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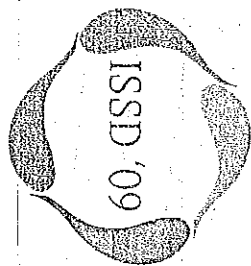
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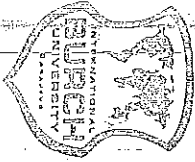
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Trends and Issues in Renewable Energy Education

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Abstract: With worldwide demand for energy increasing every day, the development of new, clean, renewable energy sources is critical to Earth's environment. To use clean-energy technology to help developing countries improve their quality of life and economies. Turkey is an energy importing country. Turkey presently has considerable renewable energy sources. The most important renewable sources are hydropower, wind, solar, geothermal, and biomass. The use of renewable energy as a topic to study energy and its forms permits a novel way to motivate students, particularly those who energy topics taking conscience with the environment. We would like to achieve this by looking beyond the schools' curricula and by introducing modern environmental and energy management methods in Universities and Vocational High Schools. This increases the *methodological competencies of students* and facilitates their change from school to professional life. Students play an *active role in the systematic improvement processes* of the schools and are even eligible to be trained to become *environmental auditors*. The *modern internet-based learning methods and instruments* are highly attractive for the students and instructors.

Key words: Renewable Energy Education, Teaching Learning Material, Motivation

Introduction

Energy is essential to economic and social development and improved quality of life in all countries. Availability of cheap and abundant energy with minimum environmental and ecological hazards associated with its production and use is one of the most important factors for economic growth and also for the desired improvement in the quality of life of the people living in developing countries. Because environmental problems result from energy-related factors, energy and environment are closely related concepts. Studies in last 2 decades have predicted that energy education will be a new discipline in both developed and developing countries. It is therefore especially developing countries that should take into account those studies and make some decisions about their energy, environment, and educational policy. Two important strategies are being adopted by a number of countries around the globe. The first strategy calls for energy demand management, which effectively means promotion of various energy conservation and efficiency measures, and the second approach is the development and large-scale dissemination of renewable energy technologies. Many countries around the world took initiatives for the development and dissemination of renewable energy technologies immediately after the first oil crisis. However, in spite of ambitious programmes of many countries in this direction, the dissemination of these technologies has not met the expectations of the planners and implementing organizations. There have been only a few successful cases of the adoption of renewable energy technologies. The poor dissemination of renewable energy technologies may be attributed to several factors. One of the important inhibiting factors is the lack of a structured framework for providing energy education, in general, and renewable energy education, in particular. For example, in many countries, the lack of indigenous technology development capacity in the area of new and renewable sources of energy has often resulted in the promotion of very expensive and inappropriate designs. Similarly, in some other places, owing to the unavailability of local technical manpower of proper repair and maintenance of the initially installed systems, the users have decided to use some other energy resource – technology combinations. Some of the renewable energy technologies were not accepted by the end-users as they were unaware of their potential benefits and associated requirements. These and several other such problems are merely manifestations of the same root cause - lack of proper renewable energy education.

technology feasible, but it will also impart income-earning skills for a new era of energy use. Here again, training materials and equipment are needed and teachers must be trained in their use. It is probably desirable throughout the educative process, but particularly at the university level, that renewable-energy considerations be presented as part of the complete energy picture, and that energy considerations in general be placed in the development context, both rural and urban. There are several reasons for this. Renewable energies are more likely to receive their proper due if they are considered on a par with other supply options so as neither to exaggerate nor to underestimate their potential importance to any locals. Beyond this, the impact of energy issues on each economic sector and on intersectoral coordination needs to be made clear and even emphasized.

Desirable features of an energy education program are as follows: It should include all energy resources (renewable and non-renewable) with particular emphasis on some specific ones depending upon the local needs and characteristics. It should cover all aspects of energy technologies such as resource assessment, technology, economics and energetic, socio cultural issues, and ecological and environmental impacts. Separate curricula should be developed for different levels (school, polytechnic, university) and for different audiences. Although to some extent the energy education programs may cater to the local, site-specific needs, they should at the same time be consistent with national, regional, and international priorities and requirements. It should be flexible and dynamic, thus allowing for improvement in the future, if desired. It should provide a balance between theory and practical aspects and should involve all aspects of teaching/training including lectures, laboratories, demonstrations, hands-on skills training, design, manufacture, trouble-shooting, etc. It should be capable of providing energy education to all in a minimum amount of time and should be economically viable so that the maximum number of people may be educated within the existing financial resources. Energy education should also ensure employment/self-employment for the students and should thus have a direct link with job requirements and responsibilities of the manpower required in the area of energy. It should be compatible with the global efforts in this direction and should allow effective and mutually beneficial experience sharing and interaction.

Renewable Energy Education in Turkey

The eighth Five-Year Development Plan of Turkey reports that the main objective in the energy sector is to meet the increasing demand for energy, in line with economic development targets, population growth rate, transition to industrialization, and taking into account the environment. The options related to some energy and environmental policies are the following General Policies:

- Measures to encourage wider use of natural gas
- Support the utilization of clean and renewable energy sources as well as passive solar energy applications
- Decentralization in energy generation
- Optimizing sustainability of energy supply and environmental costs
- Setting integrated energy consumption targets for organized industrial zones

Education and Training:

- Organization of energy conservation training at adult education centres
- Introducing energy conservation in formal education
- Organization of training for households in mass housing and rural areas (WECTNC 1999).

As mentioned above, investments in the energy sector and development of this sector are vital for Turkey. For this purpose, several new policies have been continuously produced and changed according to new growing economic requirements in this sector. During this process, it is also important to take into consideration environmental and educational factors. It is obvious that one of these policies produced must be related to studies dealing with energy education to supply qualified employees to the sector, to increase energy efficiency, to prevent energy extravagancy, and to make citizens aware of the need to protect their environment. It should not be ignored that formal education institutions play the most important role in achieving all of these goals. Because energy is closely linked to concern for the environment, energy education should also include environmental issues.

During the past decades or so, Renewable Energy Education efforts have primarily focused on postgraduate level teaching / training programmes. Several other undergraduate engineering degree programmes on Renewable Energy are offered. Short-term training and refresher courses are also being offered besides a large number of seminars, workshops, symposia and conference being organized on Renewable Energy and related topics every year. Some work has recently been initiated towards the development of vocational courses and courses for technicians and mechanics.

of available teachers rather than the inputs to be given to the students. A proper balance between theoretical and practical inputs is crucial for any renewable energy education programme. The laboratory component of renewable energy courses must ensure enough hands-on training of the students. There is an urgent need to develop suitable experiments which can be offered at different levels.

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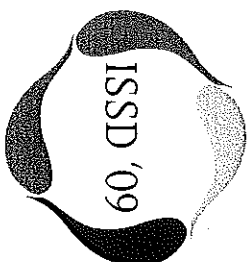
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