FACT SHEET

New Report Shows Wood Pellets from Drax's U.S. Mills Increase Carbon Emissions During the Timeframe Necessary to Address Climate Change

IN OCTOBER 2018, the United Nation's Intergovernmental Panel on Climate Change (IPCC) issued a report warning that global carbon dioxide and other greenhouse gas emissions must be cut in half within the next 12 years (i.e., by 2030) to keep global warming to 1.5 degrees and avoid the most dangerous effects of climate change.[1] Meanwhile, under the guise of reducing its carbon profile, the UK's largest power provider—Drax Power Station—has increased its reliance on burning woody biomass for electricity, a process which has resulted in over 56 million tonnes of carbon dioxide being emitted from Drax's smokestacks over the last five years.[2]

A new report by Spatial Informatics Group, LLC (SIG), commissioned by the Southern Environmental Law Center and the National Wildlife Federation, takes a closer look at the carbon profile of wood pellets produced at Drax's three U.S. wood pellet mills.[3] Building on previous studies, SIG conducted a carbon life-cycle assessment tailored to Drax's presumed wood sourcing for these mills.[i] SIG found that the accumulated emissions of burning wood pellets from these mills to produce electricity in the UK increases carbon pollution in the atmosphere for more than 40 years,[ii] well beyond the timeframe identified by the IPCC as critical for carbon reduction.

This new analysis puts the final nail in the coffin of Drax's clean energy claims. The presumed sourcing for Drax's mills represents what Drax and others in the industry have portrayed as "best practices" for biomass sourcing—trees from thinnings[iii] of pine plantations. To date, the impacts of wood pellets from Drax's mills have not been well understood. The results of the SIG analysis demonstrate that even under these most generous assumptions, Drax's biomass conversions are a false climate solution, increasing atmospheric carbon well beyond 2059.

Moreover, SIG's analysis represents only a small portion of Drax's overall climate impact from burning biomass. Drax sources most of its wood pellets from other companies, including Enviva Pellets, the largest wood pellet manufacturer in the world. Years of on-the-ground investigations have documented the unsustainable sourcing practices used to supply Enviva's mills, such as clearcutting bottomland hardwood forests.[4] The investigations have also repeatedly shown whole trees and other large-diameter wood entering Enviva's—and therefore Drax's—supply chain. These are known to be the most carbon-intensive sources of biomass.

MAIN RESULTS

Drax's own wood pellets increase carbon in the atmosphere for over 40 years, worsening climate impacts.

Burning wood pellets from Drax's mills for electricity in the UK increases carbon dioxide concentrations in the atmosphere for well over 40 years when compared to the emissions profile of either the UK's 2018 electricity grid mix or the UK's targeted electricity grid mix for 2025.[iv] Carbon parity—or the time at which the accumulated carbon emissions from Drax's own wood pellets equals the baseline scenarios without bioenergy—was not reached over the 40-year period SIG modeled.

[i] Phase I research indicated that Drax's mills currently source predominately from softwoods, mainly trees from pine plantation thinnings, with additional feedstock from sawmill residues and a small percentage of hardwoods. As discussed below, SIG's analysis is conservative and made several assumptions favorable to Drax, mainly the exclusion of hardwoods and the over inclusion of sawmill residues. Note that any future changes to Drax's sourcing or competing demands for wood in the region will likely impact the carbon life-cycle assessment for Drax's wood pellet mills.

[ii] SIG modeled for 40 years, from 2019 to 2059.

[iii] Thinning is the process of selectively removing whole trees from a plantation in order to maintain a specific volume of trees per acre and prevent overcrowding. Thinning may occur at multiple phases of growth in the plantation stand and can therefore include trees of various ages (generally, 15 to 30 years) and sizes, including tall, large-diameter whole trees. Pine plantations are eventually clearcut in a final harvest before being replanted.

[iv] The UK's electricity grid emissions profiles represent cumulative carbon emissions, measured in megagrams of carbon dioxide equivalents per megawatt hour (Mg CO_{2e}/MWh).

Even under a generous assumption of 50% sawmill residues, Drax's own wood pellets do not reach carbon parity within 40 years.

Although Drax's mills currently consume less than 20% sawmill residues,[v] (i.e., over 80% trees), SIG modeled the Drax LaSalle mill at 50% sawmill residues to reflect the expected future feedstock mix from operation of a co-located sawmill. Even under this extremely generous feedstock mix assumption, pellets from the LaSalle mill still did not reach carbon parity within 40 years.

The climate impact of Drax's own wood pellets is far worse than genuine renewables like solar and wind.

To understand the carbon life-cycle emissions impacts of burning wood pellets, such emissions must be compared against genuine zero-emission, no-burn renewable energy sources, such as wind and solar, rather than fossil fuels. The life-cycle emissions profile for wind and solar in the UK's grid mix are 0.011 Mg CO_{2e}/MWh and 0.048 Mg CO_{2e}/MWh, respectively. In comparison, SIG's analysis found that the lowest emissions intensity for biomass electricity generated using wood pellets from Drax's pellet mills was roughly 0.468 Mg CO_{2e}/MWh—ten times that of solar—and even that was not until the end of the 40-year time period (2059). The UK's renewable energy subsidies, however, treat biomass as a non-emitting energy source on par with wind and solar.

Drax's own wood pellets are worse for the climate whether or not its sourcing practices are considered "sustainable."

Drax often conflates the term "sustainable" with the climate impacts of burning wood pellets. Accordingly, Drax touts its sourcing practices as coming from "sustainable managed working forests"—i.e., pine plantations where growth exceeds harvests. As demonstrated by SIG's report, regardless of whether growth exceeds harvests, wood pellets from Drax's own mills are still bad for the climate for well over 40 years.

BACKGROUND

Over the past eight years, the southeastern U.S. has become ground zero for a rapidly expanding wood pellet industry. Wood pellets, which are manufactured by drying and compressing wood into small pellets, are being exported to Europe at an alarming rate where they are being burned for electricity. Based on the false assumption that burning wood for electricity is carbon neutral, many European governments, led by the UK, are incentivizing such practices by providing large subsidies for new or converted biomass facilities.

One of the main beneficiaries of these subsidies is Drax Power, a large biomass and coal-fired power station in the UK, which received £789.2 million in subsidies in 2018 alone.[5] That same year, Drax imported over 4.4 million tonnes of wood pellets from the southeastern U.S.[6] This equates to over 32,500 hectares (325 km^2) or 80,300 acres (125 mi^2) of U.S. forests that were harvested in 2018 alone to supply wood pellets for Drax.[7]

DRAX BIOMASS

To distance itself from the destructive sourcing practices and resulting carbon impact of Enviva's wood pellets, Drax appears to downplay the carbon impact from burning Enviva's wood pellets and instead attempts to shift the focus to Drax's own wood pellet mills. Drax Biomass, a subsidiary of Drax Power, owns and operates three wood pellet mills in the southeastern U.S. Two of the mills (Drax Morehouse and Drax LaSalle) are located in Louisiana, while a third (Drax Amite) is located in Mississippi. Combined, these mills have a production capacity of 1.5 million metric tonnes per year of wood pellets.[8]

Drax continues to receive a large portion of its U.S. wood pellet supply from Enviva,[9] with the carbon emissions of burning such pellets analyzed at 3.4 times higher than continue used of coal over 100 years.[10] However, to date the impacts of wood pellets from Drax's mills have not been well understood. To evaluate the sourcing practices and resulting carbon impact of Drax's wood pellets, SIG approached its study in two phases.

Phase I: Forest Management Baseline Development

During Phase I, SIG, in collaboration with the Pinchot Institute for Conservation, interviewed experts in biomass harvesting in the region in order to better understand the area's forestry practices. The ultimate goal was to develop a

[v] For purposes of its analysis, SIG considered "sawmill residues" to only include byproducts of the sawmill process that are of such low quality that they cannot be used for other wood products.

forest management scenario that accurately depicts what would have happened in the relevant woodsheds in the absence of Drax's pellet mills.[11] Based on Phase I research, SIG reached the following conclusions:

- Drax's three pellets mills use mostly softwood, with the primary feedstock coming from pre-commercial thinnings from non-industrial pine plantations.
- In the absence of Drax's wood demand, non-industrial pine plantations would likely go unthinned until the final harvest.
- The supply of wood from thinning non-industrial pine plantations in the area is sufficient to meet Drax's current demand and therefore will likely not result in large-scale land use change from non-forest to forest.

Based on this information, SIG concluded that the appropriate baseline scenario to represent "no biomass"—i.e., what would have happened without Drax's pellet mills—is a situation where thinning is foregone at non-industrial pine plantations until final clearcut harvest at the end of a 25-year rotation.

An independent, on-the-ground investigation of Drax's pellet mill in Amite, Mississippi ("Drax Amite"), not associated with SIG's analysis, helps explain what it means for Drax to source from thinning of non-industrial pine plantations. As documented during that investigation, Drax's "thinnings" include large, whole trees up to 35 and 45 feet tall and 14 inches in diameter.

Pine plantation in Liberty, Mississippi. Taken in October 2018, this photo shows thinning along the bottom/left part of the harvest site and a final clearcut harvest of the middle/right part of the site. In August, whole trees from this site were tracked back to Drax Amite.

Taken in August 2018, this photo shows large-diameter, whole trees entering the Drax Amite facility. Logging trucks were tracked from two harvest sites to Drax Amite.

Phase II: Carbon Life-Cycle Assessment

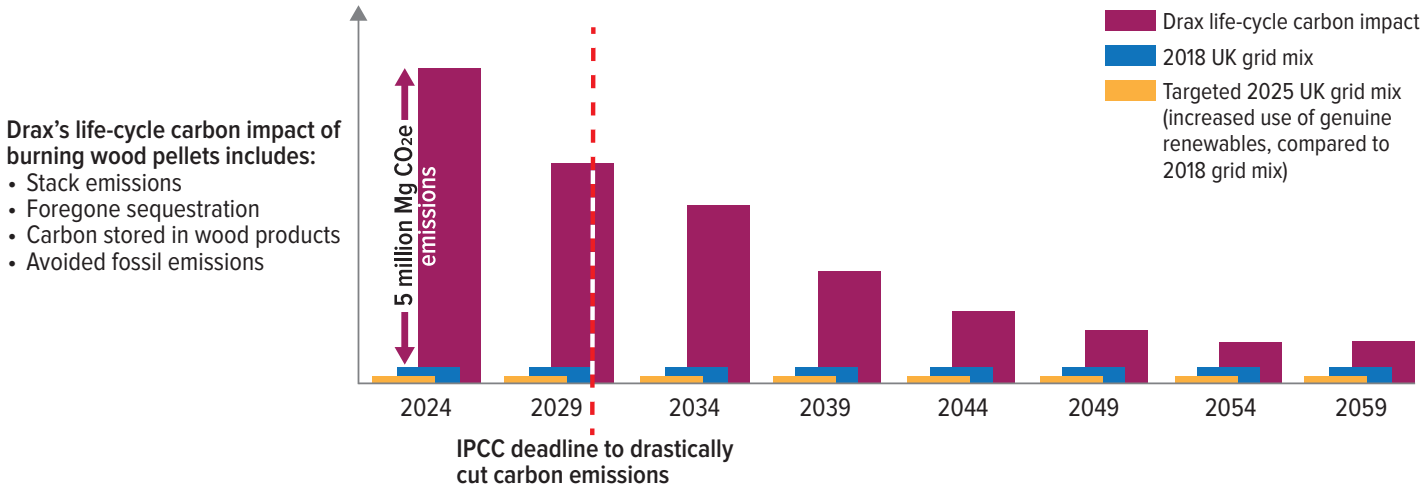
Phase II included a carbon life-cycle assessment (carbon LCA) for all three of Drax's U.S. pellet mills. Based on the results from Phase I, SIG's modeling focused on trees from non-industrial pine plantations as the primary feedstock, with a percentage of the feedstock also being derived from sawmill residues. Drax Amite and Drax Morehouse were both modeled at 80% non-industrial pine plantation feedstock and 20% sawmill residues, whereas Drax LaSalle was modeled at 50% of each. Information obtained during Phase I indicated that Drax LaSalle plans to obtain a large portion of its feedstock from a co-located sawmill that is currently under construction. The 50/50 split at Drax LaSalle was meant to model the impact of increasing sawmill feedstock on Drax's carbon profile.

The carbon LCA included modeling several factors: the emissions at the stack when the biomass is burned to produce electricity, which reflects the loss of carbon stocks on the land; the foregone carbon sequestration (due to increased harvest activities); the carbon stored in region-specific, long-lived wood products; emissions from pellet processing and transport; and avoided electricity generation emissions from the fossil fuels replaced by biomass.

Photo of log stack taken in August 2018 at Amite BioEnergy pellet plant.

The graph[vi] below shows the net difference between the life-cycle carbon impact of burning wood pellets from Drax's mills combined (purple); the carbon profile of the UK's 2018 electricity grid mix (blue); and a targeted, 2025 electricity grid mix (orange). The 2025 emission profile is based on the Committee for Climate Change's projected grid mix in order to meet the UK's carbon reduction targets; it represents a significantly decreased percentage of fossil fuels and greater utilization of genuine renewable energy sources, such as wind and solar.[12] Wherever the purple bar exceeds the blue and orange bars it represents an *increase* in carbon impacts relative to the baseline scenario. Were the purple bar to meet the blue or orange bar, this would represent the point of carbon parity between biomass electricity and the baseline. However, as shown below, carbon parity is not reached during the 40 years modeled by SIG. In fact, carbon parity for Drax's mills combined is unlikely to be reached until far beyond 2059.

The carbon impact of burning wood pellets from Drax's three U.S. mills is worse than the emissions from the UK electricity grid mix until beyond 2059, well past the deadline needed to address climate change.



Importantly, SIG's carbon parity conclusions are *conservative* estimates, meaning that carbon parity times are likely longer than what is presented in the above graph. This is because SIG modeled carbon stocks and flows using a higher percentage of sawmill residues than the current feedstock mix of Drax's mills. Additionally, SIG's modeling does not consider the potential share of hardwoods in Drax's current feedstock mix, which may be as high as 5 to 20%. As demonstrated by previous carbon life-cycle modeling for Enviva's hardwood-heavy feedstock mix, the use of hardwoods tends to prolong carbon parity times.

CONCLUSION

The evidence is clear—burning wood pellets for large-scale electricity-only generation is bad for the climate. According to SIG's new report, the life-cycle carbon impact of burning wood pellets manufactured at Drax's three U.S. mills exacerbates climate change for more than four decades at a time when countries must rapidly decarbonize their energy systems—and well beyond the timeframes relevant for averting the most dangerous consequences of climate change. Against the backdrop of the IPCC's urgent warnings, burning forest biomass cannot be part of the solution to climate change.

Rather than continuing to subsidize burning wood pellets for electricity, countries like the UK must focus on transitioning to genuine, zero-emission renewable energy sources, such as wind and solar, and protecting and expanding forests. The UK government, however, has diverted funds away from these true renewables in favor of providing hundreds of millions of pounds of subsidies each year to biomass. Given SIG's findings, these subsidies are not aligned with current science on reducing carbon pollution regardless of how the forest-derived biomass is sourced. The UK government should immediately end subsidies for biomass used in large-scale electricity-only generation and redirect that support to genuine clean energy production like solar and wind.

[vi] The graph depicts information contained in, and the underlying data for, Figures 2(a) and 2(b) of SIG's Phase II Report, available at https://www.southernenvironment.org/uploads/publications/2019-05-27_Drax_emissions_-_SIG_report_Phase_II.PDF. Instead of showing the two baseline scenarios separately, the accumulated net differences between the combined bioenergy scenario and the two baseline scenarios were averaged together so that they could be presented in one graph.

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Endnotes available at SouthernEnvironment.org/drax-report-fact-sheet-endnotes.