

# ABSTRACT

## Renewable Energy Solutions for Development of Rural Villages and Desert Communities

**Salah Arafa**

Professor, School of Sciences and Engineering, The American University in Cairo, Egypt

[smarafa@aucegypt.edu](mailto:smarafa@aucegypt.edu)

Sustainable community development/solutions can't be pursued as a sectarian initiative. In fact, the special importance of the effort outlined in this paper as a program of action lies in its integrated approach, its attempt to combine renewable energy technology promotion and youth employment, settlement, poverty eradication, social integration and equality into coordinated and participatory plan of action.

This paper reports on the progress of two unique grassroots initiatives: one that started 1974 in a small village at the heart of the Nile-Delta called Basaisa ( [www.google.com/BasaisaVillage](http://www.google.com/BasaisaVillage) ) and one that started 1992 in a new-desert community called New Basaisa ( [www.google.com/NewBasaisa](http://www.google.com/NewBasaisa) ) in South Sinai, Egypt.

The reliance on fossil fuels as the major source of energy production, places a heavy burden on our society and has lead to high environmental costs, which are increasingly being recognized as public health issues and economic costs or externalities. Our concerns relating to the heavy reliance on fossil fuels are also increasing due to the expected negative impacts of global warming. The

**promotion of renewable energy in our small villages and scattered desert communities can form part of the solution to our concerns in many ways.**

**The recent national census showed that the average per capita share of cultivated land and inhibited land in Egypt continued to fall from 1.0 feddans, and 1.4 feddans in 1800 to 0.13 feddans, and 0.2 feddans in 2006 respectively. As Egypt's document for the 21<sup>st</sup> Century states "to get out of the old valley to the desert is not merely an option to select from available alternatives, but rather a matter of life not only for the present generation, but also for the future generation". Crowdedness leads to an overall gradual deterioration in urban utilities and loss of civilized image. It renders futile any efforts exerted in cleaning and beautifying cities and controlling pollution. Besides, it had the effect of turning behavior from a tolerant to an aggressive attitude.**

**The paper describes the renewable energy technologies used and the approaches that work as well as the problems facing its implementation and the achievements to date. Small photovoltaic power units were used as multifunction units. Producing electricity for training and education, some time for TV, some time for the Friday pray in the Mosque, and other times for production activities in small workshops for income-generating activities. Knowing that one source of energy can't satisfy all needs in a community, other technologies were used like biogas, wind and Solar heating.**

**The paper also presents a vision of integrated approach to planned internal migration for settlement in new productive eco-desert communities outside the overcrowded narrow Nile-Valley and Delta.**

**The smallest community in developing areas is a complex tapestry of values, some cultural, some economic, some political, some religious, but all with a community history and tradition. The problems in a given community are so interlinked and so complex that can never be fully understood or solved by simplistic perceptions, technical or economic, or by one stakeholder. The transformation process (Development) of a community can only be positive if the direct beneficiaries, local people, catalysts, and the leaders of that community are actively involved in the process and also continuously in possession of information, innovative ideas and approaches that work, and**

**skills that are needed to sustain environmentally sound and equitable development process.**

**The proposed solutions, based on such two unique field experiences, will help solve some of the current energy, education, waste, sanitation and health issues faced in small villages and desert communities in Egypt and elsewhere.**



**A Biogas Plant and A Photovoltaic Power Unit at New Basaisa Community, Ras-Sudr, South Sinai**



**Installation of Solar Photovoltaic Power Units for Homes on the Communal Building of New Basaisa Community, Ras-Sudr, South Sinai**



**Practical training sessions on installation and maintenance of Solar Water Heaters and Demonstration of Solar Cells and working units at the Integrated Technical Center of Training and Production for Desert Community Development, New Basaisa Community.**





**Solar units on the top of the Integrated Technology Center of Training and Production for Desert Community Development – New Basaisa Community, Ras-Sudr, South Sinai**



**A Family Size Biogas Plant in the Village of Basaisa, Sharqiya Governorate, Nile Delta – Safe and Clean Energy for Future Generation**