

Sustainable energy technologies in developing countries. Case study: Project for photovoltaic electrification of rural areas in Madagascar

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Most of the big problems afflicting mankind, such as climatic alterations, the destruction of the ozone layer, desertification and pollution, migrations, poverty and social conflicts, are inherent in energy availability.

Relevant effects deriving from the use of traditional sources of energy, well known by this time, are outlining favourable conditions in order to invest in energy policies based on renewable sources of energy.

However, if on one hand we can discuss all the aspects and effects induced by the use of energy, on the other hand there are people who did not even have the possibility to access the privileges offered by such resource, yet without being excluded from suffering the related negative aspects (our ecological debt to developing countries).

If there is the awareness that it is inconceivable that Third World Countries keep on living in the precarious conditions in which they are living at present, it is unquestionable that such communities can improve their life conditions unless the energy amount they dispose of is increased. The existing pattern of energy consumption, however, is surely unsustainable. Global energy consumption increase and above all world population increase will cause emissions of greenhouse gas which will worsen the already insufficient absorption capacity of our planet.

Most part of world population lives in developing countries, which are therefore communities with priority development needs and still lacking of facilities and base infrastructure. At present, in the world for about 2 billion people (1/3 of world population) adequate and economically accessible energy facilities are not available. In my project, I tried to analyse energy situation within the worldwide context, in order to subsequently evaluate the main proposals to begin and maintain an energy sustainable development process by means of renewable sources of energy. Actually, the first project stage pointed out that the existing energy patterns of industrialised countries, based on fossil sources, surely cannot be re-proposed to developing countries. In order to develop and make available electric energy to these poor communities, the only alternative really sustainable is the use of renewable sources of energy.

In the project I meant to evaluate the opportunities that photovoltaic technology can offer as far as availability of all facilities powered by use of electric energy. I analysed the energy situation of developing countries and current applications of photovoltaic systems within these environments. Such technology, if applied in right conditions, is the most appropriate and appropriate for many rural areas.

Although it represents an advanced technology, in continuous evolution, photovoltaic system combines its complexity with the simplicity of final product, which results reliable and able to produce energy where it is needed and according to real requirements. In remote areas, hardly reachable, photovoltaic technology results economically advantageous.



One of the numerous photovoltaic systems installed in the developing countries. Photovoltaic technology produces electric energy for powering hospitals, schools, houses,...

The project concludes with the application of photovoltaic technology in a rural village of Madagascar (Manakana, in the North-East region), country with one of the lowest electrification percentage of the world.

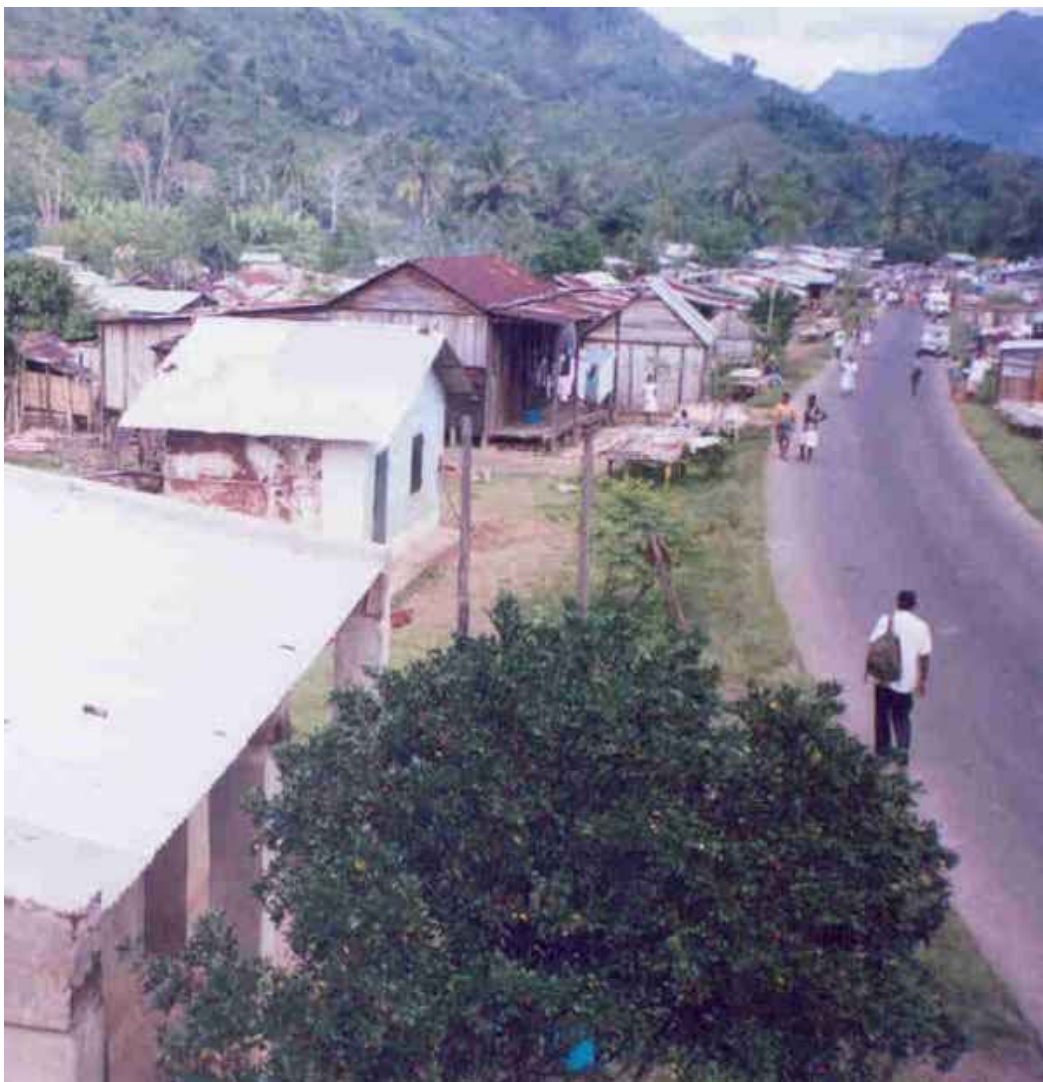


Location of madagascan village of Manakana

However, photovoltaic technology, as any other attempt of implementing new development means, needs to be programmed and planned in every single aspect both technical and economical.

Past experiences have demonstrated that photovoltaic systems technically worked. It is unquestionable however that successful projects will depend on thorough and adequate training and information of users, concerning the opportunities and limits offered by this technology.

In my project I could demonstrate how madagascan community of Manakana spends considerable economic resources in traditional energy sources and could, therefore, pay back the investment of a photovoltaic system (in this case, of 10 KWp), contributing on a monthly basis towards an equal or even lower expense with respect to the expense annually paid for other kinds of unsustainable energy supply.



Manakana Village, where I analysed the potential offered by photovoltaic technology for energy sourcing of this madagascan community

The eco-efficiency analysis of photovoltaic systems carried out by many experts have demonstrated the high cost and avoidable of polluting emissions and, therefore, the potential offered by such technology in many applications. I think that the role of architects could be to propose and utilise such technology within their projects, in order to promote its diffusion all over the world, and therefore the related costs decrease, above all in favour of developing countries, areas where energy need is a reality.

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