Bioenergy: First and second generation biofuels

The National Biofuel Mission was initiated by Government of India in 2003, mandating biofuel blending programs. These programs specify blending of biofuels (5%, 10%, 20%) with fossil fuels in a time bound and phased manner across India. Subsequently the 'National Policy on Biofuels' was released in 2009. The feed stocks identified were molasses for production of ethanol and tree-borne non-edible oilseed crops like Jatropha and Pongamia for production of biodiesel from waste and marginal lands. However, in the last decade oilseeds have given much lower yields than expected, making its future bleak unless significant R&D is carried out to improve yields. As of now, only sugarcane molasses is used for bioethanol production. Corn is another feedstock which can be used for the same.

Level 1

In Level 1, sugarcane cultivation area is assumed at current levels of 107,000 ha. Area under Jatropha/Pongamia plantation is assumed to be constant at 2015 level (11,000 ha) but yields become nil by 2035. Biodiesel production from sugarcane increases from 11.6 ktoe/yr to 13.1 ktoe/yr in 2050. Lignocellulosic liquid fuels from agri-residue are not envisaged to be produced in this level.

Level 2

In level 2, sugarcane cultivation area is assumed to increase to 119,600 ha and remain at that level till 2050. Area under Jatropha/Pongamia plantation is assumed to be constant at 2015 level (11,000 ha) and yields continue to keep reducing till 2045. Biodiesel production from sugarcane increases from 11.6 ktoe/yr to 22.2 ktoe/yr in 2050. Lignocellulosic liquid fuels from agri-residue are not envisaged to be produced in this level.

Level 3

In Level 3, sugarcane cultivation area is assumed to increase to 124,400 ha and remain at that level till 2050. Area under Jatropha/Pongamia plantation is assumed to be constant at 2015 level (11,000 ha) and continues to provide the current low yields level till 2050. Biodiesel production from sugarcane increases from 11.6 ktoe/yr to 32.5 ktoe/yr in 2050. Lignocellulosic liquid fuels from agri-residue are not envisaged to be produced in this level.

Level 4

In Level 4, sugarcane cultivation area is assumed to increase to 131,600 ha and remain at that level till 2050. Area under Jatropha/Pongamia plantation is assumed to increase with aggressive R&D efforts and reach 33,000 ha in 2050; yields are also expected to increase from 0.3 toe/ha currently to 0.5 toe/ha in 2050. Biodiesel production from sugarcane increases from 11.6 ktoe/yr to 46.3 ktoe/yr in 2050. Lignocellulosic liquid fuels from agri-residue are not envisaged to be produced in this level.