

Biofuels based Green Technology Options for India

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1. Preamble

Access to energy is required for “Development”. To achieve “Sustainable Development” is a greater challenge. It involves technologies that can help manage growth while considering economic, social, and environmental sustenance of the society. A solution of today must not lead to some negative impact in the long run, posing problems for the future generations.

Thus, the modern energy services must be evolved and deployed in all aspects of the development process – e.g., energy and communications, energy and industry, energy and the environment, energy and agriculture, energy and education, and energy and public health & safety.

Sun is the only perennial source of energy. All other sources are finite and depleting. Hence, effective and reliable technologies to harness solar energy could lead to sustainability. Nature uses solar energy to produce biomass. Hence, controlled cultivation and consumption of biomass to produce energy can be sustainable.

Biomass can provide consistent supply of the required energy through biogas, vegetable oil, biodiesel, producer gas, and by directly burning the biomass (Refer Figure 1). Notwithstanding whether the biomass is “waste” of some process or is cultivated specifically as fuel for energy, it is considered a “green” technology since:

- Life cycle of the biomass fuel can be short (could be less than 3 months)
- Net carbon dioxide emission from biofuels is zero or negative
- Biomass fuel cycle is water neutral
- After extracting energy, the unused biomass can be recycled back in earth

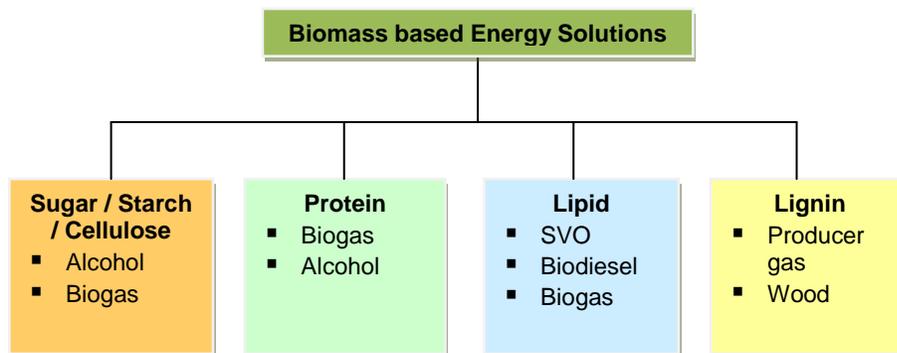


Figure 1: Energy stored in Biomass

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At Kirloskar Integrated Technologies Limited (KITL), the research and engineering team is given the mandate to develop biomass based sustainable energy solutions. KITL is today commercially offering energy solutions using Straight Vegetable Oil, Biodiesel, and Bio-methane.

2. Harnessing Solar Energy

Solar energy reaching the earth could be harnessed through devices such as photovoltaic cells or thermal absorbers; while the Nature has perfected process of “photosynthesis”. Hence, a smart link to solar energy would be through use of biomass. Figure 2 depicts a sustainable concept for “Harnessing the Sun” through biofuels.

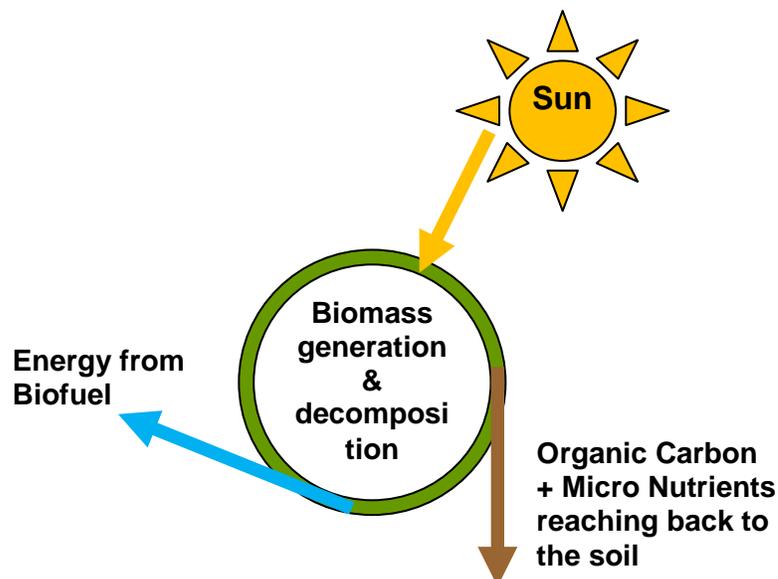


Figure 2: Harnessing the Sun

3. Bio-energy for India

In the World over and in India too, developments and policies for biofuels are influenced by the transportation sector. While it is an important sector, the energy needs of the rural areas cannot be neglected. KITL has its business philosophy primarily based on requirements at the grassroots. The solutions offered by KITL include:

- Biomass to electricity and heat (bio-methanation route)
- Bio-methane as replacement for wood, coal, LPG, CNG and other fuels
- Organic fertilizers as byproduct of bio-methanation (it enhances soil conditions, replaces chemical fertilizers and improves yield)

Typical substrates, i.e. raw materials available for energy production:

- Agricultural waste: Maize, sorghum, rice, etc.
- Food processing waste
- Sugar factory: molasses, spent wash, and press mud
- Industrial waste: oilcakes and de-oiled cakes, maize husk, starch effluent, etc.
- Other waste: Kitchen and hotel waste, organic matter in MSW
- Cultivated substrate: Napier grass, Elephant grass, Safflower, etc.

4. Biofuels and Sustainability

Biofuels can provide reliable energy supply, while creating opportunities for village enterprises. The income generated by the enterprise is recycled in the region. Hence, it not just provides energy to rural community, but truly “empowers” it to embrace economic growth.

“Social engineering” is a critical element for disseminating biofuel based energy solutions. It creates further business opportunities for local entrepreneurs through need for procurement of raw material and sale of products and services. It provides a sustainable link from farm produce to energy.

5. Conclusion

- Biofuel based energy could provide truly sustainable solution for rural areas
- Farm produce can be linked to sustainable energy solutions
- Properly designed and implemented biofuel solution could provide food and energy
- For a country like India, harnessing sun through photosynthesis could bring sustainability
- Biofuels based Energy Solutions have the potential for economic uplifting of rural India