



## Press Release

### **Jacobs Confirms Anellotech's Bio-TCat™ Process Leads to Significant Carbon Emission Reductions Compared to Petro-based Aromatics**

*Independent LCA review validates that Anellotech's Bio-TCat™ technology significantly reduces Greenhouse Gas Emissions (GHG) in bio-based aromatics produced for plastics applications and biofuels blendstocks*

**Pearl River, NY, 11 October 2018** – Sustainable technology company [Anellotech](#) announced that its pioneering Bio-TCat™ process, which produces bio-based aromatics from pine wood, has a CO<sub>2</sub> emission reduction potential of 70% or more when compared to petroleum-derived equivalents. Jacobs' analysis confirms that Bio-TCat™ is ideal for chemical producers and brand owners looking to meet sustainability goals for producing renewable polymers for consumer products or biofuels blended into transportation fuels.

Jacobs [Jacobs Engineering Group Inc. (NYSE:JEC)], a globally respected engineering firm conducted an in-depth review of Anellotech's Greenhouse Gas Emissions (GHG) Lifecycle Analysis (LCA), using its own industry-accepted refinery and petrochemical models. Jacobs verified that renewably-sourced Bio-TCat™ products enable significant GHG reductions when compared to identical chemicals currently made from crude oil.

“Engaging Jacobs' expertise to review our process energy and material balance helped us improve the accuracy of our LCA model tremendously, and make meaningful comparisons with real-world carbon footprints. This makes us even more confident that Bio-TCat™ technology will deliver on its sustainability promises and provide an economical route to a range of renewable chemical and fuel applications products that can replace those made from crude oil,” said Anellotech President and CEO David Sudolsky.

The LCA compared Bio-TCat™ aromatics, produced using sustainably-sourced loblolly pine feedstock from the southern United States, to petro-aromatics produced in the US Gulf Coast from three crude oils which represented a range of carbon intensities. Jacobs employed their proprietary,

detailed models for oil production, transportation and refining to estimate the carbon intensity of producing high-purity paraxylene and benzene products.

The results found that CO<sub>2</sub> emissions for producing paraxylene and benzene from pulpwood using Anellotech's process are estimated to be 70-80% lower than emissions for identical petro-based chemicals made from crude oils. If Bio-TCat™ is configured to make renewable gasoline and distillate fuel blendstocks, the reduction potential exceeds 90% as fuels are burned to make energy. In the coming months, Anellotech will be revisiting its process design and performing additional energy integration and optimization work to identify further ways to lower CO<sub>2</sub> emissions.

### **About Jacobs**

Jacobs leads the global professional services sector delivering solutions for a more connected, sustainable world. With \$15 billion in fiscal 2017 revenue when combined with full-year CH2M revenues and a talent force of more than 77,000, Jacobs provides a full spectrum of services including scientific, technical, professional and construction- and program-management for business, industrial, commercial, government and infrastructure sectors.

### **About Anellotech**

Anellotech is a sustainable technology company focused on commercializing innovative production of cost-competitive renewable chemicals and fuels from non-food biomass. Founded in 2008, Anellotech has raised US\$80 million in cash and in-kind contributions to date. Its patented Bio-TCat™ technology is an efficient thermal-catalytic process for converting biomass into BTX aromatics (a mixture of benzene, toluene and xylene) which are chemically identical to petroleum-based counterparts. High purity benzene, toluene and xylenes are used to make commodity polymers such as polyester (polyethylene terephthalate or “PET”), polystyrenes, polycarbonates, nylons and polyurethanes which are used to manufacture plastics for consumer goods such as beverage bottles, food packaging, clothing, footwear, carpeting, automotive and electronic components. Bio-TCat™ technology can also produce renewable AnelloMate™ fuel blendstocks which can be used to lower the GHG emissions of producing gasoline, jet fuel, diesel, and low-sulfur marine fuels. The Bio-TCat™ process is being demonstrated with loblolly pine feedstock at Anellotech’s TCat-8® pilot plant in Silsbee, Texas, and is currently collecting data to be used for scale-up and commercial plant design.

The Bio-TCat™ technology will help aromatics chemical producers and brand owners meet environmental sustainability goals for their products, due to its low carbon footprint. Unlike many others, Anellotech’s thermal-catalytic technology is focused on utilizing lower-cost and highly available lignocellulosic starting materials such as wood and agricultural by-products as feed rather than processes that start with sugars or that are based on fermentation.

Anellotech complements its world-class R&D team with in-depth, highly-interactive, and long-term alliances with leaders in process development, catalysis, engineering design and licensing to accelerate development and drive cost-competitiveness. IFPEN is our process development and scale-up partner, Johnson Matthey is our catalyst development partner and Axens is our partner for industrialization, commercialization, global licensing and technical support. Industry-leading strategic partners in the BTX supply chain including Suntory and Toyota Tsusho, as well as other confidential strategic investors, also have provided funding to Anellotech.

To learn more, please visit: [www.anellotech.com](http://www.anellotech.com)

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