

Biomass Sourcing

Capital Markets Day

17 October 2013



Agenda

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Biomass Overview

Forest Industry and Wood Pellet Market

Initial Focus on North America

Supply Chain and Suppliers

Fuel Contracting

Looking Forward



Biomass

Conversion of existing coal units requires a specific type of biomass

**Sensitivity to
corrosion, slagging
and fouling**

**Clean wood focus;
limited other biomass**



**Large quantities;
proven technology
- product similar to
coal**

Pellet form



**Greenhouse gas
emissions and cost**

**Conversion at
source**



Biomass is an Abundant Resource

Biomass is the fourth largest energy resource

By 2050 sustainable biomass could supply 10%-20% of the world's primary energy requirement⁽¹⁾

4 billion hectares of forest globally

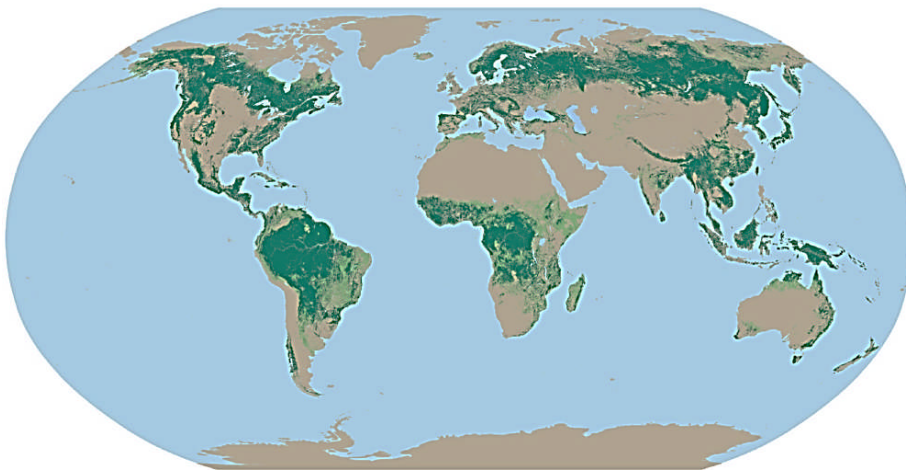
c.30% of the total land area

More than 50% total annual harvest is consumed as fuelwood

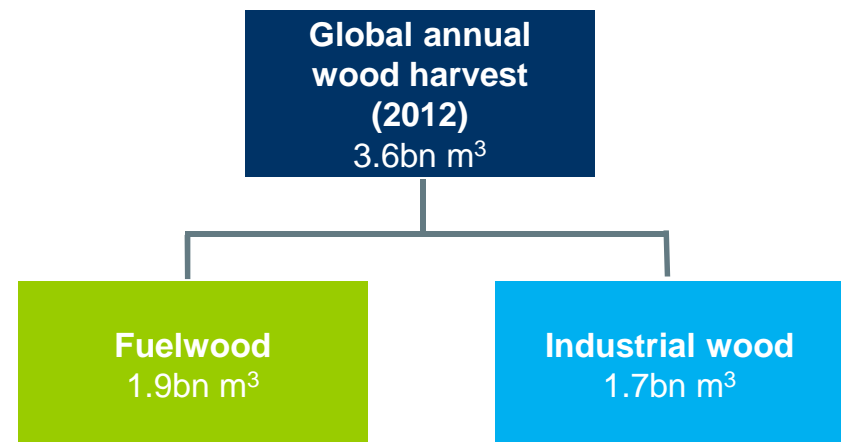
- Predominantly for small scale domestic use

Global annual wood harvest is equivalent to c.1.8 billion tonnes of wood pellets

Distribution of Global Forest Resource⁽²⁾

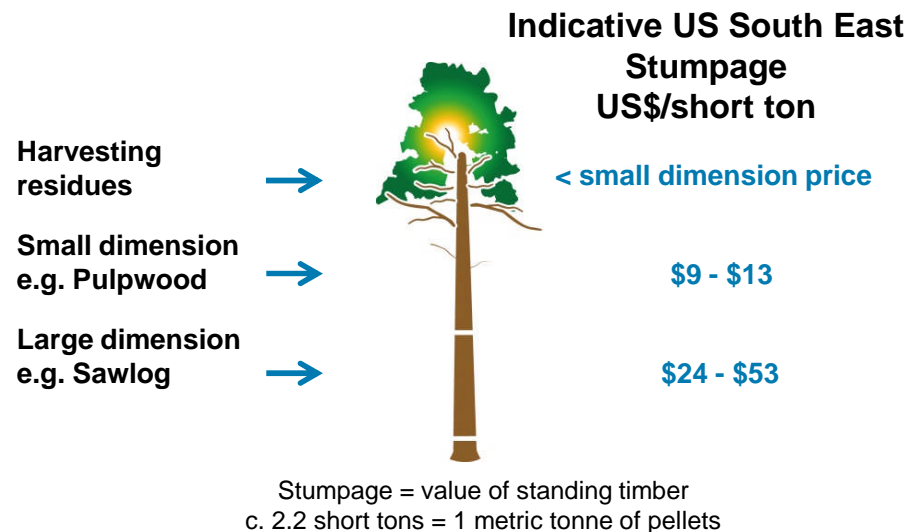
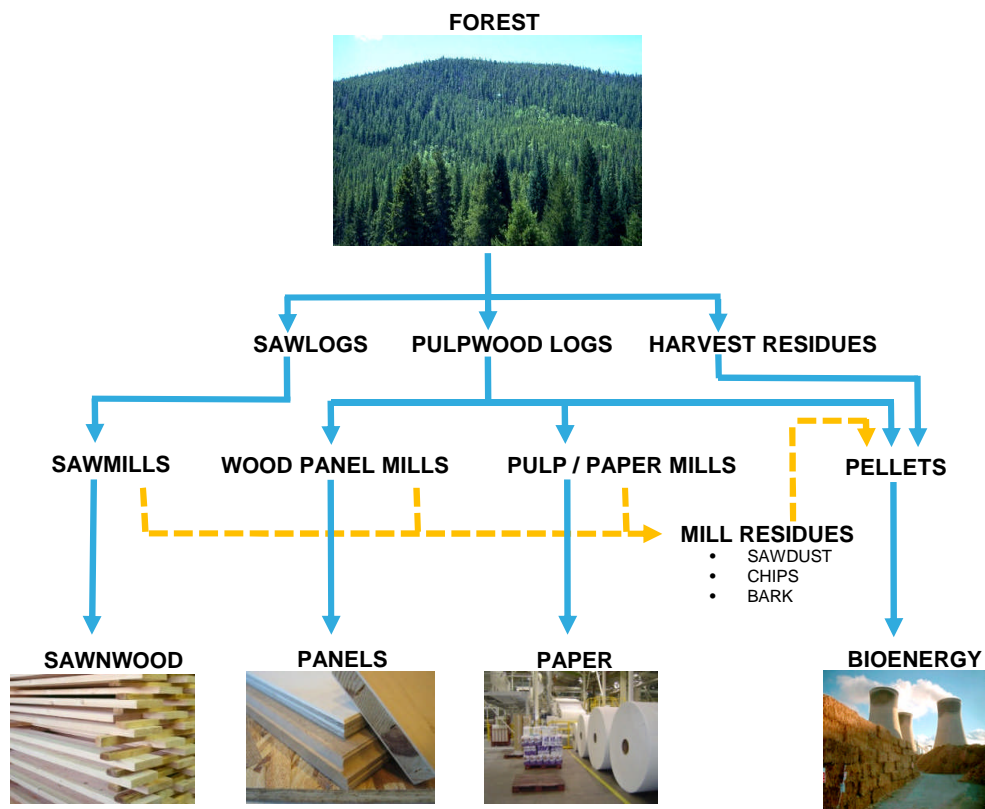


Global Annual Wood Harvest⁽²⁾



Global Forest Product Industry

Large, well established and most often highly interdependent



- Primary economic driver is sawlog
- Traditional wood markets in decline in selective areas
 - Consumption by forest products industry declining
- Wood pellets can be complementary to existing forest products
 - Higher utilisation
- Un-merchantable whole trees can also be utilised for pellets
 - Optimising sustainable forest management e.g. undersized, misshapen, 'off' species

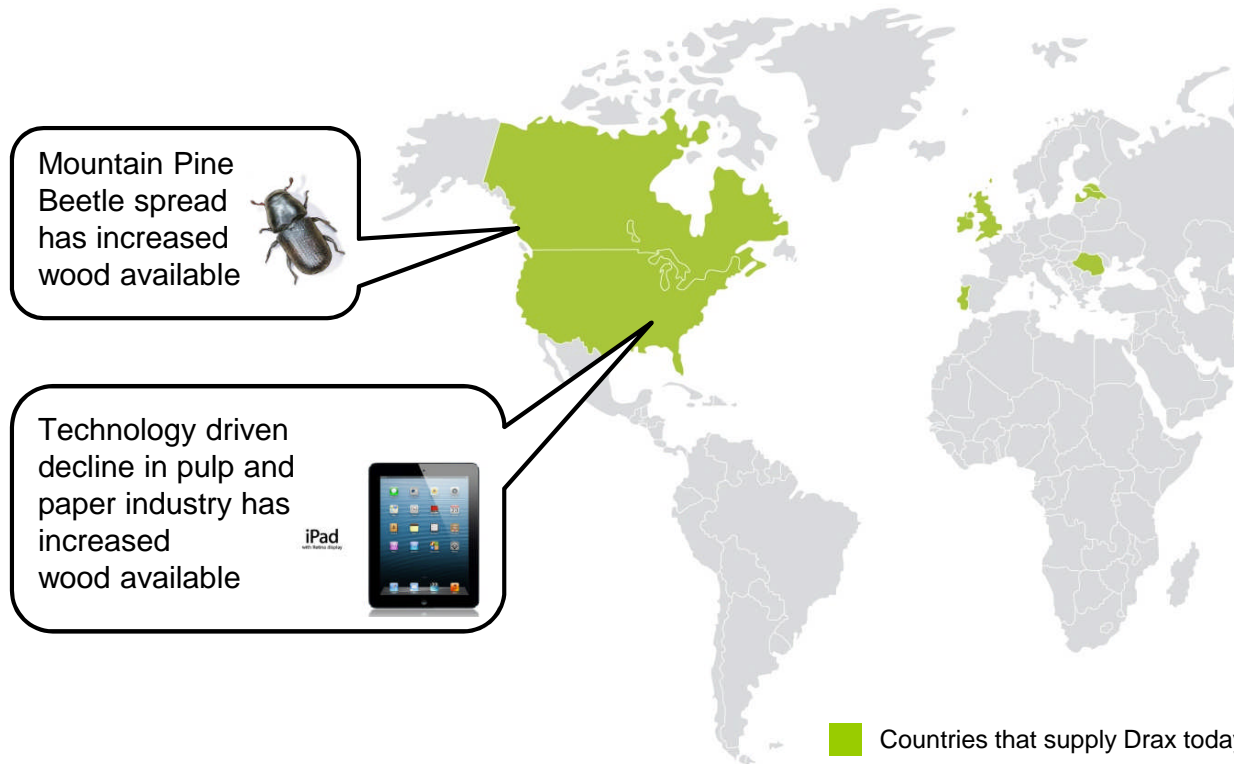
Concentration in North America

Early growth of the biomass supply portfolio focused on:

Speed to market in politically stable regions

Existing sustainable forestry industry, some pelleting infrastructure and good logistics

Opportunities best placed to obtain finance



US has > 300M hectares forest land

US forests are growing

US South has vast resource of sustainable forests

- Relatively short rotation
- South East inventories increased > 90% since 1950⁽¹⁾

Consumption by forest products industry declining

- By >100Mt since 2000⁽²⁾

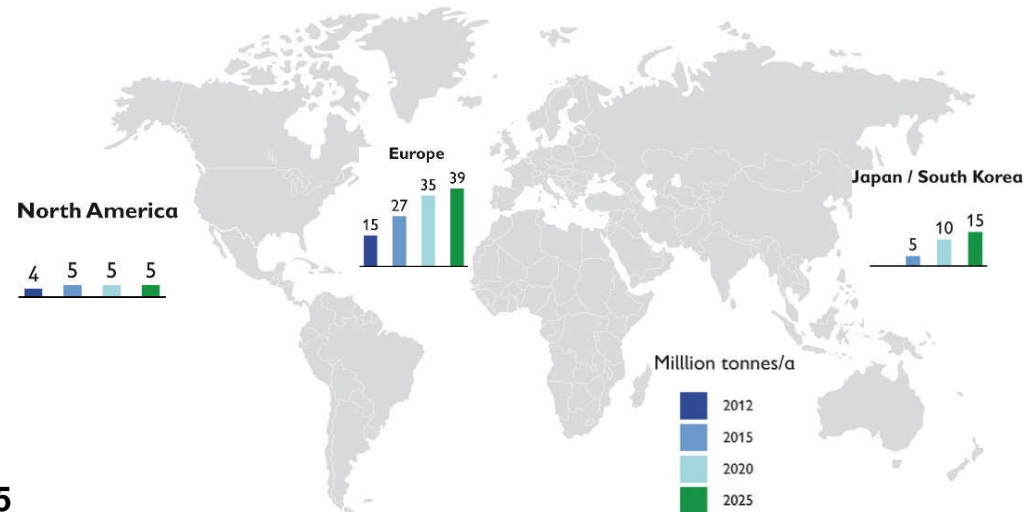
Global Market – Flow from North America to Europe

Wood pellet demand

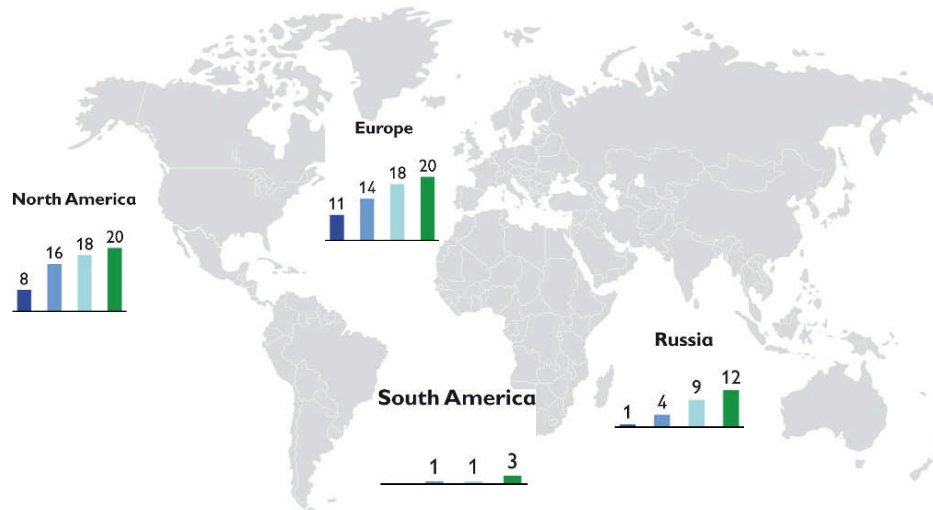
Total wood pellet demand was c.21Mt in 2012⁽¹⁾

- Largest demand and growth is Europe

Projected Demand for Pellets: 2012-2025



Projected Production of Pellets: 2012-2025



Wood pellet supply

Significant growth in wood pellet imports into Europe

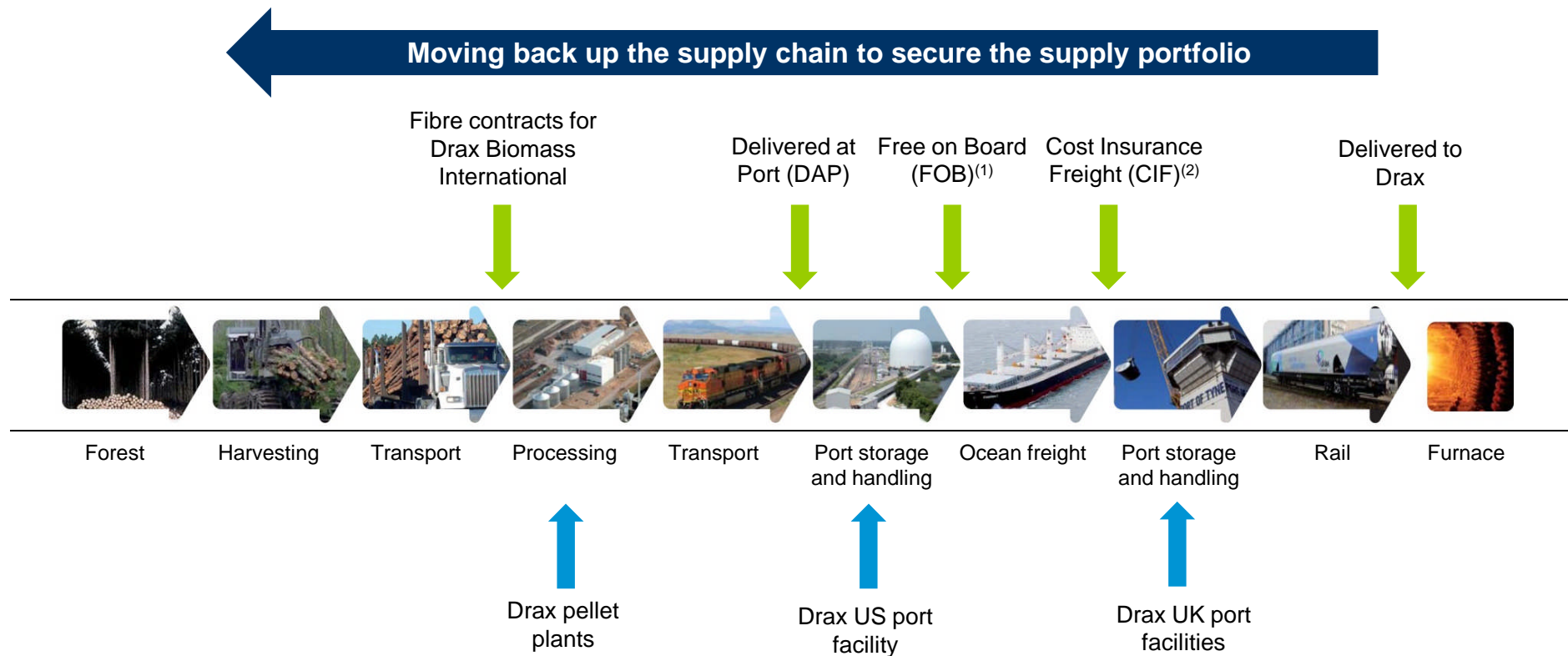
- 2009-2012 CAGR⁽²⁾ of 35% to 4.3Mt
- Industrial market projected to represent c.50% of total pellet market by 2020⁽³⁾
- Global pellet market expansion expected to maintain historic growth rate

Growing the Wood Pellet Supply Market

Wood pellet supply market will develop with demand growth

Drax facilitating investment to grow the supply chain through a combination of:

- Long-term take or pay contracts
- Selected own-investment in the supply chain
- Fostering a partnership approach



Logistics Infrastructure – UK Ports



Coal import relationships provided springboard for biomass port developments

Deep water ports and smaller local ports to optimise portfolio and gain access to short-sea market

Typically long-term throughput arrangements with minimum take or pay

Port of Tyne – existing facility, up to Panamax⁽¹⁾

- 2Mt pa throughput

Immingham – in construction, up to Panamax

- 3Mt pa throughput, 100kt storage

Hull – in construction, up to small Handysize⁽²⁾

- 1Mt pa throughput

Other port facilities in progress

Port of Tyne Biomass Discharge Hoppers



Logistics Infrastructure – UK Rail



New biomass rail wagons

8 x 25 wagon sets now secured with option for more

- Carry up to 50% more than current trains
- Efficient load / unload with full weather protection

First wagons now in early operation

Rail paths secured with Network Rail from key ports

New Biomass Rail Wagon Set



Fuel Contract Pricing

Most biomass is imported

Significant focus understanding underlying markets and supplier cost base

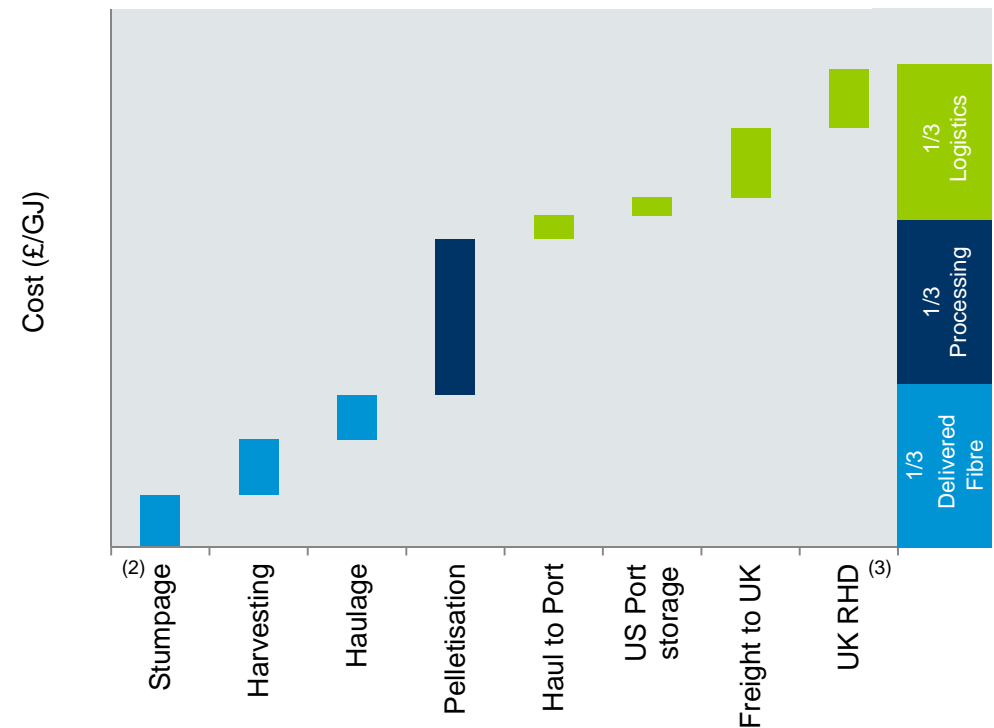
Detailed supply chain knowledge allows informed contracting

- Drivers of upward pressure on pellet prices
 - Procurement from sources further away from export facilities
 - Expanding to new geographies
- Strategy to mitigate upward pressure
 - Hedging
 - Driving efficiencies through aggregation and economies of scale
 - Potential to widen fuel envelope (agricultural residues)

£8/GJ (2013 prices) remains firm guidance

- Biomass pellets delivered to Drax

Wood Pellets – Components of Cost⁽¹⁾



(1) Illustrative only, based on wood pellets delivered to Drax from US Gulf Coast

(2) Stumpage = value of standing timber

(3) RHD = receiving, handling and delivery

North American Port Export Aggregation

Aggregation at key hubs to minimise logistic costs and unlock additional volume

The depth in portfolio enables capture of economies of scale

Medium-term transition to larger ships

1

Drax Baton Rouge investment

- 3Mt pa Panamax capable port hub

2

Drax / Pinnacle Pellets contracts

- Will utilise new Panamax capable port at Prince Rupert

3

Drax / Rentech contracts

- Underpins development of new Ultramax capable port in Quebec City

4

Drax evaluating East Coast development strategy

- Focus on aggregation potential

North American Hub Ports



Profile of Suppliers

Focus areas when selecting suppliers:

Wood supply that is technically acceptable, secure and sustainable

Greenhouse gas balance

Availability of finance, execution capability and track record

Two new suppliers:



Graanul Invest

- Based in Tallin, Estonia

Produce 0.8Mt pa of pellets from 6 plants

Raw material from sawmill co-products and forest thinnings

Export facilities at the ports of Riga, Parnu and Tallin



Georgia Biomass

- Owned by RWE Innogy
- Based in Waycross, Georgia, US

World's largest pellet plant with nameplate capacity c.750kt pa

Raw material primarily thinnings from managed forest plantations

Own load port facility in Savannah, Georgia

Biomass Supply in the Future

More of the same

Growing North American supply through aggregation and leveraging supply chain investments

Continue to grow Baltic and European supplies

Geographic and product diversification within the Atlantic basin

Facilitate growth of secure supplies from Southern Hemisphere

Atlantic basin – large proportion of global industrial wood and agricultural supply sources



Larger ships

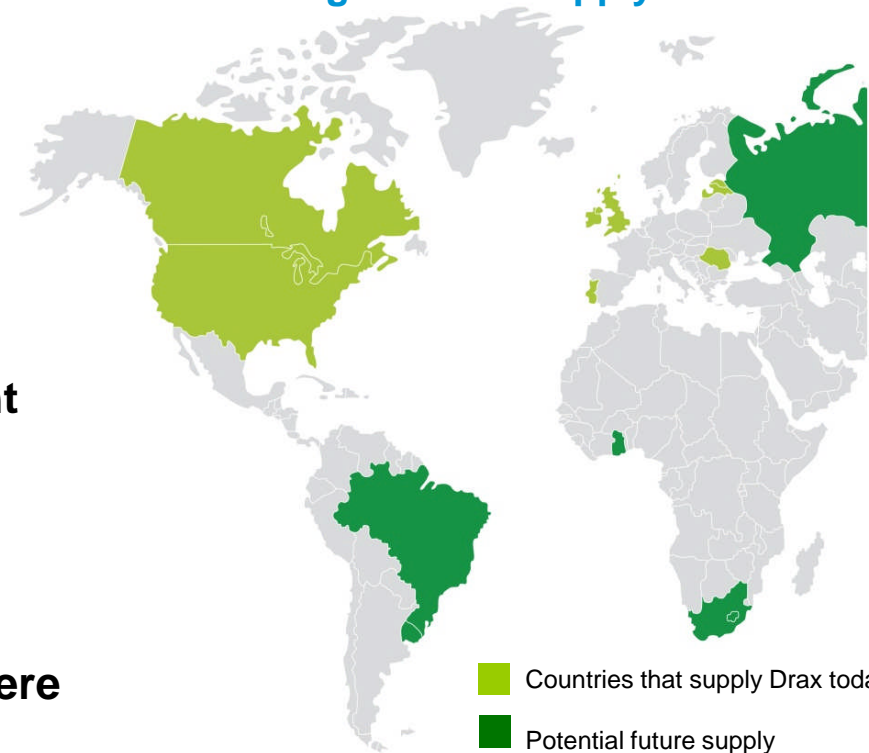


Agri-fuel development

Subject to technical limits



**Industrial plantations
– Southern Hemisphere**



Summary

Biomass is an abundant sustainable resource

The world's fourth largest energy source

Initial focus on North American woody biomass

Speed to market and existing infrastructure

Commitments to supply chain

Economic signals to underpin further supply chain development

Medium-term geographic and product diversification

Focus on Atlantic basin



