European Commission

Science for Climate Action

EU Research Contribution to IPCC Working Group III on Mitigation

Assessing solutions, informing decisions

Research and Innovation

Science for Climate Action: EU Research Contribution to IPCC Working Group III on Mitigation

European Commission
Directorate-General for Research and Innovation
Directorate B — Healthy Planet
Unit B.3 — Climate & Planetary Boundaries

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EUROPEAN COMMISSION

Science for Climate Action

EU Research Contribution to IPCC Working Group III on Mitigation

edited by Katarzyna Drabicka and Alfonso Acosta Gonçalves

2022

Directorate-General for Research and Innovation
Horizon 2020

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INTRODUCTION

With the ever-worsening climate crisis unfolding worldwide, rapid and radical action is needed to limit the global temperature rise to well below 2°C in line with the Paris Agreement. The current decade is qualified by scientists as the make-or-break moment in the fight against global warming and its adverse, potentially catastrophic effects. The EU has set very ambitious targets to cut its greenhouse gas (GHG) emissions and make the European Union climate-neutral by 2050, securing a green, fair, and healthy future for all Europeans. This objective is at the heart of the European Green Deal and reflects the EU's commitment to global climate action.

Science, which first brought global warming to worldwide attention, will continue to play a central role in dealing with this existential challenge: its contribution will go well beyond provision of innovative climate-friendly solutions. Crucially, evidence from the research community will be needed, more than ever, to drive ambition, guide policy responses, and clarify the roles of different actors: from governments, through businesses, to local communities. Impartial and transparent science can be very powerful — it has the potential to change the way policymakers and people look at climate change and mobilise action. In this spirit, scientific findings formed the backbone of the Glasgow Pact, expressing more urgency, more alarm, and more concern about climate change and reflecting the principle that policy should follow science.

The year 2022 is a special year for climate science as it brings the finalisation of the milestone Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Reports, with the contributions of Working Groups II[1] and III, and the Synthesis Report. These reports will constitute the most authoritative references on the state of knowledge on climate change for the coming years and their importance cannot be overstated.

The IPCC, consisting of the world's leading climate scientists, plays a unique role within climate science and in informing policy decisions. First convened in 1988 by the United Nations and the World Meteorological Organisation, the IPCC is tasked to provide policymakers with regular, comprehensive, and authoritative scientific assessments on climate science knowledge, building on the work of hundreds of scientists worldwide.

So far, the Panel has produced five assessment reports and its work has been instrumental in creating a broad, evidence-based consensus, not only on the link between human activity and climate change, but also on the associated impacts, future risks, and options for adaptation and mitigation. The consecutive reports have seen an increased confidence on the findings, based on continuous progress in climate science and modelling, and have reinforced the warnings and calls for action. The IPCC reports thus represent an essential source of information for the implementation of the Paris Agreement.

1. https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/

The latest reports from the IPCC 6th Assessment cycle (AR6), consisting of three parts, is part-way through publication: the first instalment, on the physical science of climate change[2], was published in August 2021, delivering the starkest warning so far, described by the UN Secretary-General António Guterres as a "code red for humanity". The second part, focusing on impacts, adaptation and vulnerability did not paint a much brighter picture — it warns that any further delay in climate action "will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all".

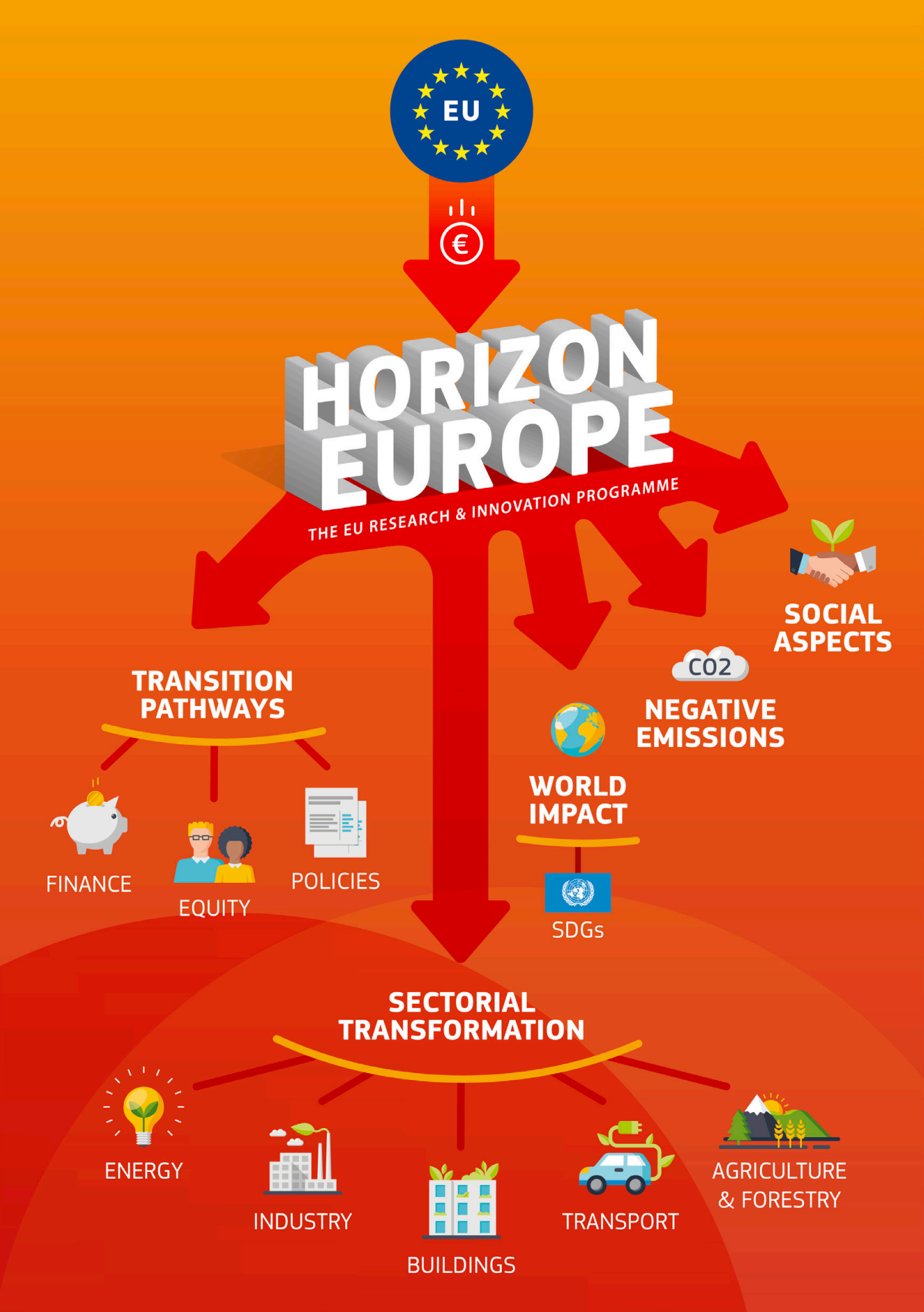
IPCC reports also provide an important guidance for the strategic programming of EU-funded research, helping to focus on the most pressing knowledge gaps and policy-relevant research.

The European Union, through its successive Framework Programmes for Research and Innovation (R&I), is among the top funders of the evidence base underpinning the IPCC reports. More broadly, EU-funded research plays an important role in addressing the key thematic areas the IPCC tackles by filling critical knowledge gaps, thereby increasing the robustness of research findings, and building consensus among the international scientific community. This way, EU-funded projects contribute to improving the effectiveness of both national and international climate policies and processes, including those underpinning the implementation of the Paris Agreement. They also play an important role in building public support for more ambitious climate action.

Coinciding with the approval of the IPCC Working Group III (WG III) report on Mitigation of Climate Change, this brochure puts a spotlight on and celebrates the contribution of EU-funded projects to pushing the boundaries of the underlying science. We provide examples of projects funded by the EU Horizon 2020 Framework Programme for Research and Innovation, specifically within its societal challenge "Climate action, resource efficiency and raw materials", which address issues of direct relevance to the Working Group III.

The highlighted projects address a broad range of topics to inform the transition to climate neutrality: from assessing methods for reducing emissions, enhancing their sinks, and removing GHGs from the atmosphere; through investigating which emissions pathways might be best for avoiding the worst climate outcomes; to advising on whether the proposed mitigation options are technically, economically, and socially feasible. Some explore mitigation options in specific sectors such as energy, agriculture, or transport, while others investigate the role of consumption and behavioural change, innovation, technology, or finance. Synergies and trade-offs with adaptation measures, sustainable development, and equity (within and between countries) are also increasingly important research areas addressed. Where available, information on the contribution to the evidence base referenced by the IPCC reports is also highlighted.

2. https://www.ipcc.ch/report/ar6/wg1/


EU
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SOCIO-ECONOMIC SCENARIOS AND TRANSITION PATHWAYS

The Paris Agreement and the European Green Deal are firmly anchored in scientific evidence. As we move forward with their implementation, it is essential that governments continue to champion science-based responses in line with state-of-art knowledge, to achieve a just and inclusive transition for all.

The European Climate Law commits the EU to become climate-neutral by 2050, in line with the goals set out by the European Green Deal. The law also sets an intermediate target by 2030 to reduce net GHG emissions by at least 55% compared to 1990 levels. In the spirit of evidence-based policymaking, it also provides for the establishment of a European Scientific Advisory Board on Climate Change that will provide independent scientific advice on EU climate measures and their adequacy.

Whereas the end goal is clear, the same is not necessarily true for its implementation given the many possible paths to climate neutrality. Different technological and non-technological choices exist, each implying distinct impacts on societies and ecosystems. Working out which is the best transition path is therefore a key challenge facing policymakers — a challenge that science can help navigate.

There are many scientific methods to investigate transformation pathways, but quantitative models, including "integrated assessment models" (IAMs) play a particularly important role. Such models are used to answer central questions about the green transition: from how the world needs to change to meet the Paris Agreement goals at the lowest cost, through mitigation options, to the implications of countries' pledges to cut emissions. The insights provided by these models are assessed in the IPCC reports and play a central role in the Working Group III assessment, as well as in the Special Report "Global Warming of 1.5°C" (SR1.5).

EU-funded research has been central in supporting the evolution of modelling tools to increase their policy relevance. This includes efforts to broaden the scope of mitigation options beyond the energy sector, like information technology, urban development, or healthier diets, and to better account for uncertainties such as future energy prices and innovation. And, while models are an essential decision-support tool for policymakers, the EU Research and Innovation also extends into other methods to mobilise effective mitigation action, including exploration of most effective governance models, feasibility analysis, and alternative economic paradigms to those based on GDP growth.

NAVIGATE

Project Name:
Next generation of AdVanced InteGrated Assessment modelling to support climaTE policy making.

Description:
IAMs play a central role in the assessment of mitigation pathways by the IPCC. NAVIGATE's overall objective is to develop the next generation of IAMs for informing EU and international climate policies. For the IPCC AR6, NAVIGATE partners contributed through several publications, covering the capabilities and gaps in IAMs; sources of uncertainty in scenarios; improved representation of sectors, inequality, and climate impacts in different models; and on carbon pricing. Our partners submitted global scenarios to the AR6 scenario database, and contributed with illustrative mitigation pathways in Chapter 3 of the report.

As an additional activity, NAVIGATE conducted a new diagnostic model comparison of IAMs, providing an important input for Chapter 3, on Mitigation Pathways Compatible with Long-term Goals, and the Annex on Models and Scenarios. Moreover, several members of the NAVIGATE consortium are authors of the WG III contribution to the AR6.

Project coordinator and participating countries:
Potsdam-Institut für Klimafolgenforschung e.V. (Germany).
Italy, Austria, Netherlands, France, Greece, United Kingdom, Switzerland, Sweden, Norway, Brazil, China, Poland.

Total investment / EU contribution:
EUR 6 998 342 / EUR 6 998 342

Start and End dates (Duration):
September 2019 to August 2023 (4 years)

Website:
www.navigate-h2020.eu

PARIS REINFORCE

Project Name:
Delivering on the Paris Agreement: A demand-driven, integrated assessment modelling approach.

Description:
Fully aligned with the scope of the IPCC Working Group III, PARIS REINFORCE has developed an integrated assessment modelling framework for effectively supporting the design and evaluation of climate mitigation policies, globally and in Europe, with respect to the objectives of the Paris Agreement. This framework is oriented towards enhancing the legitimacy of the scientific processes in support of climate policymaking, by co-creating the modelling exercises and improving the transparency of models, methods, and tools. It also develops novel methods and tailored processes for better-informed models and improved robustness of results against different types of climate and model-related uncertainties.

Based on this integrative scientific paradigm, PARIS REINFORCE has produced over 60 scientific publications, reporting and disseminating project outputs, as well as directly underpinning the majority of WG III chapters, with a focus on mitigation pathways, energy systems, innovation and its transfer, and broader sustainable development. Notably, the project has carried out several model inter-comparison exercises, directly feeding in the WG III scenarios database, with emphasis on trajectories accurately reflecting current policies and Nationally Determined Contributions (NDCs).

Project coordinator and participating countries:
National Technical University of Athens (Greece).
Spain, United Kingdom, France, Italy, Germany, Belgium, Netherlands, Norway, Switzerland.

Total investment / EU contribution:
EUR 7 830 242 / EUR 6 950 548

Start and End dates (Duration):
June 2019 to November 2022 (3 years 6 months)

Website:
www.paris-reinforce.eu

ENGAGE

Project Name:
Exploring National and Global Actions to reduce Greenhouse gas Emissions.

Description:
ENGAGE aims at co-producing knowledge for designing cost-effective, technologically sound, socially and politically feasible pathways that can meet the objectives of the Paris Agreement. It will also quantify avoided climate change impacts at regional and national levels, and identify concrete policy portfolios that maximise co-benefits and minimise trade-offs.

For AR6, national and sectoral model scenarios (on buildings, energy, land, and transport) were also targeted, engaging large portions of the climate research community. These scenarios' data are featured in almost half of the AR6 WG III chapters and the Summary for Policy Makers (SPM) figures, providing information on global emissions reductions, net-zero targets, and temperature outcomes. For example, out of some 1,200 long-term emissions scenarios assessed in Chapter 3, more than 500 were ENGAGE scenarios, and of the 9 Illustrative Pathways featured in the report, 3 are ENGAGE ones. Moreover, for the majority of modelling teams, this represented their first contribution to peer-reviewed results for the IPCC — an excellent example of capacity building.

The full database will be accessible to the public following the release of the SPM, for free download and exploration.

Project coordinator and participating countries:
Internationales Institut für Angewandte Systemanalyse (Austria).
Netherlands, Italy, Germany, Greece, Brazil, India, Hungary, China, Russia, Thailand, Vietnam, Indonesia, Japan, South Korea.

Total investment / EU contribution:
EUR 7 089 831 / EUR 7 089 831

Start and End dates (Duration):
September 2019 to August 2023 (4 years)

Website:
www.engage-climate.org

LOCOMOTION

Project Name:
Low-carbon society: an enhanced modelling tool for the transition to sustainability.

Description:
LOCOMOTION aims at enhancing an existing integrated assessment model, WILIAM, by increasing its capacity to assess the feasibility, effectiveness, costs, and impacts of sustainability policy options to identify the most effective transition pathways towards a low-carbon society. The WILIAM model will contribute to IPCC processes through:

- Diagnosis: evaluating policy impacts on society, economy, and the environment.
- Scenario assessment: assessing different energy transition pathways consistent with the standard scientific climate scenarios, testing and developing policies to implement the Paris Agreement. Alternative storylines such as "post-growth" and scenarios linked to the European Green Deal are also being analysed.
- Quantification of uncertainties.

LOCOMOTION researchers have participated as reviewers of the WG III report.

Project coordinator and participating countries:
Universidad de Valladolid (Spain).
Austria, Belgium, Croatia, Japan, Italy, Greece, Portugal, Norway, Austria, Iceland.

Total investment / EU contribution:
EUR 6 315 865 / EUR 6 315 865

Start and End dates (Duration):
June 2019 to May 2023 (4 years)

Website:
www.locomotion-h2020.eu

4i TRACTION

Project Name:
Innovation, Investment, Infrastructure and sector Integration: TRAnsformative policies for a ClimaTe-neutral European UnION.

Description:
The 4i-TRACTION project analyses what transformative EU climate policy could look like. It has four overarching objectives in support of the IPCC process:

1. a thorough assessment of the effectiveness of mitigation policies across the EU to achieve climate-neutrality;
2. identification of policy instruments capable of delivering transformative change;
3. developing transformation scenarios consistent with climate-neutrality;
4. developing a governance framework for implementing transformative policies.

4i-TRACTION is conducting ex-post evaluations of different policy instruments and how they contribute to transformative change towards climate neutrality. The project draws on the latest IPCC scenarios to understand and quantify the role of the 4 i's (innovation, investment, infrastructure, integration) in the transformation process. In order to translate findings from global scenarios to selected EU countries, 4i-TRACTION employs downscaling techniques to develop scenarios with higher regional and sectoral specificity that will be published and made accessible to the academic community.

Project coordinator and participating countries:
Ecologic Institut gemeinnützige GmbH (Germany).
Belgium, Germany, Netherlands, France, Finland, Poland, Spain.

Total investment / EU contribution:
EUR 3 997 068 / EUR 3 997 068

Start and End dates (Duration):
June 2021 to May 2024 (3 years)

Website:
www.4i-traction.eu

COP21 RIPPLES

Project Name:
COP21: Results and Implications for Pathways and Policies for Low Emissions European Societies.

Description:
COP21 RIPPLES analysed the implications of the post-COP21 global context with an interdisciplinary approach, combining analysis of the evolution of the international climate regime, emerging NDCs, and their socio-economic implications. The project addressed issues closely linked to the scope of IPCC WG III, including the development of evidence on: a) adequacy of the NDCs; b) implications of NDCs and more ambitious mitigation pathways on other European socio-economic objectives; and c) adequacy of the outcomes of COP21 from a governance-perspective.

Overall, the project contributed to clarify the required actions and available pathways to meet the Paris Agreement mitigation goals, as well as strategies that can drive higher ambition at national, EU, and global levels. It provided scientific input to better understand the nature of the ambition gap, and options for addressing it. Several COP21 RIPPLES publications were cited in the WG III report, including papers on social and developmental aspects of mitigation, governance, or the needs for a whole-systems approach to the financial sector.

Project coordinator and participating countries:
Fondation Institut De Recherche Pour Le Developpement Durable Et Les Relations Internationales (IDDRI) (France).
United Kingdom, Belgium, Germany, Italy, Poland, South Africa, Brazil, China, Bulgaria.

Total investment / EU contribution:
EUR 2 986 923 / EUR 2 986 923

Start and End dates (Duration):
December 2016 to January 2020 (3 years 2 months)

Website:
www.cop21ripples.climatestrategies.org

SECTORIAL TRANSFORMATIONS AND TECHNOLOGY TRANSITIONS

The transition to climate neutrality is an immense challenge, demanding deep transformations across all key sectors of the economy. It requires profound changes in energy supply and demand, but also a fundamental restructure of the way land, water, and other resources are managed. However, it is also an opportunity to build a better and more equitable future.

Fossil fuels must be phased out rapidly and replaced by greener technologies and practices in energy generation and storage, buildings, transportation, industry, and agriculture. Renewables will be at the heart of the transformation, working in synergy with increased energy efficiency, electrification, circularity, and sustainable bio-based approaches.

While certain sectors will be relatively easy to decarbonise, others will be much more challenging — if at all possible. Aviation, shipping, and the industrial sector will be particularly complicated due to their heavy reliance on fossil fuels, calling for substantial research and innovation efforts. In turn, agricultural GHG emissions can be reduced, but will be largely unavoidable and will have to be offset with innovative agroforestry and land-use solutions that will also offer co-benefits for biodiversity.

While some transitions are already well underway, many questions remain: Which are the most optimal technology choices, their combinations, their timing? Which are the institutional, economic, or technical enablers and constraints? The EU also needs to take into account the different circumstances and capacities of its Member States — if transitions are not adequately planned, some territories or parts of the society could pay a major economic and social toll for the transformation. It is therefore critical to find a balance between the technical, social, and spatial elements of the transition.

These are important questions for researchers and underscore the vital role of research and innovation in guiding the transition process, managing the tensions between different sectors and parts of the society, and developing the necessary technological and socio-economic solutions. EU-funded projects are contributing critical knowledge, models, and tools to help policymakers and stakeholders navigate this complex landscape of low-carbon pathways and technologies. Building on this evidence base, the EU can lead the way by investing into critical technologies and aligning action in key areas such as industrial policy or finance, while ensuring a fair and just transition for all.

EUCALC

Project Name:
EU Calculator: trade-offs and pathways towards sustainable and low-carbon European Societies.

Description:
EUCalc aimed to provide decision makers with an accessible and user-friendly modelling solution to provide real-time policy support underpinned by comprehensive analysis of trade-offs. It took a multi-sector approach based on co-design with scientific and societal actors. The EUCalc model relates emission reductions with human lifestyles, the state of natural resources, job creation, energy production, agriculture, costs, and other factors in one highly integrated tool.

EUCalc captured over 50 sectors, estimating impacts of changes in single sectors, their combinations, and/or effects of behavioural changes on emissions/energy demand for Europe as a whole or for selected countries. The scenarios were cross-tested against existing EU scenarios, allowing policy and decision makers to determine whether their choices are compatible with predefined mitigation goals, and identifying trade-offs with other policy objectives such as carbon leakage or land use.

Project coordinator and participating countries:
Potsdam-Institut für Klimafolgenforschung e.V. (Germany).
United Kingdom, Belgium, Bosnia and Herzegovina, Netherlands, Austria, Italy, Denmark, Hungary, Switzerland.

Total investment / EU contribution:
EUR 5 875 173 / EUR 5 283 351

Start and End dates (Duration):
November 2016 to February 2020 (3 years 4 months)

Website:
www.european-calculator.eu

INNOPATHS

Project Name:
Innovation pathways, strategies and policies for the Low-Carbon Transition in Europe.

Description:
INNOPATHS had five overarching goals in support of the IPCC assessments: a) understanding the challenges of decarbonisation and the innovations needed to address them; b) a detailed assessment of low-carbon technologies, their uncertainties, prospects, and system characteristics; c) proposing policy and innovation system reforms to help the EU and its Member States meet their GHG emission reduction targets; d) creating new deep decarbonisation pathways with a focus on low-carbon technology development; and e) exploring the social, economic, and environmental dimensions of the low-carbon transition and how they can be managed.

The project characterised a wide range of innovative low-carbon technologies, analysing employment, and distributional and financial implications of their deployment. Four different narratives of deep decarbonisation were created through a process of co-design with stakeholders. Online tools were developed for users to explore in more detail selected issues studied by INNOPATHS.

Given the focus on technology innovation, modelling, innovation systems, and innovation policy evaluation, the project's work in these areas supported the roles of INNOPATHS scientists as lead/contributing authors of WG III, Chapter 16 on "Innovation, Technology Development and Transfer". INNOPATHS also contributed to the WG III report through peer-reviewed publications.

Project coordinator and participating countries:
University College London (United Kingdom).
Italy, Germany, Greece, France, Netherlands, Poland, Finland, Switzerland.

Total investment / EU contribution:
EUR 6 345 578 / EUR 5 996 716

Start and End dates (Duration):
December 2016 to July 2021 (4 years 8 months)

Website:
www.innopaths.eu

REINVENT

Project Name:
Realising Innovation in Transitions for Decarbonisation.

Description:
REINVENT focused on meat and dairy, paper, plastics, and steel—four industrial sectors where low-carbon transitions are still relatively unexplored. Their entire value chains were studied to gain a broader understanding of the possibilities for transition, including non-technical aspects. The project started shortly after the adoption of the Paris Agreement, which provided a new context for its research on future industrial development. The REINVENT team contributed to facilitating the transformation process through wide engagement with societal actors and through its contributions to policy and scientific assessments. This includes participation as authors in the work of the IPCC AR6 WG III, specifically contributing to Chapter 3 on Mitigation pathways compatible with long-term gals, and Chapter 11 on Industry.

Project coordinator and participating countries:
Lunds Universitet (Sweden).
Netherlands, Germany, United Kingdom.

Total investment / EU contribution:
EUR 4 500 000 / EUR 4 500 000

Start and End dates (Duration):
December 2016 to November 2020 (4 years)

Website:
www.reinvent-project.eu

NDC ASPECTS

Project Name:
Assessing Sectoral Perspectives on Climate Transitions to support the Global Stocktake and subsequent NDCs.

Description:
NDC ASPECTS will provide inputs to the Global Stocktake under the Paris Agreement and support the development of NDCs for the post-2030 period. It focuses on advancing transformations in four GHG emission-intensive sectors that have made only limited progress in decarbonisation to date: transport, emission intensive industries, buildings, and agriculture, forestry and land-use.

For each of these sectors, NDC ASPECTS will co-create evidence-based narratives with experts and stakeholders, drawing on the latest science assessed by the IPCC, experiences with the implementation of previous NDCs and model-based analyses. These narratives can then be translated into global pathways informing the Global Stocktake, as well as national pathways. NDC ASPECTS will also aim at identifying options to improve international governance to facilitate sectoral transformations.

Project coordinator and participating countries:
Wuppertal Institut für Klima, Umwelt, Energie gGmbh (Germany).
France, Greece, Spain, Belgium, Finland, United States, South Africa, India, China, Russia, Indonesia.

Total investment / EU contribution:
EUR 4 999 375 / EUR 4 999 375

Start and End dates (Duration):
May 2021 to April 2024 (3 years)

Website:
www.ndc-aspects.eu

SOCIAL ASPECTS OF MITIGATION

Climate neutrality can only be achieved with everybody's support: governments, business, and citizens. Consumers play a crucial role in the fight against climate change by altering their consumption choices and habits to avoid or reduce their carbon footprint, what is called "demand-side mitigation".

Production and use of household goods and services is responsible for ~60% of global emissions, mainly through food, mobility, and housing decisions. However, differences in emissions mirror income inequalities between and within countries, and thus not everybody contributes in equal measure. In addition, there are many drivers of lifestyle choices — political, economic, societal, and technological — and it is important to understand these factors better to be able to steer the transition towards more climate friendly and sustainable behaviours. Responses can come from all levels: from individual citizens through increased uptake of recycling, plant-based diets, and public transport; from municipalities by improving waste management or land use planning; and from governments by facilitating the deployment of technologies and infrastructures that are needed to empower such transformations. Citizen awareness about the emissions caused by their choices also plays a crucial role in supporting GHG reduction policies, particularly when accompanied by information on how to implement and upscale effective changes.

The EU supports research to better understand the role of lifestyles in mitigation pathways, while establishing how behavioural changes can contribute to a just and inclusive transition that leaves no one behind, as enshrined in the European Green Deal. Projects develop knowledge, recommendations, and tools to accelerate the adoption of low-carbon lifestyles, exploring their scalability, barriers, and enablers. The insights gained will be used to shape policies that empower consumers and help them make better-informed choices that bring the world closer to reaching the objectives of the Paris Agreement.

EU 1.5 LIFESTYLES

Project Name:
EU 1.5° Lifestyles: Policies and tools for mainstreaming 1.5° Lifestyles.

Description:
The IPCC concludes in its Special Report on Global Warming of 1.5°C that limiting global temperature increasingly requires demand-side actions and lifestyle changes. Such changes are particularly urgent in the resource-intensive consumption areas of mobility, housing, food, and leisure. Against this background, EU 1.5° Lifestyles aims at promoting the mainstreaming of lifestyles compatible with the 1.5° objective of the Paris Agreement. With regard to the IPCC AR6 WG III, the project combines an analysis of individual lifestyle perspectives with an increased emphasis on the investigation of structural drivers of lifestyle choices — political, economic, societal, and technological — and their impacts. On this basis, it develops recommendations and tools for political decision-makers, households, and other actors. To this end, EU 1.5° Lifestyles quantifies lifestyle options and identifies necessary changes in relevant structures to enable their effective implementation. The project started only recently and will provide valuable insights for future IPCC reports.

Project coordinator and participating countries:
Westfaelische Wilhelms-Universitaet Muenster (Germany).
Sweden, Hungary, Netherlands, Germany, Spain, Latvia, Finland.

Total investment / EU contribution:
EUR 4 945 241 / EUR 4 945 241

Start and End dates (Duration):
May 2021 to April 2025 (4 years)

Website:
www.onepointfivelifestyles.eu

CAMPAIGNERS

Project Name:
Citizens Acting on Mitigation Pathways through Active Implementation of a Goal-setting Network.

Description:
The CAMPAIGNers project focuses on mitigating climate change by motivating low-carbon lifestyles with a goal-setting network co-created with the active participation of citizens and municipalities. The project will examine critically the lifestyle transformation potentials, associated barriers, and enablers across 5 continents and 16 major cities with over 20 million residents.

The analysis of existing scientific data on carbon-emitting lifestyle behaviours and policy assessments will support the development of feasible GHG mitigation pathways for citizens around the globe. The empirically validated pathways will then be applied to principal integrated modelling tools used in the EU to provide robust insights into the system-level impacts of large-scale lifestyle transformations.

Overall, the project will support the development of climate change mitigation pathways and policy approaches from a socio-economic perspective. It will develop effective multi-level policy and strategy support that fosters the GHG-mitigation potential of citizens, involving local, national, and EU policy-makers to determine policy targets.

Project coordinator and participating countries:
Energieinstitut an der Johannes Kepler Universität Linz Verein (Austria).
Germany, Norway, Greece, Ireland, Belgium, Switzerland, South Africa, Turkey, Finland, Italy, Sweden, Azerbaijan, Austria, France, Peru, Lithuania.

Total investment / EU contribution:
EUR 4 999 670 / EUR 4 999 670

Start and End dates (Duration):
May 2021 to April 2024 (3 years)

Website:
www.climate-campaigners.com

FULFILL

Project Name:
Fundamental Decarbonisation Through Sufficiency By Lifestyle Changes.

Description:
FULFILL takes up the concept of sufficiency to study the contribution of lifestyle changes to decarbonising Europe and fulfilling the objectives of the Paris Agreement. The project explores the social, infrastructural, and regulatory conditions for changing individual and collective practices in a way that reduces GHG emissions and simultaneously contributes to societal wellbeing. It thereby links strongly to Chapter 5 of IPCC WG III on demand-side measures.

FULFILL's research engages in a dialogue between social sciences and humanities as well as techno-economic energy and climate studies. At the project's core is empirical fieldwork in 5 EU and 1 non-EU countries combining qualitative and quantitative methods. FULFILL will provide an in-depth analysis of sufficiency lifestyles covering: a) their intended and unintended consequences such as rebound and spillover effects; b) enablers and barriers, including incentives and structures; and c) impacts on micro (individual and household), meso (community and municipal), and macro (economy wide) levels, and including on aspects such as health and gender. Building on this, FULFILL will evaluate the potential for upscaling and its findings will inform the development of policy recommendations, supporting National Energy and Climate Plans.

Project coordinator and participating countries:
Fraunhofer Institute for Systems and Innovation Research ISI, part of the Fraunhofer Gesellschaft (Germany).
France, Italy, Denmark, Latvia.

Total investment / EU contribution:
EUR 3 210 085 / EUR 3 210 085

Start and End dates (Duration):
October 2021 to September 2024 (3 years)

Website:
www.fulfill-sufficiency.eu

NEGATIVE EMISSIONS

The IPCC Special Report on Global Warming of 1.5°C acknowledged that limiting warming to within that range will require the use of negative emissions technologies — methods that remove carbon dioxide from the atmosphere. The recent contribution of IPCC Working Group I to the Sixth Assessment Report confirms these findings. The overshoot of temperature targets is one specific scenario where the role of negative emissions would become critical: "The larger and longer an overshoot, the greater the reliance on practices that remove CO2 from the atmosphere."

The European Climate Law underlines the importance of removals in reaching the EU targets by compensating for residual emissions and to deliver net-negative emissions beyond 2050. As announced in the Communication on Sustainable Carbon Cycles, by the end of 2022 the Commission will propose a regulatory framework for the certification of carbon removals to support scaling up of carbon farming and industrial solutions removing carbon from the atmosphere. However, the Climate Law also acknowledges that negative emissions must not delay or replace mitigation measures — as Vice-President Timmermans put it: "Our climate action must first and foremost reduce human-made emissions".

Negative emissions can take two forms: those enhancing natural processes that remove carbon from the atmosphere like reforestation or afforestation, or those that are technology-based like direct air capture and storage. The different solutions vary widely in their degree of availability, maturity, potential for widespread deployment, and permanence. They also imply diverse side effects, co-benefits and trade-offs, notably with bioenergy, food production, and biodiversity. Some may face public perception and acceptance problems. All these issues must be accounted for in climate policy-making.

The scale of negative emissions to be delivered is an important policy choice within mitigation pathways. It depends on many factors such as the rate of progress in emissions reductions in other parts of the world, the acceptance of temporarily 'overshooting' temperature targets, as well as the interpretation of the principle of "common but differentiated responsibilities" in the global climate action context. R&I is crucial to tackle these complex questions to guide policy decisions, and to develop new approaches and solutions that optimise the contribution of negative emissions to effective climate action.

NEGEM

Project Name:
Quantifying and Deploying Responsible Negative Emissions in Climate Resilient Pathways.

Description:
There has been increasing focus in the climate debate on negative emission technologies and practices (NETPs) to reduce atmospheric CO2 emissions. Essential quantitative scientific knowledge about the efficiency, effectiveness, impacts, and potential of NETPs is not well appraised, particularly within the relevant disciplines of sustainability, sociopolitical, and socio-economic sciences. This lack of understanding is a major challenge for decision-making and recommendations from policymakers and assessment bodies, such as the IPCC.

Based on real-world, multi-disciplinary assessments, NEGEM will quantify the potential for NETPs deployment in a socially, environmentally, and economically conscious manner by creating a comprehensive, quantitative analytical framework. The framework will identify concrete pathways, with their underlying conditions and governance structures, that can contribute to achieving climate neutrality as laid out in the Paris Agreement and within the context of key UN Sustainable Development Goals.

Project coordinator and participating countries:
VTT Technical Research Centre of Finland Ltd (Finland).
United Kingdom, Germany, Belgium, Switzerland, Italy, Norway, Netherlands, France, Sweden.

Total investment / EU contribution:
EUR 5 817 835 / EUR 5 817 835

Start and End dates (Duration):
June 2020 to May 2024 (4 years)

Website:
www.negemproject.eu

OCEANNETS

Project Name:

Ocean-based Negative Emission Technologies: analyzing the feasibility, risks, and co-benefits of ocean-based negative emission technologies for stabilizing the climate.

Description:

Carbon dioxide removal (CDR) is increasingly being evaluated by the IPCC. OceanNETs is determining to what extent and under what conditions large-scale deployment of ocean-based CDR technologies could contribute to realistic and effective pathways to achieve climate neutrality and the Paris Agreement goals. OceanNETs aims to identify and prioritise options with the most potential for CO_2 mitigation, taking into account their environmental impact, risks, co-benefits, technical feasibility, cost effectiveness, and political and societal acceptance. While the IPCC has so far mainly focused on land-based CDR approaches, there are many factors suggesting that ocean-based CDR could have at least as much CDR potential, making them increasingly important as a subject of scientific inquiry. Researchers funded by the OceanNETs project have provided their expertise on ocean-based CDR as contributing authors to IPCC AR6 WG I and WG III reports.

Project coordinator and participating countries:

GEOMAR Helmholtz Centre for Ocean Research Kiel (Germany).
Norway, United Kingdom, Finland, Spain, Australia.

Total investment / EU contribution:

EUR 7 310 895 / EUR 7 310 895

Start and End dates (Duration):

July 2020 to June 2025 (5 years)

Website:

www.oceannets.eu

LANDMARC

Project Name:
LAND-use based MitigAtion for Resilient Climate pathways.

Description:
LANDMARC is improving the understanding of how and where Land-based Mitigation Technologies (LMTs) — technologies and techniques that mitigate emissions or sequester atmospheric carbon within biomass and soils — can be most effectively deployed.

The project brings together stakeholders (e.g., land use managers, farmers, forest managers), earth observation technology, and computer modeling to estimate national and global realistic potential of the Earth's land surface in absorbing emissions from the atmosphere.

LANDMARC develops innovative methods that will improve the accuracy and reliability of national GHG inventory reporting, particularly in the case-study countries. In addition, the project will develop tools and services based on new methodologies that will allow interested parties, including IPCC WG III, to assess the suitability of different LMTs portfolios at national and continental levels, and to estimate the carbon, economic, and social impacts of their deployment at scale.

Project coordinator and participating countries:
Technische Universiteit Delft (Netherlands).
Germany, Switzerland, Spain, Sweden, Portugal, United Kingdom, Colombia, Venezuela, Indonesia, Nepal, Kenya, South Africa, Burkina Faso, Vietnam and Canada.

Total investment / EU contribution:
EUR 7 062 988 / EUR 6 999 988

Start and End dates (Duration):
July 2020 to June 2024 (4 years)

Website:
www.landmarc2020.eu

MITIGATION IN THE BROADER CONTEXT

The European Green Deal represents a nexus approach with all EU policies and programmes mobilised to address climate change and environmental degradation. The challenges are complex and interlinked, but the approach offers a blueprint for successful policies — integrated, effective, coherent, complementary, and fair.

Achieving the transformative Sustainable Development Goals (SDGs) and addressing climate change must go hand-in-hand. In this respect, the UN 2030 Agenda for Sustainable Development calls for action to promote prosperity while protecting the planet, recognising that ending poverty must go hand in hand with strategies that build economic growth and deliver on social needs while tackling climate change and environmental crises. Given the complexity of the challenges at stake, it is paramount to identify the interdependencies, and manage conflicts and tensions between climate action and other SDGs. Policies must be designed to work together to promote convergence and reduce trade-offs with coherence across Nationally Determined Contributions and Long-term Strategies, National Development and Adaptation Plans and other programmes. For example, energy transitions are key for lowering GHG emissions, but also hold potential for eradicating poverty, creating jobs, improving health, and conserving ecosystems. Similar synergies are also possible around actions that aim at more sustainable food and industrial systems as well as those targeting more responsible and less wasteful patterns of consumption and production. Strong links also exist between climate change and the biodiversity crisis, as emphasised in the contribution of the IPCC Working Group II to the Sixth Assessment Report. It stresses that climate-related impacts on ecosystems and biodiversity loss increase the vulnerability of people and reduce their ability to both mitigate and adapt to climate change, and that some human activities — such as unsustainable use of natural resources and pollution — exacerbate ecosystems' vulnerability to climate change, undermining the services on which the world's prosperity and wellbeing depends.

This underscores the importance and urgency of thinking more strategically about combining adaptation and mitigation actions with sustainable development, and working in a more integrated, inclusive and equitable way. Science, research, and innovation are key in guiding such convergence. EU-funded projects contribute to this shift, by improving the understanding of the relationships and interdependencies between different policy objectives, by identifying ways to ease the underlying tensions and trade-offs and by promoting more holistic approaches in climate policy design and implementation.

CD-LINKS

Project Name:
Linking Climate and Development Policies — Leveraging International Networks and Knowledge Sharing.

Description:
CD-LINKS explored the complex interplay between climate action and sustainable development to support the design of complementary and effective policies. It developed the next generation of globally consistent, national low-carbon development pathways and established a research network and capacity building platform to leverage knowledge exchange among institutions.

Following the contribution of CD-LINKS scenario analyses to the IPCC Special Report on Global Warming of 1.5°C, the project also played a substantial role in informing the WG III AR6, in particular on the interplay between climate action and sustainable development through both global and national perspectives. Specifically, CD-LINKS provided:

1. about 40 global IAM scenarios in IPCC AR6 scenarios database.
2. more than 50 national scenarios for seven major-emitting countries and regions.
3. analyses of SDGs co-benefits and trade-offs of climate change mitigation, providing key data and insights to SDGs in Chapter 3.
4. global and national scenarios that underpinned the assessment of aggregate emissions outcomes of current policies and NDCs for 2030, presented in Chapter 4.

Project coordinator and participating countries:
Internationales Institut für Angewandte Systemanalyse (Austria).
Italy, Germany, Netherlands, Greece, Brazil, Russia, India, China, United Kingdom, France, Japan.

Total investment / EU contribution:
EUR 5 212 962 / EUR 5 037 962

Start and End dates (Duration):
September 2015 to September 2019 (4 years 1 month)

Website:
www.cd-links.org

MAGIC

Project Name:
Moving Towards Adaptive Governance in Complexity: Informing Nexus Security.

Description:
MAGIC contributed to the implementation of the Europe 2020 Strategy for smart, sustainable, and inclusive growth by testing the robustness and quality of policy and innovation narratives in the water, energy, food, and environment Nexus domain in Europe. This included a critical review of proposed solutions, reducing uncertainties about their opportunities and limitations to address climate change.

The project outcomes showed that the feasible scale of the assessed technological and policy solutions (including biofuels, electric vehicles, shale gas extraction, and green bonds) will not suffice to meet the targets of the Paris Agreement. It concluded that the EU cannot achieve carbon neutrality through technological change alone: a transformative shift in social practices and demands is needed. The project has also highlighted the challenges of policy integration and the need for more holistic approaches in climate policy development and implementation.

Project coordinator and participating countries:
Universitat Autonoma de Barcelona (Spain).
Netherlands, Germany, Italy, United Kingdom, Spain, Norway, EC.

Total investment / EU contribution:
EUR 7 457 761 / EUR 7 457 761

Start and End dates (Duration):
June 2016 to September 2020 (4 years 4 months)

Website:
www.magic-nexus.eu and
www.uncomfortableknowledge.com

SIM4NEXUS

Project Name:
Sustainable Integrated Management FOR the NEXUS of water-land-food-energy-climate for a resource-efficient Europe.

Description:
SIM4NEXUS improved the understanding of interlinkages between water, land, energy, food, and climate to promote more coherent policies, management of resource conflicts, and creating synergies in natural resource use.

Through 12 case studies, SIM4NEXUS researched the potential of Nature-based Solutions, like a transboundary basin study across Germany–Czech Republic–Slovakia, which identified restoration of landscapes as a key measure to improve rainwater retention and abatement of local heatwaves, and creating synergies with climate mitigation and adaptation, water, biodiversity, health, and tourism.

Project coordinator and participating countries:
Stichting Wageningen Research (Netherlands).
United Kingdom, Sweden, Greece, Netherlands, Germany, France, Malta, Spain, Denmark, Austria, Italy, Japan, Latvia, Belgium, Czechia, Slovakia.

Total investment / EU contribution:
EUR 7 895 657 / EUR 7 895 657

Start and End dates (Duration):
June 2016 to June 2020 (4 years 1 months)

Website:
www.sim4nexus.eu

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OPEN DATA FROM THE EU

The EU Open Data Portal (**http://data.europa.eu/euodp/en**) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.

The European Union is among the top funders of the evidence base underpinning the IPCC reports, contributing to improving the effectiveness of both national and international climate policies and processes, and building public support for more ambitious climate action.

Coinciding with the approval of the IPCC Working Group III report on Mitigation of Climate Change, this brochure puts a spotlight on and celebrates the contribution of EU-funded projects to pushing the boundaries of the underlying science. It provides examples of projects funded by Horizon 2020 — the EU Framework Programme for Research and Innovation — which provide the evidence-base for guiding the transition to climate neutrality in Europe and across the globe.

Studies and reports

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