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RECENT SCENARIO OF BIOFUELS IN INDIA

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ABSTRACT

India's energy demand is mainly depend upon the foreign crude oil (fossil fuel). India's dependency on foreign oil and its increasing demand is impact on Indian economy. Biofuel would be a better alternative to fossils fuel and may increase energy security of India. Various policies are made by government of India to develop biofuel. Several steps are already taken to increase the production of feedstock and use of biofuel. Recently, in national biofuel policy on India-2018, government of India has proposed a blending target of 20% ethanol with petrol and 5% of biodiesel with diesel by 2030. Also, it has focus on increasing the use of biofuel especially in energy and transportation sector. Use of biofuel can play a significant role in sustainable development and enhance energy security of India. This paper highlights the recent scenario & progress of biofuel in India.

KEYWORDS: Biofuel, Fossils Fuels, Biofuel Feedstock, Biofuel Policy.

I. INTRODUCTION

Energy is first & most important requirement in present time for commercial and daily life. Energy demand in world and India is increasing day to day. To meet the increased energy demand, its development must be economical and sustainable too. Conventional energy resources are limited and their rate of depletion is very fast. Also, the emission from the conventional energy sources is more and unsafe for environment. The most of energy demand of industries, transportation, domestic, etc. is fulfil mainly by fossils fuels in India. Due to import dependency, pricing of crude oil and increasing energy demand India require to reduce their dependency on foreign oil. Thus, alternative fuels are most appropriate substitute to protect from emission and strengthen the energy security of India. Biofuels are the fuels; which derived from the biomass/vegetable oils and bio-degradable wastes. Switching from conventional to biofuels could reduce emission of greenhouse gases and urban air pollution [1]. At the same time, it can significantly contribute to fulfil energy demand, strengthen the energy security and save foreign exchange. Biofuel could encourage agriculture development in India and source for employment and earning.

II. BIOFUEL FEEDSTOCK IN INDIA

Feedstock for producing biofuel in India is mainly classified into two categories; (a) bio-ethanol and (b) biodiesel. *Sugarcane molasses & sweet sorghum* is used as feedstock for production of ethanol and *jatropha & pongomia* is used as feedstock for production of biodiesel. India is stand in one of the biggest producer of *sugarcane* and, *ethanol* produced from *sugarcane* all around the world. Production of biodiesel in India is mainly from the inedible oils derived from the seeds of plants; *jatropha & pongomia*. There are many advantages of biodiesel (made from *jatropha* seed oil) such as no impact on edible oil shortage, no fertile land is required and survive low rainfall, require minimum care, animal deterrent crop, low emission etc. Due to more demand & import of edible oil; India isn't using edible oil extracted from soybean, mustard, rapeseed or palm oil to produce biodiesel [2, 3]. According to "National Policy on Biofuels-2018" for production of biofuels following feedstock has proposed:

Table-1: Feedstock for Production of Biofuels [4]

Biofuel	Feedstock for Biofuel
Bio-ethanol	B-Molasses, Sugarcane juice, biomass in form of grasses, agriculture residues/wastes (Rice straw, cotton stalk, corn cobs, saw dust, bagasse etc.), sugar containing materials like sugar beet, sweet sorghum, etc. and the materials contain starch such as cassava, corn, rotten potatoes etc., Damaged food grains like wheat, broken rice etc. which are unhealthy for human consumption, Food grains during surplus phase. Algal feedstock and cultivation of sea weeds
Biodiesel	Inedible Oilseeds, Used Cooking Oil (UCO), Acid Oil, Animal tallow, Algal feedstock etc.
Advanced Biofuels	Biomass, Municipal Solid Waste (MSW), Industrial waste, Plastic waste etc.

III. BIOFUEL POLICY IN INDIAN

There are several steps has taken by govt. of India to produce biofuel and increase the use of biofuel. In January 2003, Govt. of India launched EBPP (Ethanol Blended Petrol Program) with vision of 5% blending of ethanol with petrol. Thereafter in April 2003, National Mission on Biodiesel was introduced with a target of 20% blending of biodiesel (*Jatropha oil*) with diesel by year 2012. In year 2009, Ministry of New and Renewable Energy (MNRE) introduced 'National Policy on Biofuels' with an aim of 20% blending of ethanol and biodiesel with petrol and diesel respectively by the year 2017 and the set target was not achieved due to economical and agronomical constraints [3-6]. Recently, in June 2008, Govt. of India is introduced "National Policy on Biofuels-2018" with following vision and goals [4]:

- Increase usage of biofuels in the energy and transportation sectors in India (in upcoming decades), Promote and develop domestic feedstock and their use for making of biofuels, thus can contribute in employment generation by sustainable approach, energy security for country and climate change mitigation.
- Ensure availability of biofuel for blending, at present the limit is 2 % for ethanol and less than 0.1% for petrol and diesel respectively. The target of 20% blending of ethanol and 5% of biodiesel with petrol and diesel respectively by 2030 is proposed and the goal is to be achieved by several sub goals.

IV. BIOFUEL DEMAND AND PRODUCTION

India is stand in the fastest growing economies in the world and its energy demand is increasing as the living standard of citizens is rising. Government of India looking to reduce energy emission intensity in the range 33-35% by year 2030 and aim to produce non-fossils fuel based energy at above 40% by 2030. Thus government is focusing to increase capacity & usage of renewable energy because of eco-friendly and inexhaustible. Energy demand of Indian transport sector is diesel (73%) & petrol (23%) and remaining by others. Majorly, energy demand of Indian transportation is fulfil by foreign oil because domestic crude oil production have capacity of 17.9% of total. Thereby, energy security of India will not strengthen until alternative fuel doesn't emerge as substitute. To tackle these concerns, Government

of India has set aim to cut the import dependency by 10% by the year 2022 [4].

At present near about 330 distilleries, this has capacity to make 4.5 billion litres of rectified spirit per annum. Out of them, about 162 distilleries is produce conventional ethanol over 2.2 billion litres. India's ethanol program is mainly depending on sugar molasses and by-product of sugar mills. The consumption of ethanol is about 2.4 billion litres (expected) in 2018 [6]. The total expected demand of ethanol during year 2020-21 for blending of 5%, 10% and 20% with petrol is 1.50 million tonnes, 2.99 million tonnes and 5.99 million tonnes respectively and the corresponding expected total demand after calculating portable, industrial and other uses is be 3.31 million tonnes, 4.80 million tonnes and 7.80 million tonnes respectively [7].

Biodiesel is promising bio-energy option for India. Presently, India has capacity of 10,000-25,000 metric tonnes to produce biodiesel per annum. The total expected demand of biodiesel during year 2020-21 for blending of 5%, 10% and 20% with diesel is 6.15 million tonnes, 12.31 million tonnes and 24.61 million tonnes respectively and the corresponding projected total area for *Jatropha* required to meet the expected biodiesel demand is 6.56 million hectare, 13.13 million hectare and 26.5 million hectare respectively. Advanced biofuel production from agriculture waste and municipal solid waste in India is growing slowly [7].

V. BENEFITS AND LIMITATIONS

Production and maximum usages of biofuel has certain major benefits for India [8]. The major expected benefits will be followings:

- Reduce dependency on foreign oil.
- Environment friendly because of lower emissions.
- Employment generation.
- Development in rural areas.
- Extra income for farmers as agriculture waste used for biofuel.
- Municipal Solid Waste management and energy generation from it.

The following are the certain limitations/barriers in development and production of biofuel [6]:

- Lack of developed market for primary agricultural waste.
- Require high capital investment.

- Production of feedstock for biofuel,
- Insufficient development of biomass to bio-fuel conversion technologies.
- Security of biomass supply and price of agriculture residues/industrial waste (e.g. ethanol for sugar mill).

VI. CONCLUSION

Biofuel may be better alternative to fossils fuel for India. If, proper development of biofuel value chain and sufficient production achieved by India in coming decades; it can play a key role in enhance energy security, reducing import dependency, reduction in pollutions, expansion of farming for biofuel and support economy by reduction in expenditure incurred on import of crude oil. It has several other advantages such as; it is renewable source of energy, important role in reduction of green house gases, better use of agriculture residues and municipal wastes, employment and income source in rural India etc. But, there are some issues such as fuel quality, price of biofuel feedstock, increase production of biofuel feedstock e.g. *jatropha* without affecting other food production, technical deficiencies etc. Despite of that government has to take several initiatives to promote use & production of biofuel and its feedstock. Government has to increase the minimum support price of feedstock of biofuel, subsidy for farming of biofuel feedstock, awareness in rural areas & use of infertile land for production of feedstock e.g. *jatropha*, development of biofuel value chain, force to industries and transport sector for the use of biofuel etc. If the issues stated above could be resolved properly and proper initiatives is taken; biofuel would be better option over conventional fuel for India. Also, it would contribute in sustainable development and reduction in import dependency.

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