EUROPEAN CENTRAL BANK

EUROSYSTEM

ECB climate and nature work

Civil society seminar

13 May 2026

European Central Bank

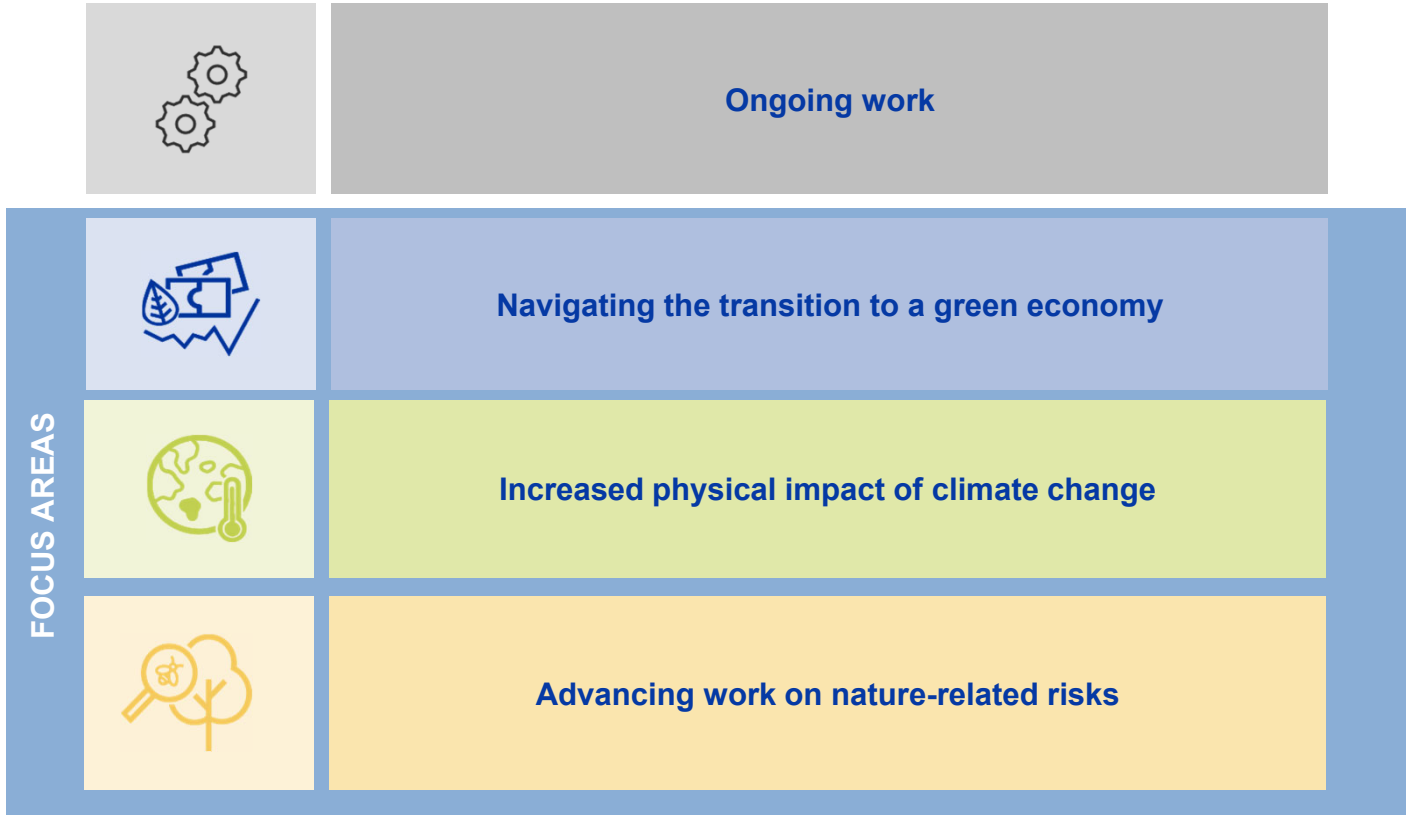
Agenda for today

1. ECB Climate and Nature Strategy
2. Climate factor in the Eurosystem collateral framework
3. Questions and feedback

1.

Staying the course – ECB´s climate & nature strategy

Overview of climate and nature work beyond 2025



We will continue & further expand our actions…

Ongoing work

Implementing **climate factor in collateral framework**

Details provided in the next session

Advancing **scenarios and stress testing**

EBA stress test exercise for the EU banking sector; NGFS scenarios work, …

Improving **availability and usability of data**

Updates of statistical indicators, access to new datasets, climate and nature related questions in ECB surveys, …

Ensuring **banks´ alignment** with supervisory expectations and **compliance with the new banking package**

Compliance with CRR and CRD requirements, integration in regular supervisory exercises, …

Monitoring of **transition policy impacts**

Macroeconomic projections, economic research and publications e.g. the Financial Stability Review, Research and Economic Bulletins, Working or Occasional Papers, …

… and intensify the efforts in three focus areas

WHAT

Navigating the transition to a green economy

WHY

- **Structural changes**, e.g. shift to renewable energy
- **Regulatory targets** and **corporate commitments**
- **Public demand**

- **Prudential transition plans of banks**
- **Analytical work on energy and fiscal impacts**
- **Operational framework review**

Increased impact of physical risk

WHAT

Increased physical impact of climate change

WHY

- Increased **losses from climate change** impacting the economy and financial sector
- **Insurance protection gap**
- **Data and methodological challenges**

Macroeconomic impacts of physical risk

Improvement of data and risk monitoring

Conducting further analysis of banks' capabilities to address challenges on physical risks

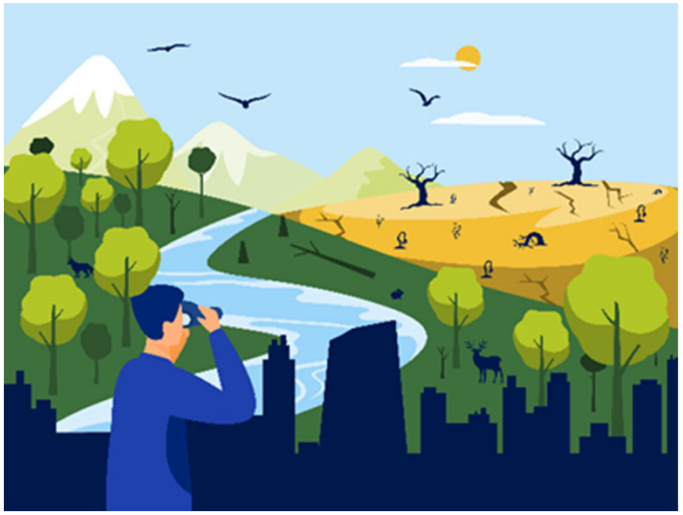
Advancing work on nature-related risks

WHAT

Advancing work on nature-related risks

WHY

- Losses from nature degradation increasing, **water scarcity** highest risk
- Dependency of financial sector on **ecosystem services**
- **Analytical framework** less developed



Macroeconomic assessment and financial risks

Work on water-related risks

Improving data and analytical approaches

Looking ahead

- We will **continue to monitor and assess full alignment of banks with supervisory expectations.**
- We will continue to **further our understanding of the impact of the green transition and the physical impacts of the climate crisis on the economy** and integrate these risks into our macroeconomic modelling and monetary policy decision making.
- We will **advance our work on the impact of nature-degradation** and as data and methodologies evolve, we will assess how to better incorporate nature-related aspects into our work.
- **We continue supporting the work of the NGFS**, as well as acting within our advisory role in international and EU policy fora.
- We will **continue to disclose information about our overall climate and nature work,** complemented by information on the carbon footprint and climate risk of our investments and the environmental impact of our internal operations.

2.

Climate factor in the Eurosystem collateral framework

Overview of collateral frameworks and climate policies

Monetary policy implementation and collateral

- Central banks **implement monetary policy**, among other instruments, through lending operations with commercial banks.
- **Collateral** mitigates the credit risk associated with lending, but the collateral itself is exposed to various financial risks.
- Issuer **default risk** is managed via minimum credit quality, **liquidation risk** via daily valuation and valuation haircuts.
- The Eurosystem needs to ensure that **sufficient collateral** is available to enable banks to participate in lending operations.

Existing climate-related policies in the collateral framework

- The Eurosystem engages with **rating agencies** to improve transparency on how climate risks affect credit ratings.
- It has set **minimum standards** for how national central banks' in-house systems must reflect climate risks.
- The Eurosystem factors climate risks into **regular reviews** of haircuts and valuation methods for corporate bonds.
- It promotes more consistent climate-related **disclosures.**

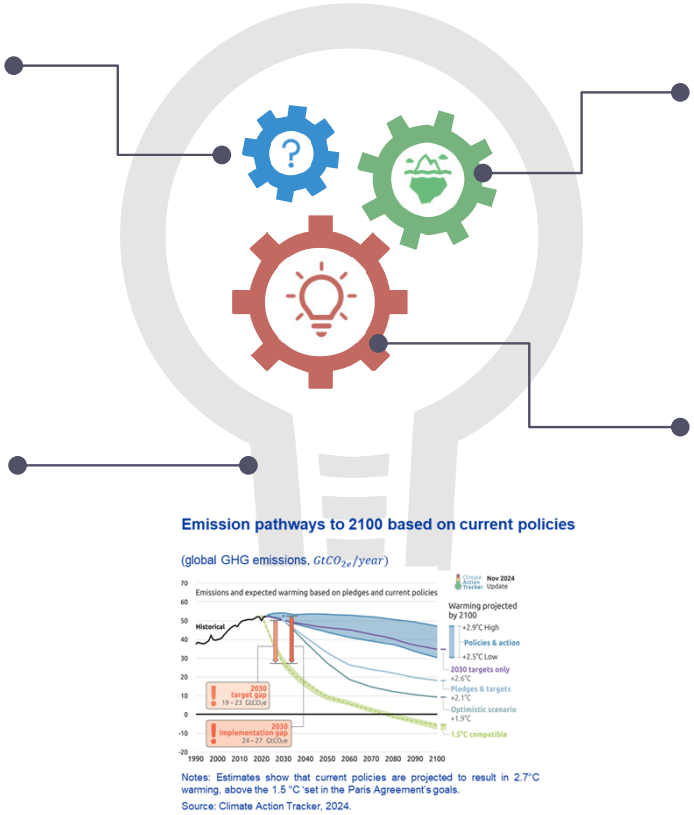
Risk management under climate change uncertainties

Uncertainty

The probability and impact of future climate events are unknown, often involving unforeseeable, unprecedented, and systemic scenarios.[1]

Precautionary measures

Risk managers can address uncertainty by adopting precautionary measures to anticipate and minimize potential impact.



Emission pathways to 2100 based on current policies

(global GHG emissions, $GtCO_{2e}/year$)

Notes: Estimates show that current policies are projected to result in 2.7°C warming, above the 1.5 °C 'set in the Paris Agreement's goals.

Source: Climate Action Tracker, 2024.

Complexity

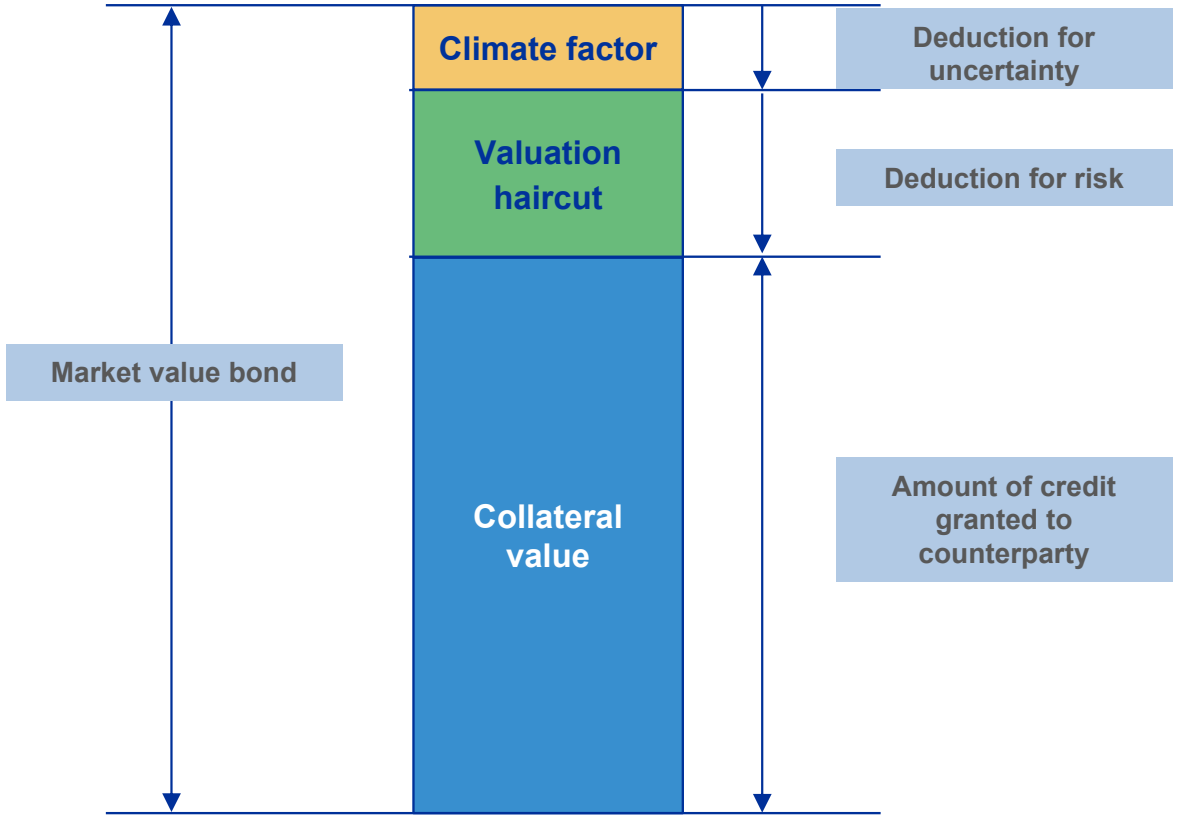
These scenarios challenge prediction, potentially producing irreversible damage and rendering historical data and existing models insufficient for decision-making.

Potential surprises

Unexpected events, whose timing and impact are unknown, prompting reevaluation of current actions. Even in efficient markets, a sudden, widespread repricing—a "**climate Minsky moment**"—is a key example.[2]

Notes: (1) In technical terms, the underlying stochastic processes are nonstationary (changing parameters), non-ergodic (path-dependency), and characterized by fat tails (extreme events) driven by unknown regime shifts, tipping points, feedback loops, etc. (2) Economic activity drives greenhouse gas emissions, which depend on carbon intensity, itself shaped by energy use and efficiency. Current efforts are insufficient to meet the Paris 1.5°C target, and delay likely worsens long-term damage. Yet we do not know how temperatures will respond to rising emissions, nor how technology and consumer preferences will evolve. Even in efficient markets, this uncertainty leaves asset prices exposed to major surprises, warranting precautionary risk measures.

Conceptual representation of the climate factor



Note: The visualization presented in this slide is not to scale and does not reflect actual sizes of valuation haircuts and climate factors. 'Collateral value' refers to the amount of credit that can be extended against collateral provided by a counterparty, taking into account its market value (P), applicable haircuts (hc), and climate factors (cf). The collateral value (CV) is calculated using the formula: CV = P × (1 - hc) × cf.

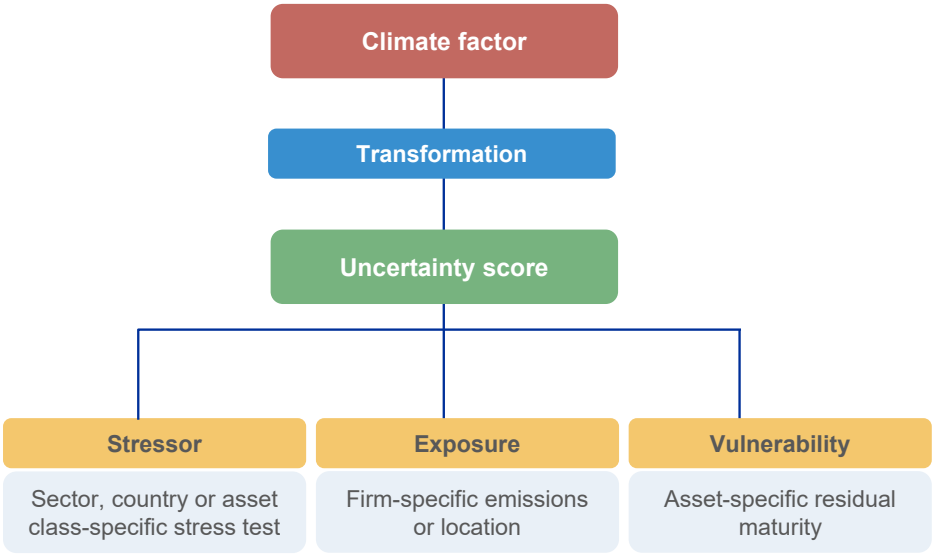
Climate factor risk management framework

Step I. The core of the climate factor is an **uncertainty score** or the product of a Stressor, Exposure and Vulnerability ($U = S \times E \times V$):

- Stressor is measured at the highest level of aggregation and derived from a climate stress test; it acts as a market factor.
- Exposure captures firm-specific sensitivity to this market factor, using data on emissions, targets, disclosure quality, location, and resilience measures.
- Vulnerability focuses on asset-specific sensitivity to the market factor, based on an asset's residual maturity.

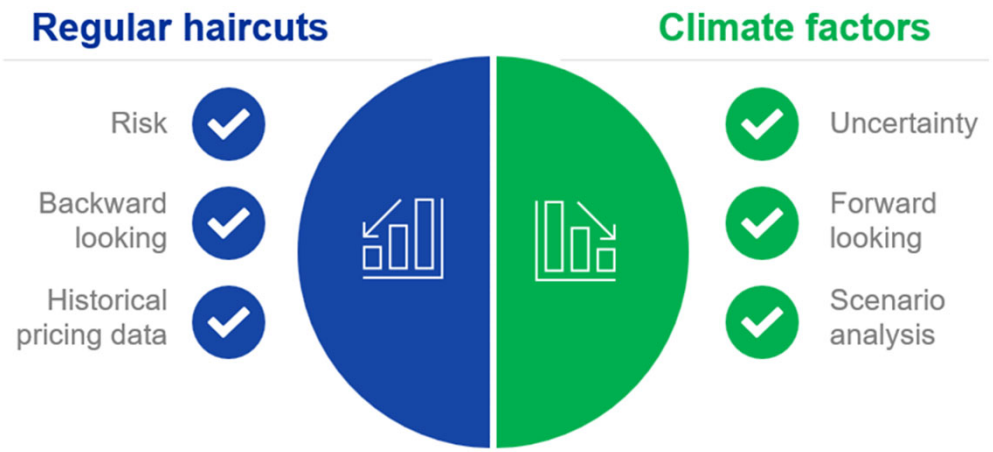
Step II. The **transformation** of an asset's uncertainty score into a **climate factor**.

- The climate factor represents an additional reduction in the collateral value, applied after regular valuation haircuts.
- Since it maintains the integrity of the current collateral framework, it can be treated as an overlay module.
- The measure is calibrated to reduce Eurosystem risks while ensuring smooth implementation of monetary policy.



Note: For NFC bonds, the stressor is set at the sector level, and individual exposure reflects issuers' emissions, climate targets, and quality of disclosure (akin to the CSPP tilting methodology).

Valuation haircuts vs. climate factors



Notes: Expected Shortfall is a risk measure that captures the average loss in the worst part of the loss distribution beyond a chosen confidence level (e.g. the average loss in the worst 1% of cases over a given horizon).

Relevant considerations:

- Valuation haircuts adequately cover **past financial risks**, but data and model limits prevent assessing their adequacy for future climate shocks.
- Climate factors address **forward-looking uncertainties**, climate-related price risks that are not captured by historically calibrated haircuts, by adding a precautionary overlay to the valuation of collateral.
- The 2025 **climate stress** test shows a 5% increase in Expected Shortfall under the Fit-for-55 adverse scenario relative to a base scenario, with high-emitting firms facing larger increases than low-emitting ones, adjusted for credit quality and maturity.

Climate factor implementation and data requirements

- The climate factor for **non-financial corporate bonds** and as well as their affiliated entities, and adverse events associated with the **green transition** was announced on 29 July 2025 and will be applicable as of 15 June 2026.
- The climate factor, including its scope and calibration, will be regularly **reviewed by the Governing Council** to account for the increasing availability of data, relevant regulatory developments and advances in risk assessment capabilities.

Relevant links to documents and webpages:

- ECB to adapt collateral framework to address climate-related transition risks
- FAQ on the climate factor in the Eurosystem collateral framework
- Determination of climate factors applicable to marketable assets to mitigate climate transition-related uncertainties
- ECB staff opinion on the revised European Sustainability Reporting Standards (ESRS)

Thank you!

Annex

What we continue to do: ongoing actions

Publications and news since January 2026

Ongoing work

Research and publications

- ECB Working Paper "Environmental score and bond pricing: it better be good, it better be green" by F. Fornari, D. Pianeselli and A. Zaghini
- ECB Economic Bulletin article "Overcoming structural barriers to the green transition" by M. Parker and S. Parraga Rodriguez
- ECB Research Bulletin no. 141 "Green supply chains at risk: measuring the true economic and environmental costs", M. Attinasi, L. Boeckelmann, B. de Castro Martins, B. Meunier, A. Borin, F. P. Conteduca, M. Mancini.
- ECB occasional paper "Global implications of export controls on rare earths: a model-based assessment" by P. Aguilar, M. Darracq Pariès, V. Jouvanceau, B. Meunier, and T. Spital

Banking supervision news

- Banking Supervision Press Release, "ECB imposes periodic penalty payments on Crédit Agricole for failing to sufficiently identify climate risks"

ECB staff opinions

- ECB staff opinion on the revised European Sustainability Reporting Standards (ESRS)

Navigating the transition to a green economy

Publications and news since January 2026

Navigating the transition

Research and publications

- Paper "Navigating the carbon price shock: Electricity costs and employment reallocation in Europe" by G. Bijnens, J. Hutchinson and A. Saint Guilhem
- President Lagarde's speech "The energy shock: where we stand and what we need to know" at the annual reception of the Association of German Banks
- ECB blog "Europe's fossil fuel dependence poses risks to price stability" by F. Elderson
- ECB Working Paper "Climate change, bank liquidity and systemic risk" by M. Giuzio, B. Kahraman, J. Knyphausen
- ECB Blog "Enhancing climate analysis: new insights through data" by P. Bellamio, C. De Melo Branco, J. Herzberg, M. Osiewicz, S. Papadopoulos, E. Pereira, D. Theleriti and C. Willeke
- ECB working paper "Macroeconomic effects of carbon-intensive energy price changes: a model comparison" by M. Burgert, M. Darracq Pariès, L. Durand, M. González, R. Priftis, O. Rohe, M. Rottner, E. Silgado-Gómez, N. Stahler, J. Varga

Speeches

- Keynote speech by Christine Lagarde, "Navigating energy shocks: risks and policy responses" at "The ECB and Its Watchers" conference
- Keynote speech by Philip Lane, "Climate change and monetary policy" at the conference organised by the ECB, Frankfurt School and CETEX

Increased physical impact of climate change

Publications and news since January 2026

Physical impacts

Research and publications

- Paper "Globally synchronized changes in the biosphere, atmosphere, and society identified using public data", coauthored by A. Ceglar and led by scientists from Max Planck Institute for Biogeochemistry
- ECB Working Paper "Climate change, catastrophes, insurance and the macroeconomy" by M. Giuzio, L. Rousová, S. Kapadia, H. Kumar, L. Mazzotta, M. Parker and D. Zafeiris
- ECB Blog "Climate-related disasters can push up the cost of debt" by S. Anyfantaki, M. Blix Grimaldi, C. Madeira, S. Malovana and G. Papadopoulos
- ECB working paper "Heatwaves, coldwaves, floods, and droughts: the short-term impact of extreme weather events on economic activity" by M. Andresson, N. Battistini, A. Bobasu
- ECB working paper "Severe weather and financial (in)stability" by C. Foroni, P. Gelain, M. Lorusso, and M. Marcellino

Banking supervision news

- ECB occasional paper "Simplifying climate change adaptation for banks in the EU" by M. J. Nieto, C. Papathanassiou
- Supervision Neswletter's article "Safeguarding real estate collateral from natural hazards" by I Baranović, G. Lialiouti, E. Rocco, and N. Rolano

Advancing work on nature-related risks

Publications and news since January 2026

Nature-related risks

Research and publications

- ECB Working Paper "Nature at risk: Implications for the euro area economy and financial stability" by A. Ceglar, M. Jwaideh, E. O'Donnell, F. Danieli, C. Pasqua, J. Hutchinson, F. Cimini, J. Sabuco, J. Alvarez, N. Ranger and I. Heemskerk
- ECB Working Paper "The climate-biodiversity-pollution nexus: the pricing of environmental credit risks for European industrial polluters" by D. Hirschbühl, A. Ceglar, T. Cojoianu, T. Emambakhsh, Y. Qi, C. Rho, E. Hu, M. Petracco, F. Biganzoli, A. de Jager, L. Garcia Herrero, A. Mandrici and C. Pasqua
- ECB Discussion Paper "The economics of natural capital" by A. Ceglar, I. Jaccard, M. Parker, A. Popov and F. Zucchi
- ECB Blog "Why the economy needs healthy oceans" by A. Ceglar, I. Heemskerk and J. Hutchinson
- Contribution to the NGFS 2026 Nature package

Banking supervision news

- Good practices for climate and nature risk management and ECB report on good practices for climate and nature-related risk stress testing

Speeches

- Opening remarks by Frank Elderson on "Incorporating nature into supervisory practices" at the NGFS Annual Plenary event panel discussion
- Introductory remarks by Christine Lagarde on "Climate, Nature and Monetary Policy" at the conference organised by the ECB, Frankfurt School and CETEX