CARBON AND FOREST IMPACTS OF THE UK'S BIOENERGY POLICY

Mary S. Booth, PhD
Partnership for Policy Integrity

April 18, 2016

PFPI
driven by data

A scary few weeks if you care about climate

Scientists Warn of Perilous Climate Shift Within Decades, Not Centuries

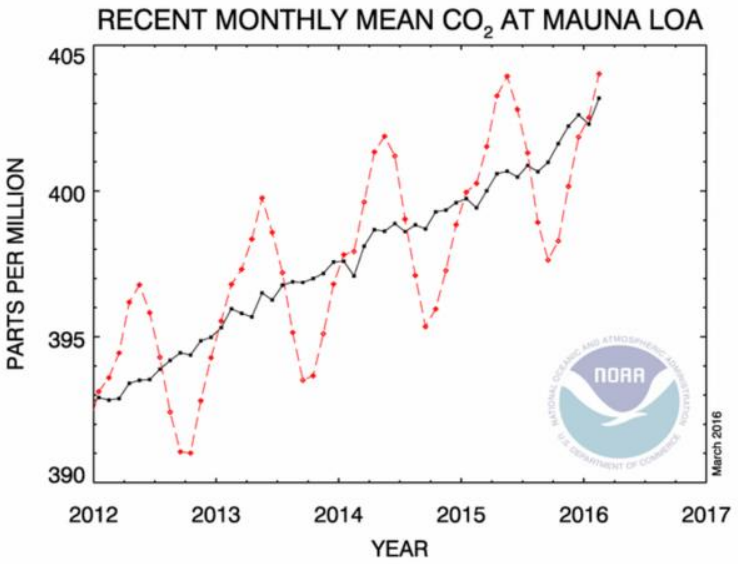
The New York Times March 22, 2016

Climate Model Predicts West Antarctic Ice Sheet Could Melt Rapidly

The New York Times March 30, 2016

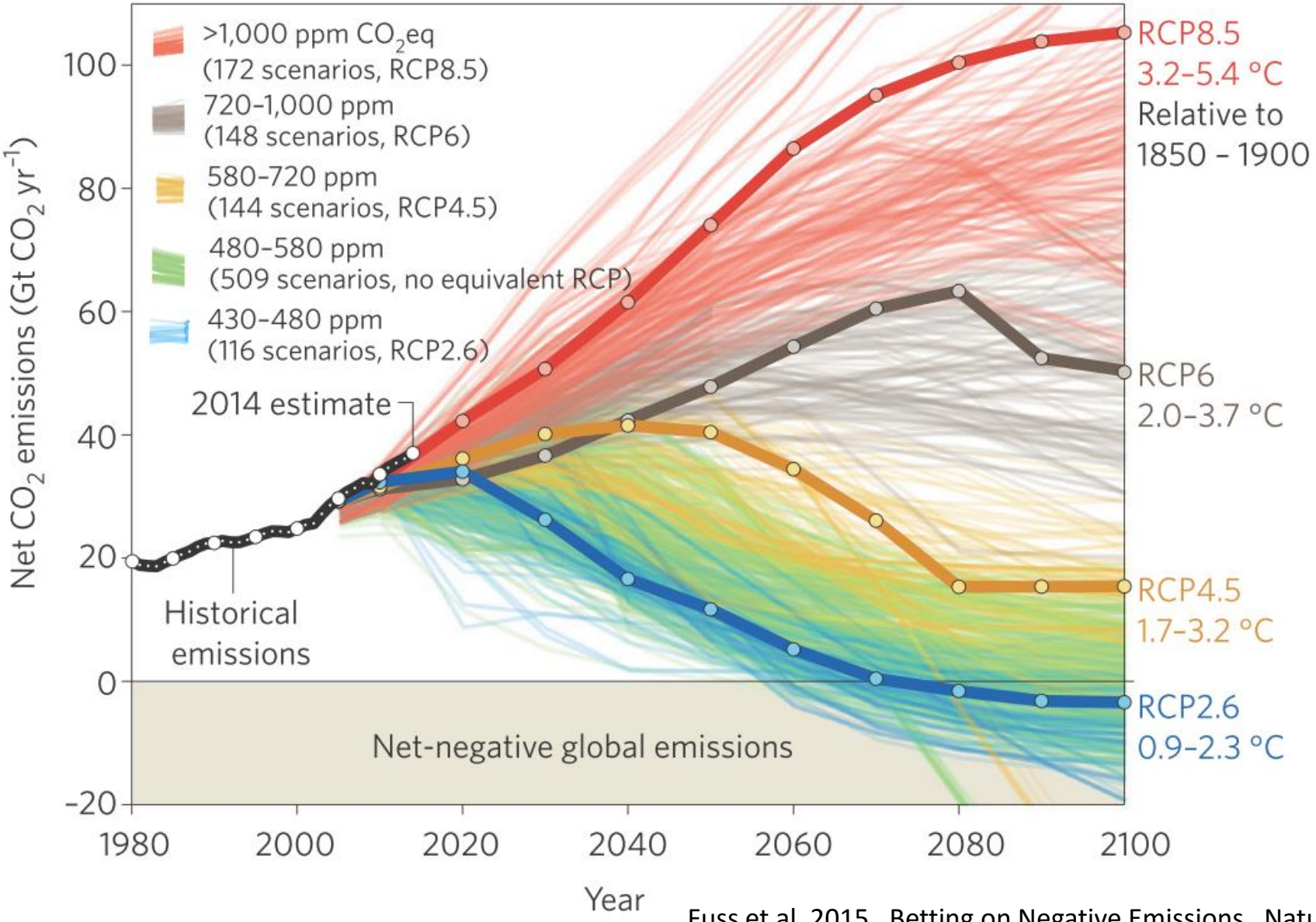
Atmospheric carbon dioxide levels are showing a startling increase

The Washington Post March 10, 2016



"Atmospheric carbon dioxide concentrations have spiked more in the period from February 2015 to February 2016 than in any other comparable period dating back to 1959"

To keep temperature rise below 2 deg C, we need negative emissions



Fuss et al, 2015. Betting on Negative Emissions. Nature.

Forests are our most important carbon sinks

U.S. GHG Emissions and Sinks by Sector (million tons CO_2 equivalent)

Sector	1990	2005	2011
Energy	5,806.2	6,891.2	6,333.6
Industrial Processes	348.4	364.6	359.9
Solvent and Other Product Use	4.9	4.9	4.9
Agriculture	456.2	491.9	508.7
Land Use, Land-Use Change and Forestry	15.1	28.0	40.3
Waste	185.0	150.9	140.8
Total Emissions	6,815.9	7,931.5	7,388.0
Land Use, Land-Use Change and Forestry (Sinks)	(875.8)	(1,099.9)	(997.6)
Net Emissions (Sources and Sinks)	5,940.0	6,831.5	6,390.4

Sinks mostly comprised of forest growth

997.6 ÷ 7,388 = **13.5 %** of US emissions taken up each year

From U.S. EPA 40 CFR Parts 60, 70, 71 et al. Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Generating Units; Proposed Rule (page 1441)

Enviva pellet plant, Ahoskie, North Carolina – 78% hardwood

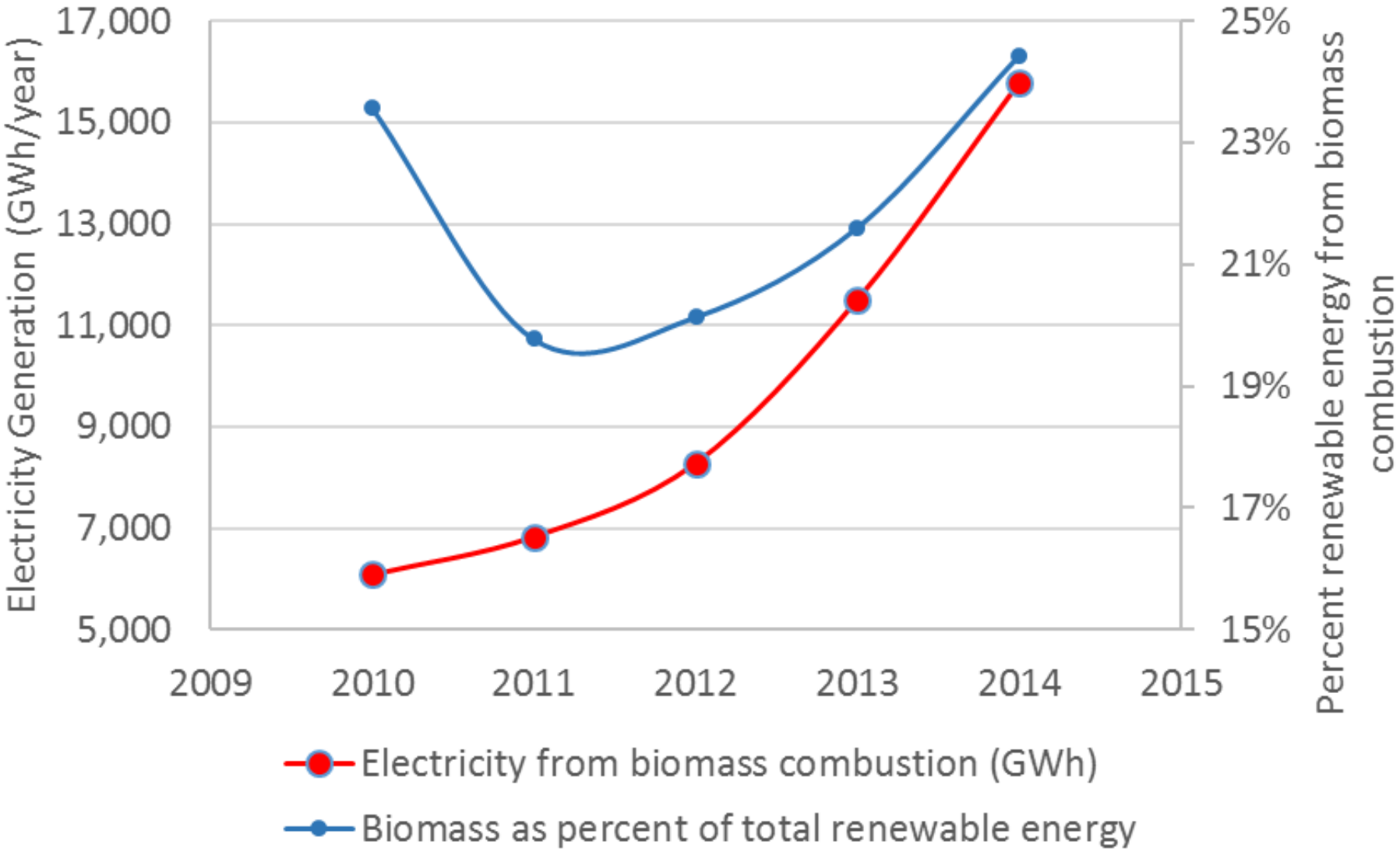
Photo: Dogwood Alliance (www.dogwoodalliance.org)

Forest harvesting for pellets in North Carolina: ***"Little remains but stumps and puddles in what was once a bottomland hardwood forest"***

Joby Warrick, Washington Post 6/2/2015

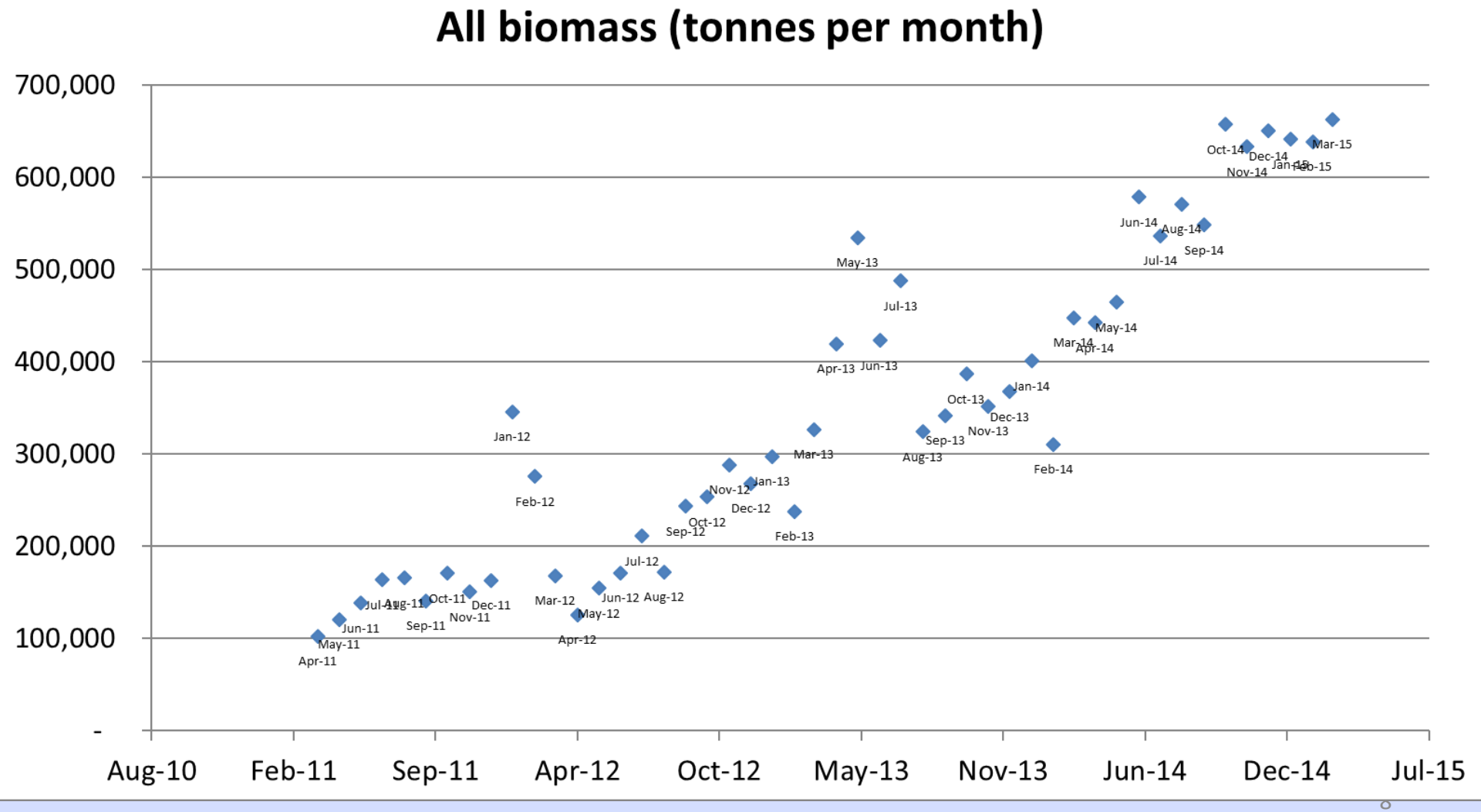
"How Europe's climate policies led to more U.S. trees being cut down"

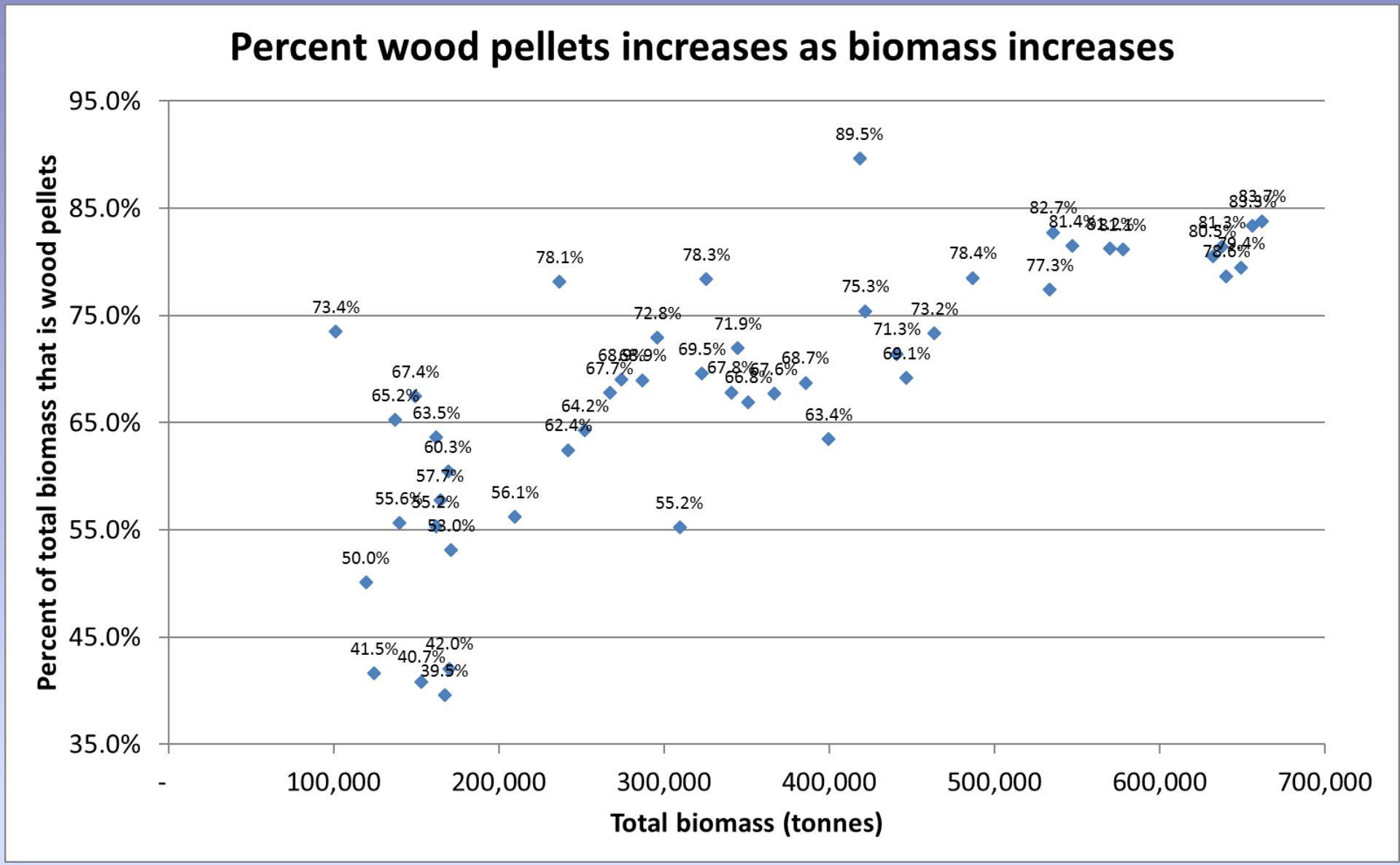
Biomass combustion provides an increasing amount of electricity in the UK each year



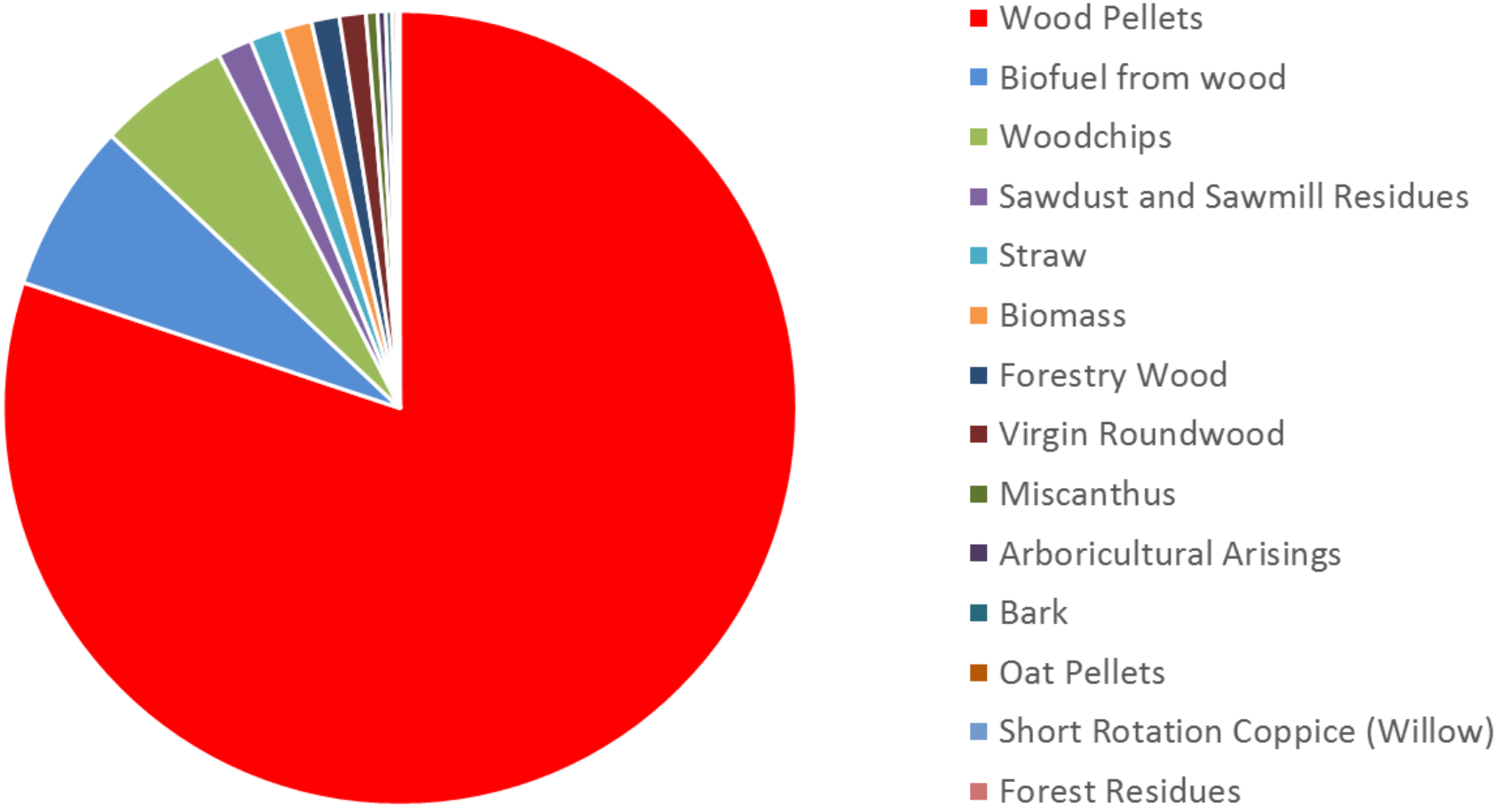
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/450298/DUKES_2015_Chapter_6.pdf

Biomass use in the UK has been increasing (2011 – 2015 data)

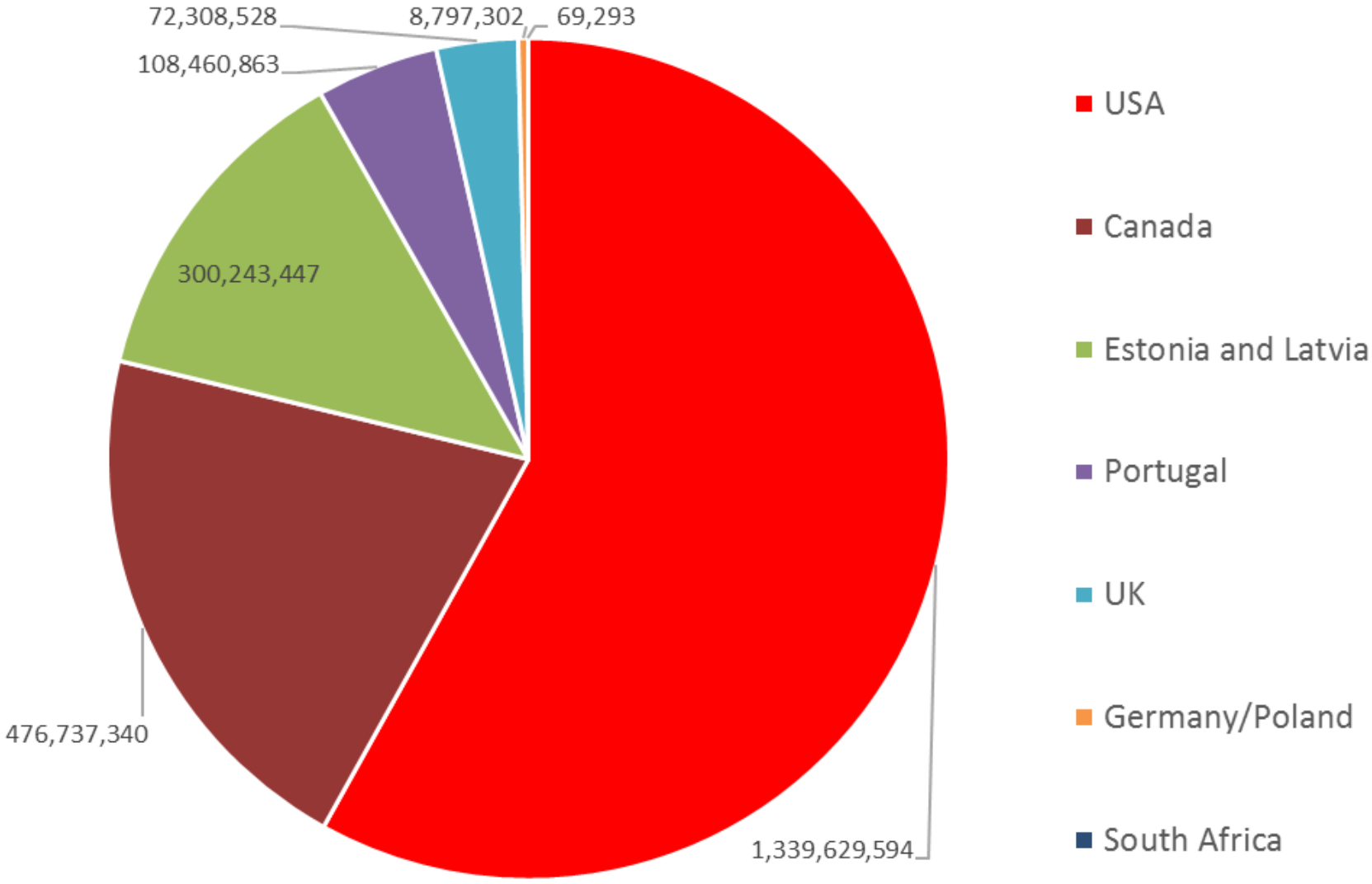



Percent wood pellets increases as biomass increases
Percent of total biomass that is wood pellets
95.0%
85.0%
75.0%
65.0%
55.0%
45.0%
35.0%
-
100,000
200,000
300,000
400,000
500,000
600,000
700,000
Total biomass (tonnes)
89.5%
82.7%
81.4%
78.1%
78.3%
78.4%
77.3%
75.3%
73.4%
72.8%
73.2%
71.9%
71.3%
69.5%
69.1%
68.7%
67.4%
65.2%
63.5%
64.2%
62.4%
63.4%
60.3%
57.7%
56.1%
55.6%
55.2%
55.2%
53.0%
50.0%
41.5%
40.7%
42.0%
39.5%

Most of the biomass burned in the UK is wood pellets (FY 14/15)



Most biomass is imported from US and Canada
(almost exclusively pellets imported from these countries)



3,960 MW Drax coal plant, Yorkshire, UK –2/6 units burn biomass

2015: Drax burned **5.9 million tons of biomass,** ~95% wood pellets, mostly from US and Canada

* Data from UK Office of Gas and Electricity Markets (OFGEM)

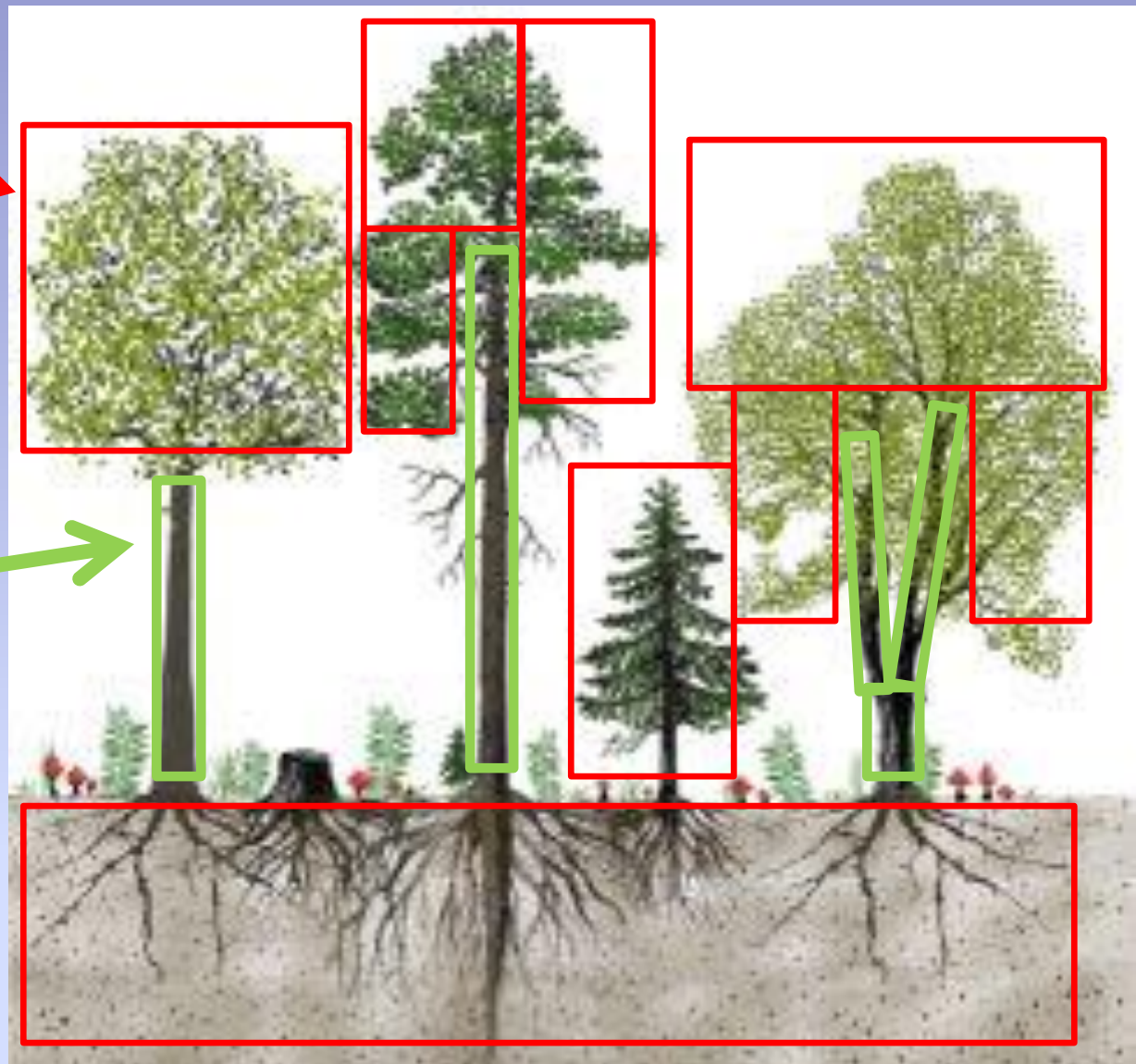
© Copyright Dave Pickersgill and licensed for reuse under this Creative Commons Licence

A tonne of wood pellets represents ~2.85 tonnes of green wood lost or burned during harvesting and processing – all representing CO2 emissions (~1:1)

Biomass that is harvested and burned for process heat, or left onsite to decompose

Large-diameter roundwood suitable for pellet manufacture (but not bark)

~ 16 m tonnes of CO2 directly emitted from Drax's biomass use in 2015



Claims that bioenergy reduces emissions

Drax: *"We're taking 12 million tonnes of carbon **out of the atmosphere** by moving three of our boilers from coal to biomass. That's the same as taking three million cars off the road, which is about ten percent of the UK's cars"*

Drax promotional video: http://www.bloomberg.com/news/videos/2015-05-20/how-green-is-biomass-power-from-forest-to-furnace

Enviva: *I have heard that burning wood pellets actually results in more carbon emissions than burning coal. Is that true?*

No. According to the UK Environment Agency, switching from coal to biomass reduces emissions of carbon dioxide by between 74 and 90% on a lifecycle basis.

http://www.envivabiomass.com/faq-most-frequently-asked/#emissions

80%

At Drax the use of biomass saves more than 80% of the carbon dioxide emitted when compared to the use of coal

Drax annual report, 2015

How can companies claim biomass "reduces" CO2 emissions?

Because the UK carbon counting protocol only counts CO2 emissions from fossil fuels burned during manufacturing and transport of wood pellets…

NOT EMISSIONS FROM BURNING THE PELLETS AT THE POWER PLANT.

8.3 Carbon Dioxide (CO_2)

The power station emits CO_2 from the combustion of fuel as well as from the chemical reaction within the FGD process. The CO_2 emissions are calculated and verified in compliance with the requirements of the EUETS. The breakdown for 2013 for each of the major combustion and process sources is provided in Table 6. Note that emissions from biomass are counted as zero within the EUETS.

Table 6. CO_2 emissions 2013

	Actual CO_2 (t calculated)	EUETS CO_2 (t calculated)
Coal and Petcoke	20,089,607	20,089,607
Biomass	2,799,391	0

CO_2 emissions rate

Coal: **1,901 lb/MWh**

Biomass: **2,128 lb/MWh**

Drax generation		2013	
Coal	TWh	23.3	88%
Biomass	TWh	2.9	12%

The IPCC does not treat bioenergy as carbon neutral

IPCC counts harvesting emissions in the land use change basket, not the energy basket

"The IPCC approach of not including bioenergy emissions in the Energy Sector total should not be interpreted as a conclusion about the sustainability or carbon neutrality of bioenergy." (http://www.ipcc-nggip.iges.or.jp/faq/faq.html)

"If bioenergy production is to generate a net reduction in emissions, it must do so by offsetting those emissions through *increased net carbon uptake of biota and soils".*

IPCC AR5 WG III 11.13.4 GHG emission estimates of bioenergy production systems, 2014

DECC report calls for counting changes in forest carbon stocks

"If the carbon stored in a forest reduces, carbon dioxide (CO2) is released to the atmosphere, whereas if the carbon stock of a forest increases, CO2 is removed from the atmosphere and sequestered as biomass in the forest…"

*These factors "**need to be considered if we wish to understand the true GHG intensities of different bioenergy feedstocks and technologies**."*

Stephenson, A.L., and MacKay, D.J.C. 2014. Scenarios for assessing the greenhouse gas impacts and energy input requirements of using North American woody biomass for electricity generation in the UK. Department of Energy & Climate Change, London, UK. At https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf.

It’s not the same to burn a 100-year-old hardwood tree, and straw…

… But the UK carbon framework treats both as if combustion emissions are zero.

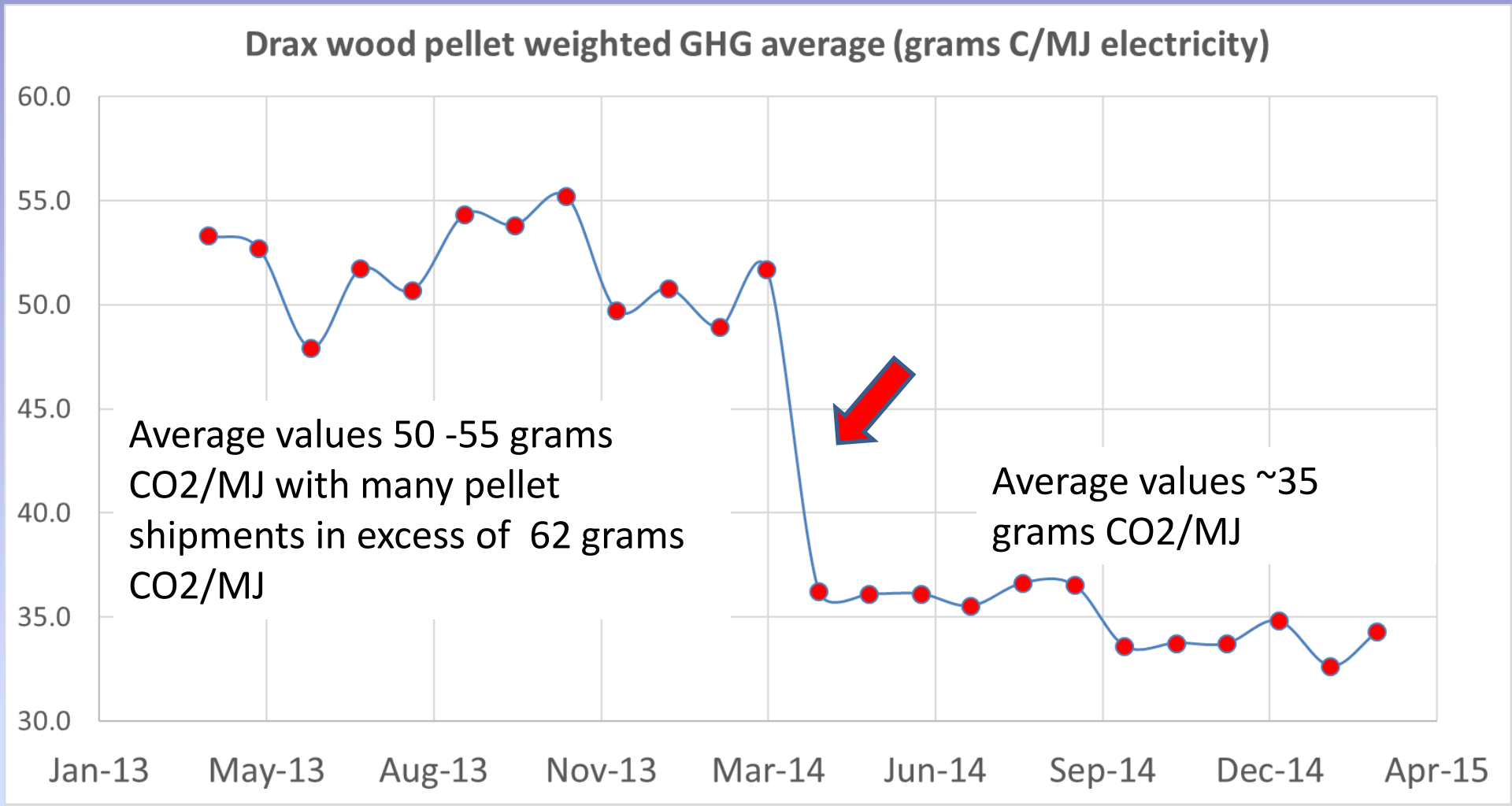
Fossil fuel emissions from wood pellet manufacturing and transport are counted under UK carbon accounting

UK Govt duration for target	Target - as grams CO2/MJ	as Lb/MWh	as kg/MWh
to 2020	79.2	629	285
2020 - 2025	55.7	442	200
2025 -2030	50.1	398	180

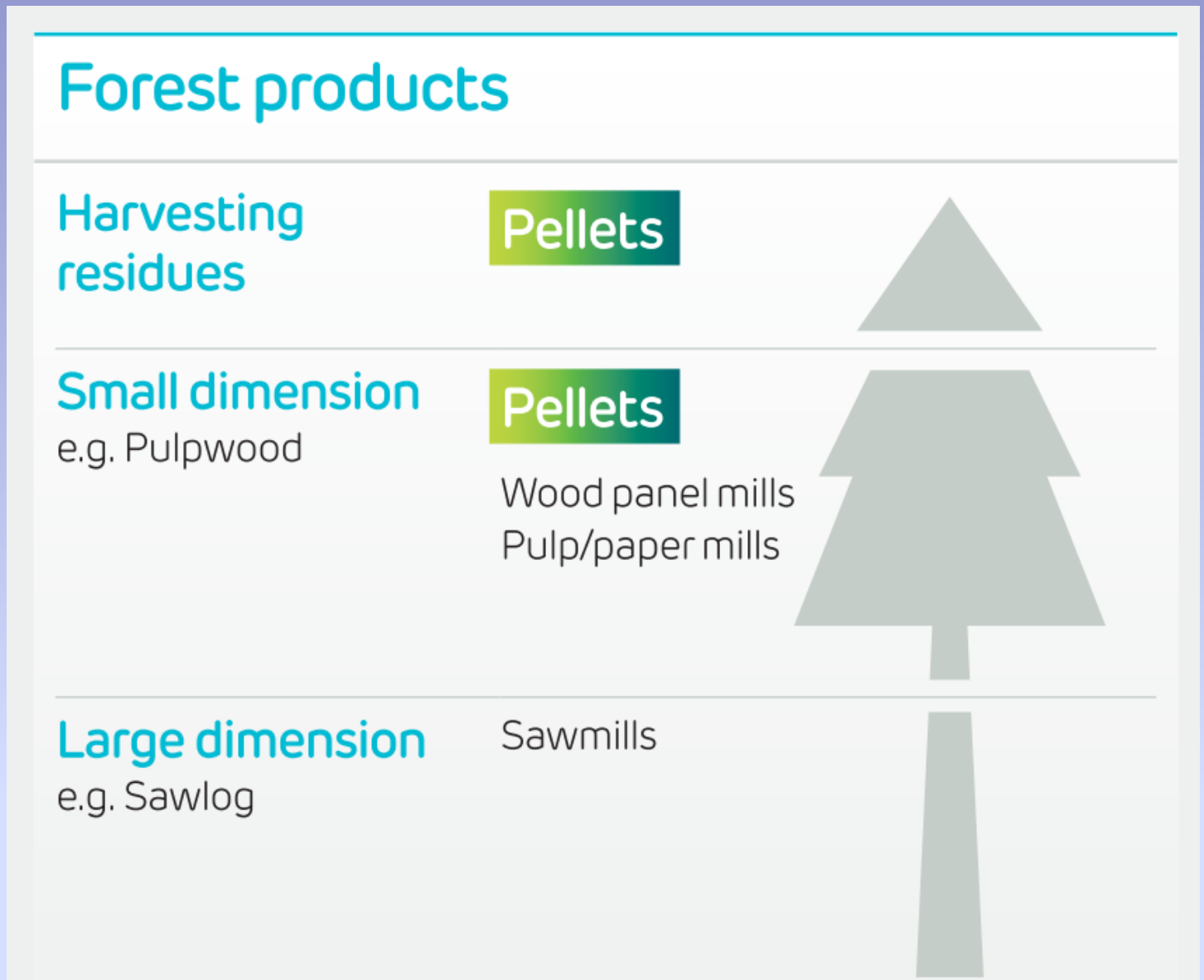
Stack emissions that are *not* counted, eg Drax: **2,128 lb/MWh**

Manufacturing and transport emissions at allowable levels represent *another* 18 – 30% CO2 on top of actual combustion emissions

33% drop in Drax's reported GHG values, FY 13/14 to FY 14/15



Drax implies that mostly residues and small timber are used as pellet feedstock (annual report, 2014)



"We take sawdust that's left over from sawmills, they're cutting the big trees into wood that goes into house building; the sawdust is collected; it's made into a pellet"

Photo courtesy Dogwood Alliance

http://www.bloomberg.com/news/videos/2015-05-20/how-green-is-biomass-power-from-forest-to-furnace

Bioenergy subsidies create perverse incentives

- Bioenergy industry is dependent on subsidies
  - (Drax's subsidies 2015: £451.8 m; Profit: £390.1 m)
- Subsidies are dependent on meeting "Greenhouse gas" and "Sustainability" standards
- But industry self-reports, and government doesn't check
  - OFGEM disclaimer: *"NB - This information has not been verified by Ofgem and is provided by the operator to the best of their knowledge and belief)*
- Industry setting up Sustainable Biomass Partnership to create certification scheme
  - Chaired by Drax CEO, populated by major industrial pellet producers and users

How Europe's climate policies led to more U.S. trees being cut down

By Joby Warrick June 2, 2015

The Washington Post

The Dirty Secret Behind Europe's Renewable Energy Industry

The EU has decided that burning US wood to make biofuel will solve global warming. What?

—*By* ***Ben Adler*** | Wed Aug. 27, 2014 2:40 PM EDT

Mother Jones

Mail Online

The UK's £1billion carbon-belcher raping US forests...that YOU pay for: How world's biggest green power plant is actually INCREASING greenhouse gas emissions and Britain's energy bill

By DAVID ROSE FOR THE MAIL ON SUNDAY

PUBLISHED: 00:35, 7 June 2015 | **UPDATED:** 12:42, 7 June 2015

What's Replacing Coal In Europe? Imported Wood

By Mary Beth Griggs

SMITHSONIAN.COM

AUGUST 27, 2014

Smithsonian.com

ALJAZEERA AMERICA

Louisiana forests being sacrificed to fuel Europe's biomass boom

January 15, 2014 7:00AM ET

by Peter Moskowitz - @ptrmsk

'Wood-pellet fuel emits more carbon than coal': U.S. watchdog to probe shock claims on power giant Drax's 'green' supplier

By DAVID ROSE FOR THE MAIL ON SUNDAY

PUBLISHED: 21:57, 12 March 2016 | **UPDATED:** 10:21, 14 March 2016

Mail Online

Amber Rudd response to Dogwood Alliance and NRDC "Our Forests Aren't Fuel" Campaign

"Our criteria are designed to protect certain habitats from exploitation and take into account a range of social, economic and environmental issues including protecting biodiversity, land use rights and sustainable harvesting.

*The criteria require that biomass should only come from forests that have plans to be regrown, whether through natural or planted regeneration."**

17th November, 2015

* note: nothing about reducing GHG emissions

Wetland forests: “Enviva suppliers take extra care by using specialized harvesting equipment and techniques that minimize environmental impacts and protect soil and water quality”

http://www.envivabiomass.com/faq-forests-fiber-sourcing/#wetlands

Photo courtesy Dogwood Alliance

Enviva: "While some images of clear-cut forests can be unsettling, this practice is entirely consistent with, and in many cases essential to, sustainable forest management."

Photo courtesy Dogwood Alliance

http://www.envivabiomass.com/faq-forests-fiber-sourcing/#clear

Drax coal-to-wood conversion of 3rd unit: EU State Aid Investigation

Complaints filed by US pulp and paper producers:

Project "*would lead to unsustainable environmental practices noting that planting commercial trees in the US South East has been declining for 3 decades. Combined with increased pellet production, this might lead to negative forest grow rates in the region, unsustainable environmental practices and loss of biodiversity.*

The greenhouse gases (GHG) emissions reductions obtained by burning imported wood pellets and the soundness of the United Kingdom sustainability criteria for biomass were also disputed."

http://ec.europa.eu/competition/elojade/isef/index.cfm?fuseaction=dsp_result

Complaint to the US Securities and Exchange Commission (www.pfpi.net)

34 Investment groups with $53 billion AUM

- Claims that wood pellets “reduce” emissions compared to coal, without disclosing that biomass combustion CO2 isn’t counted
- Inaccurate and misleading portrayals of current US and European policy developments.
- Complex and self-contradicting discussions that exaggerate the sustainability of feedstock sources and downplay the use of whole trees as pellet feedstock.

Mary S. Booth

mbooth@pfpi.net

PFPI
driven by data