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Burning wood pellets to produce electricity is on the rise in Europe, where the pellets are classified as a form of renewable energy. But in the U.S., where pellet facilities are rapidly being built, concerns are growing about logging and the carbon released by the combustion of wood biomass.

In 2011, Enviva -- the United States" largest exporter of wood pellets -- opened its flagship pellet-manufacturing mill in Ahoskie, North Carolina. The plant annually converts 850,000 tons of trees and waste wood into tiny pellets that are shipped to Europe and burned in power plants for what is being touted as a renewable form of electricity.

Two years later, Enviva opened another mill 50 miles away in Northampton County, North Carolina, and by 2016 the company is expected to operate eight wood pellet mills from Virginia to Mississippi. Elsewhere in the southeastern United States, other companies are planning or rapidly building facilities to produce wood pellets. A mill planned by Biomass Power Louisiana in Natchitoches, La., will produce up to 2 million tons of the pellets annually. Drax, a British utility that"s taking steps to transform itself into a predominately biomass energy generator, has said it will open four of its own large mills to produce pellets in Mississippi, South Carolina, and Louisiana.

Demand for this purportedly green form of energy is so robust that wood pellet exports from the United States nearly doubled from 2012 to 2013 and are expected to nearly double again to 5.7 million tons in 2015. This soaring production is driven by growing demand in the U.K. and Europe, which are using wood pellets to replace coal for electricity generation and heating. The European Union"s 2020 climate and energy program classifies wood pellets as a carbon-neutral form of renewable energy, and European companies have invested billions to convert coal plants to plants that can burn wood pellets.

But as wood pellet manufacturing booms in the southeastern U.S., scientists and environmental groups are raising significant questions about just how green burning wood pellets really is. The wood pellet industry says that it overwhelmingly uses tree branches and other waste wood to manufacture pellets, making them a carbon-neutral form of energy. But many environmentalists and scientists believe current industry practices are anything but carbon-neutral and threaten some of the last remaining diverse ecosystems in the southeastern U.S., including the Roanoke River watershed surrounding the Ahoskie, N.C., plant and longleaf pine ecosystems near the large Enviva wood pellet mill in Cottondale, Fla.

Critics contend that Enviva and other pellet manufacturers frequently harvest whole trees -- including hardwoods from bottomland areas -- that can take a long time to regrow, thus making the burning of wood pellets an overall source of CO2 emissions.

Less than a year after Enviva"s Ahoskie plant opened, the NRDC began monitoring how the facility was

impacting nearby forests and what kinds of trees were being used to produce pellets. As the demand for wood to manufacture more pellets increased, the NRDC noticed forested wetlands in the Roanoke watershed begin to disappear.

"A significant portion of the wood source Enviva uses comes from natural hardwood forests," says Hammel, noting that logging in such forested wetlands and bottomlands creates major ecological impacts, including threatening species such as wood storks and the cerulean warbler. In the opinion of Hammel and others, burning wood pellet biomass to produce electricity is far more harmful to the environment and the climate than renewable energy sources such as solar and wind power.

Industry officials say, however, that manufacturing and burning wood pellets is an important part of the mix of renewable energy options. Seth Ginther, executive director of the United States Industrial Pellet Association, says that wood pellets are a "low-cost, low-carbon alternative" to coal. In addition, he says, wood biomass is lower in sulfur, nitrogen, ash, chlorine, and other chemicals than coal and traditional fossil fuels.

Wood pellet producers are using waste wood and low-grade wood fiber in many instances, according to Ginther. This niche market is enabling some landowners to keep growing and planting trees, rather than chopping down woodlands for commercial development or agriculture. "Our industry helps encourage forest owners to reforest and replant so this market helps keep working forests working," Ginther says.

Ginther says that the U.S."s wood pellet industry can expect even more robust growth if the Asian commercial market or European residential market embraces the combustion of wood biomass. "The U.S. has established itself as a sustainable source of fiber for bioenergy, and we are very proud of the fact that so many European customers are looking to U.S. producers for sourcing needs," Ginther says.

The wood pellet industry really took off in 2012, after the U.K."s Department of Energy and Climate Change published guidelines on the direction of British renewable energy policy for the near future. The guidelines encouraged utilities to convert coal-fired generators to generators using wood biomass and gave utility companies the option to burn wood pellets to help them meet European Union air pollution and renewable energy standards. Power companies then began to turn to the southeastern United States, where logging is well-established and much less restricted than in Europe, as the primary supplier of wood pellets.