

# Sustainability of Biofuels

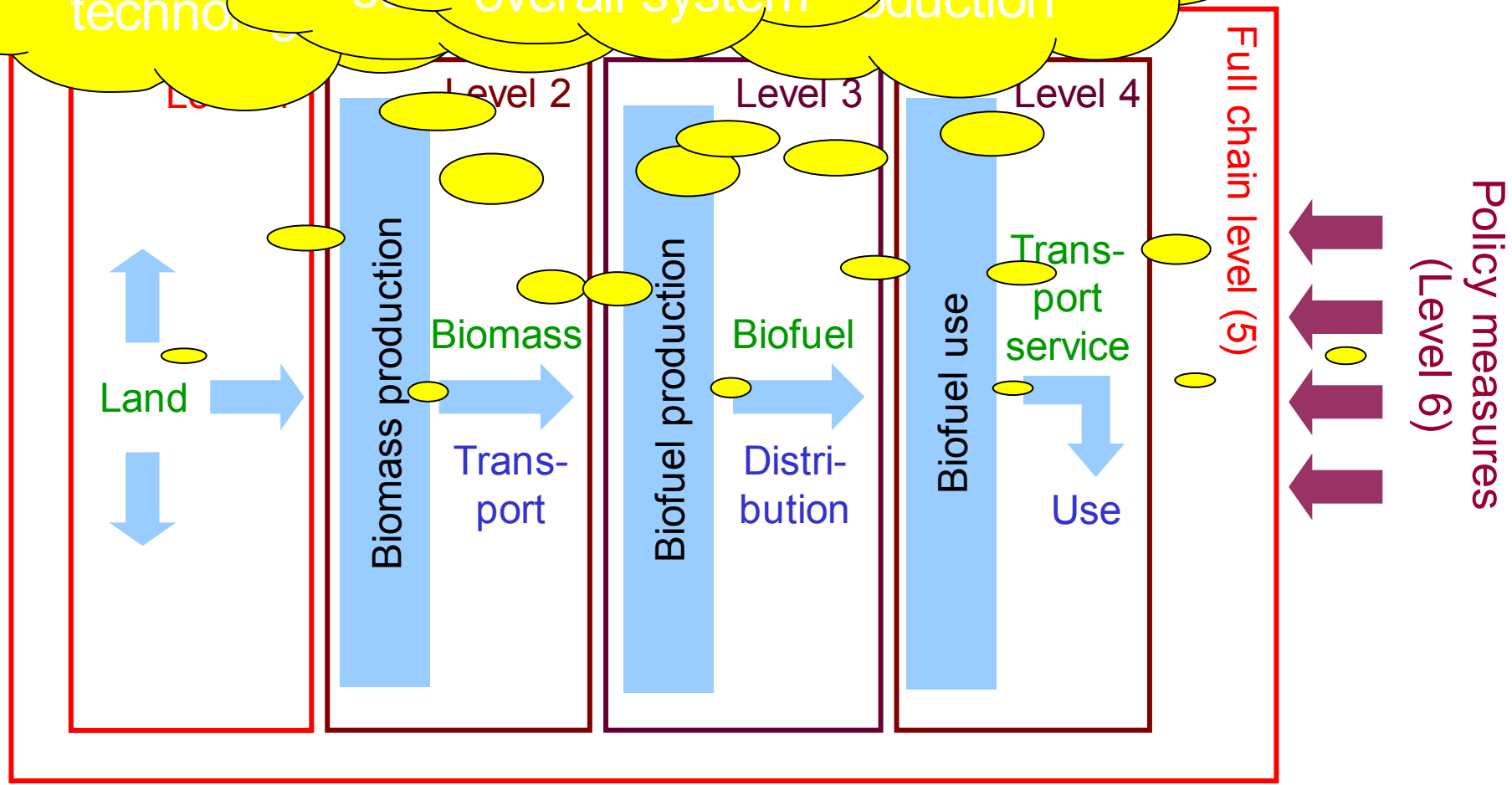
## R&D-Needs to Exploit the Given Improvement Potential

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# Introduction

- Sustainability as a critical issue
  - Negative impact within agriculture and forestry (potential deforestation, biodiversity loss etc.)
  - Environmental performance throughout the overall chain (GHG balances, toxic emissions etc.)
  - Economic impact within the markets (food prices etc.)
- Sustainability is precondition for license to produce
- Need for a significant improvement of biofuels vs. fossil fuels on a global and local level
- Valuable sustainability indicators still lacking

Sustainable conversion technologies  
Sustainable crop production  
Measures influencing the overall system  
Sustainable production



## **Level 1 "Competition for land, leakage effects, increasing commodity prices"**

### R&D-Needs (Examples)

- 1.1 Methods and approaches to reduce competition
- 1.2 Measurement methods
- 1.3 Impact monitoring

## **Level 2 "Sustainable feedstock production"**

### R&D-Needs (Examples)

- 2.1 Improvements in agricultural and forestry production
- 2.2 Better biomass provision

**Level 3** "Sustainable conversion technologies with decreased fossil inputs, less emissions, and new by-products with a huge market potential"

R&D-Needs (Examples)

- 3.1 Improvements in conversion technology
- 3.2 Integrated conversion systems / biorefinery

**Level 4** "End use: Provision of fuels matching more demanding engine specifications and meeting improved environmental standards"

R&D-Needs (Examples)

- 4.1 Identify most promising end-use options
- 4.2 Better integration of fuel, engine and vehicle

## **Level 5 "Overall chain sustainability: Viewpoint from Cradle to Grave"**

### R&D-Needs (Examples)

- 5.1 Further development of indicators, methods
- 5.2 Assessment and monitoring
- 5.3 Improvement of sustainability aspects

## **Level 6 "Policy measures & Research for biofuels deployment"**

### R&D-Needs (Examples)

- 6.1 Chain certification systems
- 6.2 Impact-adaptive incentives

# Conclusions

- Political and social support for biofuels will depend on proof of sustainability
- Sustainability has to be addressed throughout the overall provision chain and especially within agriculture and/or forestry
- R&D is urgently needed for a better and more transparent assessment of such aspects
- If sustainability issues are adequately addressed biofuels can make an important contribution to a more sustainable energy system as a whole

# Thank you very much!

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