

**Carbon Dioxide Utilization Via Photosynthetic Conversion to Higher Alcohols and Fatty Acids to Address the Climate Crises and Create a Circular Carbon Economy:
From Laboratory to Commercialization**

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This presentation will provide an overview of how Phytonix and Cyanomega are employing synthetic biology to address the global challenge of the climate crises and produce cost competitive, sustainable chemicals and fuels. Phytonix and CyanoMega are using synthetic biology, genomics and metabolomics and advanced process technology to develop and utilize efficient photosynthetic microbial cell factories for the direct and sustainable production of n-butanol, a valuable industrial chemical intermediate and potential “drop-in” gasoline replacement fuel, as well as other higher alcohols such as 1-octanol from solar energy, utilizing carbon dioxide as the sole, direct feedstock with oxygen as the co-product. In partnership with its “sister” company, Cyanomega Corporation, founded in 2019, cyanobacteria will also be engineered to produce C12 (Lauric Acid), C14 (Myristic Acid) and C16 (Palmitic Acid) fatty acids to replace the unsustainable and environmentally destructive production of palm oil and palm kernel oil. These are significantly carbon-negative and sustainable processes.

The provision of an affordable, available and sustainable carbon source has been one of the greatest barriers to the production of economically viable renewable chemicals. Phytonix’ and Cyanomega’s industrial chemical production plants, integrating its microbial cell factories along with cutting-edge process technologies, will be co-located on site at industrial facilities emitting large amounts of carbon dioxide, without the need for expensive carbon capture and separation technology of the emissions streams.

Economic and environmental opportunities and advances in industrial biotechnology with a global focus on de-carbonization are leading to a rapid transition towards a new bio-economy and ultimately to a CO₂-based economy for the production of industrial chemicals and consumer products. An overview of Phytonix’s transition from laboratory scale to pilot scale and full commercial production will be provided.