Waste Plastics to Crude Oil Pyrolysis

by JIM LANE, Editor & Publisher, *Biofuels Digest*

In Oregon, Waste Management and Total announced that they have joined the $22 million Series B investment round in Agilyx, led by Kleiner Perkins and including previous investors Chrysalix ENergy Venture Capital, Saffron Hill Ventures and Reference Capital. The Portland-based company, once known as Plas2Fuel, is developing a novel scalable technology that converts difficult-to-recycle waste plastics into synthetic sweet crude oil. Last year, it received TechAmerica's 2010 Cool Product of the Year Award. It's other milestone — opening its 10-ton-per-day demonstration facility

The Agilyx target: 162 million tons of industrial and municipal plastic finding its way to landfills each year.

Its yields: 200 to 240 gallons of synthetic crude oil per ton of plastic — depending on the source and quality of the plastic — or an addressable market of up to 38 billion gallons of crude oil. The U.S. alone generates 24 million tons of plastic with only one million tons recycled each year — an addressable market of 5.52 billion gallons in the U.S. market.

The Agilyx advantage: The use of already aggregated, already paid for waste feedstock offers significant cost and logistics advantages. In the Agilyx technology, the additional advantage is in scale — with 10-ton-per-day units that can be incrementally added to match the waste stream at the individual location.

Midstream — The Processing Technology

The technology — a pyrolysis process converting plastic into syngas, and thence cooled into synthetic crude. Waste impurities are then removed from the stream and lightweight gases (e.g. chlorine, bromine) that do not condense continue further downstream where they are treated by an environmental control device. The four primary vessels and the associated secondary processing equipment comprise the system.

Progress to Date

Agilyx's facility near Portland, OR is the largest commercially operational waste plastic to synthetic crude oil facility in North America. The company was the first of its kind to successfully permit in the U.S. and has the first refinery off-take agreement in the industry. Beginning more than two years ago, Agilyx has produced and sold more than 120,000 gallons of crude oil, recovering more than 1 million pounds of plastic to date.

The Company Model

Agilyx is a technology manufacturer and licensor, which works with customers such as Waste Management and its own downstream customer base, as well as with independent customers.

Potential customers? Large producers and/or recyclers of waste plastic (post-industrial market segment). Also, material recovery facilities and transfer stations (post-consumer market segment) throughout the world are a target market, as well as other niche applications. In the case of Waste Management, the technology is of particular interest for material recovery facilities (MRFs).

What happens with the crude? The oil can be sold to refiners or specialty petrochemical processors, or consumed on-site.

Last October, SynCrude LLC announced [1] that it would purchase Agilyx systems that would aggregate household and industrial plastics from New York, New Jersey and New England, as well as parts of Pennsylvania and Ohio, and process 40,000 pounds of plastic per day, generating approximately 120 barrels of light sweet crude oil each day. Another small company, Green EnviroTech, signed on [2] to utilize the Agilyx technology at a 50,000-square-foot facility planned for Riverbank California, and one for Wisconsin. Its target — 100,000 tons per year of "shredder fluff" left over after the metal recovery is completed from used vehicle shredding. Green EnviroTech will utilize the Agilyx system for approximately 40 percent of non-polypropylene plastics.

The Upstream Partner — Waste Management

"The stars were aligned on this one," Tim Cesarek, managing director of Organic Growth at Waste Management told the *Digest*. "In our previous investments, we had found fermentation and thermochemical waste conversion technologies with companies like Terrabon, Harvest Power and S4 — this was an opportunity with a pyrolysis technology that had the right strategic investors like Total and Kleiner, was deployable at the right scale for our customers and produces high value commodities from the waste stream."

The Downstream Partner —Total

"As a major plastics manufacturer and as an oil-refining company, Total is pleased to support the further development of Agilyx, whose technology offers a scalable

economic option to recovering waste plastics," said Manoelle Lepoutre, senior vice president of Sustainable Development and Environment for TOTAL SA, and president of Total Energy Ventures Intl.

Costs

The synthetic crude oil will be marketed at parity pricing, and last fall, SynCrude indicated that it would expect to match the crude price at a time when crude was selling at $82 per barrel.

For more information on Agilyx, please click here. *[3]*

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