Biomass and Biorefinery : what can be really expected?

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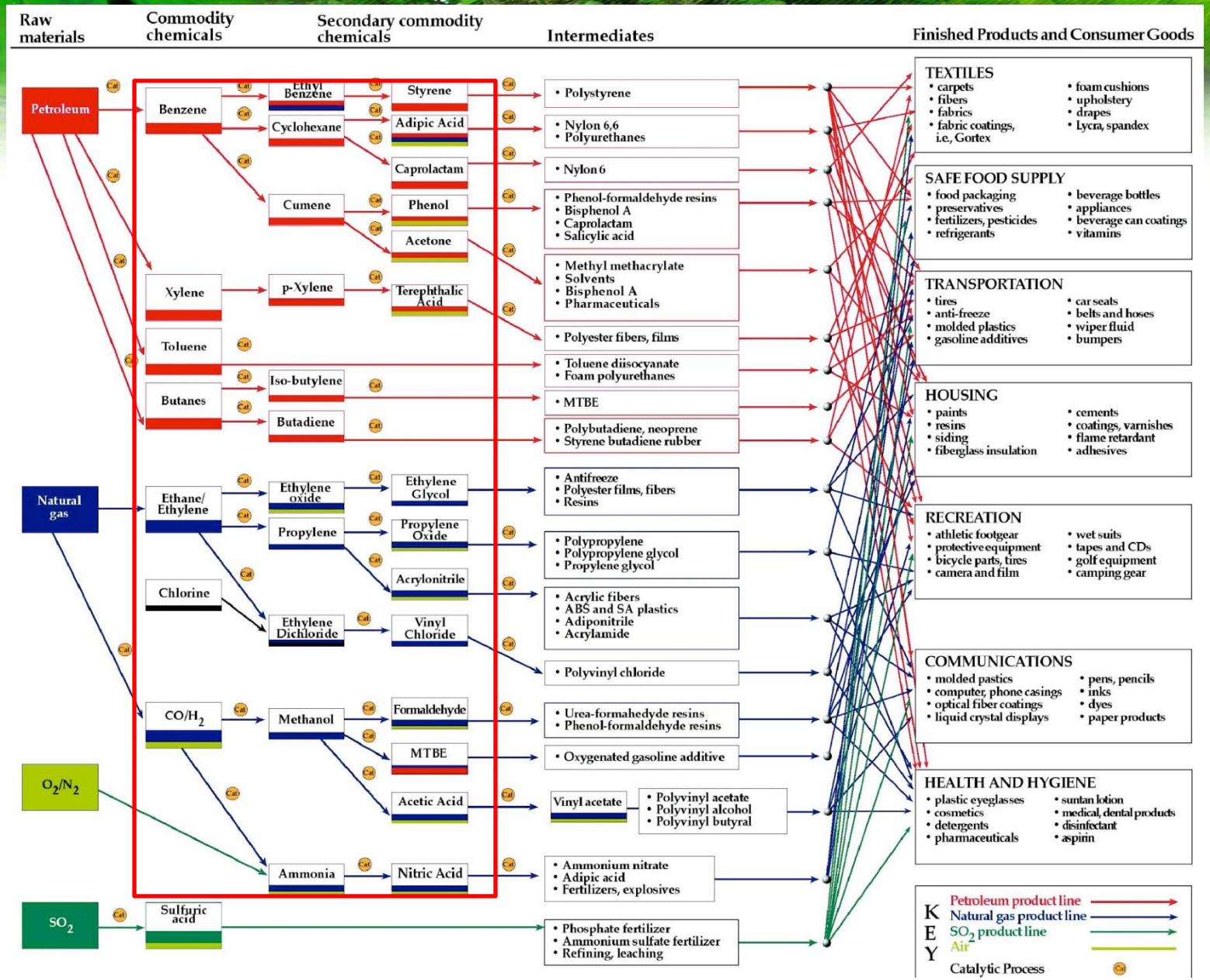
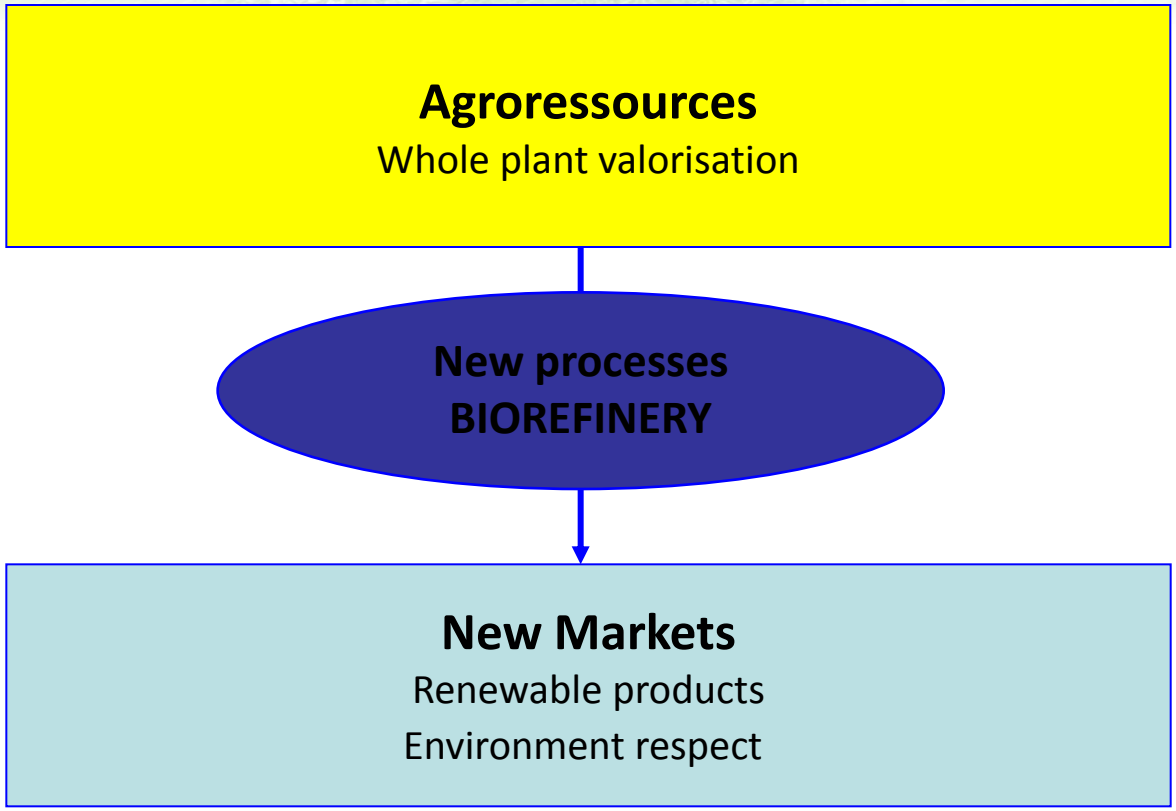
Oil based refinery



Biomass application



Biorefinery concept

Sustainable Development

Access to biomass

Biomass

Markets

Bio Molecules
Chemical intermediates, green glue, biolubricants, green surfactants

Bio Materials
Plant fibres & Biopolymers for Building, Textile, Plastics, Transport, Packaging

Bio Energy
Biofuels 2G &3G, heat & electricity

Bio Ingredients
Food Ingredients, Cosmetic Ingredients Bio-Actives, Nutraceutics

Plant biorefinery

PLANTS = BIOMASS

1st Transformation

EXTRACTION - SEPARATION

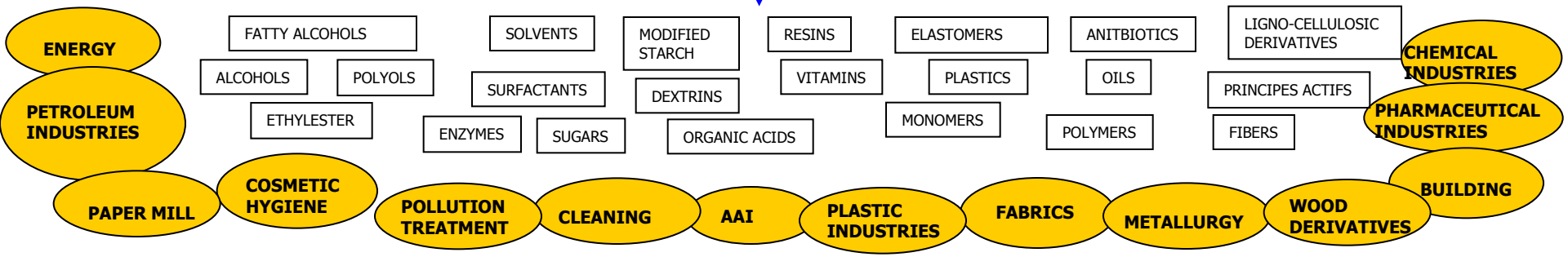
FRACTIONATION - CRACKING

FONCTIONALISATION

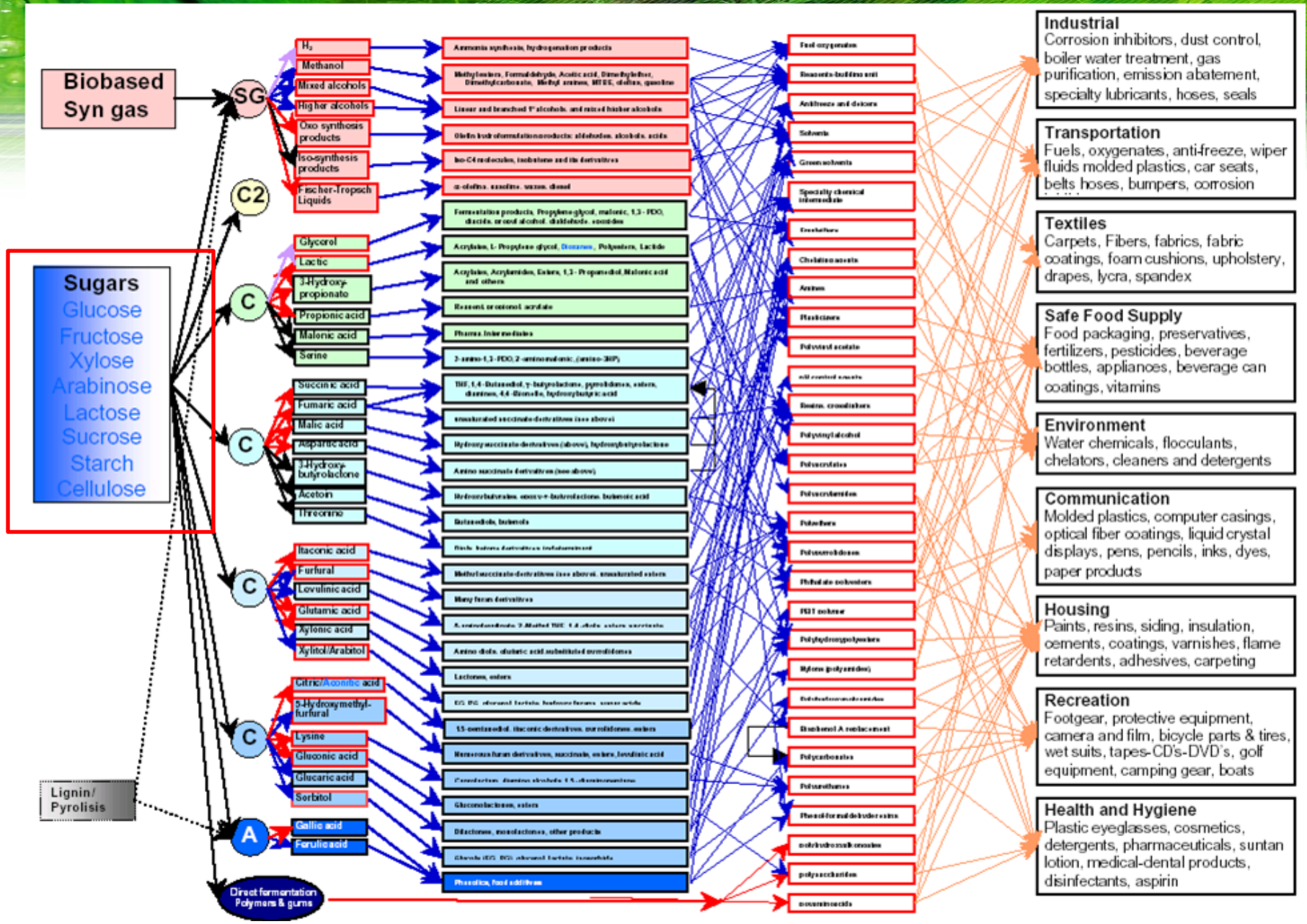
AGRO-INDUSTRIAL PRODUCTS (INTERMEDIATES)

2nd Transformation

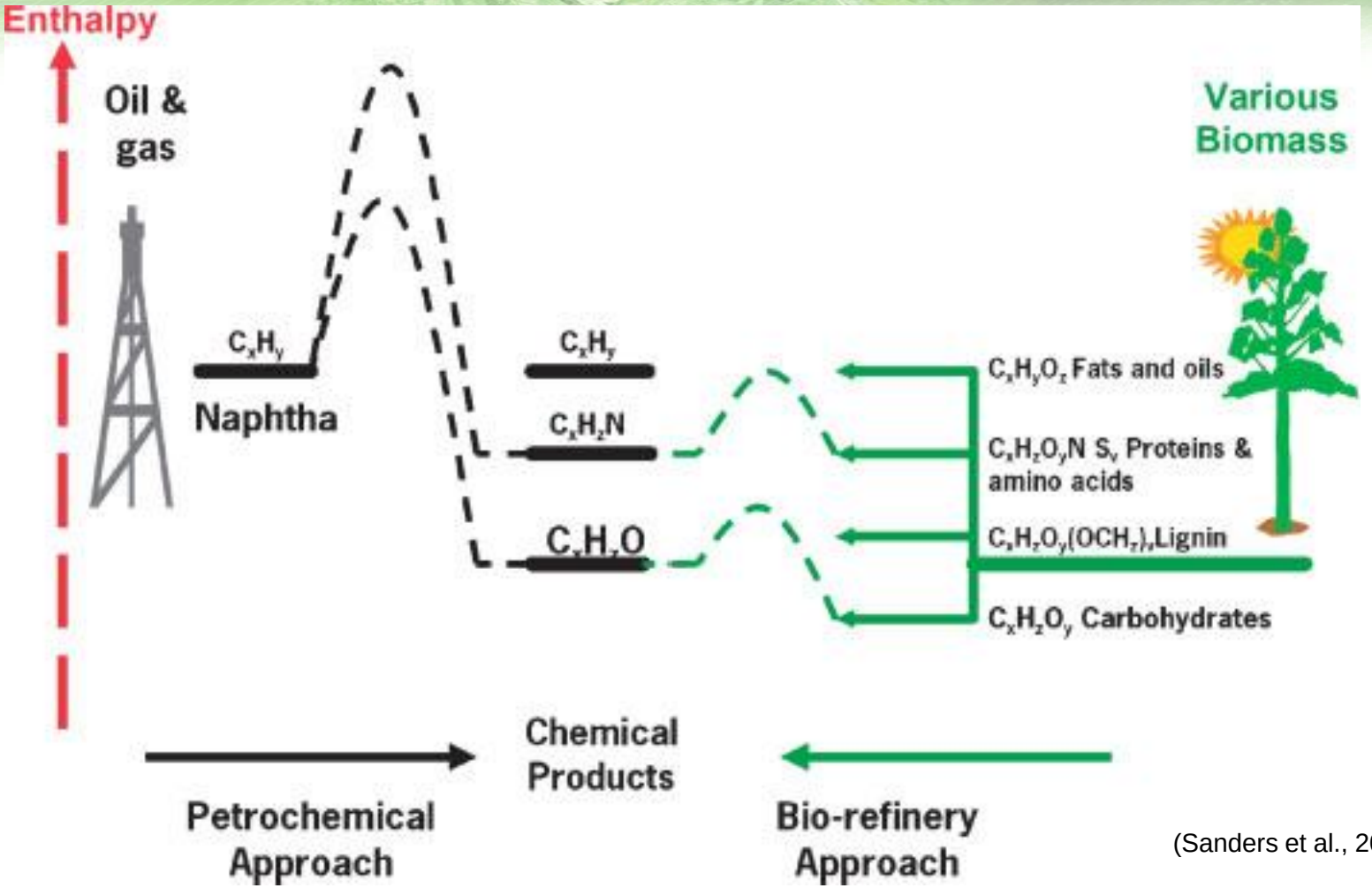
FORMULATION



Plant biorefinery

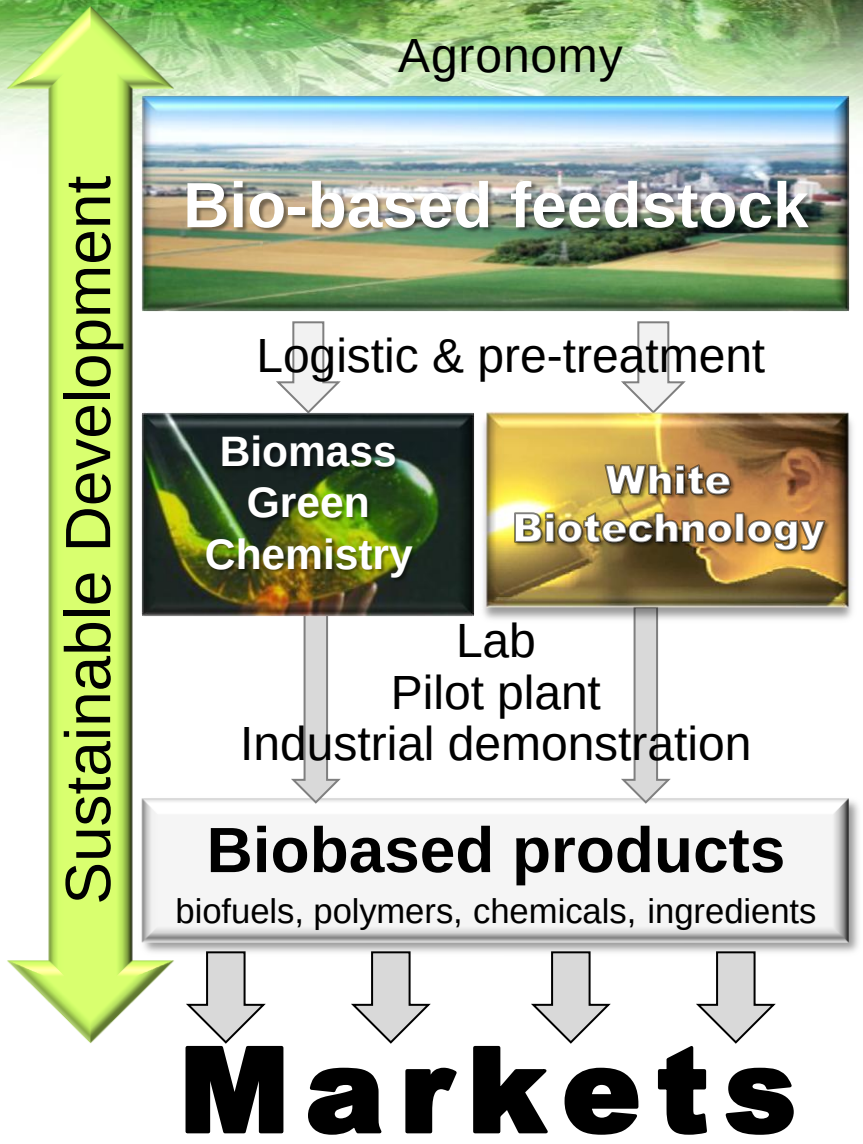


Petrochemicistry and Biorefinery



(Sanders et al., 2007)

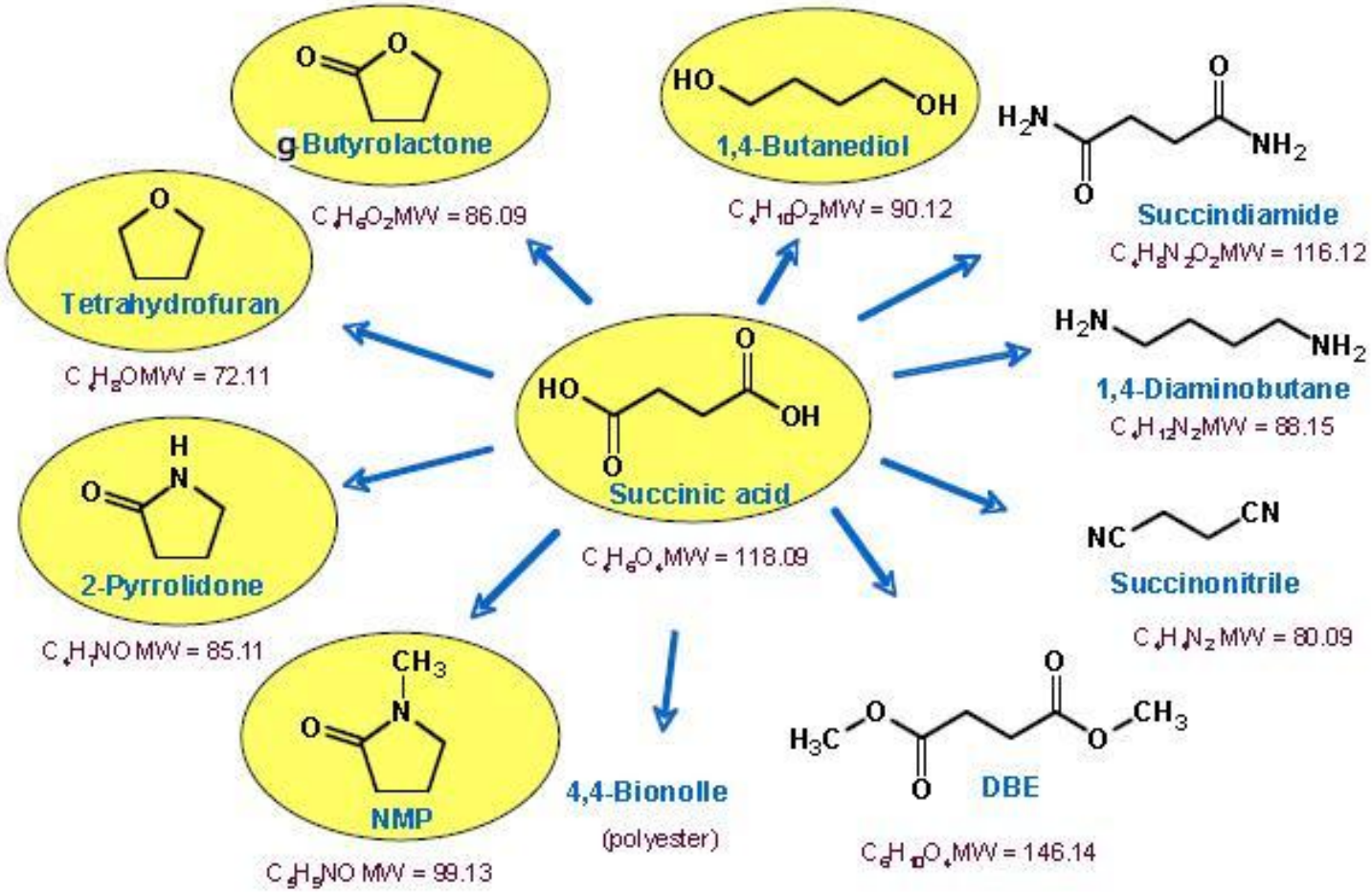
Strategy to develop biorefinery



Building blocks for chemistry

Building Blocks
1,4 succinic, fumaric and malic acids
2,5 furan dicarboxylic acid
3 hydroxy propionic acid
aspartic acid
glucaric acid
glutamic acid
itaconic acid
levulinic acid
3-hydroxybutyrolactone
glycerol
sorbitol
xylitol/arabinitol

Succinic acid



Succinic acid : a new step toward integrated biorefinery

Sugar Refinery

OUTPUT
Sucrose

Wheat Processing Mill

OUTPUT
Glucose

Cellulose Hydrolysis Pilot

OUTPUT
C5 &C6 sugars

Bioethanol plants

CO_2

Diethyl succinate

Succinic acid plant

Biorefinery: toward an industrial metabolism