

TECHNOLOGY TRANSFER ON PICO-HYDRO IN SOUTH AND SOUTHEAST ASIA

EXCHANGE ACTIVITY'S AIM: TO TRANSFER SRI LANKAN PICO-HYDRO TURBINE MANUFACTURING SKILLS TO MICRO-HYDRO PRACTITIONER ORGANISATIONS IN BANGLADESH, THE PHILIPPINES, MYANMAR AND MALAYSIA

Location:

Sri Lanka

Technology:

Micro Hydro

Costs:

Total: € 30,360

WISIONS financial support: € 30,360

Host Organisation:

Janathakshan

www.janathakshan.net

Green Empowerment

www.greenempowerment.org

Partners involved:

Hydro Empowerment Network members

www.hpnet.org

Duration:

02/2014 – 10/2014



Picture: WISIONS

EXCHANGE NEED AND OBJECTIVE(S)

The main objective of this exchange activity was to transfer solid knowledge and skills about a low-cost, easy-to-assemble pico-hydro turbine model to five member organisations of the Micro-Hydro Empowerment Network (HPNET), a regional practitioners' knowledge network which was set up in 2013 with the support of WISIONS.

Pico-hydro systems have considerable potential to meet the growing demand for reliable electricity access in rural Southeast Asian communities. However, a lack of skills, high turbine costs and the absence of business incentives have, to date, constrained their widespread use. A number of organisations are dedicated to developing community-based hydro power systems and to advocating the technology among governmental actors, but they face significant challenges.

The pico-hydro turbine model chosen for

this exchange was developed by the Sri Lankan organisation Janathakshan and has been deployed in over forty Sri Lankan villages (including in one SEPS funded project). The turbine casing and base is made of concrete, while the Pelton wheel is made of recycled aluminium. It is ideal for sites with low and medium heads of water.

Janathakshan's concrete pico-hydro turbine has demonstrated long-term reliability and ease of maintenance. Despite only achieving a maximum efficiency rate of 60%, Janathakshan's model offers several advantages over its steel alternatives:

- Depending on the cost of local materials, it can be 40% to 50% cheaper;
- It can be designed, manufactured and installed within three weeks as opposed to taking months;
- Its construction and installation do not require a complex set of technical skills;

- The design aims to maximise the use of local materials and can accommodate locally manufactured load controllers.

PARTICIPANTS & TARGET GROUP(S)

Green Empowerment and Janathakshan coordinated this exchange activity, which was directed at five member organisations of the Hydro Empowerment Network: the Renewable Energy Association of Myanmar (REAM), Bangladesh's Renewable Energy Study Group, Yamog and Aid Foundation Inc (AIDFI) in the Philippines, and Tonibung in Malaysia. Each organisation put forward key individuals to participate in the exchange, from which Janathakshan selected twelve via an application process.

ACTIVITIES

The central part of this exchange programme was a three-week long on-site

training course on concrete turbine design, manufacture, assembly and installation. Each of the five participating groups (representing five HPNET member organisations) manufactured and assembled all the elements of the turbine from scratch, including mixing the concrete for the casing and base and casting the recycled aluminium for the wheel. The activities also included the manufacture of a load controller, a challenging task for those with no experience in electrical engineering. This built a foundation for work on locally-manufactured controllers, an important topic for practitioners active in MHP projects.

Following the construction of the five turbines, the participants collaborated in the installation of one of the systems in a Sri Lankan village. During the assembly and installation, trainees demonstrated their practical understanding of the knowledge gained during the introduction and design phases.

Finally, the trainees designed suitable concrete-turbine pico-hydro systems for communities in their countries of origin (Bangladesh, the Philippines, Myanmar and Malaysia), achieved a diploma and were given support to deliver training sessions in their home countries.



RESULTS & IMPACT

The exchange resulted in the transfer of skills to twelve individuals in micro-hydro practitioner organisations, which will be key for the replication of successful pico-hydro delivery models in Southeast Asia. The project raised the profile of pico-hydro solutions among certain organisations that are otherwise dedicated to slightly larger systems. Three of the five participating

organisations are moving forward with financing efforts for concrete turbine development activities in their home countries. The Bangladeshi member is holding a dialogue with policymakers and practitioners with the aim of convincing the government to embrace the technology. All participants have delivered local training sessions. A [video manual](#), translated into several languages, was yet another positive output from the exchange.



LESSONS LEARNED

The exchange demonstrated the potential for transferring skills and technology between local practitioners. A post-training evaluation revealed that the trainees particularly appreciated the hands-on approach. Some lessons were learned, such as the need for a more thorough selection process to include a better assessment of the English language skills and experience of the trainees. Materials should be distributed prior to the training session to improve the knowledge basis of the general micro-hydro principles among the participants, eliminating the need for introductions to micro-hydro fundamentals.

On the other hand, the experience provided an unexpectedly positive outlook for micro-hydro training. The short time required to manufacture and install this system makes it well suited as the basis for an entry-level "crash course" in micro-hydro, where participants can participate in hands-on learning and see their own turbine functioning at the end of the three-week course.

The project demonstrated the value of knowledge exchange via networks and specific projects. The drive for this

knowledge exchange arose from a solid network of practitioners with common needs as well as overlapping skills and experiences. The exchange, in turn, gave rise to further ideas for activities that the Micro-Hydro Empowerment Network (HPNET) could set up, such as, for example, a coordinated regional programme for concrete turbine pilot projects.

Source: Final Report submitted to WISIONS by Green Empowerment in October 2014

Pictures: WISIONS