Fast-Growing Shrub Willow Is A Sustainable Bioenergy Crop

SUNY Stony Brook

With power plant emissions and global warming causing concern around the world, there is increasing demand for cleaner, alternative fuel sources. After 20 years of research, scientists at the State University of New York College of Environmental Science and Forestry (SUNY-ESF) in Syracuse have developed fast-growing varieties of shrub willow that can be harvested and burned as a substitute for coal or natural gas.

Associate professor Lawrence Smart, Ph.D., senior research associate Lawrence Abrahamson, Ph.D., research associate Timothy Volk, Ph.D., and research scientist Richard Kopp, Ph.D., at SUNY-ESF created several new shrub willow varieties that display improved disease and pest resistance, higher yield of biomass, and are suitable for large-scale commercialization. About $350,000 in funding was provided by the U.S. Department of Energy, the U.S. Department of Agriculture and New York State Energy Research Development Authority.

Shrub willow grows quickly, reaching heights of about 24 feet after four years of growth. At this point the stems are harvested, chipped, and delivered to a facility where this biomass can be co-fired with coal to provide heat for the

boilers that drive the steam turbines.

> *The willow plants will vigorously re-grow the following spring, returning to full height in only three years. One planting of shrub willow can be harvested about seven times.*

Shrub willow is economically competitive compared to other biomass crops grown in northern climates. Its green energy return is about 10 times higher than corn. That is, for every fossil fuel gallon expended to plant, grow, harvest and deliver the shrub willow, the return after conversion is about 10 times higher than corn in equivalent green fuel gallons. Burning shrub willow is also very clean compared to coal, emitting only minute amounts of mercury, nitrogen and sulfur oxides.

The Research Foundation of State University of New York is leading the commercialization process. Hundreds of acres of shrub willow have been planted in nurseries and bioenergy plantations in the United States and Canada. The nursery plantings will provide planting stock for the next generation of commercial plantations that will cover tens of thousands of acres of currently underutilized agricultural land.

To see available technologies from research institutions, click here to visit the AUTM Innovation Marketplace.