



S2Biom

biomass policies

New supply & demand data on biomass use for energy, fuels & organic chemicals in Europe

Biomass Policies & S2Biom projects

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Bioeconomy requires a systemic perspective but *systems are complex and collaboration essential*

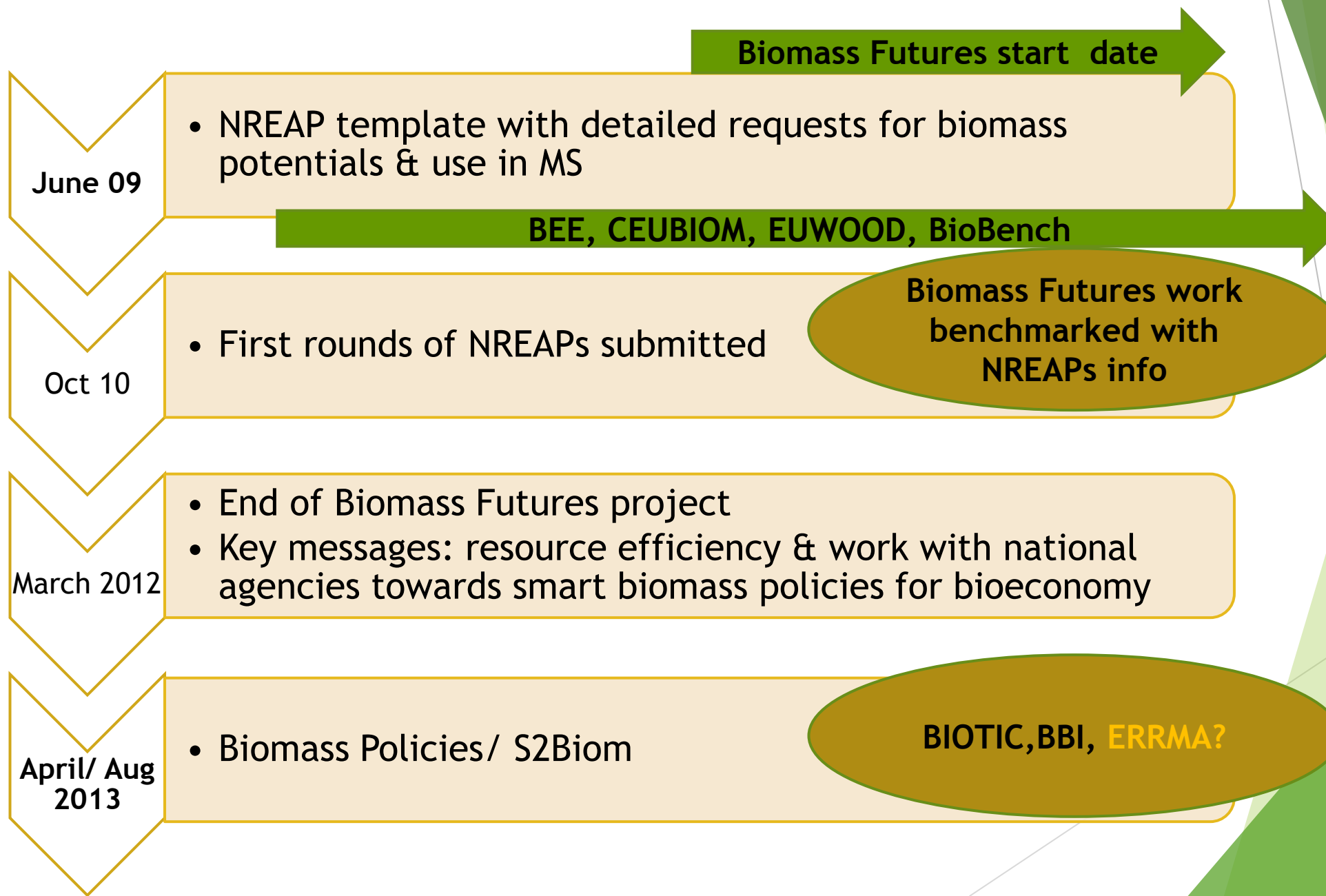
Need to work with **large datasets** and **common metrics** across supply and demand and improve:

- ▶ validity, accuracy of data
- ▶ cost and price information
- ▶ market demand projections across energy, fuels and biobased materials , and
- ▶ interactions with regional and local actors (clusters, networks, industries) through case studies

In order to improve evidence for policy, industry and markets



Background & links with other initiatives



Biomass Policies & S2Biom interactions: data and methodological approaches

Biomass Policies

All biomass feedstocks- oil, starch, sugar, lignocellulosic

EU28- detailed analysis in AT, BE, DE, ES, FIN, GR, HR, NL, PL, SK, UK

Common metrics for resource efficiency across biomass value chains (qualitative and quantitative)

Policy landscapes- beyond energy & fuels

Integrated policies for the mobilisation of “resource efficient” indigenous biomass ‘value chains’

RESolve modelling with focus on energy, fuels and biorefineries

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Only lignocellulosic biomass feedstocks

EU28, Energy Community (W. Balkans, Moldova, Ukraine, Turkey)

Integrates indicators for resource efficiency

Same method for policy landscapes; expanding geography

Adopts principles for biomass integrated policies and places further focus on regions within the Biomass Policies countries

RESolve focus on PMCs



Data - to be discussed with RRM

▶ Biomass Policies (EU28):

- ▶ Outlook of spatial (NUTS3) biomass value chains at EU28, per MS, with updated cost-supply curves and a selection of the most promising feedstocks for biomass by region and country - **available (at NUTS2 level)**
- ▶ Benchmarking biomass policy efficiency and integrated biomass policy frameworks for resource and energy efficient value chains- **ongoing, expected November 2015**
- ▶ Integrated biomass policy: how to introduce and further monitor resource efficiency metrics in future policy across various levels of governance?

▶ S2Biom (EU28 & Energy Community):

- ▶ Vision for lignocellulosic biomass supply to 2030- **ongoing, expected early November 2015 - includes data on current biomass use in Europe per feedstock type, as part of meta analysis from 350 studies (see slides 13-16)**
- ▶ S2Biom toolset- improve (feedstocks- geography) IT capacity for biomass cost supply & logistics for a wide range of feedstocks in a large geographic area with high resolution - test version is being updated, **expected early November 2015**
- ▶ Market analysis for biobased products- **ongoing, expected early November 2015**
- ▶ Atlas of sustainable non-food lignocellulosic biomass estimates for EU27 and Western Balkans, Ukraine, Moldova and Turkey (NUTS3). **Ongoing, expected March 2016**



Methodological approaches

Biomass Policies

- ▶ Guidelines for data collection to estimate and monitor sustainable biomass supply at national level (feedstock-specific availability ratios and guidelines on most efficient conversion pathways).
- ▶ Guidelines for selecting the most resource efficient value chains integrating resource efficiency (including sustainability aspects) and potential market distortions in relation to their competing uses.
- ▶ Integrated cross sectoral policy frameworks with balanced approach towards resource efficiency and competition.
- ▶ 33 Case studies with regional focus in eleven member states
- ▶ Biomass Policies toolkit: translate information to tailored packages

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- ▶ A method and tool with indicators to match biomass feedstocks with the most suitable conversion technologies, taking into account the pyramid of end use applications (materials, chemicals, fuels, energy).
- ▶ Harmonized sustainability requirements for bioeconomy value chains, including guidelines for methodologies to determine sustainability performance and environmental footprint methods for non-food biomass supply chains.
- ▶ Optimal design and evaluation of biomass delivery chains and networks at national and Pan-European scale
- ▶ Case studies covering biomass supply, logistics, demand and policy analysis



Future research based on integration, common metrics and system analysis

- ▶ Focus on the European indigenous biomass capacities in the regions and:
- ▶ Work on a multi actor engagement approach to:
 - ▶ Refine and validate data (supply, demand and cost/ prices) for renewable raw materials at the implementation level (clusters)
 - ▶ Improve evidence for policy, financing and standardisation through exemplar case studies at regional level to capture both data but most importantly the key factors/ metrics which are expected to shape cost, resource and energy efficiency once the biorefinery value chains reach maturity level.
 - ▶ Build capacity at implementation level with the participation of local actors



Validity & accuracy of data (i) Supply

- ▶ Following the **BEE assessment** both projects calculate the technical & sustainable potentials as baselines
- ▶ *Technical is the fraction of the theoretical potential which is available under the regarded techno-structural framework conditions with the current technological possibilities (such as harvesting techniques, infrastructure and accessibility, processing techniques). It also takes into account spatial confinements due to other land uses (food, feed and fibre production) as well as ecological (e.g. nature reserves) and possibly other non-technical constraints.*
- ▶ *Sustainable is the result of integrating environmental, economic and social sustainability criteria in biomass resource assessments. This means that sustainability criteria act like a filter on the theoretical, technical, economic and implementation potentials leading in the end to a sustainable implementation potential. Depending on the type of potential, sustainability criteria can be applied to different extents.*



Validity & accuracy of data (i) Supply

Biomass Policies (first report NUTS 2 online: http://www.biomasspolicies.eu/?page_id=414)

Availability = Presence - T1 (- T2)

Where:

- ▶ **Availability** = Biomass availability given what can be produced, harvested and collected with current or near future practices and known given state-the-art technologies and taking account of basic environmental sustainability requirements regarding soil and biodiversity conservation.
- ▶ **Presence** = Presence of biomass now (and in future given land use change expectations)
- ▶ **T1** = has to be left behind for soil conservation/biodiversity/erosion control
- ▶ **T2** = conventional known competitive uses (feed and food)



Validity & accuracy of data (i) Supply

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▶ Technical potential

- ▶ Minimum of technical constraints &
- ▶ Minimum constraints by competing uses.

▶ Base potential

- ▶ Sustainable potential
- ▶ Considering agreed and established sustainability standards

▶ User-defined potentials

- ▶ Vary in terms of type and number of considerations per biomass type
- ▶ Options to choose & combine



Validity & accuracy of data (ii) Demand, Market projections

Biomass Policies

- ▶ Work focus primarily among energy & fuels but accounting for biobased products as part of biorefineries.
- ▶ Exemplar case with Port of Rotterdam: focus on producing PLA and co-firing the by-product lignin. The study will analyse (RESolve, ECN) the case based on the **three value chain resource efficiency indicators: economic efficiency, energy efficiency and GHG emissions**. Next to that it will analyse the implications of existing energy subsidies and policy on the PLA production.



Validity & accuracy of data (ii) Demand, Market projections

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- ▶ Key question RESolve modelling focuses: To what extent the additional biomass demand for chemicals and materials could be sufficiently significant to:
 - ▶ influence lignocellulosic biomass prices and
 - ▶ induce scarcity and competition issues with
 - ▶ energy applications?
- Focus of specific product to market combinations: Uncertainties are substantial with respect to:
 - ▶ technologies that are to be further developed
 - ▶ supporting policies required
 - ▶ the future of (petro)chemical industry in EU
 - ▶ the oil price, being a strong factor affecting the
 - ▶ prospects for biobased chemicals and
 - ▶ materials
- ▶ BIOTIC project, BBI



Current use of lignocellulosic biomass- Forest

Total amount of forest based lignocellulosic biomass used for energy and material uses in 2013 (E28 + WB, UKR, MD):
530 million tonnes (485 in EU28)

An estimated **261 million tonnes** (245 in EU28) of wood used as a "classical" bio-based material primarily used in the woodworking and pulp and paper industry

269 million tonnes (with 240 in EU28) of wood are used for production of energy (mainly heat and power).



Current use of lignocellulosic biomass- Agriculture

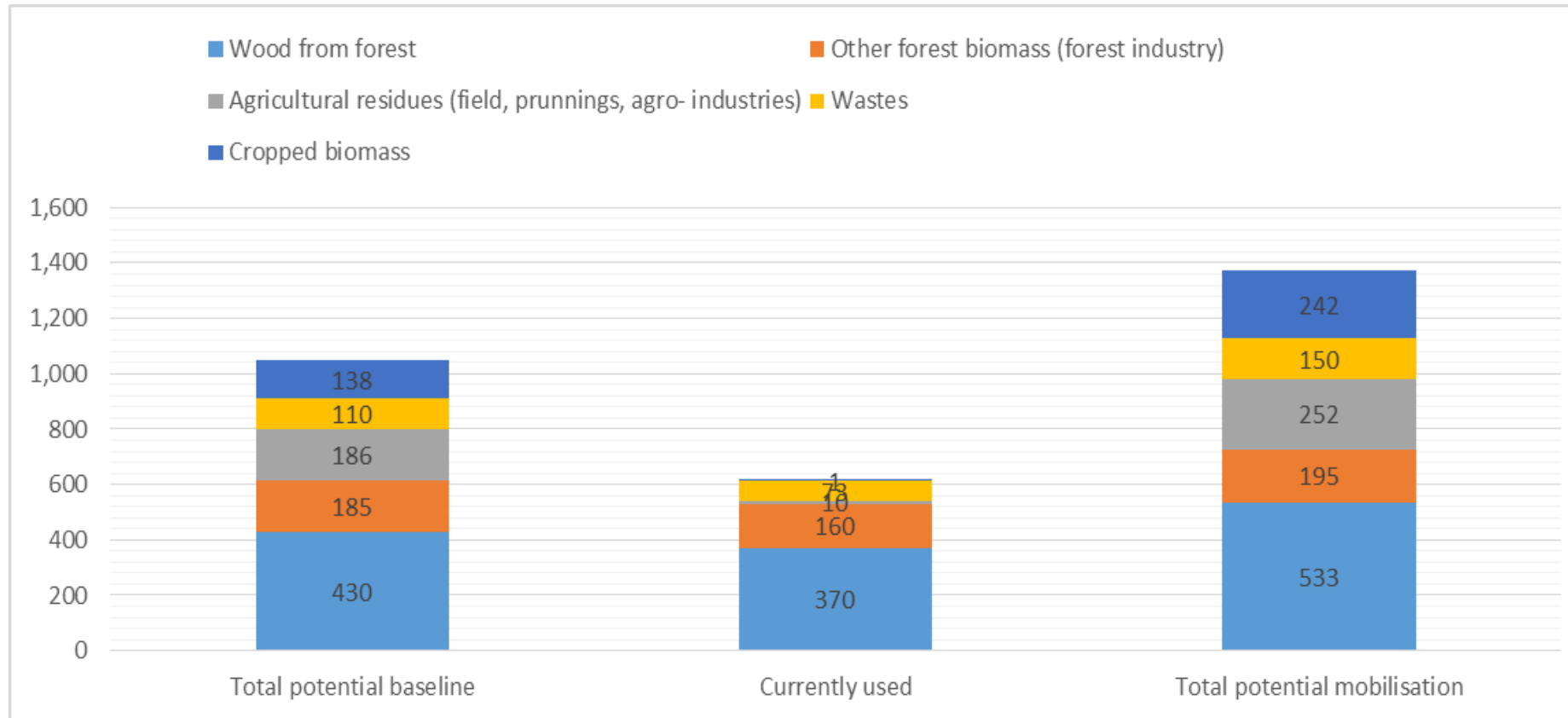
Total amount of **agricultural (non lignocellulosic) biomass** in 2013: almost 10% (8 million tonnes out of 79) of the raw materials base for the chemical industries in the EU was based on renewables:

- sugar and starch: 1.56 mTonnes)
- plant oils (1.26 mTonnes)
- bioethanol ETBE (1 mTonnes)
- natural rubber (1.06 mTonnes)
- pure bioethanol (0.46 mTonnes)
- animal fats (0.43 mTonnes)
- glycerine (0.41 mTonnes)
- ...

Total amount of **agriculture based lignocellulosic biomass**: Estimates from 5-10 million tonnes (dry) but information relies on individual studies without recent harmonisation across EU



S2Biom Vision: 1 Billion tonne supply (technical potential) by 2030



Workshop: 1st October 2015, Ispra (IT); all presentations on website (www.s2biom.eu)



PMCs of the S2Biom market review

	Product	Market
1	Heat	District heating
2	Electricity	Power market
3	Advanced Biofuels	Transport fuel
4	C6 sugars	C6 chemistry: polymers & plastics, others
5	C5 sugars	C5 chemistry: polymers & plastics, others
6	Bio-methane	Grid, transport
7	BTX	Petrochemical industry
8	Methanol	Transport, chemical industry
9	Hydrogen	Transport, (petro)chemical industry
10	Ethylene	(petro)chemical industry

October 1st
2015,
Ispra, Italy



Cost and price information

Supply

- ▶ Literature
- ▶ EUROSTAT
- ▶ FAO
- ▶ Energy Community
- ▶ World Bank
- ▶ Interviews
- ▶ Seeking stakeholder validation and input

Demand

- ▶ Literature
- ▶ Energy Roadmap 2050
- ▶ Biobased Industries Initiative
- ▶ BIOTIC project
- ▶ Energy Community
- ▶ World Bank
- ▶ Interviews
- ▶ Seeking stakeholder validation and input



Stage of research up to September 2015

Biomass Policies

- ▶ Cost supply of biomass & Resource efficiency indicators reports available online)
- ▶ Benchmarking biomass policy efficiency (report online end October)
- ▶ Biomass policies toolkit: <http://www.biomasspolicies.eu/tool/index.php>, with username BiomassPoliciesPartner and password sirebp645920

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- ▶ Overview of biomass for the biobased economy- seeking views & validation
(update end October 2015)
- ▶ Vision for lignocellulosic biomass to 2030 (online consultation: Nov 2015-Jan 2016)



What next? i) Biomass Policies

- ▶ Integrated biomass policy framework to supply the European bioeconomy
- ▶ Integrated policy frameworks for resource and energy efficient value chains in AT, BE, DE, ES, FIN, GR, HR, NL, PL, SK, UK
- ▶ Fully updated biomass policy toolkit (disaggregation at Member State level)
- ▶ 33 case studies for indigenous value chains across AT, BE, DE, ES, FIN, GR, HR, NL, PL, SK, UK
 - ▶ Indicators for Resource efficiency tested in supply demand (system modelling)



What next? ii) S2Biom

- ▶ **Large datasets in databases:**
 - ▶ Facilitate the formation and comparability of comprehensive databases populated with consistent datasets on:
 - ▶ Lignocellulosic biomass cost supply, Conversion technologies, Policies/ support mechanisms
- ▶ **Harmonised methodologies to assess biobased economy (cross sector)**
 - ▶ Transparency in data collection- harmonised protocols
 - ▶ Cross sector integrated frameworks addressing all bioeconomy sectors for: Life Cycle Analysis, Sustainability Criteria & Indicators Economic & energy modelling and Policy
- ▶ **S2Biom toolset- improve (feedstocks- geography) IT capacity for biomass cost supply & logistics for a wide range of feedstocks in a large geographic area with high resolution**
- ▶ **Bridging policy/ regulatory framework with local capacity and investment opportunities to develop action and investment plans in selected cases**
- ▶ **Developing a Vision, Strategies, regional implementation plans (EU28 & EnC) & an R&D roadmap**





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Thank you

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