegetables for sale in nearby markets.

Mid-May 2009: VEP introductory meetings held. Village agrees to participate in the project and to link energy supply to the establishment of a community water supply and sanitation project also delivered by Gram Vikas. The Maligaon Water Supply & Energy Committee formed. Villagers agree to provide in-kind contributions of labour and materials towards site preparation and the construction of the powerhouse and individual toilets and bathrooms.

May - June 2009: Education and information sessions held with small groups including a women's only meeting. Household surveys and energy budgeting carried out.

July - Nov 2009: Draft system design prepared and reviewed with the village.

Dec - Feb 2009: System design finalised and put to tender. Supply and installation contract awarded to Tata BP Solar.

March - September 2010: Construction, installation and commissioning.

Australian Government

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