

What's So Green About Burning Trees? The False Promise Of Biomass Energy



*Biomass energy - Source:
nl.wikipedia.org*

03-27-2024 ~ Bioenergy companies are clear-cutting American forests to heat and electrify Europe. This broken system harms public health, the environment, and the climate.

Renewable energy comes from matter that nature produces and replenishes constantly. The power generated through this source does not significantly threaten the environment, especially in comparison with fossil fuels, such as coal, oil, and natural gas, which take more than millions of years to [develop](#) and cause [severe](#) harm to our planet and climate when burned—fossil fuels “[account] for over 75 percent of global greenhouse gas emissions and nearly 90 percent of all carbon dioxide emissions,” [according](#) to the United Nations.

Renewable energy derived from wind, solar, geothermal, hydrokinetic, and hydro energy has a much [lower environmental impact](#) than fossil fuels. It harnesses the power of readily available elements and does not diminish with use. The production cost of these new technologies has been steadily decreasing. “Technological innovation has continued to help bring down the cost of some renewables; a fact which earlier price prediction models overlooked,” [according](#) to Matthew Ives, co-author of a report by the University of Oxford’s Institute for

New Economic Thinking. And because wind and sunlight are inherently free, there are no ongoing feedstock costs.

Bioenergy, otherwise known as biomass energy, is, however, different.

This kind of power involves using living matter or matter that was recently been alive. Plants are [commonly](#) used as “feedstock” to generate biomass energy; examples are switchgrass, copra, cotton, sunflowers, palm nuts, wheat, sugar cane, canola, rice, and algae. Trees are also used, most [often](#) from the forests of the U.S. South, including pine and hardwood species. Materials derived from plants and animals are also a source of bioenergy. These biomass feedstock materials include paper scraps, cotton, wool, yard clippings, animal manure, animal fats, solid municipal waste, and sewage.

These feedstocks are dried out and then converted to energy. Most woody feedstocks are burned or “fired” directly, alone, or with fossil fuel. Other feedstocks are subjected to [thermochemical](#) conversion to produce solid, gaseous, and liquid fuels.

In 2019, biomass constituted [60 percent](#) of all renewable energy used in the European Union—following the organization’s 2009 [pledge](#) to shift from fossil fuels to renewable energy, which led to biomass being classified as a renewable energy source. Most of the wood pellets needed to make this bioenergy are [mainly](#) harvested in the United States, [with](#) the “American South [emerging] as Europe’s primary source of biomass imports.”

Woody Biomass Energy

A major subtype of bioenergy, [woody biomass](#) consists of small wood pellets produced from raw wood materials, including whole trees, branches, and wood dust. Woody biomass is essentially firewood.

Wood pellets can be made from any type of wood. In the past, they were mainly composed of “low-value wood,” such as dust or chips left over from other wood products. However, the [increasing demand for bioenergy](#)—bioenergy accounts for 55 percent of renewable energy globally while making up for more than 6 percent of the energy supply in the world—has led to wood pellets being made from large logs and [whole trees](#).

Companies that produce wood pellets claim that the biomass industry is [harmless](#).

They [claim](#) to be extracting less wood than paper and packaging companies. While that may be true, massive growth in the biomass industry (pegged to expand from \$91.3 billion in revenue in 2023 to [\\$105.7 billion by 2028](#)).

Bioenergy is a huge global industry. [According to the International Renewable Energy Agency \(IRENA\)](#), “About three-quarters of the world’s renewable energy use involves bioenergy.” Moreover, it “accounted for about 10 percent of total final energy consumption and 1.9 percent of global power generation in 2015.” The U.S. was the world’s largest [producer](#) and [exporter](#) of wood pellets in 2021. In 2022, the U.S. exported nearly [9 million tons](#) of wood fuel pellets, [mainly](#) to Europe, the UK, and [Asia](#).

Supporters argue that bioenergy is a climate-friendly, [sustainable power source](#) that helps local economies. The truth is that wood pellet plants are as dirty and problematic as coal plants. Wood pellets are often [burned](#) alongside coal, which only helps prolong the use of coal. The United Nations even cautioned against its extensive use, [stating](#), “[B]ioenergy should only be used in limited applications, given potential negative environmental impacts related to large-scale increases in forest and bioenergy plantations, and resulting deforestation and land-use change.”

Burning wood pellets (burning trees) for heat and electricity harms people, biodiversity, and ecosystems. Compared to low-carbon technologies like solar and wind energy, bioenergy is more [expensive](#) and harmful to the environment. It requires a constant source of forest biomass—including felled trees—to [operate](#), and the number of trees on the planet is not unlimited. It isn’t a solution that can replace fossil fuels or any other high-carbon energy production method; Biomass is not a climate solution.

In fact, a [study](#) published in Environmental Research Letters in 2018 pointed out, “[C]arbon dioxide emissions from burning wood are actually higher than burning coal because wood contains more water—even when dried and compressed into a pellet—and is a less efficient source of energy,” according to a Wired [article](#).

Subsidizing Wood Pellets

In the U.S., the Department of Agriculture (USDA) and state and local governments [subsidize](#) bioenergy companies. While the USDA does so in the name of “[research](#),” the other government entities tend to offer subsidies in the

name of questionable economic benefits.

State and local governments are throwing money at these dirty industries. Most state and local money for bioenergy facilities [comes](#) via “economic development” programs. These programs may or may not require reporting on the number of jobs created. Indirect subsidies may come in the form of one of the following:

- tax abatement
- tax credits
- reduced leases of land
- building infrastructure (e.g., roads and water tanks)
- grants
- low- or no-interest bonds and loans

According to Dogwood Alliance, states and the federal government have collectively provided more than [\\$75 million](#) to subsidize wood pellet production as of 2023, and according to a 2022 article by CoastalReview.org, Enviva, the world’s largest wood pellets producer, received nearly \$10 million in state subsidies alone.

Even though millions of dollars may seem like a large sum, U.S. investment in bioenergy is a drop in the bucket compared to the foreign investment it receives. Foreign funding for bioenergy is nearly [700 times](#) greater than domestic spending. Although not all that money ends up in the hands of U.S. companies, a significant portion does.

According to the UK and the EU [renewable energy guidelines](#), woody biomass is officially classified as renewable and carbon neutral, despite pressure from environmental activists to make revisions to this policy in 2023. Utilities have been encouraged to convert coal-fired generators to generators using woody biomass, allowing them to burn wood pellets to help them officially meet the EU air pollution and renewable energy standards.

Also, due to a policy loophole, carbon dioxide emissions for wood pellets are [counted](#) during the trees’ harvest but not when they are burned. Therefore, if the

trees are harvested abroad, they are “free” in terms of carbon accounting. “Countries are not required to count the carbon emissions emitted by wood-fired power plants. That allows woody biofuels to flourish as a climate solution nevertheless,” [points out](#) a National Geographic article.

For this reason, European and UK power companies chose the southeastern United States, where [logging is much less restricted than in Europe](#), as one of the primary suppliers of wood pellets. Countries across Europe and Asia import wood pellets from North America because it is a [cheap](#) and easy way to [meet](#) their climate goals (on paper). Often, governments subsidize these purchases to the tune of billions of dollars.

A 2022 [report](#) prepared by Trinomics—an economic policy consultancy—for the nonprofit environmental group Natural Resources Defense Council (NRDC) found that 10 key European countries—Austria, Denmark, Finland, France, Germany, Netherlands, Poland, Spain, Sweden, and the United Kingdom—spent [more than \\$6.8 billion in subsidies supporting bioenergy in 2021](#)—more than in any previous year, amounting to a nearly 33 percent increase from 2015.

“[M]any governments are doubling down on bioenergy and making it central to their plans to tackle climate change, despite its many risks to people and the planet,” [wrote](#) Debbie Hammel, deputy director of the lands division of NRDC’s nature program, and Elly Pepper, deputy director of global biodiversity conservation of NRDC’s Nature Program, in 2022.

This hasn’t happened without opposition. Climate activists and forest advocates have been [lobbying](#) the public, the U.S. government, and the European Parliament on the issue long enough that it finally became a matter of public debate. In September 2022, the European Parliament voted on amendments to its [Renewable Energy Directive](#) (RED) to decide whether or not to reject the definition of woody biomass as renewable and carbon neutral. Although the parliament decided to [keep the renewable classification](#), activists were heartened that it was finally being discussed in parliament.

Another favorable decision by European lawmakers was to end some of the “[wood-energy subsidies](#),” indicating a recognition among them that the incentives offered by the EU “has contributed to deforestation without curbing greenhouse gas emissions.”

Forests Are More Than Fuel

Harvesting truckloads of whole trees threatens forests, one of our most important environmental protection systems. Trees provide humans and nonhuman animals with oxygen, clean water, shelter, medicine, protection, and food. In short, they are a vital part of a healthy planet and are necessary for the survival of animal species, including ours.

However, the indiscriminate cutting of trees to supply pellets for energy is “ravaging biodiverse forests and damaging humanity’s chances to avert the worst climate catastrophes,” [according](#) to a letter written by more than 500 scientists and economists to President Joe Biden.

Pointing to the extent of damage these facilities are capable of, NDRC [states](#), “[m]eeting the production capacity of four of Enviva’s wood-pellet facilities in North Carolina and Virginia requires logging almost 50,000 acres of forest per year.”

Clean Water

Trees are critical to sustaining the quality of natural water supplies because they collect, filter, and release rainwater into bodies of water such as lakes, rivers, and streams. Clear-cutting can cause [nitrogen](#) pollutants to leach into water runoff, while salvage logging (logging after a fire) hurts the regulation of ecosystem services like water and soil quality.

“Forest cover has been directly linked to drinking-water treatment costs, so the more forest in a source water watershed, the lower the cost to treat that water,” [writes](#) Austa Somvichian-Clausen of American Forests, a nonprofit conservation organization based in Washington, D.C. “Forests provide these benefits by filtering sediments and other pollutants from the water in the soil before it reaches a water source.”

While biomass is touted as a clean source of energy, an [analysis](#) of its water footprint shows that a shift away from fossil energy and toward energy from biomass will put more pressure on freshwater resources.

Climate Impacts of Wood Pellets

Forests mitigate the effects of extreme weather. In cases of flooding after a hurricane or storm, they act as a sponge, soaking up excess rainwater. This has the benefit of reducing runoff and damage caused by flooding. In areas with clear-

cuts, flooding spreads more quickly and is more dangerous.

Forests also retain water in leaves, branches, twigs, roots, and soil. A large tree can retain [332 gallons of water](#). The larger the forest, the greater the amount of stored water.

For this reason, forests may play a significant role in [alleviating drought](#) and desertification caused by climate change.

They also play an essential role in keeping regional temperatures steady and safe. By absorbing carbon dioxide and releasing oxygen, forests help balance the Earth's atmosphere and protect ecosystems, wildlife, and local communities.

They function as important carbon sinks that help mitigate climate change. While biomass energy is promoted as a carbon-neutral energy source, which is a major driver of the international demand for wood pellets, scientific evidence says that [wood pellets are not carbon-neutral](#). They were responsible for [88 million tons](#) of carbon dioxide being emitted due to the production and combustion of biomass in the U.S. at the end of 2020.

Far from preventing global warming, biomass destroys our forests and leads to irreversible environmental impact. For each ton of wood pellets [produced](#), 24,000 acres of forest are destroyed.

Apart from this, every single stage of pellet production involves carbon emissions. The amount of energy used to produce wood pellets varies but can [range](#) from 5 to 20 percent of the total carbon emissions generated by the entire lifecycle.

To begin with, logging releases carbon from the soil and leads to reduced carbon sequestration.

Moreover, logging machinery and transport vehicles run on diesel and gasoline. Producing the pellets (pulverizing, drying, milling, compressing, cooling, and packaging them) requires fuel, usually natural gas; shipping the pellets across the Atlantic consumes a lot of diesel. Wood storage can lead to methane emissions. Finally, burning wood pellets releases [as much or even more carbon dioxide](#) into the atmosphere as an equivalent unit of coal. “[P]ower plants that burn biomass emit 150 percent more carbon dioxide than those burning coal,” [according](#) to the Partnership for Policy Integrity.

Moreover, rather than offering a genuine energy alternative, the biomass industry effectively helps companies burn more coal. Many wood pellets are “[co-fired](#)” alongside coal in traditional power plants. Power plants can burn wood pellets alongside coal to get renewable energy credits. In other words, they can get credit for “green” energy while still burning coal.

When power plants are allowed to “offset” greenhouse gas emissions by co-firing dirty coal with wood pellets, they’re putting more and more carbon into the atmosphere. Despite claims by the biomass industry, bioenergy is far from being “carbon neutral.”

Wood pellet production facilities simply release too much carbon dioxide into the atmosphere to help the fight against climate change. They also degrade and destroy natural forests to get their forest biomass material. Collectively, wood pellet production means more air pollution and carbon emissions and fewer natural and healthy forests.

Clear-cutting, Deforestation, and Degradation

Deforestation is a devastating side effect of the growing woody mass bioenergy industry. In sourcing wood, the industry conveniently ignores climate change and [destroys forest ecosystems](#). From 2011 to 2023, more than 1 million acres in the U.S. have [already been cut](#) for wood pellets.

The most common type of logging in the U.S., especially in the U.S. South, is clear-cutting, when loggers remove all the wood from an area of forest, leaving bare ground. New trees are either planted or allowed to regrow naturally. Companies clear-cut forests because it’s easier for them to move equipment in a cleared area. It’s also more cost-effective for the forestry company; a clear-cut ensures that a company gets the greatest amount of wood from a single area. The downside is that the ecological effects of clear-cuts are [worse](#) than other types of logging.

According to a 2019 NRDC and Dogwood Alliance [report](#), “Global Markets for Biomass Energy are Devastating U.S. Forests,” clear-cutting in the North Atlantic Coastal Plain Biodiversity Hotspot for wood pellet production, “harms many unique plant and animal species, including at least 30 species of birds that are the focus of conservation efforts.”

Moreover, logging is the number one cause of carbon emissions from U.S. forests.

From 2006 to 2010, a whopping [85 percent of carbon emissions](#) from forests were attributed to logging, which is five times more than carbon lost through fires, insects, disease, drought, or development combined. In 2018, more than [half of forest tree-cover loss](#) was due to logging in North America. The number creeps higher when you focus on the U.S. South.

Scientists agree that our forests [need to absorb more carbon](#), and quickly, if we're to avoid the worst impacts of climate change. Logging can cause a carbon deficit for [up to 200 years](#) as the trees regrow; around 60 of the carbon [lost through deforestation and harvesting](#) from 1700 to 1935 has not yet been recovered in our forests. Converting old-growth forests to young plantations in Western Oregon and Washington has released [1.5 to 1.8 million metric tons](#) of carbon into the atmosphere.

Waste Product or Waste Wood

The biomass industry often claims it only uses “waste” wood as a feedstock. The implication is that it exclusively uses leftover woodchips, shavings, bark, and off-cuts from industrial lumber activity or scrap wood such as used furniture. In reality, many wood pellet facilities regularly [harvest](#) whole trees.

The industry interprets “waste” in a much broader and more self-serving sense than environmental legislation intended: waste wood or “[low-value wood](#)” is any tree that isn't perfectly shaped or is the wrong kind of tree for lumber.

In nature, nothing is wasted. A tree has great value if it's left alone in a forest. Even if imperfect, a living tree filters water, cleans the air, and provides a habitat for wildlife. A dead tree provides habitat, cycles nutrients, aids plant regeneration, and prevents erosion.

Types of Forest Logged

The biomass industry is not picky when it comes to sourcing trees. In North Carolina, in 2019, bioenergy companies took wood from [27 different types of forests](#). [Forty-one percent](#) of the wood that bioenergy facilities received were loblolly and shortleaf pine forests, which could have been natural or planted.

Anywhere from [15 to 30](#) percent of forested area around biomass industry facilities comprises planted pine trees—not natural forests. These “pseudo-forests” offer far less ecological value than natural forests. They need toxic herbicides and pesticides to grow successfully, take a long time to grow, and do

not offer the same benefits as natural forests, which tend to store more [carbon per acre](#). Planted trees may not lead to carbon benefits [even after several decades](#).

The next-largest category of wood used by the pellet industry includes tree species that grow in moist soil, often near rivers and streams. These trees, including sweetgum, black gum, sycamore, and poplar, make up roughly [28 percent](#) of the feedstock used by the wood pellet industry in North Carolina.

Because old-growth forests are [critical](#) to the ecosystems they support, they must be allowed to remain standing. However, because there is no single standard definition of old-growth forests, it's hard to determine whether or not the biomass industry is cutting them down. If we define an old-growth forest as more than 80 years old, the biomass industry will likely be getting wood from those forests. In 2019, for instance, [approximately 2 percent of forest harvests](#) in North Carolina were from stands older than 80 years.

The answer is less clear if we define old growth as containing certain ecological characteristics such as downed wood and biodiversity. We simply don't have an easy way to measure those characteristics on a large scale. Companies would need to carry out audits of old-growth characteristics in every forest that they have logged. At the moment, there is no requirement for them to do so. Alarmingly, in 2022, an [Enviva whistleblower](#) told Mongabay, "We take giant, whole trees. We don't care where they come from. The notion of sustainably managed forests is nonsense. We can't get wood into the mills fast enough."

Bioenergy and Human Health

Wood pellet facilities are a [massive](#) pollution source that harms [human health](#). They emit [thousands of tons](#) of particular matter, carbon monoxide, nitrogen oxides, and volatile organic compounds (VOCs) each year. These air pollutants can cause or worsen a range of health conditions, from asthma and heart disease to cancer. That's a pretty steep price tag for what is supposed to be renewable energy.

For example, in Hamlet, North Carolina, where an Enviva plant opened in 2019, [thick dust](#) has been filling the air and settling on homes, causing an increase in respiratory problems, particularly in older people.

The co-authors of a [peer-reviewed paper](#) wrote an [article](#) in the Hill about their

research in March 2022 and stated that the burning of wood and biomass in buildings and for industry use in the U.S. led to at least 18,000 deaths, which was higher than the deaths caused by coal-fired power plants.

While referring to their findings of 2017, they [wrote](#) that “air pollution from burning firewood in homes was responsible for 9,800 to 16,000 deaths, burning biomass in industrial boilers had a health burden of 8,000 to 15,000 deaths, and using it in commercial buildings had a health burden of 640 to 1,200 deaths. This is comparable to the 9,100 to 11,000 deaths due to the coal-fired power plants that were operating in 2017.”

Bioenergy and Environmental Justice

As the wood pellet industry grows, so do concerns about its adverse impacts on people. One pressing concern relates to environmental justice—the concept that all communities deserve equal access to a healthy environment.

Environmental racism is when specific communities, particularly BIPOC (Black, Indigenous, or People of Color) neighborhoods, are subjected to more environmental harm than their white neighbors. Communities experiencing environmental racism might be subjected to:

Higher levels of air pollution, including fine particulate matter (microscopic dust) and volatile organic compounds

- Changes in local water quality
- Increased greenhouse gas emissions from nearby plants
- Devastating clear-cuts and intense industrial logging
- Increased impacts of climate change
- Decreased property values because of nearby industrial activity

Extractive, polluting industries like the wood pellet industry have been [imposed](#) on rural BIPOC communities for decades. These communities have struggled with poverty and unemployment for several generations while industry executives living outside the community prosper.

Both property values and livability may decline in areas near these wood pellet

factories.

“As of 2018, every single wood pellet mill in North and South Carolina was in a low-income community of color. Across the South, these same neighborhoods were more than 50 percent more likely than affluent ones to become home to a wood pellet plant,” [states](#) an article by the nonprofit Southern Environmental Law Center.

The growth of the biomass industry has meant that [some communities bear a](#) higher cost of clear-cutting, including the negative impacts of soil erosion, loss of wildlife, water pollution, and degraded air quality.

The U.S. Southeast wood pellet industry is twice as likely to put their dirty plants in Black or minority neighborhoods than in white ones. The industry treats these communities as dumping grounds and exposes residents to [noise](#), dust, odors, and air pollution. This is an environmental injustice.

In the U.S. South, wood pellet mills are often placed in low-income communities of color, which are more likely to experience environmental injustice. These “[environmental justice communities](#)” often already have other sources of pollution in or near them, such as:

- Natural gas pipelines or compressor facilities
- Industrial train stations for transporting goods, not people
- CAFOs—concentrated animal feeding operations
- Other large manufacturing facilities
- Coal ash or coal power plants

Many communities hope that the biomass industry will provide social benefits to rural areas. They believe it will help the local economy and lower poverty. As a result, governments at all levels provide millions of taxpayer dollars in incentives to attract new bioenergy businesses. These include things like tax breaks, use of land, and support with water and road systems. Even international governments give subsidies to these biomass plants.

Unfortunately, wood pellet production does not bring the economic boon it claims

it will. It's often propped up through polluting vulnerable local communities. There are no environmental benefits to woody biomass production. Far from being a cost-effective strategy to combat climate change, it doesn't combat climate change at all.

What's more, there's no scientific evidence to support the idea that bioenergy production results in strong economic growth. Models, in fact, show trade-offs between:

- bioenergy production
- local economy
- community health
- ecosystem health

An example of this false economic hope is evinced in [an April 2021 report](#) by the research institute Canadian Center for Policy Alternatives, which shows that the wood pellet industry in British Columbia has generated only “a little more than 300 jobs—half of 1 percent of B.C.'s forest industry workforce—employed in 14 mills.”

The Wood Pellet Industry in the U.S. South

One of the areas most affected by the wood pellet boom is the American South, specifically the poorest rural counties. Wood pellet production capacity there has increased more than fivefold since 2009, growing at a compound annual rate of 14 percent, according to a 2022 [report](#).

The amount of logging in this region is staggering. A study based on satellite images of forest cover worldwide between 2000 and 2012 showed that industrial logging in the southeastern U.S. led to a “disturbance” (forest loss) rate [four times as high](#) as that of South American rainforests in the same period.

Wood pellet facilities have almost always been built in areas with poverty rates higher than the state average and home ownership is well below the state average. Polluting industries often exist in the double digits in these areas—82 major polluters in North Carolina, for example, and 27 in Alabama. (You can find the full table of referenced statistics [here](#).)

Perhaps it is not surprising that these vulnerable communities are being subjected to pollution and exploitation. In 2022, “[a]n investigation by Unerthed, Greenpeace’s investigative unit, found that [Drax Biomass](#) paid millions of dollars to U.S. regulators over claims it exceeded limits on chemicals emissions at wood chip plants close to [Black] and low-income communities,” [states](#) the Guardian.

Drax [faced charges](#) that it exceeded limits on emissions of volatile organic compounds, a class of air pollutants linked to cancer, breathing difficulties, and other adverse [health effects](#). Drax has been a [repeat offender in breaking](#) environmental safety regulations. Pollution is unsurprisingly still an ongoing issue, with complicity from Mississippi’s environmental regulation agency [making it worse](#), according to a 2023 report by Dogwood Alliance.

Compounding issues, the U.S. South already [bears the brunt](#) of the most extreme weather conditions in the country. “We drew the short straw (in the South) that we literally can experience every single type of extreme weather event,” University of Georgia meteorology professor Marshall Shepherd [says](#). “Including blizzards. Including wildfires, tornadoes, floods, and hurricanes. Every single type. ... There’s no other place in the United States that can say that.”

The fact that the residents are poor and unable to afford storm-hardy housing and infrastructure will exacerbate future disasters, as will any further loss of forested land in the American South.

By Sam Davis

Author Bio:

Sam Davis is a staff scientist at the [Partnership for Policy Integrity](#) (PFPI), a nonprofit that uses science, litigation, policy analysis, and strategic communications to promote policies that protect climate, ecosystems, and people. They previously served as a conservation scientist with [Dogwood Alliance](#). Davis is also a contributor to the [Observatory](#). Their work has been published by Pressenza, Countercurrents, CounterPunch, NationofChange, LA Progressive, and the Good Men Project.

Source: Independent Media Institute

Credit Line: This article was produced by [Earth | Food | Life](#), a project of the Independent Media Institute.