

Future Visions of International Biomass Market

Developing Bioenergy markets – Focus on
Forest Sector and Russia
-Seminar

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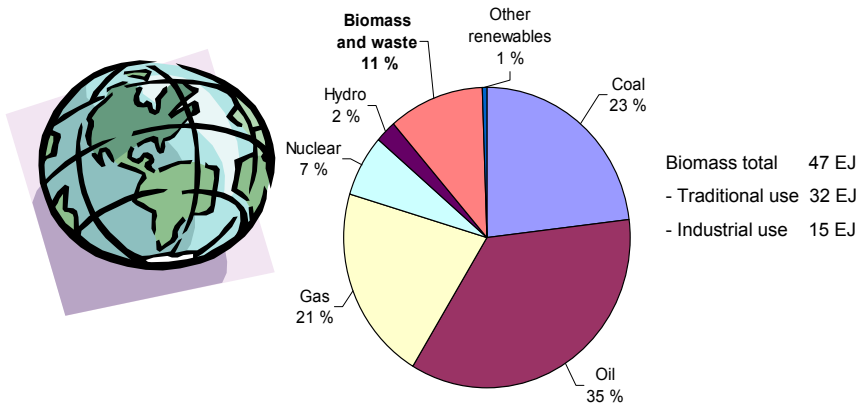


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Biomass in world energy supply



World energy consumption in 2002. In total 433 EJ.
 (IEA World Energy Outlook, 2004)

Global biomass production and trade – an overview

Product	World Production in 2004	Volume of international trade in 2004	International trade / world production
Industrial wood and forest products			
Industrial round wood	1,646 Mm ³	121 Mm ³	7%
Wood chips and particles	197 Mm ³	37 Mm ³	19%
Sawn timber	416 Mm ³	130 Mm ³	31%
Pulp for paper production	189 Mt	42 Mt	22%
Paper and paperboard	354 Mt	111 Mt	31%
Agricultural products			
Maize	725 Mt	83 Mt	11%
Wheat	630 Mt	118 Mt	19%
Barley	154 Mt	22 Mt	14%
Oats	26 Mt	2.5 Mt	10%
Rye	18 Mt	2 Mt	11%
Rice	608 Mt	28 Mt	5%
Palm oil	37 Mt	23 Mt	62%
Rapeseed	46 Mt	8.5 Mt	18%
Rapeseed oil	16 Mt	2.5 Mt	16%
Biofuels			
Ethanol	41 Mm ³	3.5 Mm ³	9%
Biodiesel	3.5 Mt	<0.5 Mt	14%
Fuel wood	1,772 Mm ³	3.5 Mm ³	~ 0%
Charcoal	44 Mt	1 Mt	2%
Wood pellets	4 Mt	1 Mt	25%

Global biofuels trade – an overview

Estimate on the scope of international trade of biofuels in 2004, (EJ). Tall oil, ETBE and wastes excluded. (EJ = 10¹⁸J)



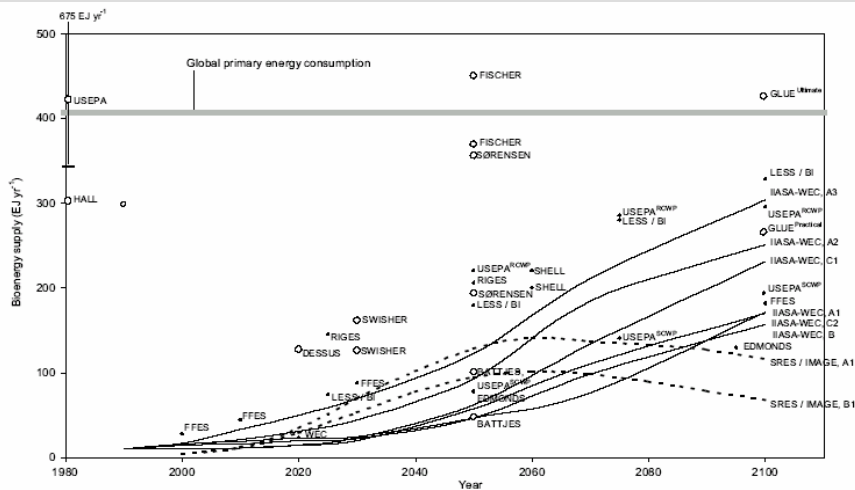
Indirect trade	0.54
Industrial round wood ^(a)	0.41
Wood chips and particles ^(b)	0.13
Direct trade	0.22
Ethanol ^(c)	0.09
Biodiesel ^(d)	0.02
Fuel wood ^(e)	0.03
Charcoal ^(f)	0.02
Wood pellets ^(g)	0.02
Palm oil ^(h)	0.04
In total	0.76



Foto: Vapo

- ^(a) Round wood in FAO statistics is without bark, so we added 10% of bark. The other assumptions: average density 0.8 t/m³, 45% average conversion into biofuels, heating value 9.4 GJ/t.
- ^(b) Assumptions: average density 0.8 t/m³, 45% average conversion into biofuels and 9.4 GJ/t heating value.
- ^(c) Assumed calorific value 27 GJ/m³.
- ^(d) Assumed calorific value 37 GJ/t.
- ^(e) Assumed density and calorific value 0.7 t/m³ and 13 GJ/t.
- ^(f) Assumed calorific value 22 GJ/t.
- ^(g) Assumed calorific value 17.5 GJ/t.
- ^(h) According to [12] the global industrial use of palm oil was 6.8 Mt in 2004. Palm oil use for energy purposes (for power generation and biodiesel production) was estimated at 1 Mt, which approximately equals the volume of industrial use of palm oil in EU-25 indicated by [12]. The calorific value of palm oil was assumed at 37 GJ/t.

Global long-term production potential of biomass for energy purposes



A Summary of the results from 13 studies that have evaluated the potential to harvest energy from biomass up to 2100 (Berndes et al., 2003)

Biomass use and trade for energy production

Summary of the biomass use in energy production and international trade:

	Current status	Future (long term) opportunities in 2050-2100
Use	43 EJ	250-500 EJ ^(a) <small>^(a) source: E.g. Faaij et al., 2006</small>
International trading	< 1 EJ	80-150 EJ ^(b) <small>^(b) source: Hansson et al., 2006</small>



Foto: Alholmens Kraft Oy



Foto: Vopak B.V.

Developing bioenergy market

- Several parties and stakeholders have ambitions to contribute to the development of international bioenergy market (biomass for energy purposes), e.g. IEA Bioenergy Task 40, FAO, World Bank, etc...
- IEA Bioenergy Task 40 aims to support the development of sustainable international bioenergy market
- The vision of Task 40 is that: *“Global bioenergy market develops over time into a real “commodity market” which will secure supply and demand in a sustainable way”.*



Developing bioenergy market / challenges

The development of the bioenergy markets is challenging since:

- Biofuels market consisting of separate sources and end use purposes of biomass and multitude stakeholders are a large and complex field the future development of which is difficult to outline
- The operational environment related to bioenergy (industrial use of biomass in energy production and the trading of biofuels) is evolving rapidly
- Changing operational environment and complex interconnections in the field of bioenergy make the planning of policy and business strategies challenging

Understanding of dynamic environment help managing the future

- The decisions made by politicians, the strategies of market actors and the direction of research activities have a significant influence on the future development of the biomass market
- To support the development of biofuels markets and make the most of the development it is needed to recognise the changes in operational environment and understand the forces behind them

Stakeholders can affect the future development

An actor can adopt several roles:

Slaughter (teuras) - waits and hopes

Predictor - trusts on the probable

Risk-taker - chooses the "best" outcome

Risk-avoider - forms a strategy, which manages all scenarios

Realist - creates flexibility in case some other than the chosen scenario takes effect

Future maker - acts so that the desired future scenario takes effect



A study on future visions of biomass market

The study aimed to clarify future development of international biomass market for energy purposes up to 2020

Scenario process aimed to:

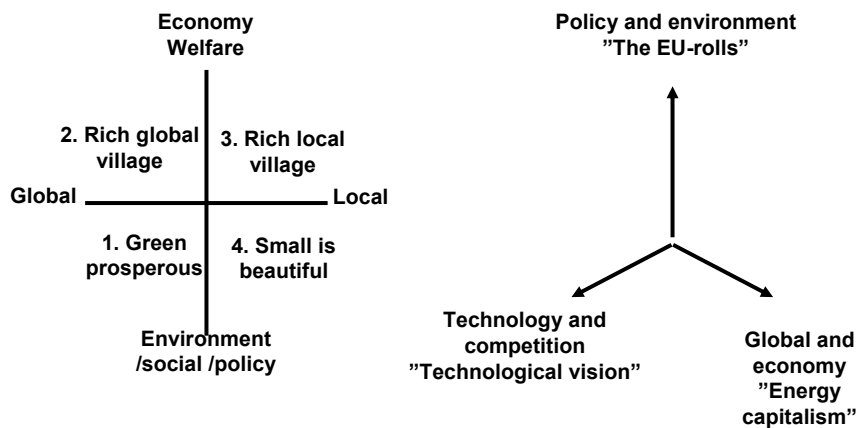
- Identify driving forces of international biomass market
- Group the driving forces into clusters
- Define the importance of the clusters
- Create the alternative scenarios based on previous

Scenario process provide a structured way to create a dynamic interaction between the environment and a stakeholders to cover a broad range of future possibilities to confront the future uncertainties and expand peoples' thinking

Scenarios

Scenarios created by the international group

Scenarios created by the Finnish group



The framework of the scenarios of international biomass market in the year 2020

Analysis of the scenarios

All scenarios assumed a considerable increase in the energy use of biomass during the next 15 years

The following factors were conceived as important for the future development of the energy use and market of biomass:

- Price competitiveness of bioenergy
- Energy policy (taxation, subsidies, R&D)
- Imbalance between supply and demand of bioenergy (resources)
- International agreements
- Sustainability issues of the utilisation of biomass
- Strong development of liquid biofuels in coming years

Analysis of the scenarios

Recognition of the key characters of each scenarios facilitates the identification of most advisable scenario

From viewpoint of vital working international bioenergy market “Green prosperous” and “The EU rolls” scenarios will give the most desirable outcome



Requirements needed in realising the desirable scenarios

“Green prosperous” -scenario:

- Removal of trade barriers
- Strong “green” policy
- Worldwide co-operation
- Ensuring the sustainability of bioenergy (well functioning certification system)
- International agreements (obliging all countries)
- Favourable public opinion (e.g. by means of education and dissemination)

“EU rolls” -scenario:

- Harmonised energy policy in the EU
- Remarkable import of biomass/-fuels to the EU
- Clear usage targets of bioenergy
- Strong coupling of environmental aspects and biomass market development

Discussion

- Dozens of experts were involved in the scenario process and have given their contribution (credence of the results)
- The scenarios give only one overview how biomass market are going to look like
- It's doubtful that one scenario will be reality in 2020, but scenarios can come true partly, parallel and with different timing
- The results can be utilised by the authorities and the market actors
- For companies results can serve as initial data in their strategic decision making and e.g. technology roadmapping of alternative future development routes
- Active role of all stakeholder is important in the developing of bioenergy markets (possibility to effect on the future)

Thank you!

More information: The research report on scenario study will be published in the publication series of LUT in late autumn of 2006.

The research was carried out in collaboration with:

