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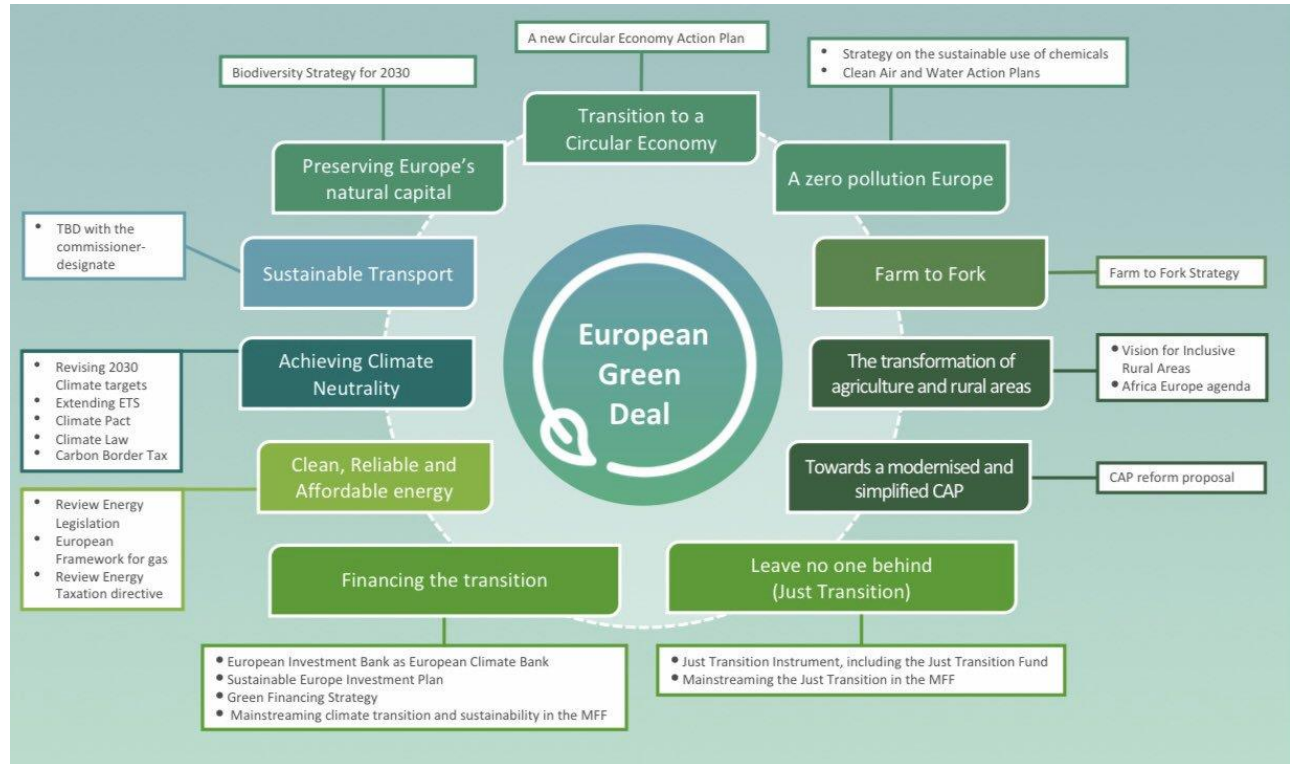
TÜBİTAK

DEPARTMENT OF SCIENCE FELLOWSHIP AND GRANT PROGRAMS (BİDEB)
CO-FUNDED BRAIN CIRCULATION 3 (CO-CIRCULATION3)

Cocirculation3 Call: Priority R&D and Innovation Topics within the Scope of the European Green Deal

Unveiled on December 11, 2019, the European Green Deal represents the European Union’s strategic roadmap for sustainable growth, aiming to position Europe as the first climate-neutral continent by 2050 through achieving net-zero greenhouse gas emissions. Central to this strategy are goals such as ensuring clean energy provision, protecting and restoring natural ecosystems, using resources sustainably, and improving public health. By implementing the Green Deal, the EU aspires to enhance the quality of life for its citizens and support the development of healthier future generations.

The Green Deal sets out a vision for transforming the EU into a modern, competitive, and resource-efficient economy. This far-reaching transformation agenda spans multiple domains, including manufacturing, trade, energy, transportation, agriculture, and fiscal policy. Its core objectives are summarized below¹.



¹ European Commission, *The European Green Deal*, COM (2019) 640 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN>



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Within the scope of TÜBİTAK CoCirculation3, it aims to mobilize the research and innovation community to develop solutions that respond to the climate crisis in line with the Green Deal objectives, reduce greenhouse gas emissions, enhance the protection of Europe's biodiversity and endangered habitats, and accelerate a sustainable socio-economic recovery without leaving anyone behind.

To support the European Green Deal policy, CoCirculation3 focuses on research in the topics of the Green Deal. Applicants have a free choice of the topic of their research, provided it falls within the wide range of topics of the Green Deal.

CoCirculation3 is open to applications from all scientific disciplines; however, all proposals must include a clear and demonstrable Green Deal dimension. As an "individual-driven mobility" programme, CoCirculation3 ensures that researchers have the freedom to define their own research topics—provided they align with the European Green Deal's goals—while also selecting a host institution and supervisor that best match their professional needs and aspirations. TÜBİTAK guarantees this flexibility to support personalized research pathways within the Green Deal framework.

Please note: This call is open to researchers from all fields, including but not limited to natural sciences, engineering, and social sciences. Applicants are expected to establish a meaningful link between their field of expertise and the objectives of the European Green Deal. The thematic descriptions provided in this document serve solely as guidance. The absence of a specific topic—particularly in areas such as social sciences—does not preclude submission. Proposals from all disciplines are welcome, as long as a strong and relevant connection to the Green Deal can be demonstrated.

Green Deal Topics:

Proposals focusing on the Green Deal and its subtopics are deemed eligible. These include the eight thematic areas and two horizontal areas.

Eight thematic areas reflecting the key work streams of the European Green Deal:

1. Increasing climate ambition
2. Clean, affordable and secure energy
3. Industry for a clean and circular economy
4. Energy and resource efficient buildings
5. Sustainable and smart mobility
6. Farm to fork
7. Biodiversity and ecosystems
8. Zero-pollution, toxic-free environments

And two horizontal areas –

1. strengthening knowledge
2. empowering citizens,

which offer a longer-term perspective in achieving the transformations set out in the European Green Deal.

Useful Links

Green Deal: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

Horizon 2020 Work Programme 2018-2020: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-cc-activities_en.pdf

https://commission.europa.eu/publications/commission-work-programme-2007-2024_en



Other Topics Identified by TÜBİTAK Within the Framework of Alignment with the European Green Deal

Since 2013, TÜBİTAK has been preparing the "TÜBİTAK Priority R&D and Innovation Topics" every two years. TÜBİTAK 2024-2025 Priority R&D and Innovation Topics, which includes current priority topics, covers two main sections: "**Priority R&D and Innovation Topics in the Green Growth Technology Roadmap**," which aligns with the European Green Deal, and "**R&D and Innovation Topics for Adaptation to the European Green Deal and Climate Change**."

Within this scope, candidates applying to the Cocirculation3 call can also benefit from the goals and topics outlined in these two main sections.

1) Priority R&D and Innovation Topics in the Green Growth Technology Roadmap

Within the scope of the **European Green Deal Action Plan**, the **Green Growth Technology Roadmap** has been developed under the coordination of TÜBİTAK, with the participation of 13 public institutions and 27 private sector umbrella representatives. This roadmap aims to identify the technological needs of our country's industrial enterprises in relation to green development goals. It covers **31 technological targets** for six key sectors that are critical to our economy, provide essential inputs at the early stages of production chains, and have a significant impact on carbon emissions.

The relevant sectors and targets are as follows:

Iron & Steel

- Integrated iron and steel production
- Continuous casting and semi-finished product processing
- Steel production from scrap – electric arc furnace, induction furnace, and ladle furnace
- Direct reduction and other alternative iron and steel production methods
- Part casting
- Optimization, energy input efficiency, and waste management in the iron & steel and part casting sectors

Aluminum

- Reducing the carbon footprint in primary aluminum production
- Scrap sorting and efficiency improvement in secondary aluminum production
- Energy efficiency in semi-finished product processing
- Efficiency improvement in aluminum part casting
- Optimization, energy input efficiency, and waste management in the aluminum sector

Cement

- Energy solutions for clinker, cement, and concrete production
- Reducing climate impacts and increasing efficiency in clinker production
- Improving cement and concrete binder production and developing new processes



Chemicals

- Clean energy usage and energy efficiency improvement in energy-intensive processes, sustainable raw material utilization
- Biorefineries
- Blue/Green ammonia production
- Blue/Green methanol production
- Green chemicals and synthetic fuels
- Green hydrogen production processes
- Advanced separation technologies in green chemistry – membranes and adsorbents
- Alternative materials for the rubber industry
- Production of critical raw materials from local sources and waste

Plastics

- Recycling
- Energy efficiency in plastic production and processes
- Efficiency of polymer processing machines used in the plastics sector
- Bio-based materials

Fertilizers

- Organic and organo-mineral fertilizer production technologies
- Mineral fertilizer production processes
- Advanced technology fertilizers
- Efficient use of fertilizers

2) R&D and Innovation Topics for Adaptation to the European Green Deal and Climate Change

This section covers the following **five research areas**:

1. Climate Change, Environment, and Biodiversity

- Resilience analytics, risk maps, and decision support systems
- Global climate models: scenarios integrated with global models
- Multi-use offshore blue economy platforms
- High-resolution, smart integrated ecosystem and biodiversity monitoring networks
- Smart and AI-based technological solutions within the "**One Health**" framework
- Optimization technologies and platforms supported by GIS and remote sensing

2. Clean and Circular Economy

- Industrial carbon capture technologies
- Renewable energy and green hydrogen-based combustion technologies for high-temperature processes
- Utilization of captured industrial CO₂ through innovative chemical, electrochemical, and biochemical processes
- Production of green hydrogen, synthetic fuels, chemicals, and green methane from waste and biomass sources
- Advanced hybrid wastewater treatment technologies for recovering valuable chemicals
- Recovery of critical raw materials from electronic and household waste



- Advanced sensor technologies, AI, and remote sensing for monitoring greenhouse gas emissions, waste minimization, process optimization, and energy efficiency
- High-performance, energy-efficient innovative materials; AI-driven material design, additive manufacturing, and biomimetic approaches

3. Clean, Accessible, and Secure Energy Supply

- Photovoltaic cells, panels, and systems
- High-efficiency concentrated solar thermal energy systems
- Onshore, offshore, and airborne wind energy systems
- Innovative geothermal systems and technologies
- Pioneering technologies for using hydrogen as an energy carrier, fuel, and raw material for valuable chemicals
- Next-generation small modular reactor technologies
- Renewable energy-supported integrated biorefineries
- Autonomous energy management systems considering inter-system interactions

4. Green and Sustainable Agriculture

- Agricultural patterns and methods for drought resistance (Desert Farming, Ocean Farming)
- Classical, biotechnological, and molecular genetics-assisted breeding studies (e.g., CRISPR)
- Innovative biological control methods (e.g., beneficial insects), disease-resistant plants, and biopesticides
- Next-generation effective fertilizer production technologies
- IoT, AI, and sensor technology-based fertilization systems
- Unmanned agricultural vehicles (UAVs), autonomous and/or unmanned farming robots, and advanced eco-friendly agricultural machinery
- Blockchain-based traceability technologies in the food value chain
- Advanced diagnostic technologies (Omics Technologies, etc.)
- Agricultural big data pools and agricultural information systems for precision farming
- Production of biofertilizers, nutritional supplements, pharmaceutical active ingredients, and bioactive compounds from agricultural and food sector waste

5. Sustainable Smart Transportation

- Next-generation smart, integrated, and high-speed charging technologies
- High-energy-density battery cell technologies (Solid-state, Li-metal, Li-sulfur, Li-air, post-lithium batteries, etc.)
- High-efficiency battery manufacturing and management
- Green propulsion and drive systems for transportation modes where battery electrification is not feasible
- Alternative transportation systems such as **Hyperloop**, **Maglev**, etc., as an alternative to air travel
- Integrated, efficient, safe, and environmentally friendly smart transportation systems
- Connected, cooperative, fully autonomous (driverless) mobility systems and the transformation of transportation networks

