

Bioenergy Information System(s): What Information to Whom?

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Overview

- Approach: Full Chain LCA- Embracing Complexity and Heterogeneity
- Building Blocks of a Bioenergy Provision Chain
- System Overview
- Useful Information Provision: BEP Structural Overview
- Information: For Whom? For What? For Where?
- Scale of the Challenge
- Interactive Centre for Biomass Information (iCBI)
 - Underpinning a 'Moore's Law for Bioenergy'

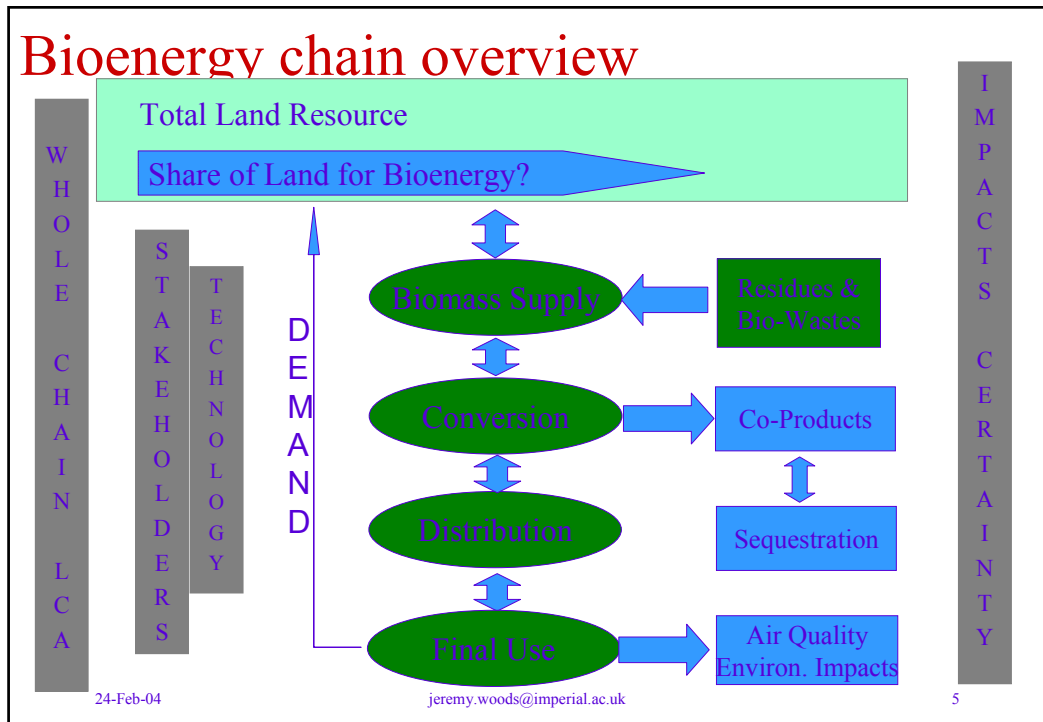
Complexity and Heterogeneity:

- Biomass Energy is not a Single RET
 - E.g. 88 individual pathways for biofuel production in UK identified by Woods & Bauen (2003)
- Role for *Innovation* and *Technology Transfer*
- Drivers / Incentives / Policy / Regulations / C-accreditation:

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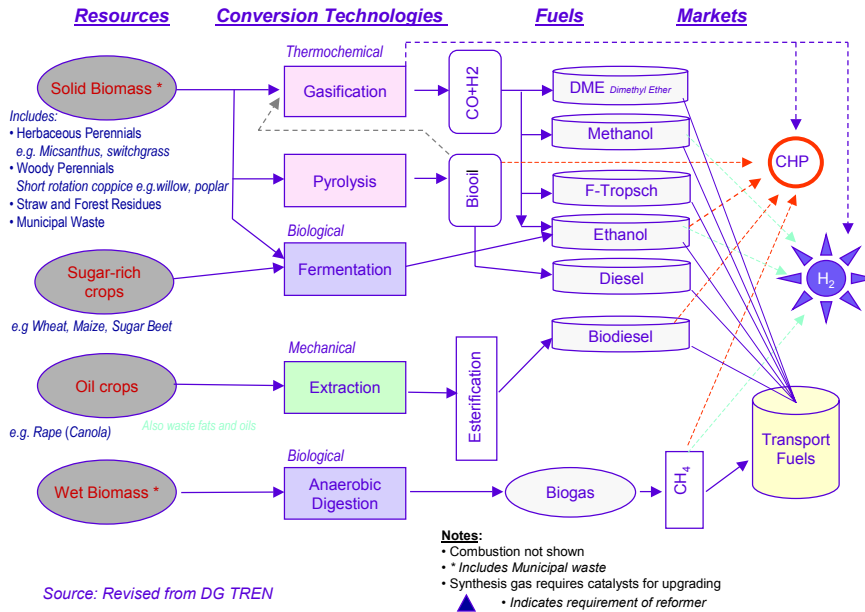
Bioenergy chain overview



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- System Overview: embracing complexity!
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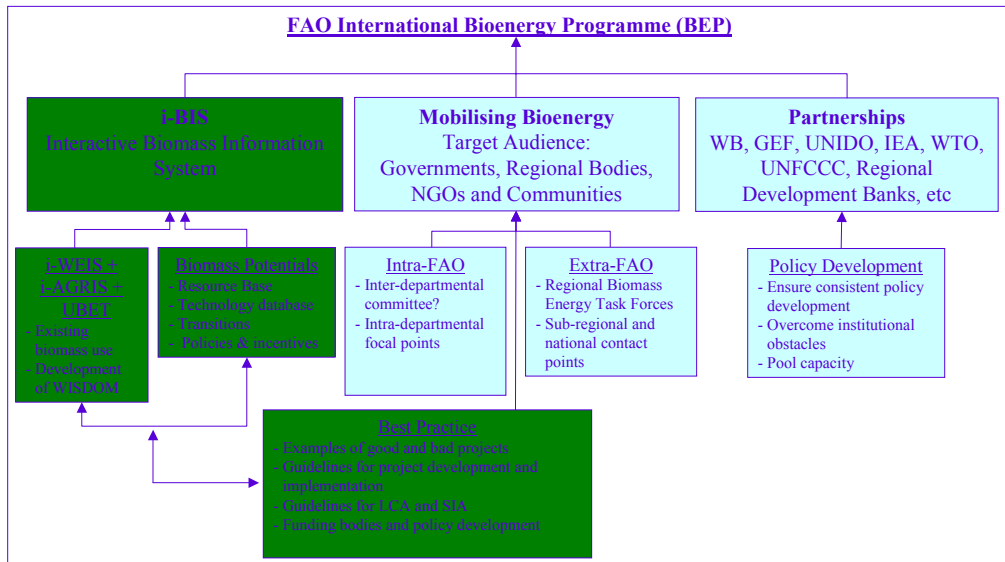
Overview of Conversion Pathways (biomass and waste)



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FAO Biomass Energy Programme: Schematic



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Information: useful? Focused?

- Who are the clients?
 - E.g. existing bioenergy industry, businesses and financiers?
 - Individuals, NGOs, academics, charities?
 - National governments and institutions- e.g. carbon accounting, agriculture and forestry departments (biomass assessment)
- Role for *Innovation* and *Technology Transfer*
- Drivers :
 - Traditional → Modern (managing transitions)
 - Energy Security, Rural Development, Climate Change, ??
 - Technology change (evolution and revolution)
 - Social equity and gender issues
 - National policy, regulations, incentives
 - E.t.c. ...

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Residues potential

- Recoverable potential from energy residues (EJ)

	Crop	Forest	Dung	Total
World	24	36	10	70
OECD of which:	8	15	2	25
N. America	4	9	0.7	14
Europe	3	5	1	9
Asia Pacific / Oceania	0.8	0.8	0.4	2

- Potential contribution of biomass energy from residues by 2020 (EJ)

	Biomass potential based on 25% residue use (EJ)	Share of primary energy (1998)	Share of electricity consumption (1998)	Share of primary energy (2020)	Share of electricity consumption (2020)
World	17.5	5%	15%	3%	8%
OECD of which:	6.25	3%	8%	2%	6%
N. America	3.5	5%	9%	3%	7%
Europe	2.25	4%	9%	2%	6%
Asia Pacific / Oceania	0.5	4%	4%	2%	3%

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Energy plantations potential

- Energy plantations potential
 - 208 Mha Globally
 - 54 Mha OECD

	Potential based on 5% of crop, forest and wood land and average 150 GJ/ha yield (EJ)	Share of primary energy (1998)	Share of electricity consumption (1998)	Share of primary energy (2020)	Share of electricity consumption (2020)
World	36.9	11%	32%	6%	17%
OECD of which:	9.8	5%	13%	3%	9%
N. America	6.4	9%	16%	5%	13%
Europe	2.2	4%	9%	2%	6%
Asia Pacific / Oceania	1.2	10%	10%	5%	7%

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Summary of potential from Biomass

- 25% of recoverable forestry and agricultural residues
- 5% of crop, forest and wood land:
 - Global Forest & Woodland area = 4.172 Bha (5% = 208 Mha)

	Potential based on exploiting 25% of residue potential and 5% of crop, forest and wood land for energy plantations (EJ)	Share of primary energy (1997)	Share of electricity consumption (1997)	Share of primary energy (2020)	Share of electricity consumption (2020)
World	54.4	15%	46%	9%	24%
OECD of which:	15.8	8%	22%	6%	14%
N. America	9.9	10%	26%	8%	19%
Europe	4.2	6%	16%	5%	10%
Asia Pacific / Oceania	1.7	7%	15%	5%	11%

What's Expected: e.g. IPCC TAR (2050)

Scenario / Biomass Energy Requirement	Bioenergy	% Primary	Land for Biomass
	EJ	%	Mha
Sørensen (1999) - bottom up assessment	178	74	-
IPCC (2001) - TAR - AIM - A1M	193	14	418
- TAR - A2 - ASF	71	27	
- TAR - B1 - Image	95	13	268
- TAR - B2 - Message	105	12	288
- TAR - A1F1 (A1G) - Minicam	52	4	68
- TAR - A1T - Message	183	71	418
IPCC (1996) - SAR	280		
	<i>Average</i>	<i>31</i>	<i>292</i>
	<i>Max</i>	<i>74</i>	<i>418</i>
	<i>Min</i>	<i>4</i>	<i>68</i>

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Information distribution

- Examples of practical information:
- Methodologies for resource assessment
- Appropriate scale and technologies
- Successful policy making frameworks
- Geographic scale matters!
- Generic framework but flexibility to allow site-specific heterogeneity to flourish

What Information at What level?

- BEP
 - National and Regional/Global protocols
 - Carbon accreditation
 - International trading (Regulation- WTO)
 - Inter-agency consistency and direction
- Regional and National Biomass Task Forces
 - Resource Evaluation
 - Project prioritisation
 - Networks
 - National Policy
 - Stakeholder engagement (NGOs, women's groups, e.t.c. ...)

Conclusions

- 'A Moore's Law for Bioenergy is required'
- Energy Security, rural development, climate change mitigation, decentralisation, deregulation,
- There should be a unique role for biomass in linking renewables to conventionals
- Information, collaboration and innovation are the key drivers

I THANK YOU!