

Research challenges the popular belief that biofuels are better for the environment

January 25 2018, by Meredith Somers



Replacing coal power with wood can improve the environment — if there's a century to spare. Credit: MIT Sloan School of Management

The European Union is raising the bar for renewable energy goals, but some climate change experts say the new targets could do more harm

than good.

A new [report](#) from MIT Sloan professor John Sterman supports the growing argument that burning [wood](#) pellets for power is worse for the climate than burning coal, because of the short-term effects and the "potentially irreversible impacts that may arise before the long-run benefits are realized."

"Because combustion and processing efficiencies for wood are less than coal, the immediate impact of substituting wood for coal is an increase in atmospheric (carbon dioxide) relative to coal," the report stated. "The payback time for this carbon debt ranges from 44-104 years after clear-cut, depending on forest type—assuming the land remains forest."

The study comes just as members of the European Parliament are negotiating renewable energy efficiency targets at a minimum of 35 percent for all energy consumption by 2030, with priority given to "[burning wood wastes and residues](#)."

In 2009 the EU set a goal that by 2020, 20 percent of its energy use would be from renewable sources. This declaration reinforced an earlier determination that biofuels—like wood—are carbon-neutral. The label dramatically increased wood pellet production in the United States. Today the United Kingdom is the world's largest pellet importer, the report said.

"Declaring that biofuels are carbon neutral, as the EU and others have done, erroneously assumes forest regrowth quickly and fully offsets the emissions from biofuel production and combustion," the report said. "The neutrality assumption is not valid because it ignores the transient but decades to centurieslong increase in carbon dioxide caused by biofuels."

While biofuel might sound good on paper, the report said—instead of using fossil fuels to inject eons-old carbon into the air, it recycles carbon from the atmosphere—in practice the research points to a much more negative impact on the environment.

Sterman's co-researchers are Juliette Rooney-Varga, director of the University of Massachusetts Lowell Climate Change Initiative, and Lori Siegel, senior modeler for the nonprofit Climate Interactive.

The researchers ran models through the Climate Rapid Overview and Decision Support (C-ROADS) simulator, which illustrated what would happen if an electric plant transitioned from coal power to wood pellet energy, and the results of replanting a variety of U.S. forests.

Aside from lower processing and efficiencies than coal, wood pellets also can't offset the "carbon debt" they create, the report said. When a forest is cut down and trees are replanted in its place, the replacement forest does not remove and hold as much carbon as the original [forest](#), the report stated. The replacement trees will also likely require fertilizer, the report pointed out, which is not good for the environment.

"It's like an investment in which you give your bank \$1,000 today," Sterman said in a statement. "They promise to pay you back, but only over 80 years, and only if they don't go out of business first or decide there's something else they'd rather spend your money on. You're better off if you keep your money. In the same way, it's better to keep the trees on the land and keep all that carbon out of the atmosphere."

The report pointed to solar and wind power (zero-[carbon](#) energy sources) as the safest, easiest, and cheapest ways to cut greenhouse gas emissions.

Provided by MIT Sloan School of Management

Citation: Research challenges the popular belief that biofuels are better for the environment (2018, January 25) retrieved 18 April 2024 from <https://phys.org/news/2018-01-popular-belief-biofuels-environment.html>

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