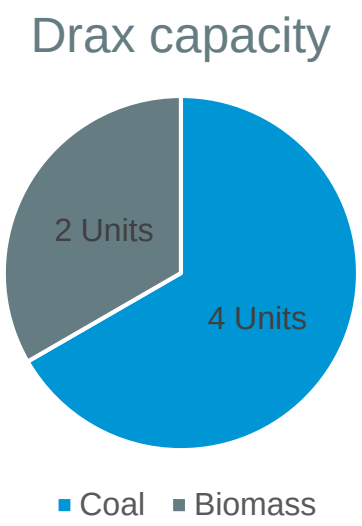
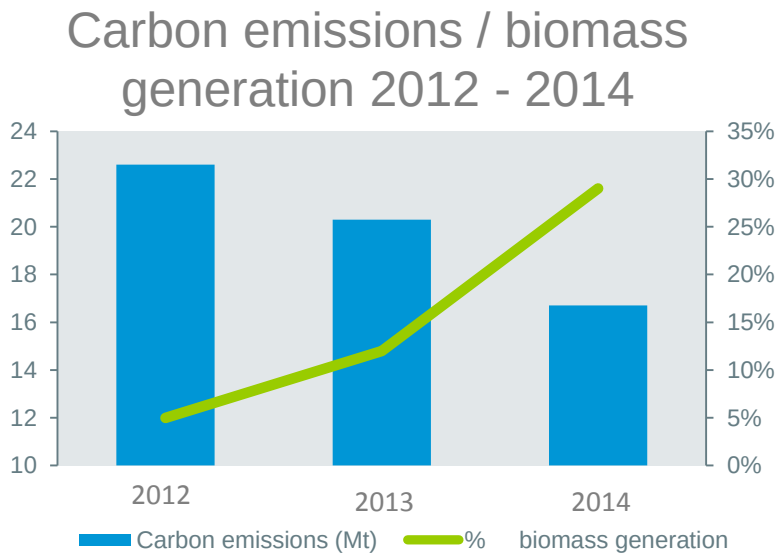
Biomass Supply

February 2015

Drax delivers low carbon energy at scale – a third of Drax's capacity is now biomass





Drax generation		2013		2014	
Coal	TWh	23.3	88%	18.8	71%
Biomass	TWh	2.9	12%	7.9	29%
Net Sales	**TWh**	**26.2**		**26.7**	

		2012	2013	2014
Carbon Emissions	Mt	22.6	20.3	16.7
Biomass Generation	%	5	11	30

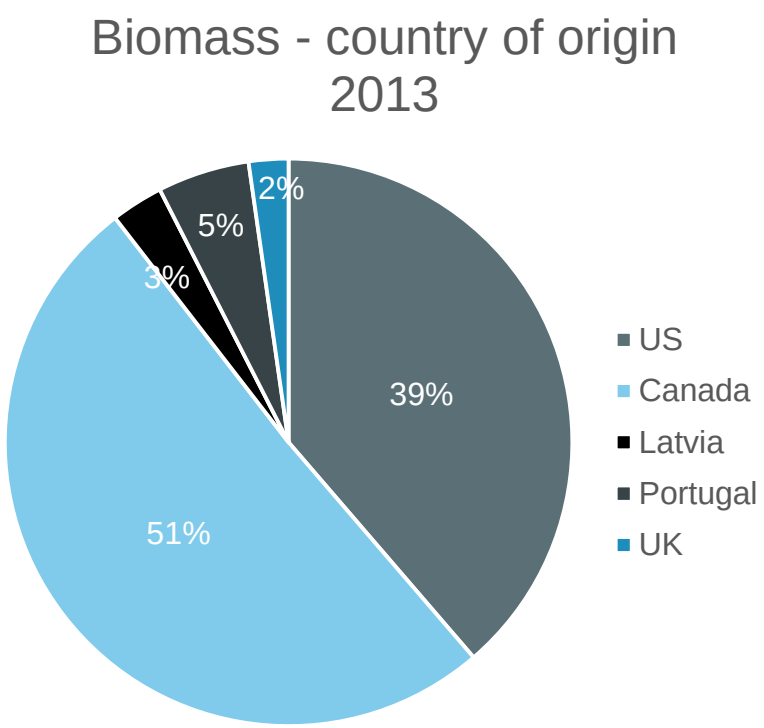
Carbon savings – Drax is the biggest carbon reduction project in Europe

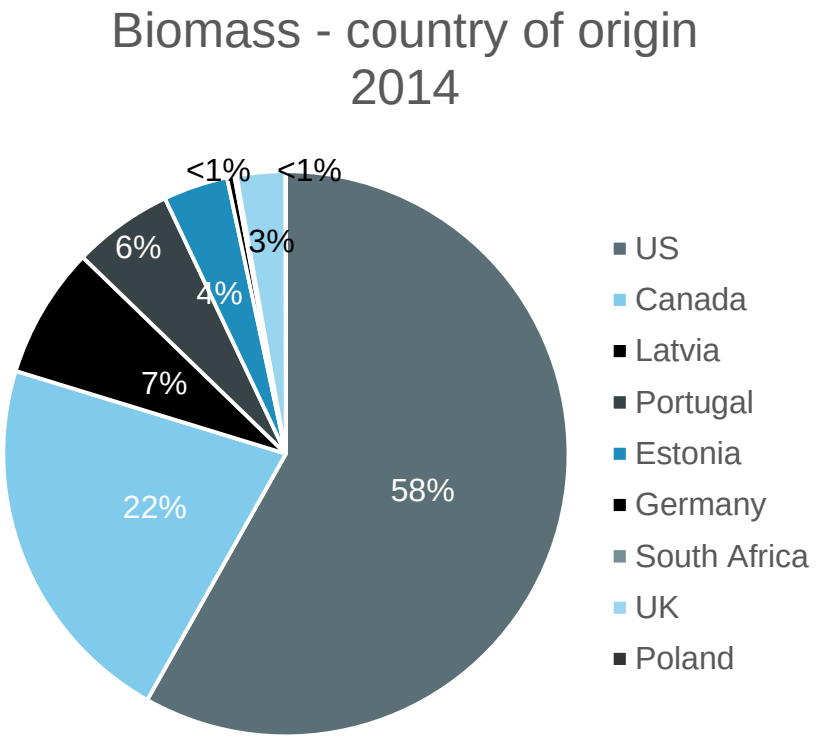
	Carbon saved (Mt/TWh)	Carbon saved 2013 (Mt)	Carbon saved 2014 (Mt)
Including lifecycle emissions*	0.767	2.2	6.1
Excluding lifecycle emissions	0.844	2.4	6.7

By 2016 it is anticipated that half of Drax's boilers will have converted to biomass. This will deliver carbon savings, relative to Drax's pre-biomass conversion emissions, of around 12 million tonnes per annum

* Life cycle emissions include carbon emissions associated with the processing and transport of pellets

Biomass* country of origin – diversification of supply



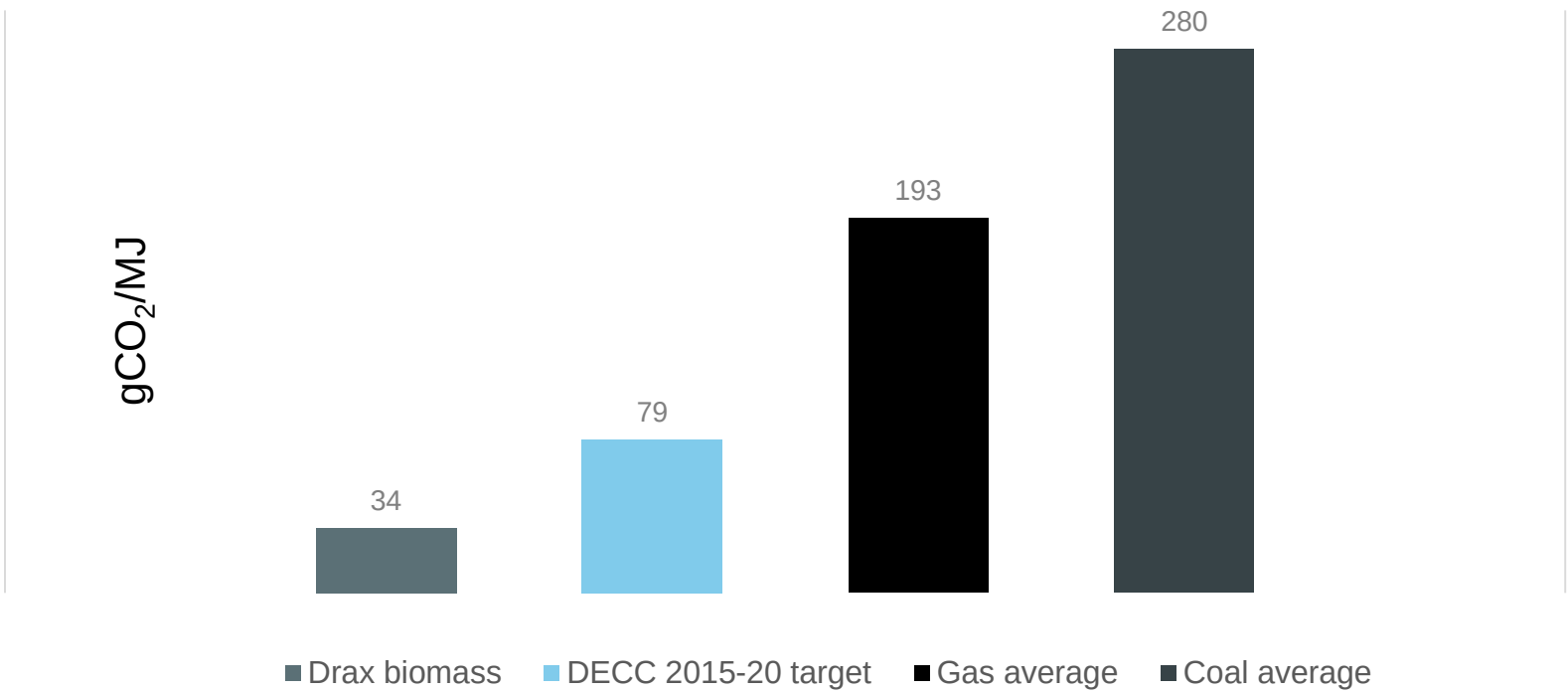


	US	Canada	Latvia	Portugal	Estonia	Germany	South Africa	UK	Poland	Total
2013	619,045	813,305	47,621	83,838	-	-	-	36,156	-	**1,599,965**
2014	2,380,347	882,758	307,114	234,287	151,196	17,376	5,304	113,345	914	**4,092,643**

All figures in metric tonnes, and rounded to nearest whole unit

* Wood and agricultural residue

Life cycle emissions – calculated using Ofgem's Solid and Gaseous Biomass Carbon Calculator



Country	Metric tonnes	GHG gCO_2/MJ (1)
Canada	882,758	27
USA	2,380,347	39
Other	829,538	25
Overall	**4,092,643**	**34**

GHG Target 2015-2020(2)	Drax Biomass in 2014	Gas(3)	Coal(4)
$79gCO_2/MJ$	$34gCO_2/MJ$	$193gCO_2/MJ$	$280gCO_2/MJ$

(1) GHG = Green House Gas calculated using Ofgem Solid and Gaseous Biomass Carbon Calculator (B2C2)
(2) Target includes emissions from transportation
(3) Source: Friends of the Earth, Russian piped gas
(4) Source: Environment Agency, UK-mined coal average
(5) All figures independently audited to ISAE3000 standard

Fibre type by country 2014 – Ofgem classifications

	Bark	Sawdust	Slab wood	Sawmill Residues	Forest residues	Diseased Wood & Storm Salvage	End of Life timber	Thinnings	Tree stumps	Waste Wood	Clear felled virgin timber	Long rotation forestry	Short Rotation Forestry	Short Rotation Coppice	Agricultural residues, (Oats Peanut)	Straw and Miscanthus	Total
Canada	3,436	52,613	-	761,281	56,110	442	-	8,877	-	-	-	-	-	-	-	-	**882,758**
Estonia	-	34,635	-	55,031	-	-	-	61,530	-	-	-	-	-	-	-	-	**151,196**
Germany	-	10,425	-	869	1,738	-	-	4,344	-	-	-	-	-	-	-	-	**17,376**
Latvia	-	92,953	-	72,084	75,977	-	-	64,447	-	-	-	1,653	-	-	-	-	**307,114**
Poland	-	549	-	46	90	-	-	229	-	-	-	-	-	-	-	-	**914**
Portugal	-	30,891	660	17,772	116,202	25,843	-	32,631	-	-	-	-	10,289	-	-	-	**234,288**
South Africa	-	-	-	5,304	-	-	-	-	-	-	-	-	-	-	-	-	**5,304**
UK	-	711	-	457	3,912	-	-	-	-	-	-	-	-	6,154	4,589	97,520	**113,343**
US	-	168,829	-	222,047	942,039	164,410	-	805,815	-	-	-	12,374	-	-	64,834	-	**2,380,347**
Total	**3,436**	**391,605**	**660**	**1,134,891**	**1,196,070**	**190,695**	**-**	**977,873**	**-**	**-**	**-**	**14,027**	**10,289**	**6,154**	**69,423**	**97,520**	**4,092,643**

This table has been prepared using independently audited data from suppliers and categorised according to the definitions used in Ofgem's Solid and Gaseous Biomass Carbon Calculator.

Definitions: **Bark** -The tough outer surface of trunks of trees and other woody plants. **Saw dust** - Powdered particles of wood produced by sawing. **Slab wood** - An outsize piece cut from a log when squaring it for lumber. **Sawmill residues** - Wood residue in the form of chip, bark, sawdust, etc. that is produced at a sawmill. **Forestry residues** - Branch wood, tops, bark and other residues (collected from forests at harvest, which can include other low grade wood). **Diseased wood and storm salvage** - Timber that is diseased or has been damaged during a storm. **End of life non-timber plantations** - Standing trees from plantations producing wood (for non-energy purposes) which have reached the end of their useful life. **Thinnings** - Roundwood from a forest or plantation thinning, as long as this practice does not change the land use status of the area. **Tree Stumps -** The basal portion of a tree remaining after the rest has been removed. **Waste wood**: Clean or treated (post-consumer) waste wood, chipboard, MDF, etc. **Clear-felled virgin forestry** - An area lightly forested (i.e. 10-30% canopy cover) with non-plantation trees and clear-felled for biomass. **Long rotation forestry** – Low quality fibre from broadleaf or conifer tree plantations felled after a growing period of several decades, and then replanted. **Short Rotation Forestry** - tree plantations with short harvest rotations. **Short rotation coppice** – Willow or poplar managed through coppicing

Forest growth – in the southern US states* which supply Drax forest growth substantially exceeds harvest

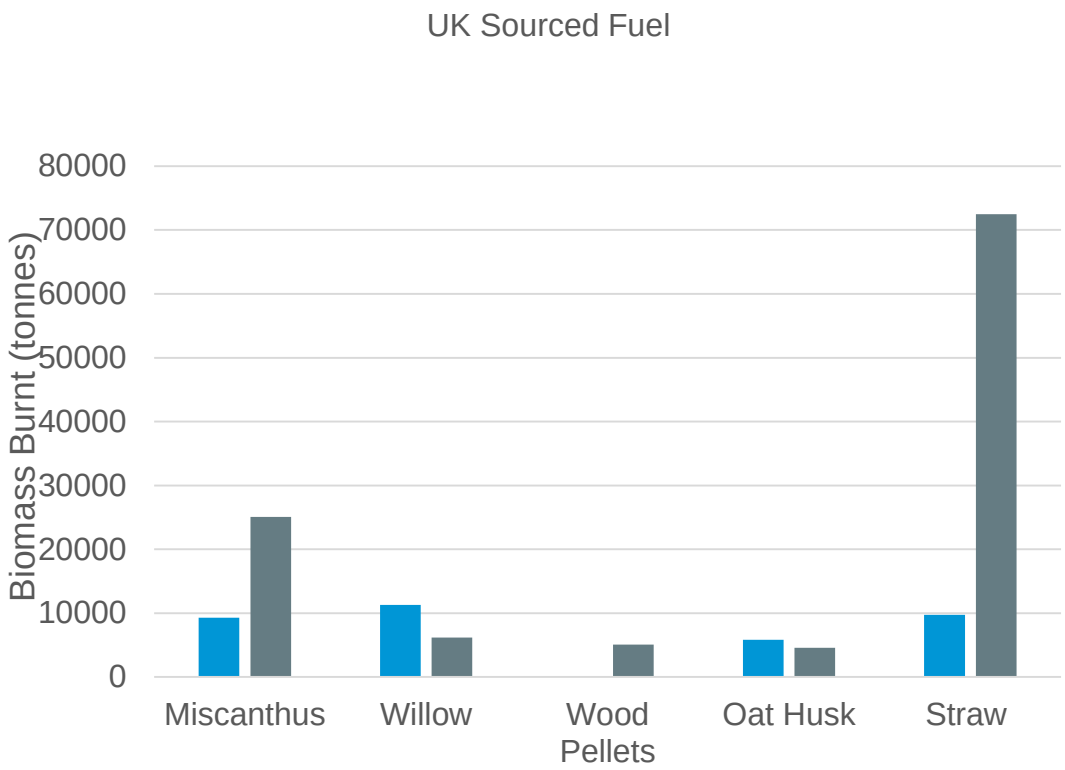
Surplus growth exceeds harvest (Mm^3)			
	Net Growth	Removals	Surplus
Total	306	182	**124**

Source – RPA Assessment 2012, USDA

Net growth is the total increment from growth (gross growth) over a period, minus the volume of wood in trees that have died during that period. Data is for timberland, all species.

* Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, Virginia

Types of UK sourced fibre burnt – inconsequential competition for UK grown wood



UK sources

- Drax only makes use of UK biomass when it is sustainable and economically attractive
- Overwhelmingly this means using the by-products of farming, such as straw or energy crops from marginal land

	2013	2014*
Energy Crop		
Miscanthus	9,302	25,058
Willow	11,290	6,155
Forestry		
Wood Pellets	nil	5,081
Non Energy Crop		
Oat Husk	5,805	4,589
Straw	9,759	72,463
Total	36,156	113,345

* Straw burn increases in 2014 because some straw was purchased in 2013 but burnt when Drax's second unit converted to biomass in October 2014