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December 5, 2011

CONTACT: Sapphire Energy:

Beth Llewelyn, 206-406-5027

beth@zebrapartners.net

Perrin Kaplan, 206-909-0111

perrin@zebrapartners.net

***Nucleic Acids Research Journal* Publishes Sapphire Energy
Peer-Reviewed Research Paper on a
Chloroplast Genome from Green Algae**

*Research Enables Improvements in Genetic Diversity in all Regions of a Chloroplast Genome
with Potential Applications for other Photosynthetic Organisms*

San Diego, CA (Dec. 5, 2011) – Sapphire Energy, Inc., one of the world leaders in algae-based crude oil, today announced that *Nucleic Acids Research Journal* has published its white paper, "An exogenous chloroplast genome for complex sequence manipulation in algae." As the site of photosynthesis in plants and algae, the chloroplast is responsible for producing organic molecules from atmospheric carbon dioxide (CO₂) and is thus a crucial metabolic engineering target. Sapphire Energy cultivates algae that use sunlight and CO₂ to create Green Crude, a low carbon renewable crude oil substitute that can be refined into jet fuel, diesel and gasoline.

This [white paper \(http://bit.ly/tfgaMI\)](http://bit.ly/tfgaMI) describes methodology for the design, construction, modification, and cellular introduction of the chloroplast genome from the green alga, *Chlamydomonas reinhardtii*. Using this methodology, the authors simultaneously modify multiple independent regions, including genes that encode core subunits of the photosynthetic apparatus, in the chloroplast genome of living algae cells. This work should allow for the creation of genetic diversity in all regions of a chloroplast genome, potentially in any photosynthetic organism.

"With this breakthrough, Sapphire Energy has shown that it is possible to make algae--the world's most efficient photosynthetic organism--even more efficient," said Jason Pyle, Sapphire Energy founder and CEO. "This work represents the first steps toward a novel approach for creating genetic diversity in any or all regions of a chloroplast genome, and may have applications in other plants."

Chloroplast genomes present a unique opportunity for the field of synthetic biology. In a single, relatively small molecule, they encode the most important genes of photosynthesis, nature's principle method for converting sunlight into chemical energy. These naturally minimized, manipulable genomes are of great interest for metabolic engineering for foods, fuels, and myriad bio-products, and are ideally suited target for synthetic biology.

At this time, Sapphire Energy is conducting advanced research into many aspects of algae growth, cultivation and lipid production in conjunction with multiple research institutions. The algae cultivated in the company's outdoor ponds in New Mexico are not genetically modified.

About Sapphire Energy

San Diego-based Sapphire Energy is pioneering an entirely new industry – Green Crude Production – with the potential to profoundly change America’s energy and petrochemical landscape for the better. Sapphire’s products and processes in this category differ significantly from other forms of biofuel because they are made solely from photosynthetic microorganisms (algae), using sunlight and CO₂ as their feedstock; are not dependent on food crops or valuable farmland; do not use potable water; do not result in biodiesel or ethanol; enhance and replace petroleum-based products; and are low carbon, renewable and scalable. In December 2009, Sapphire was awarded nearly \$104.5 million as part of President Obama’s American Recovery and Reinvestment Act and the USDA’s Biorefinery Assistance Program 9003 authorized through the 2008 Farm Bill.

For more information:

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