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Analysis on Biofuel Manufacturing Technology and National Policy on Biofuel in India

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ABSTRACT:
To save the environment from pollution and to save ozone layer from depletion caused due to increasement of greenhouse gases in the atmosphere . ozone layer depletion is the reason of climate change. Due to climate change some animal and plant species are extinguished, some are in endangered position. To conserve the biological diversity pollution free environment and natural climate is essential. Use of fossil fuel helps to greenhouse gas emission but regular use of biofuel is pocket friendly and also environment friendly. Through processing of domestic waste, biomass and other plant sources biofuel can be made. However, some policies are taken by government of India. But there is need of legislation and more strong policy regarding biofuel manufacture, supply and use.

Keywords: Biofuel, Nation policy, Greenhouse gas, Environment, Waste, fossil fuel, biodiversity, Conservation, pollution.

INTRODUCTION:

India is expected to become developed economy in the world in near future . India also has renewable energy sources but that sources must be used in every possible method. Biological carbon and biomass are the main sources of biofuel. Biomethane, bioethanol, ethanol, biodiesel, biohydrogens, fuels, solid biofuels all of these are come from renewable energy in present society focused on production of industrial machine-like automobiles, diesel engines due to this demand for diesel oil is increasing and for production of sufficient diesel oil use of biofuel is necessary. Production of biofuel is an important issue in the present world, because fossil fuels are limited in the earth. Conserve the fossil fuel for future generations and to protect the environment from greenhouse gasses which are com from burning of fossil fuel, production of biofuel is essential. Excessive demand of fossil fuel causing high rate of oil and other fossil fuel but rate of biofuel is less than fossil fuel. Burning of fossil fuel releasing greenhouse gasses which are responsible for greenhouse effect and these gasses also cause ozone depletion. Biofuels are less harmful for environment than fossil fuel. Biomass is one of the source of biofuel, biomass engross the amount of carbon dioxide at the time of its growth and released approximately the equal amount at the time of burning of biofuel.

DEFINITION AND KINDS OF BIOFUEL:

Concept of biofuel is that a liquid fuel which generated from biological sources which are the sources of renewable energy. Biological sources incorporate biological carbon and biomass which includes plants, algae, agricultural waste, wood wastes, food west etc. biofuels can replace fossil fuel not only these biofuels are less harmful for environment than fossil fuels[1]

Biofuel: Bio fuel is that type of fuel which is produced from renewable sources(biological carbon, biomass which includes plants, agricultural west, food west, wood west.)

Renewable Sources: Renewable sources are natural sources of energy which can refill the demand of higher priced fossil fuels. Price of biofuels are lower than fossil fuel. Some of the renewable resources are solar and wind energy, falling water, speed of going water, waves, ocean current, heat of the earth, energy of tides and biomass includes plants and algae.[1]

Biodiesel: Biodiesel is a processed fuel from organic oil[2]. Here organic oil includes vegetable oil, restaurant grease, animal fact, mostly it's produced from bio decomposing things. It is non petroleum product. Organic resources beneath from under the earth surface.

Biomethane: Biomethane is a renewable gas produced from biogas which was undertake as upgrading for future. This type of gas helps to co_2 from air and 95% gas contains with methane.

Biohydrogen: Biohydrogen is renewable energy of hydrogen gas which is produced by biogas and biomass Biohydrogen. is alternative of that hydrogen which produced from fossil fuel. Hydrogen is chemically linked with water, biomass and fossil fuel. To obtain hydrogen gas for use hydrogen must be extract from the substances which have chemical bound with hydrogen gas.

Bioethanol: Bioethanol is alcohol-based product. Bioethanol is volatized mostly from carbohydrates which holds sugar like sugarcane, sugar beet, starch accommodated material such as rotten potatoes, corns, Lage, cassava and cellulosic contains like west of wood, agricultural waste[3], forestry residues, bagasse and other west from restaurant and industrial west. These wastes help to produce such alcohol which can contribute to produce bioethanol. Bioethanol very much used in USA and Brazil where plant materials are converted into bioethanol through fermentation.

Bio-CNG: full form of bio CNG is bio compressed natural gas. It is mixture of various gases which are processed from agricultural west, food west, animal dunk, sewage, green west in nonappearance of oxygen. It is again processed for purification it has alike potential of fossil fuel.[4]

MANUFACTURING TECHNOLOGY OF BIOFUELS: Biofuels are environment friendly and pocket friendly replacement of fossil fuel. But to produce biofuel has some technological process. These biofuel manufacturing processes are discussed below:

Manufacturing process of Biodiesel: Manufacturing process of biodiesel are as follows:

Pre- treatment: Pre treatment is the first step of the total manufacturing process of biodiesel. Biodiesel manufacturing process includes:

- Elimination of solid particles and other pollutant from crude oil for filtering
- Also remove lipid molecule which are compressed of fatty acid.
- Take out colouring components from crude oil.
- Reduction of acid effect from oil through distillation.[5]

oil-water separation: In the making process of biodiesel water is also used to remove adjuvant or enzyme or to trace glycerol. Gravity creates separation between oil and water. As because oil flots on water. Oil

[1] https://www.oas.org/dsd/publications (Retrieved on 15.09.2024 at 8.00 p.m.)
[2] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Pands;Eiri;p-87
[3] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Pands;Eir; p-41-42
[4] THE Gazette of India; National policy on BIOFUEL,2018;P-15
[5] https://link.springer.com/chapter/10.1007/978-3-642-32735-3_18 (Retrieved on20.4.2024 at 7.45 p.m.)

has lighter weight than water. After separating adjuvants and glycerol rest of the water must take off through process of evaporation or vacuum dryer[6].

iii) primary treatment: primary treatment biodiesel production is fact restructuring that is similar to alcoholysis it a process where through chemical reaction alcohol, animal fact and vegetable oil convert into bio diesel.[7] After oil water separation raw materials are activated with kaolin and placed agitator to decolourise raw material[8].

Initial Filtration: It is first step to produce pure biodiesel. After activation of mold dust can soak up all the impurities and totally lost its active power, remove from raw material which under process of biodiesel production.[9]

Secondary treatment: Secondary treatment for biodiesel production indicates dry washing, wet wash for the separation by layer. Through wet wash process crude biodiesel is separated fro glycerol. But this process takes long time and high cost . After initial filtration the raw materials will be heated in60^0C- 80^0C and supplied huge amount of ozone gas. The tank of raw material having aspin distributor device.[10]

vi) Secondary Filtration: Secondary filtration is the final step to produce biodiesel. Through the activation of charcoal biodiesel is filtered and ready for final production. Activation of carbon can be used to complete purification of biodiesel which is ready to use biodiesel and fuel in regular life.

MANUFACTURING PROCESS OF BIOMETHANE: Biomethane is a renewable gas which is produced from biogas. Manufacturing process biomethane are as follows:

prepare container: *There is a need of different kinds of container 30 gallon drum or 50 gallon drum with lid removal.*[11] Biogas is the basic raw material for biomethane production. Biogas can be manufactured from different feedstock sources. Feedstock is a that type of material that can be used to produce something in an industrial process. Agricultural waste, vegetable oil, animal fat, municipal solid waste, sewage mud, animal manure, food processing waste, slaughter house waste, corn silage, milk house wash water, industrial waste, food wastes of restaurants.

Digester creation: As per American council anaerobic digestion is a series of biological mechanism in which break down microorganism had done biodegradable material but in absence of oxygen[12].This digestion used to convert livestock manure, municipal waste water, solids, industrial waste water, food waste, fat, oil and grease and various organic waste steamed as biogas[13].

Digester preparation:-

1. Digester must be free from rubbish or useless remaining before starting the digestion cycle.
2. All valves, pipes and all other components must be Che
3. prill of raw material will be used for impulsion inlets and gas outlets should be larger.

[6] www.google.com/search?q=oil+water(Retrieved on22.09,2024 at 10.40 a.m.)
[7] https://www.sciencedirect.com/science/article/abs/pii/S0960852408007207 (Retrieved on 25.09.2024 at 7.50 p.m.)
[8] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir; p-93
[9] https://www.amafiltration.com/ (Retrieved on27.09.2024 at 7.30 p.m.)
[10] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda;Eir; p-93-94
[11]https://www.instructables.com/Biogas-Digester/ (Retrieved on 7.40p.m.)
[12] http://www.tn.gov>sw-mm-organics. (Retrieved on 01.10. 2024 at. 10.a.m.)
[13] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir; p-29

4. Collection of organic waste like kitchen scraps, animal manure, food west, agricultural wastes, plant material should collect and combine to create strong carbon material for production of bio methane.[14]

Waste Loading: Process of loading waste includes handling, sorting and storing waste before complete disposed of. waste of household can be used as fertilizer and it can improve quality of soil for plants. Waste loading not only process of generating solid organic material but also degraded quality of water waste of fish and shrimp industry. Burning of waste crusades emission of greenhouse gases. Landfilling of waste may cause nuisance to public health. So without causing harm to environment or to public health. Wastes can be use used through scientific process for making biogas like biomethane[15].

Operating Conditions: There are two main operating condition for biogas(biomethane) manufacturing process.

1. There must be absence of oxygen.
2. Required temperature for biomethane manufacturing is $35^{O}C$- $40^{o}C$[16].

Biogas Capture and Storage: Rotting municipal waste captured by using pipes and drawing out wells along with compressors. Operator of land fill drilled series of wells for collecting biogas (biomethane)[17].Biogas can be compressed and can be stored in LPG Cylinder Biogas can be used immediately or can be stored for future use to collect methane pump is essential to continue this system can be used on diary operations where manure is used as liquid biodegradation of organic waste. Methane+ moisture+ atmospheric gas compresses these thing and store in cylinder.[18].

Biogas Cleaning: Generally, biogas consist of methane, carbon di oxide and small amount of hydrogen sulphide with other gases. But only methane gas is usable as transport fuel. Methane must be separated from remain other gases which consist biogas. Which biogas consists of 95%-100% methane that biogas only can be used as transport fuel. Methane can be separated through pressure swing adsorption. PSA is technological process through which methane gas cleaned and separated from other gases of biogas by specific assimilation of biogas in material[19].

MANUFACTRUNG PROCESS **OF BIOHYDROGEN:** Hydrogen has chemically linkage with water, biomass and fossil fuel. Biohydrogen can be produced through following proceedings:

Electrolysis: Electrolysis is a process through which can be separated from xygen. H_2O can be separated as O_2 and H_2. But this process requires huge ampere of electricity. Electrolysis can produce pure hydrogen gas.

Steam Methane Reformation: SMR is a process which produces hydrogen from natural gas or other low-boiling branch of hydro carbons this process can be done in $110^{0}C$ Temperature in the presence of adjuvant. This is an effective but less expensive process to produce hydrogen[20].

[15] https://www.sciencedirect.com/science/article/abs/pii/ (Retrieved on 8 10.2024 at 7.44 P.M.)

[16] https://biogas.mnre.gov.in/faqs#:~:text=What%20are%20the%20optimum%20conditions,with%20a%20hot%20water%20jacket. (Retrieved on 16.10.2024 at 7.40 p.m.)

[17] https://www.eesi.org/files/biogas_issuebrief_061609.pdf (Retrieved on 18.10.2024 at 7.40 p.m.)

[18] http://suscon.org/ /cowpower pdf /biomethane (Retrieved on 19.10.2024 at 7.46.p.m.)

[19] https://condorchem.com/en/biogas-cleaning/#:~:text=Biogas (Retrieved on 23. 10. 2024 at. 7.30 p.m.)

[20] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir;p-37

Photo Electrolysis: Photo electrolysis is process that uses sunlight to produce hydrogen and oxygen from water. Photo electrolysis can be done only in the presence of sunlight, here helps to split the water components. After splitting of water components it is easy to separate hydrogen gas from water components[21].

Hydrogen Collection from Coal :Coal accommodates hydrogen. Crunch of coal is mixed with oxygen, steam, air and other components. If these components are being heated to 1800^0C to create synthesis gas known as syngas which is mixture of hydrogen, carbon, carbon monoxide, carbon dioxide and other gases and particles. After cooling syngas other particles are removed and rest of particles are sent to the reactor carbon monoxide were steamed to clean hydrogen and carbon dioxide. After that hydrogen and carbon dioxide separated through steam process. After cleaning hydrogen gas is ready to use[22].

Bio-Hydrogen: Some species of green plant and algae produces hydrogen in presence of sunlight. In the time of photosynthesis of plants use sunlight to crack the hydrogen and oxygen components from water. After this through natural process bind hydrogen with carbon dioxide to produce carbohydrate[23]. Hydrogen can be produced by bio photolysis method. In this bio photolysis process sunlight operate biologically make possible to produce hydrogen from water splitting. Here solar energy converts to precise H_2 alike photosynthesis. Bio photolysis can be done from decomposed water, green algae or from green plants like spinach and cyanobacteria[24].

MANUFACTURING OF BIOETHANOL: Bio ethanol produced from biomass which is the main source of biofuel which is substitute of petrol for road transportation. Crude oil makes biofuel more magnificently To produce biofuel biomass is the main source because biomass are renewable source. To produce bioethanol there is a need of some raw material, these are a) sugar, b)starch c)lignocellulosic biomass.

Bioethanol production from sugar: the raw material for ethanol production is sugar andproduced from sugar:

a) **Squashing:** First of all sugar cane will be chopped properly at sugar mill for next step.
b) ***Extraction:*** Next step is extraction from sugar cane, after extraction of juice from sugar cane. That bagasse will be boiled in warm water. Thereafter again extraction process will be done of rest of 5% (approx.) remaining sugar up to the limit of bagasse dried completely.
c) ***Juice Treatment:*** Extracted sugar juice must be heated on 115^0C temperature and after that will be treated with sulfuric acid.
d) ***Fermentation:*** Sugar is fermented by using yeast or another microorganism. Sugar cane bagasse also can be fermented to produce ethanol by using saccharomyces cerevisiae which is also known as yeast baker.
e) ***Distillation:*** The fermented pulp known as beer accommodated with6-10% of alcohol and and with remaining fermentable solid yeast cells. After that remaining pulp will be pumped continuously for

[21] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir;p-37-38
her
[22] https://theconversation.com/explainer-how-do-we-make-hydrogen-from-coal-and-is-it-really-a-clean-fuel-94911 (Retrieved on 27.10.2024 at 7.40 p.m.)
[23] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir;p-38
[24] https://www.sciencedirect.com/topics/engineering/biophotolysis (Retrieved on 28.10.2024 at 8.00 p.m.)

column distillation. Alcohol leaves the base and come to the top of column that pulp will be transferred from the base to vertical to product processing area. After that ethanol is boiled off and condensed to remove rest of the alcohol and water.

MANUFACTURING OF COMPRESSED NATURAL GAS: CNG consist of nitrogen, propane, ethane, hydro carbon includes carbon dioxide and gas wells which are drilled to produce natural gas from underground reservoirs. Through following steps Cng is produced as fuel. Due to increasing population demand of fuel and electricity is also increasing because of that price of fossil fuel is too high. It is very difficult for common people meet their needs regarding fuel for high price rate. Fossil fuel is in sufficient for the huge populated country like India. Technology to process compressed natural gas for use as fuel there are need of some technologies for manufacturing of CNG are as follows:

Gas Power Plant and Steam: Gas power plant is combination gas power plant and steam power plant. Power plant operate gas turbine which has capacity to covert heat energy to mechanical fuel which energy comes from burning fuel. After applying baryton cycle power plant will convert the energy into chemical energy through steam power it will be again converted into thermal energy.

Brayton Cycle: Brayton cycle includes compression of gas, addition of heat to gas, after that enlargement of gas and finally cooling of gas at a adequate pressure. It is thermodynamic cycle t describes how gas turbines work[25].

Compressed Natural gas: Cng processed in high pressure in liquid form natural as contraction in tube. Main components of Cng methane CH_3 , ethane(C_2H_8) Cng 90% made of methane(CH_4) which is extracted from natural gas. Cng stored in thanks and also distributed through tanks[26].

IMPACT OF BIOFUEL PRODUCTION ON BIODIVERSITY: Production of biofuel has two both kinds of impact on biodiversity negative and positive impacts. The main source of biofuel is solid biomass and biogases. Solid biomass includes various plants agricultural wastes biomass also comes from animals. Tobacco cultivation is continuing since 16th or 17th century when Portuguese introduced tobacco to India after that it is continuing years after years. Transformation of tobacco leaves into smoking products, inhaling powder and some chewable products. But tobacco is also a source of green energy[27]. However, cultivation of tobacco plants and some of other plant sources of biofuel has negative impact on biodiversity. Generally, biodiversity will be based on which kind of crops are planted and use of that particular land before or after biofuel source plant's plantation. Changes may cause loss of habitats and degradation of ecosystem which is threat towards biodiversity.

Not only negative impacts biofuel production has also some positive impacts. Biofuel production helps to reduces the carbon emission. Production of biofuel has positive impact on climate because burning of fossil fuel discharges greenhouse gases which are causing ozone layer depletion. Ozone depletion and greenhouse effect is the main reason of climate change. But biofuel production or burning of biofuel does not produces greenhouse gases and not responsible for climate change. Biofuel is environment (specially climate) friendly and side by side pocket friendly. Biofuel production needs plants of perpetual nature,

[25] https://www.gidb.org/pdf/gSPCCompressedNaturalGas.pdf (Retrieved on 14.11.2024 at 7.25 p.m.).
[26] https://www.e3s-conferences.org/articles/e3sconf/pdf/2018/06/e3sconf_icenis2018_01011.pdf (Retrieved on 14.11.2024. at 7.45 p.mm)
[27] Manufacturing technology of biofuels, biomethane, biohydrogen, bioethanol, ethanol, bio diesel, fuels, solid biofuel and renewable energy; Dr. Himadri Panda; Eir; p-18-19

which can improve soil quality. Plant sources of biofuel can be grown on degraded land and soil quality of degraded land can be productive land. Biofuel crops may not be harmful for water quality as because biofuel crops do not require more fertilizers[28].

NATIONAL POLICY ON BIOFUEL,2018 And Amendment 2021: Government of India planed for reduction of imported dependency in oil and gas by adopting various strategies the increasing domestic population, manufacturing biofuels from renewable energy sources, improvement of filtering process, India needs environment friendly and pocket friendly for common people biofuel presume global attention due to serious environmental concerns. This kind environmental concern encourages India to manufacture biofuels to meet the needs India's urban and rural population. Object national policy2018; The main object of the policy is to entitle the availability of biofuels in the biofuels in the market for the use of common people. This policy has target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel by 2030. These objectives will be achieved through:

1. strengthen ongoing ethanol/biodiesel- supply by increasing domestic production.
2. setting up of 2G biofuel production refineries.
3. Improvement of raw material for biofuel production.
4. d)Enlargement of new technologies for manufacturing biofuels.
5. Generate suitable environment for plantation of plant sources of biofuel[29].

Interference and Available Mechanism:

first step for increasing biofuel production is to make feedstock available and needs to develop the available mechanism. In India, Bioethanol can be produced from sugar cane, starch containg material, cellulose. In this policy EBP is developed by various mechanism. Ethanol blended petrol helps to produce bioethanol. Bio diesel can be produced from oil either edible or non-edible oil. However, biodiesel is also produced through blending process.

Ethanol Production: Sugar cane juice after juice extraction sugar cane bagasse. Agricultural material like rice straw, cotton stalk corn dobbin, saw dust and agricultural bagasse etc. sea weeds can also be used as feedstock for ethanol production.

Biodiesel Production: Used cooking oil, non- edible oil seeds, animal fat, acid oil, algal feedstock these raw material productions will be increased for increasing biodiesel production.

Advanced Biofuels: Municipal solid waste, Biomass, plastic waste, industrial waste these are the main sources of biofuel production.

This policy is indicating the development of scope of raw material for increasing ethanol blended programme. Grains of biofuel sources will be approved by National Biofuel coordination committee. Food grains will be anticipated by Ministry of Agriculture and Farmers Welfare,[30] To identify the location of unused biomass and leftover feedstock which will be supplied for biofuel making sources. Under this policy farmers a will be motivated to grow various divergent biomass and oil seeds on their marginal lands as secondary crops, proper feedstock collection centre will made and set up feedstock supply chain mechanism.

[28] The Impact Of Biofuel Production On Bio diversity: A Review of Current Literature; December2009;P-9-10
[29] THE GAZETTE OF INDIA; NATIONAL POLICY ON BIOFUEL,2018
[30] THE GAZETTE OF INDIA; NATIONAL POLICY ON BIOFUEL,2018;(PART I- SEC.1)

Blending and Biofuel refinery Programme: EBP Programme is the main process of bio refinery 350 MMT and 26-28 MMT per Annum after refinery process 13 MMT molasses which is sufficient to produce 300 core litres of alcohol/ethanol.

More molasses and juice of sugar cane can produce one MMT may produce 60 core litres ethanol.[31]

Ethanol Second generation: Main source of ethanol production is molasses. According to some research studies India has stipulated availability of biomass 120-160 MMT which can produce 3000 crore litres of ethanol annually. As per this policy 2G ethanol industry will be more environment friendly[32].

Biodiesel Blending Programme: According to research report submitted for national policy percentage of blending after that converting of biodiesel into diesel of 0.5% only in over all in our country. Blending programme has done through imported resources . as per the national policy used and wasted cooking oil has the potentiality to produce biodiesel. Our country has to improve resources collection mechanism for bio diesel manufacturing process[33].waste of used cooking oil by the small vendors and traders should be stopped, must be collected properly for bio diesel production.

Other Biofuel (Bio-CNG, Bio-Hydrogen, Bio-Methanol): Task force on waste to energy creation by NITI Aayog has fixed the aprox 62MMT of solid municipal waste annually in India. This waste has immense potential to produce biofuel. There are some technologies followed by the all over the world to convert wastes into biofuel e.g. drop-in fuels, bio-CNG model followed by over all world. Entire world used blended bio methanol for transportation. This bioethanol can be produced from agricultural waste coal ash and also from natural gas. As per the report 2018 India in 2018 was a net importer. India needs to improve availability of potential biomass sources for bio methanol production in India. Production of biofuel from algae which has potential to discharge high oil. This alga needs minimum land. Algae based biofuels are promoted as to techno- commercial potentiality.

Financing and Financial Initiatives: Government will consider the expenses of oil extraction and other processing to produce bio diesel and includes its distribution expenses also. National policy on Biofuel, 2018 encouraged Foreign Direct Investment in biofuel technologies. Biofuel will be produced and will be used for domestic purposes. Government will ensure to provide funding gaps and subsidies and other fiscal initiatives to raise production of bioethanol. Government can provide financial support for biofuel production as because it is not harmful environment and help to reduce carbon emission.

NATIONAL POLICY ON BIOFUELS,2018 AMENDMENT, 2022:

Caluse2.2 (i)The goal of the policy is to ensure the availability of biofuel in the market and increasing blending percentage. The Ministry of petroleum and Natural Gas has instructed oil companies to sell ethanol blended petrol with 20% ethanol from 1st April 2023. Blended percentage of ethanol will be increased in every coming year.20% incasement of ethanol supply with petrol proposed to supply in2025-26.5% blending of biodiesel with diesel and direct sale of biodiesel proposed by 2030. This goal will be achieved by

a) Strengthen ongoing ethanol/ biodiesel supplies through increasing collection of domestic waste,

b) Preparing for 2nd generation bio refineries,

c)Discovering new feedstocks for biofuel manufacture.

d) Develop new technologies and mechanism for conversion process OF biofuels.

[31] THE GAZETTE OF INDIA; NATIONAL POLICY ON BIOFUEL,2018; p- 17; 5.9
[32] THE GAZETTE OF INDIA; NATIONAL POLICY ON BIOFUEL,2018; p- 17; 5.10
[33] THE GAZETTE OF INDIA; NATIONAL POLICY ON BIOFUEL,2018; p- 17; 5.11

e) Generate proper environment for biofuels combination with main fuels.
clause3.2 (i), (ii) Bioethanol produced from sugar containing material, rotten potatoes, corn pulp of vegetable and fruit and other cellulosic materials like bagasse, agricultural waste, forestry left over or other renewable sources being industrial waste, industrial waste off-gases, vegetable wastes and other mix combination of the above-mentioned feedstock.
Clause 5.3 (v)Raw material supply for Ethanol Blended Petrol programme will be increased for ethanol production. sugarcane juice, sugar syrup, sugar other biomass in form of gases, agricultural remnant includes rice straw, cotton stalk, corn, wood dust other sugar and starch containing material which encompasses corn, rotten potato, damaged food grains and food grain unsuitable for human consumption of food grans which are excess declared by Biofuel Coordination Committee. If NBCC permits than algal feedstock and cultivation of seaweeds can also be a source of production of ethanol[34].
Growth of Ethanol Production needs more develop technologies with proper investment.
Biodiesel production sources are non-edible oilseeds, used cooking, Animal tallow, acid oil-rich crops and algal feedstock etc.
Clause5.9.1 (vi) total ethanol production capacity fixed 2018 biofuel policy 300 crore liters per annum. But according National Biofuel Policy,2018 Amendment2022 ethanol production capacity in the country is estimated to be around 700 crore Liters per annum[35].
Clause 6.2 (VII) National policy on Biofuel, 2018 Amendment 2022 motivate increasement of indigenous feedstock supply for biofuel production. This amendment recommended make use of wastelands for feedstock causation. Need to promote production of biofuel in the country. Collection of domestic sources of biofuel production is also an important step will be taken for biofuel production in our country[36].

BIOFUEL AND BIODIVERSITY: Biological resources of the world are essential for human existence. It is also important for economic and social development of a country. Convention on Biological Diversity influenced by growing demand and increasing awareness regarding sustainable development.
Main objective of convention on biological diversity,1992 is to conserve biological, genetical resources and protect the environment as well.
Every sovereign state has right to access their natural resources which is subject to national legislation[37].
Article 13 of CBD deals with public education and awareness which assist and encourage spreading awareness among public about conservation biodiversity[38]. It is only possible if the whole environment including climate is protected from greenhouse gas which are produced due to regular use of fossil fuel. Burning of fossil fuel causes greenhouse effect but use of bio fuel not causing carbon or greenhouse gases emission which are reason for ozone layer depletion and climate change. Climate change can harm or destroy biological diversity of a region. Main target of biofuel is saving biodiversity directly or indirectly. Some of the targets are as follows:

[34] Ministry of Petroleum and Natural Gas Notification; F.NO.P-13032(18)7/2021-CC(E39223); Nation Policy on Biofuel-2018 Amendment,2022.
[35] Ministry of Petroleum and Natural Gas Notification; F.NO.P-13032(18)7/2021-CC(E39223); Nation Policy on Biofuel-2018 Amendment,2022; (vi) 5.9.1
[36] Ministry of Petroleum and Natural Gas Notification; F.NO.P-13032(18)7/2021-CC(E39223); Nation Policy on Biofuel-2018 Amendment,2022.
[37] Convention On Biological Diversity,1992, Article 15
[38] CONSERVATION OF BIOLOGICALD DIVERSITY;1992

A. Demand and production of biofuel is increasing speedily worldwide to achieve the goal of energy security and to control greenhouse gas emission

B.A pollution free environment is required conserve the biodiversity. Use of fossil fuel may create obstacle for sustainable development. To maintain the sustainability in environment use of biofuel is helpful and useful. Sustainable development is an essential process, step for conservation of biodiversity.

C. use of land for different feedstock production has vital effect on ecosystem and biodiversity. Land which is not used for cultivation of crops that can be used to cultivate plant sources of biofuel. Bio fuel production can cause conversion of grassland or forest into agricultural land. It has huge impact on biodiversity. Direct or indirect land use can affect biodiversity and can control greenhouse gas emission which has an impact life cycle of living components of biological diversity.

D. Main target of some developed countries to increase production of biofuel in developing countries through providing subsidies and taking other initiatives including national policies.

CONCLUSION:

Advanced industrialization coexists with polluted environment and adversely affected climate. Industrial machines e.g. diesel engines, automobiles running by fossil fuel. High rate of fossil fuel consumption for industrialization which causes alarming rate of pollution such as increasing level of greenhouse gases in atmosphere which is reason for ozone depletion and climate change. Polluted environment and changed climate can adversely affect the biological diversity. Biofuel is kind of fuel which driven energy from biological resources. Like biomass which includes animal dunk, animal fat, used cooking oil and non-used cooking oil. Biofuel sources include not only animal sources plant sources like sugarcane, jatropha, tobacco agricultural waste, domestic waste. Convention on Biological Diversity,1992 had enlighten the path to conserve biological diversity. To conserve the biological diversity pollution free environment and proper climate is essential. Regular use of fossil fuel in transportation and industrial purposes increasing greenhouse gas level in atmosphere which results ozone depletion. Ozone layer depletion is the main reason for climate change. In compare to the fossil fuel greenhouse gas emissions are reduced up to12% by the production of biofuel . Regular use of biofue can reduce the air pollution also. Regular use of biofuel by common people and industries can control the over all environment pollution including prevention of ozone layer depletion and climate change through the reduction of emission of greenhouse gas emission. Though the Government of India had taken policy on biofuel production in the year of 2018 but this policy is amended in the year 2022. Government had tried to take more step to make the production supply process easy. Sufficient availability of biofuel for regular use by common people needs more stronger steps to be taken. Regular use of bio fuel in transportation or in industries can reduce the pollution rate of the country. But there are some flaws in government policy. Need to improve collection process of domestic waste and other biofuel sources. Only making policy is not enough proper implementation mechanism of policy and public awareness regarding use of biofuel is essential to protect the environment include climate. It is expected that in future government will adopt more progressive and necessary policies to produce and supply biofuel. Not only policy strong legislation on biofuel must be passed by parliament of India to reduce the fuel rate and to reduce the environment pollution.