



Global Development And Environment Institute  
Tufts University

## EU Bioenergy Policies Will Increase Carbon Dioxide Concentrations

William R. Moomaw\*

In January 2018, the European Parliament voted its support for the Renewable Energy Directive that would double the amount of renewable energy to be added between 2020 and 2030. While the directive contains many excellent provisions, it will unfortunately double the amount of energy coming from forest bioenergy.

The European Union aims to replace fossil fuels with renewable energy, but ignores the fact that burning wood from forests releases carbon dioxide. Instead, bioenergy emissions are officially counted as zero or carbon neutral.

### **Forest bioenergy is not carbon neutral**

The Intergovernmental Panel on Climate Change summarized the emissions of bioenergy use as follows: “The combustion of biomass generates gross GHG emissions roughly equivalent to the combustion of fossil fuels.”<sup>1</sup> When wood is burned to produce electricity, it releases an estimated 80% more carbon dioxide per unit of electricity than coal.<sup>2</sup> This work by Dr. Sterman of MIT and his colleagues provides the first quantitative comparison of the total carbon emissions from forest bioenergy throughout the full carbon cycle, and compares them to coal, and renewables for a variety of bioenergy scenarios.

Modeling studies find that it is unlikely for the world to reduce its emissions from fossil fuels and other sources sufficiently to meet the 2°C limit on temperature growth, and propose negative emissions or active removal of carbon dioxide from the atmosphere. Integrated Assessment models arbitrarily

\* Dr. William Moomaw is the co-director of GDAE and lead author or coordinating lead author of multiple IPCC reports. Your comments may be sent to [gdae@tufts.edu](mailto:gdae@tufts.edu).

allocated this task to bioenergy with carbon capture and storage (BECCS). In these scenarios, trees that have already removed and sequestered carbon dioxide from the atmosphere are burned to generate electricity and the carbon dioxide emissions from combustion are then captured and stored in deep land reservoirs. This results in large removal rates if done at a sufficiently large scale. However, recent studies demonstrate that even if this hypothetical technical fix were possible in curbing additions of carbon dioxide to the atmosphere, planetary boundaries would be exceeded for water, nutrients, and biodiversity.<sup>3</sup> Hence massive use of forest bioenergy is unlikely to achieve the goal of constraining global temperature rise.

Burning wood to make electricity is also far more costly than deploying solar or wind technologies, and is only made economic by the European governments billions of dollars in annual subsidies.<sup>4,5</sup>

### **European demand for wood**

A 2016 study found that 45% of EU renewable energy was from burning wood, and by 2020 the amount would equal the total EU harvest.<sup>6</sup> According to an analysis of the new EU directive, conducted at Princeton University, “To supply even one third of the additional renewable energy likely required by 2030, Europe would need to burn an amount of wood greater than its total harvest today.”<sup>7</sup>

With Europe unable to meet its current demand for wood pellets to replace coal in electric power plants, the largest import supply market is now the forests of the southeastern United States. While pellet manufacturing facilities claim to use only biomass residue and wood product production waste such as sawdust, whole trees (stem wood) make up the majority of the raw material.<sup>8</sup> This has led to major deforestation, loss of critical habitat in a hot spot for biological diversity of plants and wildlife, and increased flooding and air pollution in the neighborhood of the pellet manufacturing plants.<sup>9</sup>

Finally, a study for the European Commission found that burning wood could undermine the EU’s ability to achieve its climate targets.<sup>10</sup>

### **Scientists voice concerns**

Prior to the vote by the European Parliament on January 17, 2018, two groups of scientists<sup>11</sup> sent letters documenting problems with the EU’s proposal to double the use for forest biomass.<sup>12</sup> Concerns include:

- Forest bioenergy should not be counted as zero, according to international rules, and should be limited to forest product production waste such as sawdust, and forest residues.

- Current demand to replace coal with wood pellets is decimating forest ecosystems that are biodiversity hot spots, particularly in the American southeast.
- Wood pellet manufacturing plants and accompanying deforestation are more likely to be located in poor communities of color that suffer not only severe air pollution issues, but have been subject to major flooding in the past decade as the forests no longer moderate more intense rainfall.<sup>13</sup>
- To meet the growing demand for forest bioenergy in the developed world, developing countries in Africa and Asia will become the future source for woody biomass. This will likely increase deforestation there and undermine the goals of Article 5 of the Paris Climate Agreement to protect developing country forests to mitigate climate change.
- Current and planned expansion of bioenergy from forests is inconsistent with every international forest agreement from 1992 to 2014. It undermines the Convention on Biodiversity and holds back attempts to meet four of the Sustainable Development Goals agreed to by all nations: SDG#7 Clean and Affordable Energy; SDG#12 Responsible Production and Consumption, SDG# 13 Climate Action, and SDG# 15 Life on Land (biodiversity).

### **The future of forest bioenergy**

Unfortunately, the United States is following in the policy footsteps of the EU with federal legislation requiring that all federal agencies count forest bioenergy as carbon neutral.<sup>14</sup> Scott Pruitt, the Administrator of the Environmental Protection Agency has recently announced that he is prepared to declare forest bioenergy carbon neutral even though the Science Advisory board has not concluded that this is true.<sup>15</sup> Even leading states in climate change policy such as California and Massachusetts have joined the forest bioenergy bandwagon and are subsidizing the burning of wood for heat<sup>16</sup> and electricity, potentially undermining ambitious carbon emissions reduction goals.

Future projections of forest bioenergy from the International Energy Agency suggest an 8-fold increases in the use of wood from forests to produce electricity in developed countries from 430 TWh in 2014 to approximately 3,500 TWh in 2050.<sup>17</sup>

It is essential that we stop subsidizing the use of forests to produce heat and electricity. The world must recognize that the carbon emissions from burning wood for fuel contributes to global warming and climate change just as carbon emissions from fossil fuels do. Instead, we must restore degraded forests and soils and the other terrestrial ecosystems so as to increase the removal rate of carbon dioxide from the atmosphere. With these actions, atmospheric concentrations of carbon dioxide will gradually come down and eventually restore a supportive climate system once again.

## Endnotes

- <sup>1</sup> IPCC, AR5 WG III, 11.13.4 GHG emission estimates of bioenergy production systems (2014)
- <sup>2</sup> John D. Sterman, Lori Siegel, and Juliette N. Rooney-Varga, “Does Replacing Coal with Wood Lower CO<sub>2</sub> Emissions? Dynamic Lifecycle Analysis of Wood Bioenergy,” *Environmental Research Letters* 13, no. 1 (2018): 015007, <https://doi.org/10.1088/1748-9326/aaa512>
- <sup>3</sup> Vera Heck, Dieter Gerten, Wolfgang Lucht, Alexander Popp, “Biomass-based negative emissions difficult to reconcile with planetary boundaries.” *Nature Climate Change*. (2017) doi:10.1038/s41558-017-0064-y
- <sup>4</sup> Stefan Koster and William R Moomaw, “Can U.S. and U.K. Forest Bioenergy Subsidies Have Adverse Climate Consequences?” *Econofact*, August 15, 2017, <http://econofact.org/can-u-s-and-u-k-forest-bioenergy-subsidies-have-adverse-climate-consequences>
- <sup>5</sup> IEA Bioenergy 2017: Annex 2 Bioenergy Technologies.
- <sup>6</sup> Kenneth Richter, “A Comparison of National Sustainability Schemes for Solid Biomass in the EU,” *Fern* (2016) ISBN: 978-1-906607-65-4 <http://www.fern.org/sustainabilityschemes>
- <sup>7</sup> John Beddington, et. al., “EU Must Not Burn the World’s Forests for ‘renewable’ Energy,” *The Guardian*, December 14, 2017, <http://www.theguardian.com/environment/2017/dec/14/eu-must-not-burn-the-worlds-forests-for-renewable-energy>.
- <sup>8</sup> William R Moomaw, “To curb climate change, we need to protect and expand US forests” *The Conversation*, May 8, 2017, <https://theconversation.com/to-curb-climate-change-we-need-to-protect-and-expand-us-forests-76380>
- <sup>9</sup> *Ibid*
- <sup>10</sup> Pinchot Institute for Conservation, “Environmental implications of increased reliance of the EU on biomass from the South East US,” *European Commission*, 2016, <https://publications.europa.eu/en/publication-detail/-/publication/8005fb30-81e9-4399-9b19-01af823fa42d>
- <sup>11</sup> The author was directly involved in initiating both of these letters.
- <sup>12</sup> 796 Signatories, “Scientist Letter on EU Forest Biomass,” January 9, 2018, [http://www.ase.tufts.edu/gdae/Pubs/climate/LetterFromScientistsToEuParliament\\_ForestBiomass\\_January\\_2018.pdf](http://www.ase.tufts.edu/gdae/Pubs/climate/LetterFromScientistsToEuParliament_ForestBiomass_January_2018.pdf); Philip B. Duffy et al., “Letter from American Scientists to Members of the EU Parliament Regarding Forest Biomass,” January 8, 2018, [http://www.ase.tufts.edu/gdae/Pubs/climate/LetterFromAmericanScientistsToEUParliament\\_2018.pdf](http://www.ase.tufts.edu/gdae/Pubs/climate/LetterFromAmericanScientistsToEUParliament_2018.pdf).
- <sup>13</sup> Stefan Koester and Sam Davis, “Siting of Wood Pellet Production Facilities in Environmental Justice Communities in the Southeastern United States,” *Environmental Justice*, January 29, 2018, <https://doi.org/10.1089/env.2017.0025>.
- <sup>14</sup> Chris Mooney, “These Experts Say Congress Is ‘Legislating Scientific Facts’ — and Wrong Ones, Too,” *Washington Post*, February 26, 2016, <http://wapo.st/1Q8xyWr>; The Editorial Board, “An Energy Bill in Need of Fixes,” *The New York Times*, April 20, 2016, <https://nyti.ms/2poR2wN>.
- <sup>15</sup> “EPA Chief Signals Push To Declare Wood Energy Carbon-Neutral On N.H. Visit,” February 14, 2018, <http://nhpr.org/post/epa-chief-signals-push-declare-wood-energy-carbon-neutral-nh-visit>.
- <sup>16</sup> Department of Energy Resources “225 CMR 16.00: ALTERNATIVE ENERGY PORTFOLIO STANDARD (APS)”, 2017. <https://www.mass.gov/files/documents/2018/01/05/225cmr16.pdf>
- <sup>17</sup> “How 2Guide for Bioenergy Roadmap development and Implementation International Energy Agency,” 2017, <https://www.iea.org/publications/freepublications/publication/How2GuideforBioenergyRoadmapDevelopmentandImplementation.pdf>

Tufts University’s Global Development And Environment Institute (GDAE) offers a series of [climate policy briefs](#) covering the Paris agreement, the role of forests and soils, and current policies on biomass and forests.