Unlocking Agricultural Biomass Potential:

Lessons from Forestry and Global Market Insights

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- Global coverage of biomass markets: price assessments on Europe, N America, Asia-Pacific markets
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- Market news, in-depth analysis
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Argus *Biomass Markets*

Weekly biomass markets news and analysis

Issue 24-44 | Wednesday 30 October 2024

MARKET COMMENTARY

Atlantic basin: Spot firms

The spot price of industrial wood pellets for deliveries to northwest Europe (NWE) extended its weekly gains, as trading activity picked up alongside discussions for deliveries further out along the curve.

The 90-days industrial wood pellet price rose by $1.83/t to $193.88/t cif NWE on Wednesday.

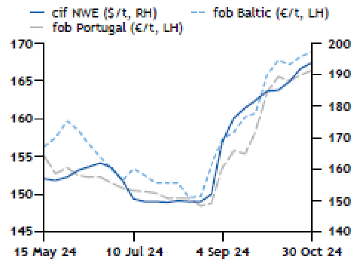
A spot deal for 30,000t of industrial wood pellets for delivery in the second half of November was heard concluded at $190/t cif NWE, but it could not be confirmed with the counterparty. The trade was aimed at offsetting a drop in pellet production, following stormy weather in the US in late September-October.

Demand was expected to pick up further out in the spot window, which extended to 29 January this week, when larger end users will supplement stocks to meet increased consumption. Most participants expect higher prices for deliveries in January, by which time inventories will likely have largely depleted.

Spot buying interest was between $180-190/t cif NWE, while most producers were reluctant to drop offers below $200/t cif NWE - where breakeven prices were estimated.

Temperatures were edging down throughout Europe and expected to prompt higher consumption in the coming month, compared with the weak start to the heating season. In London, overnight temperatures were forecast at 7.7°C

Argus industrial wood pellet index



EUROPEAN INDUSTRIAL WOOD PELLETS

Wood pellets - within 90 days (spot)

	Week index		Month index		
	Price	±	Oct	Sep	Aug
cif NWE $/t	193.88	+1.83	188.70	176.51	150.22
fob Baltic €/t	168.86	+0.69	167.60	159.09	151.17
fob Portugal €/t	166.43	+0.60	165.28	155.72	149.04

Wood pellets - within 90 days (spot)

	Price	±
cif NWE $/MWh	41.06	+0.39
fob Baltic €/MWh	35.76	+0.15
fob Portugal €/MWh	35.25	+0.13

Wood pellets - forward prices

	Bid	Ask	±
cif NWE $/t			
4Q24	189.50	195.50	+2.50
1Q25	193.00	199.00	+1.00
2Q25	195.50	201.50	+0.50
3Q25	195.25	201.25	+0.25
2025	196.00	202.00	nc
2026	200.50	206.50	nc
2027	202.50	208.50	nc
fob Baltic €/t			
4Q24	165.00	171.00	nc
1Q25	172.00	178.00	nc
2Q25	171.00	177.00	nc
3Q25	171.00	177.00	nc
2025	174.00	180.00	nc
2026	179.50	185.50	nc
2027	182.50	188.50	nc
fob Portugal €/t			
4Q24	161.50	167.50	nc
1Q25	171.50	177.50	nc
2Q25	170.50	176.50	nc
3Q25	170.50	176.50	nc
2025	173.50	179.50	nc
2026	178.00	184.00	nc
2027	181.00	187.00	nc

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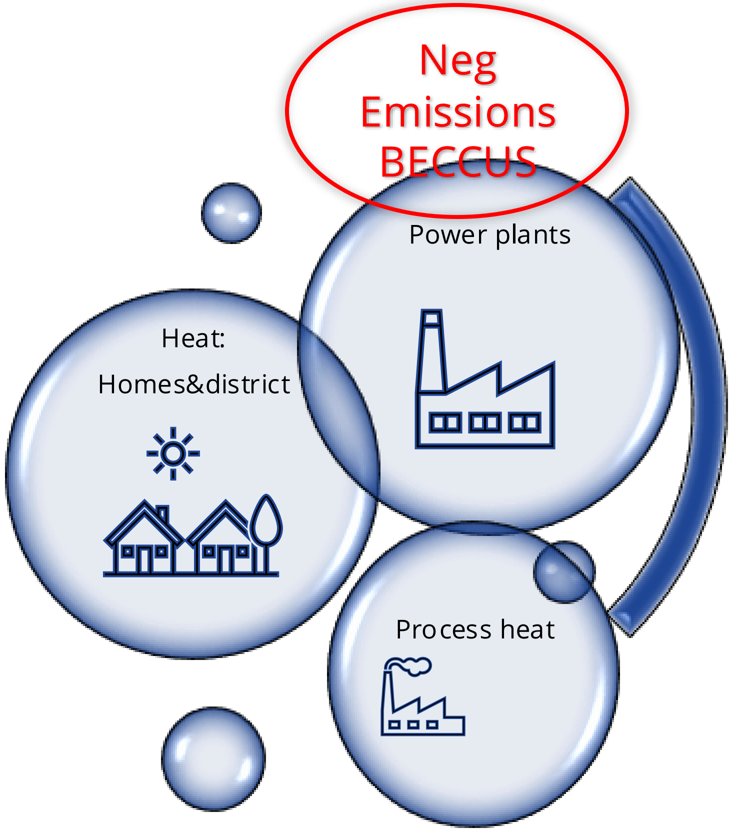
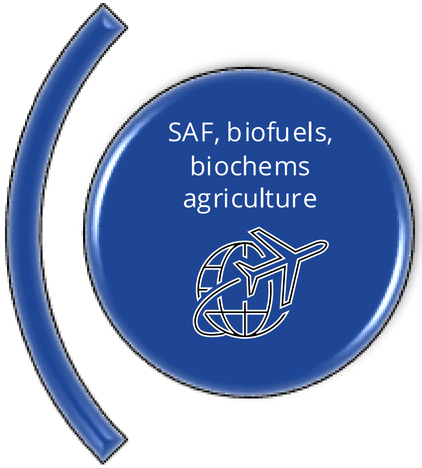
The Biomass Downstream Demand Centres

Current and Future Uses of Biomass





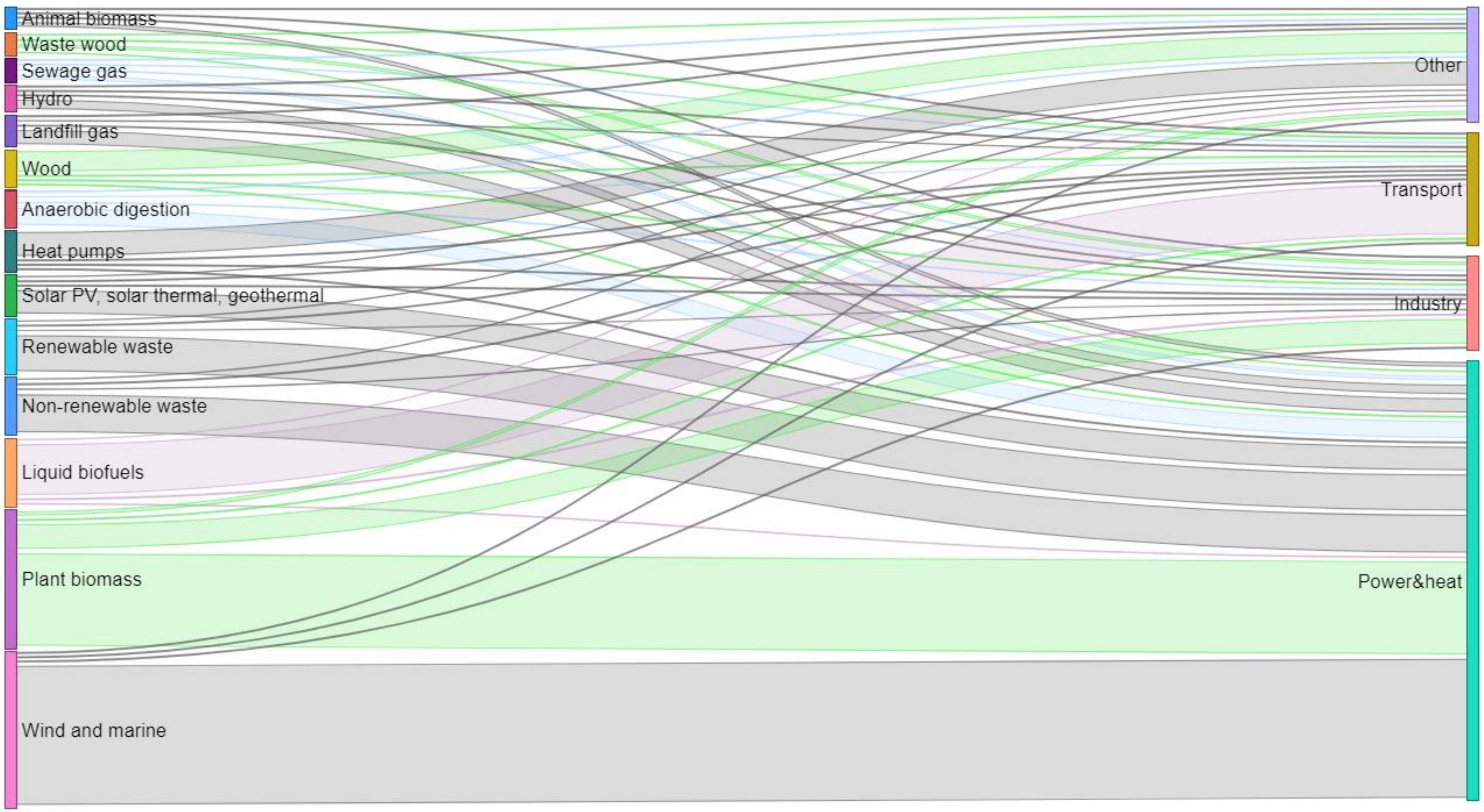
FUEL

FEEDSTOCK

Source: Argus Media

UK's total renewable and waste in 2023 by technology and end use (ktoe)

Total renewables in 2023: 26,507 ktoe

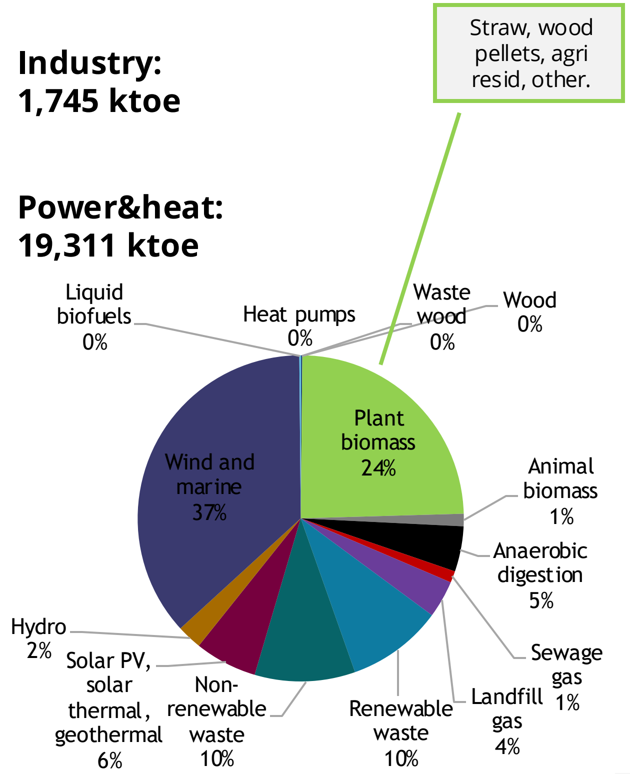


Other: **2,753 ktoe**

Transport: **2,697 ktoe**

Industry: **1,745 ktoe**

Power&heat: **19,311 ktoe**



Source: Digest of UK Energy Statistics (DUKES), visualisation by Argus

UK Biomass Strategy: High Electrification Scenario by 2050

Regardless of which strategy considered for the UK, high electrification, high resource, or high innovation, domestic and imported biomass plays a key role in the path to de-fossilization.

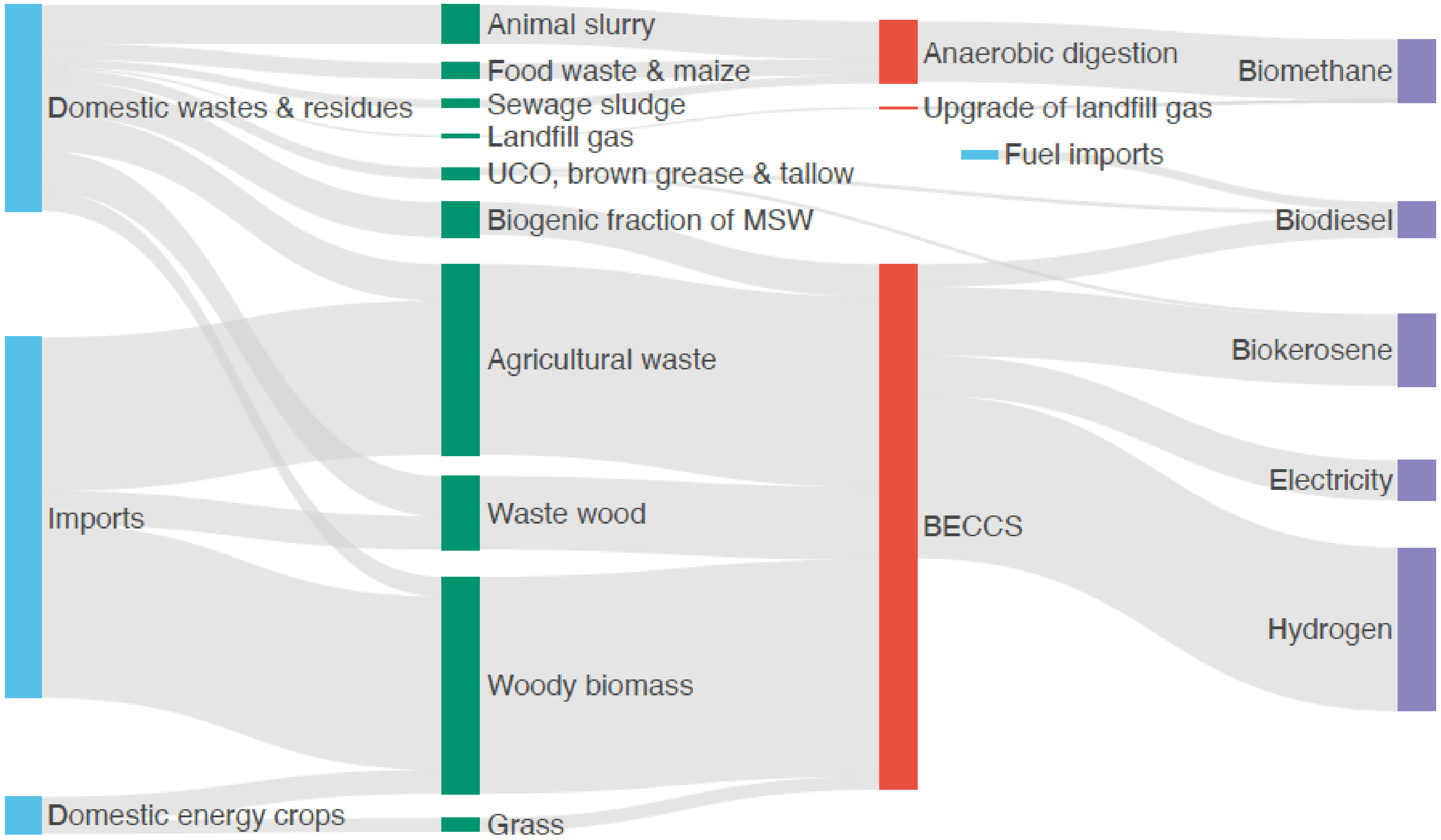


Figure 5.4: Sankey diagram representing the allocation of biomass to the different processing technologies and end uses in illustrative Scenario 1, High Electrification.

Source: UK Biomass Strategy 2023

Potential of locally sourced biomass availability in the UK until 2050

Short rotation forestry (SRF), short rotation coppice (SRC), perennial grasses (miscanthus) – largest growth potential

Feedstock	Unit	2020	2025	2030	2035	2040	2045	2050	2050-25
Agricultural field residues	PJ	14	14	14	14	14	14	14	-
Forestry harvesting residues	PJ	-	9	10	10	10	10	9	0
Small roundwood	PJ	5	8	8	8	8	8	8	1
Short rotation forestry	PJ	-	-	-	-	-	4	13	**13**
Sawmill residues	PJ	9	11	12	13	13	12	12	1
Arboricultural arisings	PJ	8	14	14	14	14	14	14	-
Waste wood	PJ	39	44	46	48	50	52	54	**10**
Residual biogenic waste	PJ	55	80	66	54	48	48	49	(31)
Food waste	PJ	9	15	20	20	20	21	21	5
Landfill gas	PJ	35	27	18	11	7	4	3	(24)
Sewage sludge	PJ	23	24	25	25	26	26	26	2
Cattle manure and slurry	PJ	1	69	68	68	68	68	68	(1)
Pig manure and slurry	PJ	0	6	6	6	6	6	6	0
Tallow	PJ	3	3	3	3	3	3	3	-
UCO	PJ	4	4	5	5	5	5	5	0
SRC willow	PJ	0	0	1	5	10	14	19	**19**
Miscanthus	PJ	2	2	2	3	8	14	20	**19**
Maize	PJ	16	25	33	26	20	20	20	(5)
Wheat	PJ	4	4	4	4	4	4	4	-
Sugar beet	PJ	2	2	2	1	1	1	1	(1)
Brown grease	PJ	0	2	5	7	10	10	10	7
Waste tyres biogenic fraction	PJ	2	1	-	-	-	-	-	(1)
Microalgal oil	PJ	-	0	0	0	0	0	0	0
Agricultural processing residues	PJ	1	45	45	45	45	45	45	-

Source: DESNZ UK and Global Bioenergy Resource Model 2024 , Argus calculations

Case studies: Projects for agricultural and woody biomass production worldwide

Application spectrum for biomass is very wide, but sustainably sourced supply limited.

Company	Biomass type	Country	Destination end use	Notes
Delta Biofuels	**Bagasse**	US	Utilities, heavy manufacturing in Europe.	340kt/yr of bagasse pellets.
Terragrn	**Bamboo, pine**	S Africa	Manufacturing firms in Europe.	Wood pellets, activated carbon production. Forest regeneration, soil restoration, revitalising degraded landscapes (on mined land).
Raw Energy	**Fast growing (tropical) grass**	Malaysia	Utilities in Japan, Europe.	Grass growth cycle 4 months, pelletized at factory and shipped.
Steampower	**Acai**	Brazil	Iberian industrial heat market (mid-size manufacturers).	Process residue from acai fruit production.
various	**PKS**	Indonesia, Malaysia	Utilities in Japan.	
CM Biomass	**cashew nut shells**	Ivory Coast	Manufacturing firm in Denmark.	Two year offtake contract signed in 2023.
Orsted	**Beccs (bio-CCS from straw, wood chips)**	Denmark	Avedore (straw), Anses (wood chip) power plants.	Will burn straw and wood chips to generate power and heat, capture&store CO2.
various	**Heat –treated material from wood, agri-biomass**	Global	Utilities (low-C), process heat, manufacturing (high-C).	Various feedstocks tested to produce heat-treated biomass (torrefied, biocarbon, biochar).

Source: Argus Media research

Biomass Industrial Applications : The Path towards Green Steel

From open-loop to closed loop-carbon emissions

Scrap utilization → Electrification → Hydrogen

Fossil fuel injection → Anthropogenic CO2

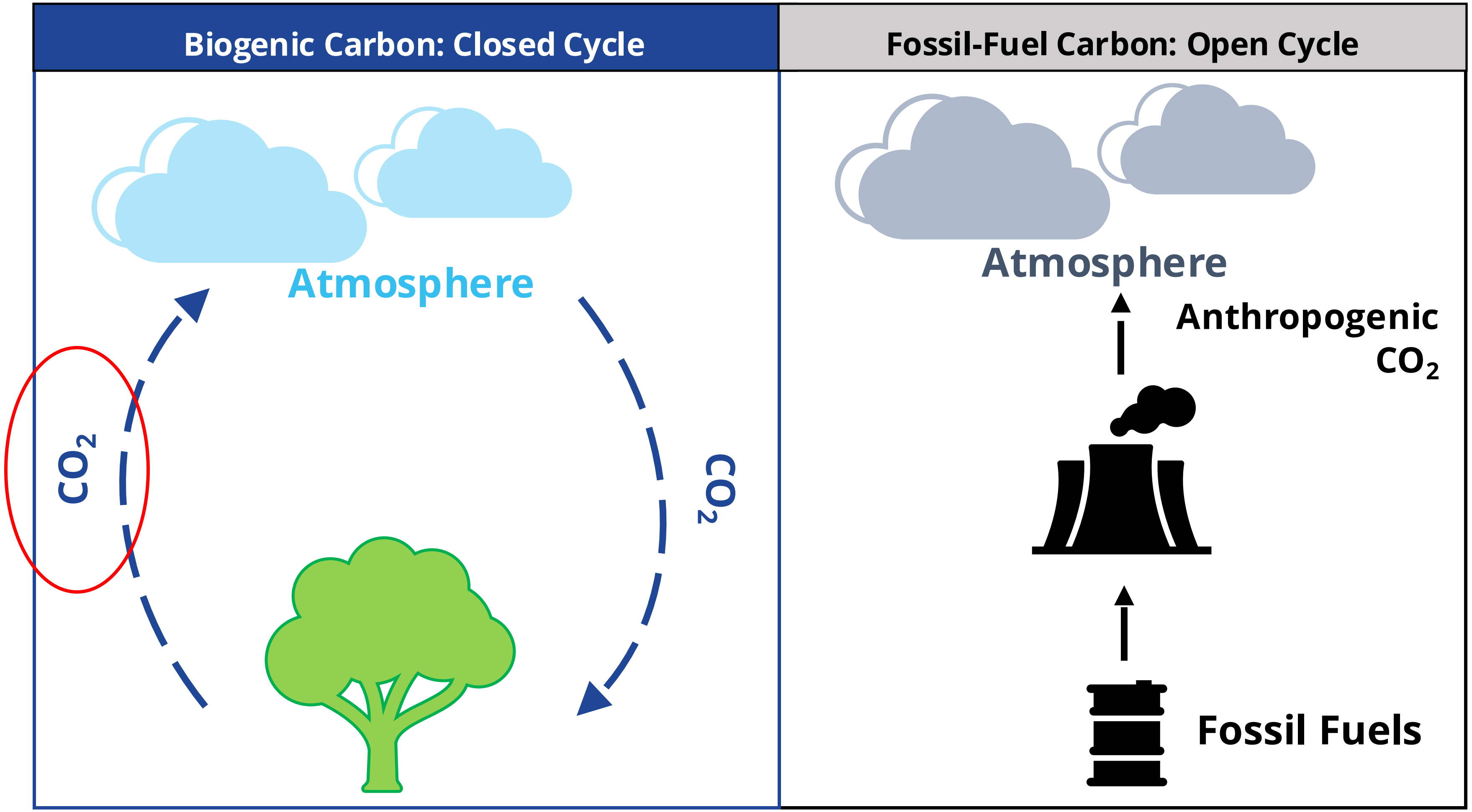
Fe_2O_3 (Iron Ore) + Metallurgical coal and gas → $2Fe + CO_2 + O$

Biochar (renewable carbon) injection → Biogenic CO2

Fe_2O_3 (Iron Ore) + C (Biochar) → $2Fe + CO_2 + O$

The Carbon Cycle

Contrary to common belief, the carbon cycle considered for fossil fuels is quite different from that considered for biomass, namely, in that fossil fuels will use an open cycle and biomass a closed cycle.



Source: Argus Media research

Lessons learnt from global experience

- **Product specifications** (ash, NA+K, other), characteristics matter. Agricultural biomass has more fibre, more ‘unwanted’ materials.
- **End user technology** as important (pulverized coal - PC vs fluidized bed combustion - FBC boilers)
- **Supply availability** limitations, seasonality (agri)
- **Sustainability, land use, regulation** (agri-residue/waste advantage)
- **Shipment costs** (local supply in advantage)
- **Raw material** costs
- **Biomass price volatility**

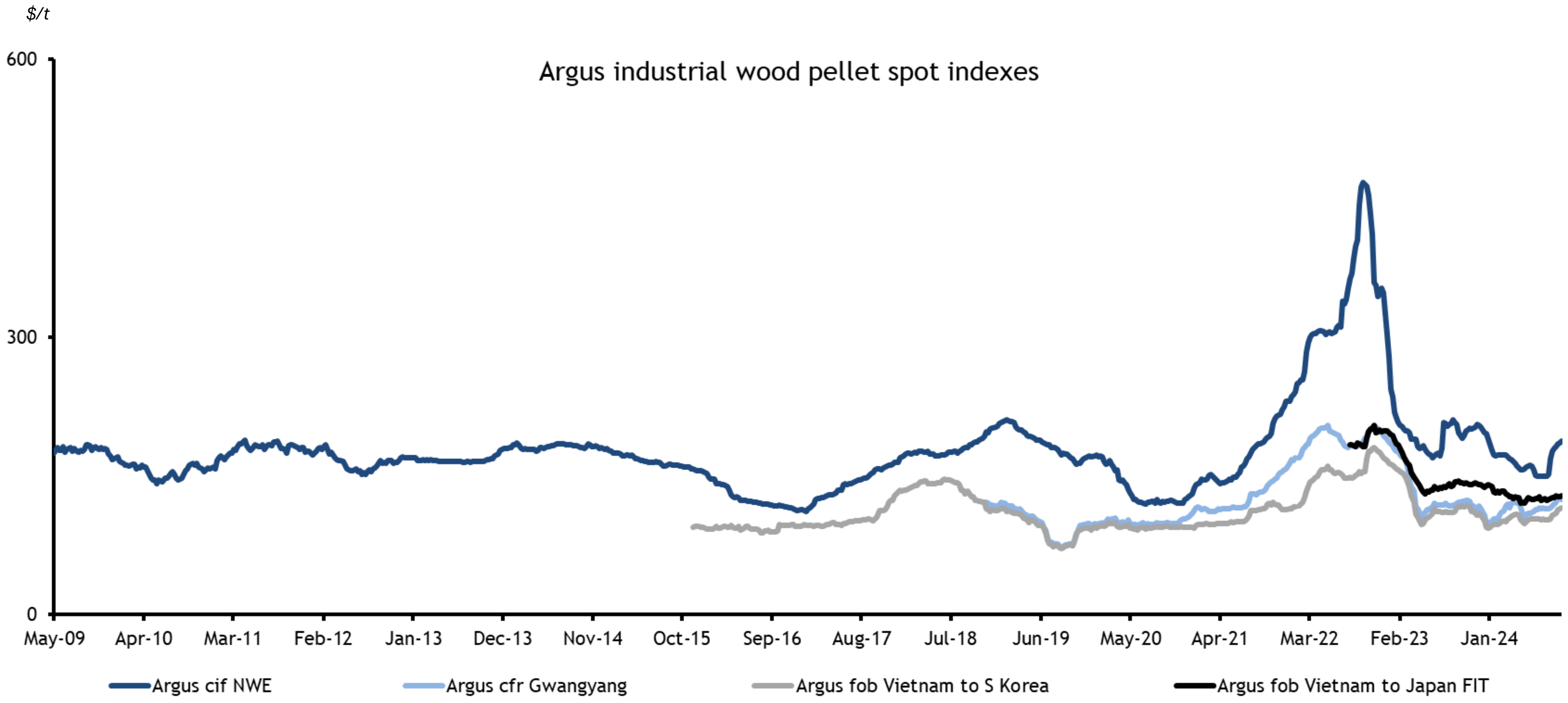
Asian palm kernel shell specifications	
Location: east coast Sumatra, peninsular Malaysia	
Unit(s):	$/t
Contracts assessed:	Spot
Quantity:	8,000t minimum
Delivery: Bulk, handysize or container basis	
Total moisture (as received basis):	Max. 20pc wt
Net calorific value (as received basis):	Min. 3,500 kcal/kg
Ash (air dried basis):	Max. 4pc wt
Chlorine (air dried basis):	Max. 700ppm
Sulphur (air dried basis):	Max. 0.15pc wt
Foreign matter*:	Max. 1pc
metallic materials and stones bigger than 4cm	

Asian industrial wood pellets specifications (Japan FIT)	
Location: Quy Nhon, Cat Lai, Vung Ang, Cai Lan, Dung Quat	
Unit(s)	$/t
Quantity	10,000t minimum
Delivery	Bulk basis
Dimension (mm)	6-10
Length (mm)	≤ 40
Moisture (as received basis %)	≤ 10
Ash (as dried basis %)	≤ 1.5
Durability (as received basis %)	≥ 97
Fine (as received basis %)	≤ 5.0
Other additives (as received basis %)	< 2
Particle size distribution (as received basis %)	≤ 98
Net calorific value (as received basis MJ/kg)	≥ 16.5
Bulk density (as received basis kg/m³)	≥ 600
Nitrogen (as received basis %)	≤ 0.3
Sulphur (as dried basis %)	≤ 0.2
Chlorine (as dried basis %)	≤ 0.05
Arsenic (as dried basis mg/kg)	≤ 2
Cadmium (as dried basis mg/kg)	≤ 1
Chromium (as dried basis mg/kg)	≤ 15
Copper (as dried basis mg/kg)	≤ 20
Lead (as dried basis mg/kg)	≤ 20
Mercury (as dried basis mg/kg)	≤ 0.1
Zinc (as dried basis mg/kg)	≤ 200
Sodium + Potassium (ppm)	≤ 2,000

Source: Argus Biomass Markets methodology

Argus industrial wood pellet spot price indexes for Europe, Asia

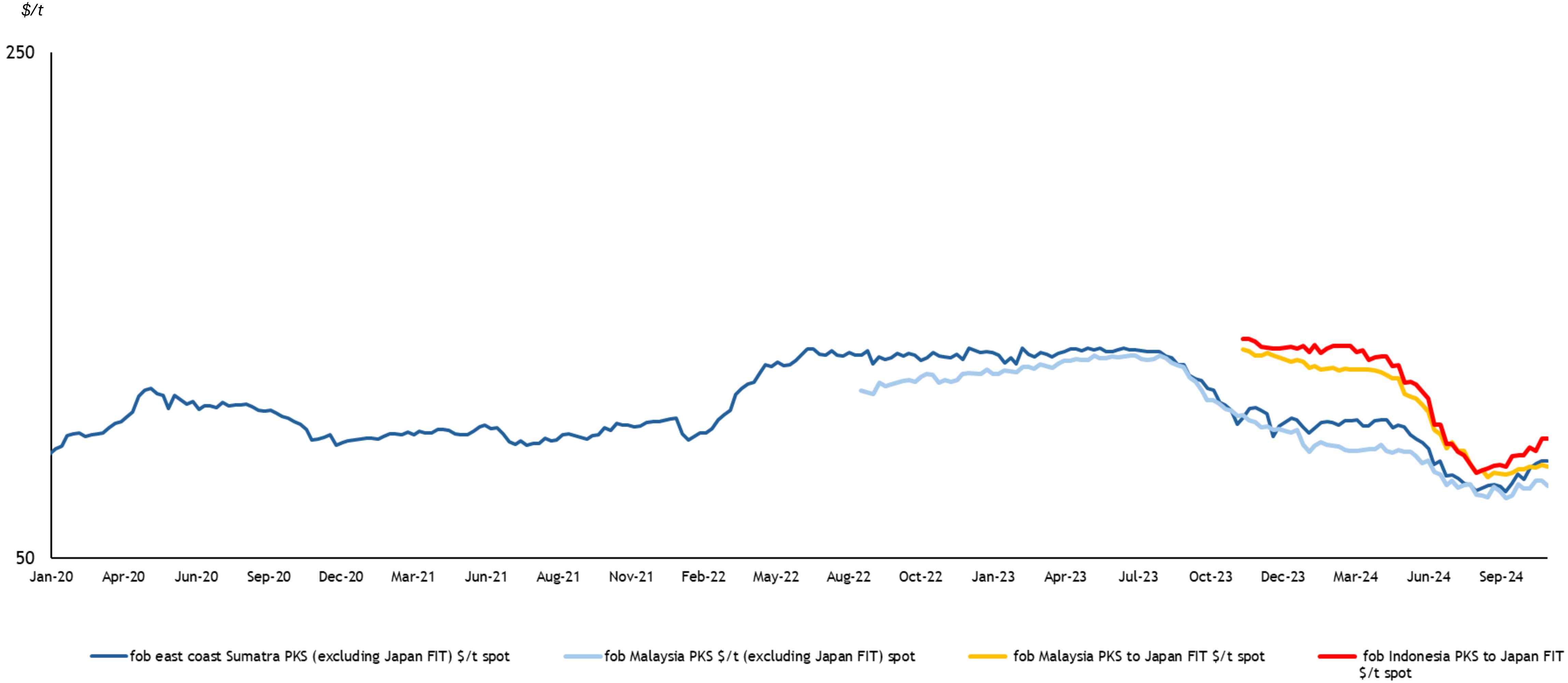
Volatility peaked during the energy crisis in 2022.



Source: Argus Media

Asian palm kernel shell (PKS) spot price indexes

Less volatility compared with wood pellets.



Questions?

Thank you!

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