



June 2, 2015 (updated February 1, 2017)

TO: UK and EU Policy Makers

FROM: Southern Environmental Law Center - Derb Carter and David Carr

RE: New Study Shows Drax/Enviva Reliance on Southeast U.S. Hardwoods for Pellets Will Result in Greater Carbon Emissions Than Continued Reliance on Coal

Drax is by far the largest importer of wood pellets from the southeastern United States for combustion in power plants in the UK. In the first half of 2016, Drax imported 85% of the U.S. exports of utility wood pellets, most all from the SE U.S.¹

Enviva, a U.S. wood pellet producer, has provided one million metric tons of pellets to Drax annually since April 2014, according to Enviva filings with the U.S. Securities and Exchange Commission.² Enviva has pellet plants in Virginia, North Carolina, Florida and Mississippi. Its three plants in southeast Virginia and northeast North Carolina produce 1.38 million metric tons of pellets annually, and provide a large portion of Enviva's supply for Drax.³ Enviva has disclosed that each of these plants relies on approximately 80% or more hardwood input.⁴ See Appendix A for more detail.

(Enviva, in the fall of 2016, added the Sampson NC plant producing another .51 million metric tons. Also, Enviva has contracted to supply 800,000 tons per year to the Lynemouth plant and 375,000 tons to the MGT Teesside plant.)⁵

The Southern Environmental Law Center (SELC), other NGO's, and media outlets have observed logging in bottom land hardwood wetlands to supply the first three NC/VA Enviva plants. SELC and others have also observed log stacks at the Enviva plants that show boles up to and beyond 24 inches in diameter. See photos attached in Appendix A

Given Enviva's heavy reliance on standing hardwood trees and its large contract with Drax, SELC asked Spatial Informatics Group LLC (SIG), an expert in carbon lifecycle modeling, to assess the atmospheric carbon effects of the Enviva/Drax biomass practices. (**SIG Report, May 27, 2015 attached**). SIG used the BEAC (Biomass Emissions and Counterfactual) Model developed by the UK's Department of Energy and Climate Change (DECC) to evaluate the Enviva/Drax supply and combustion scenario. BEAC scenario 13(a) addresses increased logging of hardwood forests ("additional wood generated by increasing the rate of harvest of a naturally-regenerated hardwood forest in the South USA from every 70 years to every 60 years.")⁶

The BEAC report confirmed that much of the hardwood sourced for biomass in the southern U.S. is likely to come from new harvesting, since hardwood pulpwood demand has been steady from 2009 to 2013 and is projected to rise 5% over the following 5 years.⁷ Even if hardwood pulpwood demand declined in a specific sourcing region, new biomass demand would result in additional harvesting compared to what would have occurred in its absence. As the BEAC report found, hardwood pulpwood often represents 50-60% of the volume from harvesting a stand of naturally-regenerated hardwood forest.⁸ Hardwood pulpwood in the South region includes any tree and bole that does not meet sawtimber specifications, regardless of its size and age. Much of

the hardwood pulpwood sourced by Enviva would likely have been left as standing trees (storing and sequestering carbon) in the absence of the recent subsidized biomass demand from Drax.

Despite claims to the contrary over the past several years, Enviva now concedes that it uses whole trees at its pellet plants.⁹ Inspection of its woodlots revealed this in 2013. While it is unlikely that Enviva uses sawtimber, given its higher price, it is clearly using boles, tops and limbs from new hardwood harvesting.

Thus, BEAC's scenario 13(a) is the most appropriate scenario for at least 80% of Enviva's input to the three pellet plants in Virginia and North Carolina. As a result, SIG used scenario 13(a) to model 80% hardwood input to the Enviva/Drax supply chain. SIG assumed the other 20% was mill residue with 50% moisture content (BEAC Scenario 3). The result was 2,677 kgCO₂e/MWh over a 40 year time frame, or nine times the 285 kgCO₂e/MWh DECC standard for coal to biomass conversion. SIG Report at 8. **This means that Drax's emissions from using Enviva pellets over 40 years could be more than 2½ times higher than continuing to burn coal.** (1018 kgCO₂e/MWh). The report showed emissions of 3,478 kgCO₂e/MWh over 100 years, **so 3.4 times higher than continuing coal emissions.** SIG report at 12.

Even if one made numerable assumptions in favor of Drax/Enviva, the carbon profile is still very troubling. For example, SIG modeled a scenario assuming 48% of the input was fine forest residues, 17% mill residue, and only 35% additional hardwood harvesting. This shifts 45 % of the input from the additional hardwood logging category to the fine forest residue category, and seeks to emulate Drax's reported supply categories. SIG Report at 2, Table 1. This scenario is unrealistic given (1) the reliance on hardwoods and the additional harvesting discussed above, (2) the difficulty and expense in sourcing fine forest residues, and (3) the fact that utilities do not want the bark content in fine forest residues. Even so, this scenario's emissions would still exceed the DECC carbon standard by four times, and would be at least 20% higher than continuing to burn coal. See SIG Report at 9.

SIG further showed that Enviva/Drax would have to reduce hardwood harvest input to 8% in order to meet the 285 kgCO₂e/MWh standard. If one considers (1) the type of forest surrounding the Enviva plants (predominantly hardwood)¹⁰ (2) the stacks of hardwood logs, tops and limbs at the Enviva plants, and (3) heavy non-biomass demand for extant pine plantation in the area, it is clear the Enviva/Drax sourcing scheme in this region is unlikely to ever meet the DECC standard.

Drax has recently claimed that it is meeting DECC's CO₂ emissions target. In making this claim, it uses the OFGEM calculator.¹¹ Of course, this calculator fails to consider the change in carbon stocks in the forest/or its mirror image, the combustion emissions from burning the biomass pellets. In order to get a true picture of Drax's and others carbon emissions, the UK and EU must adopt a calculator similar to the BEAC model that includes the change in carbon stocks.

We trust that the attached report will help you make the necessary policy changes. Please let us know if you need additional information or if we can answer any questions.

Sources Cited

¹ U.S. Energy Information Admin. 12/2016.

² U.S. Securities and Exchange Commission (SEC) 2014. Forms S-1, Registration Statement under the Securities Act of 1933. Enviva Partners, LP. Washington DC. Available at:

<https://www.sec.gov/Archives/edgar/data/1592057/000119312514383777/d808391ds1.htm> [Last accessed on May 8 2015].

³ Id.

⁴ Enviva Data for Trader EUTR Compliance, Version 3, February 2015.

⁵ Enviva Partners, LP, Business Overview, p. 20, 24-25, 8/15/16.

⁶ Stephenson, A.I., MacKay, D.J.C. 2014. Life Cycle Impacts of Biomass Electricity in 2020 Scenarios or Assessing the Greenhouse Gas Impacts and Energy Input Requirements of Using North American Woody Biomass for Electricity Generation in the UK. Department of Energy and Climate Change, London, UK, 154 pp. at 78-79.

⁷ Id.

⁸ Id.

⁹ Enviva, 2015. FAQ: Forests & fiber sourcing, Available at: <http://www.envivabiomass.com/faq-forests-fiber-sourcing/#wood> [Last accessed on May 8, 2015]. See information currently available at:

<http://www.envivabiomass.com/wp-content/uploads/Enviva-Wood-Fiber-Resources.pdf>

¹⁰ Evans, J.M., R.J. Fletcher, Jr., J.R.R. Alavalapati, A.L. Smith, D. Geller, P. Lal, D. Vasudev, M. Acevedo, J. Calabria, and T. Upadhyay. 2013. Forestry Bioenergy in the Southeast United States: Implications for Wildlife Habitat and Biodiversity. National Wildlife Federation, Merrifield, VA, 275p. Available at:

http://www.nwf.org/pdf/Conservation/NWF_Biomass_Biodiversity_Final.pdf [Last accessed May 8 2015].

¹¹ Drax, 2015. Biomass supply. <http://www.drax.com/media/56583/biomass-supply-report-2014.pdf>

[Last accessed on May 8 2015].

Appendix A: Enviva and Drax Wood Pellet Sourcing

Enviva is the largest exporter of wood pellets from the southern United States. Enviva supplies nearly half of the wood pellets used in Drax's converted coal fired power plants in the UK, and Drax is Enviva's largest customer. In Virginia and North Carolina, Enviva's three largest wood pellet mills predominantly source wood biomass from harvesting hardwood forests, including wetland hardwood forests. Details of this sourcing, apparent for over two years from extensive documentation of forest harvests and delivery of logs to mills, are now confirmed by admissions in Drax and Enviva filings including Drax's 2014 annual report providing information on wood biomass sources (2015), Enviva's initial public offering filed with the Securities and Exchange Commission (October 27, 2014), and documentation provided by Enviva for European Union Timber Regulation compliance (February 2015). Documentation of Enviva's wood biomass sourcing is summarized below.

Drax Biomass Sourcing Report

Drax 2015. Biomass supply. <http://www.drax.com/media/56583/biomass-supply-report-2014.pdf>

In February 2015, Drax released an annual report with claims of significant reductions in carbon emissions resulting from a substantial increase in the use of wood biomass instead of coal.¹ Drax reports it has converted two of its six units from coal to wood biomass and has increased biomass generation from 5% of its generation in 2012 to 30% in 2014.

In its annual report, Drax states over half (58% or 2,380,347 tons) of its wood biomass originates from the United States. Drax reports sourcing from the U.S the following quantities of wood biomass from these OFGEM² categories:

▪ Sawdust	168,829 tons
▪ Sawmill residues	222,047 tons
▪ Forest residues	942,000 tons
▪ Diseased wood and storm damage	164,410 tons
▪ Thinnings	805,815 tons
▪ Long rotation forestry	12,374 tons
▪ Agricultural residues	64,834 tons

In its annual report, Drax expands the OFGEM definition of "forestry residues," which is defined by OFGEM to include "branch wood, tops, bark, and stump," to include "other low grade wood."³ This category is the largest single category of sourcing and Drax does not define "low

¹ Drax claims the conversion from coal to wood biomass has reduced its carbon emissions from 22.6 million tons in 2012 to 16.7 million tons in 2014. These carbon reduction claims are totally misleading because they ignore the reduction in carbon storage on the landscape (or conversely the emissions from burning the wood pellets) and cannot stand up to scientific scrutiny.

² The Office of Gas and Electricity Markets or OFGEM regulates the electricity and gas markets in Great Britain. OFGEM 2015. UK Solid and Gaseous Biomass Carbon Calculator (B2C2) User Manual for the Solid and Gaseous Biomass Carbon Calculator v2.0. p99. <https://www.ofgem.gov.uk/ofgem-publications/93896/b2c2rhiusermanualv71-pdf> [Last accessed on May 8 2015]

³ Id at 88.

grade wood” or its unilateral amendment and expansion of the forestry residues category. Of the total wood biomass sourced by Drax from the United States approximately 80% is derived from OFGEM categories that in whole or in part include whole trees: forest residues (defined to include “low grade wood”), diseased wood, thinnings, and long rotation forestry.

Enviva Initial Public Offering

Enviva Partners, LP 2014. Registration statement under the Securities Act of 1933 for Initial Public Offering (October 27, 2014).

<http://www.sec.gov/Archives/edgar/data/1592057/000119312514383777/d808391ds1.htm>

Enviva filed a registration statement for its Initial Public Offering (“IPO”) with the US Securities and Exchange Commission on October 27, 2014.⁴ The filing requires detailed disclosures about the company and the nature of its business. Enviva produces 1,740,000 metric tons per year (MTPY) at five facilities in Amory, Mississippi (110,000 MTPY), Wiggins, Mississippi (110,000 MTPY), Ahoskie, North Carolina (370,000 MTPY), Northampton, North Carolina ((500,000 MTPY), and Cottondale, Florida (650,000 MTPY).⁵ An Enviva affiliate (sponsor) owns the Southampton, Virginia plant. (510,000 MTPY)⁶. In its filing, Enviva states “[o]ur contracts with E.ON [E.ON UK PLC], Drax and GDF [GDF SUEZ Energy Management Trading] will represent substantially all our sales for 2014.”⁷ Enviva has off-take contracts with Drax to supply 1,000,000 MTPY of wood pellets through 2018.⁸ In sum, Drax is Enviva’s largest customer, and Enviva supplies nearly half of Drax’s wood biomass from the U.S.

Enviva’s IPO admits and describes the predominant sourcing of whole trees to produce the wood pellets it then supplies to Drax and other utilities. In its IPO, Enviva states its timber removals “comprises predominantly pulpwood” and currently “represents approximately 3% of the annual removals in the Southeastern U.S.”⁹ It categorizes its procured wood into the following four categories, without quantifying the percentage in each:

- Low-grade wood fiber: wood that is unsuitable for or rejected by the sawmilling and lumber industries because of small size, defects (e.g., crooked or knotty), disease or pest infestation;
- Tops and limbs: the parts of trees that cannot be processed into lumber;
- Commercial thinnings: harvests that promote the growth of higher value timber by removing weaker or deformed trees to reduce competition for water, nutrients and sunlight; and
- Mill residues: chips, sawdust and other wood industry byproducts.¹⁰

Enviva describes its wood procurement for manufacture of wood pellets as follows:

⁴ United States Securities and Exchange Commission, Form S-1 Registration Statement, Enviva Partners, LP (October 27, 2014). The Enviva Partners, LP filing with the US Securities and Exchange Commission can be accessed at <http://www.sec.gov/Archives/edgar/data/1592057/000119312514383777/d808391ds1.htm>

⁵ *Id.* at 2.

⁶ *Id.*

⁷ *Id.* at 26

⁸ *Id.* at 132.

⁹ *Id.* at 139.

¹⁰ *Id.*

Our wood fiber is procured under a range of arrangements, including (1) the direct purchase of *timber tracts* which provide an inventory of *stumpage* for up to 36 months, (2) *logging* contracts for the thinnings, pulpwood and other unmerchandized chip-and-saw *timber* cut by a harvester, (3) in-woods chipping contracts where we may also provide the actual harvesting assets, (4) contracts with *timber* dealers, and (5) “*gatewood*” purchases, which refer to wood hauled to a mill that was not purchased as standing timber by the mill. During the year ended December 31, 2013, we sourced our wood fiber from approximately 289 suppliers, including landowners growing both *hardwoods* and *softwoods*.¹¹

Enviva goes on to describe the intake of wood fiber for the manufacture of wood pellets at its mills:

Log Receiving, Storage, Debarking, Chipping, Chip Storage and Chip Transfer

- Incoming trucks pass over truck scales and are routed to unloading areas and storage piles based on their contents
- Cranes feed *logs* into a processing system, where bark is removed.
- Debarked *logs* are fed into a chipper by a knuckle boom hydraulic loader.
- Chipped wood fiber is transferred via conveyor either directly to the drier or into a secondary storage.
- Bark byproduct is fed directly to the furnace fuel bin or to bark storage.
- Purchased green chips are unloaded at a separate hydraulic truck dumper that delivers the chips to a furnace fuel reclaim system, a dryer bin or a chip storage pile.¹²

Enviva’s IPO admits harvesting whole trees for wood biomass and processing logs into wood pellets. Its procurement of wood biomass for pellets extends from purchase of “timber tracts” for harvest to even the indiscriminate acceptance of “gatewood” delivered by loggers to the gates of its mills.

Enviva Data for Trader European Union Timber Regulation Compliance

In February 2015, Enviva provided information on its sourcing of wood pellets from the southeastern United States to use in assessing compliance with the European Union Timber Regulation. The documentation of its sourcing includes percentages of hardwood tree species versus softwood species for each of its mills. It confirms that Enviva harvests predominantly hardwood tree species to manufacture its wood pellets:

<u>Enviva Pellet Mill</u>	<u>Hardwood</u>	<u>Softwood</u>
Ahoskie (North Carolina)	78%	22%
Northhampton (North Carolina)	89%	11%
Southhampton (Virginia)	100%	
Amory (Mississippi)	48%	52%

¹¹ *Id.* at 140 (emphasis added).

¹² *Id.* at 135 (emphasis added).

Wiggins (Mississippi)	43%	57%
Monroe (Louisiana)	82%	18%

Enviva identifies 46 species of trees used to produce its wood pellets. Several of these tree species are found in wetland forests: Atlantic White Cedar (*Chamaecyparis thyoides*), Bald Cypress (*Taxodium distichum*), Black Gum (*Nyssa sylvatica*), Green Ash (*Fraxinus pennsylvanica*), Pond Pine (*Pinus serotina*), Red Maple (*Acer rubrum*), Swamp Chestnut Oak (*Quercus michauxii*), Sweet Bay (*Magnolia virginiana*), Water Oak (*Quercus nigra*), and Water Tupelo (*Nyssa aquatic*). Two species listed as sourced for wood pellets, Atlantic White Cedar (*Chamaecyparis thyoides*) and Longleaf Pine (*Pinus palustris*), are dominant tree species in two of the most ecologically significant and endangered ecosystems in the region.

Enviva Wood Pellet Sourcing –Visual Evidence

A simple drive by visit to one of Enviva’s pellet facilities, or an aerial photograph, confirms that Enviva primarily sources wood pellets from whole trees and reveals the scope of forest harvest associated with these operations. As described in the Enviva IPO, all its pellet mills have massive log yards where trees are delivered for further processing into wood pellets.



Enviva Pellet Mill, Northampton County, North Carolina



Enviva Pellet Mill, Ahoskie, North Carolina



Enviva Pellet Mill, Southampton, Virginia



Enviva wood pellet clearcut in wetland hardwood forest, Urahaw Swamp, Northhampton County, North Carolina May 2015 (*photo Dogwood Alliance*)



Enviva wood pellet clearcut in wetland hardwood forest, Urahaw Swamp, Northhampton County, North Carolina showing forestry residuals left on ground, May 2015 (*photo Dogwood Alliance*)



Logs from Enviva wood pellet cut in wetland hardwood forest, Urahaw Swamp, Northhampton County, North Carolina, May 2015, entering Enviva mill (*photo Dogwood Alliance*)



Enviva wood pellet cut in wetland hardwood forest, Urahaw Swamp, Northhampton County, North Carolina, May 2015



Enviva wood pellet cut in wetland hardwood forest, Martin County, North Carolina, May 2015



Enviva wood pellet cut in wetland hardwood forest, Martin County, North Carolina, May 2015



Enviva wood pellet cut in wetland hardwood forest, Bertie County, North Carolina, July 2013



Enviva Pellet Mill, Cottondale, Florida



Enviva Pellet Mill, Wiggins, Mississippi



Enviva Pellet Mill, Amory, Mississippi