

# EU Biorefinery Outlook to 2030

*Studies to support R&I policy in the area of  
bio-based products and services*

*Moving towards a competitive European  
bioeconomy: Rollout of biorefinery technologies -  
policy perspective*

# Part of three studies for The Directorate-General for Research and Innovation (DG RTD)

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The overall objective is to provide a range of new information and analysis that will help identify **future policy directions, emerging technologies, societal demands, challenges and opportunities** in the fields of the **Bioeconomy** related to **bio-based products** and the **bio-based innovation**.

**LOT 1** – Carbon economy

**LOT 2** – Life and biological sciences and technologies as engines for bio-based innovation

**LOT 3** – Biorefinery pathways and outlook for deployment (lot 3) “EU Biorefinery Outlook to 2030”

# The study can be used to help make decisions and take actions to accelerate biorefinery deployment to 2030

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**AIM:** To provide an **outlook for chemical and material driven biorefineries** enabling **stakeholders** such as the scientific community, industry (primary producers and manufacturers), investors, policymakers, and NGOs to take the present-day **decisions** necessary **to shape the future** sustainable bioeconomy

# A circular biobased economy is important to help build a sustainable future and meet the EU Green Deal's targets

## EU Bioeconomy Strategy 2018

## Biodiversity Strategy

## Farm-to-Fork Strategy

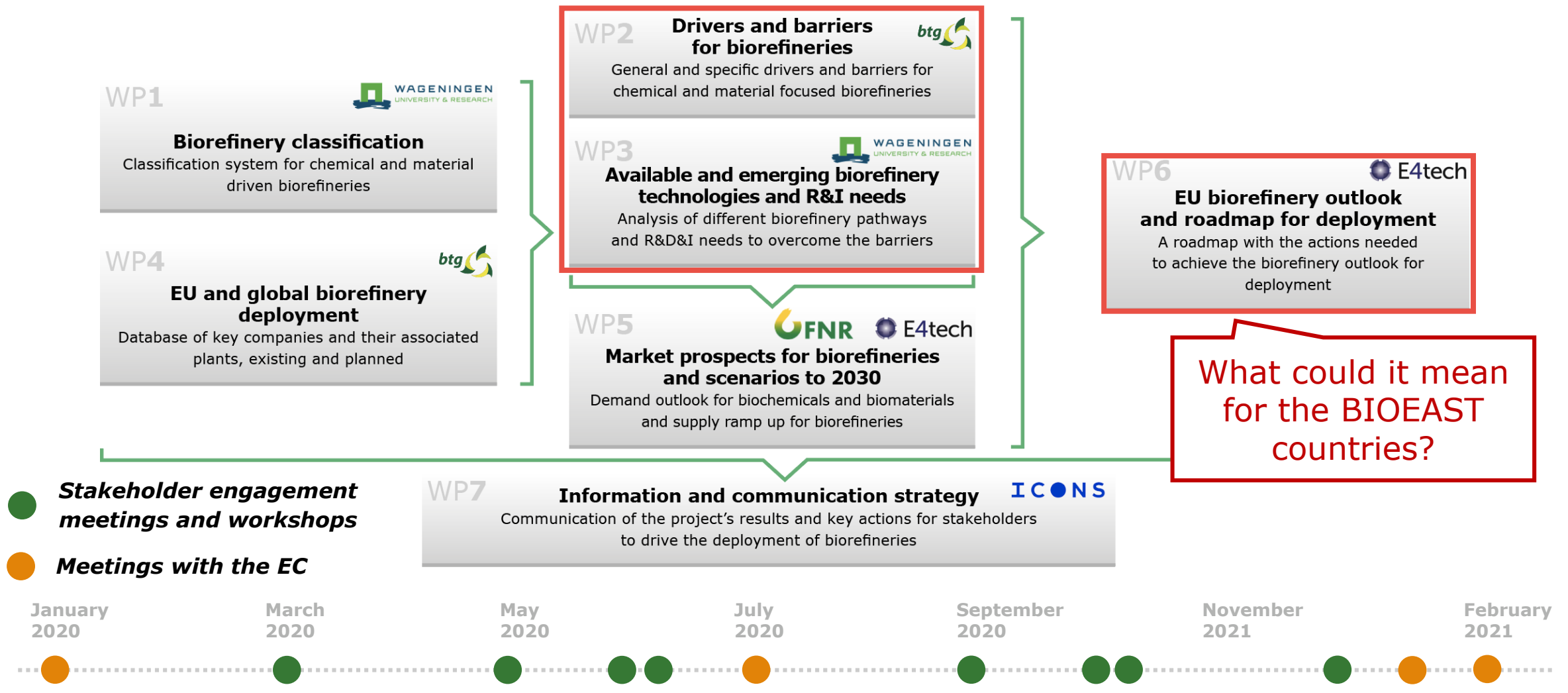
**EU GHG reduction by min. 55% by 2030 compared to 1990 levels**

## Circular Economy Action Plan

- The study supports the **action to facilitate the development and deployment of new sustainable biorefineries.**
- **Biorefineries** have the potential to play an **important role** for the development of a **carbon-neutral economy.**
- Biorefineries **can increase EU security of raw materials** and improve business opportunities by **creating local jobs.**

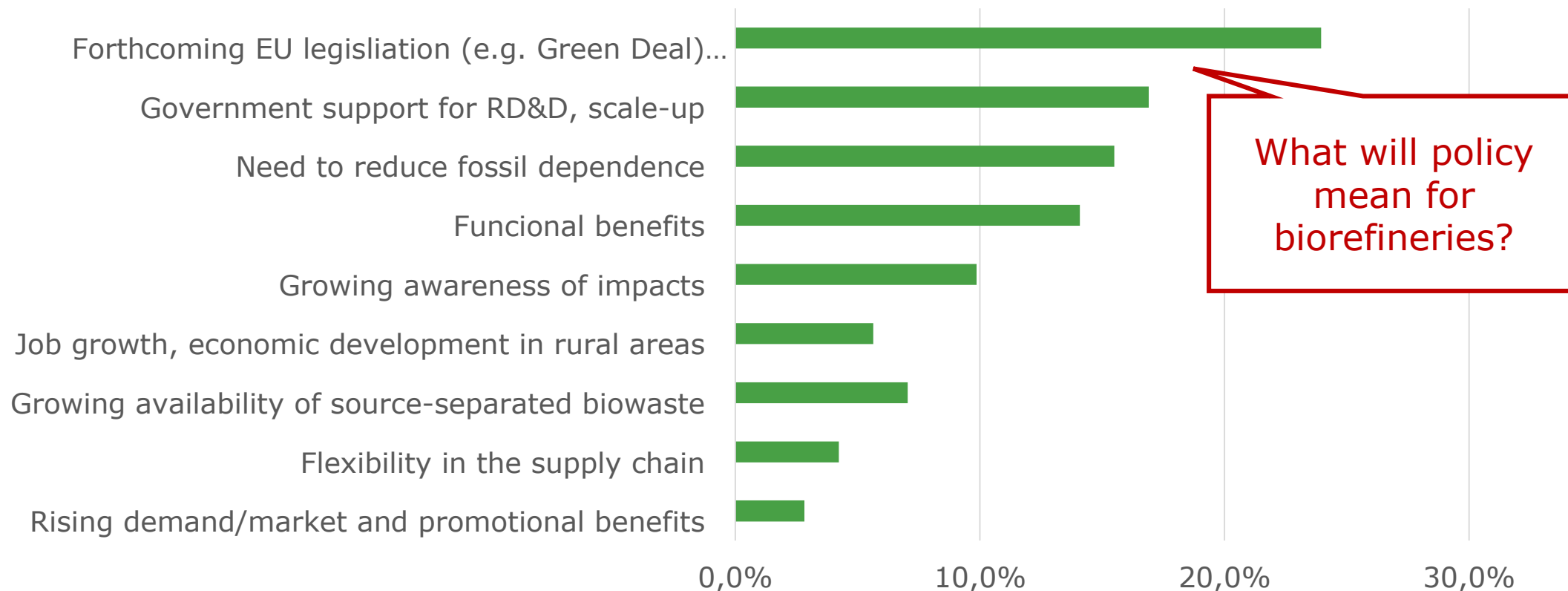
- This study can help **inform policy** and biorefinery deployment can help achieve **objectives** at EU level

# The focus today is on the drivers and barriers to biorefinery deployment and how policy could help overcome these



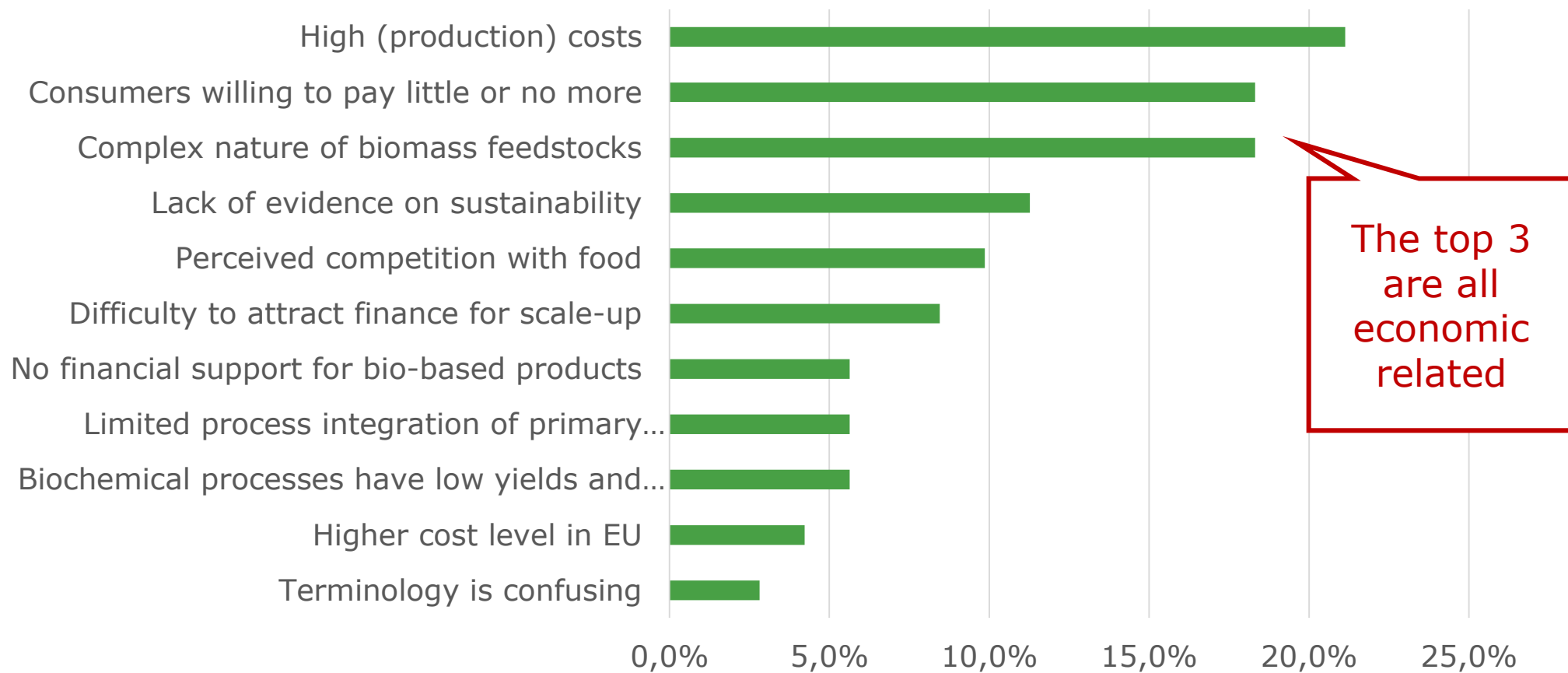
# Stakeholder identified the main drivers as environmental, government support and awareness...

## Most important drivers



# ...and the main barriers as economic viability and scale-up challenges


## Most important barriers






# Stakeholders and policy makers need to take action to accelerate towards the high deployment scenario

- The roadmap **actions** aim to **overcome barriers** to increase the likelihood of **reaching** the **outlook for deployment**

## Stakeholder type

-  Policy makers
-  Bio industry & associations
-  Chemical/material industry & Industry associations
-  Academia & Research institutions
-  NGOs & Civil societies
-  Investment community

## Action type

-  Policy & regulation
-  Support for RD&D and scale up
-  Information and coordination

Actions are segmented by barrier groups and are listed in order of importance 3





# Policy & regulation is essential to close the large gap between the market's willingness to pay and costs

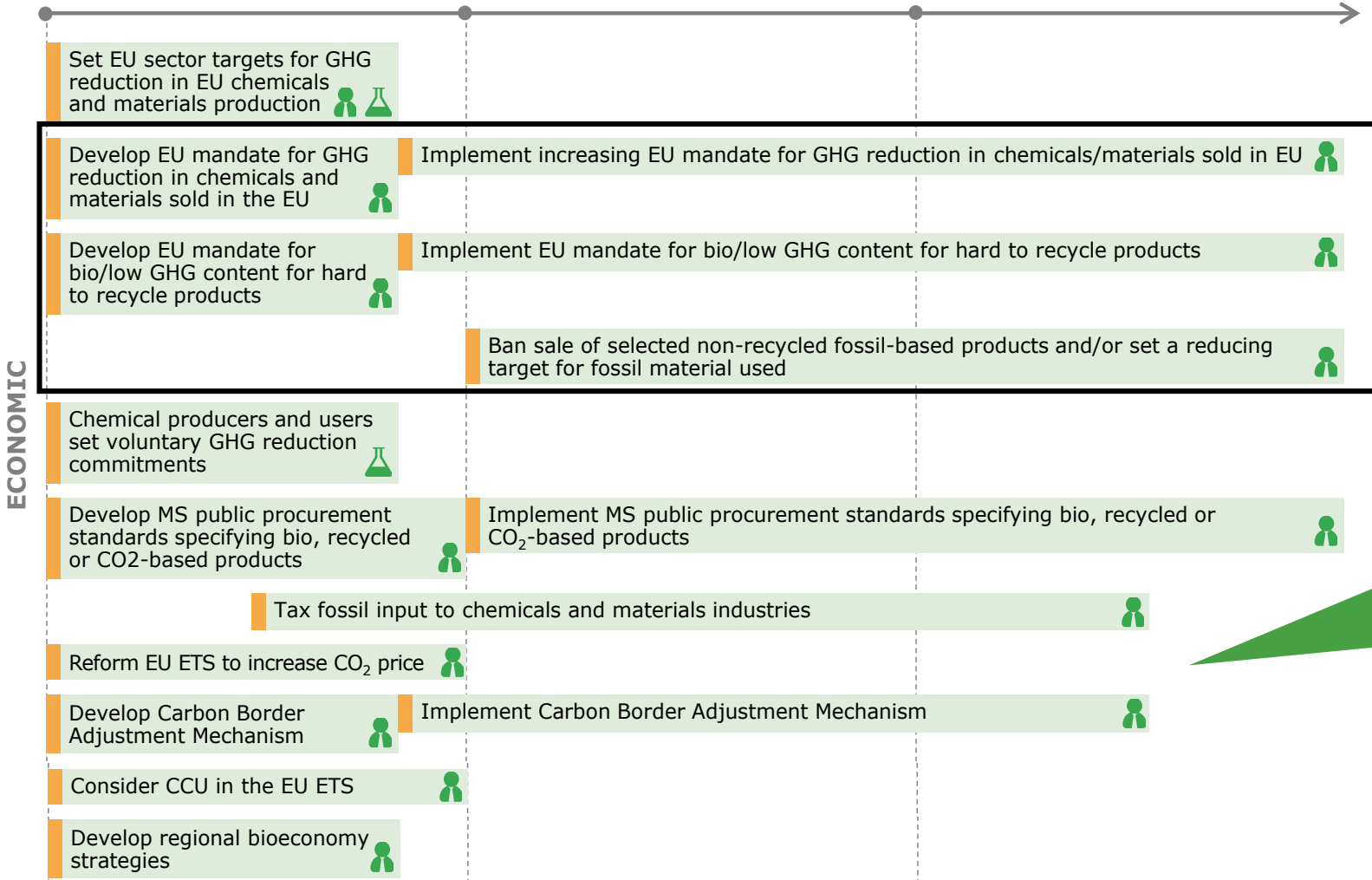
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Policy & regulation is required to achieve this through:

- **Policy** that supports **chemicals and materials** that provide **environmental benefits** (focused on GHG savings): bio-based, recycled, CO<sub>2</sub>
  - GHG reduction targets, mandates (e.g. on products sold, in public procurement etc...), bans/reducing targets on use of fossil and non-recycled products, taxes on some fossil products and carbon
- Ensuring that **where production costs are higher** as a result of the above actions, **EU competitiveness is supported** (e.g. through the Carbon Border Adjustment Mechanism)
  - The requirement for this depends on which actions are taken

# Policy & regulations need to be developed and implemented over in 5 years to have an impact on deployment by 2030

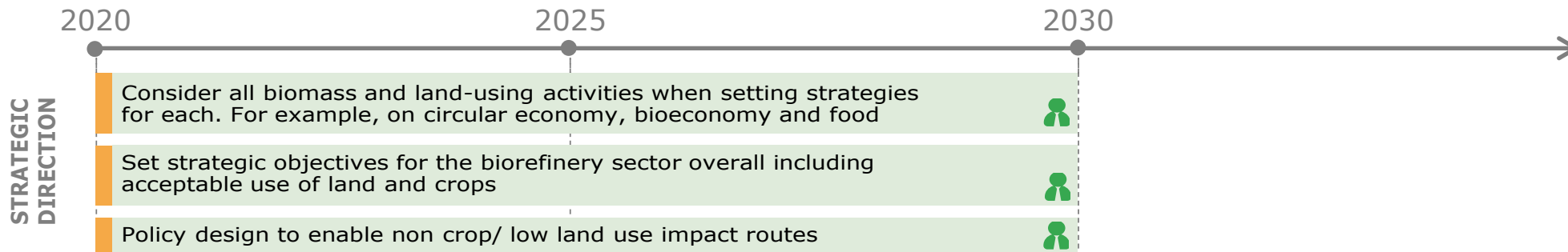
2020 2025 2030



One of these actions is required at least – a GHG reduction mandate on sales is recommended

If mandates on sales are **not** developed, these actions could help support biorefineries and EU competitiveness

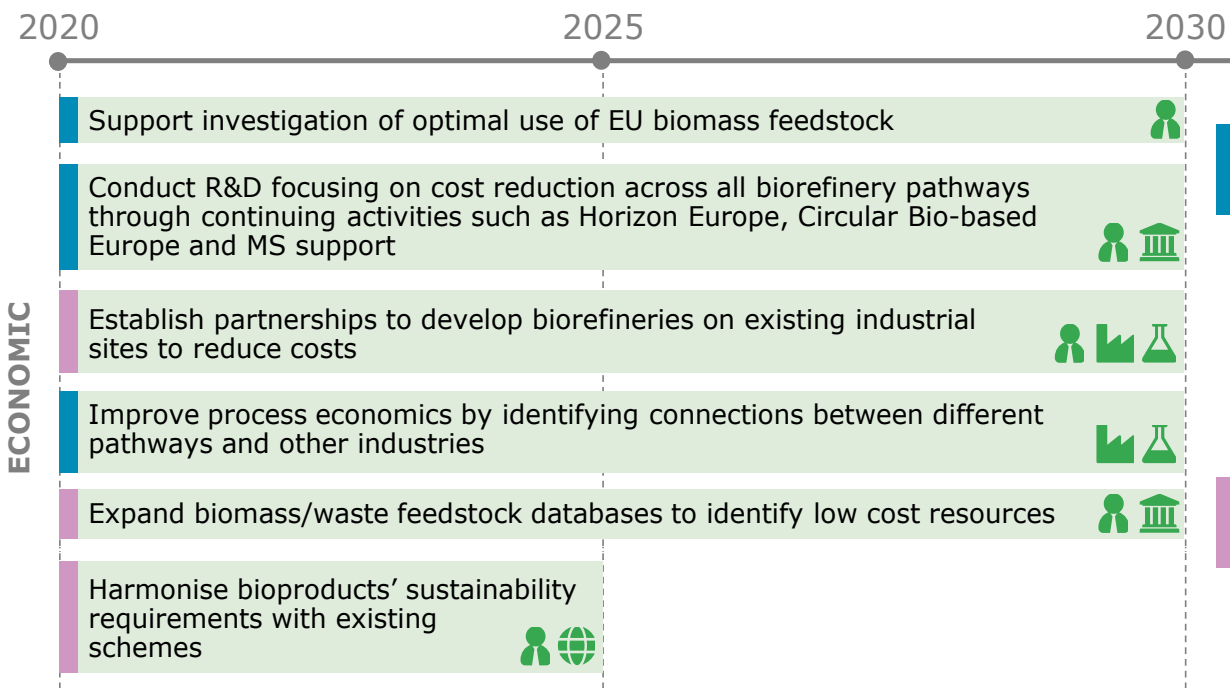
# To achieve lower environmental impacts the strategic policy & RD&D direction should be focused on selected pathways



Policy & regulation **strategic direction** is required to:

- Develop **chemical and materials policies** alongside **other biomass and land uses policy** – currently strategies and policies, for example on biofuels, bioeconomy, circular economy and Farm to Fork strategy, renewable energy, can overlap and conflict.
- **Scale up pathways** with **lower environmental impacts** that are currently more **expensive** and at an **earlier stage** of commercialisation

# Supporting Research, Development & Demonstration (RD&D) and feedstock sourcing can help accelerate cost reduction



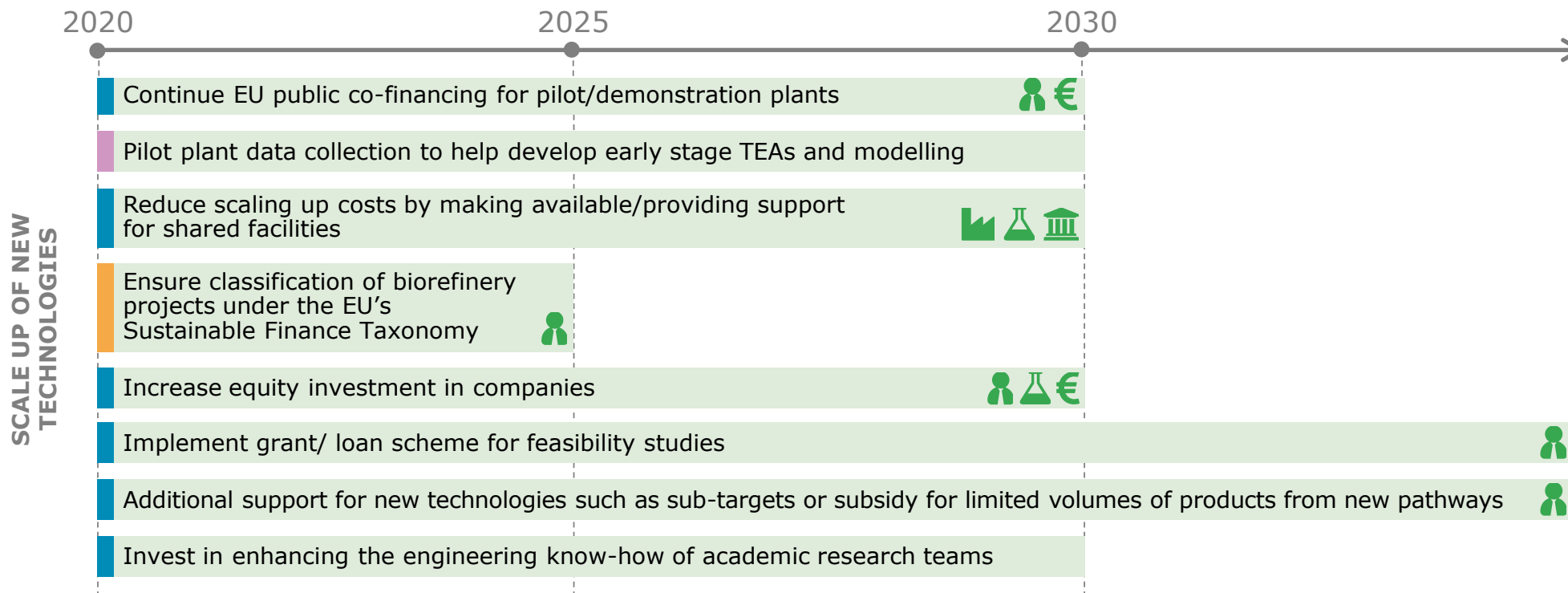
## Support for RD&D and scale up:

- **RD&D** on all pathways to bring **cost savings** (Horizon Europe, Circular Bio-based Europe, MS level support)

## Information and coordination:

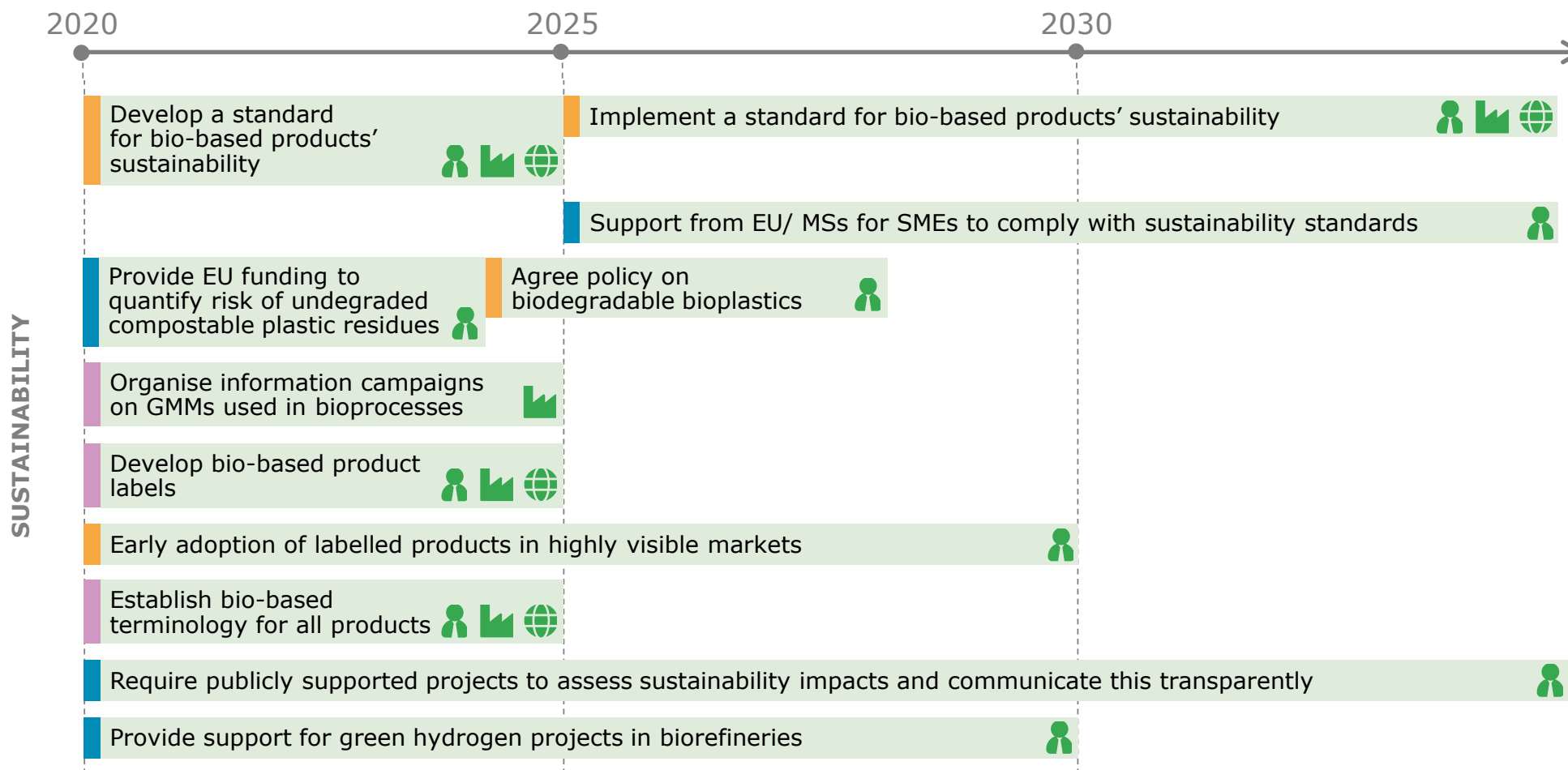
- **Lower costs** by developing on **existing industrial** sites
- **Connections** between different pathways
- Identification of **low-cost feedstock**

# Public finance for RD&D and scale up is crucial to commercialise lower TRL pathways by 2030



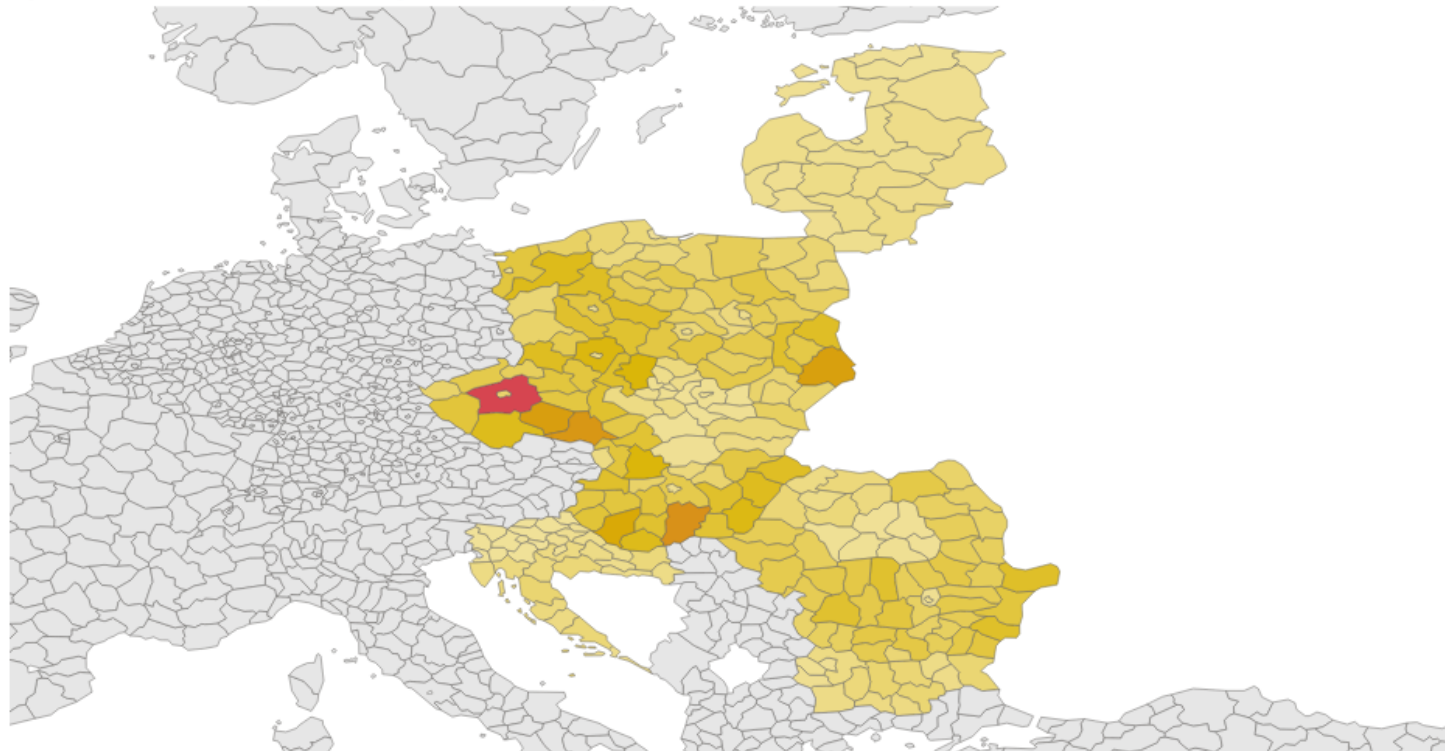
Support for RD&D and scale up actions focus on **ensuring** the level of **investment required** is provided, by **co-financing** with public funds via **equity** in companies and **financing projects**, as well as reducing costs through **supporting shared facilities**

# Environmental benefits need to be measured and broadly understood by all stakeholders

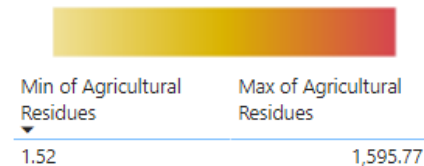


# BIOEAST countries have significant volumes and some high density of agricultural residues...

Agricultural Residues by NUTS 3 region ktonnes DM /year



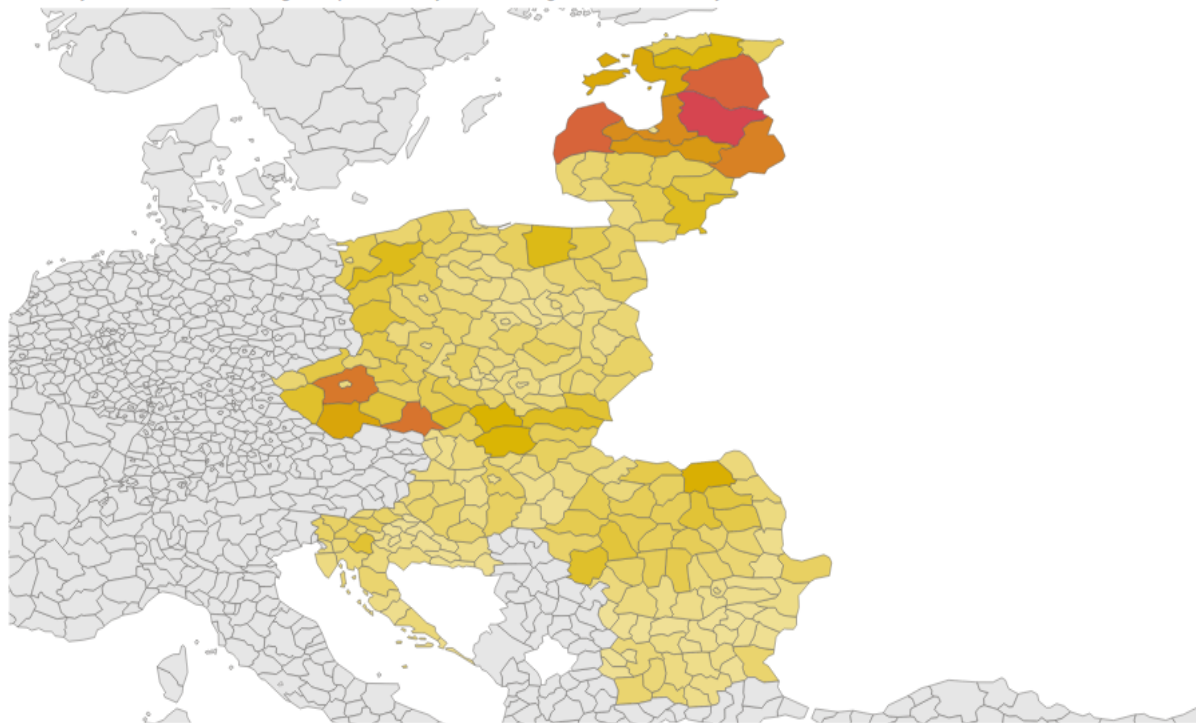
- Classification, Cou... ▾
- ▾  Candidate Country
  - ▾  EU
  - ▾  Non-EU
  - ▾  Potential Candidate



Country	Agricultural Residues
Poland	21,509.08
Romania	11,740.90
Hungary	10,186.21
CzechRepublic	7,915.53
Bulgaria	6,701.52
Croatia	2,199.22
Slovakia	2,193.10
Lithuania	732.58
Latvia	396.40
Estonia	130.40
Slovenia	63.40
<b>Total</b>	<b>63,768.33</b>

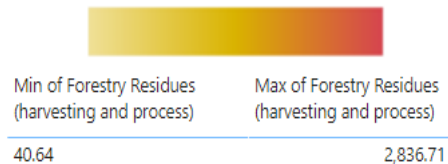
# ...as well as forestry residues

Forestry Residues (harvesting and process) by NUTS 3 region ktonnes DM /year



Country	Forestry Residues (harvesting and process)
Poland	28,705.24
Romania	20,663.02
CzechRepublic	13,771.36
Latvia	11,214.70
Estonia	6,694.05
Hungary	6,527.99
Slovakia	5,861.10
Lithuania	5,831.06
Slovenia	5,367.39
Bulgaria	4,533.37
Croatia	3,854.51
<b>Total</b>	<b>113,023.79</b>

- Classification, Country
- Candidate Country
  - EU
  - Non-EU
  - Potential Candidate

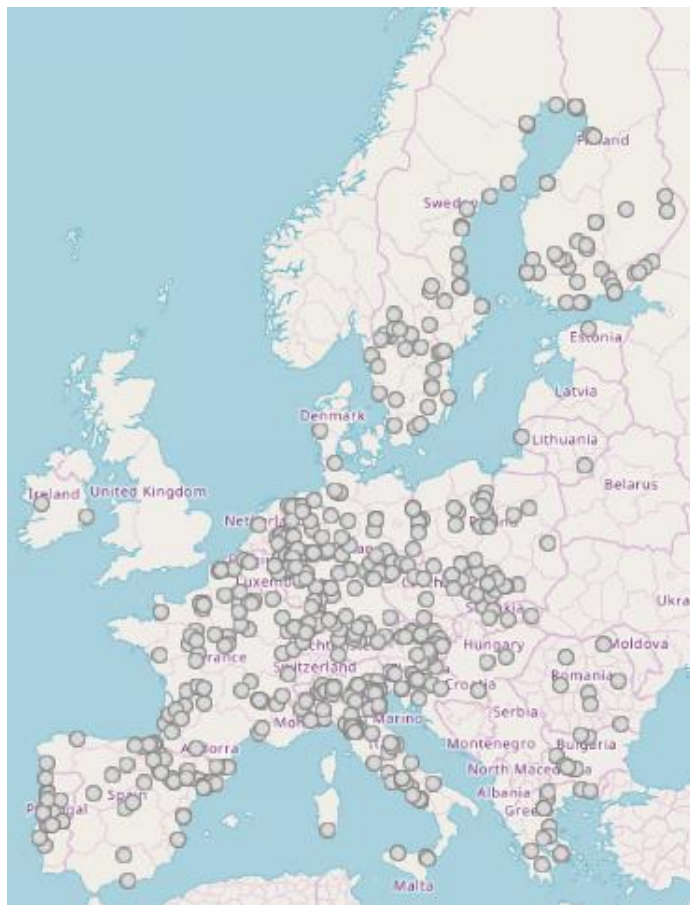


Note: this map shows combined primary and secondary forest residues and product from forest potentials.



# They also have existing biobased industries in some areas that could support biorefinery development...

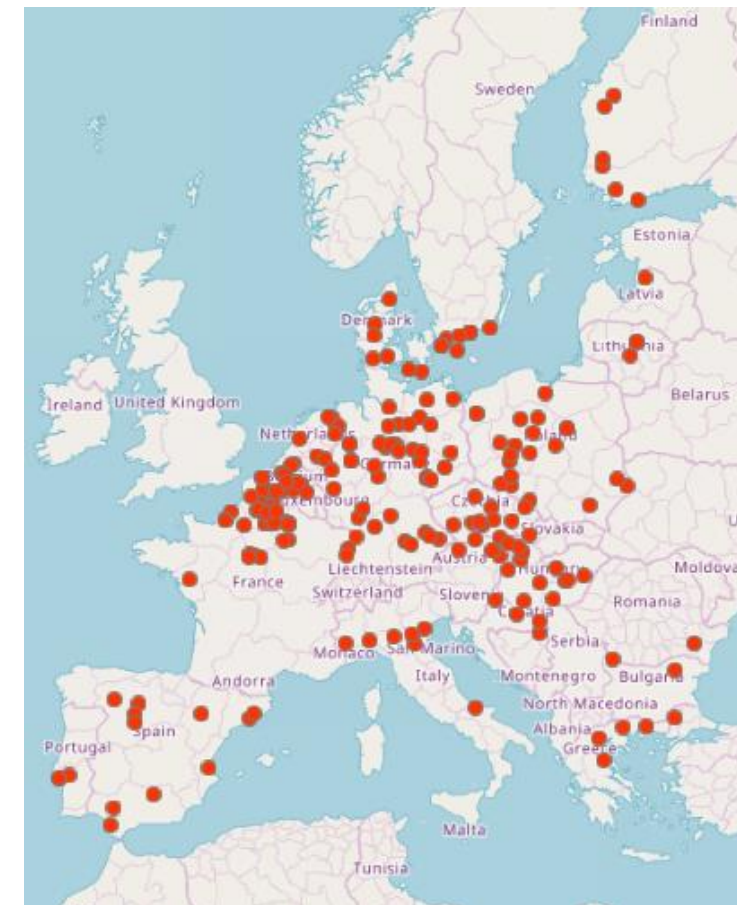
## Pulp and paper



## Wood industry

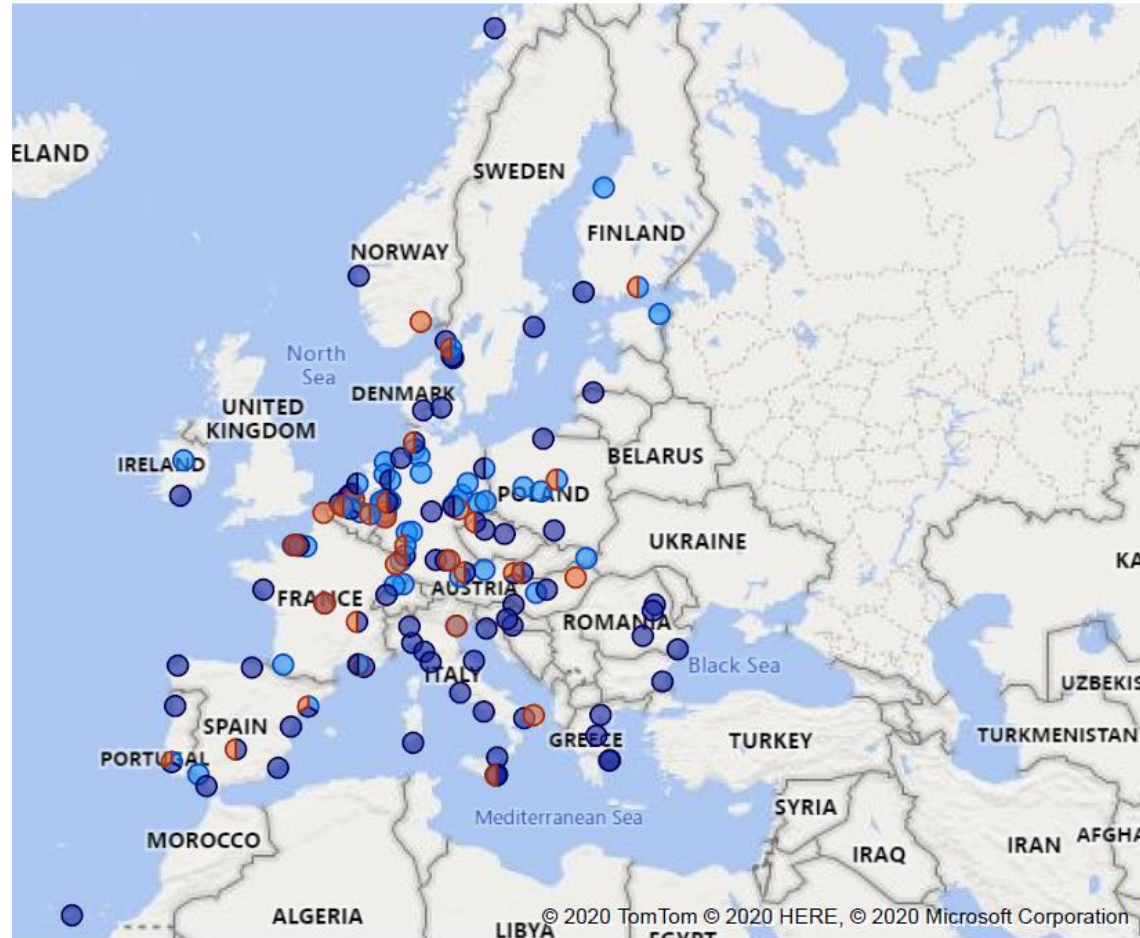


## Sugar and starch



## ...and chemical and fuels infrastructure

Category ● Chemical Park ● Refinery ● Steam Cracker



**With supportive policies and funding put in place and cooperation between existing industries there are likely to be competitive locations for biorefinery development in the BIOEAST countries**



# Thanks

Email: [richard.platt@e4tech.com](mailto:richard.platt@e4tech.com)

Biorefinery report: [www.e4tech.com/biorefinery-outlook.php](http://www.e4tech.com/biorefinery-outlook.php)

LinkedIn: <https://www.linkedin.com/in/richard-platt-b18a522b/>

The full EU Biorefinery  
Outlook to 2030 study  
deliverables are available  
here