Abstract

The Yulitun (the Village) is located in Yulicun, Leye Country, Guangxi Autonomous Region in South Central China, where the residents are mostly of Zhuang minority. The village is located in the mountains; there is no common road, no access to public transportation service, and no access to public utility service. Electricity service is a key issue for local economy development. But the local electric power company will not extend the power line to the village since too small electric load will be expected.

To develop the village economy and improve residents’ living standards, in 1992 the village head organized all the 24 village households to construct a 5KW micro-hydro power station, without any outside financial assistance. It is a lower income community living below the China national poverty line. No outside funding and financial assistance would be available, so they decided to fund it themselves. Each family contributed RMB 230 Yuan, and labour was contributed by the villagers. It took one year for them to collect the money and one and half year to construct the power station. The power station is managed by two operators, who are selected from among the villagers. They receive RMB10 Yuan per person per month. The power produced services the entire village. Furthermore, a tap water supply and drain system was constructed. These infrastructure developments have significantly improved the living standard in the village. The power system is well kept through scheduled routine maintenance which is also funded by the villagers. Due to the growth of load, the power station has been replaced by an 8KW generator. Because of low efficiency, the power station generated 18-25kWh/d when the capacity was 5KW, and 24-32kWh for the 8KW machine. Annual power produced is about 9,000-11,000kWh.

The power station is tiny, with very small scale in its capacity. However, it is demonstrating that a remote village can establish its own power and water service and improve their life without outside assistance.
Quote

“We invested in the power station by ourselves, managing by ourselves, and service the entire village community. We were using kerosene for lighting before. The electric lamp greatly improves the illumination, allowing housewife and children doing what they want to do in the evening. Since then, we have had seven students graduated from technical school and above.”

Rongdu Ban, Current Village leader

Strategy Matrix

<table>
<thead>
<tr>
<th>Market information</th>
<th>Invest in removing constraints</th>
<th>Leverage the strengths of the poor</th>
<th>Combine resources and capabilities</th>
<th>Engage in policy dialogue with government</th>
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</thead>
<tbody>
<tr>
<td>Regulatory environment</td>
<td>Grid not extending to the village</td>
<td>Challenge of bringing equipment to site</td>
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<tr>
<td>Physical infrastructure</td>
<td>Villagers found solution in own micro-hydro station</td>
<td>Received voluntary labour/manpower from the villagers</td>
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<tr>
<td>Knowledge &amp; skills</td>
<td>Did not have the skills to run a micro-hydro station</td>
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<td>Access to financial services</td>
<td>Ask for training support from the local utility agency</td>
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<td>Villagers not always able to pay</td>
<td>Lack of outside financial support</td>
<td>Set up a mechanism of self-funding by the villagers</td>
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<td>Allow for in-kind and payment in installment</td>
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Actors

- **Village leader**: as the leader of the village, he has the responsibility to lead the village to improve its poor situation. He is the initiator of the social-economic activity- constructing a micro-hydro power station to benefit the whole village.
- **Villagers**: they are supporters, investors, workers, final users, and beneficiaries. It is obvious that involvement in this activity will improve their own life situation, and may directly or indirectly change their financial situation. Two villagers are responsible for technical operation and maintenance.
• **Local county utility company:** provided training to the two village people on operation and maintenance.

**Results**

- **Economic:** power systems not only provide the electricity to improve daily living standards, but also stimulate economic development. In this case, since the capacity is limited, the direct economic impact is not too obvious. The most important economic outcome after the electrification was the fact that more and more young people left the village and found jobs in cities, since TV programs present a colourful and attractive outside world to these young people. They send money back to their parents to improve their life. This promotes the local economy indirectly.

- **Social:** the social impacts are mostly indirect. Due to better lighting, kids have better study conditions. Now, for these 35 households, there are 30 middle-school students and five high-school students. The rate of receiving nice-year compulsory education is above 90%, compared with less than 50% 20 years ago.

- **Environmental:** electricity has been available for 17 years now, and has improved the indoor air quality and displaced the fossil fuel consumption, contributing to environmental protection. Based upon the estimation that the micro-hydro power station will generate 10,000kWh per year, the following pollution will be displaced and the coal consumption will be reduced: CO$_2$ 7500kg; SO$_2$ 61kg; NO$_2$ 45kg; Dust 52kg; Consume Std. coal 3.900 ton; and Water 30 tons.

**Research Fellow**

**Charlie Dou** is an adjunct Professor and Research Associate, Alternative Energy Institute, West Texas A&M University, USA; International advisor for UNDP/GEF on renewable energy project in China; key Expert for EU; Consultant for the World Bank/GEF, etc. He is directly involved in many research and international projects sponsored by UNDP/GEF, the World Bank, China central government, and has published and/or edited 14 books and more than 40 papers/presentations, including “China Village Power Project development Guidebook” and the series books of “Capacity Building Strategy for the Rapid Commercialization of Renewable Energy in China” for UNDP. He received his Master's Degree in Engineering Technology in the US, and Master's Degree in Electric Engineering in China, and once worked on his doctoral degree on Industrial Engineering at Texas Tech University.

**Citation**