USING THE INTERNET TO DISSEMINATE INFORMATION ON MICRO HYDROPOWER

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1. Introduction

Micro hydropower has proven to be a technology with huge potential to provide energy to individual households and small villages. Particularly in Asia the technology has seen large uptake, with Africa as an area where only limited activity has taken place up till recently.

Several technical publications are available, either as hardcopy books or downloadable from the internet in softcopy, describing the microhydro technology in great amount of detail. However, as the application of the technology is very site specific, sharing of examples and best practices has proven to be a very welcome addition to these text books. In addition to these more static exchanges of information, interaction amongst microhydro plant owners and potential developers of such sites has proven to be very effective as information dissemination techniques.

This article will focus on the use of the Internet to build a virtual community around the technology of microhydro to boast the uptake of the technology by analyzing the microhydropower.net internet portal and the associated email and web discussion forum.

2. History

The microhydropower.net web portal originates from a wish by the author to make information on technical and non-technical issues of microhydro more readily available to interested persons.

Somehow word was spread that the author had worked with ITDG Zimbabwe (now called Practical Action Southern Africa) on the rehabilitation of a microhydro plant in the Eastern Highlands of that country and he was approached quite often with questions regarding microhydro and its applications. The questions differed from very broad requests for general information, to very detailed technical questions. The general questions could be answered most of the time with a very general response, while some of the technical queries were really beyond his knowledge.

Initially referring people to some of the available textbooks on the topic, it became clear that the more practical questions could not be answered in that way. Standard documents describing examples of microhydro installations that could be sent by email evolved into the microhydro web portal. This portal brings together information on the topic of microhydro and intends to be a dedicated information source.

Based on the interests of the author, the original target audience was developers of microhydro stations in remote areas of developing countries. However, during the nearly fifteen years' of existence it has seen greater interest from the developing world (and in particular the United States of America) than from developing countries.

While most of the generic questions could be referred to the new web site, for the more specific technical questions another solution had to be found. Several e-mail discussion groups did (and still do) exist for solar energy, wind energy and other sources of renewables, but no such group existed for microhydro. Therefore, by the end of 1998, the author set up a discussion group related to microhydro using eGroups, which was later incorporated in the Yahoo! family of web services and is now called Yahoo! Groups.

3. Technology delineation

The main aim of the internet portal microhydropower.net is to provide information to people interested in the application of the microhydro technology and bring the international internet community around this topic

together. Currently no uniform international definitions of the different sizes of hydropower do exist and consequently no strict definition is being applied to the web site as well. However, the opening page of the web site does indicate that the definition of a maximum of 300 kW of installed capacity as used by Fraenkel (1991) is loosely applied to the site to give visitors an indication of the delineation applied. The limit of 300 kW relates to a commonly accepted maximum size for standalone hydro systems not connected to the grid, and suitable for 'run-of-the-river' installations.

4. The microhydro web portal

The microhydro internet portal has been build around the following building blocks:

- Events: this section gives an overview of events dealing with microhydro that will take place in the near future. Typical examples are conferences, workshops and training courses. Information for this section is either received directly from the organisers or collected through scanning through renewable energy magazines, newsletters, press releases and web searches.
- News: providing an overview of recent news related to micro hydropower, either supplied directly to the website or collected from newsletters, web sites and magazines.
- Databases: one of the main areas of the web site is the database with information on consultants, manufacturers and organisations in the field of microhydro. Visitors to the website can register their company or organisation in the database and add themselves to the expert directory. Through logging in on the web site, visitors can manage their own entries on the database.
- Downloads: a popular area of the web site is the download corner in which software, manuals and full books can be downloaded. In particular, the Layman's Guide on Microhydro by Celse Peche and the ITDG/ESMAP publication on Best Practices for Microhydro prove to be very popular.
- Literature overview: an overview of titles on micro hydropower, with a short description of the books and possible links to web sites where the books can be ordered
- Internet links: an overview of relevant links to Internet sites that deal with microhydro.
- Case studies of microhydro plants, which are described as best practices from which visitors can learn.
- Basic theoretical background of microhydro, describing all stages from site survey to turbine selection and the electrical installations.
- Country pages: for a number of countries a special section of the web site is being allocated that gives an overview of the state of affairs regarding hydro in that specific country, a selection of companies and experts from the country, as well as an overview of the hydro stations in the country.

The microhydro portal was originally started on the web server of the employer of the author and moved to the free web servers of GeoCities in 1999. Since 2001 the web site is hosted on its own server and accessible under its own domain name.

The site statistics of the web site are captured using Google Analytics and the last couple of years the number of visitors is constant at around 2000 unique visitors per week (see Figure 1).

Figure 1 Weekly visitors figures for the period January 2009 – July 2011

The majority of the visitors are from IP addresses in either North America or Europe, followed by Asia. A breakdown of the visitor's origin can be found in Figure 2. The top 10 of countries visitors are coming from is topped by the USA, followed by the Netherlands, the UK, India, Belgium, Canada, Indonesia, South Africa, Australia and Italy.

Figure 2 Geographical origin of visitors (period January 2009 – July 2011)

5. The microhydro discussion forum

Linked to the web portal is an email and web based discussion forum at which topics related to microhydro can be discussed. The forum is in existence since 1999 and is hosted at Yahoo! Groups. It offers various subscription methods: individual emails for each posting, daily digests of messages and reading through the web interface. Over the last three years the group does see on average around 140 postings per month. Topics discussed range from very basic questions on how to determine the feasibility of a possible site to very technical questions related to for examples the bearings of turbines.

The discussion forum is open for everyone wishing to join and the archives are accessible to non-members as well. To guarantee the quality of the discussions each and every message to the forum is moderated and evaluated whether it is on-topic and relevant to the subscribers. Although this does result in substantial workload for the moderator and delays in the dispatch of messages to the members, moderation has proven to be necessary to maintain quality discussions.

As with most discussion forums, most subscribers are either only following emails or not active at all, with the number of people really active in the discussions being limited to a small group. In particular a handful of subscribers is very active at the forum with a larger group around them that provides inputs every now and then (see also the results of the survey).

6. User survey

From Monday the 18th of July 2011 till Friday the 13th of August 2011 a questionnaire survey was held amongst the users of the web portal and discussion forum. A web-based questionnaire was developed to get a better understanding of the background of the visitors / participants, their expectations and their feedback. In total 234 dedicated members of the discussion forum and users of the web site did complete the survey.

The survey consisted of a number of sections dealing with the visit frequency to the web portal, referrals to the site and the contents of the site, a section on the discussion forum and a set of questions on the background of the respondent.

The full survey can be accessed via the web portal at http://microhydropower.net/survey.

7. Survey results

In this section of the article the main results of the survey will be discussed, followed by some conclusions in the next section. The full survey results are available at the microhydropower web portal should the reader be interested (http://microhydropower.net/survey).

Demographics

The majority of the respondents to the survey was male (94.5%) and from the United States of America or Canada (41% of the respondents) and in most cases more than 40 years of age. Figure 3 gives an overview of the age categories of the respondents, while Figure 4 gives an overview of the country of residence of the respondents to the survey.

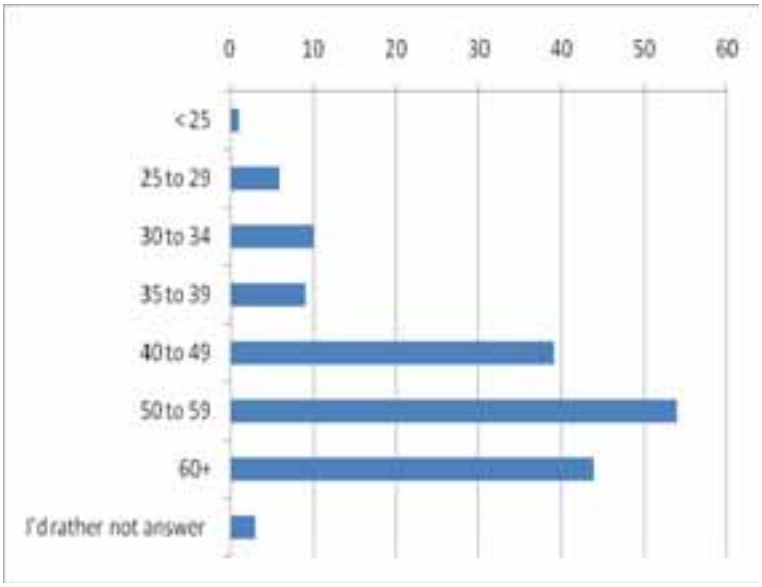

Figure 3 Age of respondents

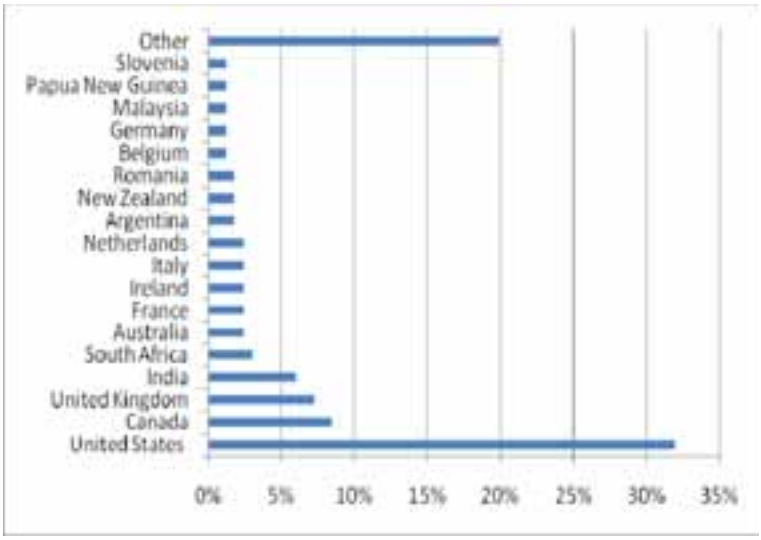

Figure 4 Country of residence respondents

Next to the country of residence of the respondents the survey did ask the geographical area of interest to them. This question could be answered with either “no specific area”, assuming interest in the technology irrespective of the geographical location, or by selecting one or more geographical areas. Although northern America and Europe were selected quite often, nearly 35% and 21% respectively, also other areas were reasonably well represented. Figure 5 does give details on this.

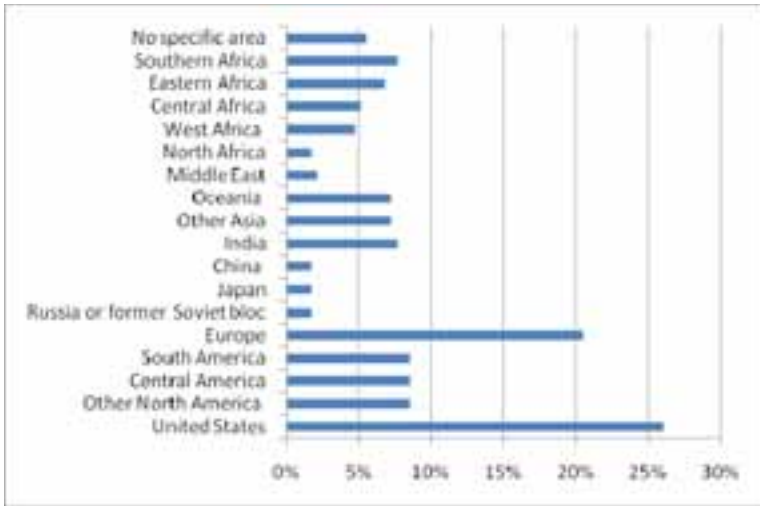

Figure 5 Geographic interest (more than one answer possible)

As the microhydro portal is mainly focusing on hydro installations with an installed capacity of less than 300 kW (see paragraph 3), it was quite revealing to see that the respondents showed a large interest in pico hydro installations (less than 10 kW). Also a substantial number of respondents were interested in larger scale hydro as well. Figure 11 does give the details of interest shown in the different sizes of hydropower with Figure 7 giving details of the nature of the interest in hydropower.

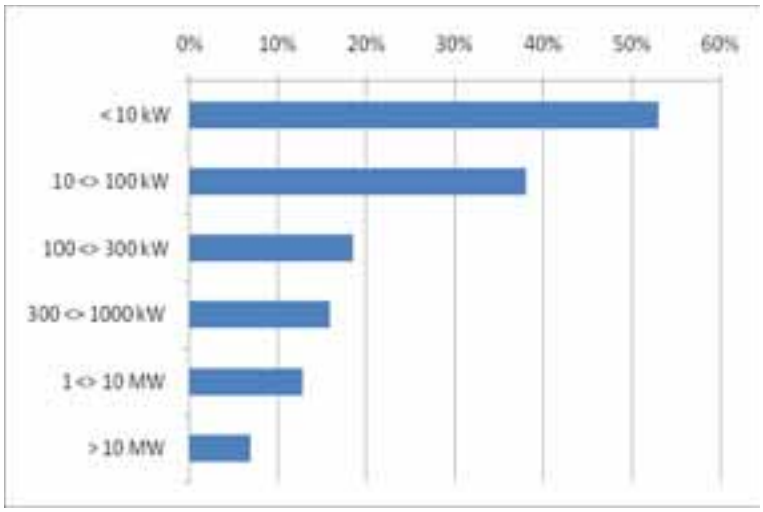

Figure 6 Hydro size interest

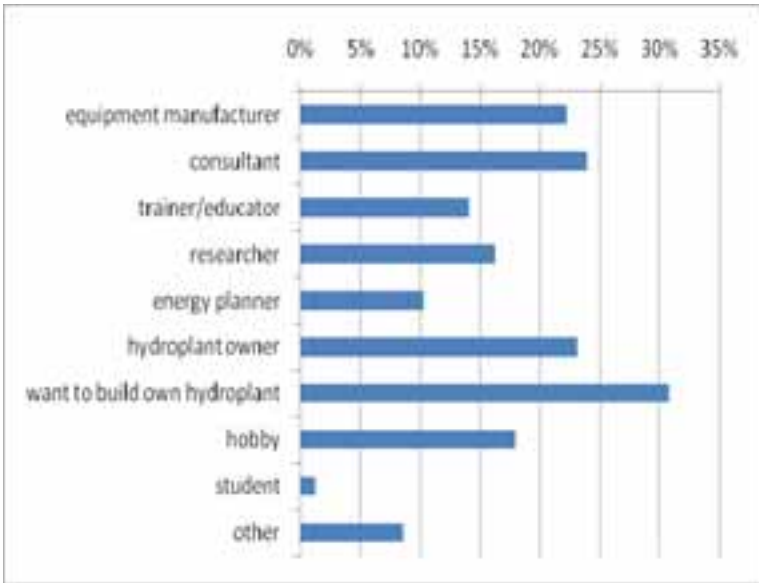

Figure 7 Interest in hydropower as indicated by the respondents

Microhydro web portal

The section of the survey that focused on the microhydro portal did start with an analysis of how often the respondents did visit the web site and how long ago their first visit was. The majority of the respondents indicated that they do visit the web site every now and then, with a small group (14%) being regular visitors. Most of the respondents indicated that they visited the web site the first time a long time ago, with only 23% indicating that their first visit was within the last month.

Most visitors did reach the web site the first time using a search engine, as can be seen in Figure 8.

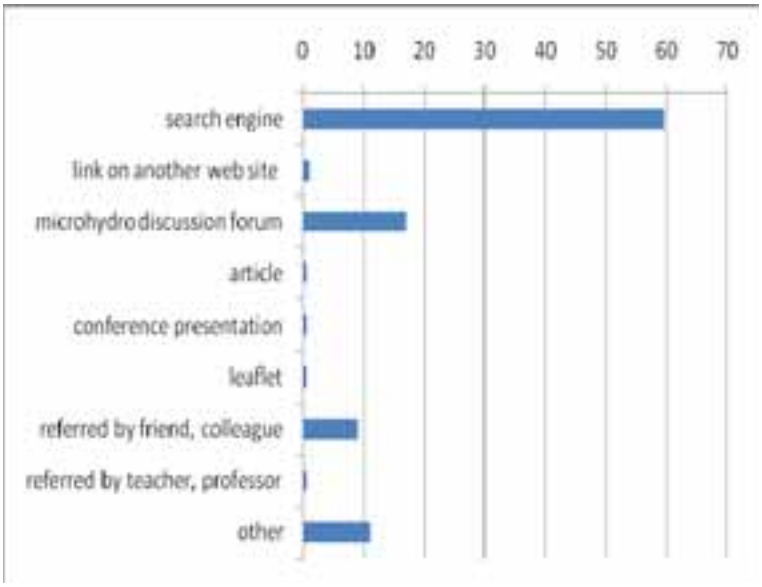

Figure 8 Indication of how respondents did find the web site the first time. The category "other" is mainly respondents who could not remember how they found the site

For different sections of the web site (see paragraph 4) respondents were asked their opinion of its usefulness. In particular the sections on theory, case studies and the manufacturers' database were well appreciated by respondents. In subsequent questions respondents indicated that most sections of the web site did meet their expectations.

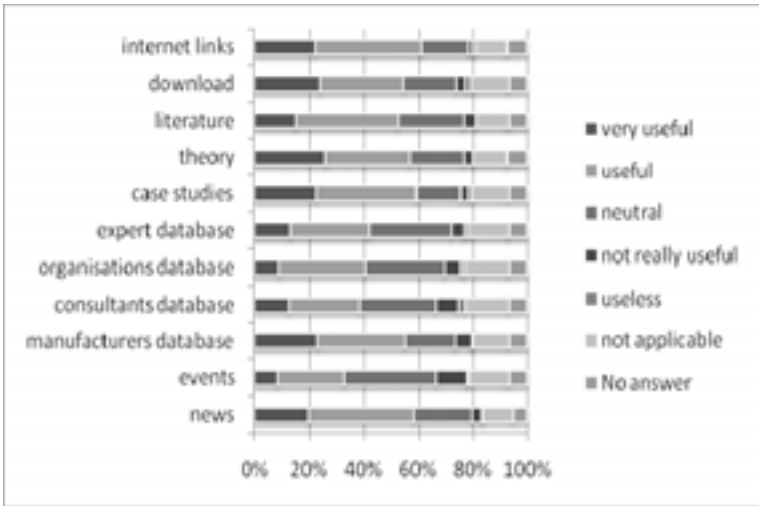

Figure 9 Usefulness of sections of the web site

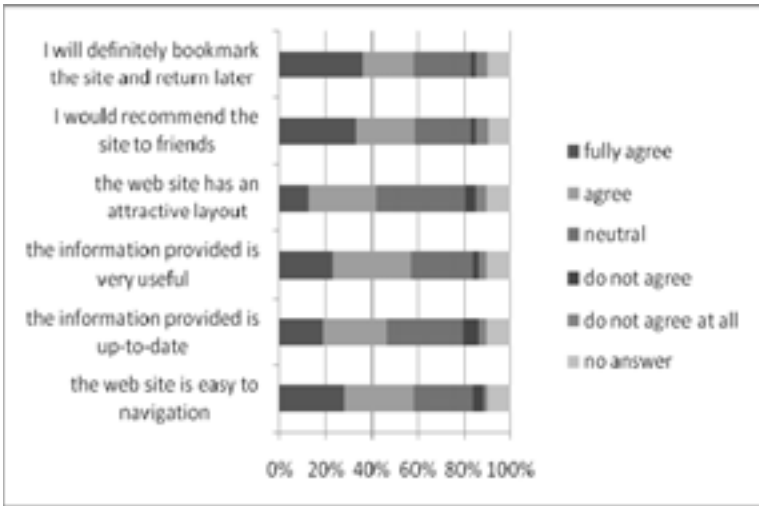

Figure 10 Overall opinion on the web site

In the open questions respondents indicated that they would like to see more information on case studies and if possible also videos on installations.

The databases on the web site were seen as very relevant and in particular the manufacturers' database was well appreciated by respondents. Respondents who did register for the databases and have their information included did indicate that their major reason for doing so was the hope to get some business out of the listing, with a wish to let people know their interest in microhydro as a second best reason. About 5% of the respondents indicated that a listing did indeed get them new business. The next two figures do give an overview of the opinion of respondents on the databases.

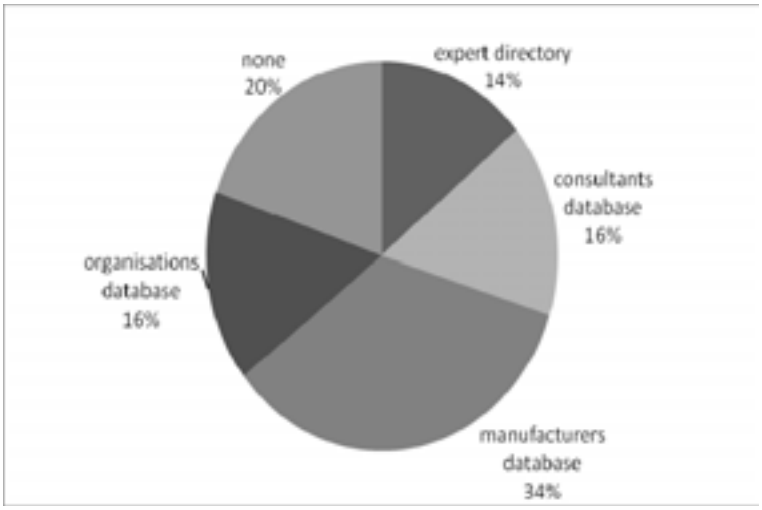

Figure 11 Use of databases

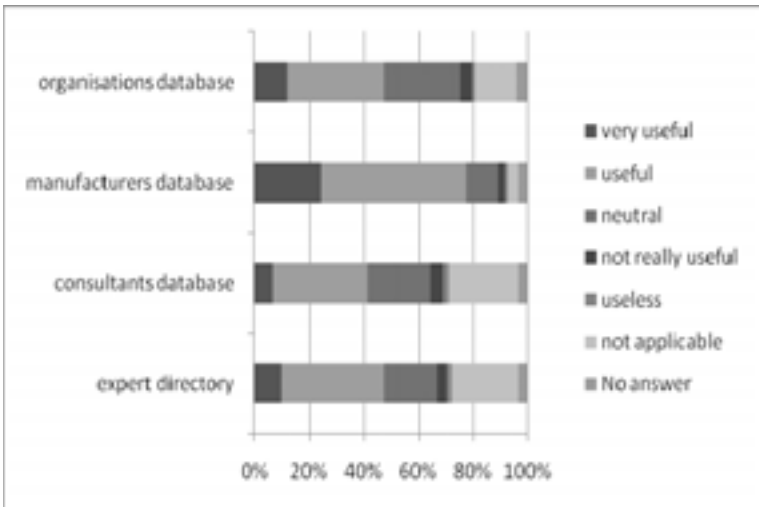

Figure 12 Usefulness of databases

Discussion forum

The section on the discussion forum did provide a good insight in the users of the forum. Most users are member of the forum for a considerable time already, with 5% member since the start of the forum. Most of the respondents do either subscribe by individual emails (54%) or daily digests (30%) with only a minority reading messages on the web site. Most respondents did find the discussion forum through a web search (68%), while reference to the forum by colleagues and friends (8%) did also bring a number of respondents to the forum. Most of the respondents that are a member for a long time did find it difficult to indicate how they found the forum.

A large majority of 80% of the respondents indicated that they read nearly all or most of the messages of the forum, which does correspond well with the 76% of the respondents that indicated that the quality of the discussion is either excellent or good. As expected, about 45% of the respondents indicated to see themselves more as a listener than a contributor, while 40% indicated to contribute seldomly to the discussion.

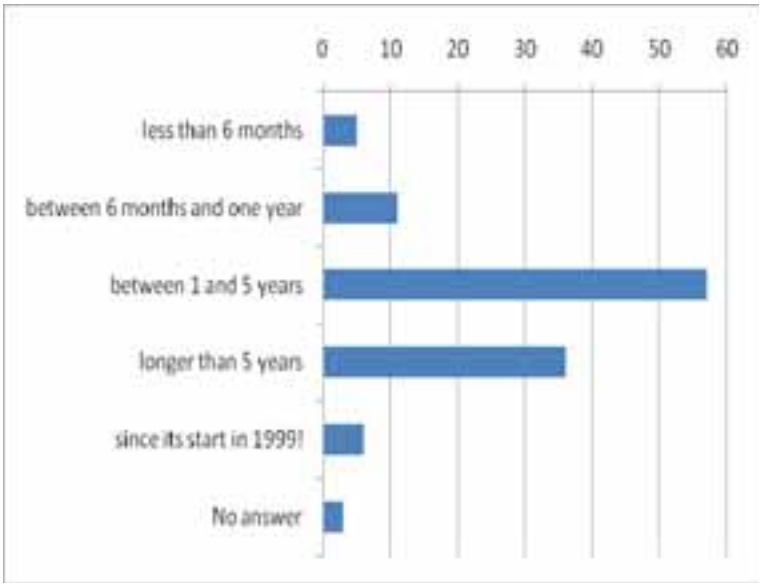

Figure 13 Length of membership discussion forum

In the open questions in the section on the discussion forum respondents expressed their satisfaction with the forum and its quality, the role of the moderator in stopping off-topic postings, and the dedicated contributions of some of the members. Other respondents did mention the fact that some discussion threads were a bit too technical for them and suggested a FAQ sections for new members to avoid repetition of novice questions.

8. Conclusions

The results from the survey do show that a web site like the microhydro portal can certainly play an important role in the dissemination of information about this renewable energy technology. It must however be noted that the survey does indicate that these mediums might be better suited to people in areas with good internet connections (e.g. northern America, Europe and South East Asia) rather than countries in the developing world.

The most appreciated parts of the web site are the manufacturers' database and the case studies section, indicating that the web site is indeed a good medium to give people information on practical introduction of the technology.

With respect to the discussion forum, respondents indicated a long time interest in the forum because of the focused discussion that is achieved through strict moderation of all messages.

Based on the results of the survey, the pending overhaul of the web portal will focus on enhancing the manufacturers' database and the addition of more case studies.

9. References

Fraenkel, P., Paish, O., Bokalders, V., Harvey, A., Brown, A., & Edwards, R. (1991). *Micro-hydro power, a guide for development workers*. London: Intermediate Technology Publications Ltd.