Bioenergy & Biotechnology for Future Fuels

BIODIESEL BIOMETHANE BIOLPG SYNTHETIC FUELS TOWARDS NET ZERO

BIOENERGY

- **Derived from recently living organic materials known as biomass**
- Main waste feedstocks are wood waste, agri waste, municipal solid waste and manufacturing waste
- Thermal conversion using torrefication,pyrolysis & gasification
- Surface power density is issue

BIOTECHNOLOGY

- **uses living cells to develop or manipulate products for specific purposes**
- Lipase,methanobacteria,yeast, e.coli etc are used to achieve the biofuels
- IndustrialFermentation,esterification,anaerobic digestion
- Intial capital in R&D, tech development at scale

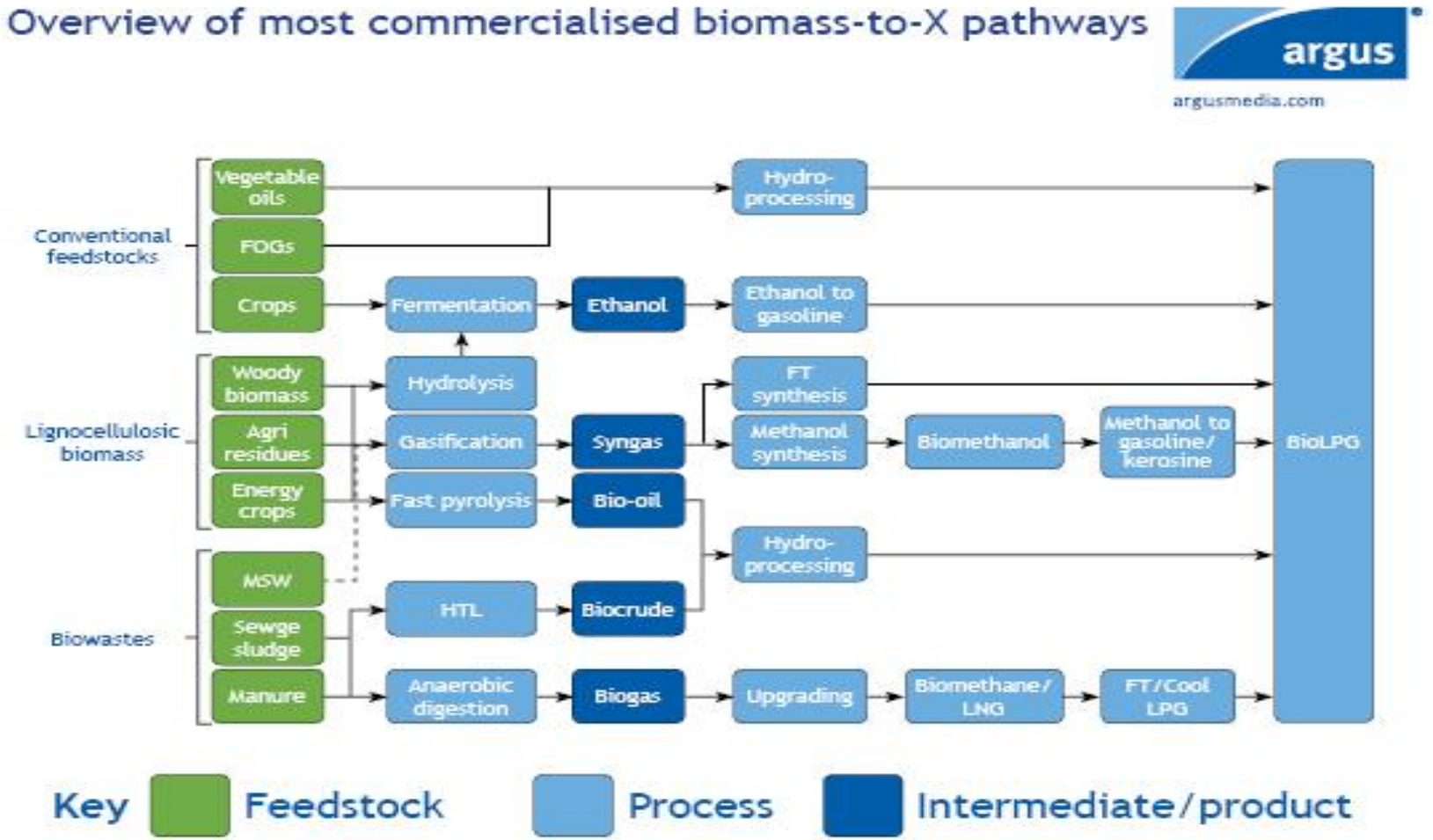
Biodiesel

- Transesterification and Esterification
- UCO,Palm stearin,Tallow, Virgin oils in transesterification
- Acid oils,DFA's,POME,chiken oil etc. via esterification (higher ffa)
- Sustainable Aviation Fuel effect and byproduct disruption
- 90% of plants in india operate on palm stearin and tallow(per recent tender)
- Price of end product against feed
- Biodiesel as FAME and expanding scope

Biomethane

- Upgrading biogas and Thermal gasification
- Crop residue,animal manure,organic fraction-MSW,wastewater sludge
- Crops produced for sole purpose of energy generation as feed
- Asia’s largest bio cng plant recently inaugurated in indore
- SATAT scheme from MOPNG encourages cbg
- EOI from OMC’s for long term procurement at fixed price
- Sustainable alternative towards NET Zero

BioLPG


Overview of most commercialised biomass-to-X pathways
argus
argusmedia.com
Conventional feedstocks
Vegetable oils
FOGs
Crops
Lignocellulosic biomass
Woody biomass
Agri residues
Energy crops
Biowastes
MSW
Sewge sludge
Manure
Fermentation
Hydrolysis
Gasification
Fast pyrolysis
HTL
Anaerobic digestion
Ethanol
Syngas
Bio-oil
Biocrude
Biogas
Hydro-processing
Ethanol to gasoline
FT synthesis
Methanol synthesis
Biomethanol
Methanol to gasoline/ kerosine
Hydro-processing
Upgrading
Biomethane/ LNG
FT/Cool LPG
BioLPG
Key
Feedstock
Process
Intermediate/product

What is Net zero

- achieving a balance between the amount of emissions produced and those removed from the atmosphere in order to reduce global warming.
- state in which greenhouse gases going into atmosphere are balanced by removal out of atmosphere
- Carbon neutral, ghg neutral,carbon negative,climate neutral
- Anthropogenic emissions to achieve net zero

OPPORTUNITIES

- Biofuel production in india is in its nascent stage compared to world over
- Tremendous impetus from government for setting up plants
- Availability of local market for consumption
- Long term procurement contracts with government
- Virtually no competition as demand exceeds production

Challenges

- Competition among biofuels for feedstocks pushing prices up
- Uncertainty in geopolitical as well as environmental causing supply chain disturbunce
- Food vs Fuel
- Policy of states and center are not in sync
- Grey area in technology

Recommendation

- Allow imports and ban exports of feedstocks for manufacturing of biofuels
- Allow exports of biofuels from India
- Localisation of production is key
- Encourage smaller plants district wise mapping the feedstock availability
- Platform development for agri,municipal,food waste trading

Thank you