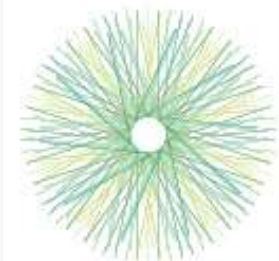


EIP-AGRI Workshop 'Building new biomass supply chains for the bio-based economy'

May 27 – 28, 2015 – Alghero, Italy



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EIP-AGRI Workshop 'Building new biomass supply chains for the bio-based economy'

Wednesday 27 May 2015, Alghero - Italy

08:30 – 09:00 Registration

09:00 – 09:20 Welcome and opening address
Mr Rob Peters – Directorate-General Agriculture and Rural Development

09:20 – 09:50 Setting the Scene
Keynote address on 'Building of new biomass supply chains for the bio-based economy'
Mr Federico Maria Grati

09:50 – 10:30 Presenting business cases

- SÖDRA, based on forestry Mr Christer Segerstéen
- NOVAMONT/COLDIRETTI based on industrial crops Ms Catia Bastioli and Mr Battista Cualbu

10:30 – 10:35 Introducing interactive session 1

10:35 – 11:00 Coffee break

11:00 – 12:15 Interactive session 1:
Addressing drivers and obstacles

12:15 – 12:50 Reporting back to the plenary and discussions

12:50 – 13:00 Closing morning session and announcing practicalities

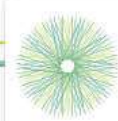
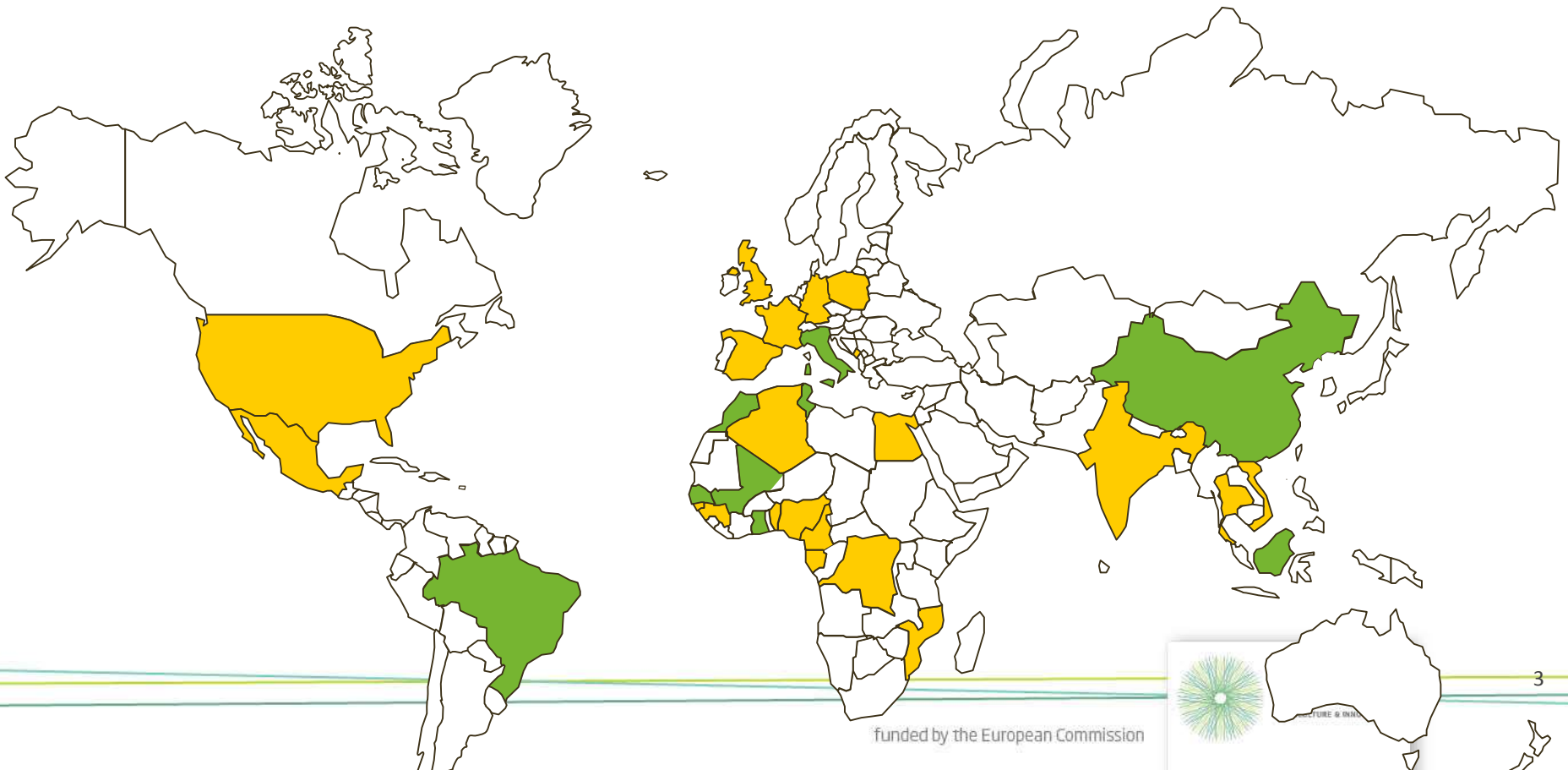
13:00 – 14:00 Lunch

14:00 – 18:00 Field visit: Showing a concrete business case of new biomass supply chain and conversion in the Matrica plant in Porto Torres

19:30 – 22:00 Networking dinner

Personal introduction

- Environmental Engineer, 10+ years experience bio-energy
- Development of biofuel projects in West Africa
- Manager supply chains cellulosic biomass



Industry objectives

BIO BASED INDUSTRIES OBJECTIVES 2030

Reindustrialize Europe by creating **rural infrastructure** of bio-refineries

Diversify **farmer's income** (+40% by using available residues)

30% chemistry becomes biobased

25% transport energy from 2G biofuels

Support bioplastic and bio-polymers

New generation biobased materials and composite

Primary sector objectives



RURAL DEVELOPMENT REGULATION

Supply and use of renewable sources of energy for the purpose of the bioeconomy



BY-PRODUCTS



WASTES



RESIDUES



NON FOOD MATERIAL

Additional, diversified revenues: selling by-products and wastes, growing industrial crops

Introduction of **innovative value chains** in agriculture and forestry: projects can be initiated by the primary sector or by industry

Economically viable measure for **carbon sequestration**

Bio-based products

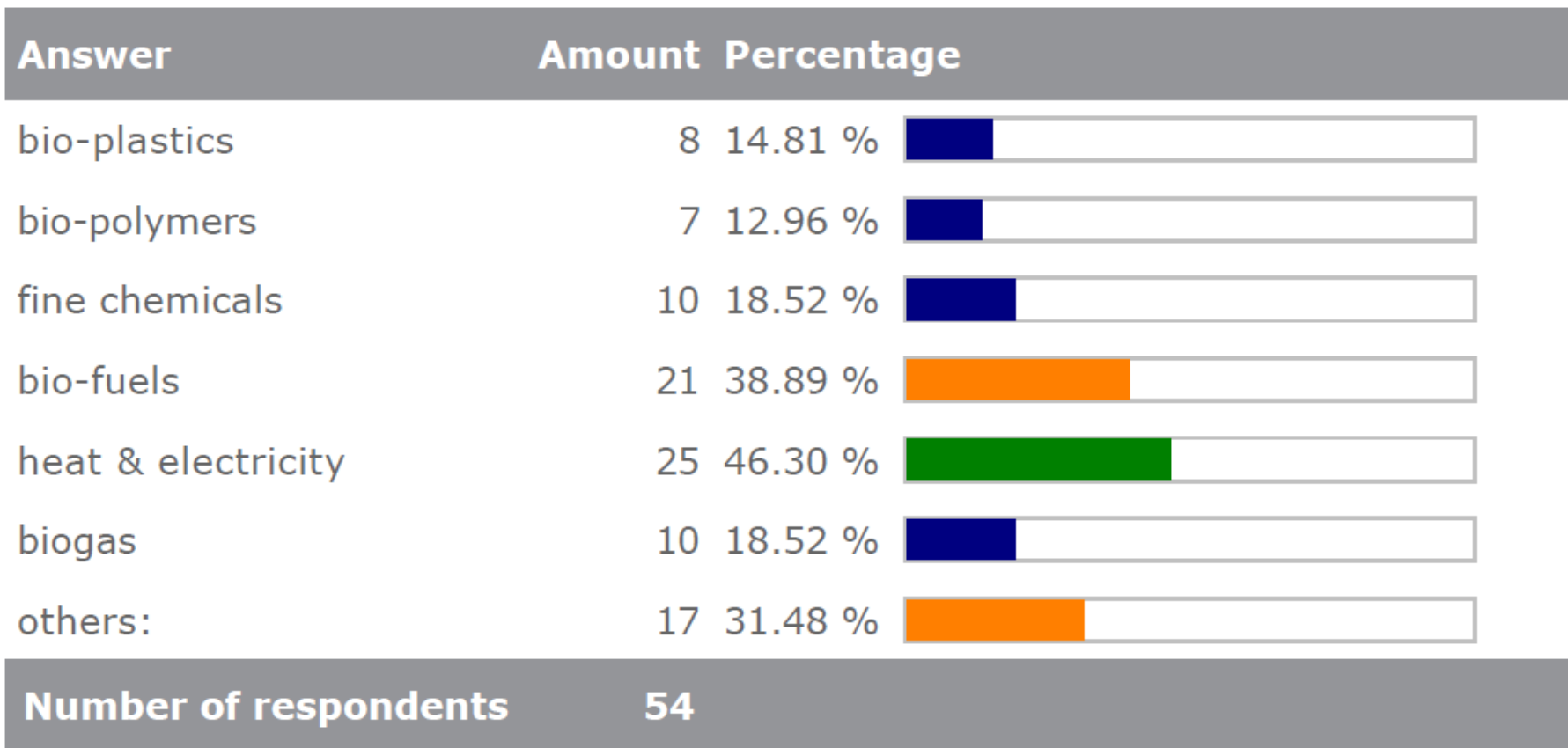
EUROPEAN COMMITTEE OF STANDARDIZATION

The term bio-based product refers to products wholly or partly derived from biomass, such as plants, trees or animals (the biomass can have undergone physical, chemical or biological treatment).

- Inclusion of bio-energy, i.e. heat and power generation from biomass



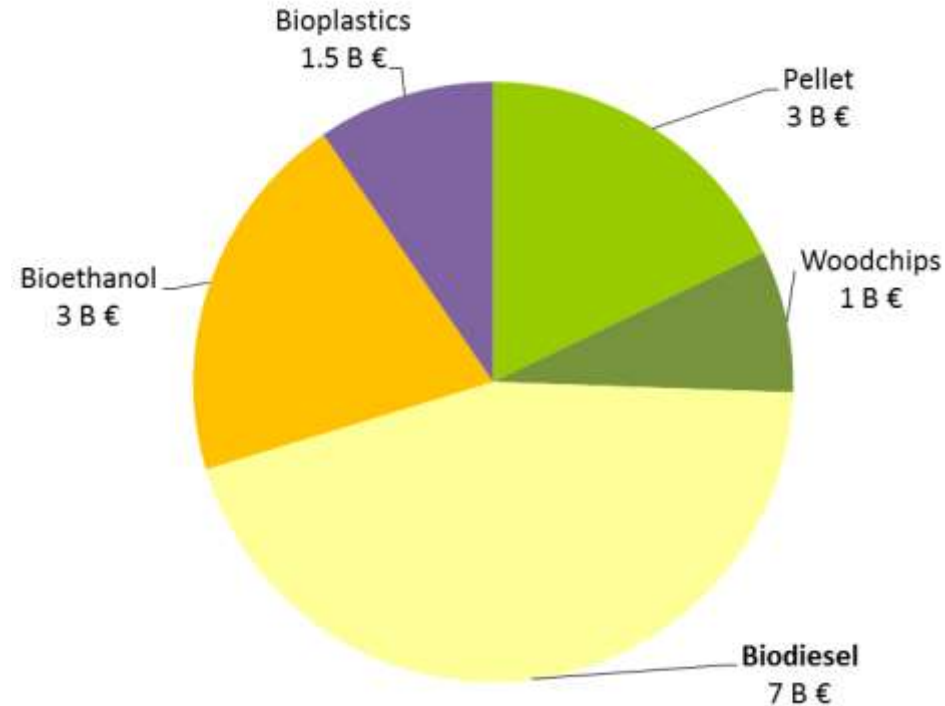
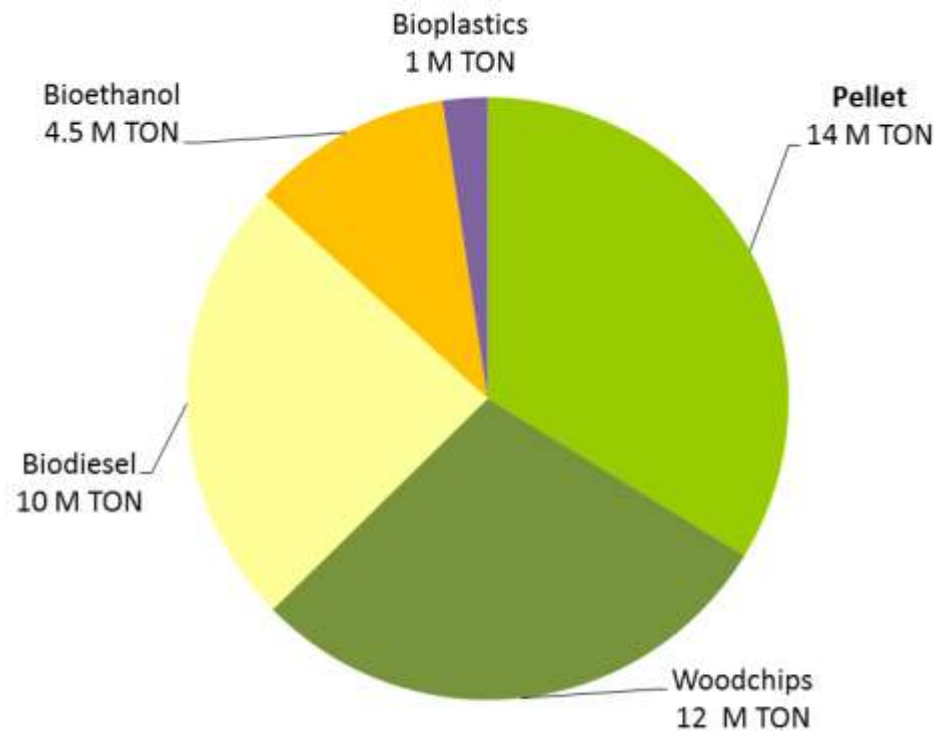
Bio-based products



Others: papermaking, services, planning

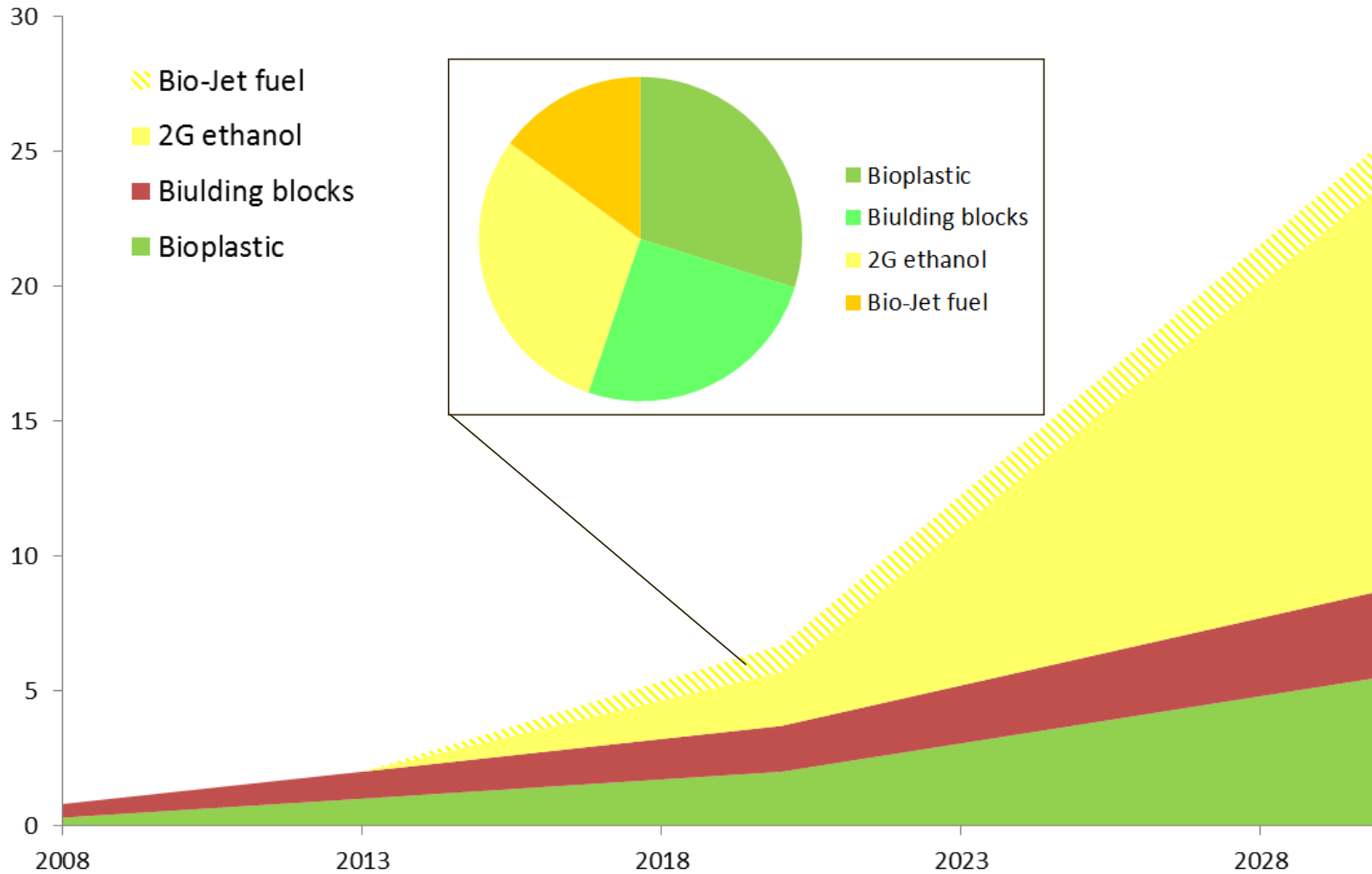
Market overview

- **42 Million TON** – 60% wood-based - Europe 2015
- Overall **16.5 B €**, heat, power and biofuels dominating



SOURCES: Foreign Agricultural Service (FAS) at EU (2014), EIA (2012), European Bioplastics (2014)
Elaboration and graphics Federico Maria Grati

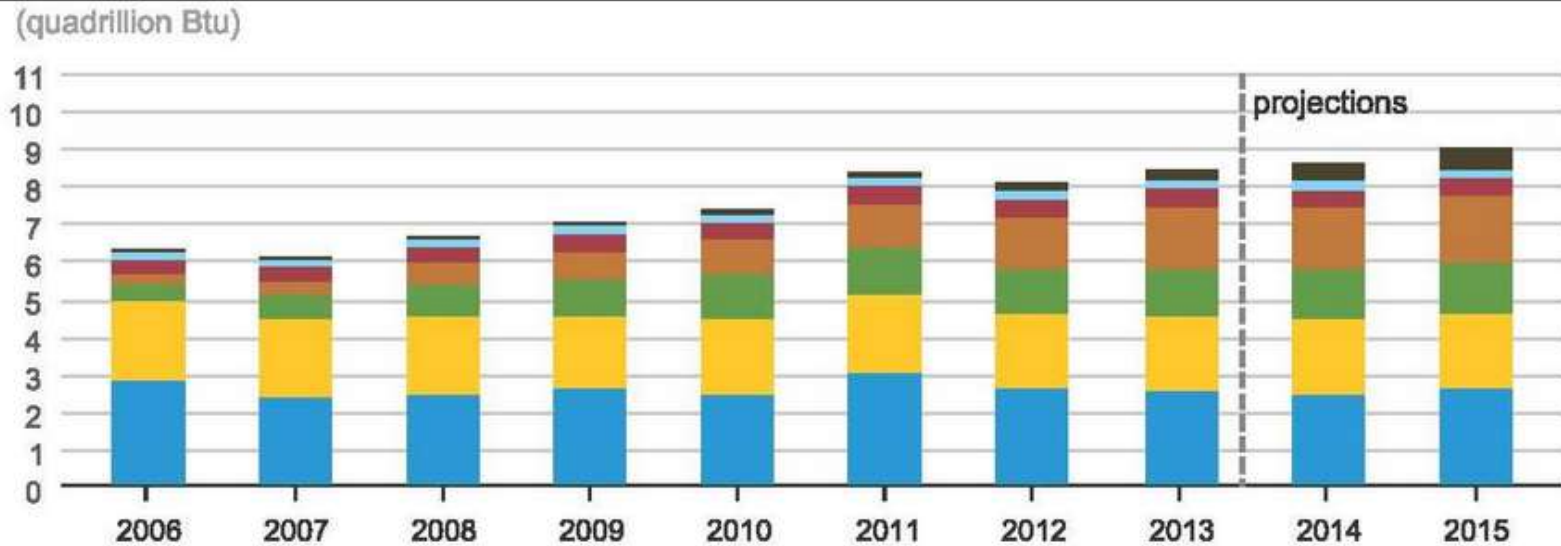
Market trends in Europe



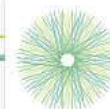
SOURCE: BIO-TIC project, market assessment and projections (2015)

Bioenergy

- Wood biomass largely used to produce energy



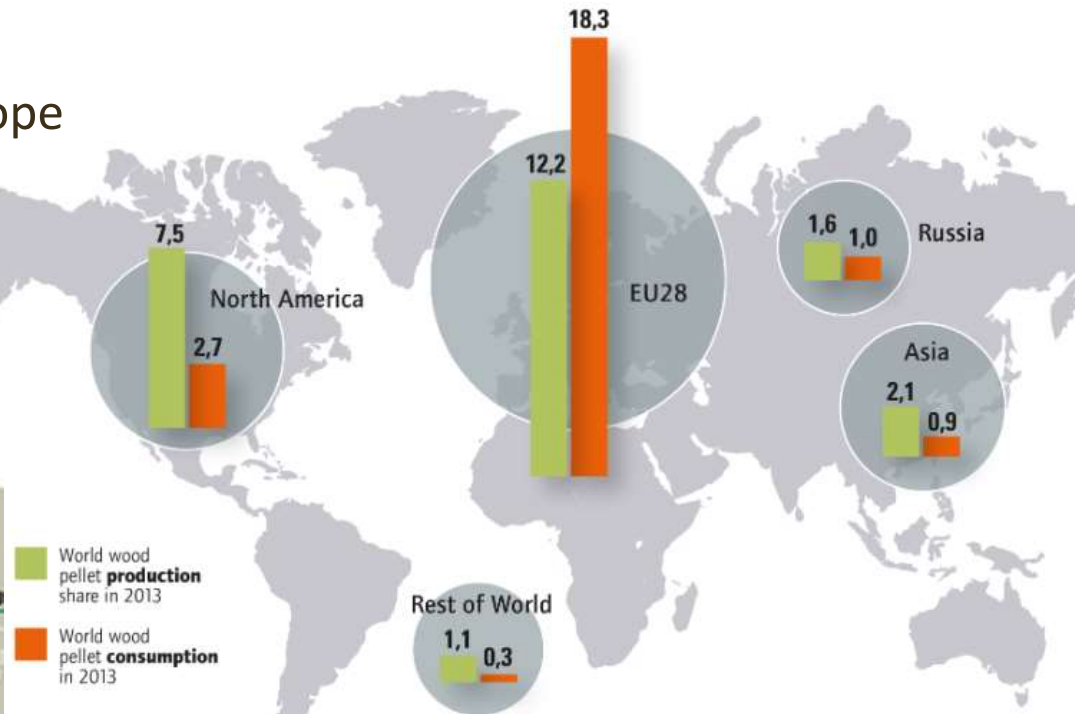
Source: Short-Term Energy Outlook, February 2014.



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Bioenergy (pellets)

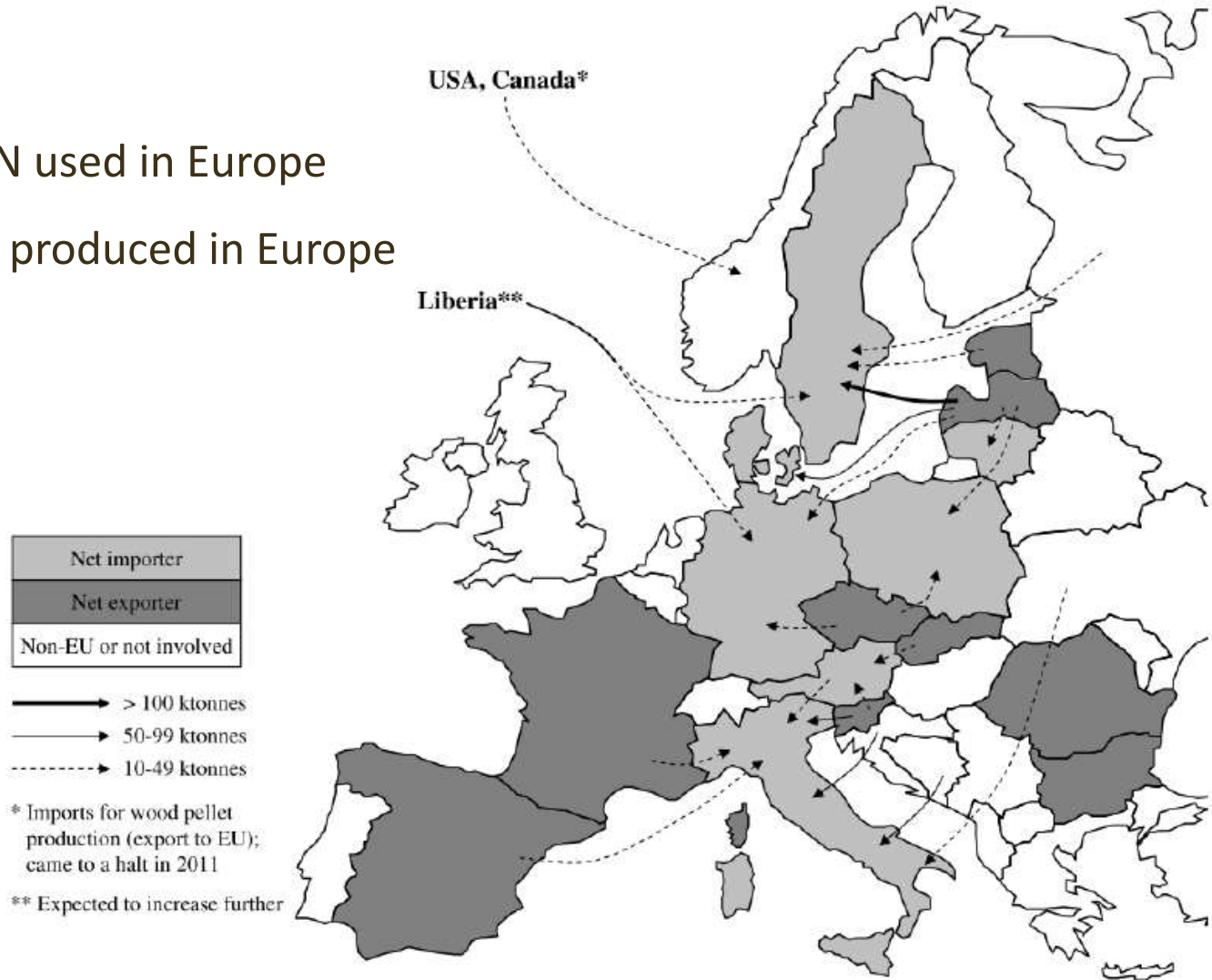
- 18 M TON used in Europe
- 12 M TON produced in Europe



SOURCE: European Bioenergy Outlook (2014)

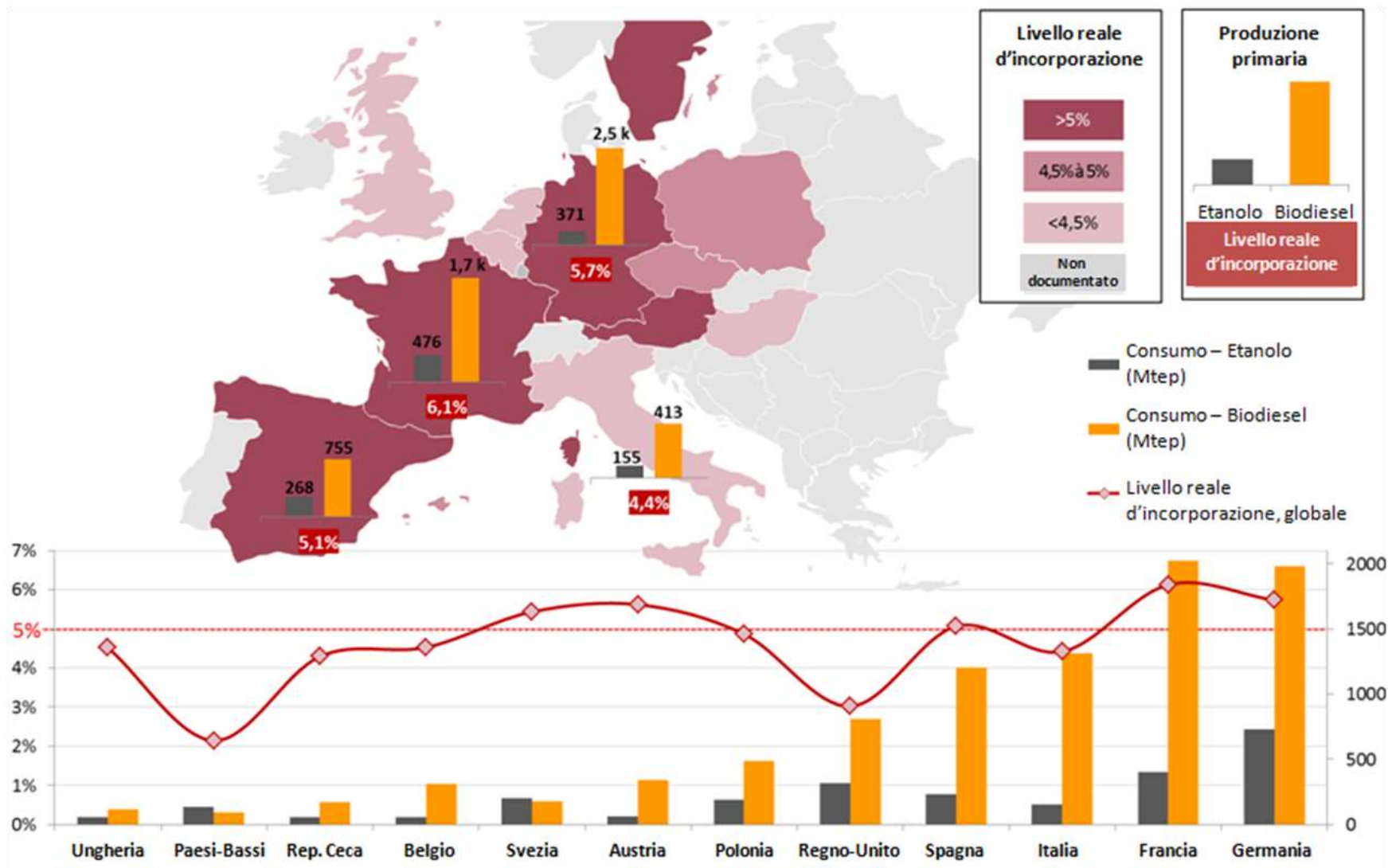
Bioenergy (woodchips)

- 12 M TON used in Europe
- 8 M TON produced in Europe



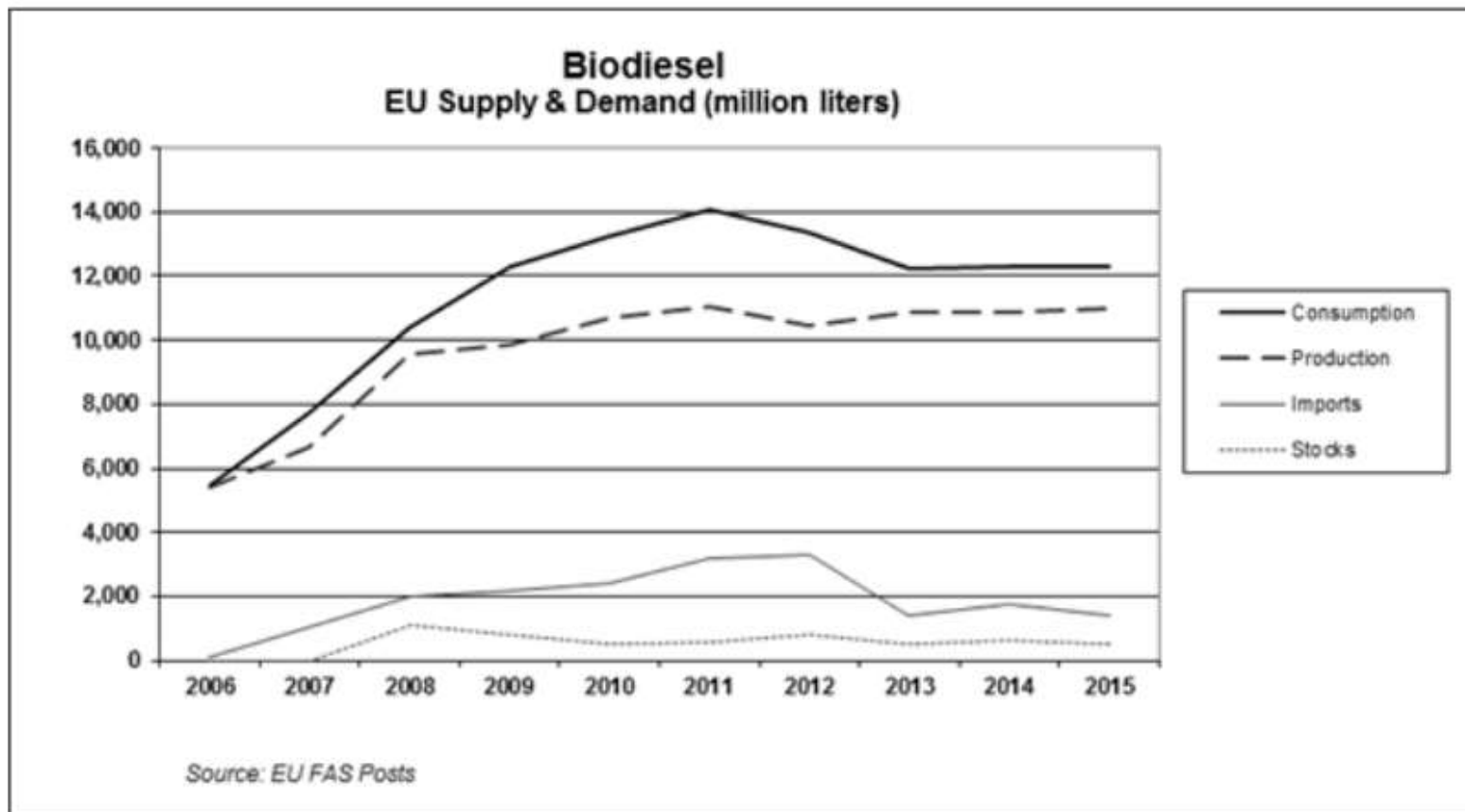
SOURCE:European Bioenergy Outlook (2014)

Biofuels



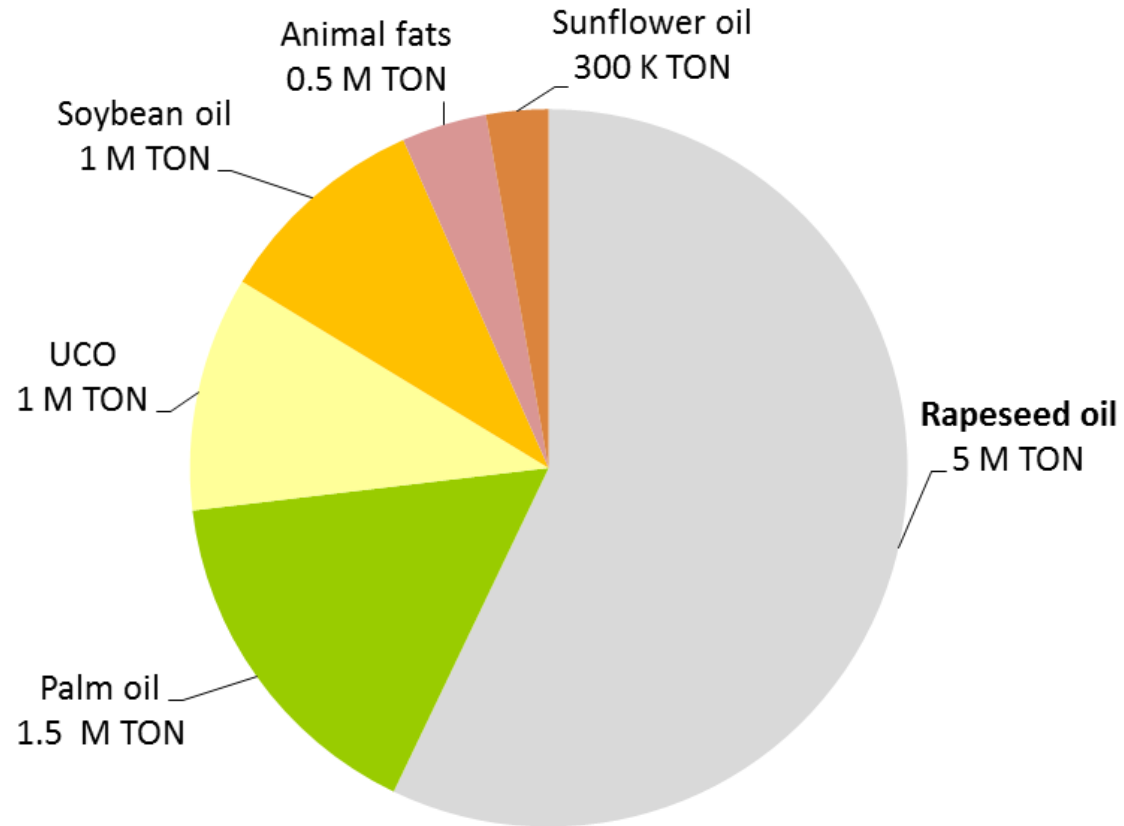
Biodiesel

- **10 Million TON** - 70% total biofuel
- Blend rate 5.4%



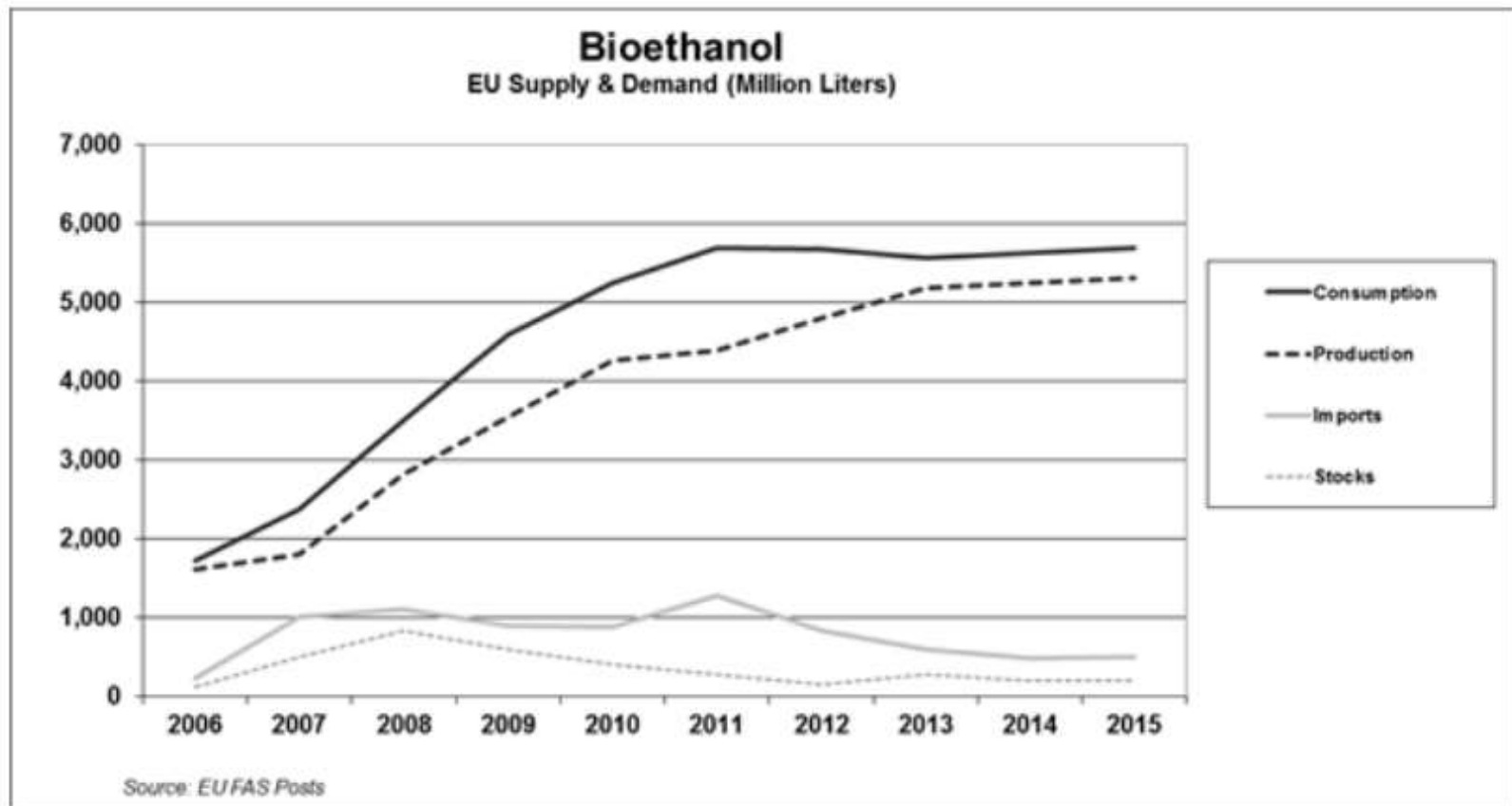
Biodiesel feedstock

- 1.2 Million ha rapeseed
- 300 Thousand ha palm oil



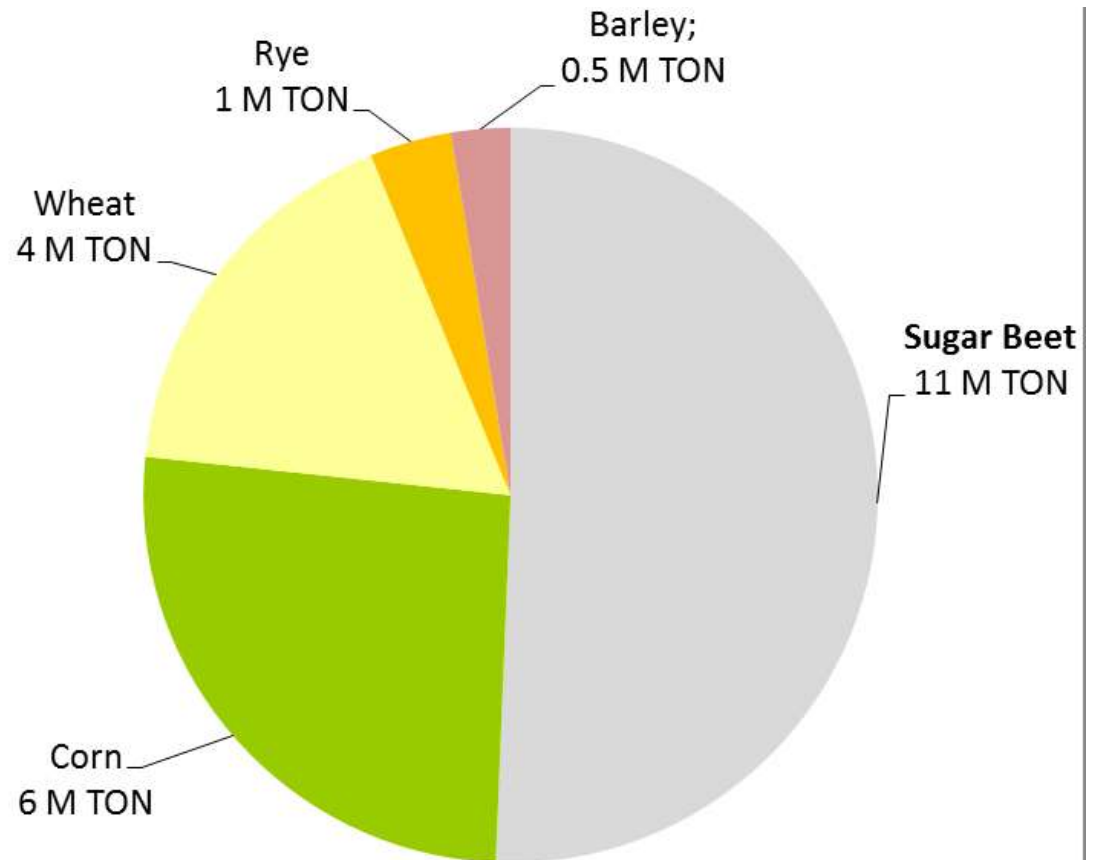
Bioethanol

- **4.5 Million TON** - 30% total biofuel
- Blend rate 3.9% bioethanol + 5.4% biodiesel = **5% fuel in EU**



Bioethanol

- 1.2 Million ha corn
- 200 Thousand ha sugar beet



2G Biofuels



28 APRIL 2015

- 7% cap conventional biofuels
- *No support for food-based fuels (1G) after 2020*
- 0.5% non binding mandate for 2G biofuels

ANNEX 9 RED DIRECTIVE: 2G biofuel feedstock list

- Wastes
- Agricultural residues
- Forestry residues
- Non food cellulosic materials

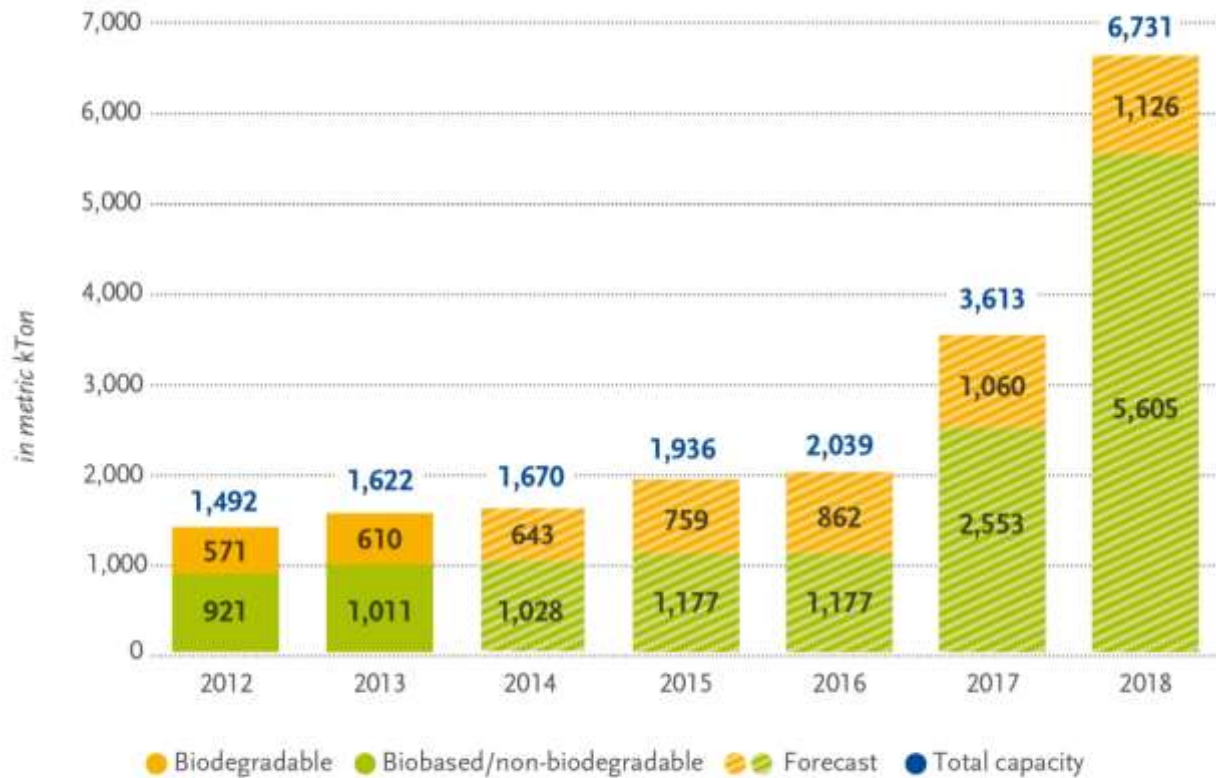
2G Biofuels

'non-food cellulosic material' means feedstocks mainly composed of cellulose and hemicellulose, and having a lower lignin-content than ligno-cellulosic material; it includes food and feed crop residues (such as straw, stover, husks and shells), grassy energy crops with a low starch content (such as *ryegrass*, switchgrass, miscanthus, giant cane, ***cover crops before and after main crops etc***), industrial residues (including from food and feed crops after vegetal oils, sugars, starches and protein have been extracted), and material from biowaste ;

Bioplastics

- 2 Million TON

Global production capacities of bioplastics

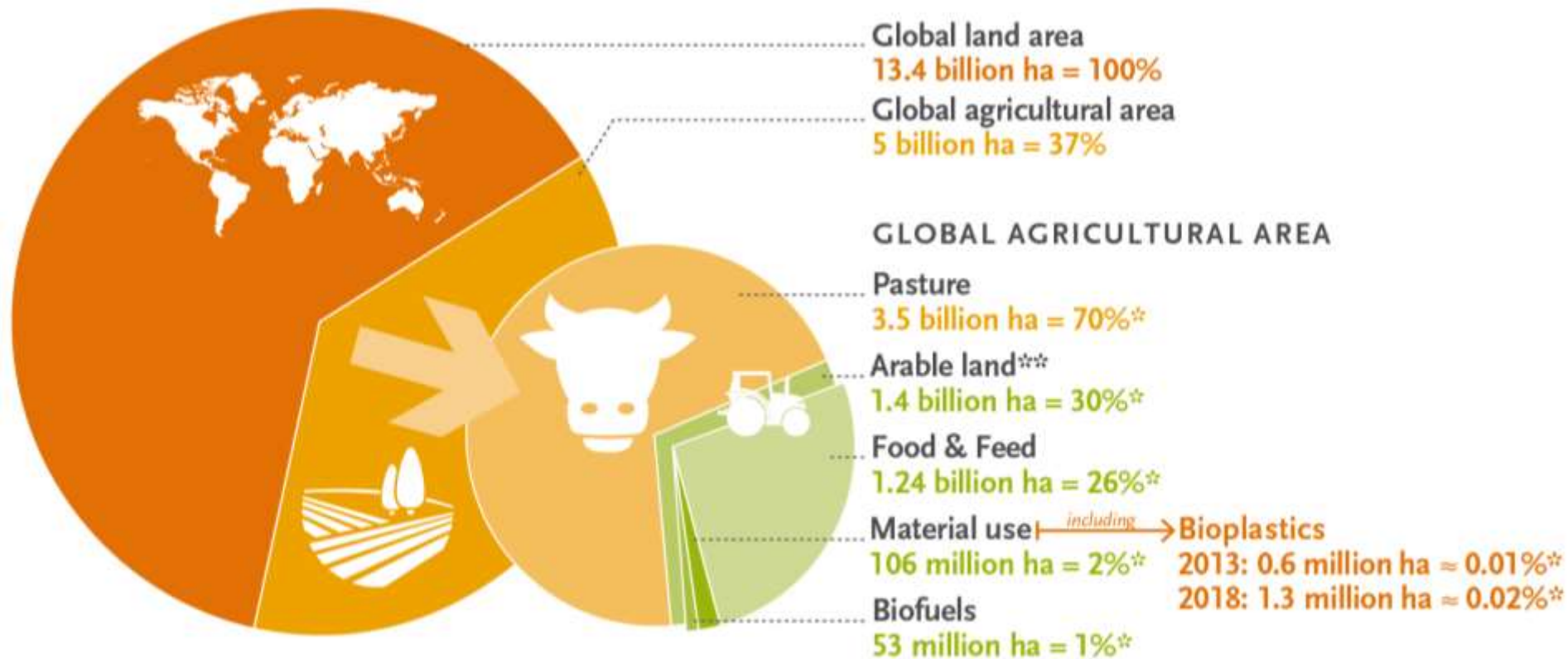


Source: European Bioplastics, Institute for Bioplastics and Biocomposites, nova-Institute (2014)

More information: www.bio-based.eu/markets and www.downloads.ifbb-hannover.de

financed by the European Commission

Land use

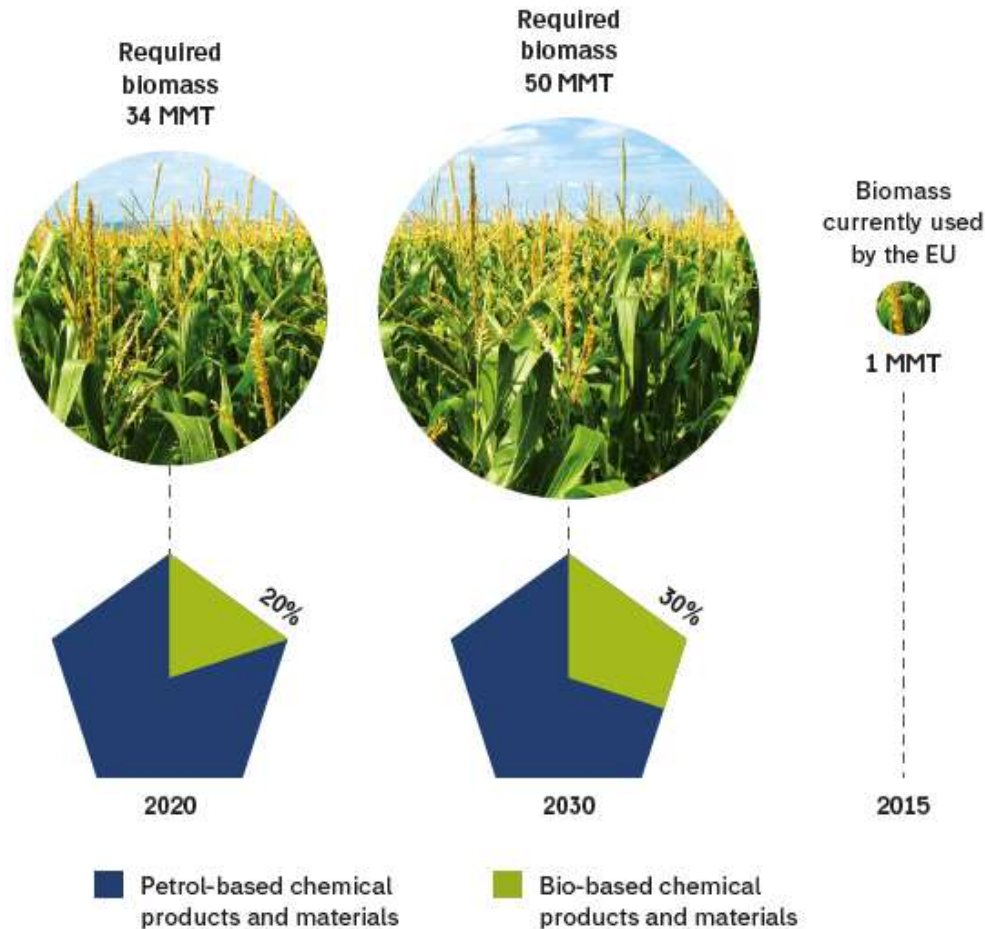


Source: European Bioplastics, Institute for Bioplastics and Biocomposites, nova-Institute (2014)
More information: www.bio-based.eu/markets and www.downloads.ifbb-hannover.de

* In relation to global agricultural area
** Also includes approx. 1% fallow land

Land use for bioplastic production

Biomass' future need forecast



SOURCE: University of Wageningen published by Bonaccorso on Renewable Matterr (2015)

Food crops

- **Starch**

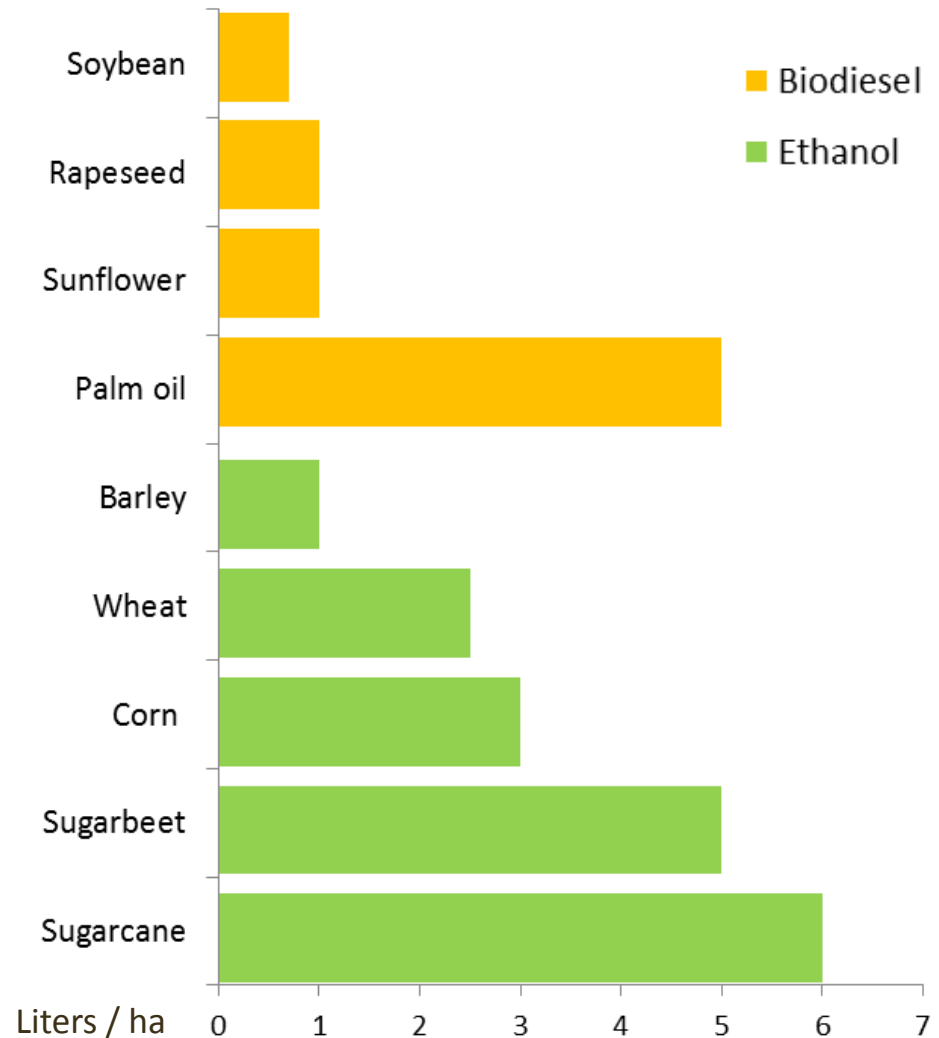
- Maize
- Wheat
- Barley

- **Sugar**

- Sugar beet
- Sorghum
- Sugarcane

- **Oilseeds**

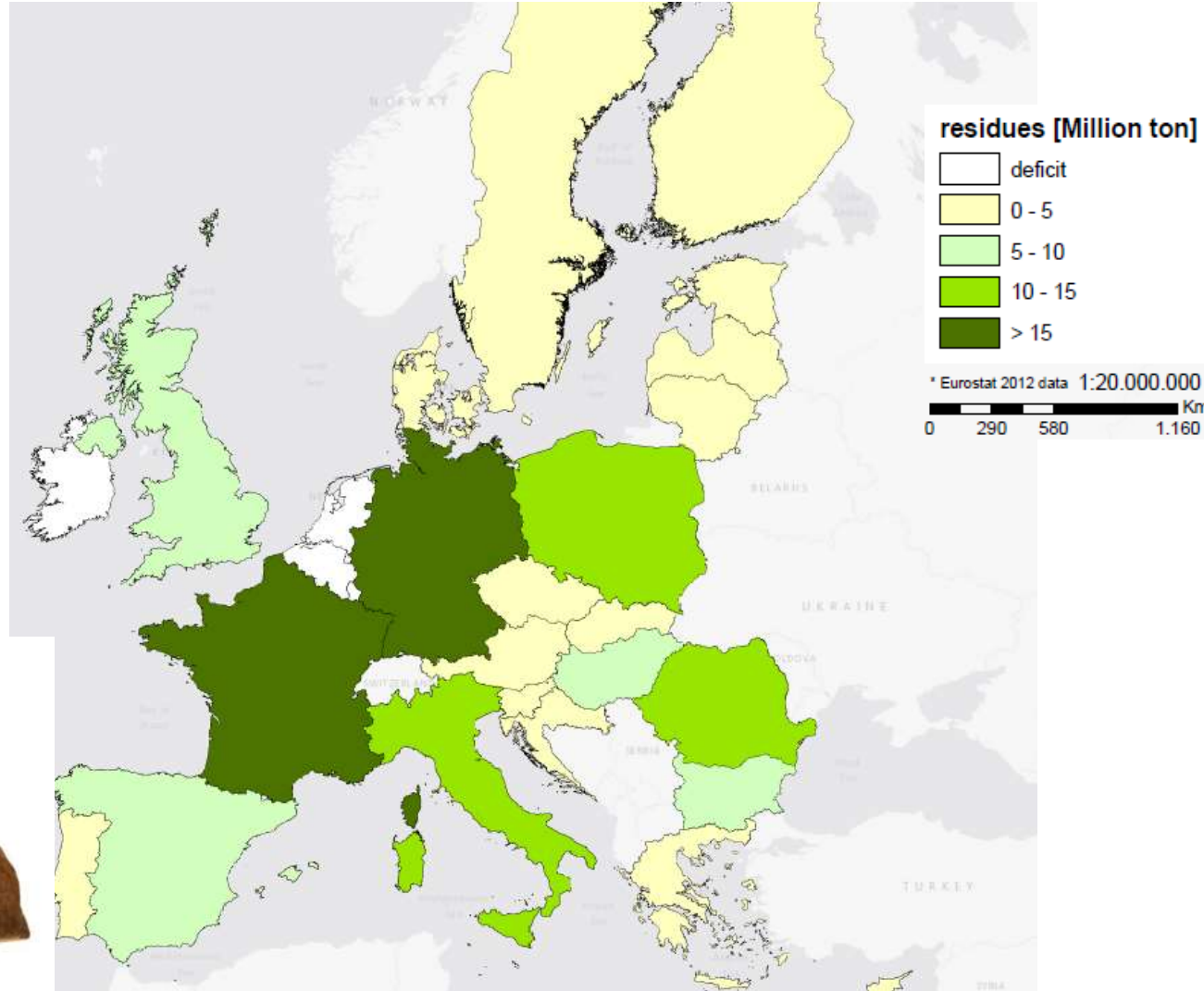
- Soybean
- Canola
- Sunflower
- Oil Palm



SOURCE: Royal Society, 2008

Agricultural residues

- 70% collection
- Net other uses
- **140 M TON** available

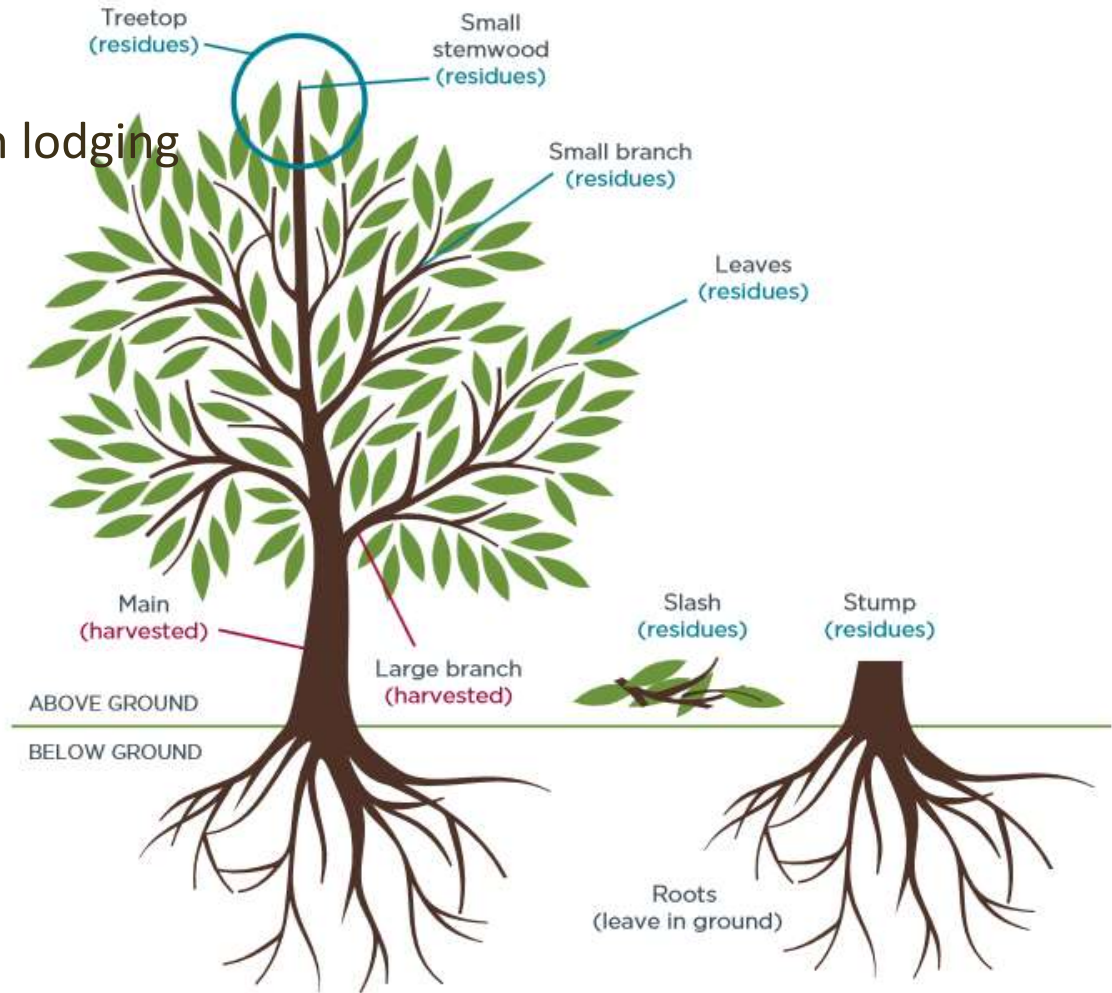


SOURCES: Eurostat data on grain and livestock production.
Grain/residue ratio, livestock use and collection ration by bibliography.

SOURCE: Wasted Report, 2014

Forestry/forest res.

- 40 M TON wood waste from logging
- 8 M TON processing



40 million tonnes of
Forest Slash



Industrial crops

Fiber Sorghum



15-25 dry TON/ha

- Annual plant
- Tall herbaceous plant, rapid growth
- High resistance to drought

Arundo donax



10-25 dry TON/ha

- Perennial, rhizomatous, sterile seeds
- Tall cane, rapid growth
- High resistance to drought

Miscanthus



10-25 dry TON/ha

- Perennial, rhizomatous, sterile seeds
- Promising in northern Regions
- Adapted to short vegetation period

Switchgrass



10-20 dry TON/ha

- Perennial, rhizomatous
- Tall grass, rapid growth
- High resistance to drought

Cardoon

Guayule

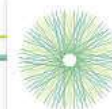
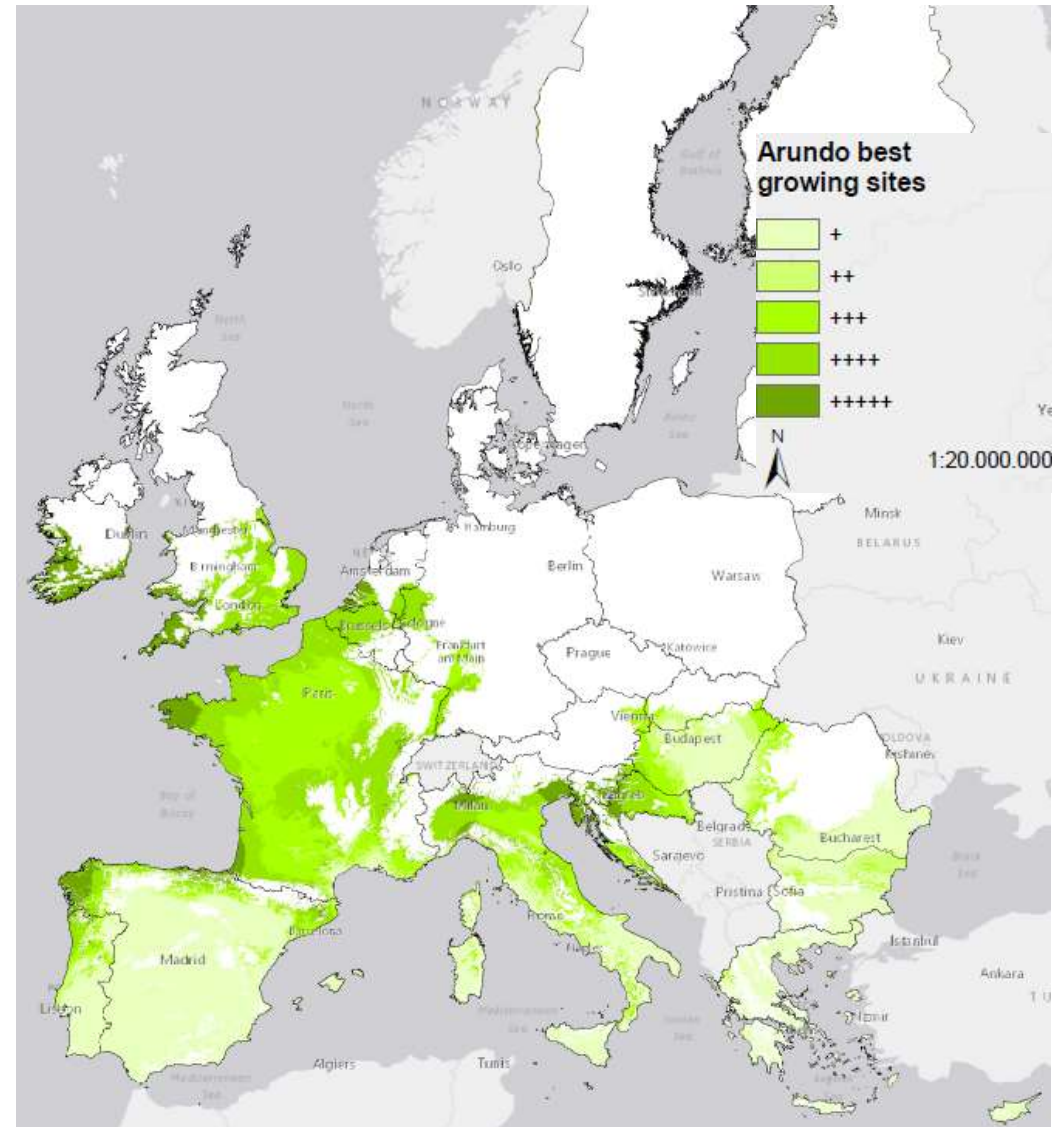
Hemp

Kenaf

Industrial crops potential

USE OF RESOURCE EFFICIENT CROPS

- Abandoned land
- Semi marginal and marginal
- Contaminated land
- Waste-water recycling
- Intercropping



Biomass is not a commodity

Wikipedia says a commodity is a good ...

- Supplied without qualitative differences across the market
- With partial or full fungibility: that is, the market treats it as equivalent, no matter who produces it
- With price determined by the market as a whole
- Typically traded on the spot and derivative markets



A biomass, in many cases, is ...

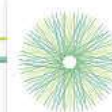
- Differentiated in quality (within the same type), thus with limited or no fungibility (logistics, decay of quality)
- Priced on a geographical base
- Purchased on factors other than pure price (eg. Food competition and sustainability issues)
- Missing sophisticated derivatives tools

Drivers for industry

- **Quantity**
 - Estimating biomass availability
 - Seasonability
 - Definition of fuel mix
 - Risk evaluation
 - How to secure contracts
- **Quality**
 - Quality needs for the industry
 - Biomass degradation
 - How to store the biomass
 - Quality check
- **Price**
 - Price estimation of biomass
 - The market price
 - Spot supply
 - Long term agreements



SUSTAINABILITY



Agricultural residues challenges

Financial/Economic



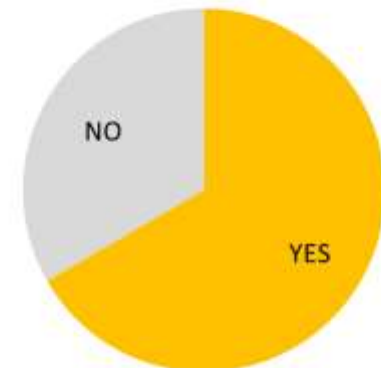
- Price fluctuations
- Other competitive uses

Cultural/Structural



- Lack of communication
- Resistance farmers

Technical / Know how



Industrial crops challenges

Financial/Economic



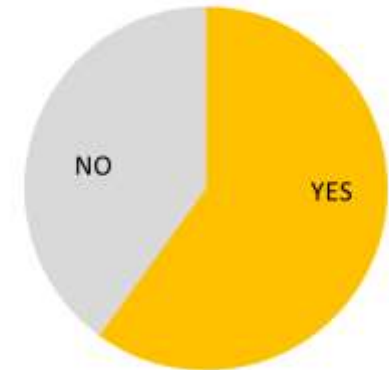
- Price fluctuations
- Lack of long term agreements

Cultural/Structural



- Resistance farmers
- Lack of communication

Technical / Know how



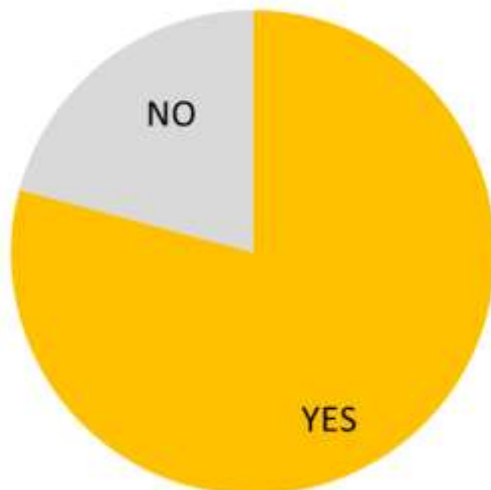
Industrial crops challenges

Regulatory/Policy



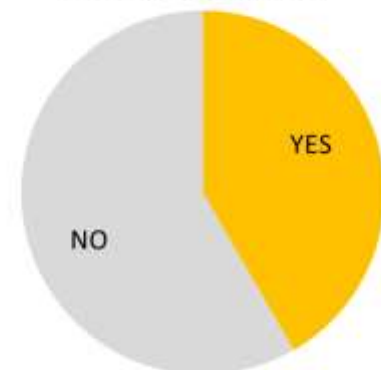
- Existing regulation
- Lack of regulation improvement

Financial/Economic








- High biomass prices
- Competition from imported biomass

Technical / Know how



Main drivers

Answer	Amount	Percentage	
Increase and diversification of revenues for farmers/ forest holders/ cooperatives	44	65.67 %	
Access to new markets for industry/new business models	48	71.64 %	
Policy at European/national level (e.g. energy and climate targets, circular economy, rural development, industrial renaissance)	50	74.63 %	
Regional/national incentives at regional/national (e.g. subsidies for biofuels, biogas)	39	58.21 %	
Other drivers, please specify	13	19.40 %	
Number of respondents	67		