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“The Circular Bioeconomy and the EU Green New Deal”

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Cluster Coordinator of SPRING



SPRING

*Sustainable Processes and Resources
for Innovation and National Growth*

Italian Cluster of Green Chemistry



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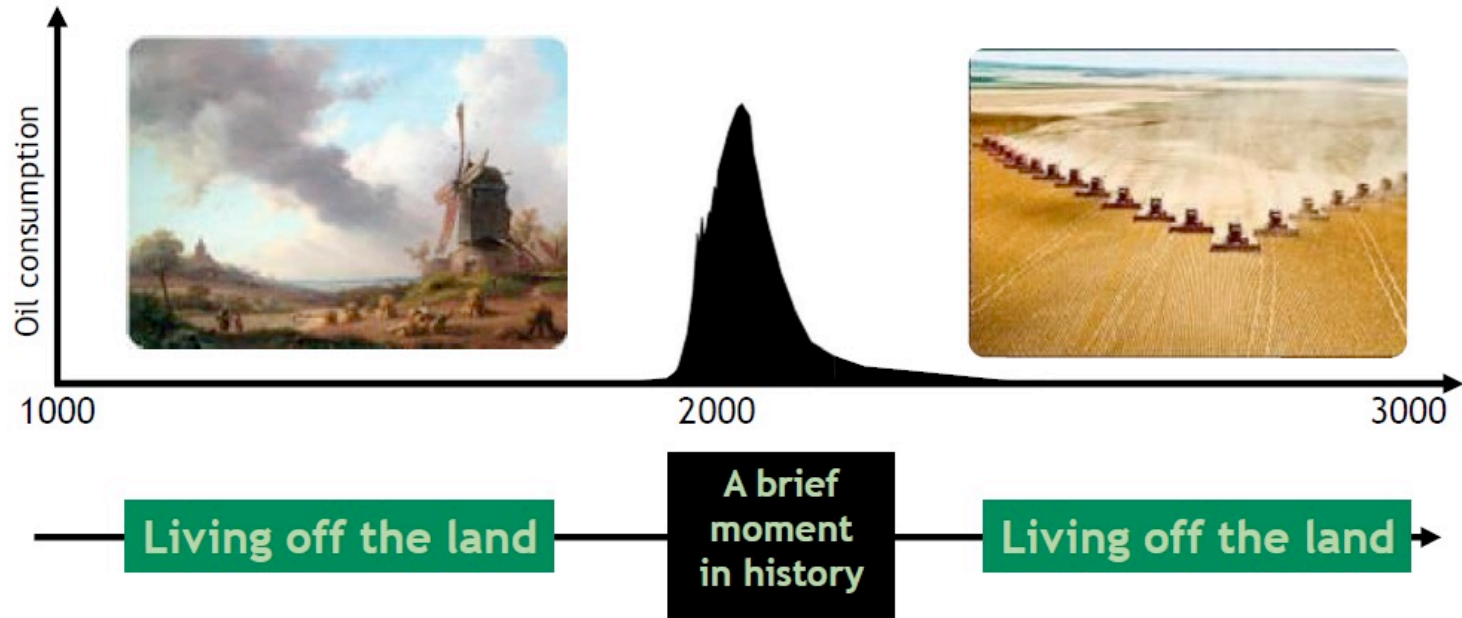
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What is the bioeconomy

An economy using biological resources from the land and sea, as well as waste, as inputs to food and feed, industrial and energy production. It also covers the use of bio-based processes for sustainable industries. Bio-waste for example has considerable potential as an alternative to chemical fertilizers or for conversion into bio-energy, and can meet 2% of the EU renewable energy target.



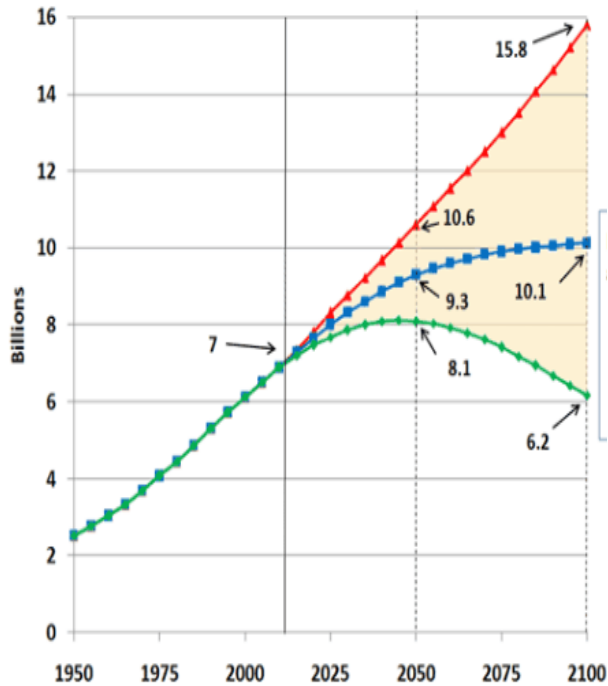
The Industrial Revolution of Third Millennium



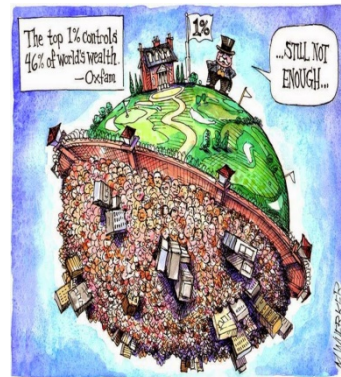
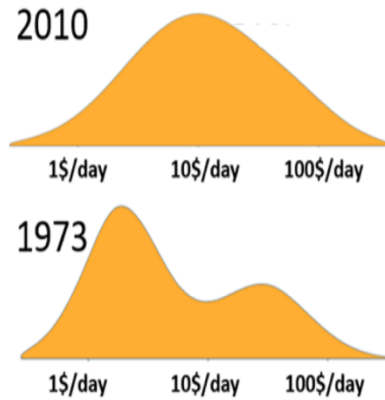
The Oil age will end long before we run out of oil
And while running out, it will become much more expensive



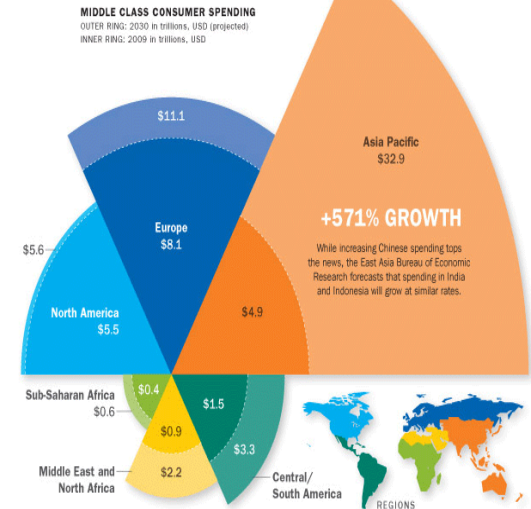
Economic growth and demography



UN projection of population growth under high-medium-low fertility assumption



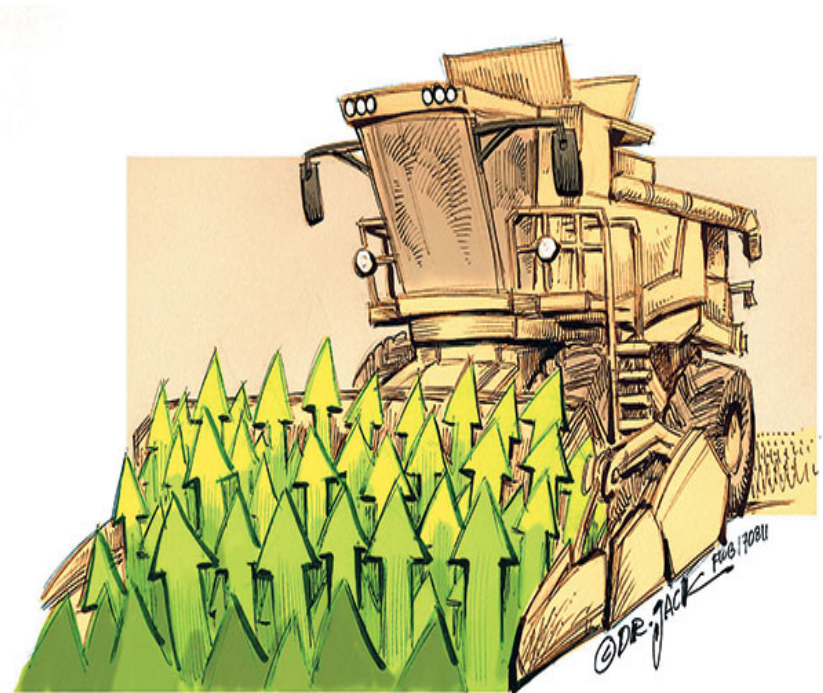
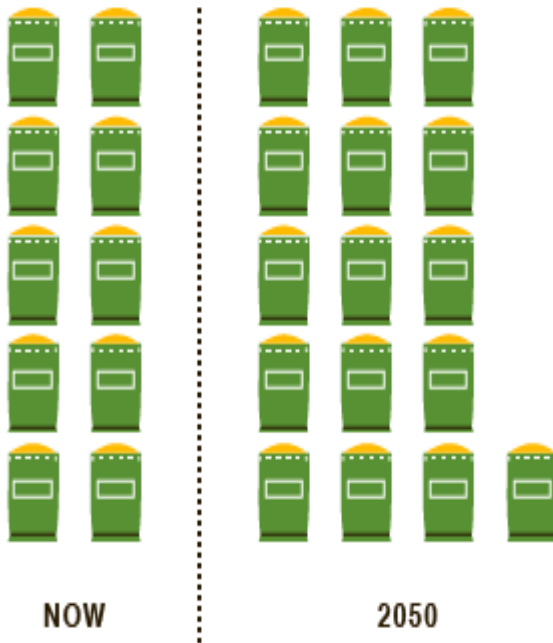
The explosion of the middle-class





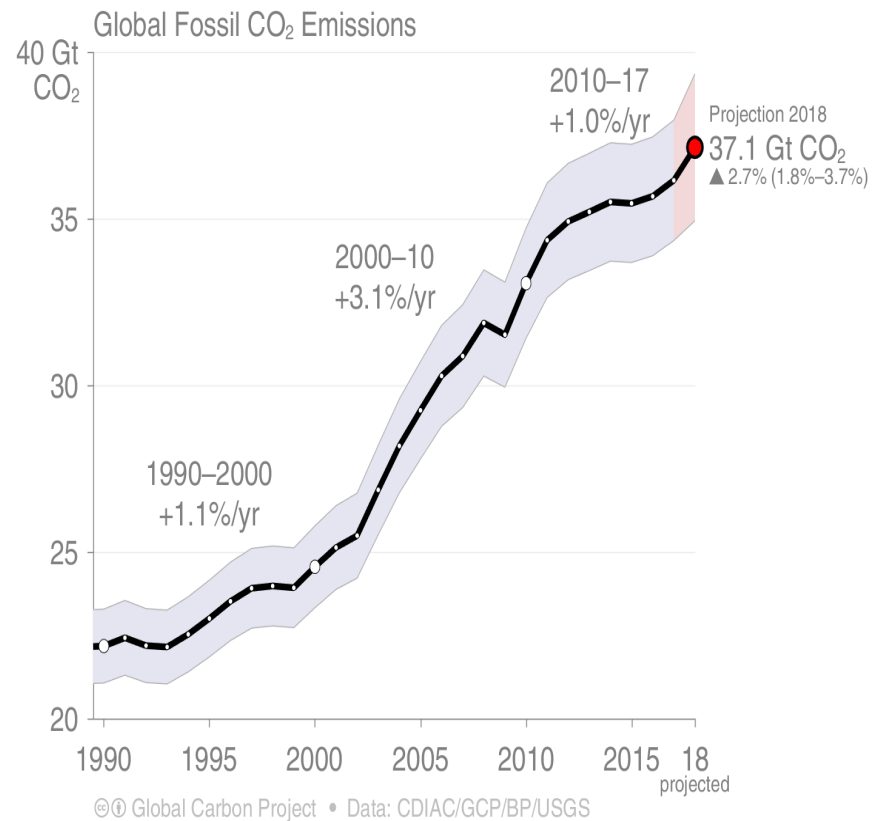
The rise in global food demand

With current global trends in diets and population, **60% MORE FOOD** will be needed in 2050.





The rise in global CO₂ emissions





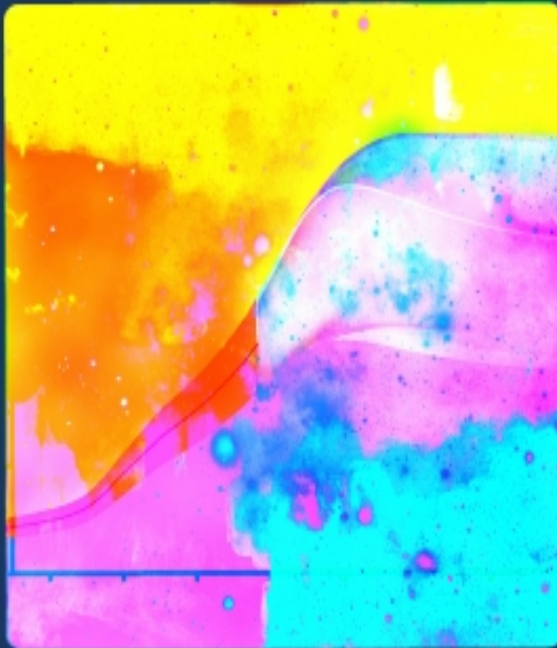
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Limiting Global Warming to 1.5°C compared to 2°C

ipcc INTERGOVERNMENTAL PANEL ON climate change Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty



WG I WG II WG III



*“rapid and far-reaching” transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO₂) would need to **fall by about 45% from 2010 levels by 2030**, reaching ‘net zero’ around 2050. This means that any remaining emissions would need to be balanced by removing CO₂ from the air.*



The rise in waste production

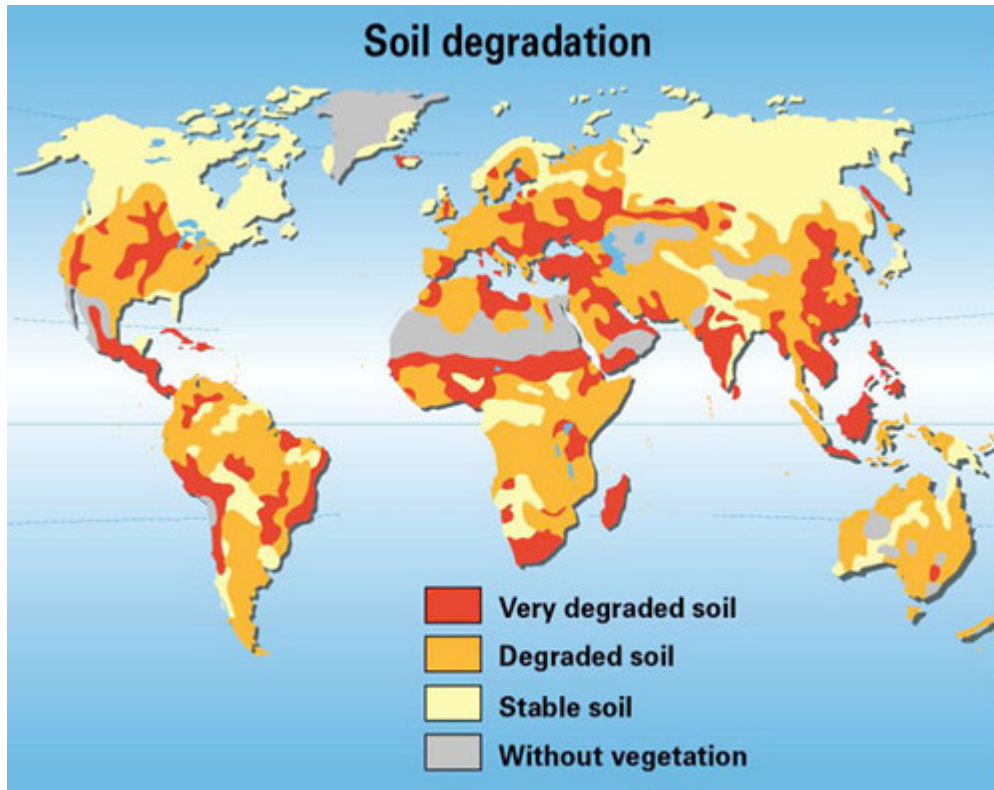


The rise in per-capita waste production determines an explosion in the global waste production if associated with population growth and middle class expansion





Global soil degradation



Overview of the state of global soil degradation in the world. The loss of arable land has been caused by a number of factors, many or most of which are tied to human development. The primary causes are deforestation, overexploitation for fuelwood, overgrazing, agricultural activities and industrialization.

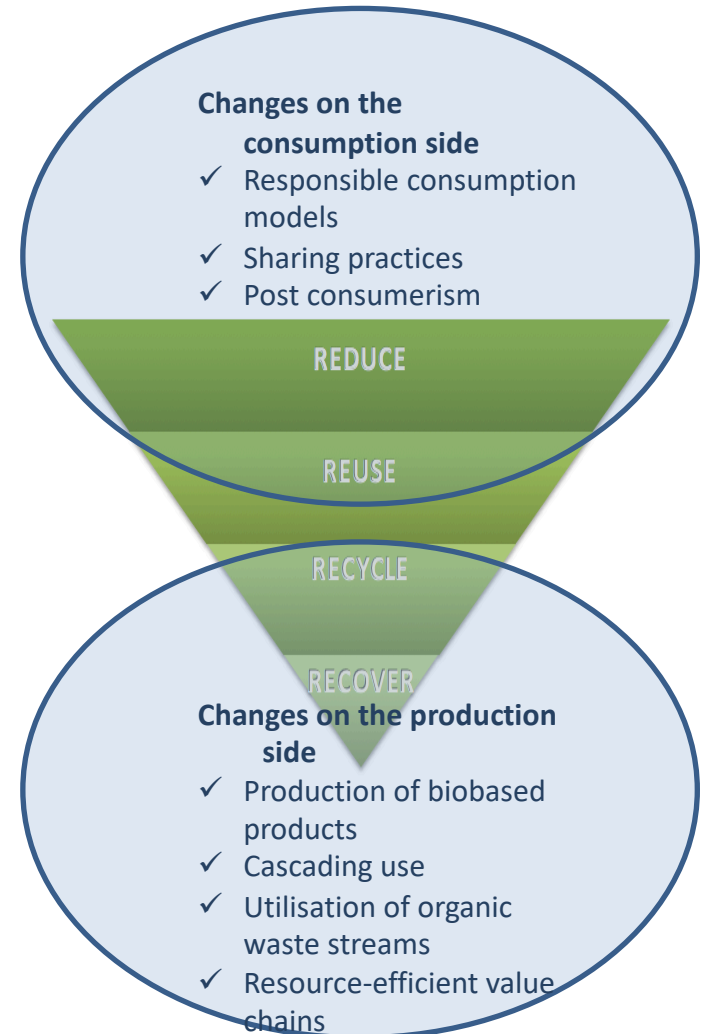
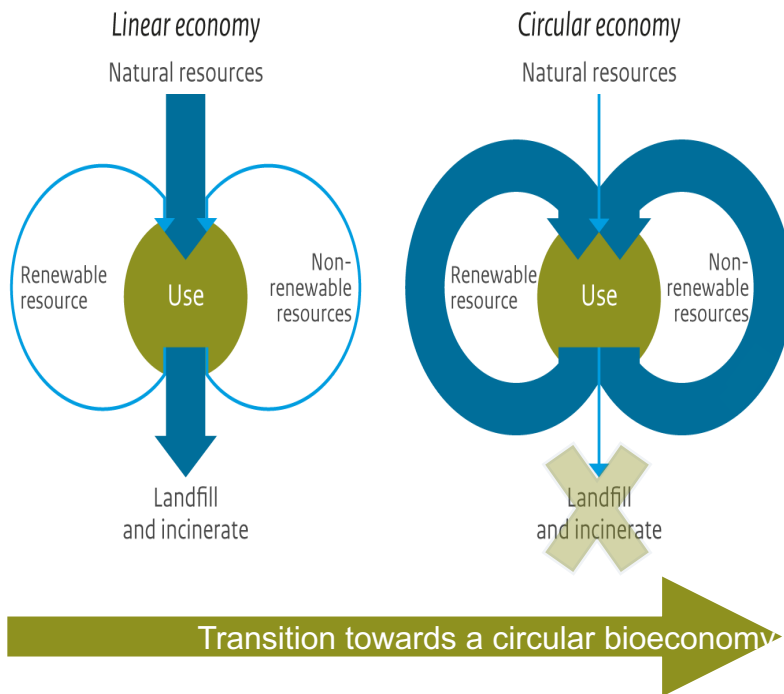


How to revert these trends?

The transition towards circular biobased economy

Framing the problem

From a linear to a circular bioeconomy





The European Strategy

The European Commission has adopted a strategy to shift the European economy towards greater and more sustainable use of renewable resources. With the world population approaching 9 billion by 2050 and natural resources finite, Europe needs renewable biological resources for secure and healthy food and feed, as well as for materials, energy, and other products. The Commission's strategy and action plan,

"Innovating for Sustainable Growth: a Bioeconomy for Europe", outlines a coherent, cross-sectoral and inter-disciplinary approach to the issue. The goal is a more innovative and low-emissions economy, reconciling demands for sustainable agriculture and fisheries, food security, and the sustainable use of renewable biological resources for industrial purposes, while ensuring biodiversity and environmental protection..



The three pillars

The European Strategy focuses on three key aspects:

- 1. developing new technologies and processes for the bioeconomy;**
- 2. developing markets and competitiveness in bioeconomy sectors;**
- 3. pushing policymakers and stakeholders to work more closely together.**

The Updated Bioeconomy Strategy: WHAT does the initiative aim to achieve?

- ❖ Deliver **SUSTAINABILITY** and **CIRCULARITY** in the EU Bioeconomy policy and practice
- ❖ Link the **BALANCED USE** of biological resources for food/feed/bio-based production with the **PROTECTION** and **RESTORATION** of biodiversity, ecosystems and natural capital on land and water.
- ❖ Boost EU **COMPETITIVENESS**, **JOB**S and **GROWTH**, by renewed industrial base and modernised primary production, with strengthened **BIO-BASED** sectors
- ❖ Focus on **IMPACT** by **FEW ACTIONS** to embed in agriculture, marine, energy, environment, industrial, regional, education and R&I policies
- ❖ Deploy **EU REGIONAL / LOCAL** bioeconomies in rural, coastal, urban areas, across the entire EU



Drivers: check policy directions match the objectives

Present/frequent

- Climate change and climate obligations (nearly all)
- Lowering/ending oil dependence (especially Japan, Sweden)
- Rural development/regeneration
- Brownfield redevelopment/revitalising chemical industry (especially Canada and Italy)
- Resource efficiency (all countries)
- Waste valorisation (most case studies, especially China)



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The Circular Bioeconomy in the EU Green New Deal

The political and economic debate in Europe and in many Member States emphasizes the Green New Deal. What role can the circular bioeconomy play in this scenario?

Europe needs an ambitious “Green Innovation Deal” to accelerate towards our 2030 goals and to become the world’s first climate-neutral continent by 2050. Our 2030 and 2050 goals require decarbonisation at a speed at least six times faster than anything globally achieved so far. Currently available technologies, even when combined with much greater investment, more ambitious regulations and radical behavioural change, will simply not suffice. Radically new technologies and disruptive innovation are needed to fuel the required societal transition. The pressure on our planetary boundaries through rapidly accelerating climate change, increasing environmental degradation, resource depletion and dramatic loss of biodiversity require unprecedented investment and a shift to new circular, digitally hardwired, sustainable systems. **Sustainable bioeconomy, healthy food systems, clean industries, low-carbon electricity and heating, net zero cities, green housing/schools/buildings, and restorative biodiversity need a forward-looking generational innovation challenge within the political narrative of European Green Deal.**

In this context, the shift to a circular and sustainable bioeconomy – a core pathway to reach carbon neutrality in Europe by 2050 as identified in the Commission’s “Clean Planet Strategy” – needs to be completed. Research, Innovation and Investment are key enablers in this transition and drivers to deploy the potential of Circular Economy Action Plan and the updated Bioeconomy Strategy. The updated European Bioeconomy Strategy aims to balance the exploitation of the economic potential of the natural resources, to provide for the needs of the society, and to protect, maintain and restore land and sea ecosystems and biodiversity. The impact of food systems on our environment will have to be greatly reduced while offering to European farmers and fishermen concrete opportunities to reap the benefits of the transition. Circular bioeconomy solutions that are already capable of turning fisheries by-products into new products are already contributing to creating new economic opportunities in coastal areas. In addition, significant existing R&I investment in developing a sustainable ocean economy across EU sea basins, inland waterways and ocean coastline will play an important part in helping EU to reach the European Green Deal objectives.

An exclusive interview with John Bell,
Director Healthy Planet at EU
Commission: “Europe needs an
ambitious ‘Green Innovation Deal’”
25 November 2019, Il Bioeconomista



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Is Italy doing well in the Bioeconomy?





Bioeconomy in Italy

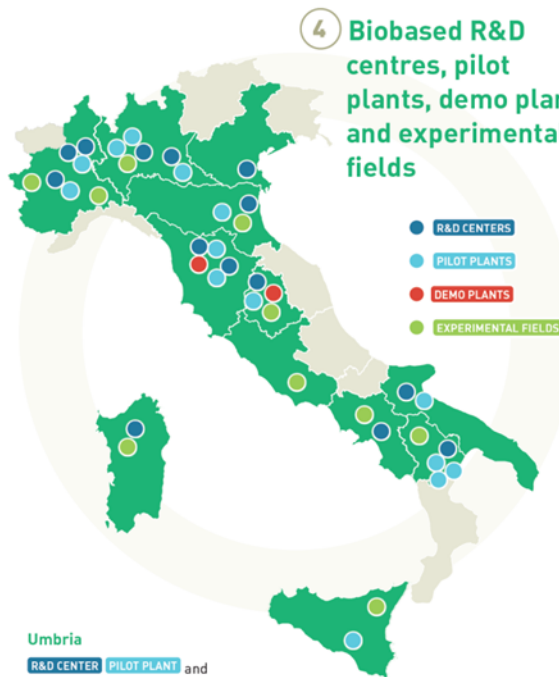
- **Relevant bioeconomy stakeholders**
- **Clusters development (SPRING)**
- **Research and development facilities to provide support**
- **Industry partners available as collaboration partners**
- **Educated workforce**
- **Several biorefineries with private investments which are more than 1.0 billion € and 1600 people employed**



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4 Biobased R&D centres, pilot plants, demo plants and experimental fields



Piemonte

R&D CENTER Bioplastics and biochemicals from renewable raw materials (Novara)

R&D CENTER Chemistry from renewables (Novara)

R&D CENTER Biochemicals and biofuels from renewables (Rivalta Scrivia - AL)

PILOT PLANT Fatty alcohols (Rivalta Scrivia - AL)

PILOT PLANT Biomonomers (Novara)

EXPERIMENTAL FIELDS

Lombardia

R&D CENTER Biolubricants (San Donato Milanese - MI)

R&D CENTER Green chemistry, process engineering and biolubricants (Mantova)

PILOT PLANT for biobased butadiene (Mantova)

PILOT PLANT for biobased coatings (Cernusco sul Naviglio - MI)

PILOT PLANT for biomaterials from mycelia and scraps (Varese)

EXPERIMENTAL FIELDS

Veneto

R&D CENTER for new technologies development in the biotech-sector (Adria - RO)

Emilia Romagna

R&D CENTER Bioelastomers (Ravenna)

PILOT PLANT for PHA (Bologna)

EXPERIMENTAL FIELDS

Toscana

R&D CENTER and **PILOT PLANT** for biolubricants and biopesticides (Sesto Fiorentino - FI)

R&D CENTER **PILOT PLANT** and **DEMO PLANT** on bioenergy, biofuels and bioproducts (Scarperia e San Piero - FI)

Umbria

R&D CENTER **PILOT PLANT** and **DEMO PLANT** Oleaginous crops and biolubricants from local crops (Terni)

EXPERIMENTAL FIELDS

Lazio

EXPERIMENTAL FIELDS

Campania

R&D CENTER on biotechnologies (Piana di Monte Verna - CE)

EXPERIMENTAL FIELDS

Puglia

R&D CENTER to characterize biomass and biomaterials, organic waste and sludge, residues and agro-food byproducts (Foggia)

PILOT PLANT Anaerobic digester plant, pyrolysis/gasification plant, photobioreactors plant (Foggia)

Basilicata

R&D CENTER for green biotechnologies (Matera)

PILOT PLANT for conversion of non-food cellulosic biomass into cellulosic glucose (Rotondella - MT)

2 PILOT PLANTS for steam gasification of biomass (Rotondella - MT)

EXPERIMENTAL FIELDS

Sardegna

R&D CENTER for biochemicals from vegetable oils (Porto Torres - SS)

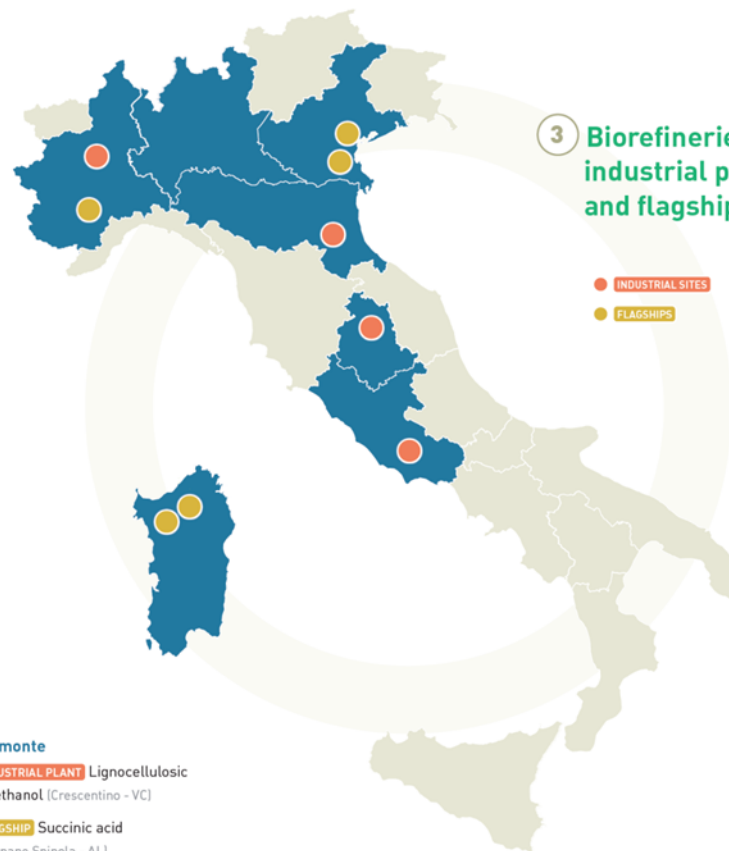
EXPERIMENTAL FIELDS

Sicilia

PILOT PLANT for cellulose extraction from citrus for textiles (Caltagirone - CA)

EXPERIMENTAL FIELDS

3 Biorefineries: industrial plants and flagships



Piemonte

INDUSTRIAL PLANT Lignocellulosic bioethanol (Crescentino - VC)

FLAGSHIP Succinic acid (Cannano Spinola - AL)

Emilia Romagna

INDUSTRIAL PLANT based on vinification scraps and byproducts (Faenza - RA)

Veneto

FLAGSHIP 1,4 BDO from renewable raw materials (Adria - RO)

FLAGSHIP for the production of biofuels from vegetable oils biomass (Porto Marghera - VE)

Umbria

INDUSTRIAL PLANT Bioplastics based on starch and polyesters from vegetable oils (Terni)

Lazio

INDUSTRIAL PLANT Biodegradable polyesters (Patrica - FR)

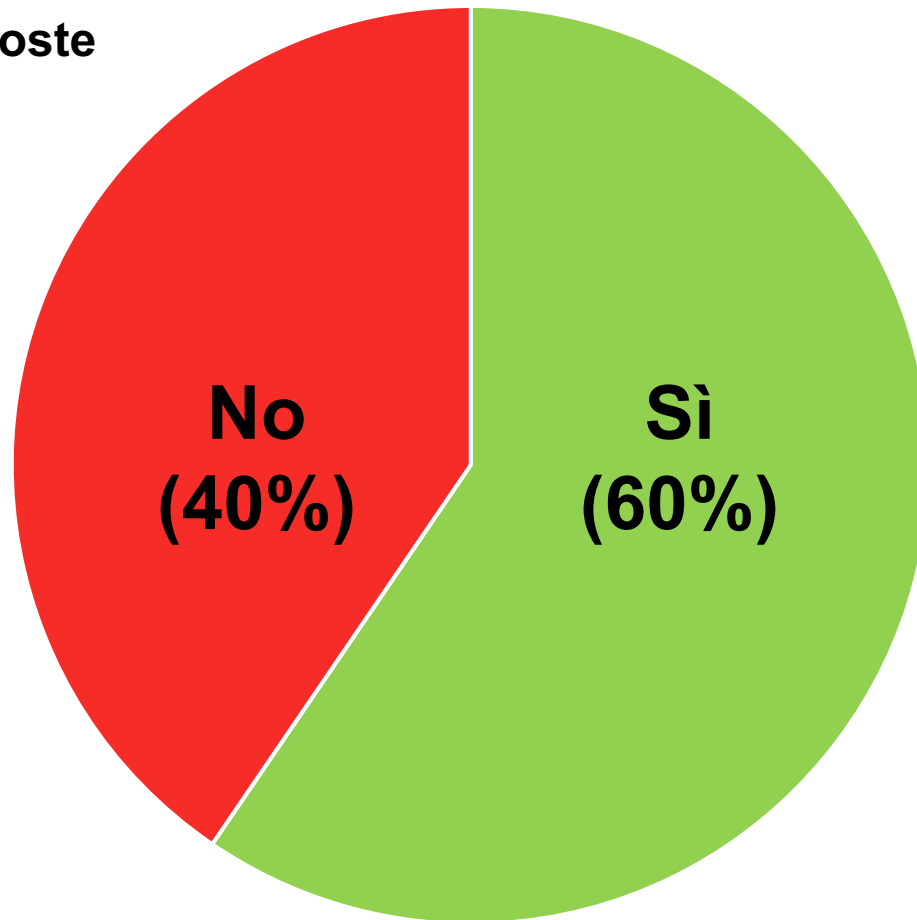
Sardegna

FLAGSHIP Bases for biolubricants and bioadditives for rubber (Porto Torres - SS)

FLAGSHIP Azelaic acid and pelargonic acid (Porto Torres - SS)

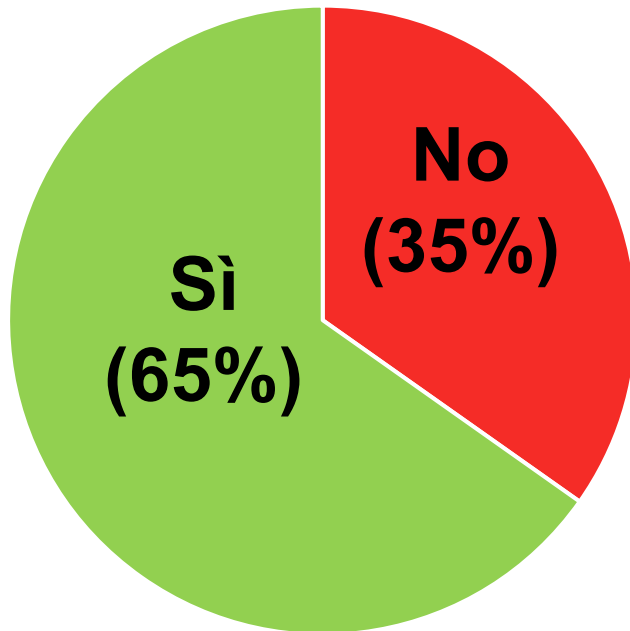
La tua impresa è coinvolta nella ricerca o produzione di soluzioni contro il COVID?

Su totale delle risposte

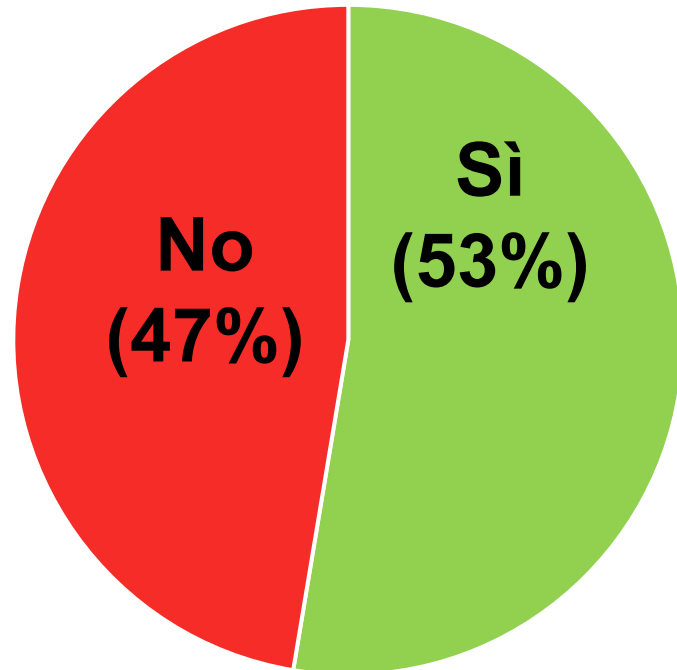


La tua impresa è coinvolta nella ricerca o produzione di soluzioni contro il COVID?

**Università, Enti di Ricerca,
Associazioni, Fondazioni,
Agenzie, Consorzi...**

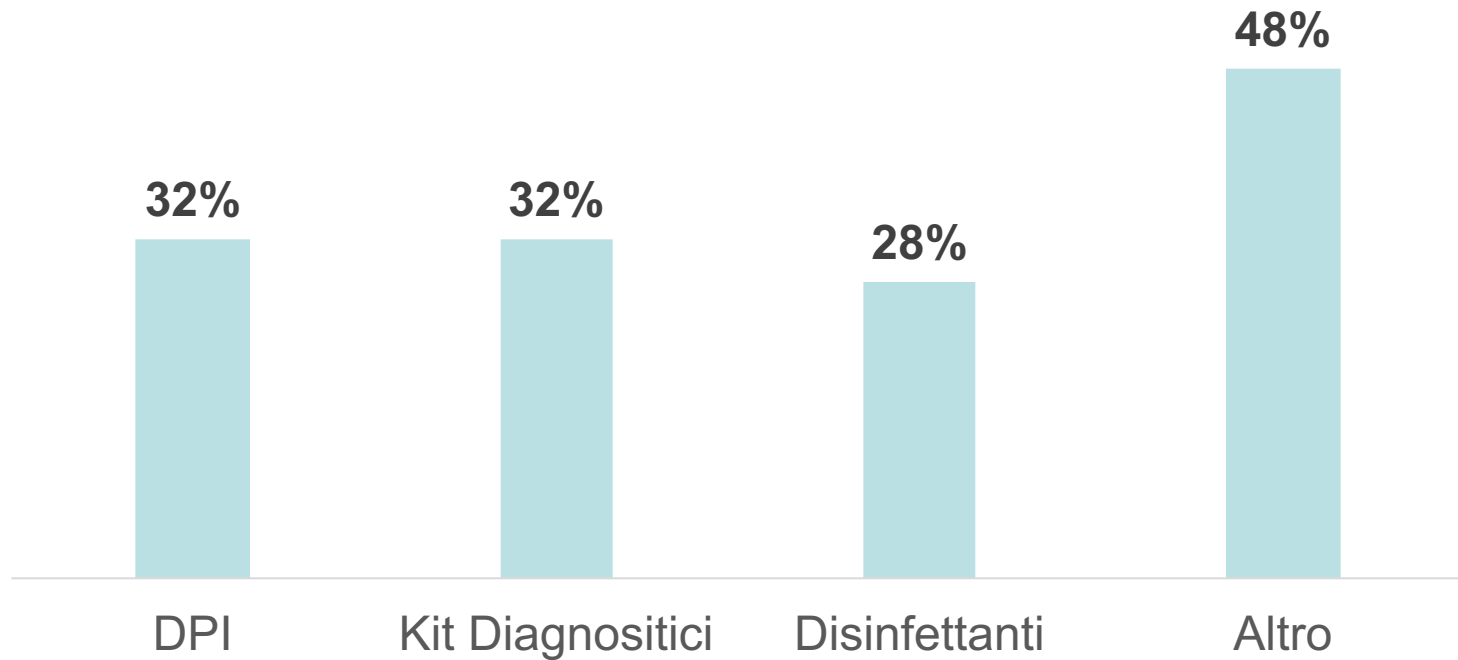


Industrie



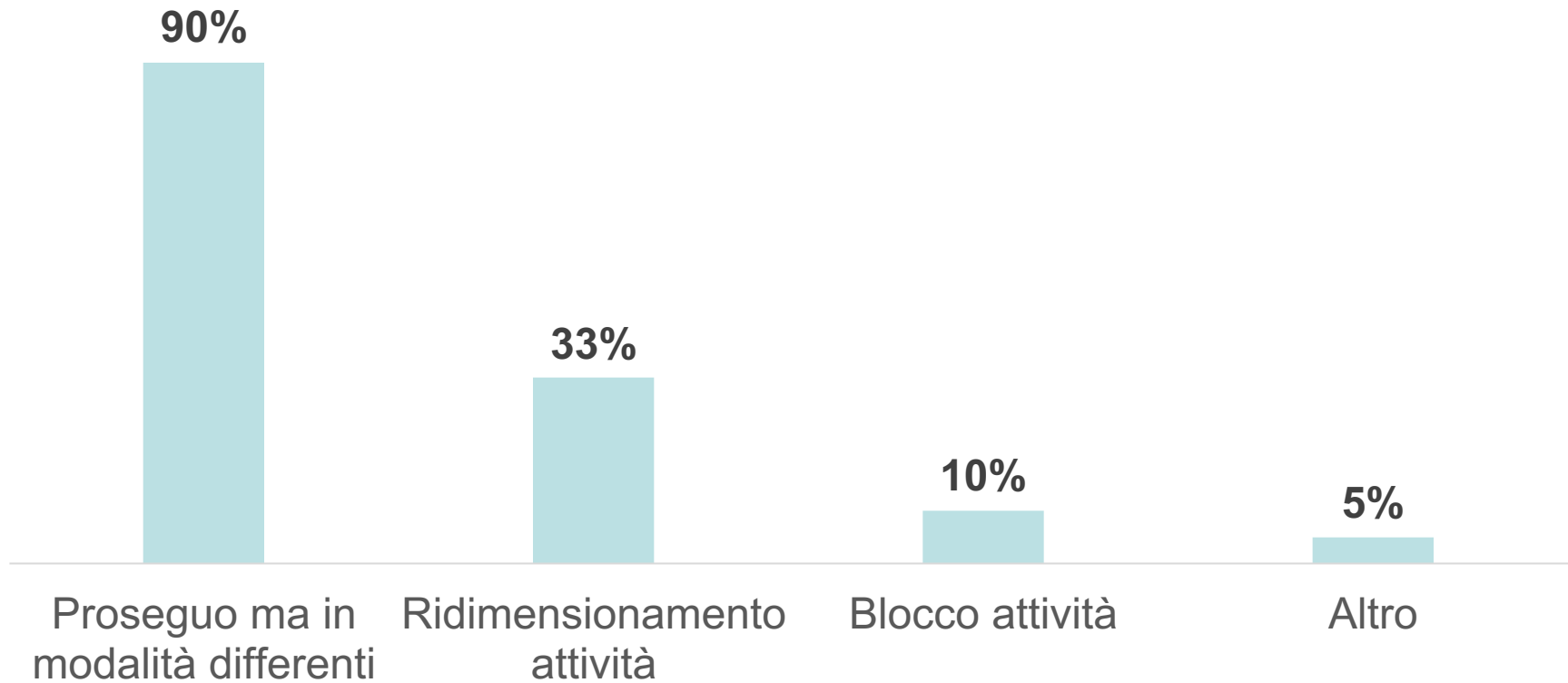
Se è coinvolta nella ricerca o produzione di soluzioni contro il COVID, in quale ambito?

Su totale risposte



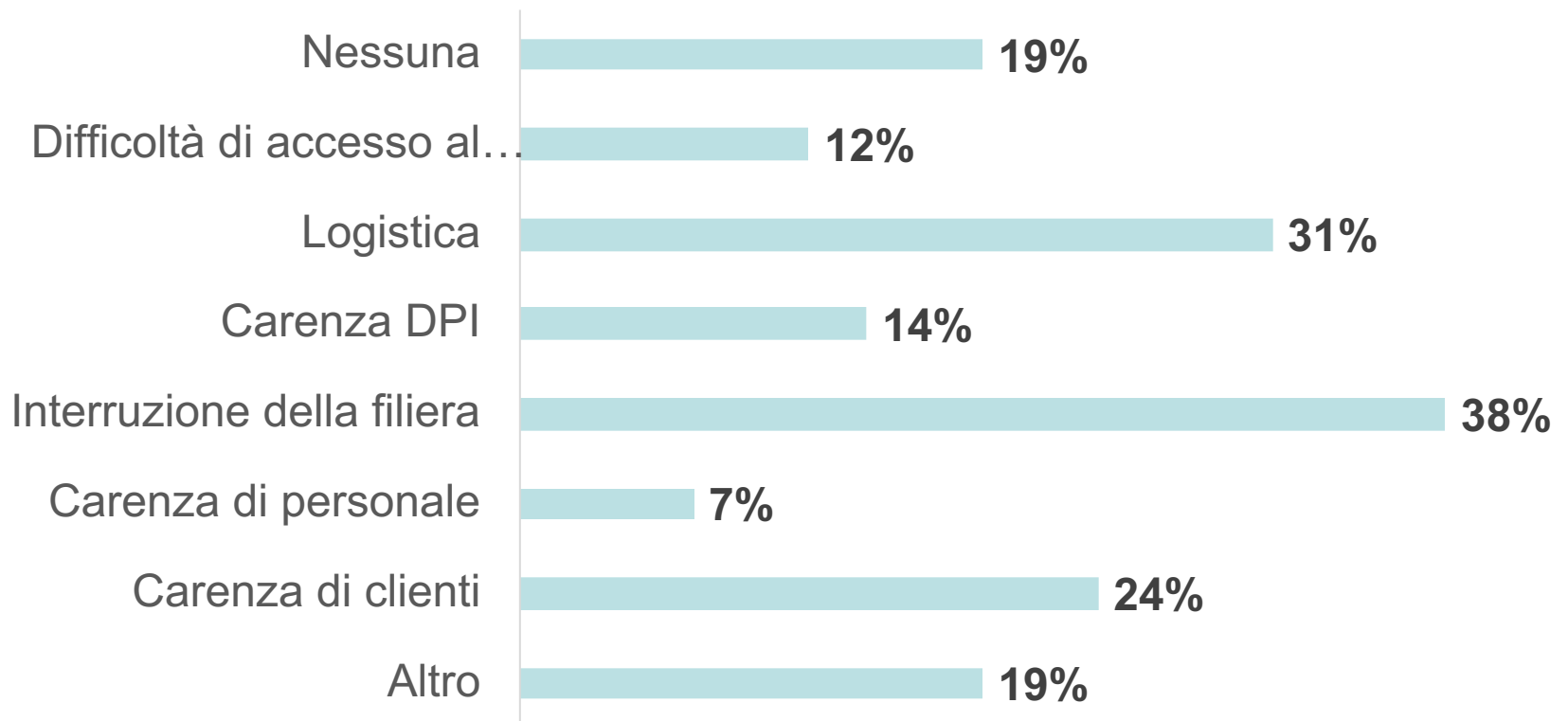
Il lockdown che tipo di effetto ha avuto sulla vostra attività?

Su totale risposte



Quali difficoltà operative vengono riscontrate?

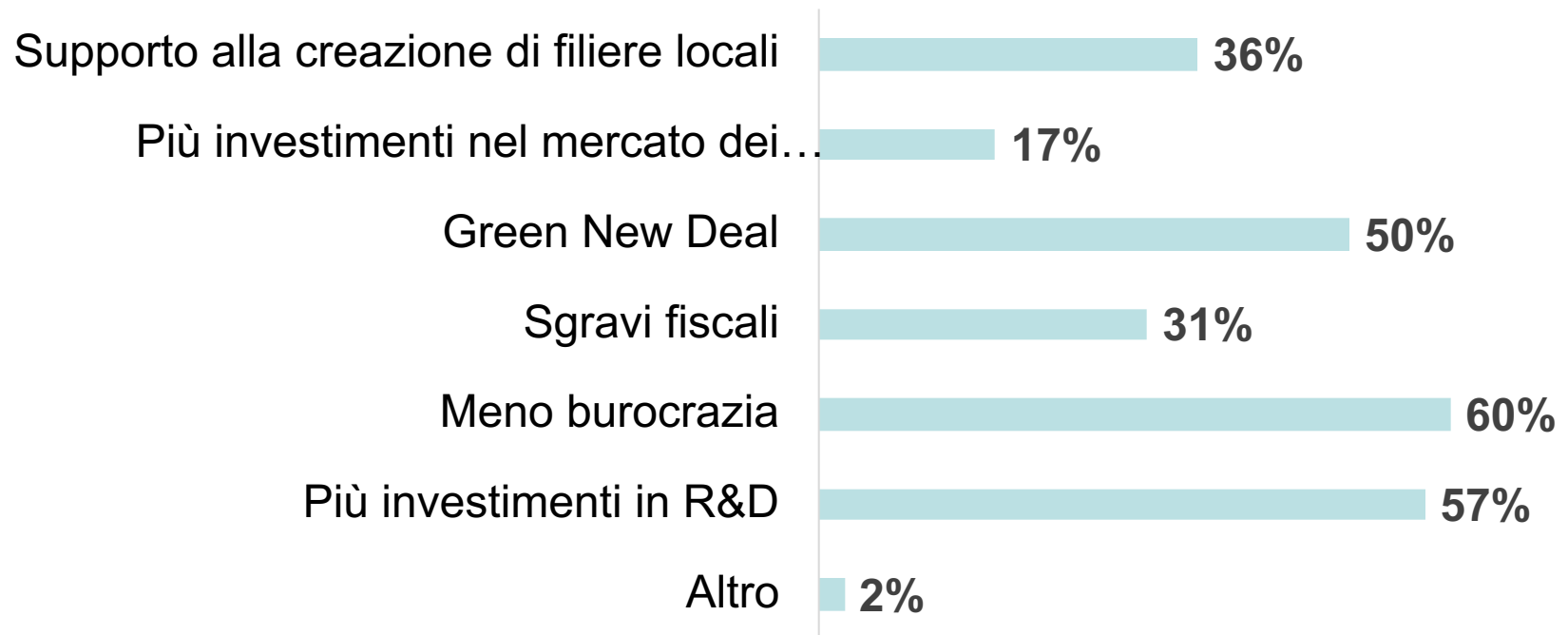
Su totale risposte





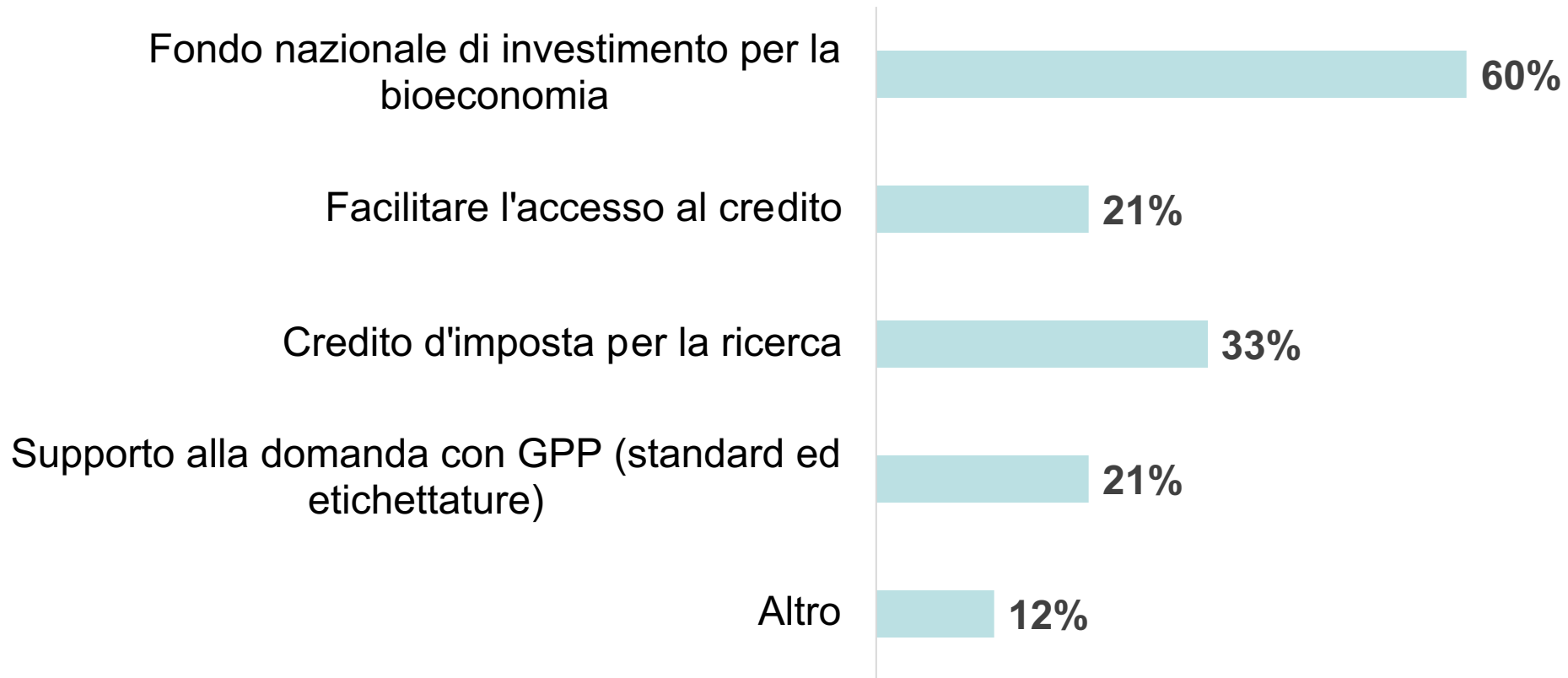
Superata l'emergenza, su quali priorità le istituzioni dovrebbero lavorare per permettere all'impresa di svilupparsi e affrontare meglio le sfide future come questa?

Su totale risposte



Quale misura di policy si ritiene più urgente per sostenere il settore?

Su totale risposte





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Thanks for your attention
My email
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**Thanks to Jim Philp (OECD), Piergiuseppe Morone
(Unitelma), Jennifer Holmgren (LanzaTech)**

