

Biotrade + project:Workshop: policy options for sustainable biomasse trade
Global Biomass Resources – Potential opportunities for trade



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Messe Wien – Congress center
Schubert 4

Global Biomass Resources – Potential opportunities for trade

Structure:

Global issues: population, energy demand, emissions, land endowment

Facts and examples

outlook



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Global Biomass Resources – Potential opportunities for trade

- *Purpose of the project: guidelines for an european trade strategy for 2020 and beyond, sustainably sourced and efficiently used biomass; focus: wood chips, pellets, torrefied biomass and pyrolysis oil*
- ***Key assumptions for ths presentation:***

***climate mitigation policy is getting serious
economic growth and population growth continue
Europe develops a global responsibility***



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towards 2035:

Economic growth and climate mitigation

2035: more energy needed – growth of population and the economies

the carbon budget approach: halving the use of fossil fuels required to comply with the 2°C target

How to close the gap?

more renewable energies

better energy efficiency

What can be the role of bio-energy and of bio-energy trade?



Global population

	Global Population bn	
	2011	Trends to 2035
World	7 058	Growth
Africa	1 072	Strong growth
Americas	942	Almost stable
Asia	4 216	Strong growth
Europe	740	Stable, declining
Oceania	37	-

The projected population growth will mainly take place in Africa and Asia, In these continents they will need more land for food!



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Global energy demand

	Energy consumption per capita	Trends towards 2035
World	21 900kWh (79 GJ)	growing
Africa	low	Strong growth
Americas	North Amer: very high South Amer: low	Small growth Growth
Asia	Rather low	Strong growth
Europe	High (38 000kWh; 137GJ)	Rather stable, maybe decline
Oceania	High	



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Global Biomass Resources – Potential opportunities for trade energy demand and CO2 emissions

	Energy demand and CO2 emissions/capita	
	CO2 emisions	What should be the trends towards 2035
World	4,6 t/cap and year	Should decline by 50%
Africa	low	Small increase
Americas	North: high South: low	Strong decrease Small decrease
Asia	China: medium Other countries: low	Small Decrease Small increase
Europe	medium	Strong decrease
Oceania	Rather high (AU)	

Africa, Asia, South America: increasing energy demand, will need much more RES

Europe: reduce emissions and energy demand, more res

North America: strong reduction in emissions and strong growth in res!

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Global Biomass Resources – Potential opportunities for trade

available arable land per capita

	Arable land/cap ha	Trends towards 2035
World	0,20	reduced
Africa	0,22	Strongly reduced
Americas	0,39	Rather stable
Asia	0,11	Strongly reduced
Europe	0,37	Rather stable
Oceania	1,30	oversupply

Americas and Europe have a good endowment with arable land/capita, Africa and especially Asia not. In these continents arable land/cap will go Decline futher due to population growth.

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Period 2015 – 2025

Big differences in the infrastructure to use biomass between North America, Africa and Europe.

Europe

Biomass to power plants

Biomass district heating systems

Millions of biomass boilers, pellets stoves

Europe continues to import more biomass, doing so Europe helps to build up a supply structure in exporting countries, but sooner or later these countries will need part of this biomass in their own countries.

Europe needs efforts to increase the European supply of biomass!



Global Biomass Resources – Potential opportunities for trade

conclusions 1

World	situation	Short term Until 2025	Longer term Beyond 2025
Africa	Strong growth in energy demand and population, arable land per capita low as compared to Europe and Americas, Deforestation, unsustainable forest management	Limited export Possibilities for Europe, Building up a Bioenergy structure	Africa will need all its Bioenergy For Africa
Americas	Canada: huge bioenergy potential as compared to the population, USA: huge bio-potential but also high fossil CO2 emissions, Latin America: big bioenergy potential,	Import possibilities for Europe	Import possibilities for Europe but less and less from the USA
Asia	Strong growth in energy demand and population, arable land very scarce	Demand for bioenergy imports	Strong demand for imports
Europe	Well endowed with arable land and forests, stable population	Good import possibilities – America	Reduced import possib., Europe has to use its resources better

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Bioenergy and climate change

Biomass for energy: origin and potential by 2035

Forestry: fuel wood, forest residues, wood industry residues, black liquor (lignin from pulp mills) recovered wood, wood from landscape cleaning, processed forms; charcoal, pellets

Agriculture: animal by-products (manure-biogas), agricultural by-products like straw, rice husk, sun flower shells, empty fruit bunch, bagasse, kernels from olive trees etc., energy crops, short rotation coppices etc.

Waste streams: MSW (municipal solid waste – organic fraction), sewage sludge, waste from food industry,

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Structure of global biomass supply 2010

source IPCC study

Biomass sector		%	EJ
Forestry (87%)	Fuelwood	67%	34.7
	Charcoal	7%	3.62
	Forest residues	1%	0.52
	Black liquor	1%	0.52
	Wood industry residues	5%	2.59
	Recovered wood	6%	3.11
Agriculture (10%)	Animal byproducts	3%	1.55
	Agricultural byproducts	4%	2.07
	Energy crops	3%	1.55
Wastes (3%)	MSW and landfill gas	3%	1.55
Total			54.7

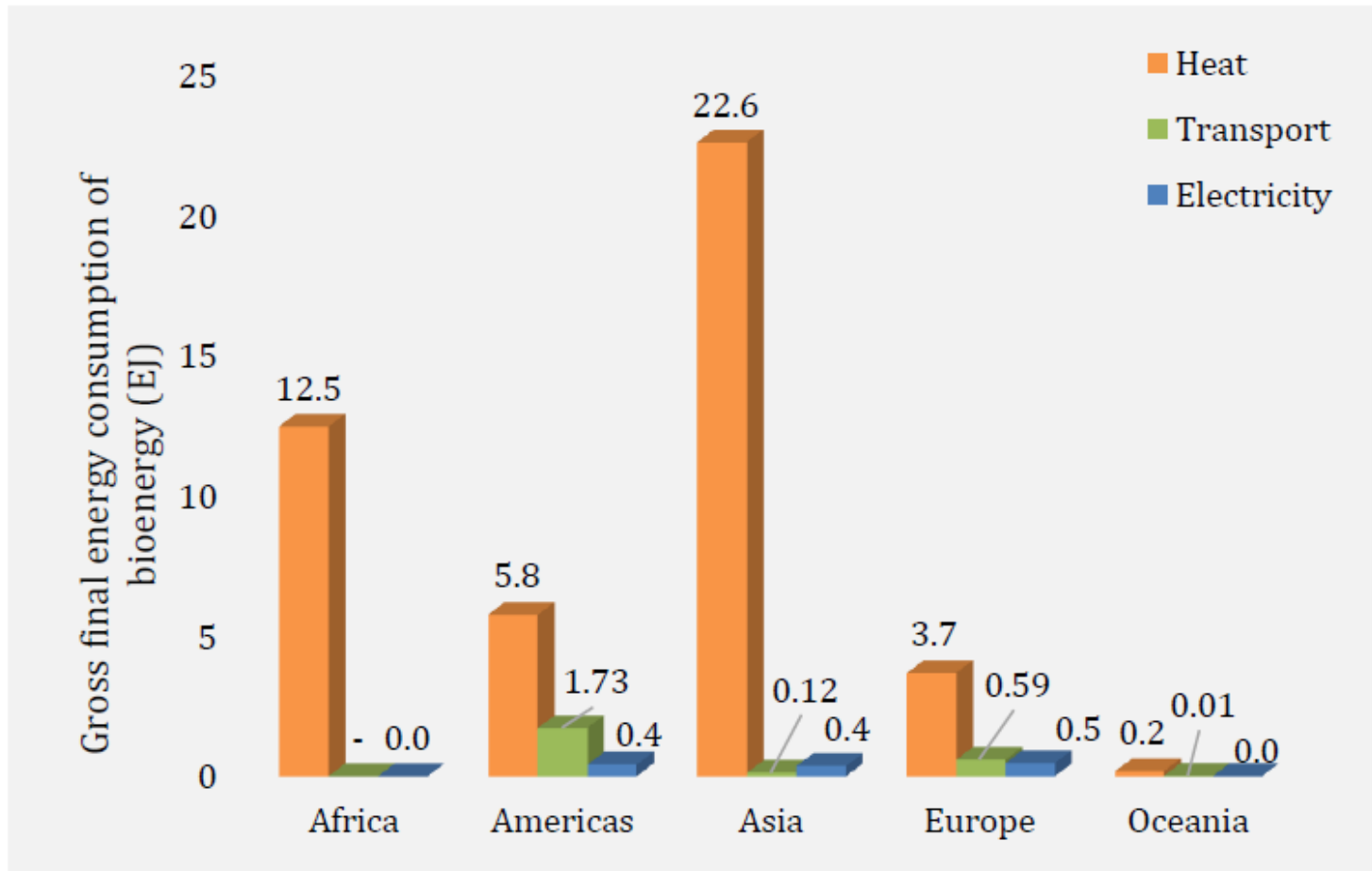


Bioenergy 2014 estimated with 58.5 EJ, hereof 3,5 EJ pellets, 3 EJ biofuels)

The use of bioenergy by continents:

Asia is leading, followed by Africa and the Americas

Asia is the largest user of bioenergy followed by Africa and Americas.



Bioenergy and climate change

Supply of biomass, EJ (source 2010 IPCC)

Additional 80 EJ until 2035!

	2010	2035
Forestry	47.2	Medium increase
Agriculture	5.4	Strong increase
Waste	1.6	Strong increase
total	54.2	125 - 150



Global Biomass Resources – Potential opportunities for trade

Biomass in Europe 2012 and 2035

2012: bioenergy in Europe EU28

116Mtoe (4,8 EJ, 1 333 TWh as prim. Energy)

2014: Pellets consumption 0,35EJ (20 Mt equals 96TWh or 8,27 Mtoe.)

2035: bioenergy in EU europe as part of a climate mitigation strategy

Ca 200 – 230 Mtoe (about 9 EJ)

Assumed share of pellets 20% would be 40 Mtoe (ca 100 Mt pellets)

2035: European production: ?

2035: Imported pellets: ?

5 Mha decidated energy crops for solid biomass deliver 60Mt solid biomass as dry matter (1,08 EJ = 30 Mtoe = 300 TWh) that is 75% of the assumed 100 Mt pellets



Low quality wood for bioenergy



Straw for bioenergy



A few clarifications

- ILUC is a misleading concept, that does not depict the real world, underestimates the innovation and dynamic of the agric. sector
- First generation fuels are a by-product of the protein production, a too low limitation as now in Europe limits the protein production and causes more protein imports from abroad.
- Dirty carbon and renewable carbon: dirty (fossil) carbon would remain in the earth crust forever if humans would not dig it out. The use of fossil carbon leads to a huge carbon debt! Renewable carbon in biomass origins from the atmosphere and is given back to it by decay or by use. It is part of the natural carbon cycle.
- Nature as example: we need a fossil free energy system but not a low carbon society – nature is not a low carbon system!



!

Now to Logistics-

Logistics Costs of Trade

	<u>Total</u>	<u>Logistics</u>
	(% of End User Price)	
Feed stock	1 to 25	
if mill residues		1
if road side/standing		10 to 25
Mill	8 to 15	
Finance	6 to 10	
Transport to port	5 to 10	5 to 10
Storage, load/unload	5 to 12	5 to 12
Ocean shipping	12 to 20	12 to 20
Transport to end user	2 to 10	2 to 10
Risk and profit	20+	

100%

~50%



A Quantum Leap in Traded Biomass

- How get biomass to where it is needed competitively
 - **Improve supply chains**
 - Integrate with existing low cost supply chains
 - Invest in supply chain infrastructure
 - **Make products more energy dense**
 - Torrefied pellets, Pyrolysis oil



Supply Chain Enhancements

BC- Buy the Supply Chain!

- Pinnacle Pellet buys 330 rail cars
- Lowers cost of transporting pellets
- Ensures delivery



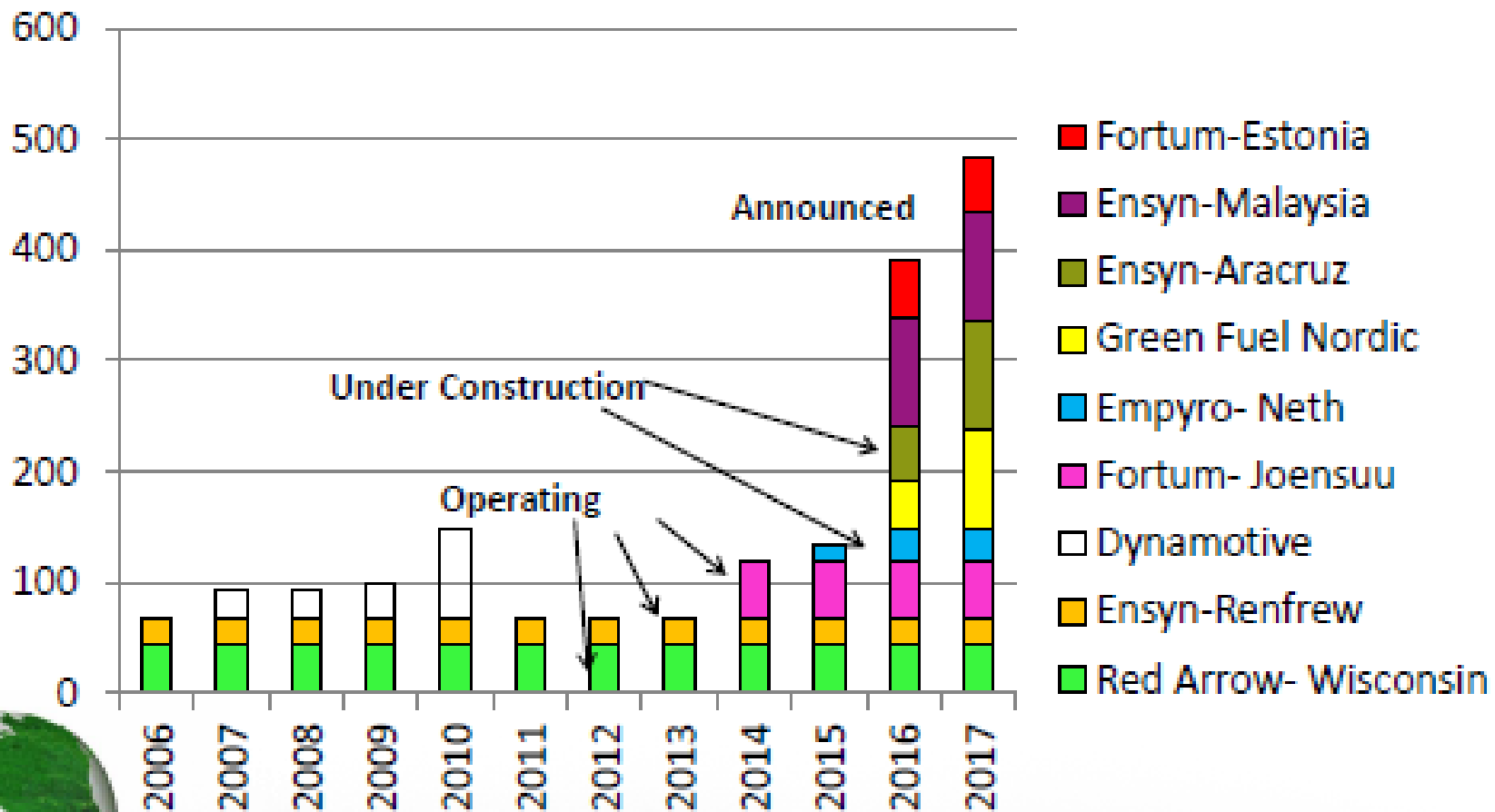
Increase Energy Density



	Calorific Value	Bulk Density	Energy Density
	GJ/t	t/m ³	GJ/m ³
Wood Pellets	16-18	.65	10.9
Torrefied Pellets	19-23	.7	14.5
Pyrolysis Oil	16-19	1.2	21

Twice as much energy as pellets, per unit volume

Pyrolysis Oil Plant Capacity- 000tpa



Bioenergy and climate change

Overview about technologies for treatment of biomass:

- Baling, chipping
- Drying, grinding
- Pelletizing, briquetting
- Torrefaction
- Steam explosion
- Pyrolysis



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conclusions

Biomass trade is a global not an European issue

- **Europe Short term opportunities:**
Import possibilities from Africa and America
- **Europe long term opportunities:**
Import possibilities mainly from Canada and South America

!



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Principles in the use of biomass

Efficiency

Sustainability

Cost competitive

Regional priority for production and use



Bioenergy and climate change



Philip Lowe, former Directeur General of the EU energy department:

Biomass is the only renewable, affordable energy source available on-demand. European countries need to make sure it is sourced sustainably, writes Philip Lowe.



Bioenergy and climate change

Philip Lowe: “Sweden is already getting it right. Bioenergy is today the largest source of energy in the overall mix, accounting for one-third of Sweden's energy consumption. Since 1990, the Swedish economy has grown by more than 50% in real terms, and at the same time, greenhouse gas emissions have decreased by 23%. A leading factor in this decoupling between economic growth and emissions is the steady growth of bioenergy use, in all sectors of the Swedish economy.”



To cope with this challenge: join the World Bioenergy Association (WBA)



WORLD BIOENERGY
ASSOCIATION



Member of the REN-Alliance



WBA: How we work?

- **Office** in Stockholm, Sweden
- **Our board:** 22 members from 5 continents (Africa 4, Americas 6, Asia 6, Australia 1, Europe 5)
- **Our members:** companies, associations, individuals from all over the world
- **Main issues:** biomass potential, sustainability of biomass, small scale heat with biomass, combined heat and power, future of biofuels, carbon neutrality of biomass, bioenergy statistics
- **Main activities:** fact sheets, projects, position papers, presentations in conferences and workshops, supporting biomass trade with the platform: bioenergy connect (BC)

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WORLD BIOENERGY
ASSOCIATION



Member of the REN-Alliance



WBA: Benefits of membership

- strengthen of the lobbying in favor of biomass on a global scale
- exchange of information and experience between the bioenergy sector world wide
- possible cooperation in working groups and projects
- access to new global studies and informations about bioenergy

We invite you: join WBA!

for more: www.worldbioenergy.org

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Thank you for your attention!



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KWB pellet boilers, AGRANA ethanol producer



Global Biomass Resources – Potential opportunities for trade conclusions

conclusions from this analysis by 2035:

high emitter countries:

will have to reduce fossil fuels strongly in their energy mix; they will have to use a big share of their biomass in their own country, they are big difference between USA and Canada

Low emitter countries:

Africa – strong growth in energy demand, unsustainable biomass use for cooking! They will need their biomass to replace unsustainable use by sustainable practices and cover part of the growing demand by indigenous sustainable biomass

Medium emitters like Europe:

Limited import possibilities from Africa and USA, better possibilities from Canada, Latin America and Russia, if a political accord can be reached.

