Joule Biotechnologies

Joule Biotechnologies is a Cambridge, MA, company seeking to produce affordable, renewable fuels using advanced bioscience and robust, scalable systems capable of producing liquid fuel at scale, and at a low enough cost to make energy independence a reality.

Joule says biofuel models, even the newer biomass-derived cellulosic and algal approaches, require harvesting, water, agricultural land, and feedstocks, all of which add to cost. Joule says that by contrast, its path to energy independence uses process engineering, minimal use of natural resources, a system that can be scaled to meet massive demand, and pricing at or below that of fossil fuels.**1**

Their system uses Helioculture technology. This is a proprietary process using highly-engineered organisms that harness sunlight and convert CO2 directly into biofuels. Joule says this process yields ready-to-use liquid fuels without the steps that biomass-derived renewable fuels require.

In Joule's technology, biomass is not used as an intermediate. The microorganism uses sunlight and obtains carbon and oxygen by fixing atmospheric CO2 or instead uses direct-fed waste CO2. It obtains hydrogen from water at a rate of two gallons of water per gallon of fuel produced. The company says brackish, non-potable water can be used.[2]

Joule says its technology has the following advantages:

- Modular
- Integrated - the process manages the end-to-end bioprocessing and initial product separation
- Replicable
- Uses minimal non-agricultural land
- Requires no fresh water
- Cost competitive with $50/barrel oil for diesel
- Cost competitive with less than $82/barrel oil for ethanol
- Meets vehicle fuel specifications and infrastructure

Joule is currently seeking locations to scale up. The company is targeted for commercial-scale development of its ethanol in 2012, and Joule diesel is targeted for pilot-scale development in 2010.

References and external links:

1 As of November 2009, their system and process had been demonstrated only at lab scale.

2 Biofuels Digest

External link:

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