



1 December 2011

*The bio-based economy for a sustainable use of  
agricultural resources*

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# Our business

Food and Beverages

Household care

Bioenergy

Agriculture

Wastewater  
Solutions

BioPharma

Textiles

Leather

Pulp and Paper

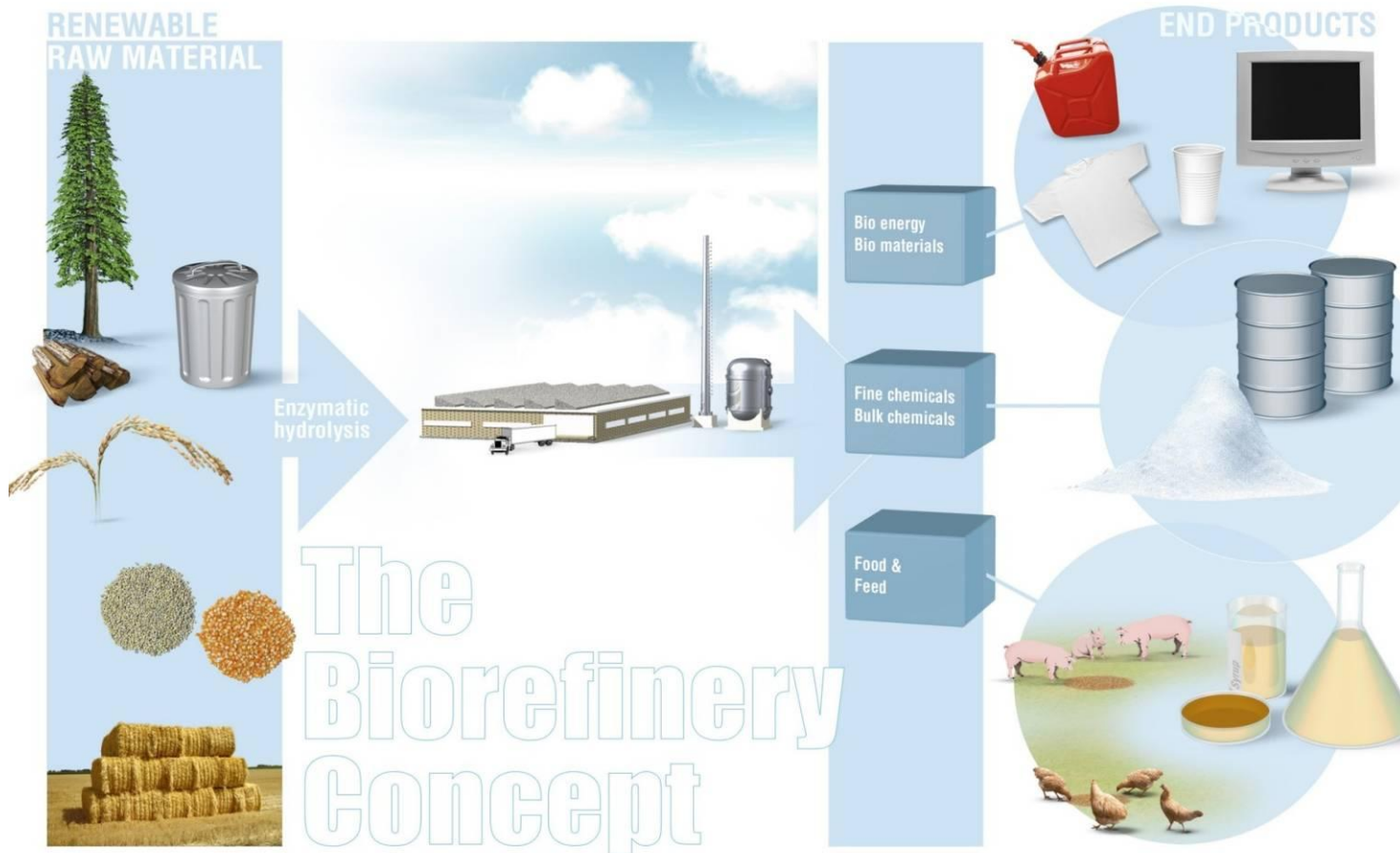


## The Bio-based economy

The bio-based economy is an envisioned future where **bio-refineries** have replaced **oil refineries**, and **biological raw materials** have replaced **fossil fuels** as the primary feedstock for materials, fuels and energy.

# The Biorefinery concept

Bio-innovation: from renewables to consumer and industrial markets



# Benefits for Europe



## Growth

- Generate € 31bn in revenues\*
- Strengthen innovation/technological leadership



## Jobs

- Up to 1mill. jobs by 2020\*



## Energy

- New domestic energy resource
- Compatible with existing fleet and infrastructure



## Climate

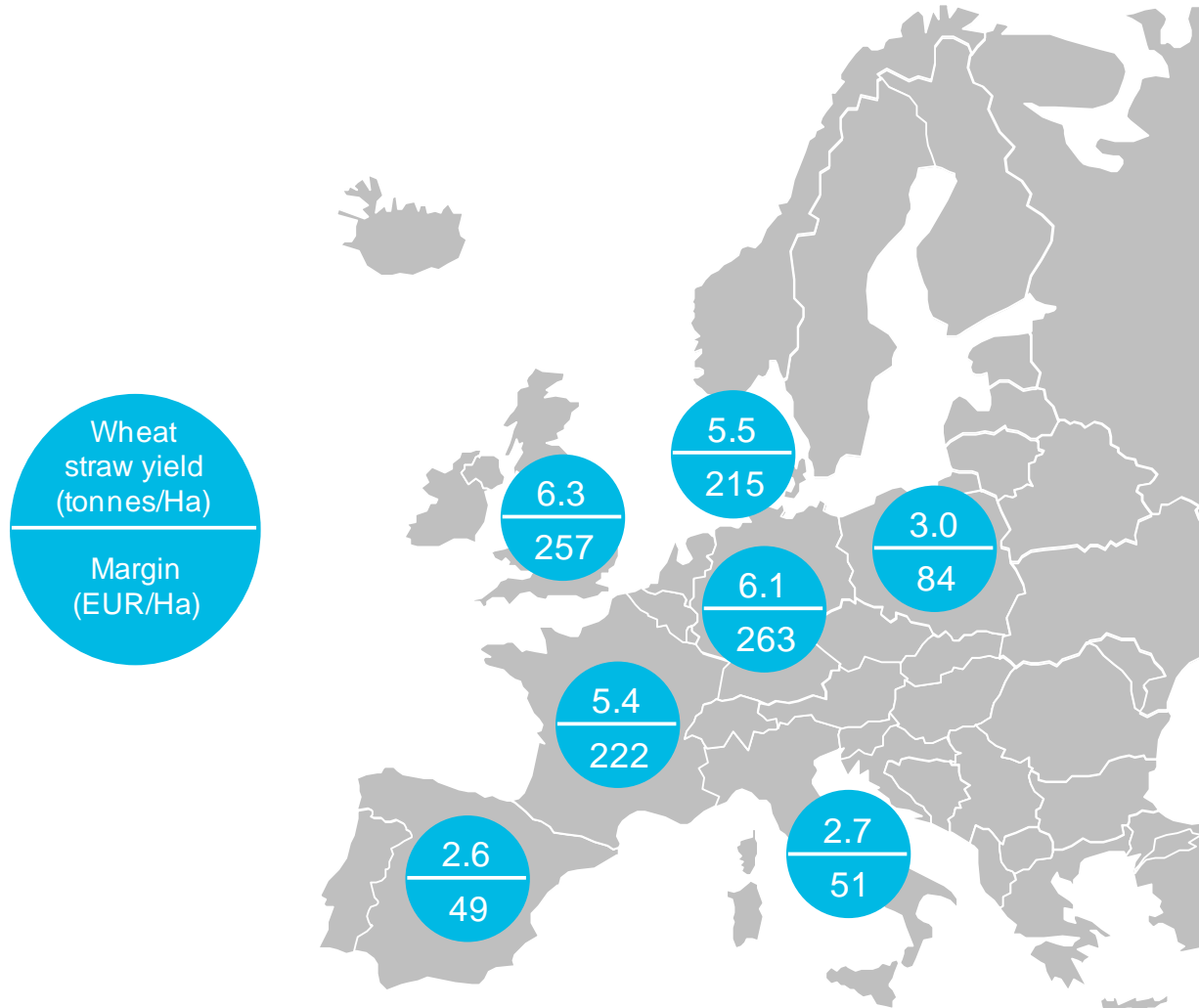
- Massive GHG reductions in road transport



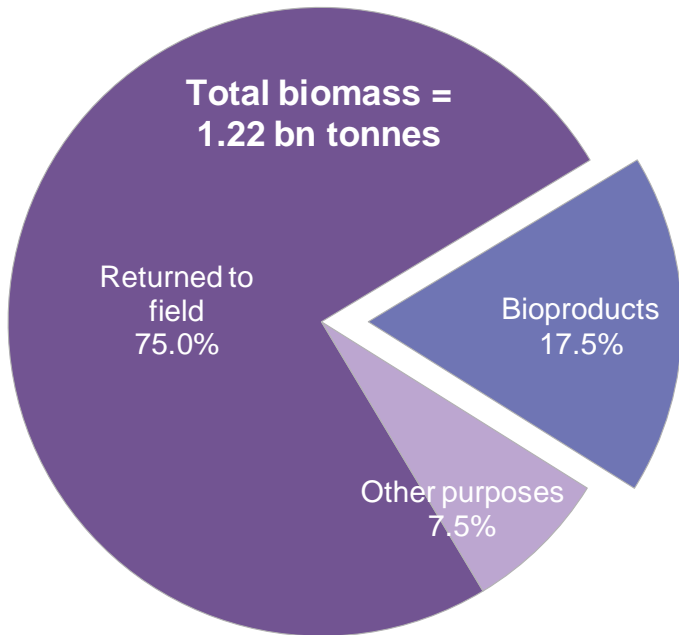
## Growing population

- Biofuels by-products (dry distilled grains with solubles – DDGS) are used as animal feed and therefore can contribute to food security.

# Farmers' margins per hectare of wheat straw in 2015



# Sustainability: our assumptions



## LAND USE CHANGE

In this study we assume **land use patterns will not change** before 2020; existing activities are not altered nor is new agricultural land added.

## HUMUS BALANCE

We assume a maximum of 17.5% is potentially available for bioenergy production; it is a **conservative estimate** which deliberately steers clear of removing a high level of nutrients.

## YIELD GROWTH

Our methodology assumes stable or **moderate yield growth** rates, based on historic data between 1990 and 2010.

## ENERGY CROPS

We **excluded energy crops** and project there will be no change in existing soil productivity. Growing energy crops on marginal land will however increase total biomass availability.

# Bioproduct industry: challenges and opportunities for the agricultural sector

## INCENTIVISING HARVESTING

- no financial incentive for farmers to harvest and collect agricultural residues.
- limited funds (eg, grants) available to invest in machinery for harvesting, loading and transporting agricultural residues to the biorefinery gate.

## POLICY

- No clear EU27 guidelines on how much agricultural residues can safely be removed from the field.
- Current EU27 next-generation biofuels blending mandate not large enough to drive investment into the bioproduct industry.

## INFRASTRUCTURE

No value chain infrastructure

## SOCIO-ECONOMIC

The farming community will be reluctant to harvest, load and transport agricultural residues until a long-term market is in evidence.



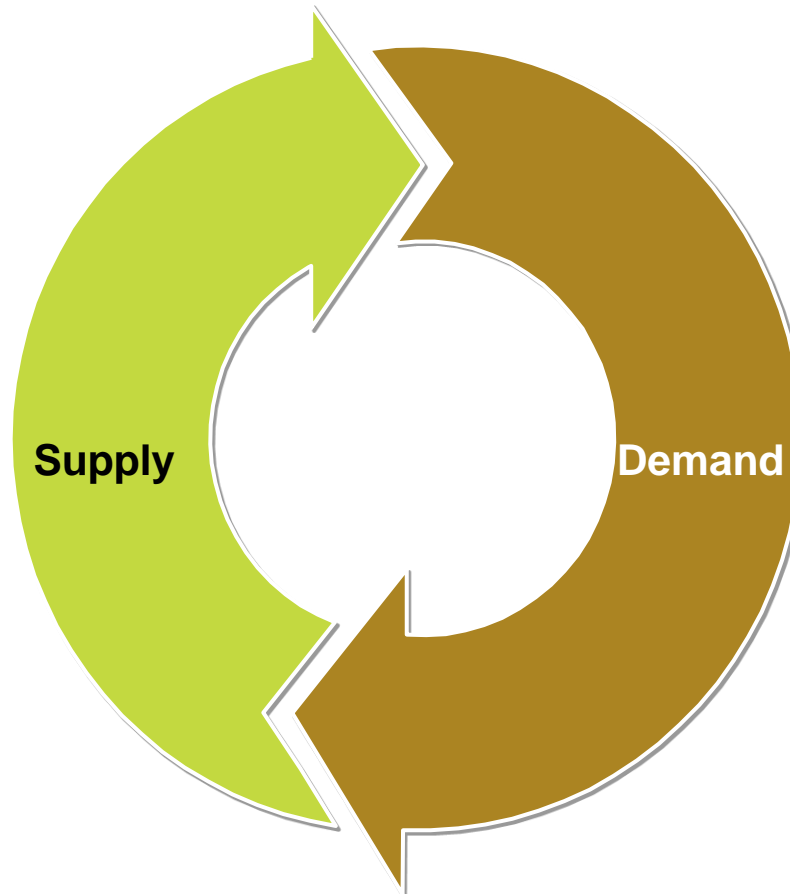
# The role of policy

## Guiding principle

- Secure demand early and set ambitious target to provide investor confidence
- Incentivise supply simultaneously to lower the cost in a short period

### Incentivise supply

- 1 Loan guarantees
- 2 Production incentives for demo/flagship plants
- 3 Support biomass development and collection through EU farm policies



### Secure demand

- 4 Mandatory bioproducts targets
- 5 Remove technical barriers e.g. blend walls



THANK YOU