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REVIEW ARTICLE

Bioenergy, Environment, and Sustainable Development

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ABSTRACT

Sustainable energy is energy that, in its production or consumption, has minimal negative impacts on human health and the healthy functioning of vital ecological systems, including the global environment. It is an accepted fact that renewable energy is a sustainable form of energy, which has attracted more attention during recent years. A great amount of renewable energy potential, environmental interest, as well as economic consideration of fossil fuel consumption and high emphasis of sustainable development for the future will be needed.

Key words: Agricultural wastes, biomass resources, energy, environment, sustainable development

INTRODUCTION

The increased demand for gas and petroleum, food crops, fish, and large sources of vegetative matter mean that the global harvesting of carbon has in turn intensified. It could be said that mankind is mining nearly everything except its waste piles. It is simply a matter of time until the significant carbon stream present in municipal solid waste is fully captured. In the meantime, the waste industry needs to continue on the pathway to increased awareness and better-optimized biowaste resources.

The renewable energy resources are particularly suited for the provision of rural power supplies and a major advantage is that equipment such as flat plate solar driers, and wind machines, can be constructed using local resources and with the advantage resulting from the feasibility of local maintenance and the positive influence such local manufacturing has on small-scale rural based industry. This study gives some examples of small-scale energy converters; nevertheless, it should be noted that small conventional, that is, engines are currently the major source of power in rural areas and will continue to be so for a long time to come. There is a need for some further development to suit local conditions, to minimize spares holdings, to maximize the interchangeability of the engine parts and of the engine applications. Emphasis should be placed on full local manufacture.

Bioenergy is a growing source of power that is playing an ever-increasing role in the provision of electricity. The potential contribution of the waste industry to bioenergy is huge and has the ability to account for a source of large amount of total bioenergy production. Woody biomass is usually converted into power through combustion or gasification. Biomass can be specially grown in the case of energy crops. Waste wood makes up a significant proportion of a variety of municipal, commercial, and industrial waste streams.

The nations as a whole would benefit from savings in foreign exchange, from energy security, and socio-economic improvements. With a nine-fold increase in forest plantation cover, the nation resource base would be greatly improved. The non-technical issues, which have recently gained attention, include: (1) Environmental and ecological factors (e.g. carbon sequestration, reforestation, and revegetation), (2) renewables as a CO_2 neutral

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replacement for fossil fuels., (3) greater recognition of the importance of renewable energy, particularly modern biomass energy carriers, at the policy and planning levels, (4) greater recognition of the difficulties of gathering good and reliable biomass energy data, and efforts to improve it, and (5) studies on the detrimental health efforts of biomass energy particularly from traditional energy users. There is a need for some further development to suit local conditions, to minimize spares holdings, to maximize interchangeability both of engine parts and of the engine application. Emphasis should be placed on full local manufacture.[1]

Energy is an essential factor in development since it stimulates and supports economic growth and development. Fossil fuels, especially oil and natural gas, are finite in extent, and should be regarded as depleting assets. The efforts are oriented to new energy sources. The clamor all over the world for the need to conserve energy and the environment has intensified as traditional energy resources continue to diminish while the environment becomes increasingly degraded. Alternative energy sources can potentially help to fulfill the acute energy demand and sustain economic growth in many regions of the world. Bioenergy is beginning to gain importance in the global climate change fight. The scope for exploiting organic wastes as a source of energy is not limited to direct incineration or refuse-derived fuels burning. Biogas, biofuels, and woody biomass are other forms of energy sources that can be derived from organic waste materials. These biomass energy sources have significant potential in the fight against climate change.[2]

Conservation of energy and rationing in some form will however have to be practiced by most countries, to reduce oil imports and redress balance of payments positions. Meanwhile, the development and the application of nuclear power and some of the traditional solar, wind, biomass and water energy alternatives must be set in hand to supplement what remains of the fossil fuels. The encouragement of greater energy use is an essential development component. In the short-term, it requires mechanisms to enable the rapid increase in energy/capita, and in the long term we should be working toward a way of life based on energy efficiency and without the impairment of the environment or of causing safety problems. Such a program should as far as possible be based on renewable energy resources.[3]

Large-scale, conventional, and power plant such as hydropower have an important part to play in development. It does not, however, provide a complete solution. There is an important complementary role for the greater use of small scale, rural based-power plants. Such plant can be used to assist development since it can be made locally using local resources, enabling a rapid built-up in total equipment to be made without a corresponding and unacceptably large demand on central funds. Renewable resources are particularly suitable for providing the energy for such equipment and its use is also compatible with the long-term aims[4,5] (Andrea, and Fernando, 2012; Robinson, 2007).

METHODS, MATERIALS, AND APPROACH

With a view to fulfill the objective, a massive field survey was conducted to assess the availability of raw materials as well as the present situation of biomass technologies. The data were analyzed. Agricultural residues recycling helps to reduce the intensity of use of natural resources, decreases the need for waste disposal, decreases the specific energy consumption in manufacturing, and also provides reasonable levels of profits for those in the business.

This article highlights the potential energy saving that could be achieved through use of biomass energy source. It also focuses on the optimization and improvement of the operation conditions.

In compiling energy consumption data, it could be possible to categorize usage according to a number of different schemes:

- Traditional sector – industrial, transportation, etc.
- End-use – space heating, process steam, etc.
- Final demand – total energy consumption related to automobiles, to food, etc.
- Energy source – oil, coal, etc.
- Energy form at point of use – electric drive, low temperature heat, etc.

The aim of any modern biomass energy systems must be:

- To maximize yields with minimum inputs
- Utilization and selection of adequate plant materials and processes

- Optimum use of land, water, and fertilizer
- Create an adequate infrastructure and strong research and development (R & D) base.

CONCLUSION

Turning to chemical engineering and the experience of the chemical process industry represents a wakening up but does not lead to an immediate solution to the problems. The traditional techniques are not very kind to biological products, which are controlled by difficulty and unique physicochemical properties such as low mechanical, thermal, and chemical stabilities.

Furthermore, investigating the potential is needed to make use of more and more of its waste. Household waste, vegetable market waste, and waste from the cotton stalks, leather, and pulp; and paper industries can be used to produce useful energy either by direct incineration, gasification, digestion (biogas production), fermentation, or cogeneration.

The adoption of green or sustainable approaches to the way in which society is run is seen as an important strategy in finding a solution to the energy problem. The key factors to reducing and controlling CO_2, which is the major contributor to global warming, are the use of alternative approaches to energy generation and the exploration of how these alternatives are used today and may be used in the future as green energy sources. Even with modest assumptions about the availability of land, comprehensive fuel-wood farming programs offer significant energy, economic, and environmental benefits. These benefits would be dispersed in rural areas where they are greatly needed and can serve as linkages for further rural economic development. The nations as a whole would benefit from savings in foreign exchange, improved energy security, and socio-economic improvements. With a nine-fold increase in forest – plantation cover, a nation's resource base would be greatly improved. The international community would benefit from pollution reduction, climate mitigation, and the increased trading opportunities that arise from new income sources.

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