

Biobased Economy en Logistiek

Agrologistiek, Monster 16 Februari 2009

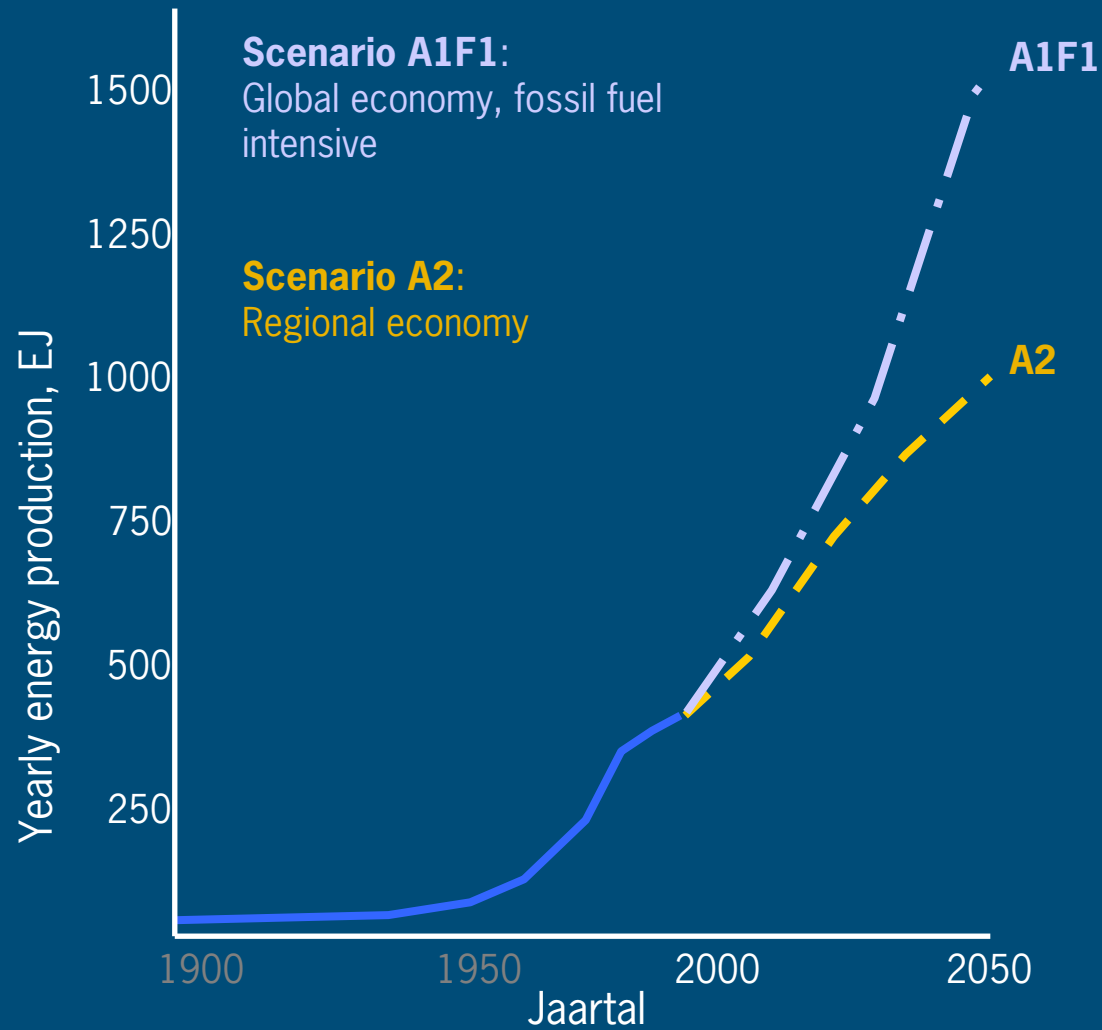
Johan Sanders

Professor Valorisation of Plant Production Chains

Wageningen University and Research center



Energy consumption past and future

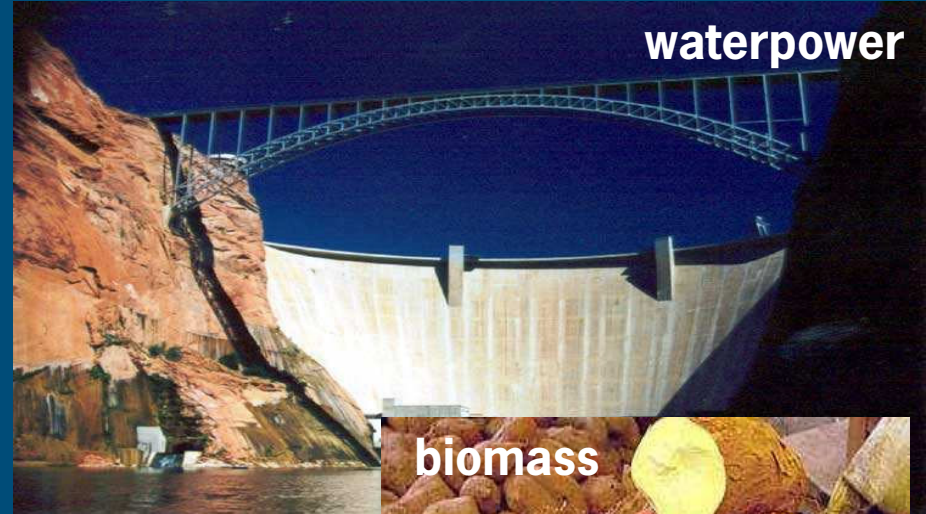


Alternative sources of energy

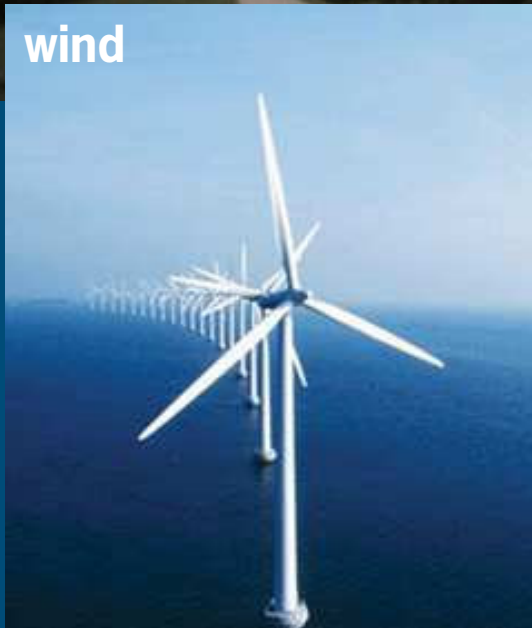
Nuclear



waterpower



wind



Solar energy

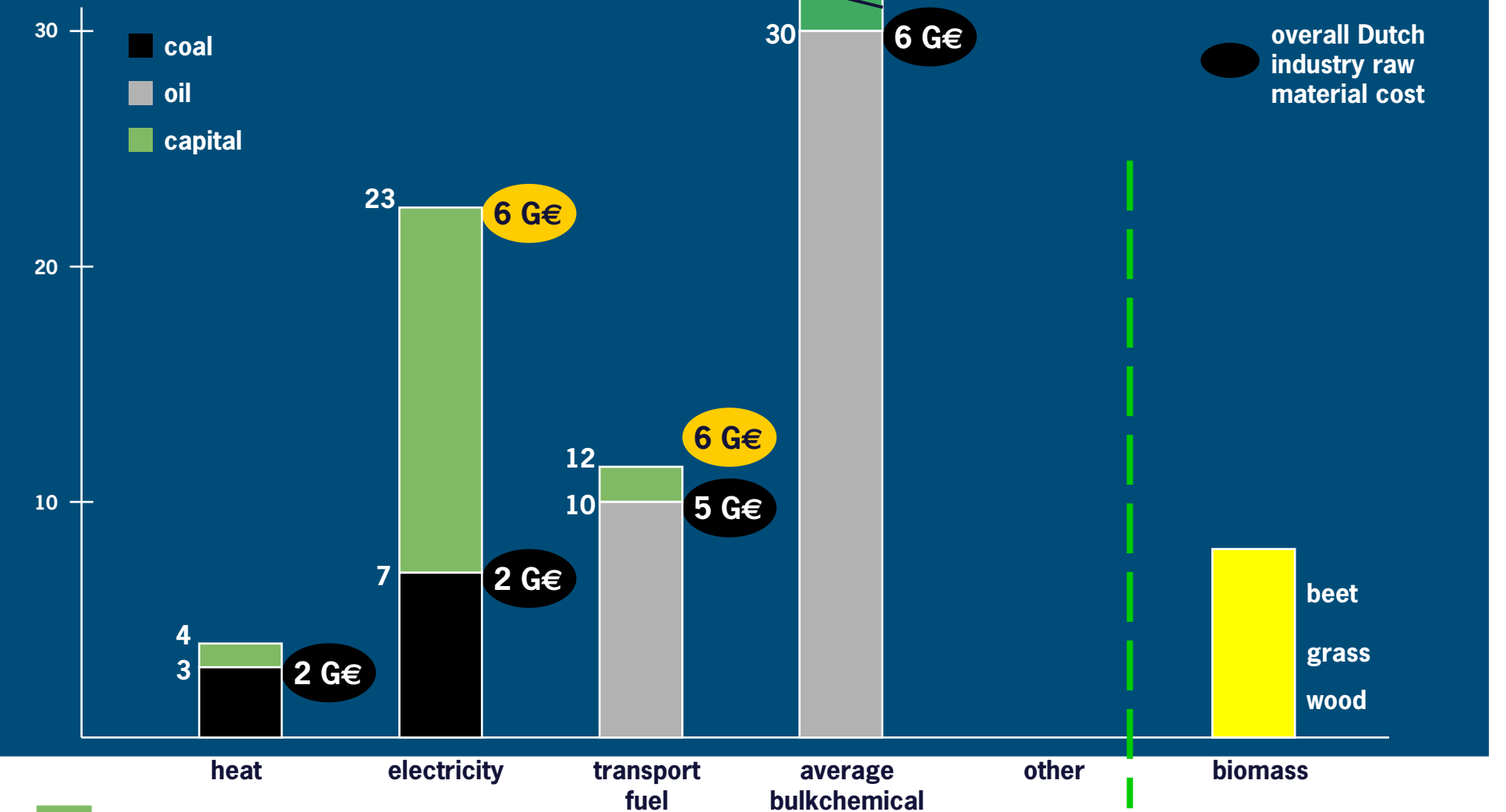


biomass



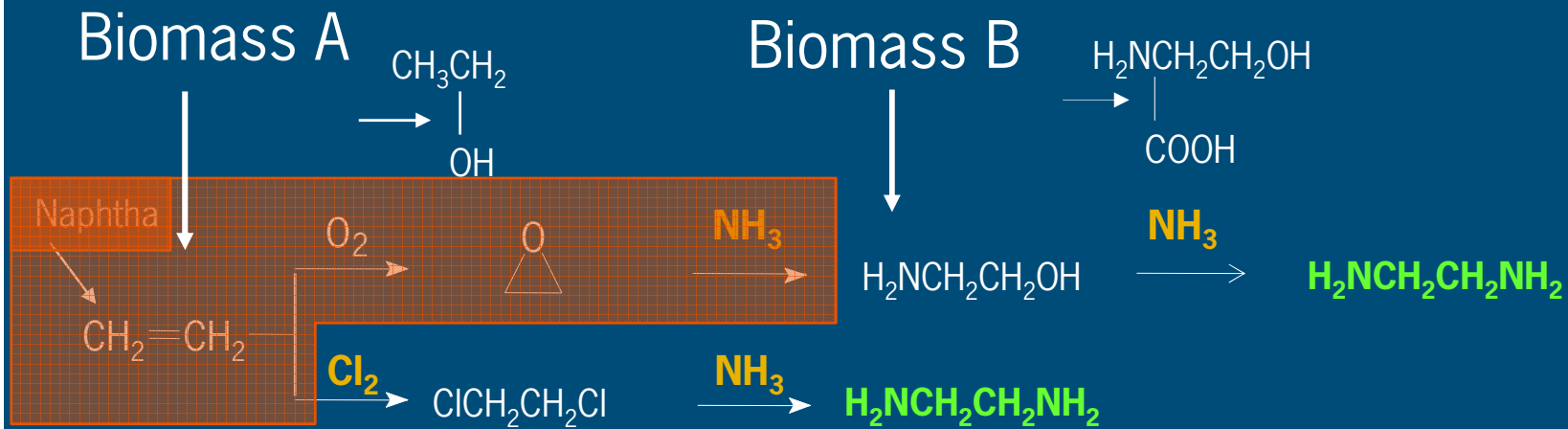
How biomass can best compete with fossil derived products

Production costs
(€/GJ endproduct)



Functionalized Savings Potential

1,2-Ethanediamine : rubber chemicals, pharma, lubricants, detergents



Platform Renewable Materials/ Rijks brede visie BBE

30% substitution of fossil by Biomass in 2030

- 25% chemical resources (140 PJ)
- 60% transportation fuels (324 PJ)
- 17% heat (65 PJ)
- 20% electricity (203 PJ)

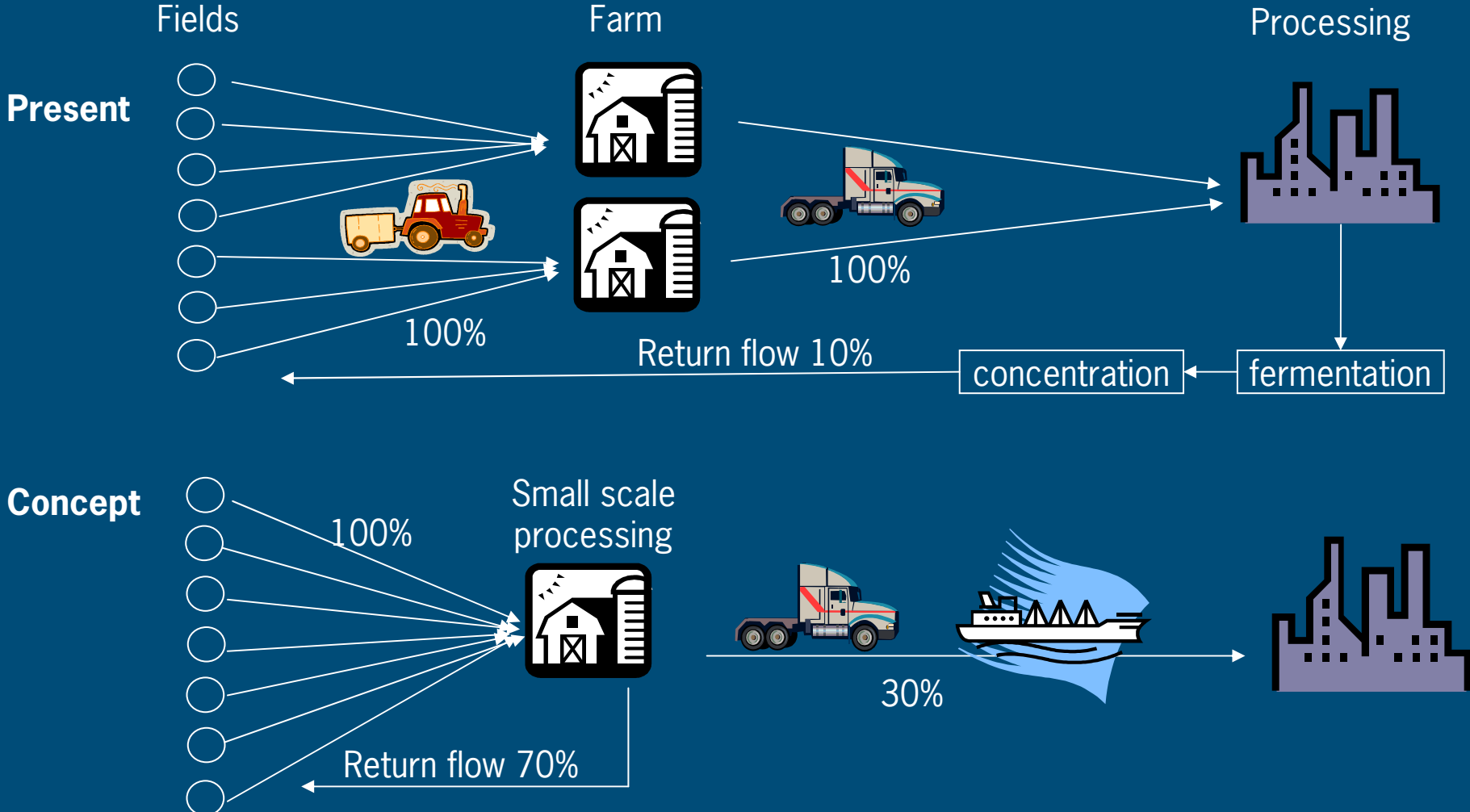
By:

- Enhancing efficiency present Biomass (400 PJ)
- Development (new) crops (250 PJ)
- Aquatic cultures (250 PJ)
- Import (250 PJ)

Consequenties Biomassa

- Nieuw volume
- Substitutie door groter volume vanwege lage energiedichtheid
- Grote verscheidenheid (Biocommodities)
- Verwerking/Bioraffinage is veel minder schaal afhankelijk
- Is Rotterdam the place to be?
 1. Midden Europa? Inlands?
 2. Zuid Amerika?
 3. Eemshaven?

Forward integration reduces transport cost and seasonality and will give more income to the farmer



Mobile Cassava starch refinery in Africa



Source: Duteso



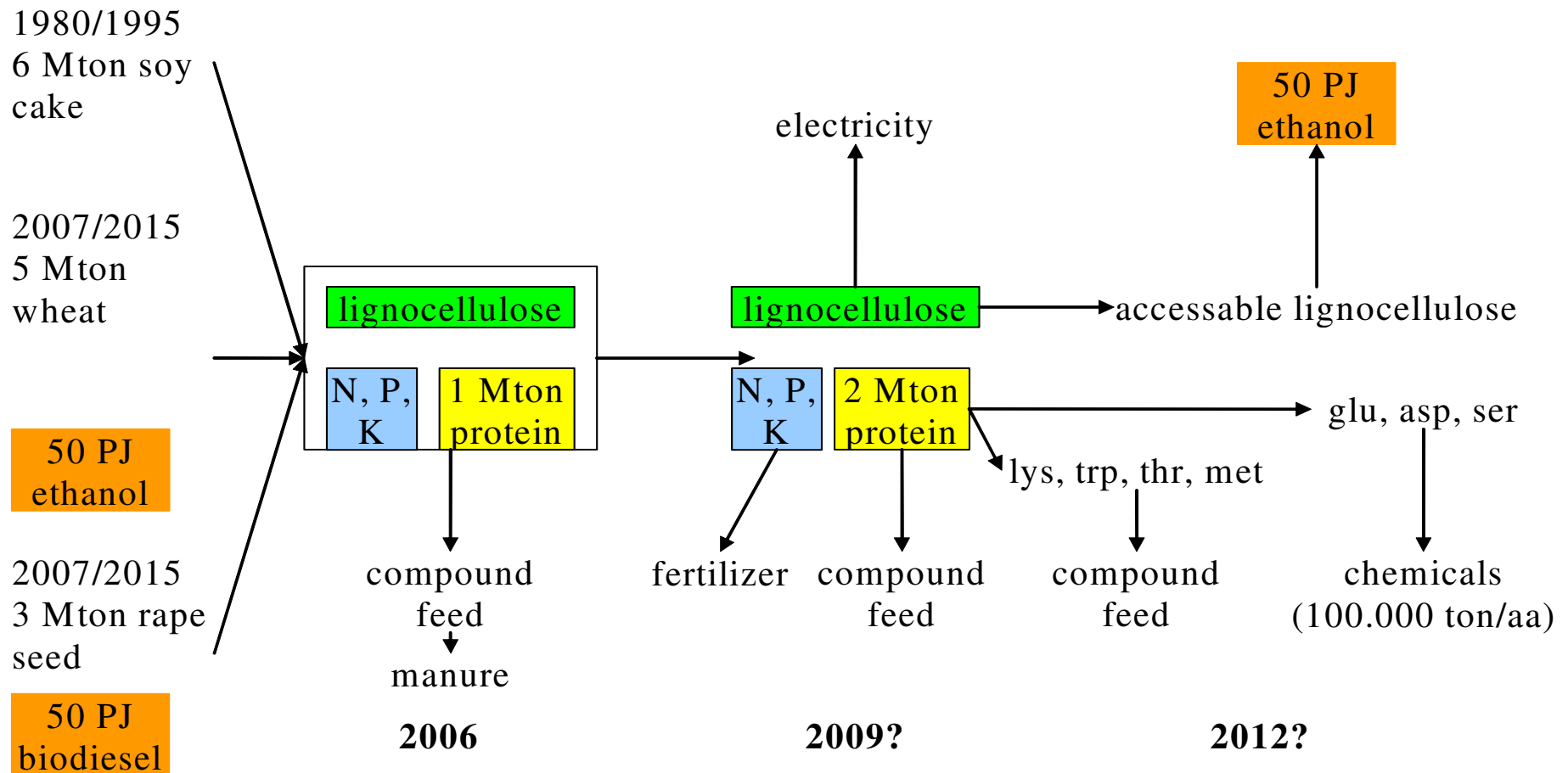
DuPont /Tate & Lyle BioProducts :1,3 Propanediol factory, Loudon, USA



Potential Bio-commodities

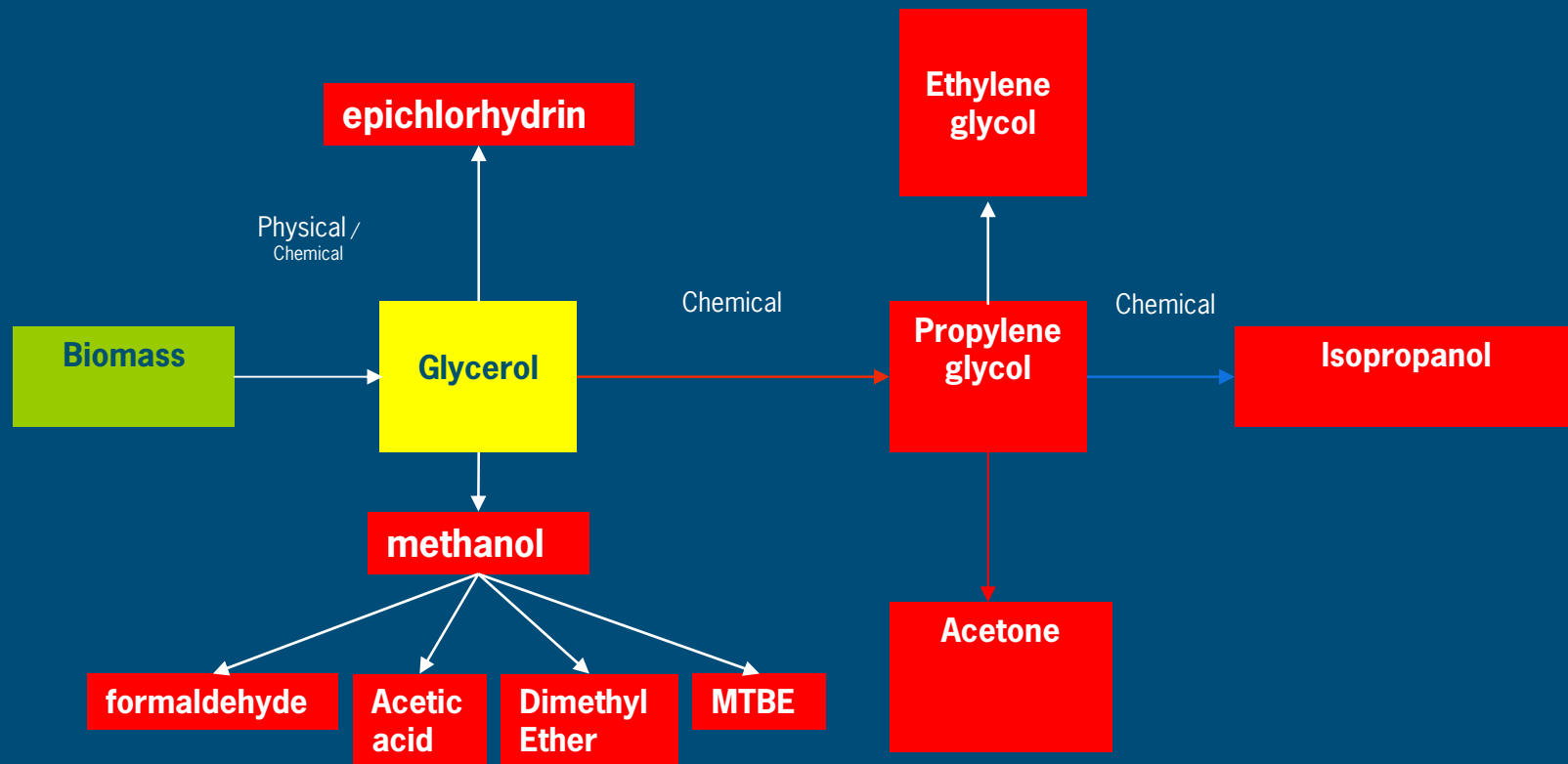
- Pyrolysis oil
- Torrefaction pellets/ wood pellets
- HTU biocrude
- Non purified syngas/ upgraded biogas
- (hydrous) ethanol
- Biodiesel
- Pure Plant Oil
- Rape seed/ rape cake
- Soy beans
- Cereal grains
- Crude protein (hydrolysates)
- Crude minerals

Stepwise development of Dutch BbE can be build on Dutch pillars: Agriculture, Chemistry, Ports. (Port Authorities)



Many 'Rotterdam' chemicals can be produced from Biomass

Example of short term substitution potential



Scheme. Chemical production in Rotterdam - a bio-based alternative for butadiene and ethylene.

Current production by Shell Chemical and Lyondell

Conclusies:

- Bioraffinage verhoogt waarde van biomassa grondstoffen en reduceert transport m.n. van componenten welke geen transport behoeven
- Economy of Scale is nauwelijks voordelig. Processing tot hoogwaardige producten laat reststromen in haven t.b.v. elektriciteit of export
- Veel biomassa producten kunnen over water; Rotterdam kan grondstoffen aanvoeren ook vanuit achterland
- Eemshaven profiteert van combi van twee werelden: veld en oceaan.

Afsluiting

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