NEW PATHWAYS

New pathways for equitable climate action in line with the Paris Agreement and sustainable development

Project brief

November 2025

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Funded by the European Union

Grant agreement No. GAP-101183367. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

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Background

The world is running out of time to limit global warming to levels consistent with the long-term objective of the Paris Agreement. Although low carbon technology trends are favourable and climate action has become more widespread in many parts of the world, greenhouse gas (GHG) emissions have remained high.

After a short-lived drop due to the COVID-19 pandemic in 2020, global GHG emissions have rebounded and will be reaching record levels in 2025. As humankind has still not managed to bend the global GHG emissions curve, it is clear by now that warming will likely overshoot 1.5°C during the next two decades even if most ambitious action was taken from now on. Scenario modelling shows that it remains possible to return warming to below 1.5°C by 2100 with deep emissions reductions and substantial deployment of carbon dioxide removal.

It is imperative that countries rapidly and collectively strengthen climate action to limit temporary overshoot, stay well below 2°C and retain credible options to pursue limiting warming below 1.5°C by the end of the century.

This requires overcoming multiple impediments that together kept global emissions and fossil fuel use at high levels:

(1) a lack of ambition and international coordination to align national contributions with the global long-term objective of the Paris agreement,

(2) a lack of cross-sectoral coordination in leveraging green technologies to cut emissions rapidly and deeply, and

(3) insufficient emphasis on equity and finance to forge stronger collective climate action.

Overview

The NEWPATHWAYS project aims to help overcome current barriers in international climate action by developing next-generation, Paris-aligned global and national low-emission transformation pathways. It combines pathway modelling with insights from the social sciences, economics, and policy analysis to assess opportunities, risks, synergies, and trade-offs across sectors and regions.

The project seeks to inform transparency and consistency of GHG emission reduction commitments, identify opportunities to leverage equity and finance to strengthen collective climate action, and establish new national and global transformation pathways that limit temporary overshoot, rely on deep sectoral transformations, combine climate and nature protection, and are aligned with sustainable development and just transition objectives.

The NEWPATHWAYS project is funded by the European Union and coordinated by the Potsdam Institute for Climate Impact Research. It runs from January 2025 to June 2028.

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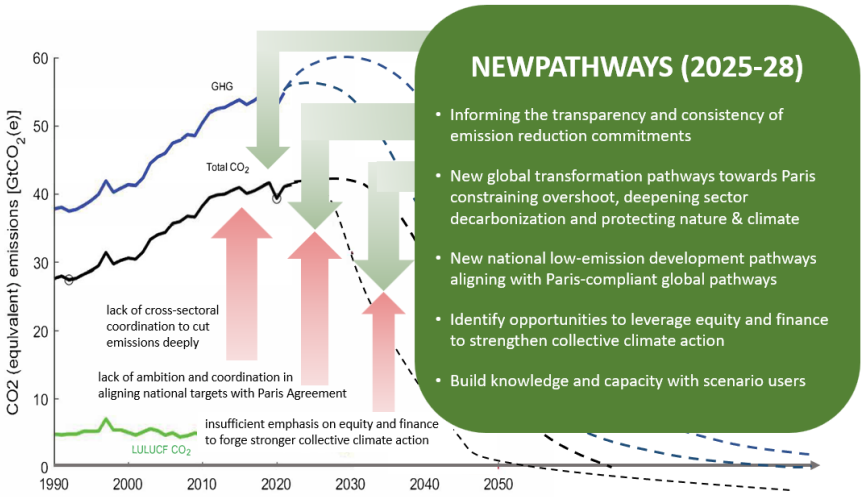

Figure 1 – Expected outcomes of the NEWPATHWAYS project and how they aim to address the impediments for ambitious and collective climate action. Historic emissions data in the graph are from Forster et al., 2023, Earth Syst. Sci. Data, 15, 2295–2327.

The Global Stocktake in 2028 will evaluate collective progress toward the Paris Agreement goals. NEWPATHWAYS will contribute to this process by generating evidence-based national and global pathways that reflect Paris-consistent ambition. By connecting national priorities with global transformation scenarios, the project will highlight opportunities to strengthen ambition and implementation while taking into account equity and feasibility considerations. It will use these insights to inform policy decisions with the aim to support the strengthening of national policies, NDCs, and long-term strategies (LTSs), helping accelerate collective climate action ahead of the Global Stocktake.

To maximize usefulness, the project is aligned with the international climate policy cycle, including UNFCCC negotiations and national policy development processes (see Figure 2).

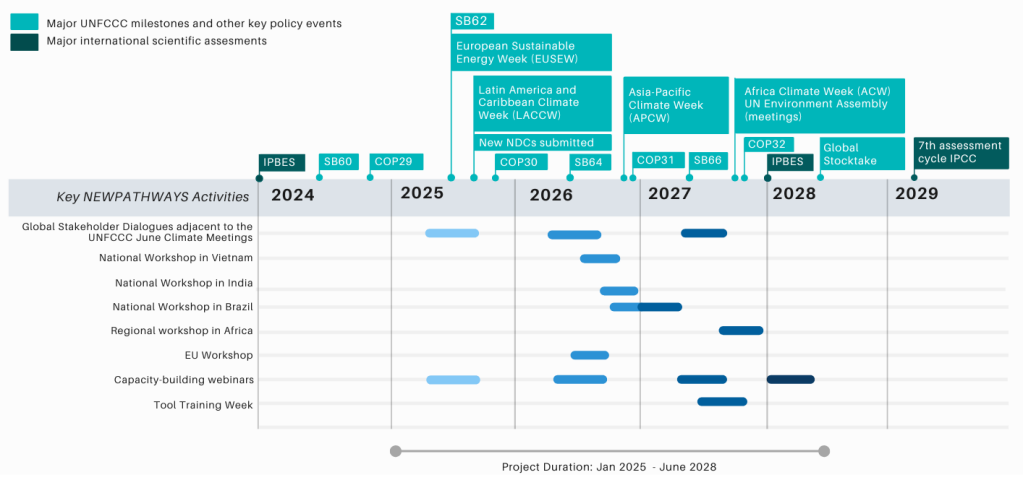

Figure 2. Project Timeline and alignment with UNFCCC processes and international assessments

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Co-creation and stakeholder engagement

Stakeholder engagement is a core component of the NEWPATHWAYS project. We work closely with policymakers, researchers, the private sector, financial actors, NGOs, and civil society to ensure that diverse perspectives inform our research and its applications.

To support the co-creation of knowledge and strengthen the relevance and uptake of results, the project will facilitate multi-level dialogues and capacity-building activities (i.e. webinars, tool training week). This approach ensures that assessments of climate policy effectiveness and the development of next-generation mitigation scenarios are context-sensitive and aligned with national and local priorities.

A Community of Practice will bring together influential climate actors—including policymakers, academics, civil society representatives, and private sector leaders—to actively participate in the co-design and review of research outputs. This will foster mutual learning and help ground project outcomes in real-world feasibility, equity considerations, and regional needs.

Engagement will take place through a series of global, regional, and national workshops. These dialogues will allow stakeholders to shape research processes and outputs, fostering shared ownership and increasing the likelihood of sustained impact.

World Café discussions during Global Stakeholder Workshop in Bonn, June 2025

How to get engaged ?

Interested in joining the Community of Practice?
Please complete the form

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Development-Focused Socio-Economic Projections (DSPs)

The Shared Socio-Economic Pathways (SSPs) used in climate change research describe possible future worlds through narratives and quantitative projections of socio-economic developments, in particular demographic change and economic output by country. These SSPs are widely applied as inputs to integrated assessment models (IAMs) to develop and analyse climate change mitigation and adaptation pathways. However, recent literature has highlighted the need to strengthen the development perspective in mitigation, adaptation, and sustainable development pathway research (Soergel et al., 2024).

In this context, the NEWPATHWAYS project has launched an Expression of Interest to use development-focused socio-economic projections (DSPs) in its pathway modelling. These DSPs would need to be newly developed and should reflect diverse national development objectives and aspirations, particularly in the Global South.

The goal is to identify academic institutions that can produce 1–2 narratives and associated quantitative projections for the 21st century. The development and publication of such DSPs is expected to benefit climate mitigation, impact, adaptation, and broader transformation pathway research beyond their intended use in NEWPATHWAYS.

How to get engaged ?

To be used by NEWPATHWAYS, DSPs should be finalised by mid-2027, include a narrative and quantitative projections (e.g. GDP and population by country), and meet specific conceptual, institutional, and technical criteria.

If you are developing, or considering to develop such projections, and if your profile and the scope of your intended work meet the needs described above and in the Expression of Interest, we invite you to complete the form below.

Access the Expression of Interest

Interested? Complete the form

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IAMC SWG on National Scenarios

National development and mitigation pathways are influenced by national policies in addition to international agreements, and implementation of policies is highly dependent on national circumstances. Since the adoption of the Paris Agreement, numerous studies of national low-carbon development pathways by national modelling teams have emerged. However a comprehensive assessment requires within country comparisons and cross-country analysis of national pathways across the board. Since 2024, more than 100 national, subnational, regional and global modelling teams have shown interest to participate in the first of its kind national scenarios study (also known as National Model and Scenarios Forum Study 1).

We have registered **90+ teams from 36+ countries**, out of which about **50+ modelling from 20+ countries have submitted their national scenario**s as on August 31, 2025 (making it one of the largest model and scenario intercomparison exercises to date).

For more information, visit the 'SWG on National Scenarios' page on the IAMC website here.

How to get engaged ?

In case, you are interested to know more about it and/or would like to participate in the exercise, please contact:

Saritha Sudharmma Vishwanathan (Asst. Prof., Kyoto University; Senior Researcher, IIMA) at vishwanathan.saritha.5t@kyoto-u.ac.jp, or sarithasv@iima.ac.in.

Preliminary results

First findings emerging from the NEWPATHWAYS project are outlined below.

Biodiversity side-effects of carbon-focused reforestation under Paris-aligned transition pathways

von Jeetze et al. 2025, in preparation

Large-scale afforestation is often promoted as a cost-effective way to remove carbon from the atmosphere and support climate goals. Using an integrated land and energy model, we find that while protecting existing ecosystems provides major biodiversity benefits, these gains are largely lost when afforestation expands beyond 150 million hectares, leading to the loss of open habitats. Afforestation has little effect on energy transitions before 2050 and only limited influence on long-term emissions. These results highlight that rapid emission reductions remain essential and that restoring diverse ecosystems offers greater overall benefits than large-scale afforestation focused solely on carbon removal.

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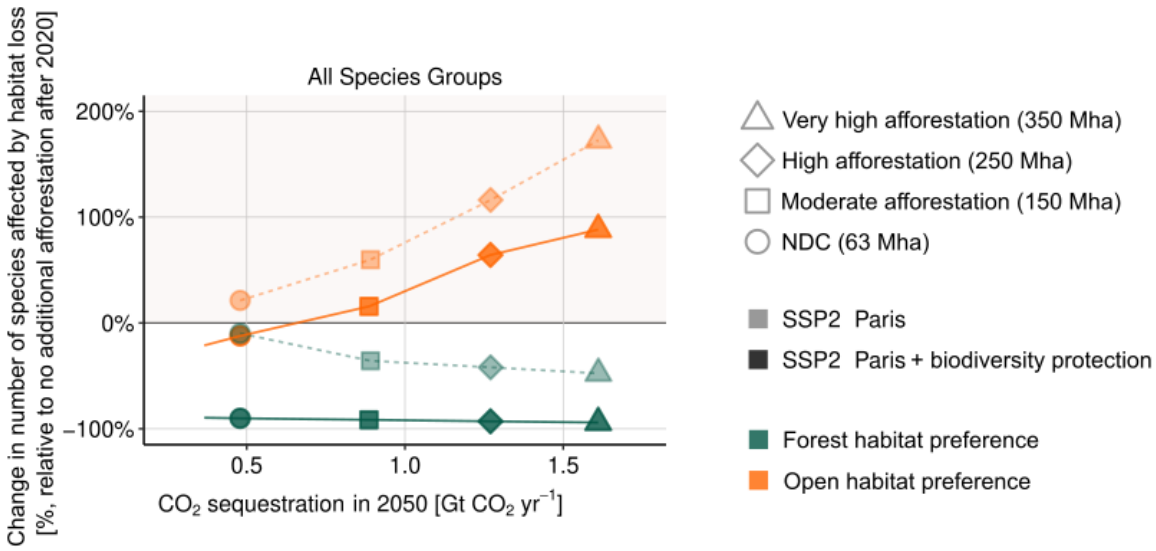

Figure 3: C02-sequestration from afforestation/reforestation and relative change in the number of species affected by severe habitat loss across different afforestation ambition scenarios. The response of species with different habitat preference (forest and open habitat) is shown in different colours, while solid lines and bold colours show scenarios variants with additional protection of biodiversity hotspots.

Transitioning away from fossil fuels in a Paris-aligned scenario

Fabrice Lécuyer, Felix Schreyer, Gunnar Luderer, and colleagues. Work in progress, upcoming publication.

The outcome of the first Global Stocktake highlights the need to transition away from fossil fuels in order to limit climate warming and comply with the Paris Agreement. Yet, many scenarios consistent with limiting warming to 1.5°C by 2100 envisage a lasting reliance on fossil fuels, and compensate for emissions with large amounts of carbon dioxide removal (CDR). As a rule of thumb, an additional 100 billion tons of CDR is required for every 2 billion tons of residual fossil CO2 emitted yearly over the period 2050–2100. Our work reveals a feasible pathway to achieving a fossil-free energy system by 2060. In our standard *Net Zero* scenario, the share of fossil fuels already falls to a sixth of current levels, driven by maximal direct electrification using renewable power. The *Fossil Phase-out* scenario goes beyond this by replacing remaining fossil fuels by biofuels or e-fuels in sectors that cannot be electrified. Our findings highlight that limiting the environmental risk of large-scale biomass use requires accelerating the development of renewable e-fuels and preventing demand for rising significantly in the bottleneck sectors of aviation, shipping and chemicals.

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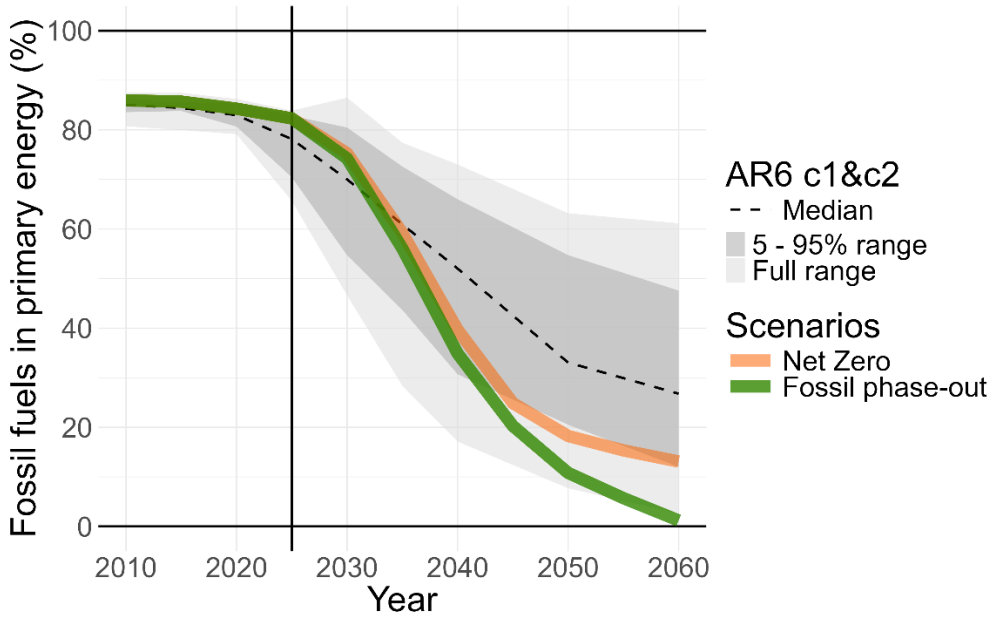

Figure 4: Share of fossil fuels in primary energy for Paris-aligned scenarios. Orange and green lines represent most recent scenarios obtained with integrated assessment model REMIND. They both reach net zero CO2 emissions around 2050 with a likely peak temperature of 1.7°C. The orange scenario relies on fossil fuels compensated by carbon removal, while the green scenario phases out fossils by 2060. The dashed line and grey ribbons respectively represent the median and percentile ranges of 1.5°C AR6 scenarios*. Fossil fuels are defined as coal, oil and gas, and primary energy is calculated with the direct equivalent method.

* 213 scenarios of the C1 and C2 categories, see definitions in www.ipcc.ch/report/ar6/wg3/chapter/technical-summary#TS.4.2

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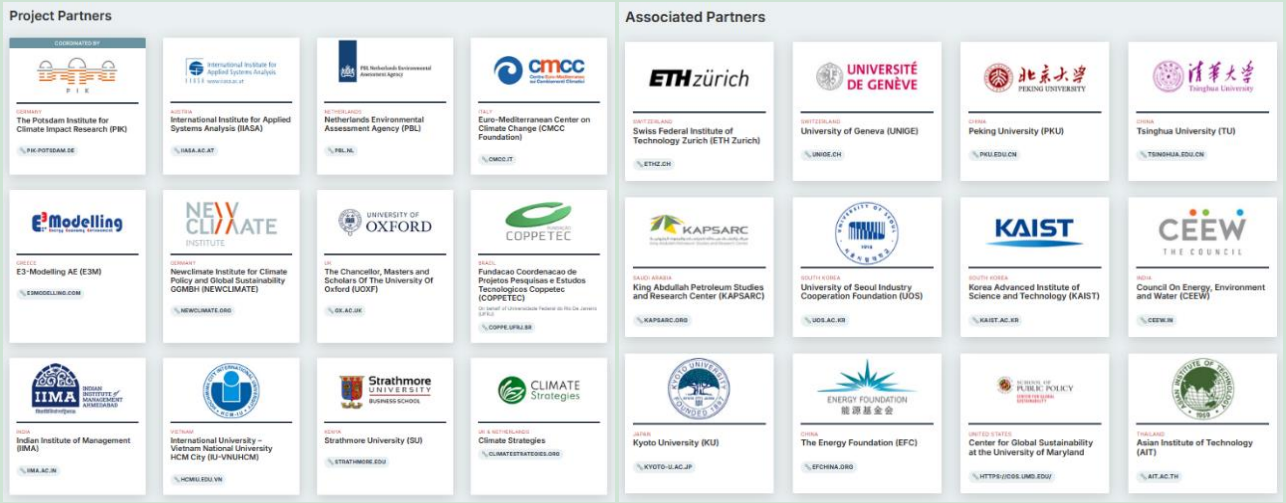
Consortium

NEWPATHWAYS brings together 24 international partners with strong expertise in global and national pathway modelling, social sciences, economics, and climate policy analysis. The consortium spans the Americas, Asia, Africa, and Europe.

The project includes six leading global Integrated Assessment Modelling (IAM) teams and sixteen national and regional modelling teams. Together, they cover around two-thirds of global greenhouse gas emissions.

The national modelling teams cover the following countries and regions: Brazil, China, the EU and wider Europe (including Switzerland and the United Kingdom), India, Japan, Kenya (with modelling also for Ghana and South Africa), Saudi Arabia and the Gulf Region, South Korea, Thailand, the United States, and Vietnam.



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Do you want to get in touch with us?

Contact Simon Ravelli at simon.ravelli@pik-potsdam.de

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Please cite this publication as:

Kriegler, E., Ravelli, S., von Jeetze, P., Lécuyer, F., Troupi, T., & Vishwanathan, S. (2025). New pathways for equitable climate action in line with the Paris Agreement and sustainable development - Project brief, November 2025. Zenodo. https://doi.org/10.5281/zenodo.17736159

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