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Mark P. Elless, Ph.D.
Technology Manager
US Department of Energy
Bioenergy Technologies Office
Room 5H-021, 1000 Independence Ave., SW
Washington, DC 20585

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Re: Comments to the Biomass Research and Development Technical Advisory Committee for the US Department of Energy. Presented in Los Angeles.

Dear Dr. Elless,

Nikua Training Center USA non-profit corporation, is dedicated to the benefit of isolated communities in need of economic development and energy independence. We are committed to providing an open-source solution in the form of training and equipment for production of international quality standard biofuel, integrated with sustainable agriculture. Nikua means “Today” in native Fijian language. www.nikua.org

Nikua will demonstrate economic viability of community-scale production for Hydrotreated Vegetable Oil fuel - HVO fuel, commonly called Renewable Diesel – RD, which meets or exceeds the regular diesel fuel quality specification ASTM D975. Nikua RD projects intend to operate without reliance on subsidy by capturing the maximum spread between reduced production cost and improved selling price of premium quality renewable diesel fuel.

At community-scale, logistics costs are minimized on stranded supplies of low cost recycled cooking oil, virgin vegetable oil, and tallow raw material. Revenue is maximized on sale of premium quality renewable diesel in critical maritime, land transportation, power generation, and aviation markets to communities faced with risk of supply disruption on imported diesel fuel.

Nikua is the project manager for design & build of two facilities for production of Hydrotreated Vegetable Oil, for use as renewable diesel transportation sector fuel.

1. GO Bio Co. plant in Redmond Oregon for production of #2 grade renewable diesel meeting the ASTM D975 diesel fuel quality specification. GO Bio Co. is currently a collector of 200,000 gallons annually of recycled cooking oil. The plant is designed for 400,000 gallons per year of HVO fuel production.

2. Institute of Applied Science - University of the South Pacific, Laucala Campus in the capital city of Suva in the Republic of Fiji. The USP will receive the contribution of a field engineering laboratory for production for #2 grade ASTM D975 renewable diesel and biodiesel. The Nikua - USP Field Engineering Lab will be co-located with

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the USP Biofuel Analytical Laboratory, capable of supporting production of biofuels in isolated island communities across the Asia-Pacific region.

Renewable diesel is a premium quality drop-in fuel which requires no special storage or distribution infrastructure. Used as a fuel additive renewable diesel will upgrade petroleum diesel fuel inventory. A notable advantage of renewable diesel over biodiesel is that RD is approved for use at 100% concentration in modern diesel engines, whereas biodiesel blends are typically limited to 5%. RD at 100% makes the maximum contribution to rural energy security and provides a foundation for economic development. Rural production enhances family income and worker training in chemical production and business management.

Nikua's hydrotreating production system employs an innovative microscale reactor design, with inherent gains in reaction rate and heat transfer. Modular design numbers-up rather than scales up, allowing for standardized automation for process control on multiple systems in isolated communities. The result of standardized, mobile production modules, tailored to local supply & demand is reduction in capital cost, streamlined operator training, reduced project lead time, reduced economic risk, and superior return on investment.

Nikua RD production systems are integrated with on-site production of renewable hydrogen, which is a necessary inclusion in the hydrotreating process. Village scale systems can come on-line quickly using solar photovoltaic powered electrolysis of water. Village scale systems are strongly net-positive on fuel production using diesel-electric generators to power electrolysis production of hydrogen, when driven by the propane byproduct of hydrotreating reaction and by use of straight vegetable oil diesel fuel. Both are suitable for use in stationary diesel engines.

Microscale reactor architecture is well suited to production of renewable hydrogen via steam reforming of stranded supplies of organic waste biogas and glycerol arising from biodiesel production. Larger community-scale RD production systems can capture biogas from waste water treatment plants, animal manure recycle processing, and landfill gas. In the case where biogas would ordinarily go to the atmosphere, then RD production can be net-negative on greenhouse gas impact, taken on a $CO_2$ equivalent basis.

Production economics for renewable diesel will depend on minimizing onsite production cost for renewable hydrogen. We show that RD production cost is competitive with biodiesel production cost using electrolysis powered by grid electricity from hydro-electric sources. Renewable hydrogen production cost is further reduced on steam reforming of biogas.

The directors of Nikua have experience as process engineers of US EPA registered biodiesel production plants and on raw material procurement. We serve as a consultant to the World Bank, the United Nations Development Program, the Global Green Growth Institute, and to governments in the South pacific, including the Fiji Department of Energy and the Samoa Electric Power Corporation.

Dramatically lower cost microscale reactors and complete reactor assemblies for production of renewable diesel and renewable aviation fuel, integrated with production of renewable hydrogen in automated modular production system, in a community-scale platform represents an opportunity for export earnings on USA technology and USA jobs.

Best regards,
Daniel Shafer