# **SynSel Energy:** Succeeding against the Backdrop of KiOR

All Second-Generation Biofuel technology is not the same . . . the closing of the Columbus, MS KiOR plant and KiOR's bankruptcy in 2014 continues to cast a dark shadow on the biofuel industry. However, there is an alternative that actually delivers on past claims – ***SynSel Biorefineries***.

| | KiOR | SynSel |
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| **Invented By** | BIOeCON | A leading US energy & environmental R&D firm |
| **Funded By** | Kholsla Ventures & other venture capitalists | US DOE, an international gas & oil company, & other sponsors |
| **Developed By** | KiOR | The R&D firm & the international gas & oil company |
| **Founding Technology** | **Catalytic Pyrolysis**<br>- Removes oxygen from devolatized biomass vapors (w/o $H_2$) to create biofuel<br>- Uses FCC reactor technology extensively used in the petro-industry & designed for liquids | **Hydropyrolysis**<br>- Converts the biomass into a molecular gas which then is stripped of its oxygenated compounds in the presence of $H_2$<br>- Uses Bubbling Fluidized Bed reactor technology typical of boilers/gasifiers & specifically designed to handle solids |
| **Fuel Quality** | - A synthetic crude oil that needed to be further refined<br>- Fuel had high levels of carbon (coke) and aromatic products<br>- Oxygenated fuel also created high concentrations of acids and alcohols | - A stable, drop-in renewable hydrocarbon fuel<br>- Fuel has negligible oxygenation and aromatic content<br>- Guarantee for fuel quality and yield by the International Gas & Oil Company<br><br>Fuel meets the following requirements:<br>- Gasoline: ASTM D4814<br>- Diesel: ASTM D975<br>- Aviation: Jet A1/JP8 (freeze pt.: -80° vs. -47°C for A1/JP8) |
| **Technology Readiness** | - Inconclusive pilot & demonstration plant testing<br>- Construction of commercial plant commenced prior to the validation of technology at the demonstration plant level<br>- Closed commercial plant in Columbus, MS | - Over 7,000 continuous hours of pilot testing by the R&D firm<br>- A demonstration plant is under construction & will be operational in Q1 2017<br>- SynSel construction funds will not be released until demonstration plant is validated in Q2 2017 |
| **Challenges** | - Yield & quality issues: low yields, water mixed with bio-oil in the effluent, & prohibitively expensive catalyst | - Technology not yet proven at larger scale, demonstration plant under construction |