ETIP Bioenergy
European Technology and Innovation Platform

ETIP-B Strategic Research & Innovation Agenda (SRIA)

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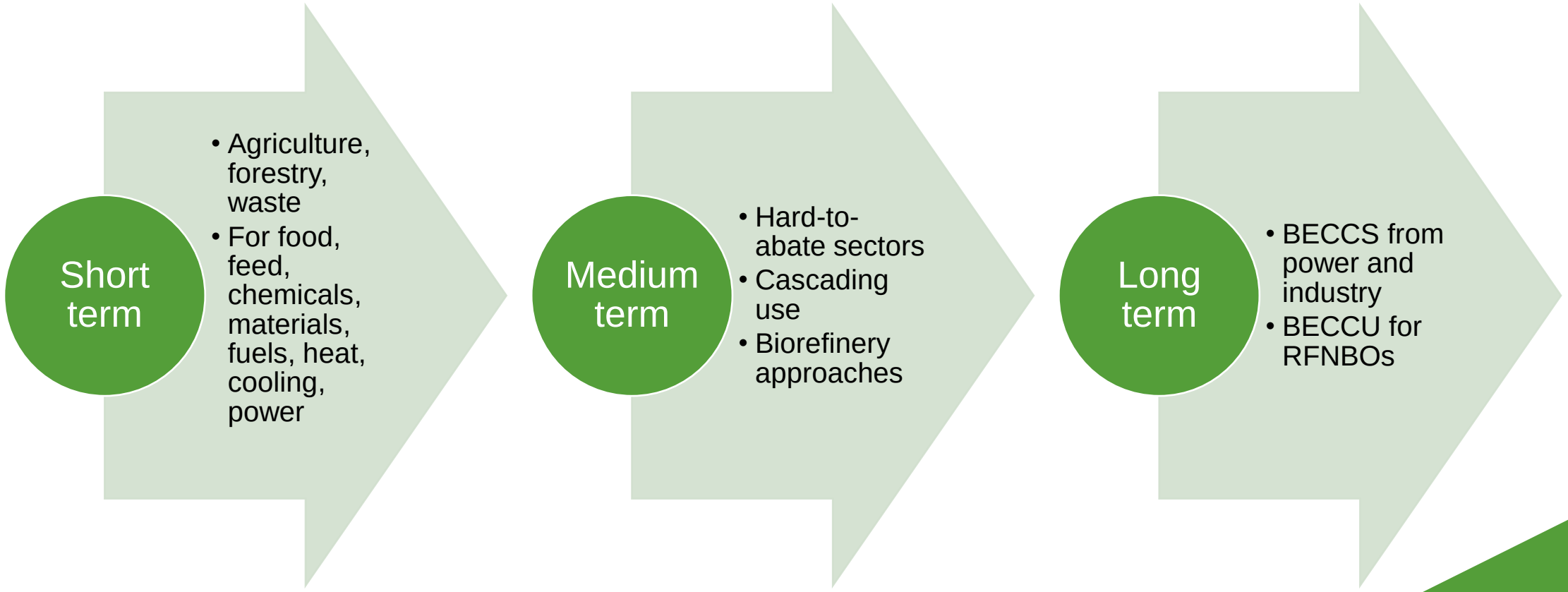
SRIA 2023

- Objective:
  - to identify important activities and focus areas that need to be considered in research and innovation, either fundamental or applied, in order for the value chains to reach their full market potential.
- RD&D is needed to develop the different value chains and accelerate technology development with the goal of increasing technology readiness levels as well as the societal readiness levels.
- Technology research and innovation must go hand in hand with sustainable biomass sourcing, societal aspects and the broad policy framework of the transition to a sustainable and clean EU.

Benefits of bioenergy

- Bioenergy is integrated in the natural carbon cycle, hence with net zero carbon emissions.
- Further increasing the use of sustainable bioenergy in the EU will have multiple benefits:
  - Such as improved energy security,
  - Jobs in agricultural and/or sparsely populated areas,
  - Reduced GHG emissions,
  - Establishment of a technology portfolio that leads to increased competitiveness of the European industry.

Changing focus of biomass use



Making biomass available sustainably

- Mobilisation rates, esp. for agricultural biomass residues and biowastes are still low
- Risk of falling short of policy targets due to limitations and potential sustainability conflicts of the biomass feedstocks
- Key challenges
  - Improve productivity and resource efficiency
  - Efficient low-cost harvesting and logistics
  - Develop reliable, year- round supply chains
  - Place sustainability, smart and efficient use of resources at the heart of industrial, business and social activities
  - Inform policy formation and updates at global, European, national, regional, and local level

Technology R&D

6 Priority Value Chains

- Recent developments
- Challenges
- Strenghts & weaknesses
- Recommendations
- Outlook

Technology recommendations

- Liquid transport fuels from gasification
  - Reduce CAPEX
  - Establish reference installations
  - Densify feedstock to facilitate supply of large installations
- Power and heat from gasification
  - Develop markets and legal framework for by-products such as char and chemicals
  - Develop CHP grid balancing services via management of electricity production
- Transport fuels via pyrolytic and thermolytic conversion
  - Encourage combinations of small-scale decentralized pyrolysis or HTL facilities with central gasification or upgrading
  - Develop standards or technical specifications appropriate for intermediates (bio-oil, biocrude)
  - Develop refining processes that can produce both transport fuels and bio-chemicals

Technology recommendations

- Power and heat from intermediate bioenergy carriers
  - Further develop the combustion of bio-oils and biocrudes for heat and electricity production
  - Create a market pull for CHP/ process heat which applies sustainability criteria
  - Promote production and conversion of sustainably sourced domestic solid biomass
- Liquid transport fuels from fermentation
  - Increase the availability of lignocellulosic feedstocks locally, e.g. by including crops cultivated on marginal land, degraded land, or as catch crops
  - Clarify how fuels from the joint processing of different types of feedstocks are treated legally
- Gaseous transport fuels from biological processes
  - Develop processes that use industrial by-products and residues from e.g. food & beverage industry
  - Establish integration with agricultural production systems
  - Develop hybrid systems that e.g. couple biogas technologies with hydrogen production from green electricity

Key R&I challenges for further deployment

- Mobilising so far unused biogenic resources
- Further refining of sustainability safeguards
- Using low-quality resources
- Improving conversion efficiencies, reducing costs, and de-risking value-chains
- Preparing for a move towards long-term application sectors
- Developing efficient approaches for infrastructure
- Preparing long-term solutions

Outlook for biofuels

- Strong demand for SAF and maritime fuels expected
- This can accelerate the development and deployment of fuel production technologies
- Market signals could deviate fuels away from the road transport sector to the shipping and aviation sectors
- …or to biochemicals and biomaterials markets
- Future refineries will focus on middle distillates for fuel production, and naphtha for chemicals and materials
- Design and structure of incentives should encourage investments in production facilities to be made in Europe
- Regulations for future eligible feedstocks for biofuels must be discussed now
- Incentive structure must be valid for 10 years or up to 2040
- Incentives must be structured to pay for the price gap between fossil fuels and biofuels/RFNBOs

Key messages

- Renewable fuels (biofuels + RFNBOs) should replace fossil energy consumed by current vehicle/vessel fleets, and in market segments which are not suitable for electrification or the direct use of hydrogen.
- The transport sector is an enabler of technologies and overall concepts for the use of biomass, residues and wastes, providing a market for fuels in the short to medium term and preparing the ground for a shift to other renewable carbon requiring sectors in the medium to long term.
- Potential market demand is huge.
- Promoting renewable fuels does not mean competing against the electrification of transport, but rather supporting the phase-out of fossil fuel consumption, such as gasoline and diesel.

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