

Opportunities and Challenges in Harnessing Energy from Biomass

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Abstract

In recent period, with rapid increase in population, industrialization, urbanization and adoption of modern agricultural practices in different parts of the world, the demand for energy mostly from fossil fuels, is increasing very fast. As a result, the amount of green house gases namely carbon dioxide, methane, oxides of sulphur and nitrogen, particulate matters etc., are being released to the atmosphere causing the hazardous global warming and climate change. To address the situation, the governments of different countries are giving importance for the use of renewable energy from sun, wind, biomass, and small hydro power as well as for power winning from nuclear sources. In the present scenario, biomass is considered by scientists and technologists as the most potential material for producing renewable energy and can be effective to replace the fossil fuels to a considerable extent. Biomass has always been a major source of energy particularly for cooking and providing heat for mankind since the dawn of civilization. Large quantities of biomass can be obtained through cultivation of various energy crops, plants and bushes, perennial grasses, harvesting of leaves, branches of trees from the forest and also organic solid wastes of agricultural, industrial and domestic origin and urban and industrial sewage. Biomass is considered to be carbon neutral on the assumption that, carbon released from biomass during its burning will be reabsorbed in course of the growth of the tree. On this assumption and the availability of biomass, it is felt necessary to use increasing amounts of renewable energy from this source in Industrial, domestic and transport sectors. In this paper, general processes for conversion of biomass

into energy through thermo- chemical, biochemical and mechanical processes have been described. The thermo chemical processes include combustion, gasification and pyrolysis. The bio-chemical conversion includes anaerobic digestion and fermentation. The scope of using bio-energy in domestic, industrial, transport and other commercial sectors in different countries have been outlined. The opportunities and challenges faced for producing biomass and converting it to energy have been mentioned briefly. The status of biomass energy in India has been described and discussed.

Keywords: *Biomass, bio energy, combustion, gasification, pyrolysis, fermentation, anaerobic digestion, bio energy application in industrial, domestic and transport sectors.*