

European Union and Bioenergy – Biofuel.

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Outline Map of EU-25.



Central Science Laboratory.



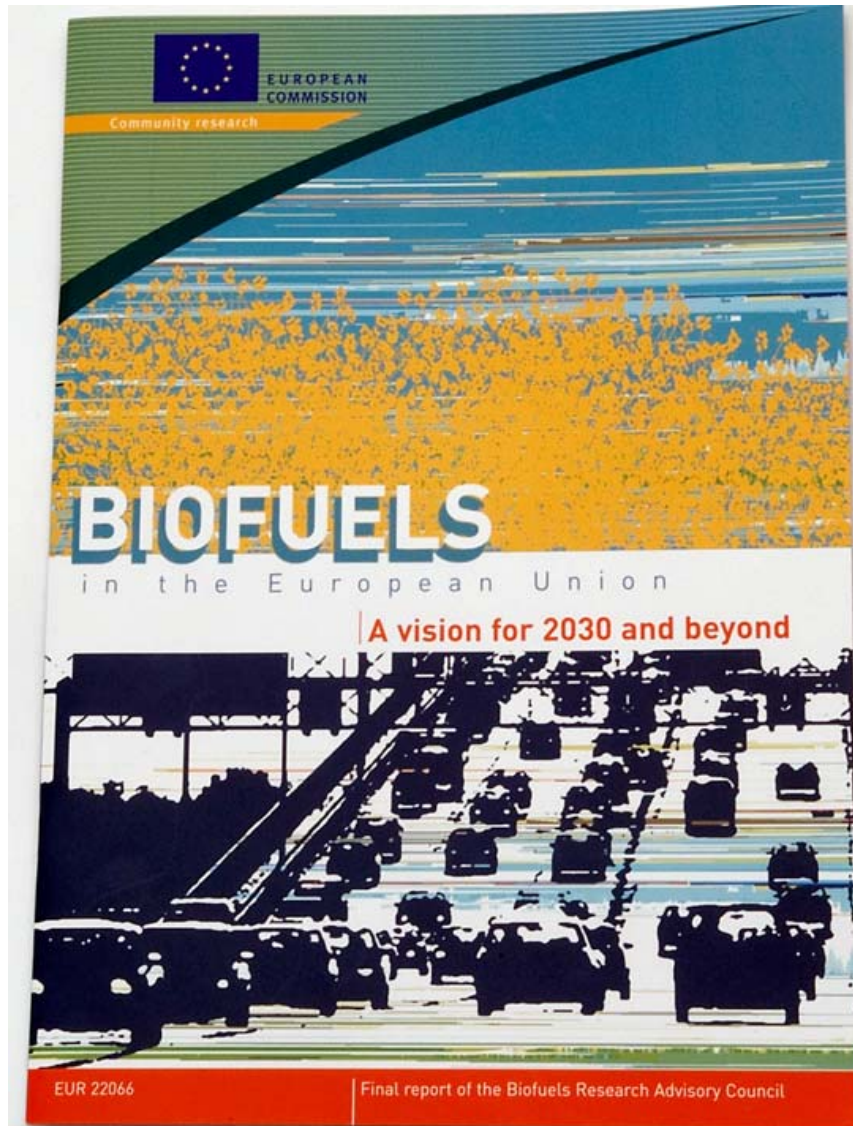
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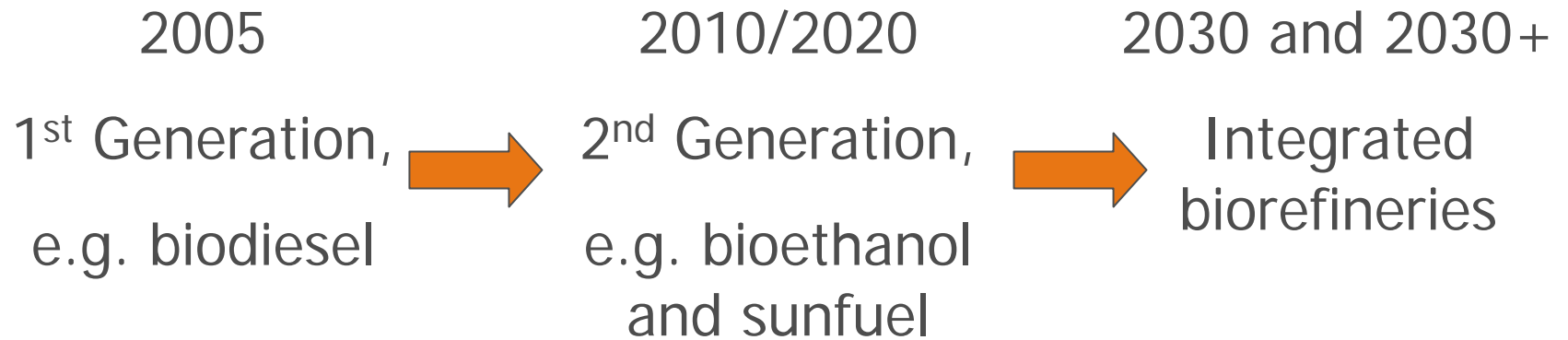
Drivers For Bio-Energy In EU.

- **Energy White Paper**
~ 130 + million tonnes *per annum* biomass.
- **Biofuels**
~ Progressive increases in substitution of biofuels for gasoline and diesel.

Biofuel Vision for 2030.



Technology roadmap: vision for biofuels for 2030+.



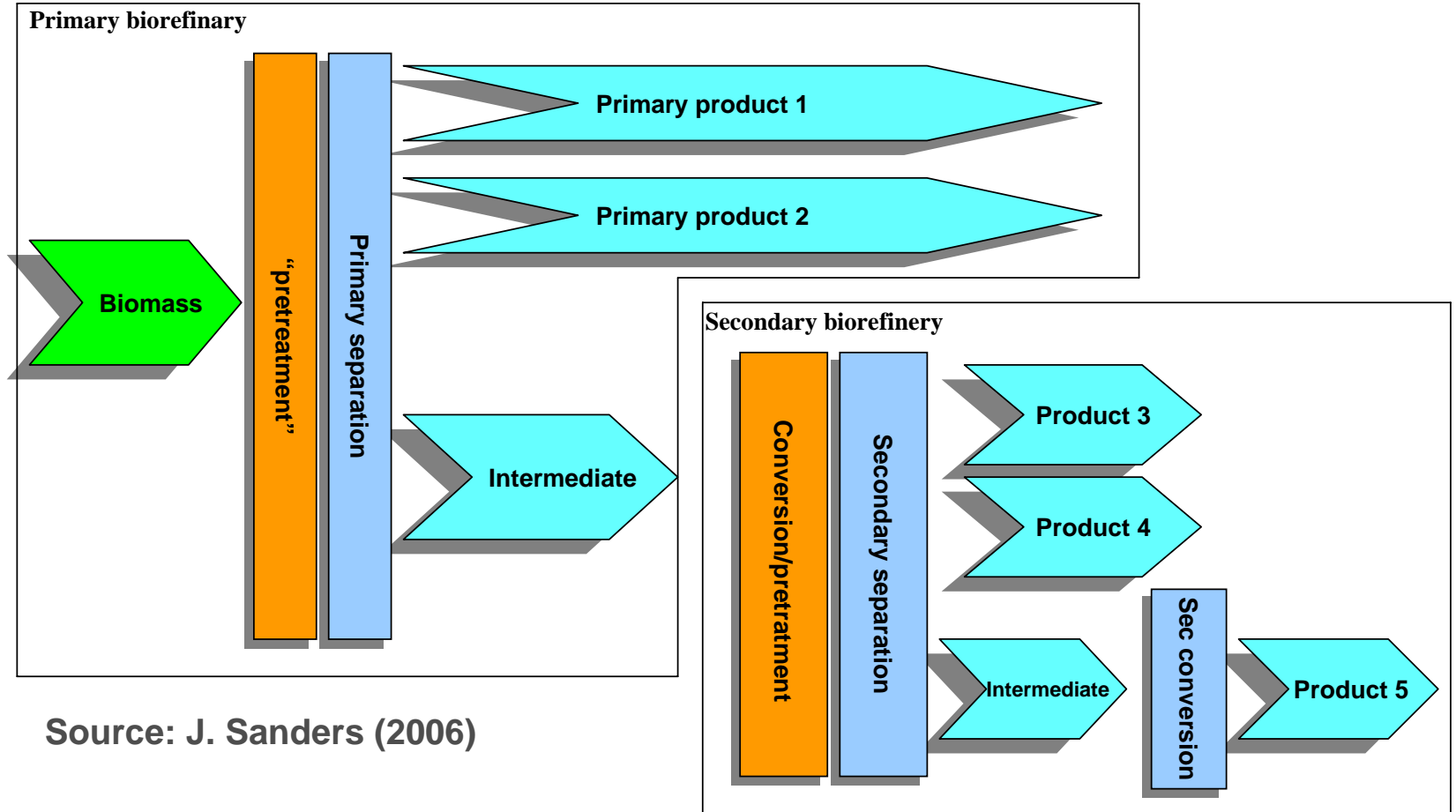
First Generation (Conventional) Biofuels.

First generation (conventional) biofuels			
Biofuel type	Specific names	Biomass feedstock	Production process
Bioethanol	Conventional bioethanol	Sugar beet, grains	Hydrolysis & fermentation
Vegetable oil	Pure plant oil (PPO)	Oil crops (e.g. rape seed)	Cold pressing/extraction
Biodiesel	Biodiesel from energy crops Rape seed methyl ester (RME), fatty acid methyl/ethyl ester (FAME/FAEE)	Oil crops (e.g. rape seed)	Cold pressing/extraction & transesterification
Biodiesel	Biodiesel from waste FAME/FAEE	Waste/cooking/frying oil/animal fat	Transesterification
Biogas	Upgraded biogas	(Wet) biomass	Digestion
Bio-ETBE		Bioethanol	Chemical synthesis

Second Generation Biofuels.

Second generation biofuels			
Biofuel type	Specific names	Biomass feedstock	Production process
Bioethanol	Cellulosic bioethanol	Lignocellulosic material	Advanced hydrolysis & fermentation
Synthetic biofuels	Biomass-to-liquids (BTL): Fischer-Tropsch (FT) diesel Synthetic (bio)diesel Biomethanol Heavier (mixed) alcohols Biodimethylether (Bio-DME)	Lignocellulosic material	Gasification & synthesis
Biodiesel	Hydro-treated biodiesel	Vegetable oils and animal fat	Hydro-treatment
Biogas	SNG (Synthetic Natural Gas)	Lignocellulosic material	Gasification & synthesis
Biohydrogen		Lignocellulosic material	Gasification & synthesis or Biological process

Schematic overview general integrated biorefinery process.



But!

**Have we asked the question, “What
are we trying to achieve?”**



Do We Need To Rethink Our Current Position?

- Visions for biofuel.
- Optimising bio-resources from land-based industry to minimise additional CO₂ production.
- Adding value to agriculture/forestry/wider rural economy.
- Integration of provision of public goods with bio-resource production.

Which Use of Bioresources is Most Appropriate?

- Fuel – solid/liquid.
- Fuel demand reducing products.
- A balance of fuel and other uses?
- What about the wider energy picture?

Optimising Use of Bio-Resources.



As a £ or \$ investment in terms of reduced energy demand, the construction industry gives the best return?



Hemp Lime Construction.



And The Environment?



EEA Report.

EEA Report | No 7/2006

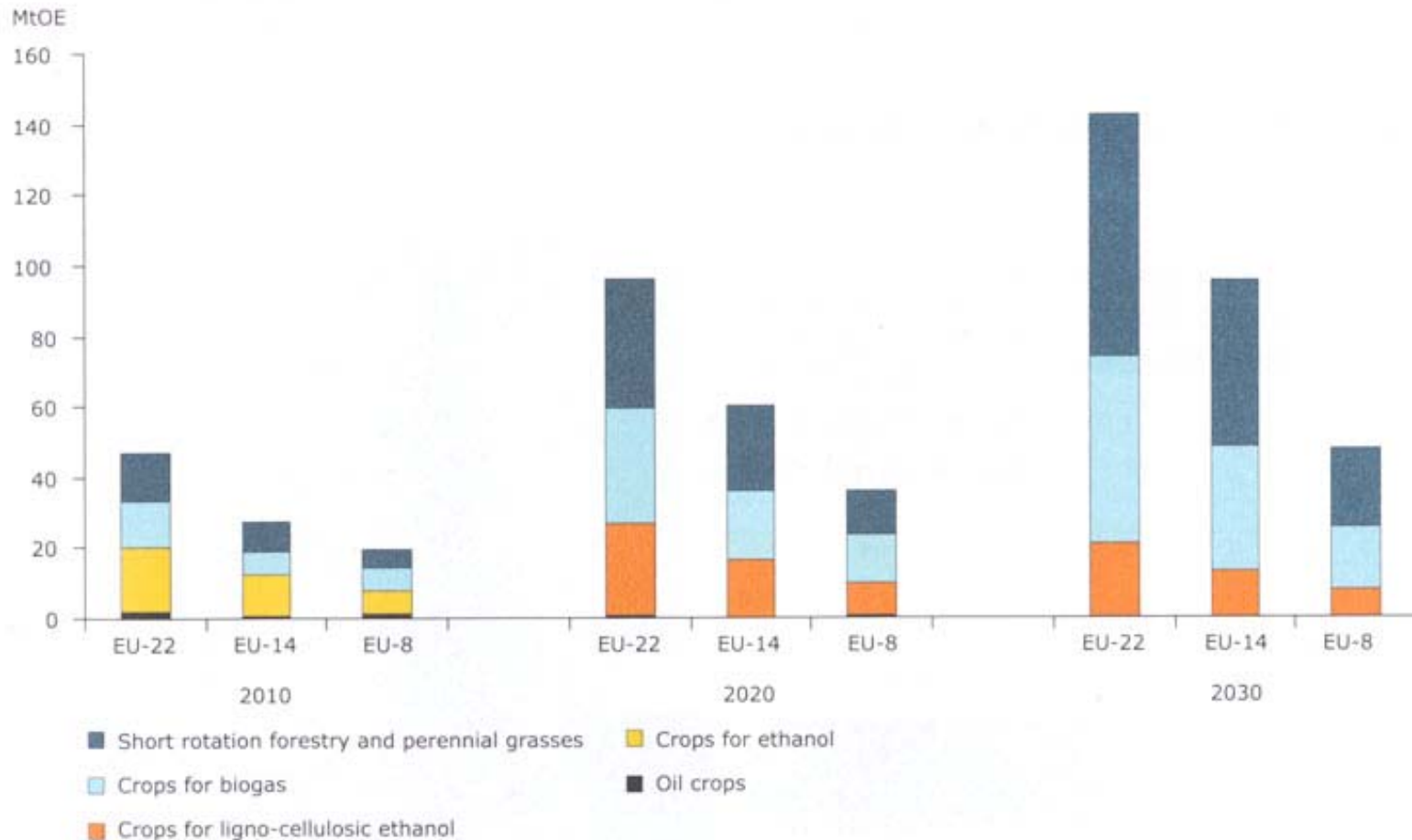
How much bioenergy can Europe produce
without harming the environment?

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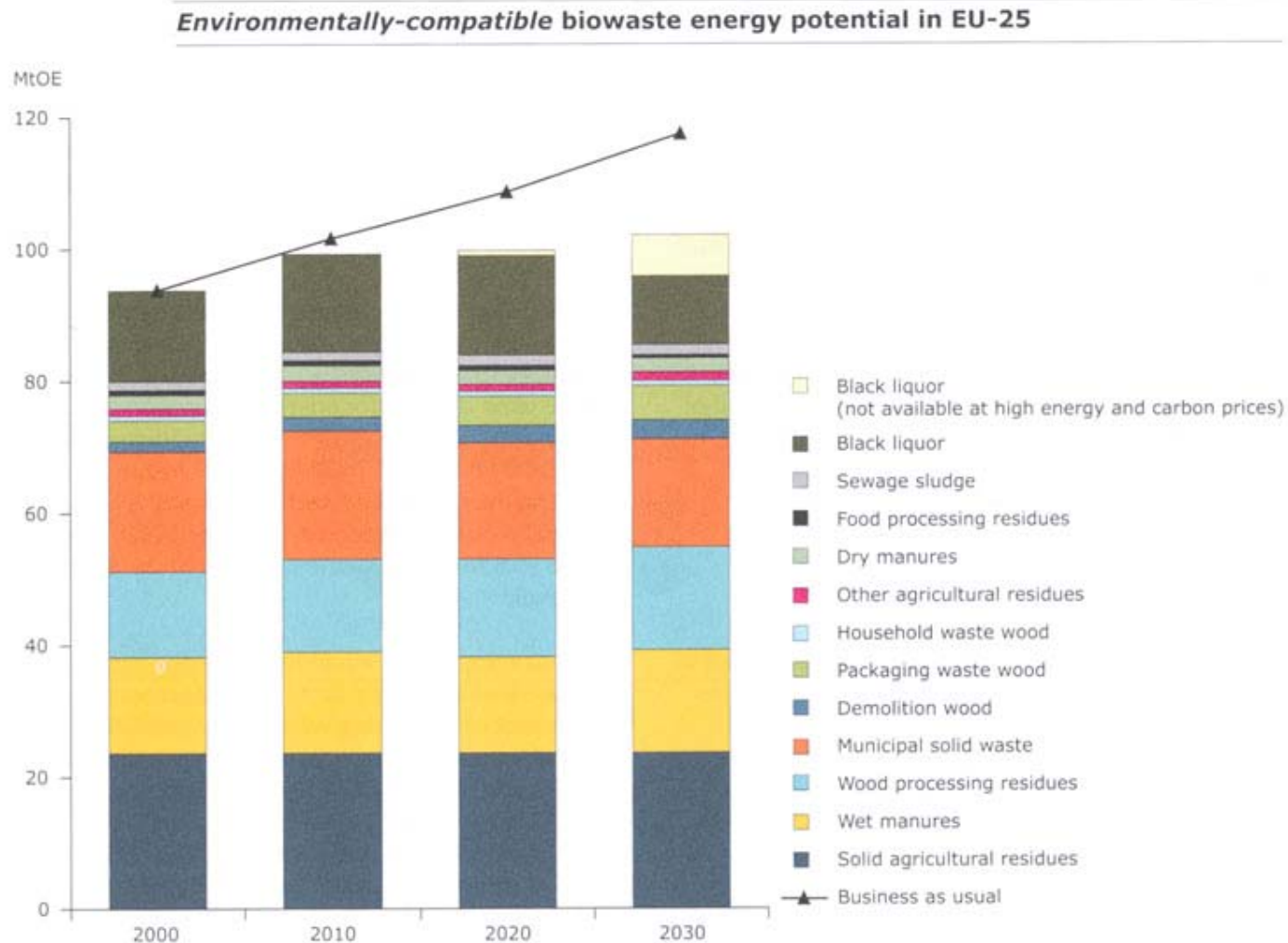


Environmentally-Compatible Agricultural Bioenergy Potential.

Environmentally-compatible agricultural bioenergy potential



The Potential of and Impact of Wastes?



The Public Perception of Bioenergy In Europe.

Bioenergy (wood, biogas, biofuels etc.) has the biggest potential to contribute to European targets regarding the proportion of renewable energy or greenhouse gas reductions. However, compared to energy carriers liked wind or solar energy, the image of bioenergy appears to be lower and broad public support is often lacking.

In Conclusion.

- Have we integrated biofuel/bioresource production and utilisation?
- Have we recognised the significance of public goods as a funder of land-based industry?
- Have we recognised differences in approach by different nations?
- What are we targeting?



