

UNIVERSITY OF FLORIDA

TAPPABLE PINE TREES

PROJECT TITLE:	Commercial Production of Terpene Biofuels in Pine		
ORGANIZATION:	University of Florida	LOCATION:	Gainesville, FL
PROGRAM:	PETRO	ARPA-E AWARD:	\$6,367,275
TECH TOPIC:	Advanced Fuels	PROJECT TERM:	1/1/12 – 12/31/15
WEBSITE:	www.arpa-e.energy.gov/ProgramsProjects/PETRO.aspx		

CRITICAL NEED

Biofuels offer renewable alternatives to petroleum-based fuels that reduce net greenhouse gas (GHG) emissions to nearly zero. However, traditional biofuels production is limited not only by the small amount of solar energy that plants convert through photosynthesis into biological materials, but also by inefficient processes for converting these biological materials into fuels. Farm-ready, non-food crops are needed that produce fuels or fuel-like precursors at significantly lower costs with significantly higher productivity. To make biofuels cost-competitive with petroleum-based fuels, biofuels production costs must be cut in half.

PROJECT INNOVATION + ADVANTAGES

The University of Florida is working to increase the amount of turpentine in harvested pine from 4% to 20% of its dry weight. While enhanced feedstocks for biofuels have generally focused on fuel production from leafy plants and grasses, the University of Florida is experimenting with enhancing fuel production in a species of pine that is currently used in the paper pulping industry. Pine trees naturally produce around 3-5% terpene content in the wood—terpenes are the energy-dense fuel molecules that are the predominant components of turpentine. The team aims to increase the terpene storage potential and production capacity while improving the terpene composition to a point at which the trees could be tapped while alive, like sugar maples. Growth and production from these trees will take years, but this pioneering technology could have significant impact in making available an economical and domestic source of aviation and diesel biofuels.



IMPACT

If successful, the University of Florida's project could make pine trees sources of fuel precursors for the domestic production of aviation and diesel biofuels, enabling large-scale production of replacements for petroleum-based fuels.

- **SECURITY:** The transportation sector accounts for nearly all of our petroleum imports. Providing an advanced biofuels alternative to petroleum will allow the U.S. to reduce these imports, improving our energy independence.
- **ENVIRONMENT:** More than 25% of all GHG emissions in the U.S. come from the transportation sector. Because plants naturally absorb carbon dioxide as they grow, the level of GHG emissions from biofuels is less than half that of petroleum fuels.
- **ECONOMY:** The U.S. imports nearly \$1 billion in petroleum each day, accounting for the single largest factor in our trade balance with the rest of the world. Biofuels can be produced domestically, allowing us to keep more dollars at home.
- **JOBS:** A self-sustaining biofuels industry that is cost-competitive with oil is well-positioned to see job growth in the agricultural, engineering, and research sectors.

CONTACTS

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