

Current and prospective market for industrial bio-products and biofuels in France by 2015 / 2030

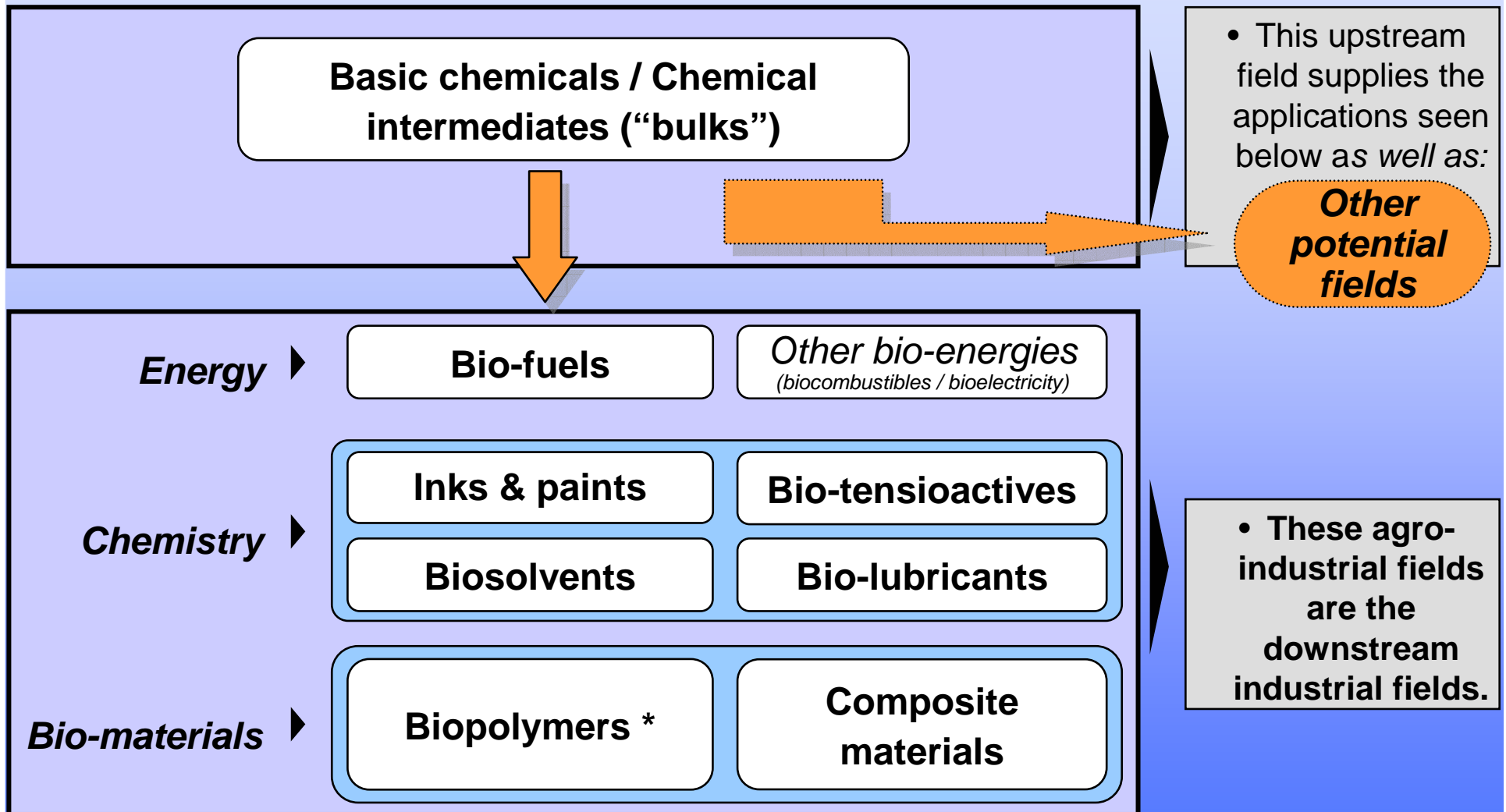
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Responsible for sustainability expertise pole

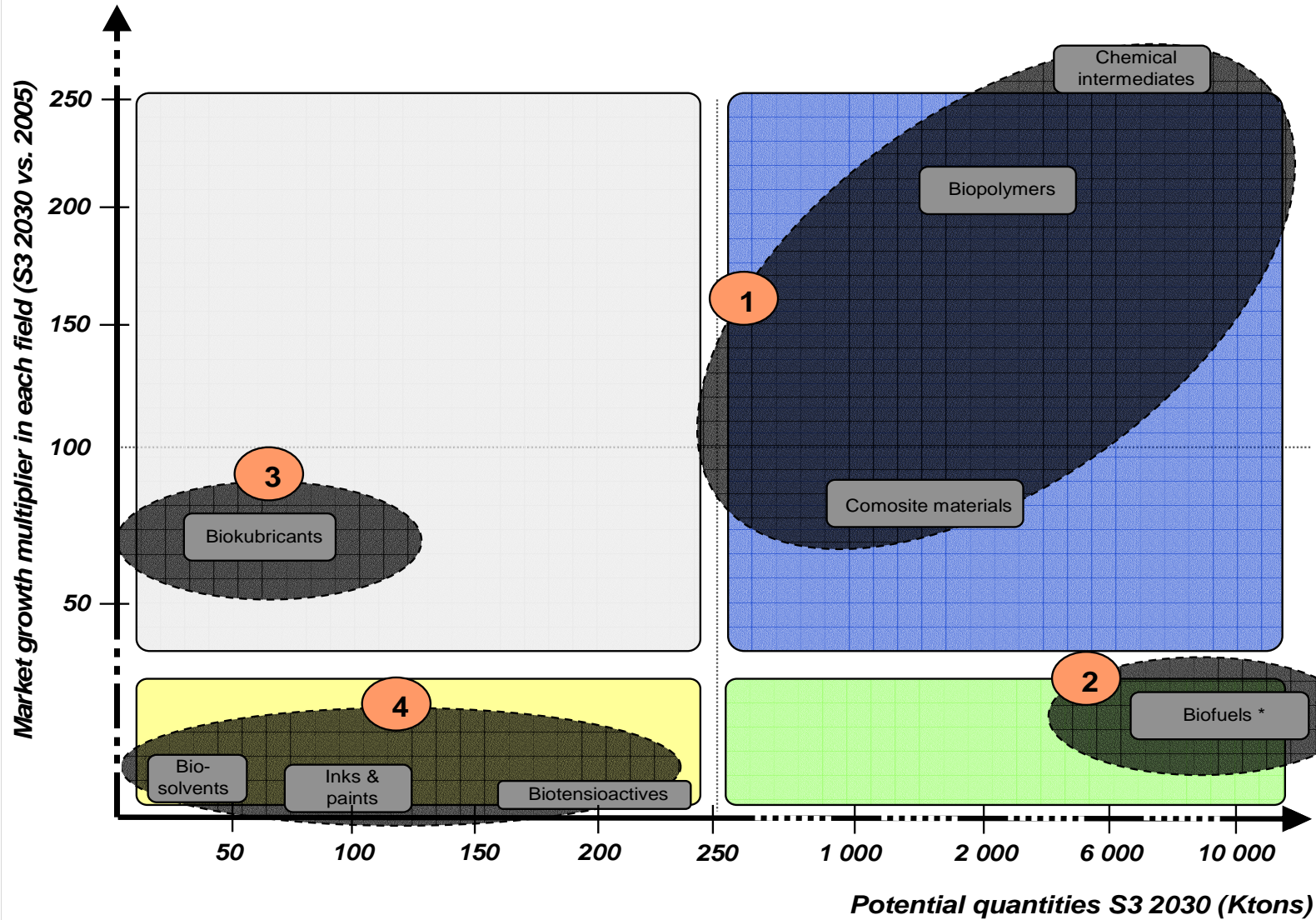
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Nine agro-industrial fields in energy, chemistry and biomaterial markets



* : currently obtained from three raw materials: i) **cereal starch** which can be incorporated in more than 70% within plastic materials, ii) **derivatives of glucose** with many ways of transformation, in particular those leading to PLA and PHA and iii) **the transformation of whole plants**.

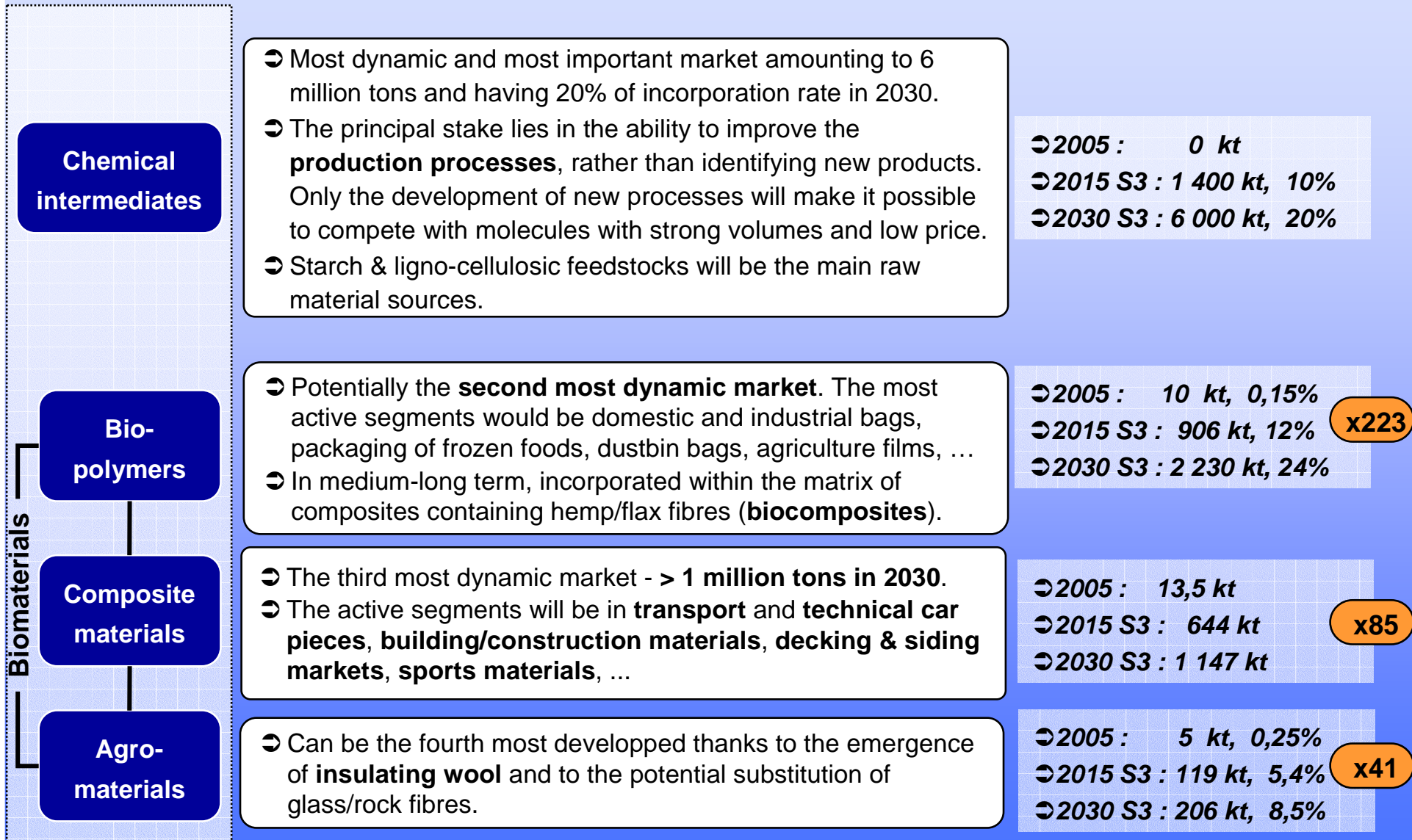
Growth dynamics / potential quantities – matrix



- 1 High dynamics / high quantities
- 2 Middle dynamics / high quantities
- 3 High dynamics / middle quantities
- 4 Middle dynamics / weak to middle quantities

* : data in Ktep for biofuels.

Group 1: the 4 most potential dynamic agro-industries



Groups 2 & 3: good dynamics

Group 2

Bio-fuels

- This market is different by its **strongest development during last several years thanks to European and national regulations.**
- The challenge to mid/long term will be to **improve profitability and environmental impacts** and to place biofuels in a large scale production to reach more than 5 million tons from 2015.
- The **exploitation of ligno-cellulosic feedstock's** (2nd generation) will be of major importance to achieve these goals and **avoid competition between uses.**

➤2005 : 403 ktep, 1,4%
➤2015 S3 : 5 0282 ktep, 12%
➤2030 S3 : 11 5620 ktep, 25%

x29

Group 3

Bio-lubricants

- The market would probably have strong dynamics but **its volume will be relatively minor compared to the others**, less than a hundred ktons.
- In spite of important R&D efforts, this agro-industrial field did not develop in France **contrary with other countries, in particular Germany.**

➤2005 : 1 kt, 0,1%
➤2015 S3 : 42 kt, 5,3%
➤2030 S3 : 64 kt, 8,9%

x64

Three priority fields to be “encouraged” in order to reach ambitious environmental and economic goals

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- Although France has a important potential in terms of plant resources, industrial exploitation lags more than 10/20 years behind USA, and 5 to 10 years behind most advanced European countries.
- Theses resources are the abundant biomass provided by agriculture, large volumes being currently exported (this is the case for grain crops) and the potential of set-aside farmlands and also forest cultivation: represents today 15 millions hectares, with a natural rate of expansion of 20% that is not exploited.
- A concerted national efforts to focus development on priority areas is needed to make up for this delay, coordinated and integrated by the actors in these sectors.

This French dynamics must be encouraged around priority agro-industrial fields:

**Chemical
intermediates**

Biofuels

Biomaterials

Bio-polymers

**Composite
materials**