BIOMASS SOURCING STRATEGIES

NON-TECHNICAL CHALLENGES OF A COMPANY INTENDING TO BUILD A DEMONSTRATION/FLAGSHIP PLANT

EUROPEAN BIOFUELS TECHNOLOGY PLATFORM
5TH STAKEHOLDER PLENARY MEETING
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AGENDA

1. The PÖYRY Group
2. Key Challenges in Biomass Sourcing
3. Examples from other industries
4. Where is all the biomass?
5. Market competitiveness
6. International biomass logistics vs. local sourcing

THE PÖYRY GROUP - SECTORS & SERVICES

We deliver best-in-class management consulting and engineering services across our business groups.

Management Consulting		Strategic advice Business development Organizational optimization	Performance improvement Market analysis Valuation, M&A
Engineering 1)	**Energy**	Thermal power Hydro power Nuclear energy	Renewable energy Transmission & distribution ...
	Industry	Pulp and Paper Chemicals Minerals processing	Bio-refining Bio-converting (e.g.. pellets) ...
	Water & Environment	Water Wastewater Waste	Desalination Environmental services ...
	Urban & Mobility	Roads Rail and urban public transport Tunnels	Real estate development Construction management ...

1) Owners & Lenders Engineering, Project Management, (Pre-) Feasibility EPC & EPCM Projects, …

THE PÖYRY GROUP IN THE BIOENERGY SECTOR

We build our strategic advisory and M&A support on our deep knowledge in the biomass to energy sector; the competence is unique & profound

Strategy development

- Bioenergy strategy formulation
- Market penetration strategy
- Comprehensive market analysis
- Bioenergy master plans
- Change management
- Analysis of selected business alternatives
- Partnership opportunities / Investor and downstream partner identification

Business operations and planning

- Business development and modelling
- Performance improvement
- Competitiveness benchmarking
- Sales plan development
- Business opportunity assessment
- Corporate restructuring
- Investment analysis and technical valuation

Procurement strategies

- Biomass sourcing strategy
- Supply/market analysis
- Scenario analysis
- Strategy formulation
- Implementation
- Procurement optimisation
- Contract evaluation and negotiation

Bioenergy market analysis

- Market research and market advisory
- Marketing, product and production strategies
- Demand, supply and price forecasting
- Identification and evaluation of target customers
- Policy analysis and monitoring.

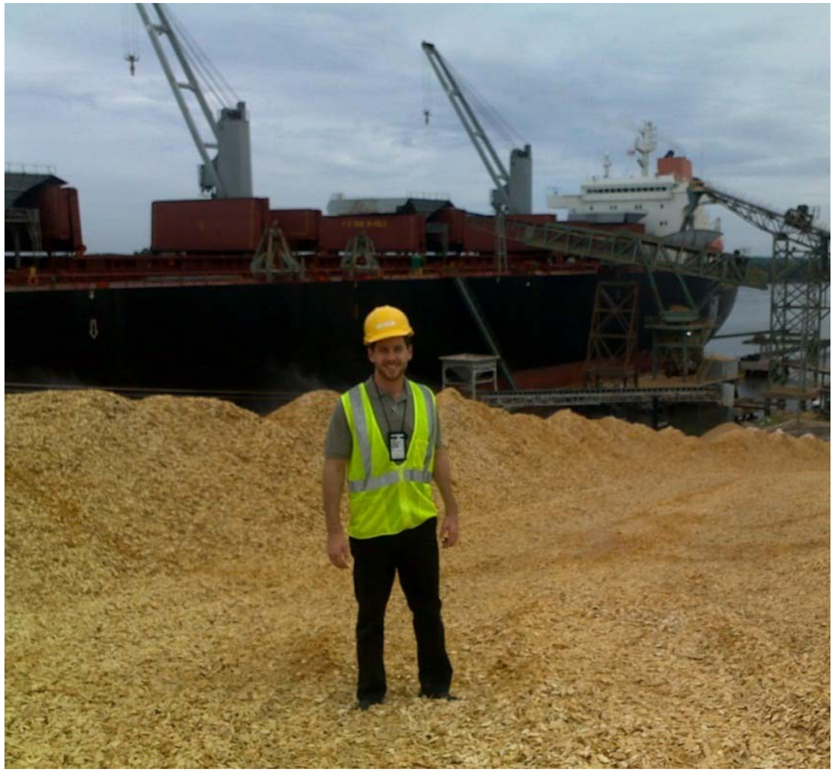
Technology assessment

- Technology options evaluation
- Technology development benchmarking
- Audits of novel technology
- Integration of bioenergy inv. to existing plants
- Technology partnership opportunities
- Energy efficiency assessment

Project services

- Project identification and concept development
- Project pre-feasibility / feasibility assessments
- Financial viability analysis – ports, vessels
- Project due diligence / second opinion
- Financial valuation of biomass plants – services to financiers

WHAT IS A BIOMASS SOURCING MANAGER DOING ALL DAY?



Making sure that the **right feedstock volume** of the **right quality** arrives at the facility at the **right time** at **affordable cost.**

KEY CHALLENGES IN BIOMASS SOURCING

- Identification of suitable biomass supply regions and sources
- Mobilisation of existing surplus volumes
- Development of new resources
- Bulky materials from dispersed origins
- Complex logistics
- Seasonality and cyclicality of supply flows
- Competition for raw material with other industries
- Competition for land and other resources
- Price uncertainty and risk of increasing biomass market prices
- Regulatory environment and financial incentive schemes
- Sustainability requirements and public perception
- etc.

BIOMASS ASSORTMENTS

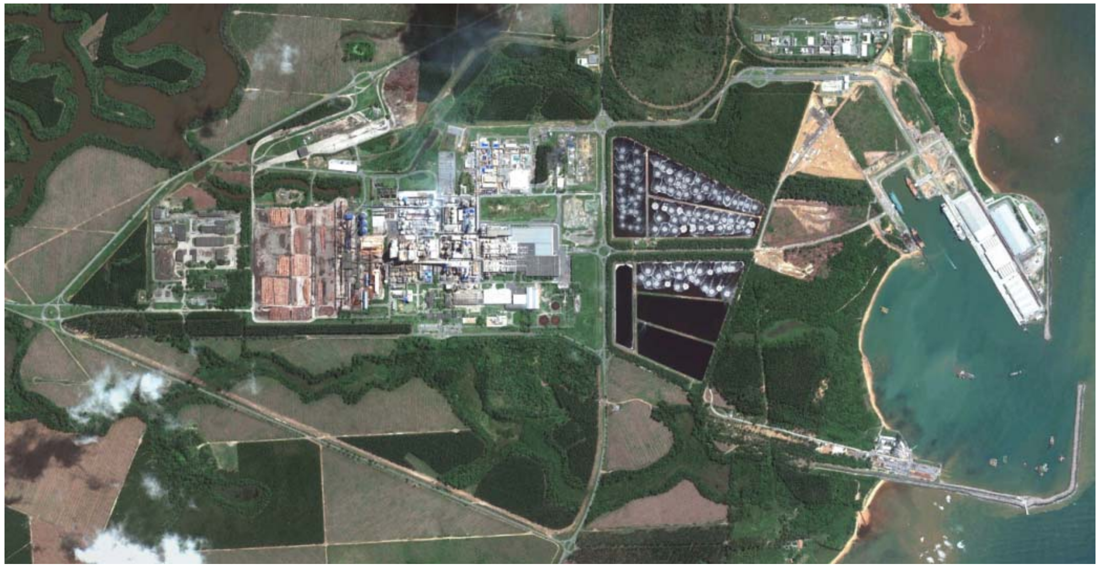
Should the conversion technology decide over the feedstock to be used or vice versa?

	Pulpwood Logs	Chips / Sawdust	Bark	Harvesting Residues	Woody Energy Crops	Herbaceous Energy Crops	Agricultural Residues
Continuous supply	++	+	+	++	-	-	--
Low bulk density	++	+	+	-	+	-	-
Clean, homogenous fuel	++	++	--	--	++	++	0
Output per hectare	+(+)	n/a	n/a	-	++	++	-

BIOMASS SOURCING IN THE FOREST INDUSTRY

The pulp industry can do it…

- Barra do Riacho pulp mill owned by Fibria Celulose – currently largest pulp mill in Latin America
- Annual wood consumption: ~10 million green tonnes
- Wood supply exclusively through trucks
- Directly located in plantation rich area



BIOMASS SOURCING IN THE ENERGY INDUSTRY

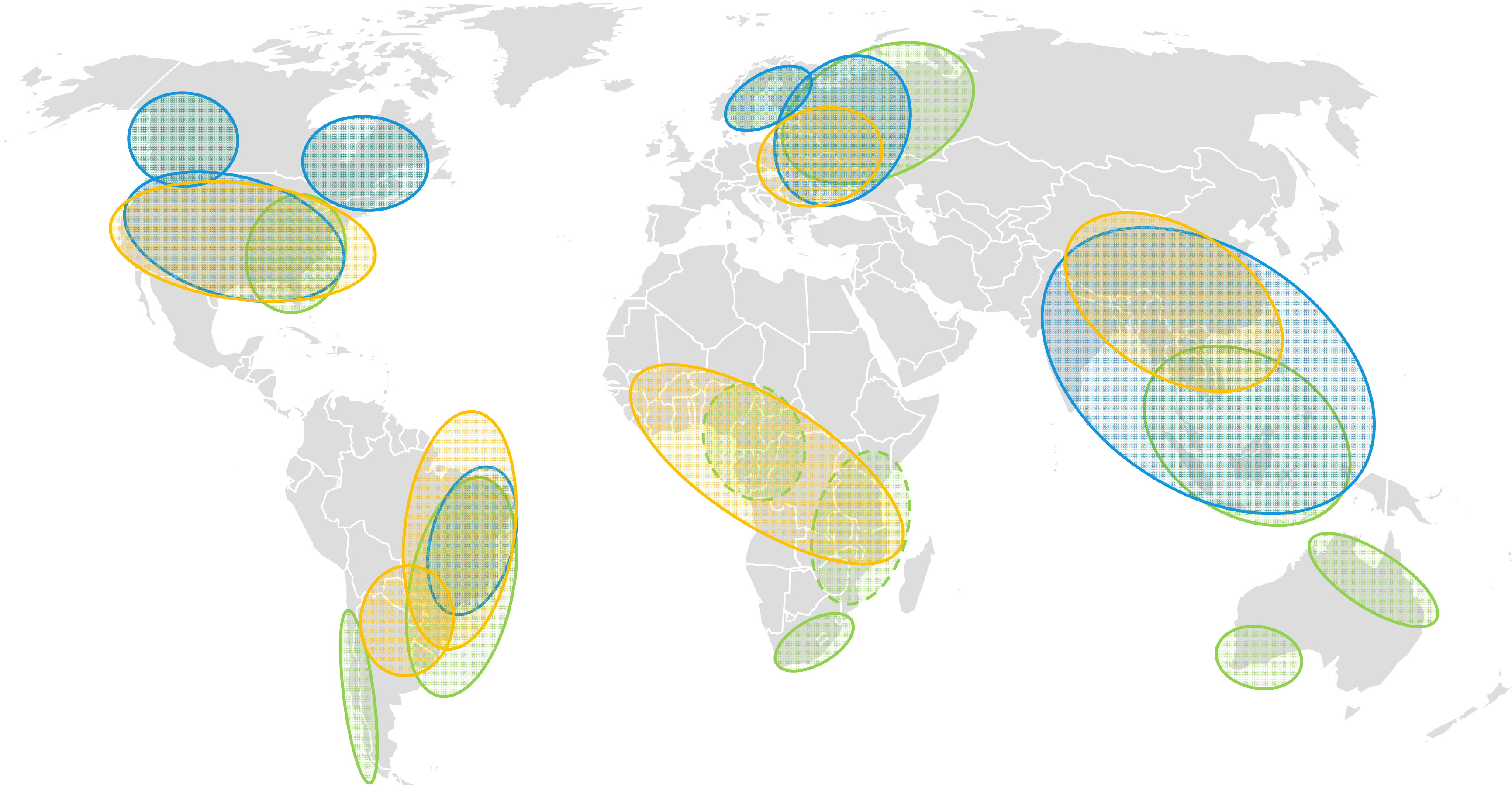
The energy industry can do it…

- Drax Power - largest single electricity generator in the UK with a capacity of ~4 GW
- Drax plan to convert three of their six units to biomass, resulting in a total biomass demand of about 8 million tonnes of pellets p.a. by 2015
- Wood chip equivalent: 16 million tonnes p.a.
- Biomass will be imported from various overseas supply regions

Implementation of Drax's large scale biomass sourcing strategy is feasible and in full swing…but doesn't come cheap!

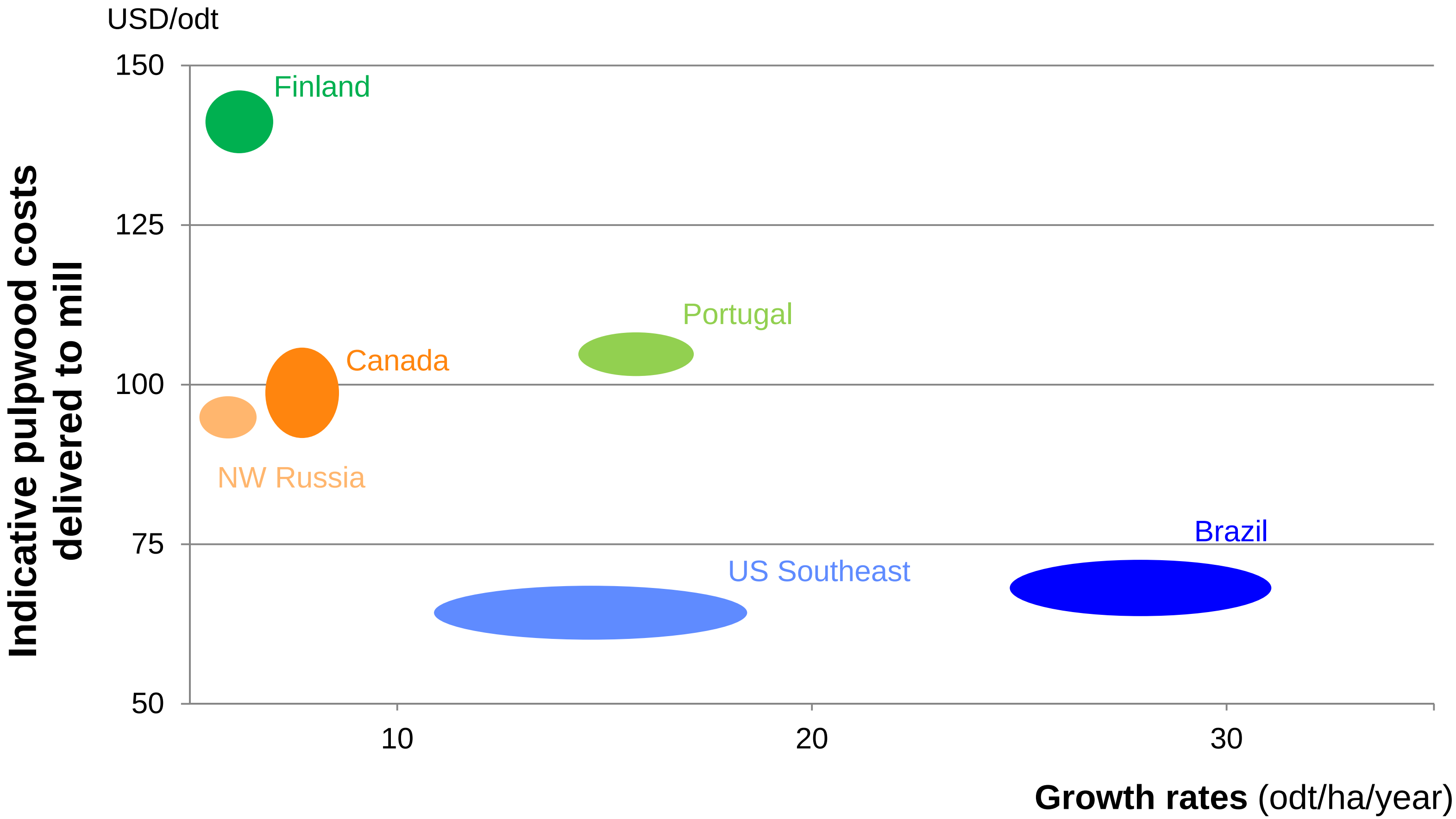
WHERE IS THE BIOMASS?

On a macro level, the world is full of opportunities to source large quantities of biomass.



WHERE IS THE BIOMASS?

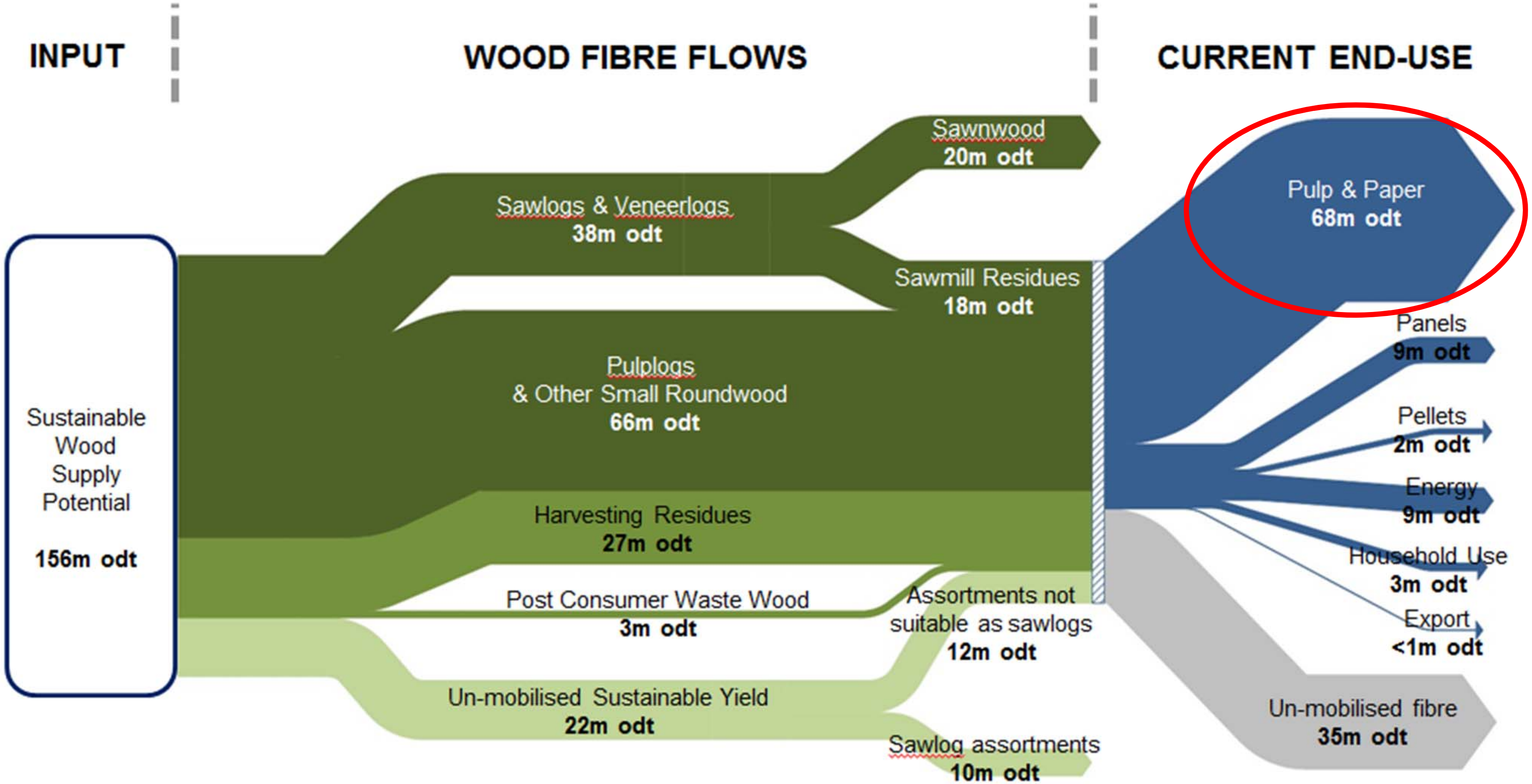
Local delivered cost for traditional wood assortments vary significantly between regions and influence strategic positioning.



PÖYRY

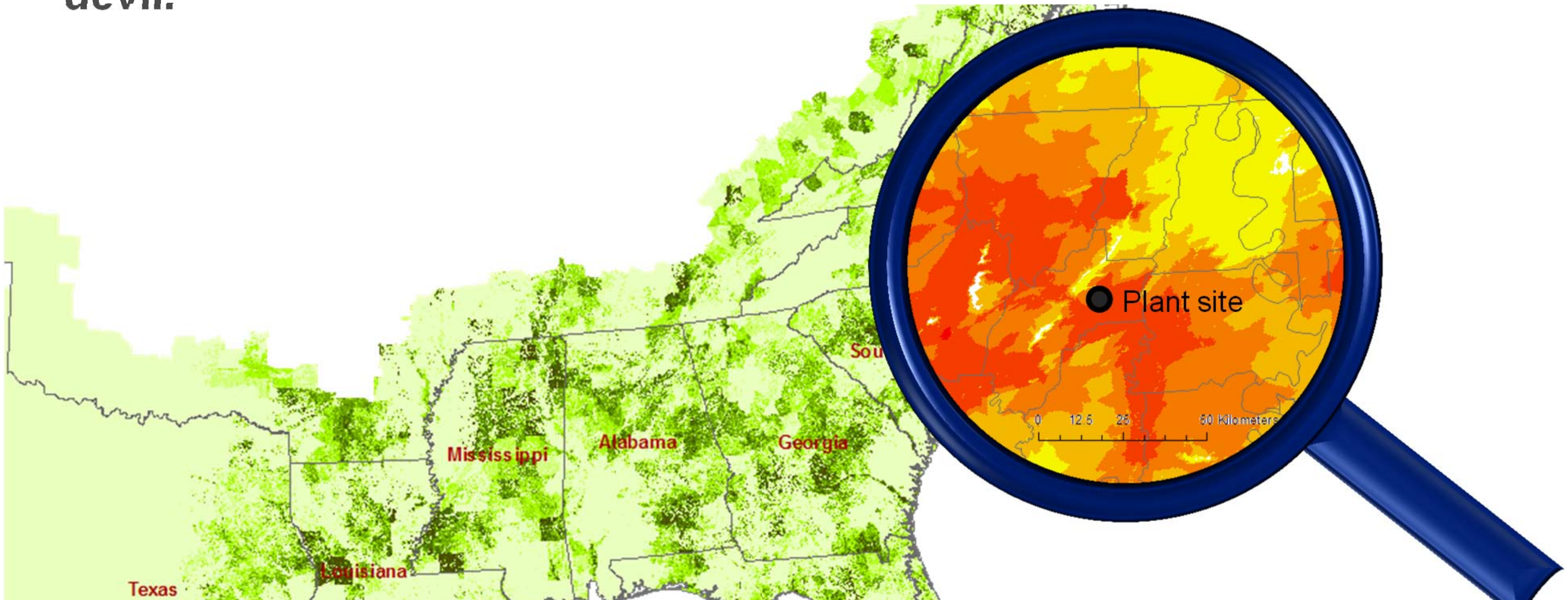
THE US SOUTHEAST AS FIBRE BASKET

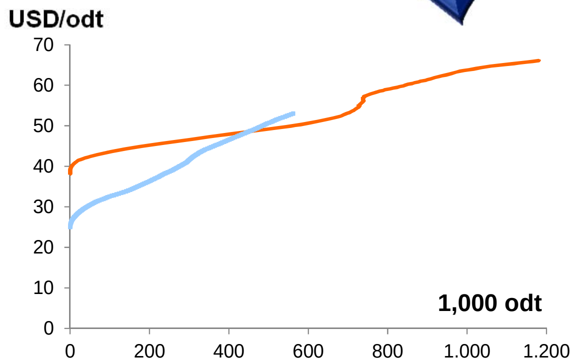
Understanding current and future fibre flows is key for strategic positioning.



FOCUS ON US SOUTHEAST

Biomass markets are highly regional and transportation distance can be the devil.

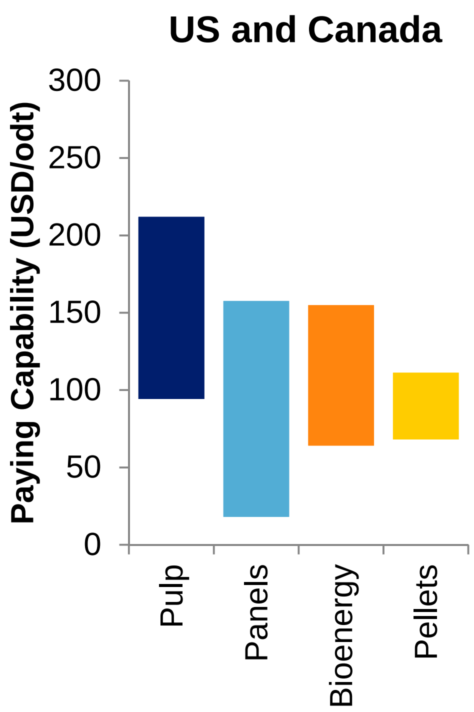


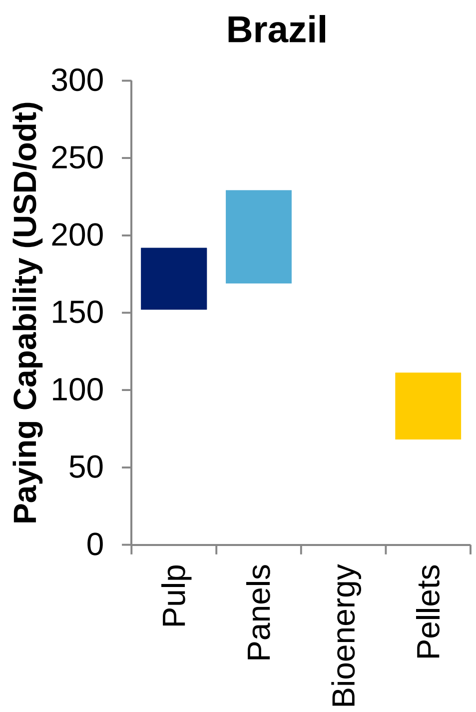


COMPETITIVENESS OF BIOMASS CONSUMING INDUSTRIES

Possible market entry strategies

1. Find a niche in the biomass market and be friendly
2. Head on competition with existing consumers
3. Build own resource base / vertical integration

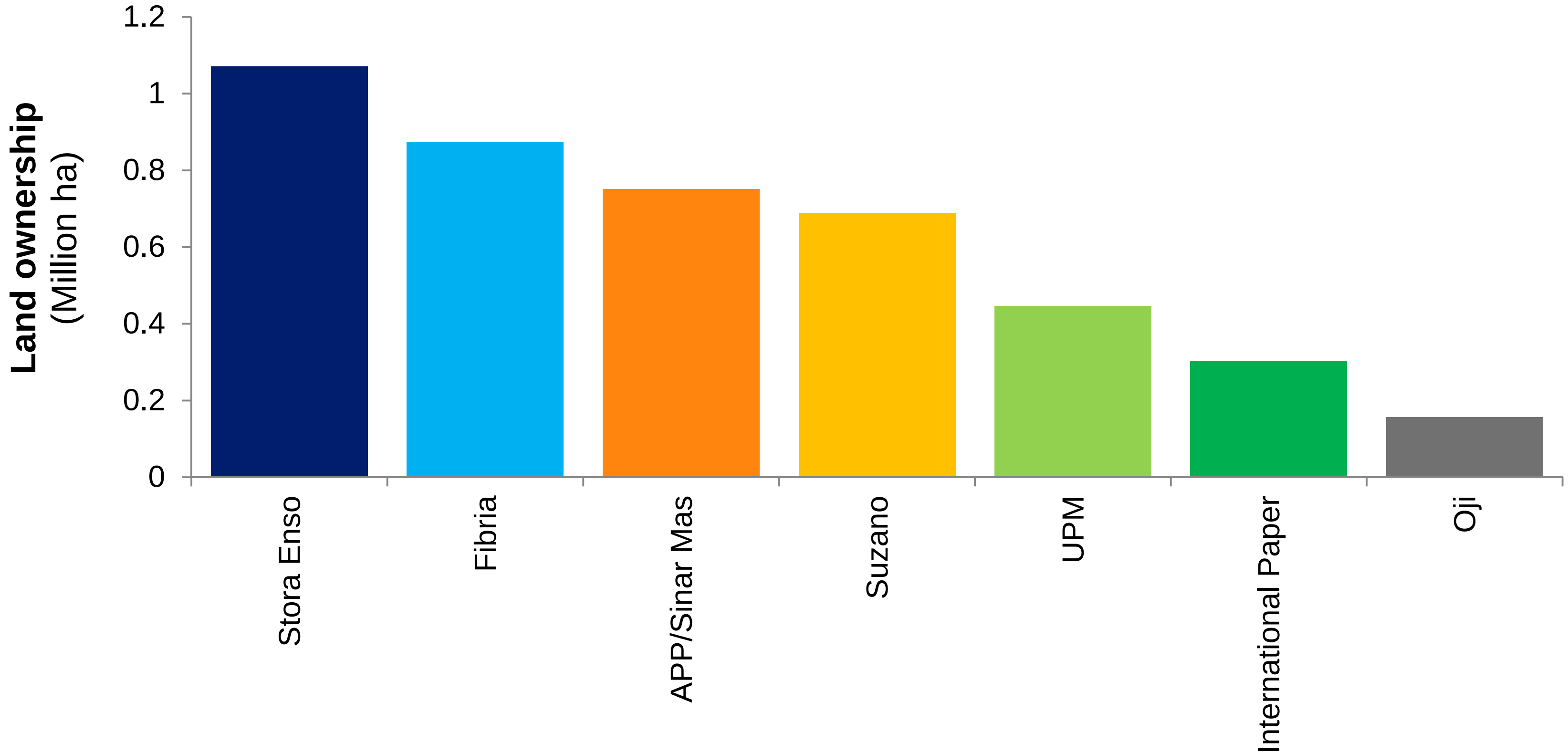




VERTICAL INTEGRATION

Pulp producers often show a high level of vertical integration, especially in Latin America and Asia Pacific

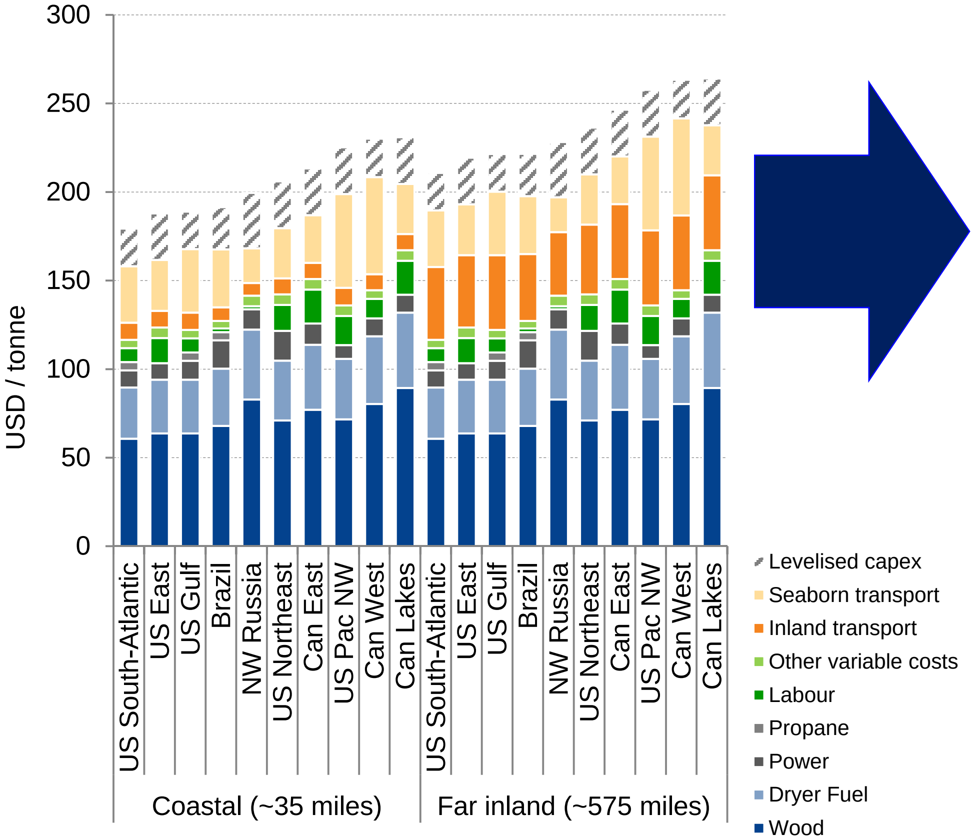
Vertical integrated companies with global forest land ownership or user rights



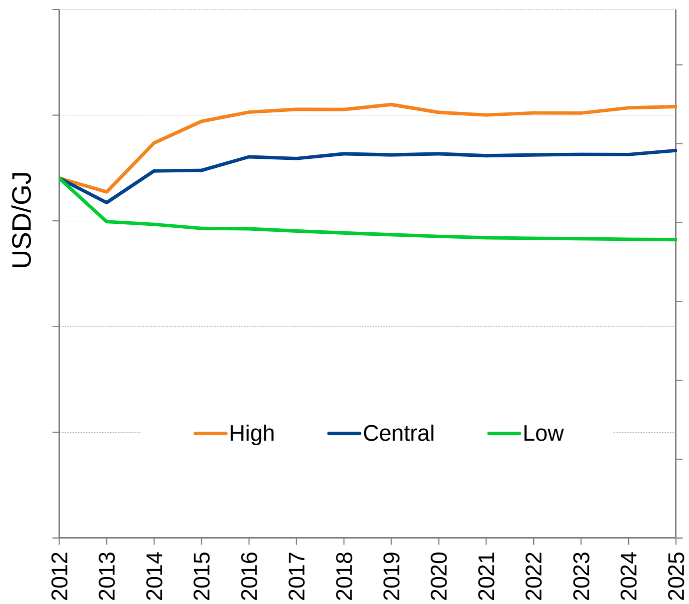
INTERNATIONAL BIOMASS LOGISTICS

Access to international biomass markets opens up a large resource basket and stable commoditised market might develop…

Pellet Supply Cost Breakdown
Real 2011 CIF ARA



Pellet price projections, CIF ARA, prices real 2011

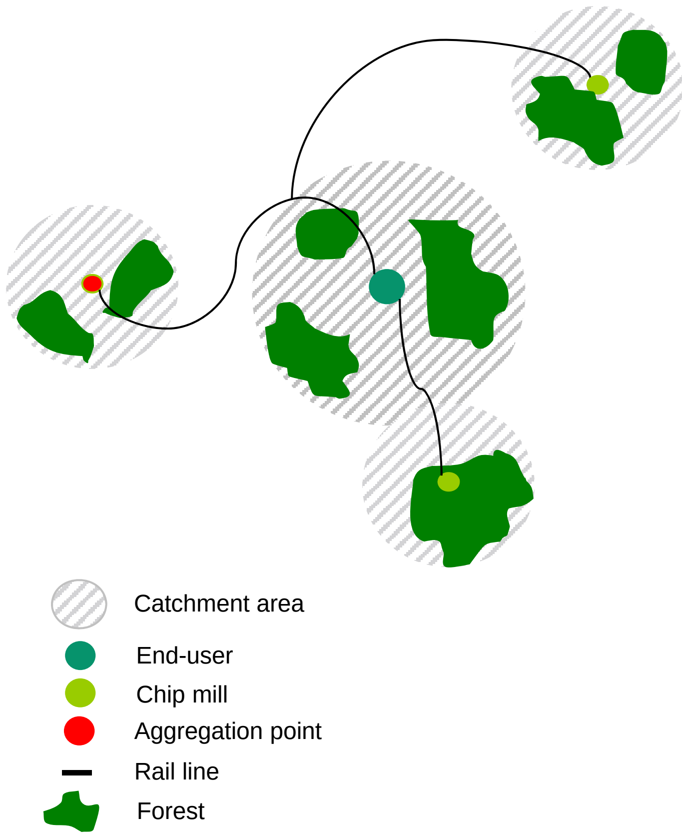


…but are price levels affordable for biofuel producers?

BIOMASS PRE-TREATMENT TECHNOLOGIES

Efficient densification technologies can present interesting options for large scale biomass conversion facilities.

	Net calorific values (GJ/t as delivered)
Logs	8 – 12
Chips	10.2 –13.8
Pellets	17.1 – 17.7
Pyrolysis Oil	16 –19.2
Black Pellets	20.9 – 22.3



SUPPLYING LARGE SCALE PROJECTS WITH BIOMASS CAN BE DONE

- A robust long-term biomass sourcing strategy is key for the success of your project
- Proven supply chains for large scale biomass projects do exist
- The competitive power of existing players can be very strong
- Vertical integration can create peace of mind
- The learning curve ahead might be steep but provides lots of fun

THANK YOU!

Engineering balanced sustainability™

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