

"Light for Ca Lo"

Energy for Red Dao Minority in Ca Lo/Vietnam

Mathias Faust

In June 2016, two members of the German branch of Electricians Without Borders (*Elektriker ohne Grenzen e.V.*) travelled to the remote village of Ca Lo in Northern Vietnam. Their goal was to set up a small electricity grid, powered by solar panels, so the local people would have access to sustainable energy and thus sustainable growth. There, they encountered very helpful people, good food and amazing landscapes. But first things first...

The local situation

The Red Dao is one of nine ethnic minorities living in Northern Vietnam. Their village is set amidst karst rock mountains. Known for its water permeability, leading to beautiful cave formations, a karst rock landscape makes for harsh living conditions as it is not practical for agriculture and water consuming life in general.

The Organization DECEN (*Cao Bang Community Development Center*) was established to improve the lives of the Red Dao by undertaking initiatives for sustainable tourism and attracting foreign aid organizations. Tran Van Tri is DECEN's founder and chairman and focuses his efforts on developing the local infrastructure and increasing the trade of traditional products for the regional minorities.

For this worthy cause we joined Mr. Tri, his entity and the Red Dao, by set-

ting up an energy system in one of their villages. After an evaluation process, the very remote Ca Lo was selected by *Elektriker ohne Grenzen e.V.* because of its isolation from the thoroughfares and public power supply.

Thanks to constant and successful communication between the two organizations, our project leader, Peter Althoff, planned an energy system with solar panels and a local grid. To maximize the local added value, we decided to purchase all materials and services from local companies.

The local impact

Environmental protection is critical for the solutions *Elektriker ohne Grenzen e.V.* shares. For the project in Ca Lo we manage to reduce a lot of climate-damaging greenhouse gases by bringing in a solar power solution that will only

use renewable energies and succeed in meeting primary energy needs of the local people. The development phase where fossil fuels are transformed into electrical energy can be almost entirely skipped in this village.

Solar power is well suited for remote villages. First, after an initial investment, it generates electricity at a very low cost because no additional fuel is needed. Second, since solar panels have no moving parts, the maintenance is simple and low cost. Yet the returns for the local community are immense, for example:

- With a reliable electricity supply the possibilities for economic development grow: local products could be processed into more valuable products like soy beans to tofu, which generates a bigger income for households.

Figure 1: PV-installation at Ca Lo Village





Figure 2: Team and local partners of our PV-Project (f.l.t.r.): Mr. Chảo Văn Sáng (village head), M.Sc. Tom Kwakman (EoG project manager), Mr. Chảo A Sãn (Ca Lo village party secretary), Mr. Trần Văn Tri (chairman of DECEN), Dipl.-Ing. Peter Althoff (EoG senior project manager), Mr. Quan Văn Hùng (chairman of Khanh Xuan commune)

- It has a beneficial impact on health: an electric mill could replace the local kerosene fueled maize mill, which generates lots of in-house emissions; a refrigerator makes the storage of food and medication easier.
- With electricity, technologies like radio and television, can connect the inhabitants to the rest of the world.
- Neighboring villages could see the benefits of electricity and install solar power, too.

Also the environmental protection is

critical for Elektriiker ohne Grenzen e.V. Because of this project in Ca Lo we manage to reduce lots of climate-damaging greenhouse gases. What is more: we only use renewable energies and succeed in meeting primary energy needs of the local people. The development phase where fossil fuels are transformed into electrical energy can be skipped in this village almost completely.

The local implementation

After landing in Hanoi, our first stop was Cao Bang, the province capital. Thanks to Mr. Tri, who drove

us around and helped with the practicalities. His translating skills were decisive to the success of our project. In Cao Bang we purchased long-life LED light bulbs and - to our surprise - LED light bulbs with integrated batteries. These were invented to provide light in unstable grids but they could also be used as flashlights – a very useful feature in areas without “street” lights.

Our next destination was Bao Lac where we closed a deal with the national energy company EVN. Mr. Tri facilitated the communication with the provider EVN (Vietnam Electri-



Figure 3: Transportation of a switchboard (207 kg)



Figure 4: Assistance from local community

Fact-sheet:

- Mountain village Ca Lo: 2150 m above-normal
- 22° 58' 49.52" N / 105° 48' 22.29" E
- 30 houses - about 170 residents
- water supply: several cisterns because of the karst rock
- 40 Solar Panels - 12 kg each
- 2 Inverter 5000VA / 4000W
- 2 switchboards - 207 kg each
- 700 m copper cable - weight: more than 800 kg
- 16 truck batteries - 12V-200Ah - 68 kg each
- only place for a phone call: ascent and descent with the amount of 2 hours - aprox. 2,550m above-normal
- final costs: approx. 23.000 €, only funded by donations

city Group) has something of a reputation for not being easy to work with however we found the local staff to be obliging and supportive of our project. We also had the advantage that the project leader, Peter Althoff, is appreciated by EVN as he had built one of the regional power plant

It was important that our project support local markets so we bought 700 m cable locally and hired three local electricians for one day, who ran the cable and did some in-house installations in Ca Lo one week later. Other necessary equipment, such as 5 metal poles, were purchased and welded at a small metalworking shop in Bao Lac.

Our journey to Ca Lo was an adventurous ride - our land rover had to make it's way up a narrow hiking path, but finally at the top we were rewarded with the astonishing beauty of the mountainous landscape in Northern Vietnam. The village children were already waiting for our arrival and you could tell from their faces how unusual it was for them to see non-Vietnamese people. After a welcome ceremony, we explored the area for the right place to put up the solar panels. Because of the steep terrain,

it would be necessary to build a flat terrace out of slate rock. We thought it would take two days to accomplish this but the young people of the village were incredibly skillful and completed the task in one afternoon. So we used the second day to explore the area and also searched for a spot where we could get cell reception. This took us on a one hour climb to the top of a mountain. Later, we were informed that the truck wouldn't be able to climb up the hiking path to the village and all the equipment had to be carried the 14km up the mountain on foot. This would have been an immense obstacle were it not for the village chief who gathered his citizens and the next day five 5metre tall iron poles, 16 truck batteries (each weighing 60 kg), 40 solar panels, 700m cable and half a ton of cement were carried up the path by manpower. Thanks to this extraordinary effort, it was possible to start the construction immediately. Over the next 4 days, the villagers, the construction worker from the solar panel company, the electricians of EVN and our team worked together and overcame obstacles like digging holes in stone and fixing broken poles. Two days ahead of schedule, the solar panel system with the local grid was ready for operation and the first light bulbs lit up in Ca Lo.

Our efforts also participate in improving the circumstances of education in Ca Lo by bringing electricity to the small village school. Now lessons can also take place through the dark winter months.

The local transition

It was very important for us not to repeat the mistakes made by others in development work who wished to transfer an energy system to people in need. Therefore, we had to think about designing a plan which considered the years after the set up, so no resources and donations would be wasted. For this project, apart from providing accurate instructions in how to deal with the energy system in various situations, we implemented a local payment system. Each household connected to the grid has to pay a small amount per annum to the village chief, who will collect the money for buying new batteries and other maintenance duties. All of this will be supervised by DECEN. With this plan we tried to maximize the sustainability of the project and hope that the people of Ca Lo could benefit from this technology as long as possible. And hopefully one day they can sustain themselves with clean and reliable energy with their own resources and help and inspire others in the transition to clean energy based economy.

And the transition has already taken place in Ca Lo. Students from the Hanoi University of Technology have come to inspect the off-grid solar system. Furthermore, they trained two villagers to maintain the plant, ensuring the longevity of this project.

This experience is an example of how the volunteer work of *Elektriker ohne Grenzen e.V.* leads to a sustainable development in societies who suffers from energy poverty.

About Elektriker ohne Grenzen e.V.

The German department of Electricians Without Borders originated from the French sister organization "électriciens sans frontières" and was founded in Karlsruhe in June 2012. Starting with 11 founding members, the organization now counts 40 members and is still growing.



Its goal is to enable the local people in developing countries to have access to energy supply and thus to sustainable development. Our work is entirely funded by donations and all members work voluntarily.

Website: www.elektriker-ohne-grenzen.de

Facebook: www.facebook.com/ElektrikerOhneGrenzen

Mathias Friedhelm Faust [mathias.faust@elektriker-ohne-grenzen.de] is head of public relations at Elektriker ohne Grenzen e.V. He has professional experiences as mechatronic technician and field service engineer. Before moving to a career in technical education, Faust was news anchor of a radio broadcasting station in Central Germany and had studied geography at Martin Luther University Halle-Wittenberg.