

INEOS BioEnergy technology

The INEOS BioEnergy technology efficiently converts a wide range of low cost, organic materials, including household and commercial wastes into bioethanol for use as a renewable road transport fuel while generating renewable power for export to the grid. The INEOS Bio process is a combined thermo-chemical and bio-chemical process and comprises three main steps:

1 Gasification - The prepared organic carbon material is gasified using a controlled amount of oxygen to produce synthesis gas, a mixture of principally carbon monoxide and hydrogen. The gasifier design and operating conditions have been carefully chosen to inhibit the formation of dioxins and furans and to suppress the carry-over of volatile metals. The hot synthesis gas is quenched and cleaned. Heat is recovered to generate renewable power for use in the process as well as export to the grid.

2 Fermentation - The cleaned, cooled synthesis gas is passed into a patented fermentation process, where it is converted selectively into ethanol by naturally occurring anaerobic bacteria (the biocatalyst). The fermentation environment, containing the right quantity and type of nutrients, is maintained at carefully controlled conditions. The bacteria, in this healthy state, achieve an extremely high selectivity to ethanol and high yield of ethanol. The high selectivity and yield translate to outstanding process efficiencies. The off-gas from the fermenter is used to generate additional power for export to the local electricity grid.

3 Purification - The ethanol solution is purified and refined to make anhydrous ethanol (>99.7% ethanol). This can be blended into the gasoline pool for the renewable fuels market.



Future Plans – DOE announced on December 4, 2009 that INEOS Bio's JV project has been selected for a \$50 million grant under the Section 932 Biorefinery Program. We are now moving to build our first commercial demonstration facility by late 2011 in Vero Beach, Florida.

For more information, contact biopress@ineos.com or visit our website at www.ineosbio.com
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