State partnerships can promote increased bio-energy production, reduce emissions

October 25 2016, by Nathan Hurst

Under the Environmental Protection Agency's (EPA) Clean Power Plan, states soon could be mandated to significantly reduce carbon emissions. Researchers at the University of Missouri have identified the most effective ways for various Midwest states to partner and share resources in order to increase the amount of renewable energy they produce through burning woody biomass, which is recognized as a carbon neutral source of energy. Francisco Aguilar, an associate professor of forestry in the MU College of Agriculture, Food and Natural Resources, says that by finding effective and efficient partnerships, states can greatly improve the environment by maximizing renewable energy production and reducing carbon emissions.

"Wood biomass already contributes about a quarter of all renewable energy consumed by the U.S. and often is overlooked by public policy initiatives," Aguilar said. "We already have plenty of biomass available to burn. In fact, we could greatly increase the amount of biomass we harvest from forests and still maintain healthy forest ecosystems. The problem has been that not enough information has been shared among states, power utilities and power plants to allow them to work together efficiently to maximize bio-energy production. Our new study has accomplished this for the Midwest, and this work could easily be replicated throughout the entire country."

For their study, Aguilar, Bayram Dundar, an industrial engineering doctoral student, and Ronald McGarvey, an assistant professor of industrial and manufacturing systems engineering and of public affairs in

the MU College of Engineering and Truman School of Public Affairs, analyzed which power plants were able to burn woody biomass with minimal-to-moderate upgrades within the five-state region of Missouri, Iowa, Illinois, Wisconsin and Minnesota.

The researchers also examined the amount of harvestable biomass within a 90-kilometer radius of each biomass-burning power plant. Using this data, they were able to identify the most efficient potential partnerships between states. Across a range of potential emission reduction levels, their analysis identified how various partnerships could achieve selected emission targets for the least amount of cost. The researchers found that for any emission level considered, Missouri would benefit by partnering with other states; some potential partnerships (e.g., with Iowa) provide the best partnership for achieving modest emissions reductions, while other partnerships (e.g., with Minnesota and Wisconsin) would be preferable if the goal was more to make more significant emissions reductions. The researchers identified multiple alternatives that achieved similar costs to generate comparable emissions reductions, providing policymakers with considerable flexibility to create state partnerships.

"It is clear from this research that states can be much more efficient in increasing renewable energy production if they work together, rather than separately," McGarvey said. "Considering the potential for EPA restrictions on carbon emissions, states would be well served to begin planning for cutting emissions, and this study can help policymakers determine the best ways to accomplish those goals."

The study, "Identifying Optimal Multi-state collaborations for reducing CO2 emissions by co-firing biomass in coal-burning power plants," was published in *Computers & Industrial Engineering*.

Provided by University of Missouri-Columbia