



# The Vision



*2<sup>nd</sup> Stakeholder consultation*

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# The 2050 society and megatrends



- Europe in the 2050 world
  - Transition towards a low-carbon economy; climate change
  - Population growth and widening global middle class
  - Depletion of resources; demand for sustainable sourcing
  - Mass-customisation; meeting the needs of well-informed consumers
  - Technological change and innovations



# Outlook:

## Supply and use of raw materials in the 2050 world

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- The EU Raw Materials sectors need to foster a sustainable supply and use of raw materials to feed existing and new value chains, while
  - ensuring base loads from EU resources,
  - decreasing import dependencies and
  - ensuring resilience of the EU industrial base through resource diversification.



# The EU Raw Materials sectors will need to:

- Provide and improve sustainable supply and use of primary, secondary and renewable RMs throughout the values chains.
- Strengthen the EU economy, develop and reinforce the position of EU sourced primary and secondary obtained RMs by decreasing import dependencies and ensuring base load supply through diversification at source.
- Embrace digitisation & manage technical and practical applications of digitisation in the sector.
  - Traditional value chains will be revolutionised;
  - Current processes will change radically and become data-driven;
  - New business models will develop.

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- Develop and implement improved and better adapted measurable scientifically based values/indicators/standards associated with sustainability through the whole value chain where needs have been identified using newly developed data management systems.
  - Improve scientific and technical dialogue along and across business lines, exchange experiences, advance and leverage good practices.
  - Cross-disciplinary integration between academia and business for identification and development of new, cross-sectorial value chain opportunities.

# Outlook:

The EU raw materials sector will foster security and sustainability of access to raw materials from within Europe by

## Abiotic



- Increasing EU production to ensure base load supply for the EU economy and reduce import dependencies
- Improving access to resources in every possible way to attract more investments;
- Exploring investment possibilities outside of Europe to facilitate future access to resources and increase sustainability globally;
- Creating new jobs in the mining and mining services sector to compensate for loss of jobs through closure of coal mines in Europe and automation;
- Developing further the technical leadership worldwide and maintain global competitiveness in sustainable technologies.

## Biotic

Forest-Based Sector  
Technology Platform



The European forest-based sector can sustainably increase its primary wood production by 30%. This would strengthen the EU industrial base while adding around €100 billion in annual turnover to the EU economy. Recirculation and reuse of biotic raw materials might have similar impact on the raw material security of the EU economy. Together with light-weight, resource efficient products and materials it can reduce the carbon footprint to a fraction of what it is today.

## Supply: Sustainable RM supply in EU entails

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1. Supply of the precise quality of RM from a balanced provision of primary, secondary sourced RMs and renewables.
2. Increased EU RM supply will be possible through development of new, highly precise, artificial intelligent, high yield exploration and harvesting/mining techniques of all type of resources with minimal impact on eco-system and sustainable land-use management.
3. Viable supply routes for more diversified RMs need to be further developed. Accurate material identification and continuous traceability throughout the value chain are required and enable development of new RM supply business models.
4. Research and new technologies to retain RM properties in re-use.

# Supply: Enabling supply of EU RM sources through

## Abiotic



- Data management: inventories & classification, enabling data and information flow throughout the values chains.
- Technology: new exploration, new better yield extraction and beneficiation technologies for large and small deposits/ quantities of RMs, deep-sea mining and others, harsh-condition mining, asteroid mining technologies, quality secondary resources through novel recycling technologies, improving worker's and communities' health & safety through automation and reduced exposure.
- Access to Resources: Sustainable and integral land use planning and management avoiding sterilisation of mineral deposits.
- Management of Resources: Maintaining/improving/tracing qualities and properties throughout the value chains in order to enable optimised use/reuse of RM and its downstream products.

## Biotic

Forest-Based Sector  
Technology Platform



“Precision forestry” can maximise yield while further minimise the impact on the ecosystem. Precision forestry means that new remote sensing technologies and intelligent and sometimes autonomous technologies allow traditional forestry operations to be executed with tree precision, uninhibited by terrain- and weather conditions, while data on every valuable tree is collected and carried forward through each step of the value-chain from forest to end-product.



## Processing: Step changes required in RM processing include

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1. Technologies enabling resource efficient processing; highest possible yield and per raw material usage while development use and valorisation of processing side material streams and by-products flows.
2. Smart technologies enabling seamless data communication and exchange along the value chain from exploration down to the production of more complex, durable, miniaturized & raw material efficient products, fit for a circular economy.
3. Integration of processes for industrial symbiosis.
4. Innovative primary & secondary conversion and processing technologies enhancing and continuously determining RM quality and performance.

# Step changes

## Abiotic



- Smart technologies: Development of resource efficient processing & refining technologies for higher RM qualities tailored to market requirements (highest possible yields and beneficiation of by-products).
- RM valorisation: Production residue minimization & valorisation through optimized both metallurgical and constructive systems for the recovery of valuable elements from complex & low grade feed stocks and technologies for residual matrix valorisation, while providing safe sinks for toxic remnants.
- Industrial symbiosis: Turning “wastes” into “feed” materials across industrial value chains.
- RM purity/quality: Seamless data communication/exchange along the value chain from exploration down to the production of more complex, durable, miniaturized & material efficient products, fit for a circular economy.

## Biotic

Forest-Based Sector  
Technology Platform



- Significant developments in connectivity allow documenting each operational step and carry the information forward through each step of the value-chain.
- Regional businesses and infrastructure, including road networks are part of the system which creates additional jobs in local economies.
- Satisfying demanding consumers require a transition to agile production for mass customization. This in turn requires more flexible production and assembly processes, both for mechanical industries and process industries.

# 2050

- The raw materials sector is the backbone of a circular economy and main driver of a symbiotic industrial environment in Europe.
- European raw materials sustain the needs of people across the world. Biotic and abiotic raw materials are sourced sustainably through flexible, circular and knowledge-based systems that allow outstanding levels of customization and transparency throughout the value-chain.
- The EU raw materials sectors possess the know-how and technological capacity to adjust to the manifold innovations of upstream processes.

# 2050

- It embraces digitisation & manages technical and practical applications of digitisation in the sector. Traditional value chains will be revolutionised; Current processes will change radically and become data-driven. New business models will develop.
- The raw material sectors develop and implement improved and better adapted measurable scientifically based values/indicators/standards associated with sustainability through the whole value chain where needs have been identified using newly developed data management systems.
- As a result of successful cross-sectoral collaboration, the EU raw materials producers compete with, complement and finds synergies with each other, which decreases import dependency and ensures the resilience of the EU industrial base through resource diversification.
- A long history of innovation leadership and entrepreneurial spirit attracts investments to Europe and secures the further development of the EU economy. The raw materials will strengthen the EU economy, develop and reinforce its position of EU sourced primary- and secondary obtained RMs by decreasing import dependencies and ensuring base load supply through diversification at source.



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