



## Scaling Up Financing to Expand the Renewables Portfolio: Advanced Biofuels

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## ADVANCED BIOFUELS READY FOR COMMERCIALISATION

- From a technological barrier to financial and political barriers
  
- Commercialization depends on political leadership and ambitious targets

# THE FUTURE IS LIQUID FUELS

## – ADVANCED BIOFUELS WILL PLAY KEY ROLE

### World facts in 2035



- Global energy demand has increased by 40%
- Oil demand has increased by 18% driven by transport
- Global vehicle fleet has doubled and the vast majority still use liquid fuels
- Oil production is concentrated in fewer and fewer countries

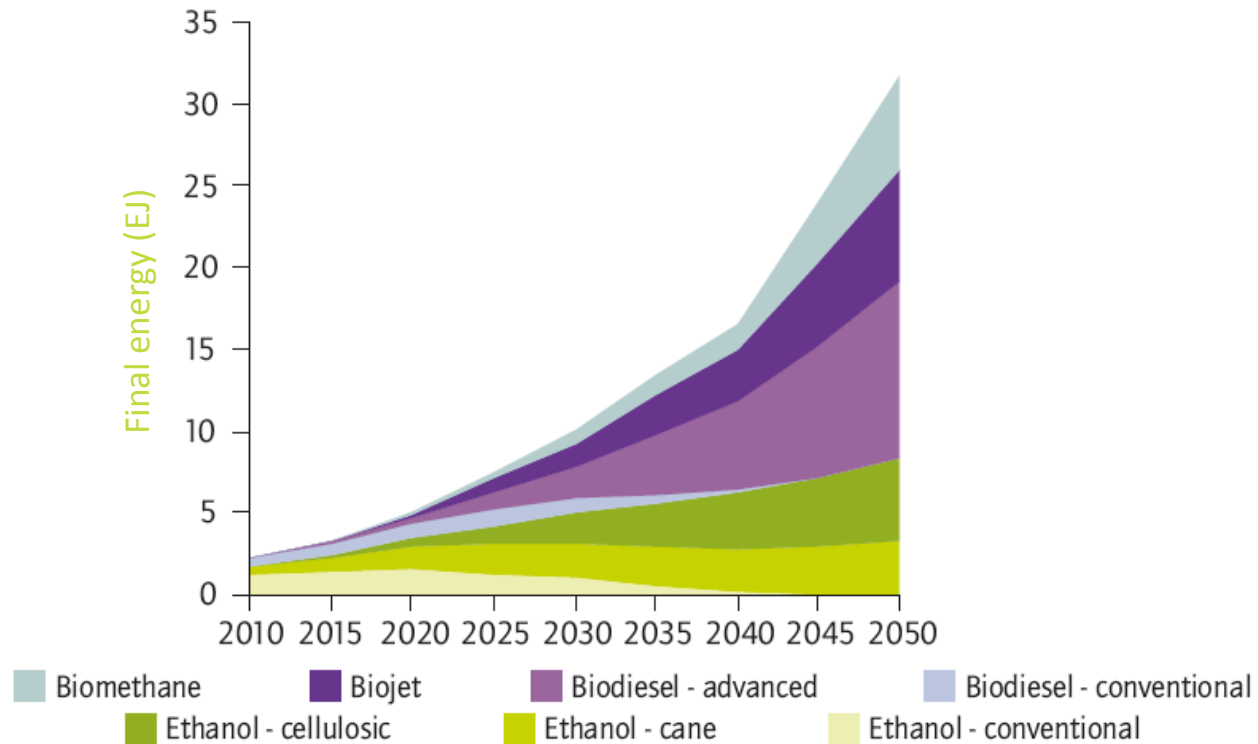
### Great promise of advanced biofuels



- Meet >50% of gasoline demand
- Reduce dependency on imported oil
- Help keep oil prices under control
- Stimulate rural economies and create domestic jobs
- Significant reduction of GHG emissions

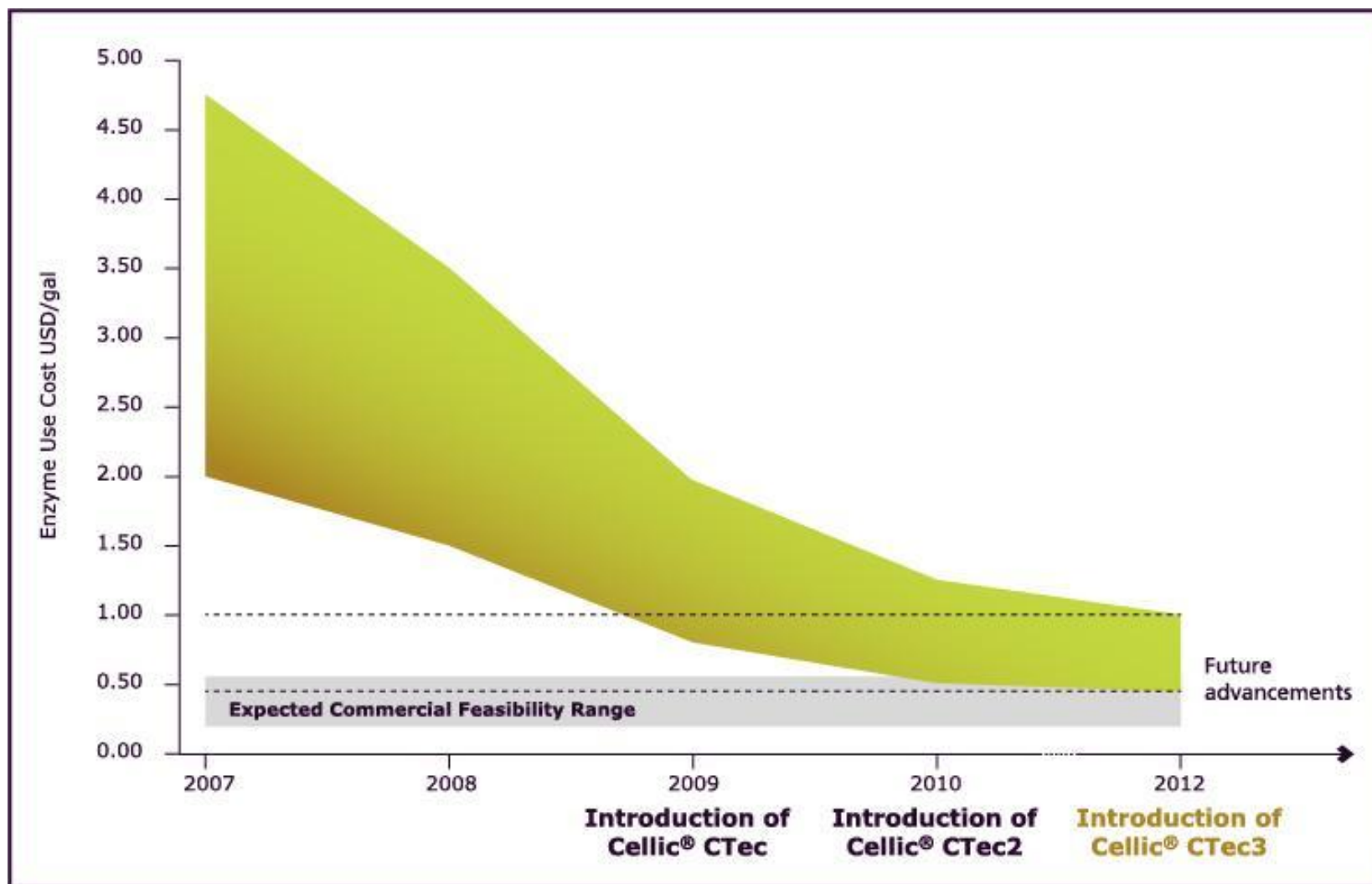
# VISION FOR BIOFUELS BY 2050

## - IEA BIOFUEL ROADMAP



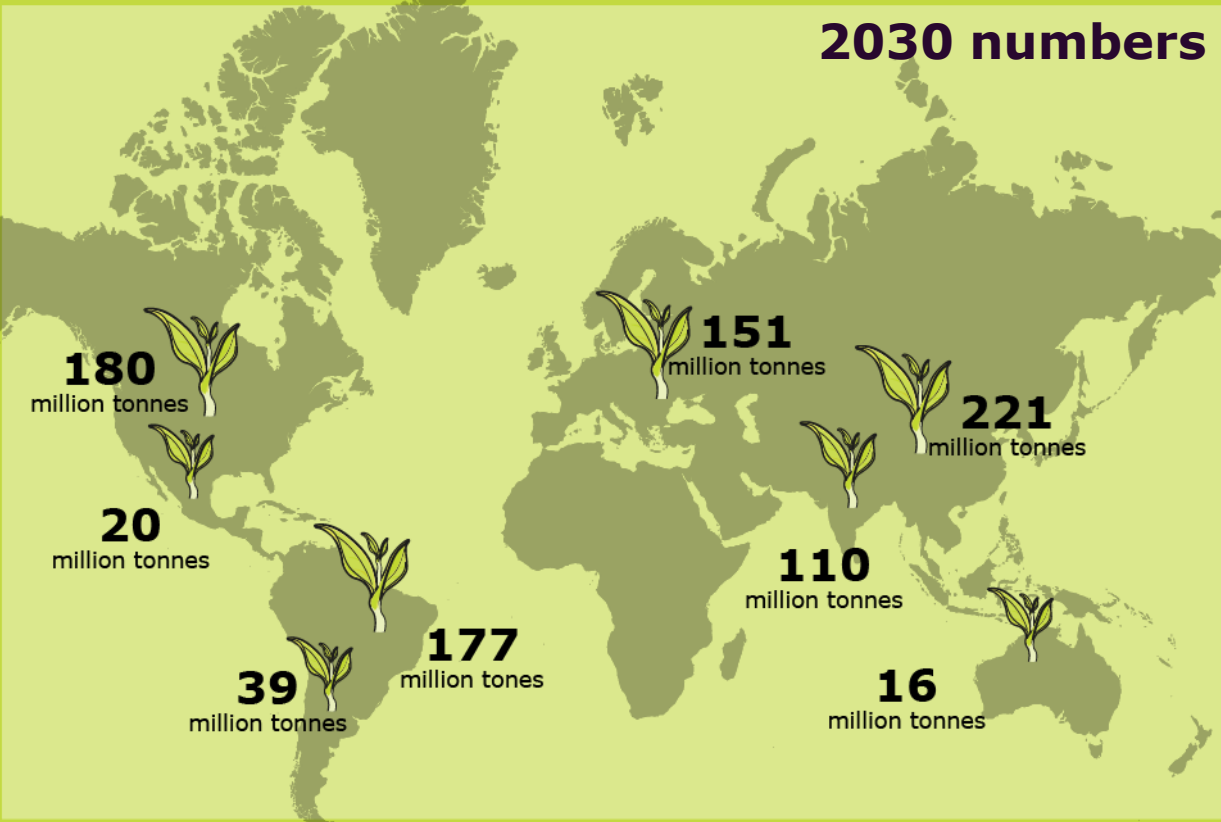
- Global biofuel supply grows from 2.5 EJ today to 32 EJ in 2050
  - Biofuels share in total transport fuel increases from **2% today, to 27% in 2050**
- Diesel/kerosene-type biofuels become particularly important to decarbonise heavy transport modes
- **Large-scale deployment of advanced biofuels vital to meet roadmap targets**

# ENZYME TECHNOLOGY ON THE RIGHT TRACK



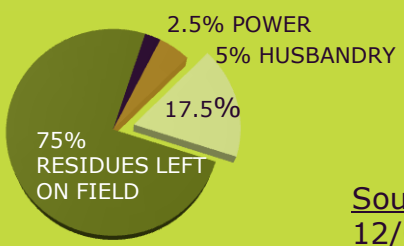
# ASSESSING THE POTENTIAL BASED ON THE AGRICULTURAL POWERHOUSES

- USA**
  
**Main crop residue:** Soy bean, wheat, corn
   
**Biomass available** 180 million tonnes
- Mexico**
  
**Main crop residue:** Sugar cane, wheat, corn
   
**Biomass available** 20 million tonnes
- Brazil**
  
**Main crop residue:** Sugar cane, soy beans, corn
   
**Biomass available** 177 million tonnes
- Argentina**
  
**Main crop residue:** Soy beans, sugar cane, corn
   
**Biomass available** 39 million tonnes



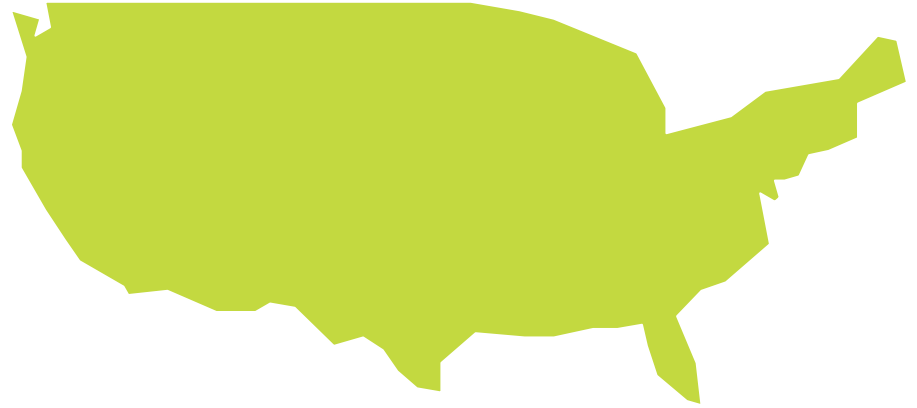
- EU-27**
  
**Main crop residue:** Wheat, barley, corn
   
**Biomass available** 151 million tonnes
- China**
  
**Main crop residue:** Wheat, corn, rice
   
**Biomass available** 221 million tonnes
- India**
  
**Main crop residue:** Sugar cane, wheat, rice
   
**Biomass available** 110 million tonnes
- Australia**
  
**Main crop residue:** Sugar cane, wheat, barley
   
**Biomass available** 16 million tonnes

**914 million tonnes** residues will be available and can replace half of the gasoline needs in the above regions



Source: Bloomberg New Energy Finance, 'Moving Towards a Next-Generation Ethanol Economy', 12/01/2012

# CASE STUDY - WHAT'S IN IT FOR THE US



Energy  
security

The US can replace 16% of its annual gasoline consumption by 2030 with advanced biofuels



Jobs

Create more than 1 million jobs between 2010 and 2030 mainly in rural areas



Economy

American players would be the major beneficiaries, including 663 billion USD domestic engineering, construction and feedstock market



Environ-  
ment

Save CO2 and reducing GHG emission from gasoline related road transport by 11%

# THE ROLE OF POLICY

## Guiding principle

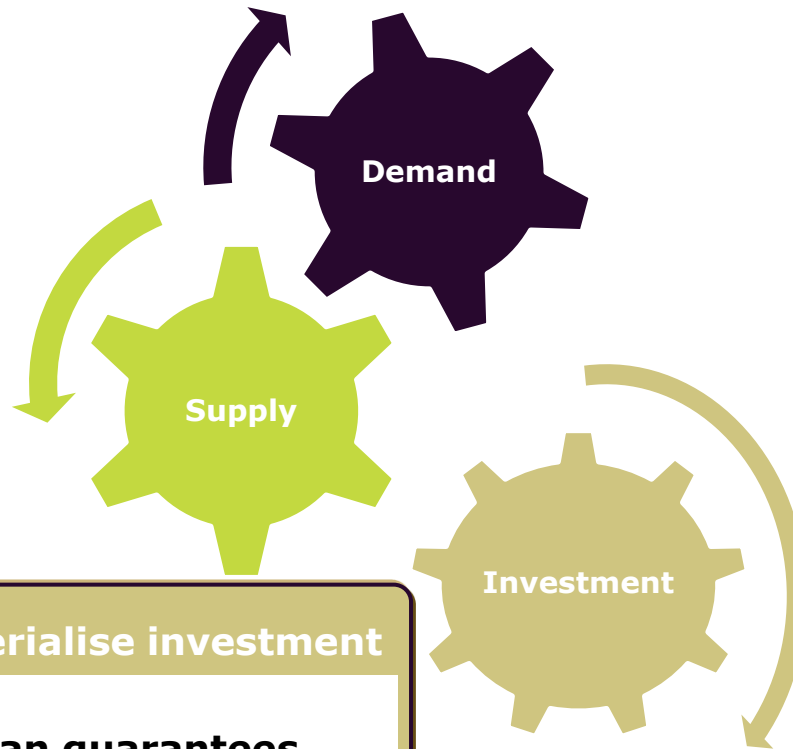
- Secure demand early and set ambitious target to provide investor confidence
- Incentivise supply simultaneously to lower the cost in a short period

### Incentivise supply

- Support biomass development and collection

### Materialise investment

- Loan guarantees
- First of its kind commercial plants

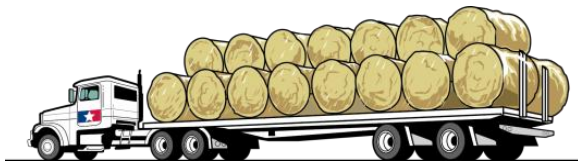


### Secure demand

- Mandatory targets
- Remove technical barriers e.g. blend walls

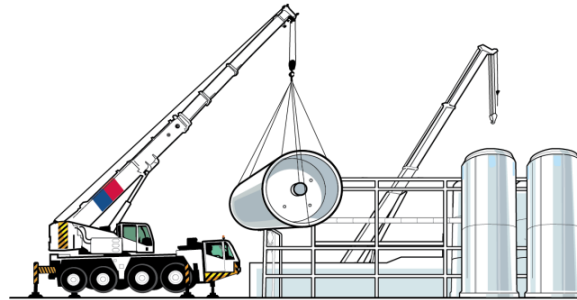


# BARRIERS



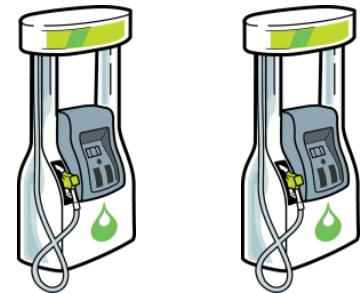
**Need for biomass collection infrastructure**

**No market for biomass**



**Conversion economics – economies of scale**

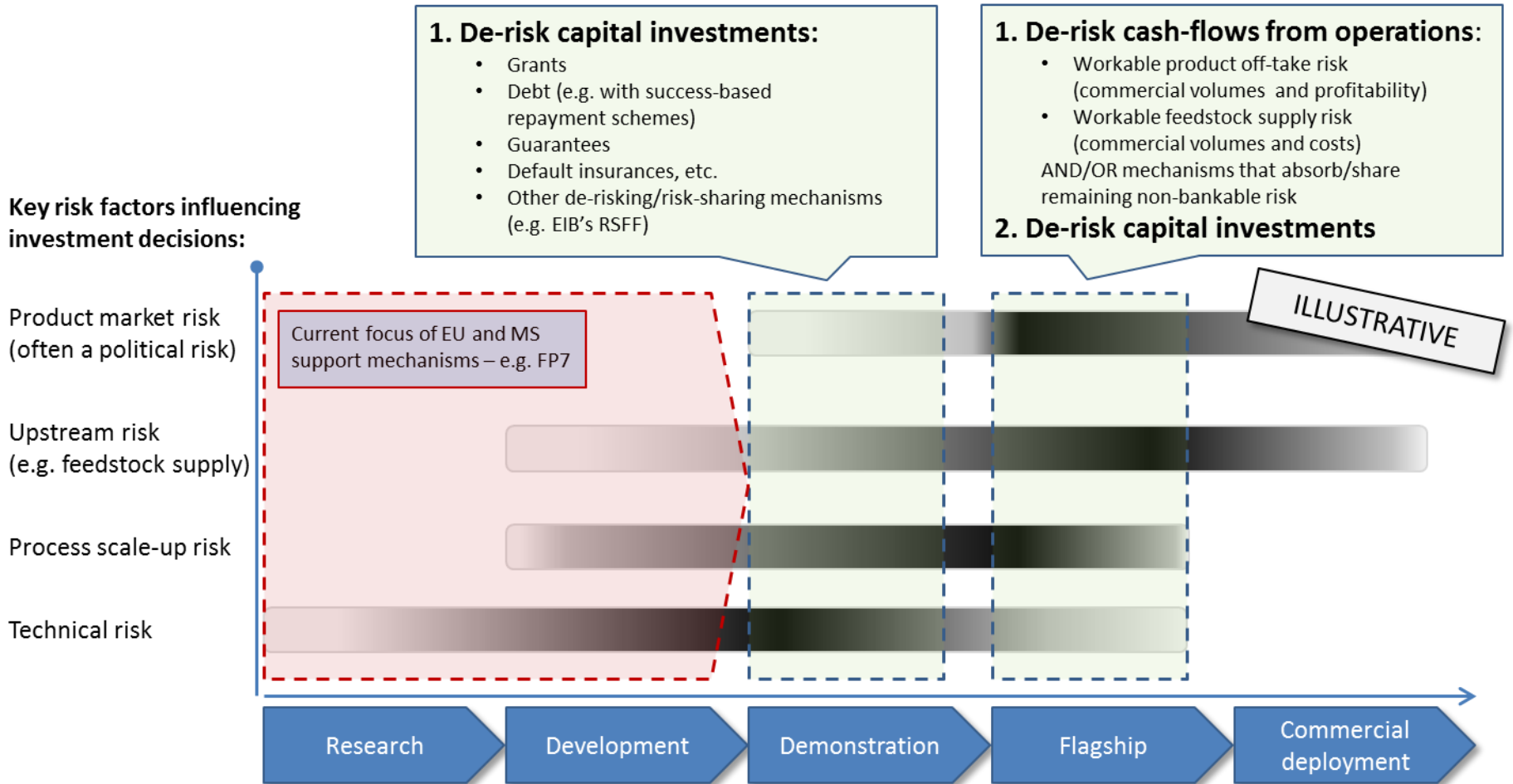
**Biorefinery financing**



**No incentives for demand for biobased product**

**Bankable demand**

# MECHANISMS TO ADDRESS INVESTMENT NEEDS AND RISKS



## SUMMING UP.....

- No current market for biomass
- Biomass infrastructure required
- Conversion economics
- Technical blending hurdles
- Capital shortage

Main barrier is the perceived investment risk in *an uncertain policy environment with no clear incentives*

THANK YOU !

Learn more:  
[www.bioenergy.novozymes.com](http://www.bioenergy.novozymes.com)