

Biomass and Renewable Sources of Energy at the Basis for a Sustainable Development in México

by Dr. Eduardo A. Rincón Mejía, President of the Mexican Association of Solar Energy (ANES)
School of Engineering, UEAMéx



In order to adequately exploit the abundant potential of renewable energies in Mexico, there is a strong need for the development of new technologies, which are less expensive, locally available and suit the end users' requirements. These efficient and economically sound technologies offer the opportunity to boost the technical and industrial development in Mexico and they will contribute to the alleviation of the country's serious environmental and social problems.

Mexico has a territory of almost 2 million km² with an average solar irradiation of about 5,8 kWh/m² per day, and more than 10 000 km of seashore including regions with an extremely high wind potential. Although its renewable energy resources are plentiful, the country does not take advantage of them. Instead, Mexico's energy system is based on fossil fuels, representing more than 90% of the primary energy consumption.

It is commonly agreed upon that Mexico's energy requirements can be covered by renewable energies in future centuries, but uncertainties exist how this can happen in short term and in an economically feasible manner. In this newsletter article it is argued that Mexico has to transit from the present unsustainable oil-based energy system to a system based on renewable energies in a period of about 20 years. In order to achieve this change, there is a strong need to promote research and development activities at universities, technology institutes and research centers, which must be accompanied by awareness-building and communication activities towards all actors involved including politicians, entrepreneurs and media as well as the final users of clean technologies. The advantages of such a change comprise the generation of hundreds of thousands of permanent jobs, a large reduction in pollutant emissions, the reduction of deforestation and desertification, important savings on fossil resources and the advancement of science and technology in the country. Thereby, an energy system based on renewable energies will contribute to the alleviation of economical, social and health problems such as the emigration of poor inhabitants from rural regions to other countries.

Today, the energy problem in Mexico (and in other poor countries) can be summarised as follows:

- The present electric and thermal energy production is not sufficient for Mexico's 100 million inhabitants. The currently installed 42 000 MW of electric generation capacity in Mexico are significantly below the level of 75 000 MW, which would enable the country to reach European standards, following the commonly accepted fact that the per capita energy consumption is an indicator of a country's welfare and development.
- Almost 90% of primary energy is generated by fossil fuels.
- Energy, as well as revenues and incomes, are shared very unequally among the Mexican population.
- The present way of production and distribution of energy and its consumption patterns are mainly unsustainable. Therefore, the use of renewable energies is indispensable for a sustainable future, as it is not possible to significantly increase the number of thermo-electric or large hydro-electric plants.

Renewable energies are ideal for decentralised application. They are almost free of pollutants, they do not contribute to the greenhouse effect and they are in line with policies of environmental protection. But, most of the technologies available nowadays are still too expensive for most inhabitants in developing countries. However, there are many cheap, reliable and efficient systems that can be immediately implemented in order to increase the welfare of everybody. These systems include water and air heating systems, solar hot plates and ovens for cooking, wind generators and photovoltaic applications, which are economically competitive and easy to manufacture and operate.

Recently, several wind projects with more than 300 MW of nominal capacity have been implemented, which is a rather small figure compared to the large wind energy potential in Mexico of about 30 000 MW. Additionally, the biomass potential for electricity production is estimated to exceed 40 000 MW, with a currently installed capacity of less than 400 MW. As biological biomass solar collectors can cover hundreds of square kilometers at moderate costs, it is apparent that in the near sustainable future, cogeneration plants based on biomass are the most economical and technical feasible source of clean energy for Latin American as well as for developed countries.

Renewable resources are most plentiful in Mexico, but they are not used adequately today. Therefore, there is a strong need for the development of new technologies, which are less expensive, locally available and suit the end users' requirements.

Conclusions

- Renewable energies are a plentiful resource, which is available almost everywhere in developing countries. They have the potential to cover the future energy needs of these countries, but presently these resources are wasted.
- The use of currently available renewable energy technologies can supply an important part of the electric and thermal energy demand without adverse environmental impacts. Thereby, biomass is of particular importance, even though nowadays it is applied in an unsustainable way.
- The development of cheaper and more efficient technologies, which are optimized to the local availability and price of resources, will lead to great opportunities for technical and industrial development. In addition, an energy supply based on renewable energies will generate thousands of jobs and contribute to the alleviation of serious environmental and social problems in countries such as Mexico.
- Only renewable energies can provide the basis for sustainable development. But, in order to provide sufficient clean energy for all mankind at low costs, increased activities in the field of research, development and dissemination are required.