



Expanding Integrated Assessment Modelling:
Comprehensive and Comprehensible Science
for Sustainable, Co-Created Climate Action

D6.4 - Scientific & policy outreach (including briefs)

WP6 – Explaining – Policy analysis,
capacity development, CDE

26/01/2024



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EC Summary Requirements

1. Changes with respect to the DoA

No changes with respect to the work described in the DoA.

2. Dissemination and uptake

This deliverable can be used by any party interested in the scientific and policy outreach of the IAM COMPACT project, in terms of scientific publications in high-impact journals, presentations, and posters in academic conferences, as well as of other types of publications and media outputs targeting policymakers and other stakeholders, including policy briefs, videos, newsletters, etc., in order to direct them into exploring the project's scientific and policy outcomes.

3. Short summary of results (<250 words)

To disseminate obtained, processed, and accumulated knowledge for scientific debate and progress, IAM COMPACT has engaged in sharing its scientific insights in numerous high-impact journals and conferences. As the project aims to inform policy choices, we have transposed highly technical modelling results into legible policy recommendations in the form of timely publications of policy briefs, articles, and commentaries in multiple media outlets for stakeholders, policymakers, businesses, and civil society actors, as well as have created a series of infographics and educational videos to promote capacity building and comprehensibility of modelling by all stakeholders at all scales.

By January 2024, IAM COMPACT had produced 20 scientific publications in highly esteemed scientific journals, 1 book chapter, and 12 posters/papers in academic conferences. Regarding its policy outreach, it has already published 2 policy briefs, 5 press releases, and 8 newsletters. In an endeavour to create awareness with stakeholders and provide open access self-learning training materials, the project has also uploaded 21 videos demonstrating each modelling ensemble, accompanied by 21 slide packs, and 10 infographics. Towards informing a wider audience on climate, environment, energy, biodiversity, and sustainability aspects related to the project, we have also engaged in science communication in various media outlets, with 11 articles/commentaries. Finally, we have participated in 5 policy events and 12 policy/capacity building workshops, aiming to increase the outreach of the project's outputs and enhance cooperation and mutual learning.

Overall, the significance of the project's scientific and policy outreach is in line with its pathways towards outcomes and impact.

4. Evidence of accomplishment

This report, all scientific publications of the project (listed in the following sections), all other material in the links presented in the following sections (in press, the website, etc.) as well as the following links in the project website:

- IAM COMPACT scientific publications ([Website link](#))
- IAM COMPACT conference publications ([Website link](#))
- IAM COMPACT press communications ([Website link](#))

Preface

IAM COMPACT supports the assessment of global climate goals, progress, and feasibility space, and the design of the next round of Nationally Determined Contributions (NDCs) and policy planning beyond 2030 for major emitters and non-high-income countries. It uses a diverse ensemble of models, tools, and insights from social and political sciences and operations research, integrating bodies of knowledge to co-create the research process and enhance transparency, robustness, and policy relevance. It explores the role of structural changes in major emitting sectors and of political, behaviour, and social aspects in mitigation, quantifies factors promoting or hindering climate neutrality, and accounts for extreme scenarios, to deliver a range of global and national pathways that are environmentally effective, viable, feasible, and desirable. In doing so, it fully accounts for COVID-19 impacts and recovery strategies and aligns climate action with broader sustainability goals, while developing technical capacity and promoting ownership in non-high-income countries.

NTUA – National Technical University of Athens	EL	
Aalto – Aalto Korkeakoulusaatio SR	FI	
AAU – Aalborg Universitet	DK	
BC3 – Asociacion BC3 Basque Centre for Climate Change – Klima Aldaketa Ikergai	ES	
Bruegel – Bruegel AISBL	BE	
CARTIF – Fundacion CARTIF	ES	
CICERO – Cicero Senter for Klimaforskning Stiftelse	NO	
E3M – E3-Modelling AE	EL	
KTH – Kungliga Tekniska Hoegskolan	SE	
POLIMI – Politecnico di Milano	IT	
UPRC – University of Piraeus Research Center	EL	
UVa – Universidad De Valladolid	ES	
WI – Wuppertal Institut fur Klima, Umwelt, Energie GGMBH	DE	
IIMA – Indian Institute of Management	IN	
THU – Tsinghua University	CN	
USMF – University System of Maryland	US	
AAiT – Addis Ababa University	ET	
KEI – International Civic Organisation Kyiv Economics Institute	UA	
RUSL – Raja Rata University of Sri Lanka	LK	
TUM – Technical University of Mombasa	KE	
UNIGE – Université de Genève	CH	
Imperial – Imperial College of Science, Technology and Medicine	UK	

Executive Summary

IAM COMPACT has engaged in sharing its scientific insights in numerous high-impact journals and conferences to provide information in light of the preparation of climate policies and national planning for the post-2030 period, as part of the Paris Agreement goals and the need to reduce global net greenhouse emissions to zero by 2050, as well as to disseminate obtained, processed and accumulated knowledge for scientific debate and progress, and provide feedback to the IPCC 7th Assessment Report (AR7) Cycle. As the project aims to inform policy choices, enhance mutual learning, and boost international cooperation, we have transposed highly technical modelling results into legible policy recommendations in the form of timely publications of policy briefs, articles, and commentaries in multiple media outlets for stakeholders, policymakers, as well as business and civil society actors, and have created a series of infographics and educational videos to promote capacity building and ensure comprehensibility of modelling information by all stakeholders at all scales.

About 17 months in its life cycle, IAM COMPACT has contributed to the scientific community by publishing 20 research papers in highly esteemed scientific journals, 1 book chapter in a peer-reviewed book and 12 posters, presentations, and/or papers in academic conferences. Regarding its policy outreach, IAM COMPACT has published 2 policy briefs, 5 press releases and 8 newsletters. Additionally, in an endeavour to create awareness with stakeholders and provide open access self-learning training materials, the project has also uploaded 21 videos (demonstrating the project's modelling ensemble), accompanied by 21 slide packs, and 10 infographics. Towards informing a wider audience on climate, environment, energy, biodiversity, and sustainability aspects related to IAM COMPACT, the project's partners have also engaged in policy commentaries in various media outlets, with 11 articles/commentaries so far. Lastly, the project has participated in 5 policy events and 12 policy and capacity development workshops, aiming to enhance learning and cooperation and increase the outreach of the project's outputs.

The scientific and policy outreach of the project is interrelated with all project outcomes and performance indicators (see also D6.1 - IAM COMPACT CDE plan), actively supporting and scientifically underpinning the transition to a climate-neutral and resilient society and economy.

The first expected outcome (EO₁) of the project is focused on the provision of information for the preparation of climate policies and national planning for the post-2030 period, and requires:

- over 20 scientific publications on national, regional, and global post-2030 pathways, considering extreme events, disruptive changes, societal innovations, gender, and SDGs, 6 of which have already been published (Section 2); and
- over 10 policy briefs for EU and partner countries, 2 of which have been produced (Section 5).

The second expected outcome (EO₂) calls for international cooperation among the modelling community and other relevant stakeholders to expand the provision of robust in-country advice to decision-makers around the world focused on collaboration, through, among others:

- over 15 scientific publications on national and global mitigation pathways jointly produced with other research projects and non-consortium teams, 9 of which have been published (Section 2); and
- at least 10 events jointly held in collaborations and synergies with other/sister research projects, 5 of which have been completed (Section 8).

The third expected outcome (EO₃) is about mutual learning among the modelling, social science, and policy communities to ensure coherence between different tools used to inform climate action, and consistency with the best available and open science, and asks for:

- at least 10 consortium-wide scientific interdisciplinary/transdisciplinary publications, 6 of them already published (Section 2);
- at least 2 scientific papers on interdisciplinary modelling science frameworks, 1 of which is available

(Section 2);

- at least 10 submissions to modelling consortia (IAMC, ECEMP, etc.) meetings, 8 of which have already been completed (Section 4); and
- at least 25 participations in relevant scientific conferences, 12 of which have been successfully completed (Section 4).

To properly assess the progress towards the KPIs set, however, it should be noted that this progress report is published at a stage where the first of the two modelling cycles of the IAM COMPACT policy response mechanism (the vessel for all research conducted in the context of the project) is still underway. It is following the completion of this first cycle (around May 2024) that the bulk of about half the project's expected policy and scientific outreach is to be made.

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1 Introduction

The scientific and policy outreach of IAM COMPACT aims at policymakers at all scales from countries/regions represented in the consortium, scientists in IPCC processes, researchers in relevant H2020 and Horizon Europe projects, and members of research consortia / communities academia specifically but not limited to modelling researchers and social scientists worldwide, industry decision-makers & business associations, especially from high-emitting industries, as well as civil society, including civil society organisations, climate activist groups, and citizens more broadly.

Among key outputs of the project are the expansion of the science base and technical capacity to scientifically underpin climate policy at national and global level, acknowledging that post-2030, Paris-compliant routes to net zero should integrate hitherto underexplored aspects of policy, society, economy, and technology. Apart from and toward effectively informing climate action, a core motivation of the project is to advance and expand the capabilities of integrated assessment models and climate change policy research, and enhance the robustness of policy prescriptions, and improve the understanding of aspects underrepresented, including interactions with other political priorities (poverty alleviation, gender equality, growth, mobility, unemployment, etc.) structural inertia, and path dependencies. In achieving that, IAM COMPACT produces and shares with the scientific community an interdisciplinary & transdisciplinary framework for multi-model analysis of climate action that includes the representation of out-of-ordinary extremes, disruptive innovations, lifestyle and social innovation, and sustainable development pathways, and reinforces qualitative evidence with qualitative analysis exploring in-depth the factors driving and hindering decarbonisation in sectors, from both global and national perspectives.

As of January 2024, IAM COMPACT has produced 20 scientific publications in highly esteemed scientific journals (such as Joule or Nature Climate Change) and 12 posters/presentations/papers in academic conferences (such as the Integrated Assessment Modeling Consortium meetings and the European Climate and Energy Modelling Platform). Moreover, regarding its policy outreach, IAM COMPACT has published 2 policy briefs, 5 press releases and 8 newsletters. Additionally, in an endeavour to create awareness with stakeholders and provide open access self-learning training materials, the project has also uploaded 21 videos (demonstrating the project's modelling ensemble), accompanied by 21 slide packs, and 10 infographics. Towards informing a wider audience on climate, environment, energy, biodiversity, and sustainability aspects related to IAM COMPACT, the project's partners have also engaged in policy commentaries in various media outlets, with 11 articles/commentaries so far. Lastly, the project has participated in 5 policy events and 12 policy or capacity development workshops, aiming to increase the outreach of the project's outputs and enhance learning.

The results presented in this deliverable are part of the first co-creative cycle of IAM COMPACT and its Policy Response Mechanism, which drives the project's policy relevance. This cycle includes an assessment of policy-relevant modelling against co-created, realistic baselines and multiple types/sources of uncertainty, considering the national context and specificities of the diverse range of countries, and an update of the representation of policy measures/packages in the project's wide modelling ensemble to drive the required transitions. These provide the basis for expanding the analysis, by looking into implications of/for behavioural change, disruptive and societal innovations, extreme developments and crises, and overall sustainable development.

Specifically, Section 2 reports the scientific publications of the consortium, Section 3 the book chapters published, and Section 4 the consortium's participation in relevant scientific conferences. Afterwards, Section 5 presents the project's policy briefs, Sections 6 and 7 outline the newsletters and press releases published and communicated to interested stakeholders. Section 8 includes all the policy events and workshops, in which the consortium has participated. Section 9 outlines the media outreach of the projects, by listing all articles about and/or commentaries by the consortium in international press. Finally, Sections 10 and 11 list the project's videos and infographics, respectively.

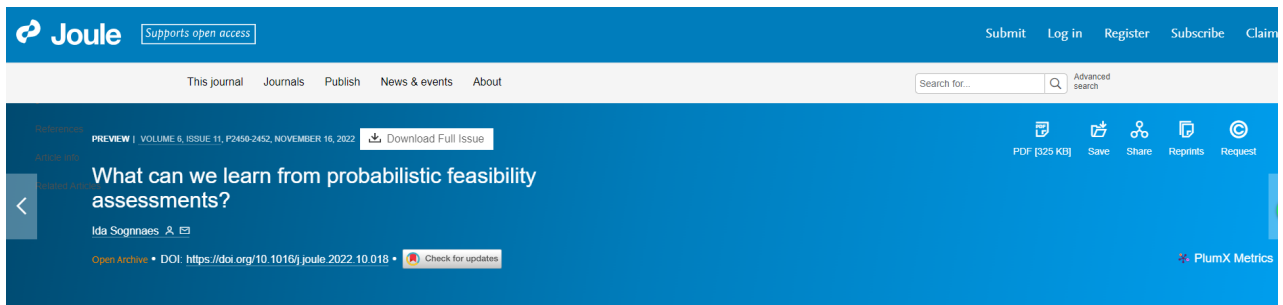
2 List of scientific publications in peer-reviewed journals

In this section, we report all the scientific publications¹ supported by the IAM COMPACT project, mentioning the title, authors (adding the IAM COMPACT partner institutes in parentheses), abstract, and any synergies with other projects funded by the EC or otherwise.

2.1 Sognaes (2022), Joule

Title:	What can we learn from probabilistic feasibility assessments?
Authors:	Ida Sognaes (CICERO)
Journal:	Joule
Abstract:	In a new paper in Nature Energy, Odenweller et al. use uncertainty analysis to derive a probabilistic feasibility space for green hydrogen supply. Their analysis shows that even if electrolysis capacity grows as fast as wind and solar power have done, green hydrogen supply will remain scarce in the short term and uncertain in the long term.
Keywords:	Hydrogen; feasibility
DOI:	https://doi.org/10.1016/j.joule.2022.10.018
First Online:	16 November 2022
Repository:	Zenodo (Link: https://zenodo.org/records/7360781/0)
Synergies with:	H2020 PARIS REINFORCE (GA: 820846)
Citation (APA):	Sognaes, I. (2022). What can we learn from probabilistic feasibility assessments?. Joule, 6(11), 2450-2452.

¹ <https://iam-compact.eu/publications/scientific-publications>



The screenshot shows the Joule journal website interface. At the top, there is a navigation bar with the Joule logo, a search bar, and links for Submit, Log in, Register, Subscribe, and Claim. Below this is a secondary navigation bar with links for 'This journal', 'Journals', 'Publish', 'News & events', and 'About'. The main content area features a blue header with the article title 'What can we learn from probabilistic feasibility assessments?' and the author's name 'Ida Sognnaes'. A 'Download Full Issue' button is visible. On the right side, there are icons for PDF (325 KB), Save, Share, Reprints, and Request. A 'PlumX Metrics' icon is also present. The article is identified as a 'PREVIEW' in 'VOLUME 6, ISSUE 11, P2450-2452, NOVEMBER 16, 2022'.

In a new paper in *Nature Energy*, Odenweller et al. use uncertainty analysis to derive a probabilistic feasibility space for green hydrogen supply. Their analysis shows that even if electrolysis capacity grows as fast as wind and solar power have done, green hydrogen supply will remain scarce in the short term and uncertain in the long term.

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Main text

Achieving net-zero carbon emissions, which is necessary to limit global warming to well below 2°C, requires rapid scaling up of low-carbon technologies. Hundreds of mitigation scenarios have been produced to show how this can be achieved. Scenarios show a wide range of possibilities, but the Intergovernmental Panel for Climate Change (IPCC) and the Integrated Assessment Modeling (IAM) and energy-economy modeling communities have long been reluctant to assign probabilities to scenarios.¹ The IPCC clearly states that mitigation scenarios are “neither predictions nor forecasts.”²

At the same time, mitigation scenarios are meant to be “plausible,” and judgments of what is and isn’t plausible necessarily require some implicit judgments of likelihood. Several recent studies have questioned the plausibility of key aspects of mitigation scenarios. For instance, studies have cast doubt on the scale of carbon removal technologies³ and on the likelihood of the widely used RCP8.5 scenario.⁴ These and many other studies are part of a growing discussion around the

Figure 1. Preview of ‘What can we learn from probabilistic feasibility assessments?’ in Joule

2.2 Perdana et al. (2022), Energy Strategy Reviews


- Title:** Expert perceptions of game-changing innovations towards net zero
- Authors:** Sigit Perdana, Georgios Xexakis, Konstantinos Koasidis (NTUA), Marc Vielle, Alexandros Nikas (NTUA), Haris Doukas (NTUA), Ajay Gambhir (Imperial), Annela Anger-Kraavi, Elin May, Ben McWilliams (Bruegel), Baptiste Boitier
- Journal:** Energy Strategy Reviews
- Abstract:** Current technological improvements are yet to put the world on track to net-zero, which will require the uptake of transformative low-carbon innovations to supplement mitigation efforts. However, the role of such innovations is not yet fully understood; some of these 'miracles' are considered indispensable to Paris Agreement-compliant mitigation, but their limitations, availability, and potential remain a source of debate. We evaluate such potentially game-changing innovations from the experts' perspective, aiming to support the design of realistic decarbonisation scenarios and better-informed net-zero policy strategies. In a worldwide survey, 260 climate and energy experts assessed transformative innovations against their mitigation potential, at-scale availability and/or widescale adoption, and risk of delayed diffusion. Hierarchical clustering and multi-criteria decision-making revealed differences in perceptions of core technological innovations, with next-generation energy storage, alternative building materials, iron-ore electrolysis, and hydrogen in steelmaking emerging as top priorities. Instead, technologies highly represented in well-below-2°C scenarios seemingly feature considerable and impactful delays, hinting at the need to re-evaluate their role in future pathways. Experts' assessments appear to converge more on the potential role of other disruptive innovations, including lifestyle shifts and alternative economic models, indicating the importance of scenarios including non-technological and demand-side innovations. To provide insights for expert elicitation processes, we finally note caveats related to the level of representativeness among the 260 engaged experts, the level of their expertise that may have varied across the examined innovations, and the potential for subjective interpretation to which the employed linguistic scales may be prone to.
- Keywords:** Expert survey; Game changers; Low-carbon innovations; Disruptive innovation; Behavioural change
- DOI:** <https://doi.org/10.1016/j.esr.2022.101022>
- First Online:** 13 December 2022
- Repository:** Zenodo (Link: <https://zenodo.org/records/7704465>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846), HFRI ATOM (GA: HFRI-FM17-2566)
- Citation (APA):** Perdana, S., Xexakis, G., Koasidis, K., Vielle, M., Nikas, A., Doukas, H., ... & Boitier, B. (2023). Expert perceptions of game-changing innovations towards net zero. Energy Strategy Reviews, 45, 101022.



Energy Strategy Reviews
Volume 45, January 2023, 101022



Expert perceptions of game-changing innovations towards net zero

Sigit Perdana^a, Georgios Xexakis^b, Konstantinos Koosidis^c, Marc Vielle^a, Alexandros Nikas^c, Haris Doukas^c, Ajay Gambhir^d, , Annela Anger-Kraavi^e, Elin May^a, Ben McWilliams^f, Baptiste Boltier^g

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Highlights

- The study evaluates 27 low-carbon innovations based on a global survey of 260 experts.
- Innovations were clustered and ranked based on mitigation potentials and feasibility.
- Next-generation energy storage had the highest potential among examined technologies.
- Most non-technological innovations feature uniformly high potentials and feasibility.
- We note gaps among different stakeholder groups—e.g., regarding building innovations.

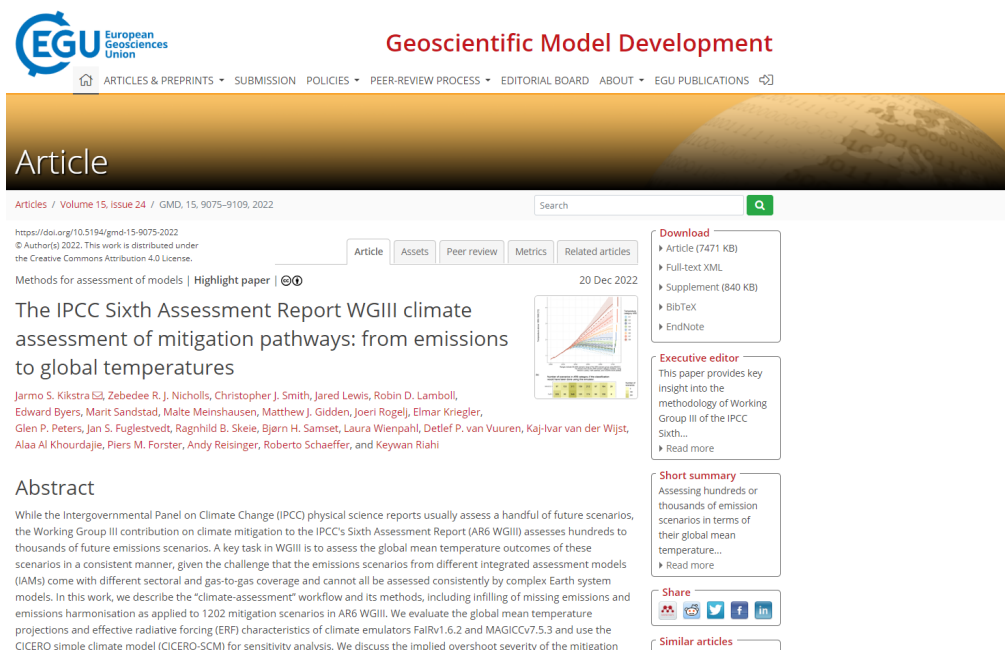
Figure 2. Preview of 'Expert perceptions of game-changing innovations towards net zero' in Energy Strategy Reviews

2.3 Kikstra et al. (2022), Geoscientific Model Development

- Title:** The IPCC Sixth Assessment Report WGIII climate assessment of mitigation pathways: from emissions to global temperatures
- Authors:** Jarmo S. Kikstra, Zebedee R. J. Nichollsm, Christopher J. Smith, Jared Lewis, Robin D. Lamboll (Imperial), Edward Byers, Marit Sandstad, Malte Meinshausen, Matthew J. Gidden, Joeri Rogelj, Elmar Kriegler, Glen P. Peters (CICERO), Jan S. Fuglestvedt, Ragnhild B. Skeie, Bjørn H. Samset, Laura Wienpahl, Detlef P. van Vuuren, Kaj-Ivar van der Wijst, Alaa Al Khourdajie (Imperial), Piers M. Forster, Andy Reisinger, Roberto Schaeffer, Keywan Riahi
- Journal:** Geoscientific Model Development
- Abstract:** While the Intergovernmental Panel on Climate Change (IPCC) physical science reports usually assess a handful of future scenarios, the Working Group III contribution on climate mitigation to the IPCC's Sixth Assessment Report (AR6 WGIII) assesses hundreds to thousands of future emissions scenarios. A key task in WGIII is to assess the global mean temperature outcomes of these scenarios in a consistent manner, given the challenge that the emissions scenarios from different integrated assessment models (IAMs) come with different sectoral and gas-to-gas coverage and cannot all be assessed consistently by complex Earth system models. In this work, we describe the "climate-assessment" workflow and its methods, including infilling of missing emissions and emissions harmonisation as applied to 1202 mitigation scenarios in AR6 WGIII. We evaluate the global mean temperature projections and effective radiative forcing (ERF) characteristics of climate emulators FaIRv1.6.2 and MAGICCv7.5.3 and use the CICERO simple climate model (CICERO-SCM) for sensitivity analysis. We discuss the implied overshoot severity of the mitigation pathways using overshoot degree years and look at emissions and temperature characteristics of scenarios compatible with one possible interpretation of the Paris Agreement. We find that the lowest class of emissions scenarios that limit global warming to "1.5 °C (with a probability of greater than 50 %) with no or limited overshoot" includes 97 scenarios for MAGICCv7.5.3 and 203 for FaIRv1.6.2. For the MAGICCv7.5.3 results, "limited overshoot" typically implies exceedance of median temperature projections of up to about 0.1 °C for up to a few decades before returning to below 1.5 °C by or before the year 2100. For more than half of the scenarios in this category that comply with three criteria for being "Paris-compatible", including net-zero or net-negative greenhouse gas (GHG) emissions, median temperatures decline by about 0.3–0.4 °C after peaking at 1.5–1.6 °C in 2035–2055. We compare the methods applied in AR6 with the methods used for SR1.5 and discuss their implications. This article also introduces a "climate-assessment" Python package which allows for fully reproducing the IPCC AR6 WGIII temperature assessment. This work provides a community tool for assessing the temperature outcomes of emissions pathways and provides a basis for further work such as extending the workflow to include downscaling of climate characteristics to a regional level and calculating impacts.
- Keywords:** Global modelling
- DOI:** <https://doi.org/10.5194/gmd-15-9075-2022>
- First Online:** 20 December 2022
- Repository:** Zenodo (Link: <https://zenodo.org/records/7704528>)

Synergies with: H2020 CONSTRAIN (GA: 820829), H2020 4C (GA: 82100360), H2020 ENGAGE (GA: 821471), H2020 GENIE (GA: 951542), H2020 ESM2025 (GA: 101003536)

Citation (APA): Kikstra, J. S., Nicholls, Z. R., Smith, C. J., Lewis, J., Lamboll, R. D., Byers, E., ... & Riahi, K. (2022). The IPCC Sixth Assessment Report WGIII climate assessment of mitigation pathways: from emissions to global temperatures. *Geoscientific Model Development*, 15(24), 9075-9109.



The screenshot shows the article page on the Geoscientific Model Development website. The article title is "The IPCC Sixth Assessment Report WGIII climate assessment of mitigation pathways: from emissions to global temperatures". The authors listed are Jarmo S. Kikstra, Zebedee R. J. Nicholls, Christopher J. Smith, Jared Lewis, Robin D. Lamboll, Edward Byers, Marit Sandstad, Malte Meinshausen, Matthew J. Gidden, Joeri Rogel, Eimar Krieglger, Glen P. Peters, Jan S. Fuglested, Ragnhild B. Skeie, Bjørn H. Samset, Laura Wienpahl, Detlef P. van Vuuren, Kaj-Ivar van der Wijst, Alaa Al Khourdajie, Piers M. Forster, Andy Reisinger, Roberto Schaeffer, and Keywan Riahi. The article is dated 20 Dec 2022. The abstract discusses the IPCC's Sixth Assessment Report (AR6 WGIII) and its assessment of future emissions scenarios. The page includes a search bar, navigation tabs (Article, Assets, Peer review, Metrics, Related articles), and a sidebar with download options (Article, Full-text XML, Supplement, BibTeX, EndNote), an executive editor's note, a short summary, and social sharing options.

Figure 3. Preview of 'The IPCC Sixth Assessment Report WGIII climate assessment of mitigation pathways: from emissions to global temperatures' in *Geoscientific Model Development*

2.4 Gambhir (2023), Environmental Research Letters

Title:	This really does change everything: attaining 1.5C needs all available mitigation levers
Authors:	Ajay Gambhir (Imperial)
Journal:	Environmental Research Letters
Abstract:	<p>There are multiple ways in which society can theoretically transition from its current carbon-intensive state to a zero-carbon future, ideally fast enough to limit global warming to 1.5°C above pre-industrial levels. Although the carbon budget associated with this temperature is close to being consumed (IPCC 2021), it still remains achievable - just. Furthermore, we know what needs to be done to achieve it, because we know what contributes to CO₂ emissions. We need energy sources, whose carbon content results in emissions. Reducing both our demand for energy and its carbon intensity (by increasing the share of zero-carbon fuels in our energy mix) is thus of paramount importance. Some industrial manufacturing processes, particularly in cement production, produce CO₂ as a chemical by-product. Capturing that CO₂, finding alternative ways to produce cement, or reducing cement demand, is therefore necessary. Our agriculture, forestry and other land use (AFOLU) can be a net source or sink of CO₂, so making it a large net sink by enhancing carbon dioxide removals (CDR), for example through afforestation, would help. And we hope to have available a range of human-made CDR technologies and measures, such as bioenergy with carbon capture and storage (BECCS), Direct Air Capture (DAC) and enhanced weathering (EW). Scaling these in an environmentally sustainable way would enhance our chances of keeping within the carbon budget. Finally, rapid progress in reducing short-lived greenhouse gases, particularly methane, would further help our chances of achieving 1.5°C.</p>
Keywords:	Global modelling
DOI:	https://doi.org/10.1088/1748-9326/acb6ab
First Online:	7 February 2023
Repository:	Zenodo (Link: https://zenodo.org/records/7704606)
Synergies with:	N/A
Citation (APA):	Gambhir, A. (2023). This really does change everything: attaining 1.5° C needs all available mitigation levers. Environmental Research Letters, 18(2), 022001.

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ENVIRONMENTAL RESEARCH LETTERS

VIEWPOINT • OPEN ACCESS

This really does change everything: attaining 1.5 °C needs all available mitigation levers


Ajay Gambhir¹
 Published 7 February 2023 • © 2023 The Author(s). Published by IOP Publishing Ltd
[Environmental Research Letters](#) Volume 18 Number 2
 Citation Ajay Gambhir 2023 *Environ. Res. Lett.* 18 022001
 DOI 10.1088/1748-9326/acb6ab

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There are multiple ways in which society can theoretically transition from its current carbon-intensive state to a zero-carbon future, ideally fast enough to limit global warming to 1.5 °C above pre-industrial levels. Although the carbon budget associated with this temperature is close to being consumed (IPCC

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Corrigendum: All options, not silver bullets, needed to limit global warming to 1.5 °C: a scenario appraisal (2021 *Environ. Res. Lett.* 16 064037)

Gaussian copula modeling of extreme cold and weak-wind events over Europe conditioned on winter weather regimes

All options, not silver bullets, needed to limit global warming to 1.5 °C: a scenario appraisal

Figure 4. Preview of 'This really does change everything: attaining 1.5°C needs all available mitigation levers' in Environmental Research Letters

2.5 Karamaneas et al. (2023), Renewable & Sustainable Energy Transition

- Title:** A stakeholder-informed modelling study of Greece's energy transition amidst an energy crisis: the role of natural gas and climate ambition
- Authors:** Anastasios Karamaneas (NTUA), Konstantinos Koasidis (NTUA), Natasha Frilingou (NTUA), Georgios Xexakis Alexandros Nikas (NTUA), Haris Doukas (NTUA)
- Journal:** Renewable & Sustainable Energy Transition
- Abstract:** While fossil fuel prices soar during the 2022 global energy crisis, the European Union activates all available fossil-fuel levers and Greece still plans to use natural gas as a transition fuel for delignitisation, with strong concerns over potential exacerbation of energy poverty and hurdles to progress in climate action. This study assesses the trajectory of the Greek electricity mix and its reliance on natural gas under the current policy framework on the one hand, and an ambitious scenario aiming for complete decarbonisation by 2035 on the other. We model these scenarios using an energy system modelling framework, comprising LEAP and OSeMOSYS model implementations for Greece, and use a stakeholder-informed fuzzy cognitive mapping exercise to uncover transition uncertainties. While power generation from natural gas is projected to increase by almost 50% until 2030 under existing policies, the proposed decarbonisation scenario has the potential to achieve complete independence from Russian gas by 2026 while also leading to a cleaner and considerably cheaper power sector. This 'higher climate ambition' scenario is found feasible and more robust in case high fossil fuel prices persist post-2022, even if bottlenecks stressed by stakeholders such as community acceptance or technological constraints emerge and potentially constrain the expansion of certain renewable energy technologies. Apart from the added value of stakeholder input in modelling science, as reflected in the impact of barriers Greek stakeholders critically highlighted, our results emphasise that a diversified energy-supply mix alongside bold energy efficiency strategies are key to rapid and feasible decarbonisation in the country.
- Keywords:** Greece; LEAP; OSeMOSYS; Natural gas; Fuzzy cognitive maps; Energy crisis
- DOI:** <https://doi.org/10.1016/j.rset.2023.100049>
- First Online:** 3 February 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/7704617>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846)
- Citation (APA):** Karamaneas, A., Koasidis, K., Frilingou, N., Xexakis, G., Nikas, A., & Doukas, H. (2023). A stakeholder-informed modelling study of Greece's energy transition amidst an energy crisis: The role of natural gas and climate ambition. *Renewable and Sustainable Energy Transition*, 3, 100049.



Renewable and Sustainable Energy Transition

Volume 3, August 2023, 100049



A stakeholder-informed modelling study of Greece's energy transition amidst an energy crisis: The role of natural gas and climate ambition

Anastasios Karamaneas^a, Konstantinos Koasidis^a, Natasha Frilingou^a,

Georgios Xexakis^b, Alexandros Nikas^a, Haris Doukas^a

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Highlights

- We couple two energy system models with a stakeholder-informed fuzzy cognitive map.
- The current policy framework is projected to increase gas use by about 50% until 2030.
- An ambitious yet feasible RES strategy can lead to zero Russian gas imports by 2026.
- Zero-carbon power-sector by 2035 requires penetration of new, expensive technologies.

Figure 5. Preview of 'A stakeholder-informed modelling study of Greece's energy transition amidst an energy crisis: the role of natural gas and climate ambition' in Renewable & Sustainable Energy Transition

2.6 Gambhir & Lempert (2023), *Frontiers in Climate*

Title:	From least cost to least risk: Producing climate change mitigation plans that are resilient to multiple risks
Authors:	Ajay Gambhir (Imperial), Robert Lempert
Journal:	Frontiers in Climate
Abstract:	Our plans to tackle climate change could be thrown off-track by shocks such as the coronavirus pandemic, the energy supply crisis driven by the Russian invasion of Ukraine, financial crises and other such disruptions. We should therefore identify plans which are as resilient as possible to future risks, by systematically understanding the range of risks to which mitigation plans are vulnerable and how best to reduce such vulnerabilities. Here, we use electricity system decarbonization as a focus area, to highlight the different types of technological solutions, the different risks that may be associated with them, and the approaches, situated in a decision-making under deep uncertainty (DMDU) paradigm, that would allow the identification and enhanced resilience of mitigation pathways.
Keywords:	Extremes
DOI:	https://doi.org/10.3389/fclim.2023.1149309
First Online:	17 April 2023
Repository:	Zenodo (Link: https://zenodo.org/records/7983105)
Synergies with:	N/A
Citation (APA):	Gambhir, A., & Lempert, R. (2023). From least cost to least risk: Producing climate change mitigation plans that are resilient to multiple risks. <i>Frontiers in Climate</i> , 5, 1149309.

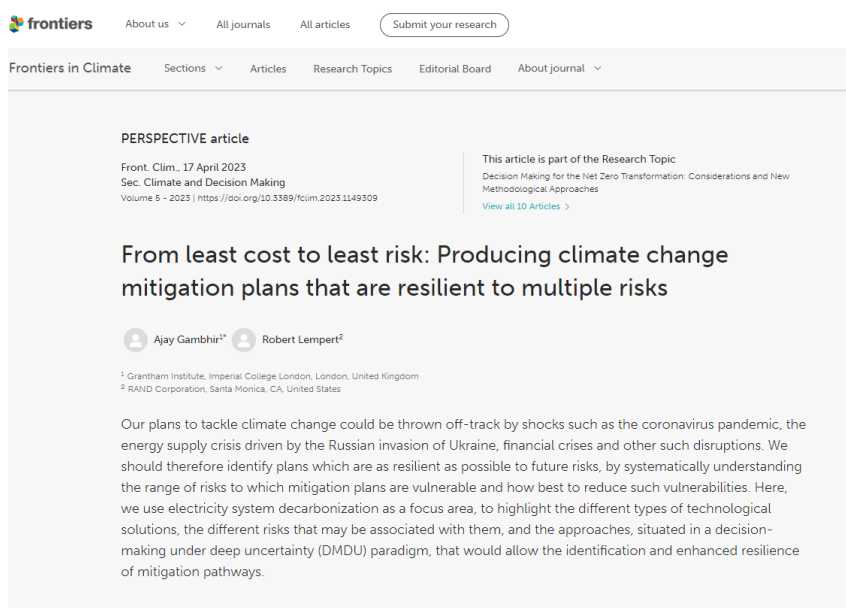
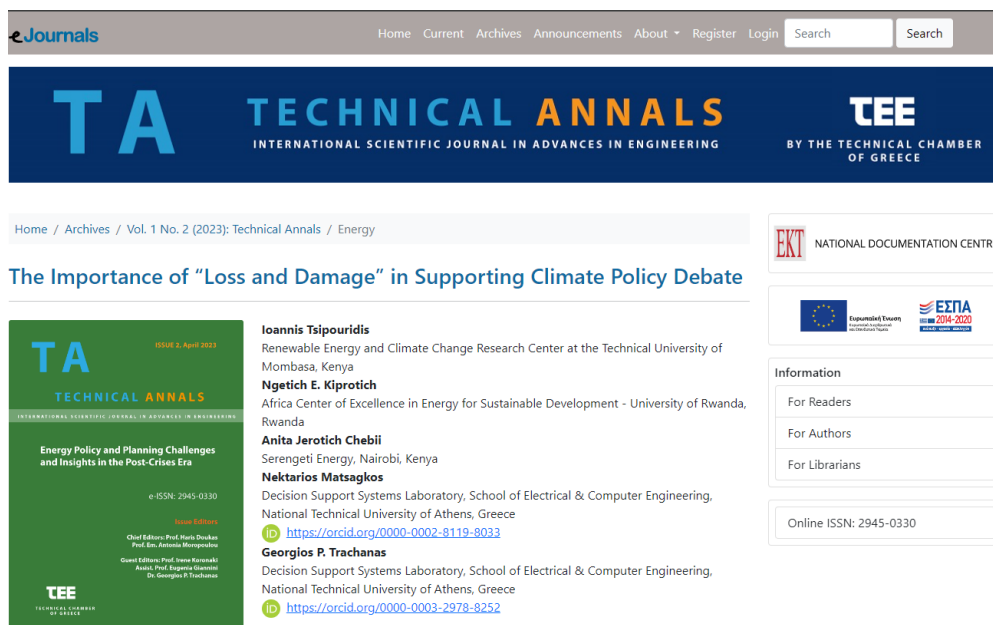


Figure 6. Preview of 'From least cost to least risk: Producing climate change mitigation plans that are resilient to multiple risks' in *Frontiers in Climate*

2.7 Tsipouridis et al. (2023), Technical Annals

Title:	The Importance of “Loss and Damage” in Supporting Climate Policy Debate
Authors:	Ioannis Tsipouridis (TUM), Ngetich E. Kiprotich, Anita Jerotich Chebii, Nektarios Matsagkos (NTUA), Georgios P. Trachanas (NTUA)
Journal:	Technical Annals
Abstract:	Climate change is having profound impacts on human and natural systems. In recent years, there has been growing recognition of the need to address Loss and Damage (L&D) associated with the adverse effects of climate change, particularly in developing countries that are more vulnerable to its impacts. There is a range of studies, examining the concepts, resilience, adaptation and policy options for dealing with climate change losses and damages. This article discusses the actions, research and finance needs in Loss & Damage as well as the approaches to it on some topics such as adaptation, stakeholder engagement, governance and risk transfer.
Keywords:	Loss, Damage, Climate, Impact, Policy
DOI:	https://doi.org/10.12681/ta.34133
First Online:	28 April 2023
Repository:	Zenodo (Link: https://zenodo.org/records/7983105)
Synergies with:	N/A
Citation (APA):	Tsipouridis, I., E. Kiprotich, N., Chebii, A. J., Matsagkos, N., & Trachanas, G. P. (2023). The Importance of “Loss and Damage” in Supporting Climate Policy Debate. <i>Technical Annals</i> , 1(2). https://doi.org/10.12681/ta.34133



The screenshot shows the journal's website interface. At the top, there is a navigation bar with 'Home', 'Current', 'Archives', 'Announcements', 'About', 'Register', and 'Login'. A search bar is also present. Below the navigation bar is the journal's logo, 'TA TECHNICAL ANNALS', with the subtitle 'INTERNATIONAL SCIENTIFIC JOURNAL IN ADVANCES IN ENGINEERING' and the publisher 'TEE BY THE TECHNICAL CHAMBER OF GREECE'. The main content area displays the article title 'The Importance of “Loss and Damage” in Supporting Climate Policy Debate' and a list of authors with their affiliations: Ioannis Tsipouridis (Renewable Energy and Climate Change Research Center at the Technical University of Mombasa, Kenya), Ngetich E. Kiprotich (Africa Center of Excellence in Energy for Sustainable Development - University of Rwanda, Rwanda), Anita Jerotich Chebii (Serengeti Energy, Nairobi, Kenya), Nektarios Matsagkos (Decision Support Systems Laboratory, School of Electrical & Computer Engineering, National Technical University of Athens, Greece), and Georgios P. Trachanas (Decision Support Systems Laboratory, School of Electrical & Computer Engineering, National Technical University of Athens, Greece). A sidebar on the right contains information about the National Documentation Centre (EKT), the European Union, and the EKTIA 2014-2020 program, along with an 'Information' section for readers, authors, and librarians, and the online ISSN: 2945-0330.

Figure 7. Preview of ‘The Importance of “Loss and Damage” in Supporting Climate Policy Debate’ in Technical Annals

2.8 Van de Ven et al. (2023), Nature Climate Change

- Title:** A multi-model analysis of post-Glasgow climate targets and feasibility challenges
- Authors:** Dirk-Jan van de Ven (BC3), Shivika Mittal (Imperial), Ajay Gambhir (Imperial), Robin Lamboll (Imperial), Haris Doukas (NTUA), Sara Giarola (Imperial), Adam Hawkes (Imperial), Konstantinos Koasidis (NTUA), Alexandre C. Koberle (Imperial), Haewon McJeon, Sigit Perdana, Glen P. Peters (CICERO), Joeri Rogelj, Ida Sognnaes (CICERO), Marc Vielle, Alexandros Nikas (NTUA)
- Journal:** Nature Climate Change
- Abstract:** The COP26 Glasgow process resulted in many countries strengthening their 2030 emissions reduction targets and announcing net-zero pledges for 2050–2070 but it is not clear how this would impact future warming. Here, we use four diverse integrated assessment models (IAMs) to assess CO₂ emission trajectories in the near- and long-term on the basis of national policies and pledges, combined with a non-CO₂ infilling model and a simple climate model to assess the temperature implications. We also consider the feasibility of national long-term pledges towards net-zero. While near-term pledges alone lead to warming above 2 °C, the addition of long-term pledges leads to emissions trajectories compatible with a future well below 2 °C, across all four IAMs. However, while IAM heterogeneity translates to diverse decarbonization pathways towards long-term targets, all modelled pathways indicate several feasibility concerns, relating to the cost of mitigation and the rates and scales of deployed technologies and measures.
- Keywords:** global modelling; regional modelling; synergies
- DOI:** <https://doi.org/10.1038/s41558-023-01661-0>
- First Online:** 18 May 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/7982967>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846), H2020 PROVIDE (GA: 101003687)
- Citation (APA):** van de Ven, D. J., Mittal, S., Gambhir, A., Lamboll, R. D., Doukas, H., Giarola, S., ... & Nikas, A. (2023). A multimodel analysis of post-Glasgow climate targets and feasibility challenges. *Nature Climate Change*, 1-9.

nature > nature climate change > analyses > article

Analysis | Published: 18 May 2023

A multimodel analysis of post-Glasgow climate targets and feasibility challenges

[Dirk-Jan van de Ven](#), [Shivika Mittal](#), [Ajay Gambhir](#), [Robin D. Lamboll](#), [Haris Doukas](#), [Sara Giarola](#), [Adam Hawkes](#), [Konstantinos Koasidis](#), [Alexandre C. Köberle](#), [Haewon McJeon](#), [Sigit Perdana](#), [Glen P. Peters](#), [Joeri Rogelj](#), [Ida Sognnaes](#), [Marc Vialle](#) & [Alexandros Nikas](#)

Nature Climate Change **13**, 570–578 (2023) | [Cite this article](#)

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Abstract

The COP26 Glasgow process resulted in many countries strengthening their 2030 emissions reduction targets and announcing net-zero pledges for 2050–2070 but it is not clear how this would impact future warming. Here, we use four diverse integrated assessment models (IAMs) to assess CO₂ emission trajectories in the near- and long-term on the basis of national policies and pledges, combined with a non-CO₂ infilling model and a simple climate model to assess the temperature implications. We also consider the feasibility of national long-term pledges towards net-zero. While near-term pledges alone lead to warming above 2 °C, the addition of long-term pledges leads to emissions trajectories compatible with a future well below 2 °C, across all four IAMs. However, while IAM heterogeneity translates to diverse decarbonization pathways towards long-term targets, all modelled pathways indicate several feasibility concerns, relating to the cost of mitigation and the rates and scales of deployed technologies and measures.

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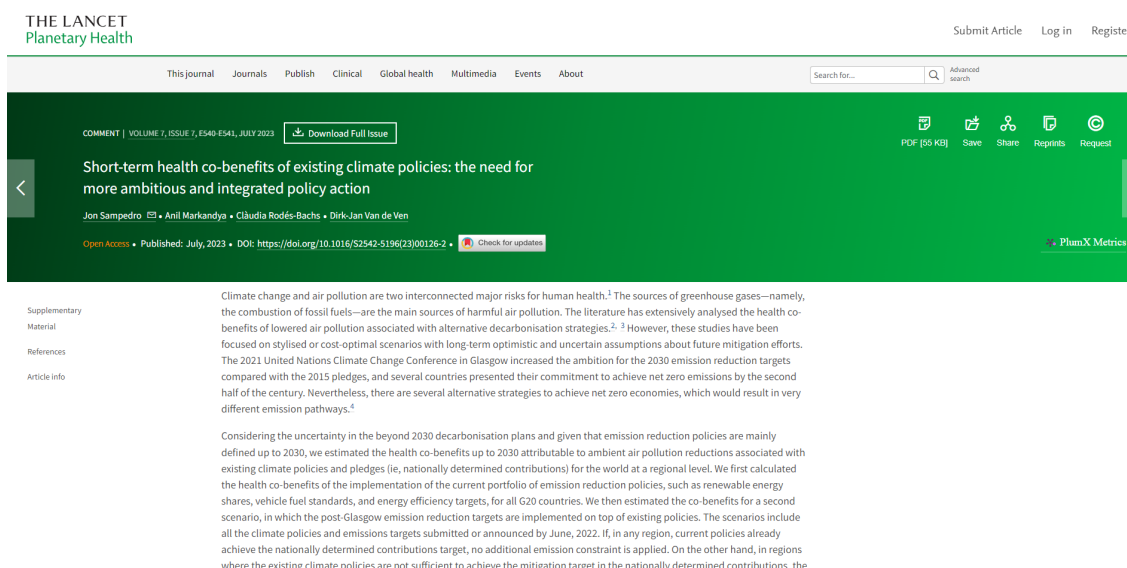
[Code availability](#)

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Figure 8. Preview of 'A multi-model analysis of post-Glasgow climate targets and feasibility challenges' in Nature Climate Change

2.9 Sampedro et al. (2023), The Lancet Planetary Health

Title:	Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action
Authors:	Jon Sampedro (BC3), Anil Markandya (BC3), Clàudia Rodés-Bachs (BC3), Dirk-Jan Van de Ven (BC3)
Journal:	The Lancet Planetary Health
Abstract:	Climate change and air pollution are two interconnected major risks for human health. For calculations of the health co-benefits, we combine the Global Change Analysis Model (GCAM) with rfast, a tool designed to calculate a range of adverse health and agricultural effects attributable to air pollution for alternative scenarios. In summary, health co-benefits associated with current policies and nationally determined contributions are relatively small. The results show that to reduce health impacts attributable to ambient air pollution rapidly, additional policy action that is explicitly designed for tackling air pollutant emissions will be needed.
Keywords:	Climate policies; health
DOI:	https://doi.org/10.1016/S2542-5196(23)00126-2
First Online:	31 July 2023
Repository:	Zenodo (Link: https://zenodo.org/records/7982967)
Synergies with:	N/A
Citation (APA):	Sampedro, J., Markandya, A., Rodés-Bachs, C., & Van de Ven, D. J. (2023). Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action. <i>The Lancet Planetary Health</i> , 7(7), e540-e541.



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Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action

Jon Sampedro • Anil Markandya • Clàudia Rodés-Bachs • Dirk-Jan Van de Ven

Open Access • Published: July, 2023 • DOI: [https://doi.org/10.1016/S2542-5196\(23\)00126-2](https://doi.org/10.1016/S2542-5196(23)00126-2) • Check for updates

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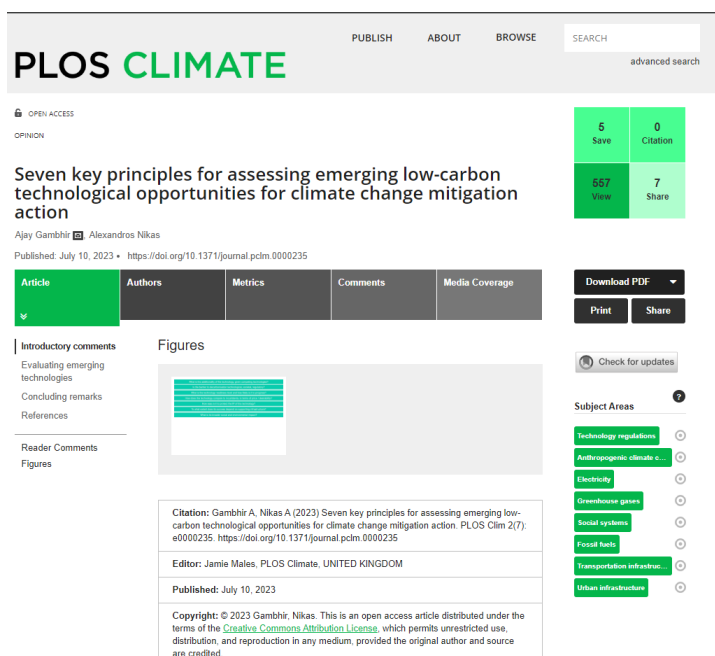
Climate change and air pollution are two interconnected major risks for human health.¹ The sources of greenhouse gases—namely, the combustion of fossil fuels—are the main sources of harmful air pollution. The literature has extensively analysed the health co-benefits of lowered air pollution associated with alternative decarbonisation strategies.^{2–3} However, these studies have been focused on stylised or cost-optimal scenarios with long-term optimistic and uncertain assumptions about future mitigation efforts. The 2021 United Nations Climate Change Conference in Glasgow increased the ambition for the 2030 emission reduction targets compared with the 2015 pledges, and several countries presented their commitment to achieve net zero emissions by the second half of the century. Nevertheless, there are several alternative strategies to achieve net zero economies, which would result in very different emission pathways.⁴

Considering the uncertainty in the beyond 2030 decarbonisation plans and given that emission reduction policies are mainly defined up to 2030, we estimated the health co-benefits up to 2030 attributable to ambient air pollution reductions associated with existing climate policies and pledges (i.e. nationally determined contributions) for the world at a regional level. We first calculated the health co-benefits of the implementation of the current portfolio of emission reduction policies, such as renewable energy shares, vehicle fuel standards, and energy efficiency targets, for all G20 countries. We then estimated the co-benefits for a second scenario, in which the post-Glasgow emission reduction targets are implemented on top of existing policies. The scenarios include all the climate policies and emissions targets submitted or announced by June, 2022. If, in any region, current policies already achieve the nationally determined contributions target, no additional emission constraint is applied. On the other hand, in regions where the existing climate policies are not sufficient to achieve the mitigation target in the nationally determined contributions, the

Figure 9. Preview of 'Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action' in The Lancet Planetary Health

2.10 Gambhir & Nikas (2023), PLOS Climate

- Title:** Seven key principles for assessing emerging low-carbon technological opportunities for climate change mitigation action
- Authors:** Ajay Gambhir (Imperial), Alexandros Nikas (NTUA)
- Journal:** PLOS Climate
- Abstract:** The proposed framework is an intuitively obvious one, yet still serves as a climate technology-specific “checklist” to ensure that any newly proposed technologies or products can succeed. There will be continuous changes to the regulations, infrastructures, and political contexts, in which new technologies will be developed, which is why each consideration is not intended as a one-shot “yes/no” process but must rather be continuously reviewed and reconsidered in light of potentially rapid developments.
- Keywords:** Low-carbon; climate change mitigation
- DOI:** <https://doi.org/10.1371/journal.pclm.0000235>
- First Online:** 10 July 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/8183549>)
- Synergies with:** HE DIAMOND (GA: 101081179)
- Citation (APA):** Gambhir, A., & Nikas, A. (2023). Seven key principles for assessing emerging low-carbon technological opportunities for climate change mitigation action. PLOS Climate, 2(7), e0000235.



The screenshot shows the PLOS Climate article page. At the top, there is a navigation bar with 'PUBLISH', 'ABOUT', and 'BROWSE' links, and a search bar. The article title is 'Seven key principles for assessing emerging low-carbon technological opportunities for climate change mitigation action' by Ajay Gambhir and Alexandros Nikas, published on July 10, 2023. The article is marked as 'OPEN ACCESS' and 'OPINION'. On the right side, there are statistics: 5 Save, 0 Citation, 657 View, and 7 Share. Below the title, there are tabs for 'Article', 'Authors', 'Metrics', 'Comments', and 'Media Coverage'. The 'Article' tab is selected. The main content area shows 'Introductory comments', 'Evaluating emerging technologies', 'Concluding remarks', and 'References'. There is also a 'Figures' section with a placeholder image. On the right side, there are buttons for 'Download PDF', 'Print', and 'Share', and a 'Check for updates' button. Below that, there is a 'Subject Areas' section with a list of categories: Technology regulations, Anthropogenic climate c..., Electricity, Greenhouse gases, Social systems, Fossil fuels, Transportation infrastru..., and Urban infrastructure. At the bottom, there is a citation block: 'Citation: Gambhir A, Nikas A (2023) Seven key principles for assessing emerging low-carbon technological opportunities for climate change mitigation action. PLOS Clim 2(7): e0000235. https://doi.org/10.1371/journal.pclm.0000235'. The editor is listed as Jamie Males, PLOS Climate, UNITED KINGDOM. The publication date is July 10, 2023. The copyright notice states: 'Copyright: © 2023 Gambhir, Nikas. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.'

Figure 10. Preview of 'Seven key principles for assessing emerging low-carbon technological opportunities for climate change mitigation action' in PLOS Climate

2.11 Giarola et al. (2023), Energies

- Title:** Sustainability Education: Capacity Building Using the MUSE Model
- Authors:** Sara Giarola (Imperial), Alexander Kell (Imperial), Sonja Sechi (POLIMI), Mattia Carboni, Mattia Carboni, Pierluigi Leone, Adam Hawkes (Imperial)
- Journal:** Energies
- Abstract:** Education for sustainable development has among its pillars, capacity building, which equips future generations with the set of skills needed to face the challenge of the transformation of society for sustainable development. This paper presents a training course for a novel model of long-term energy planning (the ModUlar energy system Simulation Environment, MUSE), as an example of capacity building activities for sustainable development. The activities were part of the Joint Summer School on Modelling Tools for Sustainable development, held in Trieste (Italy) in 2022. This summer school was one of the first successful implementations of education and training courses in a super-hybrid mode in the post-COVID era. Describing the training activities for MUSE open-source, this paper addresses one of the challenges that education for sustainable development is expected to increasingly face in the future: the training of future professionals in the use of novel toolkits and the implementation of truly trans-disciplinary approaches. This paper discusses the pre-school online training course for MUSE, the summer school contents, and some student modeling outcomes. While doing so, it shows the importance of leveraging the abstract contents of a course with practical exercises when learning a new tool. Reflecting upon the students' experience, this paper draws conclusions that can be used to improve future editions of the same course and be extended to the design of training courses for other tools.
- Keywords:** energy system modeling; integrated assessment modeling; education; open university; sustainable development goals
- DOI:** <https://doi.org/10.3390/en16145500>
- First Online:** 20 July 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/8427214>)
- Synergies with:** N/A
- Citation (APA):** Giarola, S., Kell, A., Sechi, S., Carboni, M., Dall-Orsoletta, A., Leone, P., & Hawkes, A. (2023). Sustainability Education: Capacity Building Using the MUSE Model. *Energies*, 16(14), 5500.

The screenshot displays the MDPI journal interface. At the top, there are navigation links for Journals, Topics, Information, Author Services, Initiatives, and About, along with a search bar and a 'Submit' button. Below the navigation, there is a search section with input fields for 'Title / Keyword', 'Author / Affiliation / Email', and a dropdown for 'Energies'. The main content area shows the article 'Sustainability Education: Capacity Building Using the MUSE Model' by Sara Giarola, Alexander Kell, Sonja Sechi, Mattia Carboni, Alaize Dall-Orsoletta, Pierluigi Leone, and Adam Hawkes. The article is marked as 'Open Access Article' and includes a list of authors with their affiliations. The abstract is visible, discussing education for sustainable development and the MUSE model. The interface also features a sidebar with 'Article Menu' options like 'Submit to this Journal', 'Review for this Journal', and 'Propose a Special Issue'. A right-hand sidebar contains social media and utility icons like 'Altmetric', 'Share', 'Help', 'Cite', 'Discuss in SciProfiles', 'Endorse', and 'Comment'.

Figure 11. Preview of 'Sustainability Education: Capacity Building Using the MUSE Model' in Energies

2.12 Gambhir et al. (2023), Nature Communications

- Title:** Adjusting 1.5 degree C climate change mitigation pathways in light of adverse new information
- Authors:** Ajay Gambhir (Imperial), Shivika Mittal (Imperial), Robin D. Lamboll (Imperial), Neil Grant (Imperial), Dan Bernie, Laila Gohar, Adam Hawkes (Imperial), Alexandre Köberle (Imperial), Joeri Rogelj, Jason A. Lowe
- Journal:** Nature Communications
- Abstract:** Understanding how 1.5 °C pathways could adjust in light of new adverse information, such as a reduced 1.5 °C carbon budget, or slower-than-expected low-carbon technology deployment, is critical for planning resilient pathways. We use an integrated assessment model to explore potential pathway adjustments starting in 2025 and 2030, following the arrival of new information. The 1.5 °C target remains achievable in the model, in light of some adverse information, provided a broad portfolio of technologies and measures is still available. If multiple pieces of adverse information arrive simultaneously, average annual emissions reductions near 3 GtCO₂/yr for the first five years following the pathway adjustment, compared to 2 GtCO₂/yr in 2020 when the Covid-19 pandemic began. Moreover, in these scenarios of multiple simultaneous adverse information, by 2050 mitigation costs are 4-5 times as high as a no adverse information scenario, highlighting the criticality of developing a wide range of mitigation options, including energy demand reduction options.
- Keywords:** Climate change mitigation; pathways; information
- DOI:** <https://doi.org/10.1038/s41467-023-40673-4>
- First Online:** 23 August 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/8354921>)
- Synergies with:** UK Foreign, Commonwealth & Development Office Climate Compatible Growth (GA: GB-GOV-1-300125)
- Citation (APA):** Gambhir, A., Mittal, S., Lamboll, R. D., Grant, N., Bernie, D., Gohar, L., ... & Lowe, J. A. (2023). Adjusting 1.5 degree C climate change mitigation pathways in light of adverse new information. *Nature Communications*, 14(1), 5117.

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Adjusting 1.5 degree C climate change mitigation pathways in light of adverse new information

[Ajay Gambhir](#), [Shivika Mittal](#), [Robin D. Lamboll](#), [Neil Grant](#), [Dan Bernie](#), [Laila Gohar](#), [Adam Hawkes](#), [Alexandre Köberle](#), [Joeri Rogelj](#) & [Jason A. Lowe](#)

Nature Communications **14**, Article number: 5117 (2023) | [Cite this article](#)

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Abstract

Understanding how 1.5 °C pathways could adjust in light of new adverse information, such as a reduced 1.5 °C carbon budget, or slower-than-expected low-carbon technology deployment, is critical for planning resilient pathways. We use an integrated assessment model to explore potential pathway adjustments starting in 2025 and 2030, following the arrival of new information. The 1.5 °C target remains achievable in the model, in light of some adverse information, provided a broad portfolio of technologies and measures is still available. If multiple pieces of adverse information arrive simultaneously, average annual emissions reductions near 3 GtCO₂/yr for the first five years following the pathway adjustment, compared to 2 GtCO₂/yr in 2020 when the Covid-19 pandemic began. Moreover, in these scenarios of multiple simultaneous adverse information, by 2050 mitigation costs are 4-5 times as high as a no adverse information scenario, highlighting the criticality of developing a wide range of mitigation options, including energy demand reduction options.

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Figure 12. Preview of 'Adjusting 1.5 degree C climate change mitigation pathways in light of adverse new information' in Nature Communications

2.13 Peters et al. (2023), npj Climate Action

Title:	AR6 scenarios database: an assessment of current practices and future recommendations
Authors:	Glen P. Peters (CICERO), Alaa Al Khourdajie (Imperial), Ida Sognaes (CICERO), Benjamin M. Sanderson (CICERO)
Journal:	npj Climate Action
Abstract:	Mitigation scenarios have become an important element of Intergovernmental Panel on Climate Change (IPCC) reports. We critically assess the curation of the IPCC mitigation scenarios database, with a focus on improving curation and utilisation. The existing method of curation favours particular models, and results may have limited statistical meaning. We draw lessons from experiences with the Coupled Model Intercomparison Project (CMIP) used by the IPCC Working Group I and II communities. We propose that the scientific community takes a more active role in curating the database around policy-relevant knowledge gaps, through an open and peer reviewed process of Model Intercomparison Projects (MIPs) supplemented with individual model studies. The database should be publicly accessible from the time of scenario submission, and actively involve a broad community in developing tools and analysing the database. These suggestions can broaden participation, increase transparency, and enhance the relevance of the database for users.
Keywords:	Current practices; AR6
DOI:	https://doi.org/10.1038/s44168-023-00050-9
First Online:	7 September 2023
Repository:	Zenodo (Link: https://zenodo.org/records/8427170)
Synergies with:	N/A
Citation (APA):	Peters, G. P., Al Khourdajie, A., Sognaes, I., & Sanderson, B. M. (2023). AR6 scenarios database: an assessment of current practices and future recommendations. <i>npj Climate Action</i> , 2(1), 31.

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AR6 scenarios database: an assessment of current practices and future recommendations

[Glen P. Peters](#) , [Alaa Al Khourdajie](#) , [Ida Sognaes](#) & [Benjamin M. Sanderson](#)
[npj Climate Action](#) **2**, Article number: 31 (2023) | [Cite this article](#)

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Abstract

Mitigation scenarios have become an important element of Intergovernmental Panel on Climate Change (IPCC) reports. We critically assess the curation of the IPCC mitigation scenarios database, with a focus on improving curation and utilisation. The existing method of curation favours particular models, and results may have limited statistical meaning. We draw lessons from experiences with the Coupled Model Intercomparison Project (CMIP) used by the IPCC Working Group I and II communities. We propose that the scientific community takes a more active role in curating the database around policy-relevant knowledge gaps, through an open and peer reviewed process of Model Intercomparison Projects (MIPs) supplemented with individual model studies. The database should be publicly accessible from the time of scenario submission, and actively involve a broad community in developing tools and analysing the database. These suggestions can broaden participation, increase transparency, and enhance the relevance of the database for users.

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Figure 13. Preview of 'AR6 scenarios database: an assessment of current practices and future recommendations' in npj Climate Action

2.14 Wachsmuth et al. (2023), Renewable and Sustainable Energy Transition

- Title:** Co-creating socio-technical scenarios for net-zero emission pathways: comparison of five national case studies
- Authors:** Jakob Wachsmuth, Philine Warnke, Ajay Gambhir (Imperial), Sara Giarola (Imperial), Konstantinos Koasidis (NTUA), Shivika Mittal (Imperial), Alexandros Nikas (NTUA), Kathleen Vaillancourt, Haris Doukas (NTUA)
- Journal:** Renewable and Sustainable Energy Transition
- Abstract:** The extent to which modelled future pathways support effective policymaking for sustainability transitions has been questioned for a long time, with one major issue being the insufficient integration with the perspectives of policymakers and other stakeholders. One proposal to address this issue has been to set up facilitative dialogues with stakeholders to extend model-based pathways to socio-technical scenarios. This paper presents the results of a first series of such co-creation workshops, where stakeholders discussed bottlenecks for model-based decarbonisation pathways and ways to overcome these bottlenecks through tailored policy mixes. The workshops took place in five countries: Brazil, Canada, Greece, Germany, and the UK, each with a specific sector focus. In all five workshops, it became clear that substantial tensions exist between the “ideal” modelled decarbonisation pathways and the real-world situation on the ground. Also, adverse political framework conditions, uncertainty of future policies and resistance of powerful actors were emphasised as overarching bottlenecks in most workshops. At the same time, in several instances stakeholders pointed out important aspects of transformative trajectories that are not covered by the models. Some challenges and solutions stand out in all countries in spite of the strong diversity of contexts: allocation of capital towards massive investments into low-carbon solutions; infrastructure development for generation and transport of hydrogen, capture and use of CO₂ as well as electricity grid and storage adapted to renewable energy solutions; stakeholder and citizen dialogues, where agreement is reached on cornerstones of long-term decarbonisation trajectories; and demand-side measures complementing investments into low-carbon processes.
- Keywords:** Transition bottlenecks; Sectoral transformations; Stakeholder integration; Transformative policy mix; Foresight; Techno-economic modelling
- DOI:** <https://doi.org/10.1016/j.rset.2023.100064>
- First Online:** 20 September 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/8427170>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846)
- Citation (APA):** Wachsmuth, J., Warnke, P., Gambhir, A., Giarola, S., Koasidis, K., Mittal, S., ... & Doukas, H. (2023). Co-creating socio-technical scenarios for net-zero emission pathways: Comparison of five national case studies. *Renewable and Sustainable Energy Transition*, 4, 100064.



Renewable and Sustainable Energy Transition

Volume 4, August 2023, 100064



Full-length article

Co-creating socio-technical scenarios for net-zero emission pathways: Comparison of five national case studies

[Jakob Wachsmuth](#)^a, [Philine Warnke](#)^a, [Ajay Gambhir](#)^b, [Sara Giarola](#)^c,
[Konstantinos Koasidis](#)^d, [Shivika Mittal](#)^b, [Alexandros Nikas](#)^d, [Kathleen Vaillancourt](#)^e,
[Haris Doukas](#)^d

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Highlights

- We combine techno-economic modelling, socio-technical analyses and co-creation.
- We demonstrate this in case studies for [Brazil](#), [Canada](#), [Germany](#), [Greece](#) and [UK](#).
- Stakeholders identified key bottlenecks for transitions to net-zero emissions.

Figure 14. Preview of 'Co-creating socio-technical scenarios for net-zero emission pathways: comparison of five national case studies' in Renewable and Sustainable Energy Transition

2.15 Koutsandreas et al. (2023), Energy Strategy Reviews



- Title:** A multicriteria modeling approach for evaluating power generation scenarios under uncertainty: The case of green hydrogen in Greece
- Authors:** Diamantis Koutsandreas (Aalto), Georgios P. Trachanas (NTUA), Ioannis Pappis, Alexandros Nikas (NTUA), Haris Doukas (NTUA), John Psarras (NTUA)
- Journal:** Energy Strategy Reviews
- Abstract:** Clean energy technological innovations are widely acknowledged as a prerequisite to achieving ambitious long-term energy and climate targets. However, the optimal speed of their adoption has been parsimoniously studied in the literature. This study seeks to identify the optimal intensity of moving to a green hydrogen electricity sector in Greece, using the OSeMOSYS energy modeling framework. Green hydrogen policies are evaluated, first, on the basis of their robustness against uncertainty and, afterwards, against conflicting performance criteria and for different decision-making profiles towards risk, by applying the VIKOR and TOPSIS multi-criteria decision aid methods. Although our analysis focuses exclusively on the power sector and compares different rates of hydrogen penetration compared to a business-as-usual case without considering other game-changing innovations (such as other types of storage or carbon capture and storage), we find that a national transition to a green hydrogen economy can support Greece in potentially cutting at least 16 MtCO₂ while stimulating investments of EUR 10–13 bn. over 2030–2050.
- Keywords:** Energy system modelling; Energy planning; OSeMOSYS-Greece; VIKOR; TOPSIS
- DOI:** <https://doi.org/10.1016/j.esr.2023.101233>
- First Online:** 10 October 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/8427501>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846), HE DIAMOND (GA: 101081179)
- Citation (APA):** Koutsandreas, D., Trachanas, G., Pappis, I., Nikas, A., Doukas, H., & Psarras, J. (2023). A multicriteria modeling approach for evaluating power generation scenarios under uncertainty: the case of green hydrogen in Greece. *Energy Strategy Rev.*






Energy Strategy Reviews
Volume 50, November 2023, 101233



A multicriteria modeling approach for evaluating power generation scenarios under uncertainty: The case of green hydrogen in Greece

Diamantis Koutsandreas ^{a, b}, Georgios P. Trachanas ^a, Ioannis Pappis ^c, Alexandros Nikas ^a  
Haris Doukas ^a, John Psarras ^a


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Highlights

- The proposed modeling approach stresses the importance of policymakers' risk profiles.
- A green hydrogen strategy could help Greece cut at least 16 MtCO₂ over 2030–2050.
- It could also stimulate about EUR 10–13 bn. of investments over the same period.

Figure 15. Preview of 'A multicriteria modeling approach for evaluating power generation scenarios under uncertainty: The case of green hydrogen in Greece' in Energy Strategy Reviews

2.16 Anderson et al. (2023), Nature Reviews Earth & Environment

Title:	Controversies of carbon dioxide removal
Authors:	Kevin Anderson, Holly Jean Buck, Lili Fuhr, Oliver Geden, Glen P. Peters (CICERO), Eve Tamme
Journal:	Nature Reviews Earth & Environment
Abstract:	Various methods of carbon dioxide removal (CDR) are being pursued in response to the climate crisis, but they are mostly not proven at scale. Climate experts are divided over whether CDR is a necessary requirement or a dangerous distraction from limiting emissions. In this viewpoint, six experts offer their views on the CDR debate.
Keywords:	Carbon dioxide removal
DOI:	https://doi.org/10.1038/s43017-023-00493-y
First Online:	16 November 2023
Repository:	Zenodo (Link: https://zenodo.org/records/10301846)
Synergies with:	N/A
Citation (APA):	Anderson, K., Buck, H. J., Fuhr, L., Geden, O., Peters, G. P., & Tamme, E. (2023). Controversies of carbon dioxide removal. <i>Nature Reviews Earth & Environment</i> , 1-7.

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Viewpoint | Published: 16 November 2023

Controversies of carbon dioxide removal

Kevin Anderson , Holly Jean Buck , Lili Fuhr , Oliver Geden , Glen P. Peters  & Eve Tamme 

Nature Reviews Earth & Environment 4, 808–814 (2023) | [Cite this article](#)

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 This article has been updated

Various methods of carbon dioxide removal (CDR) are being pursued in response to the climate crisis, but they are mostly not proven at scale. Climate experts are divided over whether CDR is a necessary requirement or a dangerous distraction from limiting emissions. In this Viewpoint, six experts offer their views on the CDR debate.

Carbon dioxide removal (CDR) encompasses various deliberate human approaches that can remove CO₂ from the atmosphere and store it in oceanic, terrestrial or geological reservoirs over climate-relevant timescales of decades to millennia. These approaches include schemes such as reforestation, afforestation, iron fertilisation, ocean alkalinity enhancement.

Figure 16. Preview of 'Controversies of carbon dioxide removal' in Nature Reviews Earth & Environment

2.17 Boitier et al. (2023), Joule

- Title:** A multi-model analysis of the EU's path to net zero
- Authors:** Baptiste Boitier, Alexandros Nikas (NTUA), Ajay Gambhir (Imperial), Konstantinos Koasidis (NTUA), Alessia Elia, Khaled Al-Dabbas, Şirin Alibaş, Lorenza Campagnolo, Alessandro Chiodi, Elisa Delpiazzi, Haris Doukas (NTUA), Arnaud Fougeyrollas, Maurizio Gargiulo, Pierre Le Mouël, Felix Neuner, Sigit Perdana, Dirk-Jan van de Ven (BC3), Marc Vielle, Paul Zagamé, Shivika Mittal (Imperial)
- Journal:** Joule
- Abstract:** The EU has committed to becoming a net-zero economy by 2050, with many member states having integrated this goal into national strategies. However, the bloc's path toward achieving these targets remains unclear. We use five whole-system climate-economy models and two sectoral models to explore how the EU can keep net zero within reach by mid-century, offering insights into intermediate milestones and implications at sectoral and national levels. Our results indicate that a 62% emissions reduction in the Emissions Trading System and 40% in the Effort Sharing Regulation, compared with 2005 levels, are in line with cost-optimal paths toward the bloc's 55% emissions cuts target by 2030. Bridging the gap with net zero in 2050 entails near-complete decarbonization of ETS, total decarbonization of electricity, and complete phaseout of unabated coal power by 2040, as well as rapid scale-up of negative emissions technologies and an 80% diffusion of renewables in the EU electricity mix by 2050.
- Keywords:** Modelling; IAM; net-zero
- DOI:** <https://doi.org/10.1016/j.joule.2023.11.002>
- First Online:** 23 November 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/10213459>)
- Synergies with:** H2020 PARIS REINFORCE (GA: 820846), HE DIAMOND (GA: 101081179)
- Citation (APA):** Boitier, B., Nikas, A., Gambhir, A., Koasidis, K., Elia, A., Al-Dabbas, K., ... & Mittal, S. (2023). A multi-model analysis of the EU's path to net zero. Joule.

Joule



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Article

A multi-model analysis of the EU's path to net zero

Baptiste Boitier¹, Alexandros Nikas^{2,12}, Ajay Gambhir³, Konstantinos Koasidis², Alessia Elia⁴, Khaled Al-Dabbas⁵, Şirin Alibas⁵, Lorenza Campagnolo^{6,7}, Alessandro Chiodi⁴, Elisa Delpiazzo^{6,7,8}, Haris Doukas², Arnaud Fougeyrollas¹, Maurizio Garqiulo⁴, Pierre Le Mouél¹, Felix Neuner⁵, Sigit Perdana⁹, Dirk-Jan van de Ven¹⁰, Marc Vielle⁹, Paul Zaqar¹¹, Shivika Mittal³

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Highlights

- We examine the EU's cost-optimal timeline to net zero by 2050, using seven models
- The bloc should phase out unabated coal and decarbonize its power sector by 2040

Figure 17. Preview of 'A multi-model analysis of the EU's path to net zero' in Joule

2.18 Svarstad et al. (2023), Nature Climate Change

Title:	Critical climate education is crucial for fast and just transformations
Authors:	Hanne Svarstad, Alfredo Jornet, Glen P. Peters (CICERO), Tom G. Griffiths, Tor A. Benjaminsen
Journal:	Nature Climate Change
Abstract:	If rapid and just transformations to low-carbon societies are to take place, citizens need to obtain the necessary knowledge and skills to critically examine and choose adequate climate policy options. An emphasis on critical climate education research and implementation is therefore required.
Keywords:	Climate education; just transformation
DOI:	https://doi.org/10.1038/s41558-023-01875-2
First Online:	4 December 2023
Repository:	Zenodo (Link: https://zenodo.org/records/10303921)
Synergies with:	N/A
Citation (APA):	Svarstad, H., Jornet, A., Peters, G. P., Griffiths, T. G., & Benjaminsen, T. A. (2023). Critical climate education is crucial for fast and just transformations. <i>Nature Climate Change</i> , 13(12), 1274-1275.

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Critical climate education is crucial for fast and just transformations

[Hanne Svarstad](#) , [Alfredo Jornet](#), [Glen P. Peters](#), [Tom G. Griffiths](#) & [Tor A. Benjaminsen](#)

Nature Climate Change **13**, 1274–1275 (2023) | [Cite this article](#)

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If rapid and just transformations to low-carbon societies are to take place, citizens need to obtain the necessary knowledge and skills to critically examine and choose adequate climate policy options. An emphasis on critical climate education research and implementation is therefore required.

Climate mitigation is evolving too slowly compared with the pledges and ambitions to limit global warming to “well below 2.0 °C¹. A range of climate mitigation strategies have been

Figure 18. Preview of ‘Critical climate education is crucial for fast and just transformations’ in Nature Climate Change

2.19 Nikas et al. (2024), Renewable and Sustainable Energy Transition

- Title:** Promoting sustainable transitions across the globe requires scenario co-creation with key stakeholders
- Authors:** Alexandros Nikas, Ajay Gambhir, Baptise Bitier
- Journal:** Renewable and Sustainable Energy Transition
- Abstract:** The Paris Agreement rests on individual countries and regions identifying stretching but feasible mitigation pathways. These must be acceptable and achievable in the eyes of a range of stakeholders in those countries or regions, including those from civil society, governments, and businesses. This Special Issue explores a range of feasible yet ambitious greenhouse gas emissions reduction pathways in a diversity of regions/countries of the world, in principle compatible with the goals of the Paris Agreement on climate change. Each of these pathways have been developed using energy system models or whole-economy models, in most cases using mitigation scenarios co-created with a range of policy, civil society, academic, and business stakeholders.
- Keywords:** Stakeholders; co-creation; sustainability
- DOI:** <https://doi.org/10.1016/j.rset.2023.100076>
- First Online:** 27 December 2023
- Repository:** Zenodo (Link: <https://zenodo.org/records/10518689>)
- Synergies with:** DIAMOND, NDC ASPECTS
- Citation (APA):** Nikas, A., Gambhir, A., & Boitier, B. (2023). Promoting sustainable transitions across the globe requires scenario co-creation with key stakeholders. Renewable and Sustainable Energy Transition, in press.



Renewable and Sustainable Energy Transition

Available online 27 December 2023, 100076

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Promoting sustainable transitions across the globe requires scenario co-creation with key stakeholders

Alexandros Nikas^a, [Ajay Gambhir^b](#), [Baptiste Boitier^c](#)[Show more](#)[+](#) Add to Mendeley [↻](#) Share [🗨](#) Cite<https://doi.org/10.1016/j.rset.2023.100076>[Get rights and content](#)Under a Creative Commons license [↗](#)[open access](#)

The Paris Agreement rests on individual countries and regions identifying stretching but feasible mitigation pathways. These must be acceptable and achievable in the eyes of a range of stakeholders in those countries or regions, including those from civil society, governments, and businesses. This Special Issue explores a range of feasible yet ambitious greenhouse gas emissions reduction pathways in a diversity of regions/ countries of the world, in principle compatible with the goals of the Paris Agreement on climate change. Each of these pathways have been developed using energy system models or whole-economy models, in most cases using mitigation scenarios co-created with a range of policy, civil society, academic, and business stakeholders.

Figure 19: Preview of 'Promoting sustainable transitions across the globe requires scenario co-creation with key stakeholders' in Renewable and Sustainable Energy Transitions

2.20 Nikas et al. (2024), Energy

- Title:** Three different directions in which the European Union could replace Russian natural gas
- Authors:** Alexandros Nikas, Natasha Frilingou, Conall Heussaff, Panagiotis Fragkos, Shivika Mittal, Jon Sampedro, Sara Giarola, Jan-Philipp Sasse, Lorenzo Rinaldi, Haris Doukas, Ajay Gambhir, Anastasis Giannousakis, Nicolò Golinucci, Konstantinos Koasidis, Matteo Vincenzo Rocco, Evelina Trutnevyte, Georgios Xexakis, Georg Zachmann, Eleftheria Zisarou, Emanuela Colombo, Adam Hawkes, Brinda Yarlagadda, Matthew Binsted, Gokul Iyer, Rasmus Magni Johannsen, Jakob Zinck Thellufsen, Henrik Lund, Dirk-Jan Van de Ven, Alexandros Nikas, Ajay Gambhir, Baptise Bitier
- Journal:** Energy
- Abstract:** Russia's invasion of Ukraine fuelled an energy crisis, which considerably impacted Europe given its heavy reliance on Russian natural gas imports. This study uses an ensemble of four global integrated assessment models, which are further soft-linked to two sectoral models, and explores the synergies and trade-offs among three approaches to living without Russian gas in Europe: (a) replacing with other gas imports, (b) boosting domestic energy production, and (c) reducing demand and accelerating energy efficiency. We find that substituting Russian gas from other trade partners would miss an opportunity to accelerate decarbonisation in end-use sectors while risking further fossil-fuel lock-ins, despite featuring the lowest gas price spikes and potentially reducing heating costs for end-users in the near term. Boosting domestic, primarily renewable, energy production on the other hand would instead require considerable investments, potentially burdening consumers. Energy demand reductions, however, could offer considerable space for further emissions cuts at the lowest power-sector investment costs; nonetheless, an energy efficiency-driven strategy would also risk relocation of energy-intensive industries, an aspect of increasing relevance to EU policymakers.
- Keywords:** Stakeholders; co-creation; sustainability
- DOI:** <https://doi.org/10.1016/j.energy.2024.130254>
- First Online:** 04 January 2024
- Repository:** Zenodo (Link: <https://zenodo.org/records/10464723>)
- Synergies with:** N/A
- Citation (APA):** Nikas, A., Frilingou, N., Heussauf, C., Fragkos, P., Mittal, S., Sampedro, J., Giarola, S., Sasse, J.-P., Rinaldi, L., Doukas, H., Gambhir, A., Giannousakis, A., Gollinucci, N., Koasidis, K., Rocco, M.V., Trutnevyte, E., Xexakis, G., Zachmann, G., Zisarou, E., Colombo, E., Hawkes, A., Yarlagadda, B., Binsted, M., Iyer, G., Johannsen, R.M., Thellufsen, J.Z., Lund, H., & Van de Ven, D.-J. (2024). Three different directions in which the European Union could replace Russian natural gas. *Energy*, 290, 130254.






Energy



Volume 290, 1 March 2024, 130254



Three different directions in which the European Union could replace Russian natural gas

Alexandros Nikas^a  , Natasha Frilingou^a, Conall Heussaff^b, Panagiotis Fragkos^c, Shivika Mittal^d, Jon Sampedro^e, Sara Giarola^f, Jan-Philipp Sasse^g, Lorenzo Rinaldi^h, Haris Doukas^a, Ajay Gambhir^d, Anastasis Giannousakis^c, Nicolò Golinucci^h, Konstantinos Koasidis^a, Matteo Vincenzo Rocco^h, Evelina Trutnevyte^g, Georgios Xexakisⁱ, Georg Zachmann^b, Eleftheria Zisarou^c, Emanuela Colombo^h, Dirk-Jan Van de Ven^e


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Highlights

- Three 'corner' strategies to replacing Russian natural gas in the EU are explored.
- EU climate targets can still be reached in all three strategies, but costs increase.
- Promoting energy efficiency or domestic renewables can boost end-use decarbonisation.
- An 'energy efficiency first' response may save millions € in annual electricity costs.
- Southern Europe is the most vulnerable to high electricity prices across strategies.

Figure 20: Preview of 'Three different directions in which the European Union could replace Russian natural gas' in Energy

3 List of book chapters in peer-reviewed books

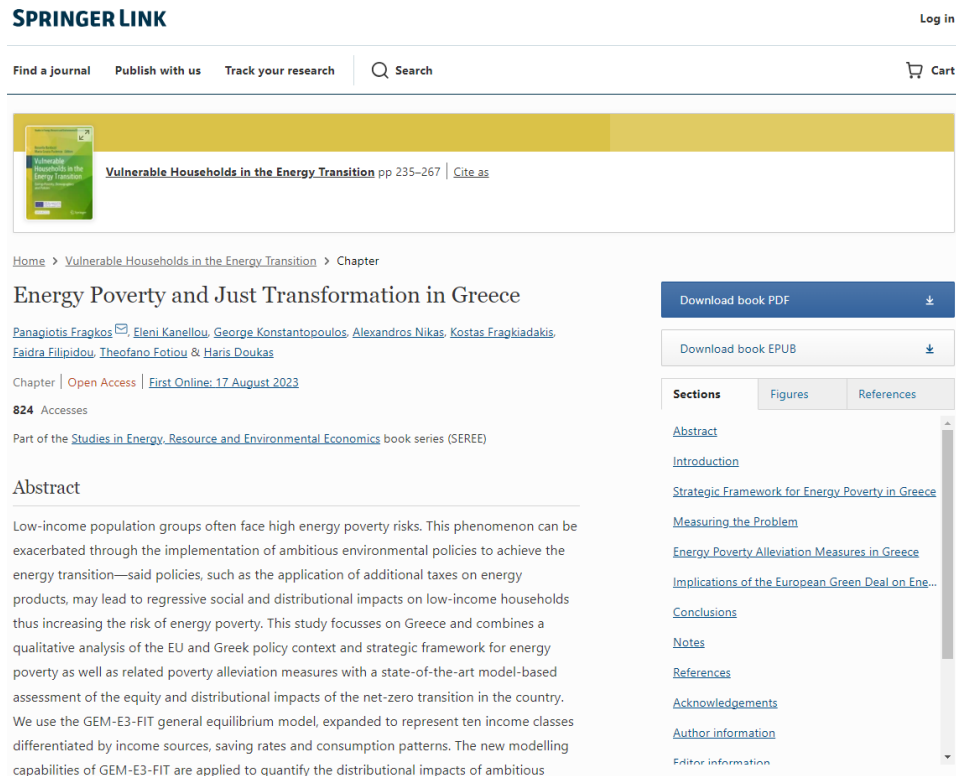
In this section, we report all book chapters² supported by the IAM COMPACT project, mentioning the title, authors (adding the IAM COMPACT partner institutes in parentheses), abstract, and any synergies with other projects funded by the EC or otherwise.

3.1 Fragkos et al. (2023), Studies in Energy, Resource and Environmental Economics

Title:	Energy Poverty and Just Transformation in Greece
Authors:	Panagiotis Fragkos (E3M), Eleni Kanellou (NTUA), George Konstantopoulos (NTUA), Alexandros Nikas (NTUA), Kostas Fragkiadakis (E3M), Faidra Filipidou (E3M), Theofano Fotiou (E3M), Haris Doukas (NTUA)
Book:	Studies in Energy, Resource and Environmental Economics
Abstract:	Low-income population groups often face high energy poverty risks. This phenomenon can be exacerbated through the implementation of ambitious environmental policies to achieve the energy transition—said policies, such as the application of additional taxes on energy products, may lead to regressive social and distributional impacts on low-income households thus increasing the risk of energy poverty. This study focusses on Greece and combines a qualitative analysis of the EU and Greek policy context and strategic framework for energy poverty as well as related poverty alleviation measures with a state-of-the-art model-based assessment of the equity and distributional impacts of the net-zero transition in the country. We use the GEM-E3-FIT general equilibrium model, expanded to represent ten income classes differentiated by income sources, saving rates and consumption patterns. The new modelling capabilities of GEM-E3-FIT are applied to quantify the distributional impacts of ambitious emission reduction targets and at the same time explore their effects on energy-related expenditure and energy poverty by income class in Greece. The country's transition to climate neutrality increases modestly the income inequality across income classes, with low-income households facing the most negative effects. However, using carbon tax revenues as lump-sum transfers to support household income and as reduced social security contributions have the potential to boost employment and scale down income inequality in Greece.
Keywords:	Energy poverty; Greece; just transformation
DOI:	https://doi.org/10.1007/978-3-031-35684-1_10
First Online:	17 August 2023
Repository:	Zenodo (Link: https://zenodo.org/records/10409104)
Synergies with:	H2020 PARIS REINFORCE (GA: 820846), NAVIGATE (GA: 821124), H2020 POWERPOOR (GA: 890437), H2020 ECEMF (GA: 101022622)
Citation (APA):	Fragkos, P., Kanellou, E., Konstantopoulos, G., Nikas, A., Fragkiadakis, K., Filipidou, F., ... &


² <https://iam-compact.eu/publications/scientific-publications>

Doukas, H. (2023). Energy Poverty and Just Transformation in Greece. Vulnerable Households in the Energy Transition, 235.




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Energy Poverty and Just Transformation in Greece

[Panagiotis Fragkos](#)  [Eleni Kanellou](#), [George Konstantopoulos](#), [Alexandros Nikas](#), [Kostas Fragkiadakis](#), [Faidra Filipidou](#), [Theofano Fotiou](#) & [Haris Doukas](#)


Chapter | [Open Access](#) | [First Online: 17 August 2023](#)


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Part of the [Studies in Energy, Resource and Environmental Economics](#) book series (SEREE)

Abstract

Low-income population groups often face high energy poverty risks. This phenomenon can be exacerbated through the implementation of ambitious environmental policies to achieve the energy transition—said policies, such as the application of additional taxes on energy products, may lead to regressive social and distributional impacts on low-income households thus increasing the risk of energy poverty. This study focusses on Greece and combines a qualitative analysis of the EU and Greek policy context and strategic framework for energy poverty as well as related poverty alleviation measures with a state-of-the-art model-based assessment of the equity and distributional impacts of the net-zero transition in the country. We use the GEM-E3-FIT general equilibrium model, expanded to represent ten income classes differentiated by income sources, saving rates and consumption patterns. The new modelling capabilities of GEM-E3-FIT are applied to quantify the distributional impacts of ambitious

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[Conclusions](#)

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Figure 21. Preview of 'Energy Poverty and Just Transformation in Greece' in Studies in Energy, Resource and Environmental Economics

4 Conferences

In this section, we report all the conference papers/posters/presentations³ presented by IAM COMPACT consortium members, mentioning the title, authors (adding the IAM COMPACT partner institutes in parentheses), abstract, and the venue where the conference took place.

4.1 Van de Ven et al. (2022), Fifteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 29 November – 1 December, 2022

Title:	Tracing the transformation through a decade of mitigation scenarios
Type	Presentation
Authors:	Dirk-Jan van de Ven (BC3), Panagiotis Fragkos (E3M), Faidra Filippidou (E3M), Lukas Hermwille (WI), Wolfgang Obergassel (WI), Leon Clarke (UMD), Ajay Gambhir (Imperial) Mikel Gonzalez-Eguino (BC3), Shivika Mittal (Imperial), Alexandros Nikas (NTUA), Glen P. Peters (CICERO), Ida Sognnaes (CICERO)
Abstract:	Presented by Dirk-Jan van de Ven (Basque Centre for Climate Change).
Conference:	Fifteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	29 November – 1 December, 2022
Venue:	Maryland, USA.
Synergies:	H2020 NDC ASPECTS (GA: 101003866)
Citation (APA):	Van de Ven, D.J., Fragkos, P., Filippidou, F., Hermwille, L., Obergassel, W., Clarke, L., Gambhir, A., Gonzalez-Eguino, M., Mittal, S., Nikas, A., Peters, G.P. & Sognnaes, I. (2022). Tracing the transformation through a decade of mitigation scenarios. Fifteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 29 - December 1, 2022, Maryland, USA.

³ <https://iam-compact.eu/publications/conferences>

4.2 Van de Ven et al. (2023), GCAM Community Modeling Meeting, 6-8 June, 2023

Title:	"Current Policies" scenario: Implementation in GCAM and open community effort
Type	Presentation
Authors:	Dirk-Jan van de Ven (BC3), Russell Horowitz (BC3), Jon Sampedro (BC3)
Abstract:	Presented by Dirk-Jan van de Ven (Basque Centre for Climate Change).
Conference:	GCAM Community Modeling Meeting
Date:	6-8 June, 2023
Venue:	Virtually
Synergies:	H2020 NDC ASPECTS (GA: 101003866)
Citation (APA):	Van de Ven, D.J., Horowitz, R. & Sampedro, J. (2023). Current Policies scenario: Implementation in GCAM and open community effort. GCAM Community Modeling Meeting, June 6 - 8, 2023, virtually.

4.3 Sampedro et al. (2023), GCAM Community Modeling Meeting, 6-8 June, 2023

Title:	Residential Energy Demand, Emissions, and Expenditures at Regional and Income-decile Level for Alternative Futures
Type	Presentation
Authors:	Jon Sampedro (BC3), Stephanie Waldhoff, Jae Edmonds, Gokul Iyer, Siwa Msangi, Kanishka Narayan, Pralit Patel, Marshall Wise
Abstract:	Presented by Jon Sampedro (Basque Centre for Climate Change).
Conference:	GCAM Community Modeling Meeting
Date:	6-8 June, 2023
Venue:	Virtually
Synergies:	H2020 NDC ASPECTS (GA: 101003866)
Citation (APA):	Sampedro J., Waldhoff, S., Edmonds, J., Iyer, G., Msangi, S., Narayan, K., Pater, P. & Wise, M. (2023). Residential energy demand, emissions, and expenditures at regional and income-decile level for alternative futures. GCAM Community Modeling Meeting, June 6 - 8, 2023, virtually.

4.4 Rodés-Bachs et al. (2023), GCAM Community Modeling Meeting, 6-8 June, 2023

Title:	An R Tool to Process and Standardize GCAM Outputs
Type	Presentation
Authors:	Clàudia Rodés-Bachs (BC3), Jon Sampedro (BC3), Dirk-Jan Van de Ven (BC3), Ryna Yiyun Cui (UMD), Alicia Zhao (UMD), Matthew Zwerling (UMD)
Abstract:	Presented by Clàudia Rodés-Bachs (Basque Centre for Climate Change).
Conference:	GCAM Community Modeling Meeting
Date:	6-8 June, 2023
Venue:	Virtually
Synergies:	N/A
Citation (APA):	Rodés-Bachs, C., Sampedro, J., Van der Ven, D.J., Cui, R.Y., Zhao, A. & Zwerling, M. (2023). gcamreport: An R tool to process and standardize GCAM outputs, GCAM Community Modeling Meeting, June 6 - 8, 2023, virtually.

4.5 Sampedro et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November, 2023

Title:	Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action
Type	Presentation
Authors:	Jon Sampedro (BC3) et al.
Abstract:	Presented by Jon Sampedro (Basque Centre for Climate Change).
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	N/A
Citation (APA):	J. Sampedro, et. al. (2023). Short-term health co-benefits of existing climate policies: the need for more ambitious and integrated policy action. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 - 16, 2023, Venice, Italy.

4.6 Rodés-Bachs et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November 2023

Title:	System-wide co-benefits associated with healthy and sustainable food consumption patterns
Type	Presentation
Authors:	Claudia Rodés-Bachs (BC3) et al.
Abstract:	Presented by Claudia Rodés-Bachs (Basque Centre for Climate Change).
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	N/A
Citation (APA):	Rodés-Bachs, C., et. al. (2023). System-wide co-benefits associated with healthy and sustainable food consumption patterns. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 - 16, 2023, Venice, Italy.

4.7 Horowitz et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November, 2023

Title:	Modelling Progress towards Emissions Reduction with GCAM Current Policies Database
Type	Presentation
Authors:	Russell Horowitz (BC3) et al.
Abstract:	Presented by Russell Horowitz (Basque Centre for Climate Change).
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	N/A
Citation (APA):	R. Horowitz, et. Al. (2023). Modelling Progress towards Emissions Reduction with GCAM Current Policies Database. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 – 16, 2023, Venice, Italy

4.8 Frilingou et al. (2023), European Climate and Energy Modelling Platform 2023 (ECEMP), 5-6 October 2023

Title:	A multi-model assessment of European strategies to eliminate Russian gas imports
Type	Presentation
Authors:	Natasha Frilingou (NTUa), Connal Heussaff (Bruegel), Panagiotis Fragkos (E3M), Shivika Mittal (Imperial), Jon Sampedro (BC3), Sara Giarola (Imperial), Jan-Philipp Sasse (UNIGE), Lorenzo Rinaldi (POLIMI), Haris Doukas (NTUA), Ajay Gambhir (Imperial), Anastasis Giannousakis (E3M), Nicolò Golinucci (POLIMI), Konstantinos Koasidis (NTUA), Matteo Vincenzo Rocco (POLIMI), Evelina Trutnevyte (UNIGE), Georgios Xexakis, Georg Zachmann (Bruegel), Matthew Binsted, Gokul Iyer, Brinda Yarlagadda, Dirk-Jan Van de Ven (BC3), Alexandros Nikas (NTUA)
Abstract:	Presented by Natasha Frilingou (National Technical University of Athens).
Conference:	European Climate and Energy Modelling Platform 2023 (ECEMP)
Date:	5-6 October, 2023
Venue:	Virtually
Synergies:	HE DIAMOND (GA: 101081179)
Citation (APA):	N. Frilingou, C. Heussaff, P. Fragkos, S. Mittal, J. Sampedro, S. Giarola, J.-P. Sasse, L. Rinaldi, H. Doukas, A. Gambhir, A. Giannousakis, N. Golinucci, K. Koasidis, M.V. Rocco, E. Trutnevyte, G. Xexakis, G. Zachmann, M. Binsted, G. Iyer, B. Yarlagadda, D.-J. Van de Ven, & A. Nikas. (2023). A multi-model assessment of European strategies to eliminate Russian gas imports. European Climate and Energy Modelling Platform 2023 (ECEMP), October 5-6, 2023, Online.

4.9 Boitier et al. (2023), European Climate and Energy Modelling Platform 2023 (ECEMP), 5-6 October 2023

Title:	A multi-model assessment of the EU's path to net zero: aligning near-term action with long-term visions
Type	Presentation
Authors:	Baptiste Boitier, Alexandros Nikas (NTUA), Ajay Gambhir (Imperial), Konstantinos Koasidis (NTUA), Alessia Elia, Khaled Al-Dabbas, Şirin Alibaş, Lorenza Campagnolo, Alessandro Chiodi, Elisa Delpiazzi, Haris Doukas (NTUA), Arnaud Fougeyrollas, Maurizio Gargiulo, Pierre Le Mouël, Felix Neuner, Sigit Perdana, Dirk-Jan van de Ven (BC3), Marc Vielle, Paul Zagamé, Shivika Mittal (Imperial)
Abstract:	Presented by Batiste Boitier.
Conference:	European Climate and Energy Modelling Platform 2023 (ECEMP)
Date:	5-6 October, 2023
Venue:	Virtually
Synergies:	HE DIAMOND (GA: 101081179)
Citation (APA):	B. Boitier, A. Nikas, A. Gambhir, K. Koasidis, A. Elia, K. Al-Dabbas, S. Alibaş, L. Campagnolo, A. Chiodi, E. Delpiazzi, H. Doukas, A. Fougeyrollas, M. Gargiulo, P. Le Mouël, F. Neuner, S. Perdana, D.-J. Van de Ven, M. Vielle, P. Zagamé, & S. Mittal. (2023). A multi-model assessment of the EU's path to net zero: aligning near-term action with long-term visions. European Climate and Energy Modelling Platform 2023 (ECEMP), October 5-6, 2023, Online.

4.10 Wachsmuth et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November, 2023

Title:	Co-creating socio-technical net-zero scenarios based on IAM scenarios and socio-technical analyses
Type	Presentation
Authors:	Jakob Wachsmuth, Philine Warnke, Ajay Gambhir (Imperial), Sara Giarola (Imperial), Konstantinos Koasidis (NTUA), Shivika Mittal (Imperial), Alexandros Nikas (NTUA), Kathleen Vaillancourt, Haris Doukas (NTUA)
Abstract:	Presented by Jakob Wachsmuth.
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	
Citation (APA):	J. Wachsmuth, P. Warnke, A. Gambhir, S. Giarola, K. Koasidis, S. Mittal, A. Nikas, K. Vaillancourt, & H. Doukas. (2023). Co-creating socio-technical net-zero scenarios based on IAM scenarios and socio-technical analyses. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 – 16, 2023, Venice, Italy.

4.11 Nikas et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November, 2023

Title:	Three corner options for replacing Russian gas imports in Europe: a multi-model analysis
Type	Presentation
Authors:	Alexandros Nikas (NTUA), Natasha Frilingou (NTUA), Connal Heussaff (Bruegel), Panagiotis Fragkos (E3M), Shivika Mittal (Imperial), Jon Sampedro (BC3), Sara Giarola (Imperial), Jan-Philipp Sasse (UNIGE), Lorenzo RinaldiHaris Doukas (NTUA), Ajay Gambhir (Imperial), Anastasis Giannousakis (E3M), Nicolò Golinucci (POLIMI), Konstantinos Koasidis (NTUA), Matteo Vincenzo Rocco (POLIMI), Evelina Trutnevyte (UNIGE), Georgios Xexakis, Georg Zachmann (Bruegel), Matthew Binsted, Gokul Iyer, Brinda Yarlagadda, Dirk-Jan Van de Ven (BC3)
Abstract:	Presented by Alexandros Nikas (National Technical University of Athens).
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	HE DIAMOND (GA: 101081179)
Citation (APA):	A. Nikas, N. Frilingou, C. Heussaff, P. Fragkos, S. Mittal, J. Sampedro, S. Giarola, J.-P. Sasse, L. Rinaldi, H. Doukas, A. Gambhir, A. Giannousakis, N. Golinucci, K. Koasidis, M.V. Rocco, E. Trutnevyte, G. Xexakis, G. Zachmann, M. Binsted, G. Iyer, B. Yarlagadda, & D.-J. Van de Ven (2023). Three corner options for replacing Russian gas imports in Europe: a multi-model analysis. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 – 16, 2023, Venice, Italy.

4.12 Boitier et al. (2023), Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), 14-16 November, 2023

Title:	A multi-model analysis of the EU's path to net zero
Type	Presentation
Authors:	Baptiste Boitier, Alexandros Nikas (NTUA), Ajay Gambhir (Imperial), Konstantinos Koasidis (NTUA), Alessia Elia, Khaled Al-Dabbas, Sirin Alibaş, Lorenza Campagnolo, Alessandro Chiodi, Elisa Delpiazzi, Haris Doukas (NTUA), Arnaud Fougeyrollas, Maurizio Gargiulo, Pierre Le Mouël, Felix Neuner, Sigit Perdana, Dirk-Jan Van de Ven (BC3), Marc Vielle, Paul Zagamé, Shivika Mittal (Imperial)
Abstract:	Presented by Baptiste Boitier
Conference:	Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)
Date:	14-16 November, 2023
Venue:	Venice, Italy
Synergies:	HE DIAMOND (GA: 101081179)
Citation (APA):	B. Boitier, A. Nikas, A. Gambhir, K. Koasidis, A. Elia, K. Al-Dabbas, S. Alibaş, L. Campagnolo, A. Chiodi, E. Delpiazzi, H. Doukas, A. Fougeyrollas, M. Gargiulo, P. Le Mouël, F. Neuner, S. Perdana, D.-J. Van de Ven, M. Vielle, P. Zagamé, & S. Mittal. (2023). A multi-model analysis of the EU's path to net zero. Sixteenth Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC), November 14 – 16, 2023, Venice, Italy.

5 Policy Briefs

In this section, the documents explicitly produced to inform policymakers during the project's lifetime are presented⁴ with details such as their title, abstract, keywords, and the website URL where they can be found.

5.1 All partners (2022), Modelling Capabilities and the Policy Response Mechanism

- Title:** Stakeholder Inclusion in Climate and Energy Policy Modelling – The IAM COMPACT Policy Response Mechanism
- Authors:** All modelling teams
- Abstract:** The purpose of this policy brief is to provide external stakeholders with an overview of the envisaged modelling process of the IAM COMPACT project and explain the stakeholder engagement strategy that will form a core part of this process. The strategy revolves around the policy response mechanism, a process that will facilitate constructive dialogue and knowledge sharing between stakeholders and modellers with the aim of generating policy-relevant insights from the IAM COMPACT research agenda.
- Keywords:** Policy brief; Integrated assessment models (IAMs); Climate policy; Climate science; Co-creation; Policy questions
- Link:** [Here](#)
- Online:** November 2022

⁴ <https://iam-compact.eu/publications/policy-briefs>

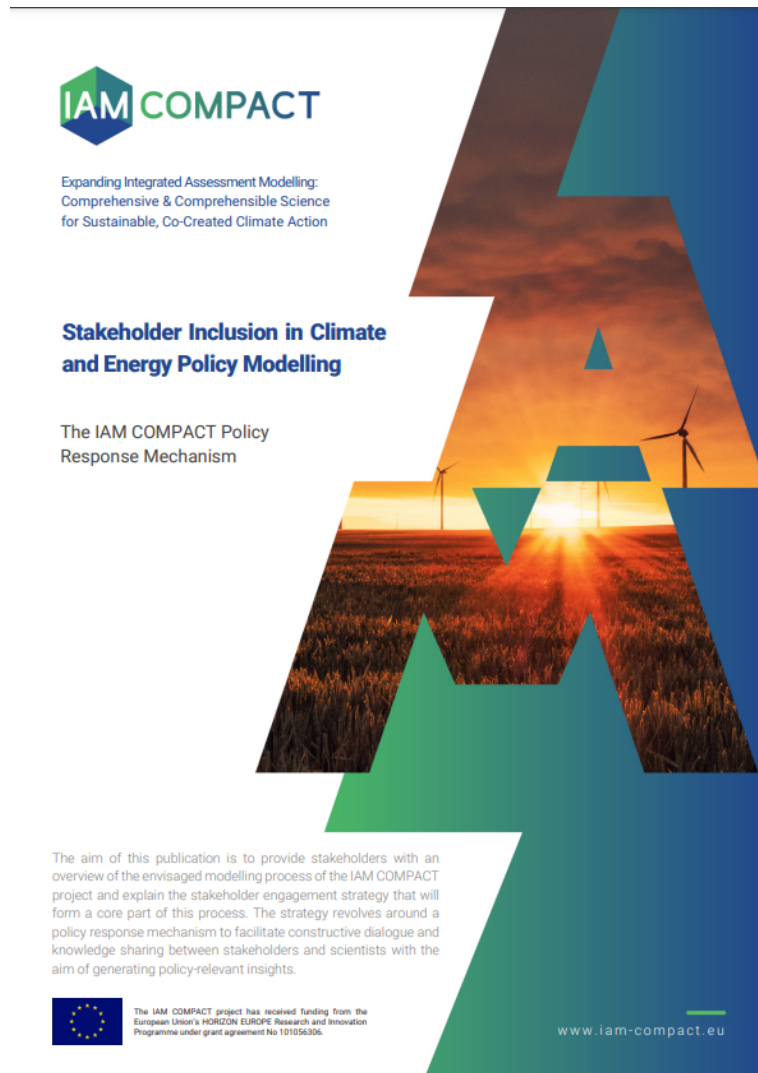


Figure 22. Preview of 'Stakeholder Inclusion in Climate and Energy Policy Modelling - The IAM COMPACT Policy Response Mechanism' Policy Brief

5.2 Nikas et al. (2023), Three responses to the energy crisis - the co-benefits of energy efficiency

- Title:** Three responses to the energy crisis - the co-benefits of energy efficiency
- Authors:** Alexandros Nikas (NTUA), Natasha Frilingou (NTUA), Konstantinos Koasidis (NTUA), Haris Doukas (NTUA), Conall Heussaff (Bruegel), Georg Zachmann (Bruegel), Panagiotis Fragkos (E3M), Anastasis Giannousakis (E3M), Shivika Mittal (Imperial), Sara Giarola (Imperial), Ajay Gambhir (Imperial), Dirk-Jan van de Ven (BC3), Jon Sampedro (BC3), Jan-Philipp Sasse (UNIGE), Evelina Trutnevyte (UNIGE), Lorenzo Rinaldi (POLIMI), Nicolò Golinucci (POLIMI), Matteo Vincenzo Rocco (POLIMI), Georgios Xexakis
- Abstract:** The ongoing war between Russia and Ukraine has created an energy crisis, which has impacted the EU, given its significant reliance on Russian natural gas. This brief explores three scenarios to replace Russian natural gas: increasing gas imports from other regions, increasing domestic production, and accelerating energy efficiency. The scenarios are benchmarked against a baseline scenario that reflects mitigation efforts implied by Nationally Determined Contributions and Long-Term Strategies. The brief aims to provide insights into the trade-offs between the different approaches to replacing Russian gas and their implications for energy sustainability, affordability, and emissions
- Keywords:** Regional modelling
- Link:** [Here](#)
- Online:** April 2023

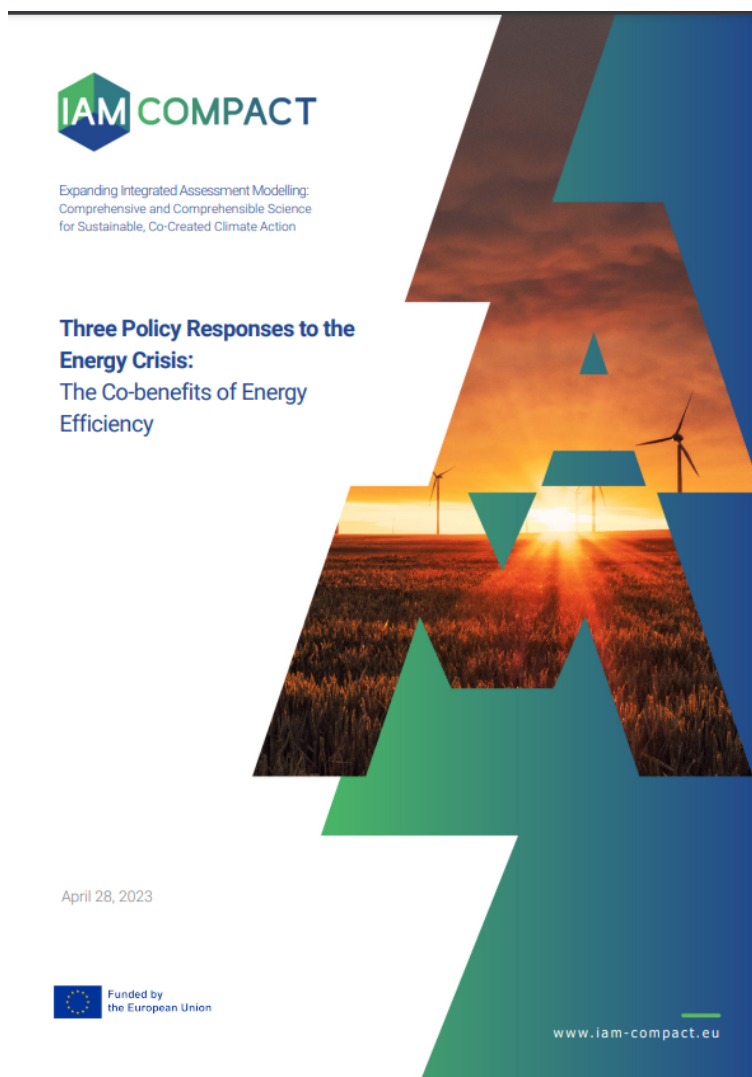


Figure 23. Preview of 'Three responses to the energy crisis - the co-benefits of energy efficiency' Policy Brief

6 Newsletters

In the context of IAM COMPACT's communication and dissemination strategy, the consortium is releasing regular newsletters⁵ to the project's subscribed followers. These newsletters are demonstrated in this section including their title, link, and headlines. The first newsletter became available in February 2023, after the website became available and the project's Communication, Dissemination, and Exploitation (CDE) plan was put together.

6.1 February 2023

Title: IAM COMPACT News: February 2023
Headline: Introducing the IAM COMPACT project in support of climate policymaking
Link: <https://preview.mailerlite.com/q7r8v2c7n5>

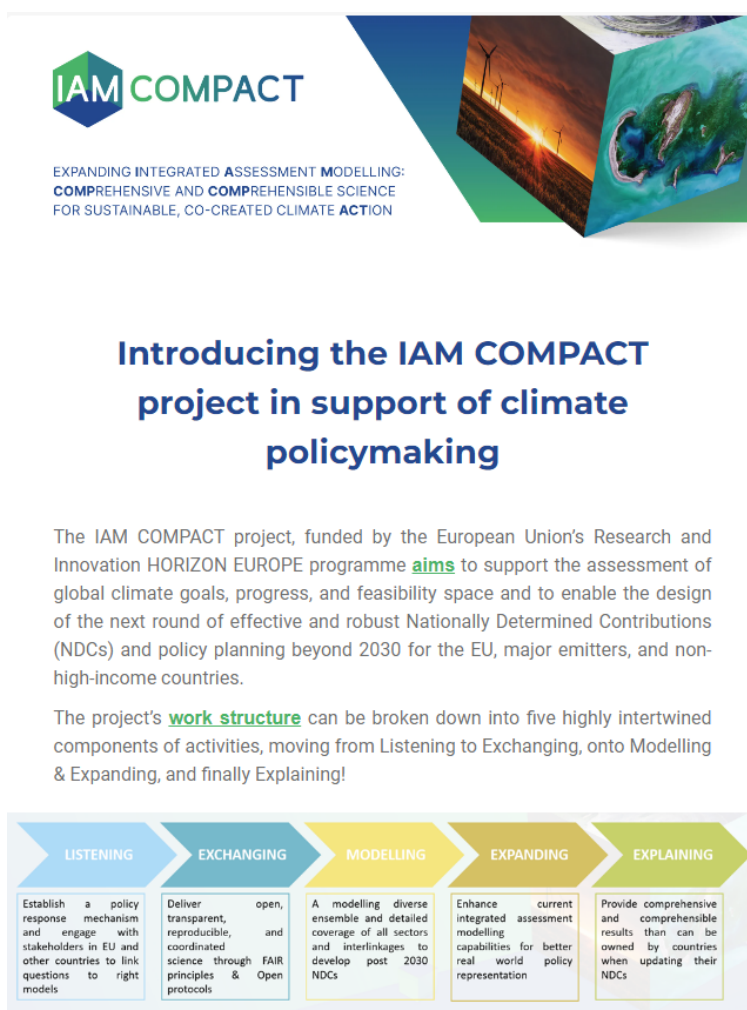


Figure 24. Preview of February 2023 Newsletter

⁵ <https://iam-compact.eu/communication/newsletters-press-releases>

6.2 March 2023

Title: IAM COMPACT News: March 2023
Headline: Editorial
Link: <https://preview.mailerlite.com/a8x4t6x2e5>



Editorial

In the wake of the latest IPCC Synthesis Report, many may wonder where—in the face of this increasing litany of scientific warnings setting out the catastrophe the world is facing—do we find hope? The good news is we still have some slim chances, as well as multiple economically and technically feasible and effective means, to reduce GHG emissions and adapt to human-caused climate change. Yet the world needs urgent, coordinated action now of vastly different stakeholders to address both near-term challenges, and long-term risks!

Looking from a science-policy lens, IAM COMPACT envisages to be the first, truly co-creative climate-economy modelling project to underpin climate policymaking in support of the Paris Agreement principles, with authoritative scientific results and robust projections against different types of uncertainties that are inherent in climate and socioeconomic evolution, and operational capacity. In this regard, IAM COMPACT employs a diversified portfolio of 25 global and regional integrated assessment models, energy and electricity models, as well as sectoral models that altogether accurately cover all geographic scales, the multiplicity of socioeconomic dimensions and economic sectors, and all types of emissions.

Figure 25. Preview of March 2023 Newsletter

6.3 May 2023

Title: IAM COMPACT News: May 2023
Headline: European Commission's 2040 target planning process
Link: <https://preview.mailerlite.com/k0a2i4p4e3>



Figure 26. Preview of May 2023 Newsletter

6.4 July 2023

- Title:** IAM COMPACT News: July 2023
- Headline:** Save the date and join the IAM COMPACT capacity development workshops in Mombasa, Kenya
- Link:** <https://preview.mailerlite.com/z1q9q3t8v8>



Save the date and join the IAM COMPACT capacity development workshops in Mombasa, Kenya

The IAM COMPACT capacity building workshops in Mombasa are set to take place from August 29 to September 1, 2023, with the aim to boost in-country interpretation of scientific evidence for practical action, as well as critically to provide hands-on training on selected modelling tools towards eventually helping guide the development of local model applications for national energy, climate, and sustainability policy support. These workshops, hosted by the **Renewable Energy and Climate Change Research Centre (RECCReC)** at the **Technical University of Mombasa (TUM)** and supported among others by the **Politecnico di Milano (POLIMI)**, the **KTH Royal Institute of Technology (KTH)**, and the **National Technical University of Athens (NTUA)**, will bring together city representatives, experts, students, and stakeholders to provide knowledge on modelling for sustainable development and energy planning for one of the **fastest growing economies** in Africa, **Kenya**.

Figure 27. Preview of July 2023 Newsletter

6.5 September 2023

Title: IAM COMPACT News: September 2023
Headline: IAM COMPACT 2nd General Assembly, August 28 in Mombasa, Kenya
Link: <https://preview.mailerlite.com/f2u9o2x1t0>



IAM COMPACT 2nd General Assembly, August 28 in Mombasa, Kenya



On the 28th of August, the **IAM COMPACT** consortium came together in Mombasa, Kenya, for its 2nd General Assembly. The hybrid meeting was well attended both physically and remotely and it was a great opportunity for all partners to update on current achievements and discuss steps to a foolproof planning to keep meeting our research project's objectives. In short, our constructive discussions enabled to review our core modelling activities, while focusing on the progress of the Core Working Group meetings that took place as part of **IAM COMPACT**'s Policy Response Mechanism, as well as on the

Figure 28. Preview of September 2023 Newsletter

6.6 October 2023

Title: IAM COMPACT News: October 2023

Headline: Community Building: Participation in the European Climate and Energy Modelling Forum – ECEMP 2023

Link: <https://preview.mailerlite.com/q4u0p2l1m6>



Community Building: Participation in the European Climate and Energy Modelling Forum – ECEMP 2023



Earlier this month, **IAM COMPACT** took part in the annual ECEMP conference that was held virtually on October 5-6, 2023. This year's edition focused on net zero, intermediate targets, and sectoral decarbonisation facing geopolitical and macroeconomic challenges. In particular,

- Day I was dedicated to "Mid-term targets towards Net Zero and sectoral challenges", and
- Day II focused on "Macroeconomic and geopolitical challenges and the Net Zero transition".

Figure 29. Preview of October 2023 Newsletter

6.7 December 2023

Title: IAM COMPACT News: December 2023
Headline: IAM COMPACT wishes you happy holidays!
Link: <https://preview.mailerlite.com/j1y4u9h8b6>



Figure 30. Preview of December 2023 Newsletter

6.8 January 2024

Title: IAM COMPACT News: January 2024
Headline: Capacity development workshops
Link: <https://preview.mailerlite.com/k8z4d8z5r0>



Capacity development workshops

IAM COMPACT envisages to be the first, truly co-creative climate-economy modelling project, so that its research questions are scientifically groundbreaking and demand-driven, its results pass the political economy and ecological validity tests, and its process is transparent, comprehended, trusted, legitimised, nationally owned, and transformed into practical action. This includes such countries with limited so far in-house capacity to underpin their sustainable way forward. IAM COMPACT will thus upscale the validation of the approach to co-creating narratives for Paris-compliant sustainable development that international organisations, such as UNDP and UNDESA, employ at the national or regional level.

Ethiopia, Sri Lanka, and Kenya are among such countries, featuring a wide range of challenges: Ethiopia and Kenya are among the fastest developing countries in Africa with multiple open sustainability fronts, while Sri Lanka is an island state in South Asia facing severe sustainability threats from climate change. Nonetheless, all three countries share an ambition to increase mitigation and adaptation efforts and limitations in technical capacity to support such efforts.



Figure 31: Preview of January 2024 newsletter

7 Press Releases

Five press releases⁶ have been sent as of January 2024 to the project's newsletter subscribers, aiming to communicate critical updates and/or news related to project progress or outputs.

7.1 May 2023

Title: IAM COMPACT Press Release: May 2023
Headline: Three Policy Responses to the Energy Crisis: the Co-benefits of Energy Efficiency
Link: <https://preview.mailerlite.com/d0z1a8u9b0>

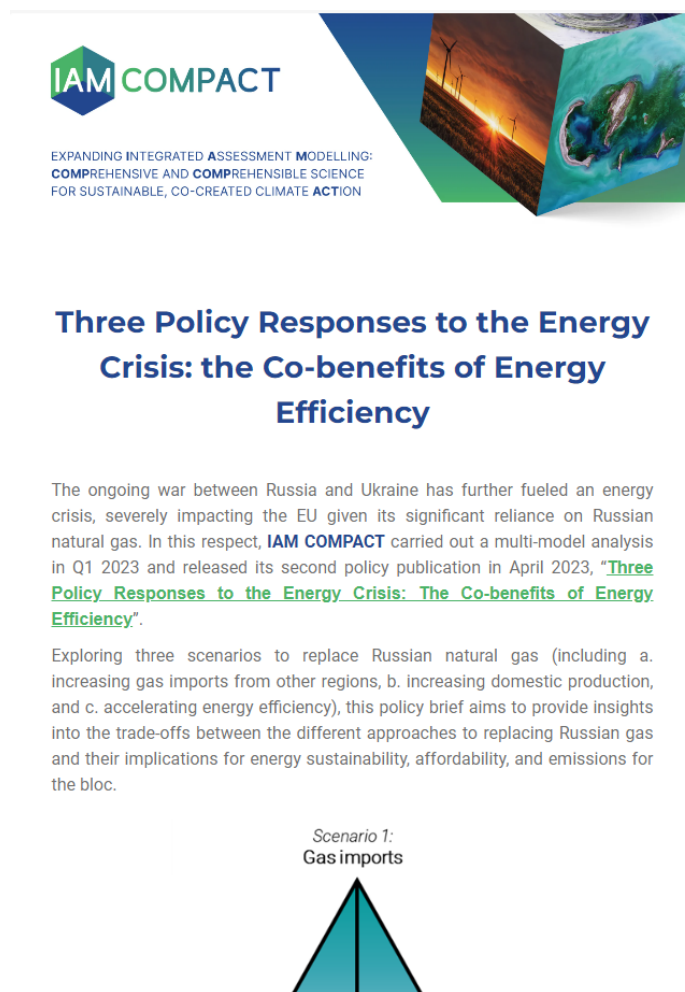


Figure 32. Preview of May 2023 Press Release

⁶ <https://iam-compact.eu/communication/newsletters-press-releases>

7.2 June 2023

Title: IAM COMPACT Press Release: June 2023
Headline: Climate promises may get us in the vicinity of 'well below 2°C' – but are they realistic?
Link: <https://preview.mailerlite.com/v6u6e5p3u3v>



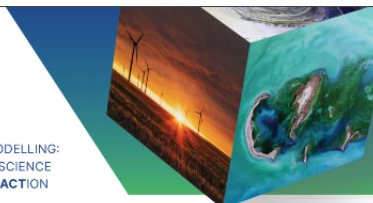
Figure 33. Preview of June 2023 Press Release

7.3 September 2023

Title: IAM COMPACT Press Release: September 2023
Headline: IAM Compact Workshops for Capacity Development in Mombasa, Kenya
Link: <https://preview.mailerlite.com/g9m7q3n4z3/2313122918676043508/v411/>



EXPANDING INTEGRATED ASSESSMENT MODELLING:
 COMPREHENSIVE AND COMPREHENSIBLE SCIENCE
 FOR SUSTAINABLE, CO-CREATED CLIMATE ACTION



IAM Compact Workshops for Capacity Development in Mombasa, Kenya



Students, policymakers, and stakeholders from Kenya engaged with the IAM COMPACT consortium in a series of workshops held in the city of Mombasa, Kenya during the last week of August. The Mombasa workshops were the first step towards achieving one of the **IAM COMPACT objectives**: to boost international cooperation, partnership, and capacity during and after the project, by supporting the design of climate pledges and developing scientific and technical capabilities in the selected countries of Kenya, Ethiopia, Sri Lanka and Ukraine.

In a two-day session, on August 29-30, students from the Technical University of Mombasa (TUM) were introduced to integrated assessment modelling. The students started from what an energy system is and how to build scenarios

Figure 34. Preview of September 2023 Press Release

7.4 November 2023

Title: IAM COMPACT Press Release: November 2023
Headline: IAM COMPACT at COP 28, Dubai, United Arab Emirates
Link: <https://preview.mailerlite.com/k7b4d0p7s7>



IAM COMPACT at COP 28, Dubai, United Arab Emirates

From **30 November to 12 December 2023** delegates from nearly 200 countries will come together in **Dubai, United Arab Emirates (UAE)** for the **28th session of the Conference of the Parties of the UNFCCC (COP 28)** to deliberate on climate action strategies and commitments that will hopefully shape a better future of our planet. Importantly, this year's Conference marks the conclusion of the first Global Stocktake (GST), a comprehensive assessment of the progress made in achieving the goals of the Paris Agreement. High expectations on the climate finance front and "phasing out" fossil fuels (check also our latest infographic with a brief timeline of landmark COPs [here](#)).

IAM COMPACT, committed to supporting and advancing the ambition of climate policy planning beyond 2030 for the EU, major emitters, and non-high-income nations using a diverse ensemble of models and insights, will actively participate at COP 28. The project will co-host a panel discussion on **"Bridging the gap between the 'Fit for 55' package and the 2050 ambition of a net-zero EU economy"** at the **Greek Pavilion**, alongside the Horizon Europe **DIAMOND** project and the **Hellenic Society for the Environment and Cultural Heritage**. The key objectives of our side-event are to (a) highlight potential challenges to the EU's path to net zero, (b) fuel the policy debate on critical technologies including carbon capture and storage but also gas in the light of the recent energy supply crisis, and (c) share knowledge.

Figure 35. Preview of November 2023 Press Release

7.5 December 2023

Title: IAM COMPACT Press Release: December 2023
Headline: From Fit-for-55 to net-zero: Our new study on the EU's path to climate neutrality by 2050
Link: <https://preview.mailerlite.com/l3s3l5w5r5>



EXPANDING INTEGRATED ASSESSMENT MODELLING:
 COMPREHENSIVE AND COMPREHENSIBLE SCIENCE
 FOR SUSTAINABLE, CO-CREATED CLIMATE ACTION



From Fit-for-55 to net-zero: Our new study on the EU's path to climate neutrality by 2050

The EU has committed to becoming a net-zero economy by 2050 and achieving 55% emissions cuts in 2030, a goal that has been integrated into national strategies of several member states. However, the bloc's path toward achieving between these two targets bridging their gap through intermediate milestones remains unclear.

In our new study "[A multi-model analysis of the EU's path to net zero](#)", resulting from a collaboration between [DIAMOND](#) and [IAM COMPACT](#) researchers and published in *Joule* ([here](#)), we used five whole-system climate-economy models ([GCAM](#), [GEMINI-E3](#), [ICES-XPS](#), [EU-TIMES](#), [NEMESIS](#)) and two sectoral models ([ALADIN](#), [FORECAST](#)) that represent a wide range of economic theories to enhance the confidence in the produced knowledge, to explore how the EU can bridge the gap between 2030 and 2050 and keep net zero within reach by mid-century, offering insights into intermediate milestones and implications at sectoral and national levels.

Apart from validating the EU's ambition for 2030, our results indicate that the agreed 62% emissions reduction in the Emissions Trading System and 40% in the Effort Sharing Regulation (compared with 2005 levels) are in line with cost-optimal paths toward the bloc's 55% emissions cuts target by 2030. However, to keep the goal of NZE within grasp, our model ensemble reasonably robustly

Figure 36. Preview of December 2023 Press Release

8 Presentations in policy events and stakeholder workshops

In this section, we list all policy events and stakeholder workshops⁷, which IAM COMPACT participated in or (co-) organised.

8.1 IAM COMPACT in the Energy Modelling Platform for Africa (EMP-A) 2023, 11 April 2023

The main objective of the [Energy Modelling Platform for Africa \(EMP-A\) 2023](#) was to contribute to creating optimised investments for the energy transition in Africa to meet the continent's growing demand for low-carbon, inclusive, and climate-resilient development pathways whilst accessing its large resource base. It was an excellent opportunity to acquire free training, access to discussion forums, and coaching skills in models and tools for energy planning needs.

EMP-A 2023 took place from 11th April to 28th April 2023 as a hybrid event (online and at the University of Namibia). IAM COMPACT partners from Addis Ababa Institute of Technology (AAiT) and Technical University of Mombasa (TUM) joined the training on CLEWs modelling framework.

⁷ <https://iam-compact.eu/news-events>



8.2 Loss & Damage: it could be your turn next, 5 June 2023

“Loss & Damage: It Could Be Your Turn Next”

World Environment Day, June 5th, 11:00 CEST
Watch on www.youtube.com/@IAMCOMPACT/

#PayUp4LossAndDamage #PollutersMustPay
#LossAndDamageFinanceNow #EndFossilFuels



The IAM COMPACT project has received funding from the European Union's HORIZON EUROPE Research and Innovation Programme under grant agreement No 101056306.



Panelists



Nakabuye Hilda F.



Omar Elmawi



Dr Ioannis Tsipouridis



Prof Haris Doukas



Led by the United Nations Environment Programme (UNEP) and held annually on 5 June since 1973, [World Environment Day](#) is the largest global platform for environmental public outreach and is celebrated by millions of people across the world.

In this context, IAM COMPACT presented: “Loss & Damage: it could be your turn next”, on World Environment Day, June 5th 2023, 11:00 CEST.

Prof. Ioannis Tsipouridis from Technical University of Mombasa and Prof. Haris Doukas from National Technical University of Athens meet climate activists Omar Elmawi & Nakabuye Hilda F. to discuss this critical issue.

The conversation was streamed live and is now archived on IAM COMPACT's [YouTube channel](#).



8.3 Global Change Analysis Model (GCAM) Annual Meeting 2023, 6-8 June 2023



The Joint Global Change Research Institute's next annual GCAM Community Modeling Meeting was held June 6-8, 2023 virtually. The GCAM Community Modeling Meeting provided a forum for the GCAM community to hear about the latest developments and current uses of GCAM. For those new to GCAM, this workshop continued to serve as an excellent in-depth opportunity to learn and gain a better understanding of the model.

More information on the model can be found [here](#).

8.4 Core Working Groups workshops: “Industry & Innovation”, 21 June 2023



The workshop, centred on the theme of Industry & Innovation, aimed to facilitate collaboration between the IAM COMPACT modelling team and policymakers, industry, and civil society representatives. By engaging with senior energy and climate policymakers, we have identified key priorities for Europe's industrial sector. CWG's contributions are envisaged to directly influence our research.

During this workshop, we sought valuable insights on our research agenda, realistic scenario design, and potential applications of our analysis. We discussed two related modelling studies:

1. What are the implications of EU industry decarbonisation, considering possible off / re-shoring scenarios? This study is led by Wuppertal Institute.
2. What is the contribution of earlier stage technologies if they undergo rapid cost reductions? This study is led by Imperial College London.

At the start of the workshop, a brief introduction of IAM COMPACT as well as the aims of the workshop were discussed by Bruegel. Then, study leads briefly presented the background and approach of both studies, before splitting into two break-out rooms.

The qualitative and modelling analysis of study will be featured in the update of Deliverable *D4.7: Sectoral and cross-sectoral analysis*, which is due on February 2024 and will be available on our website. Extensive documentation of the discussion among stakeholders and IAM COMPACT partners will be featured in *D2.4 - Proceedings of Stakeholder Interactions*.

8.5 ICTP Joint Summer School on Modelling Tools for Sustainable Development, 3-14 July 2023

The [ICTP Joint Summer School on Modelling Tools for Sustainable Development 2023](#) was held in July (3-14/07/2023) and IAM COMPACT was there to contribute to the teaching activities.

The school was split in two parts: a) online training on the tool applied (26/06 – 30/06) and b) hands-on session to conduct analyses on country-specific case studies, with assistance being provided from trainers (hybrid; 03/07 – 13/07). Through the training, participants have the chance to start developing capacity from scratch on new modelling tools within their institutions and with stakeholders. There were nine tracks listed below, each focusing on different tools:

- OnSSET/The Global Electrification Platform
- Energy and Flexibility Modelling: [OSeMOSYS](#) & FlexTool
- Financial Analysis of Power Sector Projects using the FinPlan Model
- Energy demand assessment and scenarios: MAED and EBS tools
- Introduction to [CLEWs](#)
- Energy Access Explorer: A Data-driven, Integrated and Inclusive Approach to Planning for Achieving Universal Access to Energy for Equitable Development
- The Net Zero Playbook
- Geospatial data, best practices for collection and management
- Input-Output-based Life-Cycle Assessment with [MARIO](#)
- Geospatial Clean Cooking access modelling, using OnStove

IAM COMPACT partners from POLIMI and KTH taught MARIO, OSeMOSYS & CLEWs tools & pilot countries participated in the summer school.

See [here](#) for more information on the summer school.



8.6 Summer School on Integrated Assessment Models, 3-7 July 2023

The [NAVIGATE](#) and [ENGAGE](#) projects, funded by the European Union's Horizon 2020 research and innovation programme, launched a [Summer School on Integrated Assessment Models](#) aimed at providing advanced training for young international scholars, advanced PhD students and early postdoc fellows, working on integrated assessment models. The Summer School was organised by the RFF-CMCC European Institute on Economics and the Environment (EIEE) and took place at Lake Como, Villa del Grumello, from 3rd to 7th July 2023.

IAM COMPACT partners BC3 & E3M joined the Summer School with the capacity of doctoral students and faculty, respectively.

8.7 Core Working Groups workshop: “Optimal Transition”, 18 July 2023



The workshop, centred on the theme of Optimal transition, aimed to facilitate collaboration between the IAM COMPACT modelling team and policymakers, industry, and civil society representatives. By engaging with senior energy and climate policymakers, we have identified key priorities for achieving an orderly transition that addresses current challenges to both EU policy and the materialisation of greener infrastructure. CWG’s contributions are envisaged to directly influence our research.

During the workshop, we sought valuable insights on our research agenda, realistic scenario design, and potential applications of our analysis. We discussed two related modelling studies:

1. How does the implementation of the updated draft National Energy and Climate Plans / Fit-for-55 compare to the cost-optimal EU approach? This study is led by **BC3**.
2. How can we evaluate the effects of energy system flexibility measures? This study is led by **Aalborg**.

At the start of the workshop, a brief introduction of IAM COMPACT as well as the aims of the workshop were discussed by Bruegel. Then, study leads briefly presented the background and approach of both studies, before splitting into two break-out rooms.

The qualitative and modelling analysis of Study 1 will be featured in the update of Deliverable *D4.5 - National, regional, global mitigation pathways*, which is due on February 2024, while of Study 2 in *Deliverable D4.9 - European sub-national deep dives* due on January 2024, and both will be available on our website. Extensive documentation of the discussion among stakeholders and IAM COMPACT partners will be featured in *D2.4 - Proceedings of Stakeholder Interactions*.

8.8 IAM COMPACT capacity development activities in Mombasa (Kenya), 29 August-1 September 2023

The workshop was organised in the context of the IAM COMPACT project and hosted by RECCReC (Renewable Energy and Climate Change Research Centre) at the Technical University of Mombasa (TUM), with notable contributions by Politecnico di Milano (POLIMI), KTH Royal Institute of Technology (KTH), and National Technical University of Athens (NTUA). It was split into three parts, aimed at students; policymakers; and stakeholders and was held from 29th August to 1st September 2023.

8.8.1 Students' Workshop, 29 August-30 August 2023



Figure 37: Students' Workshop, 29 August 2023, at TUM, Mombasa, Kenya

The *first day* kicked-off with an introduction to energy system modelling, covering a brief history of energy modelling and basic aspects of Energy Optimisation Models (reference energy system, classification, resolution, etc.). The session continued with a hands-on exercise, in which the students explored the implications of three different scenarios: imposing a carbon tax, introducing renewable incentives, and constraining land availability, and discussed how the least cost planning changes in each scenario.

The next session introduced Input-Output modelling, explaining the notions of industrial ecology, quantitative impact assessment, systems thinking, and the Leontief model. Finally, the day concluded with a hands-on exercise on Water management using Input-Output tables, where students were asked to introduce three different shocks and assess the change in economic and environmental impacts.

The *second day* expanded the scope and introduced the water, energy, and food nexus. The students were introduced to the concept of integrated analysis, where a CLEWs model for Kenya was presented, before shifting to a global approach through IAMs. WILIAM and GCAM models were briefly explained through a nexus lens, and examples of their applications for SDG analysis were shown.

The students were then presented with a "Farming Optimisation Game" (Martindale, Leigh. (2023, May 8). Model Optimization: An IRL Farming simulation example. Zenodo. <https://doi.org/10.5281/zenodo.7908954>) and were asked to maximise profits and meet the increasing food demand over three years while considering the ecological

impact of their farming choices. The game enhanced students' participation, and some of the teams presented their results at the end of the session.



Figure 38: Students' Workshop, 30 August 2023, at TUM, Mombasa, Kenya

The next presentation introduced the notions of scenarios, their role in energy modelling, the different types of scenarios and how they can be used to capture uncertainty. An [example](#) of scenario construction for Eastern Africa was then presented, before moving to a hands-on exercise where students were asked to design their own scenarios, either on pen and paper in a Kenyan context or in a global context by using the [EN-ROADS](#) tool. Teams were then asked to present their scenarios – e.g., one team featured just redistribution of trans-boundary resources for food and energy supply in Eastern Africa.

The workshop ended with a sample CLEWs model application, which included some features relatable to Kenya's energy, water and food supply chains. The students were provided with the OSeMOSYS model, and had the chance to run it and modify input parameters to create different scenarios. Finally, those interested were prompted to take "Introduction to CLEWs" [course](#). The next steps will include the formation of a modelling class at TUM supervised by Ms. Salsabila Abdulhalim, in addition to biweekly meetings with KTH to support progress.

8.8.2 Stakeholders' Workshop, 31 August-1 September 2023

The workshop aimed at demonstrating the use of open source and accessible energy system, economic and environment modelling tools largely used by the scientific community and by the UN to support energy and environment policy goals in Kenya. As such, it dedicates particular attention at the planning needs of Kenya - brought forward through discussion with the participants - and how they may be met with existing and expanded modelling capacity in the country.



Figure 39: Stakeholders' Workshop, 31 August 2023, Mombasa, Kenya

The *first day* kicked-off with a presentation by Bruegel, showcasing the use of energy system models & scenarios in policy, their relevance, success cases, and examples. Participants discussed how subsidies and energy prices in the EU can affect prices in other regions, and whether EU's energy policy could lower interest rates in developing countries. Stakeholders' noted that Kenya should pose its own climate agenda and sustainable financial model, as external solutions risk being seen as a new form of climate neo-colonialism.

The next session featured Mr. Martin Mutembei from the Climate Compatible Growth Programme; he presented an overview of Kenya-CCG initiatives, including energy planning support, national ownership, the creation of a whole energy system modelling toolkit for Kenya, and capacity development activities through Summer Schools, and OpenLearn courses.

The next presentation featured Ms. Salsabila Abdulhalim, who will lead the Kenyan team of IAM COMPACT for the creation of an open-access model, presenting a Kenyan case study on integrated policy planning using the CLEWs nexus framework which was created during her participation in ICTP Joint Summer School for Sustainable Development 2023. The results were preliminary, as more datasets will feed into the model, building a more advanced representation of Kenya's energy system.

The *second day* kicked-off with a presentation of interlinkages among water, energy, land use, and climate, and the need for a "nexus" approach to ensure policy coherence. A simplified diagram of a climate-land-energy-water system model was constructed step-by-step to demonstrate these interconnections. Next, Mr. Samson Soshyo, TUM lecturer, presented a conference [paper](#) on an optimised hybrid wind-solar energy system for irrigation pump load sites in Kenya, and together with Mr. Absae Sedah from Kenya's Meteorological Department, discussed the possibility for data exchange with IAM COMPACT, especially on climate and future projections.



Figure 40: Stakeholders' Workshop, 01 September 2023, Mombasa, Kenya

The next session provided an overview of integrated assessment models (IAMs) and how IAM COMPACT aims to use and develop IAMs to support the assessment of global climate goals, progress, and feasibility space, as well as the design of the next round of NDCs and policy planning beyond 2030. It then focused on Kenya's NDC targets, as well as future challenges for the country's planned energy and climate transition. Participants discussed the need to prioritise local challenges, placing afforestation as the most pressing issue, followed by lack of sustainable finance and widespread [corruption](#) – as most investments in infrastructure are currently driven by China in the form of loans, causing also "[institutional degradation](#)".

The workshop ended with a hands-on exercise, using the CLEWs [interface](#) as a tool to inform debates on sustainable development policies and the interlinkages among climate, land, energy and water. Participants were asked to implement three policy interventions using the OSeMOSYS modelling tool in a Mauritius case study, discuss the benefits and impacts of each policy, analyse their food-energy-water implications and propose mitigation measures to address any negative impacts from each policy.

8.9 Climate Targets 2040: Bridging modelling and policy, 13 September 2023



13 Sep
12:30-14:30 CET

**Climate Targets 2040:
Bridging Modelling
and Policy**

bruegel

The EU must declare its 2040 climate targets by the beginning of 2024, as required in the European Climate Law. To inform, justify and communicate the targets, policymakers will rely on energy, climate and economic modelling of the impacts of various emission mitigation pathways. The main type of models used to assess the trade-offs related to different pathways are detailed-process Integrated Assessment Models (IAMs), contributing to IPCC and other scientific reviews.

At this event, the panellists, which include our partner Bruegel, European policymakers and modellers involved in leading research projects on modelling climate mitigation discussed the considerations for the 2040 targets and how modelling can support policymaking in this space. Emerging challenges in the climate policy space were also discussed as well as the potential model development to respond to the changing needs of policymaking.

You can watch the discussion [here](#).

8.10 Core Working Groups workshop: “Global Effects”, 26 October 2023



GLOBAL EFFECTS WORKSHOP

26 October 2023, at 10.00-11.30 CEST

Virtual (Microsoft Teams)

IAM COMPACT, a Horizon Europe integrated assessment modelling project, is inviting policymakers, industry and civil society representatives to discuss two related research studies:

1. How could **geopolitics** affect decarbonisation pathways?
 - Exploring constraints on supply of materials needed for decarbonisation.
2. How do **interest rates** influence decarbonisation pathways?
 - Exploring effects of differentiated cost of capital on emissions mitigation.

The IAM COMPACT project has received funding from the European Union's HORIZON EUROPE Research and Innovation Programme under grant agreement No 101056306.

The Global Effects workshop, exploring the impact of financial and political issues on global decarbonisation, aimed to facilitate collaboration between the IAM COMPACT modelling team and policymakers, the clean energy sector and civil society representatives.

During this workshop, we sought valuable insights on our research agenda, realistic scenario design, and potential applications of our analysis. By engaging with senior energy and climate policymakers, we have identified key research questions for assessing the impact of global effects such as geopolitical tensions and interest rates on decarbonisation pathways. Expert contributions will directly influence our research.

The Global Effects workshop discussed two related modelling studies:

1. How could geopolitics and technological limitations affect decarbonisation pathways? This study is led by **E3M**.
2. How do interest rates influence global decarbonisation pathways? This study is led by **NTUA**.

At the start of the workshop, a brief introduction of IAM COMPACT as well as the aims of the workshop were discussed by Bruegel. Then, study leads briefly presented the background and approach of both studies, before splitting into two break-out rooms.

The qualitative and modelling analysis of the Geopolitics study will be featured in the deliverable *D5.4 - Modelling out-of-ordinary extremes* while of the Interest Rates study in *D5.6: Behaviour, social and disruptive innovation*. Both studies are due on February 2024 and will be available on our website. Extensive documentation of the discussion among stakeholders and IAM COMPACT partners will be featured in *D2.4 - Proceedings of Stakeholder Interactions*.

8.11 Core Working Groups workshop: “Behavioural Change”, 31 October 2023



The Behavioural Change workshop explored the decisions of economic agents in integrated assessment models, aiming to facilitate collaboration between the IAM COMPACT modelling team and policymakers, industry associations and civil society representatives.

During this workshop, we sought valuable insights on our research agenda, realistic scenario design, and potential applications of our analysis. By engaging with senior energy and climate policymakers, the workshop directly contributed to IAM COMPACT’s study “What are the economic impacts (rather than the cost or effectiveness of policy implementation) of a given behavioural change?” - led by **UVa** and **BC3**.

Topics for discussion:

- Most anticipated behavioural changes
- Potential barriers to adoption of cleantech and/or sustainable lifestyles
- Beyond raising awareness: potential structural change requirements to enable behavioural change

At the start of the workshop, a brief introduction of IAM COMPACT as well as the aims of the workshop were discussed by **Bruegel**. Then, study lead (UVa) briefly presented the motivation and the broad scenario design. The session was facilitated via Miro, which helped us gather the necessary feedback.

The qualitative and modelling analysis on behavioral change will be featured in Deliverable *D5.6 - Behaviour, social and disruptive innovation*, which is due on February 2024 and will be available on our website. Extensive documentation of the discussion among stakeholders and IAM COMPACT partners will be featured in *D2.4 - Proceedings of Stakeholder Interactions*.

8.12 LOCOMOTION Massive Open On-line Course (MOOC), 3-13 November 2023



Overview

With funding from the EU's Horizon 2020 programme, the '*Low-carbon society: an enhanced modelling tool for the transition to sustainability*' ([LOCOMOTION](#)) aims to design a new IAM (Integrated Assessment Model) to provide policymakers and relevant stakeholders with a reliable and practical modelling system to assess the feasibility, effectiveness, costs and ramifications of different sustainability policy options.

The LOCOMOTION MOOC was a four-day online course that will happen on the 3rd, 6th, 10th, and 13th of November. The course will teach participants how to use the new IAM, called [WILIAM](#) (Within Limits Integrated Assessment Model), to develop and analyse policy scenarios for social and environmental sustainability. The course covers the following topics:

- Introduction to system dynamics and WILIAM
- Environmental sustainability (energy-resources-material modules)
- Social sustainability (economy-demography-society modules)
- Policy scenarios (storylines, WILIAM toolkit, and project work)
- Course Objectives

For the full description click [here](#).

WILIAM model is also part of IAM COMPACT's [modelling ensemble](#).

Upon completion of the LOCOMOTION MOOC, participants will be able to:

- Understand the basic principles of system dynamics and WILIAM
- Apply WILIAM to develop and analyse policy scenarios for social and environmental sustainability
- Use the WILIAM toolkit to create and visualize storylines
- Program and analyse scenarios with the Vensim software

The LOCOMOTION MOOC was a unique opportunity to learn from experts in the field of system dynamics and

integrated assessment models. Participants gained the skills and knowledge necessary to develop and analyse policy scenarios for social and environmental sustainability.

8.13 IAM COMPACT side-event at COP28 in Dubai, 5 December 2023



The EU has committed to becoming a net-zero economy by 2050, with many member states having integrated this goal into national strategies. The bloc's path towards delivering on this ambition, however, remains unclear.

IAM COMPACT co-hosted a panel discussion at the Greek Pavilion at COP28, in Dubai, alongside the Horizon Europe [DIAMOND](#) project and the [Hellenic Society for the Environment and Cultural Heritage](#), aiming to explore the challenges ahead for the EU, drawing on the findings of our flagship [study](#) published in Joule.

The discussion, which took place on December 5 at the Greek Pavilion (15.00 - 16.00 GMT+4) first explored the feasibility of key aspects of the Fit for 55 policy package and question the energy-system requirements to reaching net zero by 2050, across sectors and member states. Special attention was given to strategic decisions that the EU must make today, especially relating to technological investments and associated enabling environments, as well as to key intermediate milestones on the way to net zero.

In turn, the panel discussion dived deeper into the role of carbon capture and storage (CCS) in abating residual fossil fuels (based on [this working paper](#)), as well as into that of natural gas, notably in the light of the energy crisis in Europe (based on [this study](#) and the discussion [here](#)).

The key objectives of this COP28 side-event were to (a) highlight potential challenges to the EU's path to net zero, (b) fuel the policy debate on critical technologies, and (c) share knowledge.

The panel discussion was moderated by Prof. Ryna Yiyun Cui, (*University of Maryland, US*) and included the following interventions:

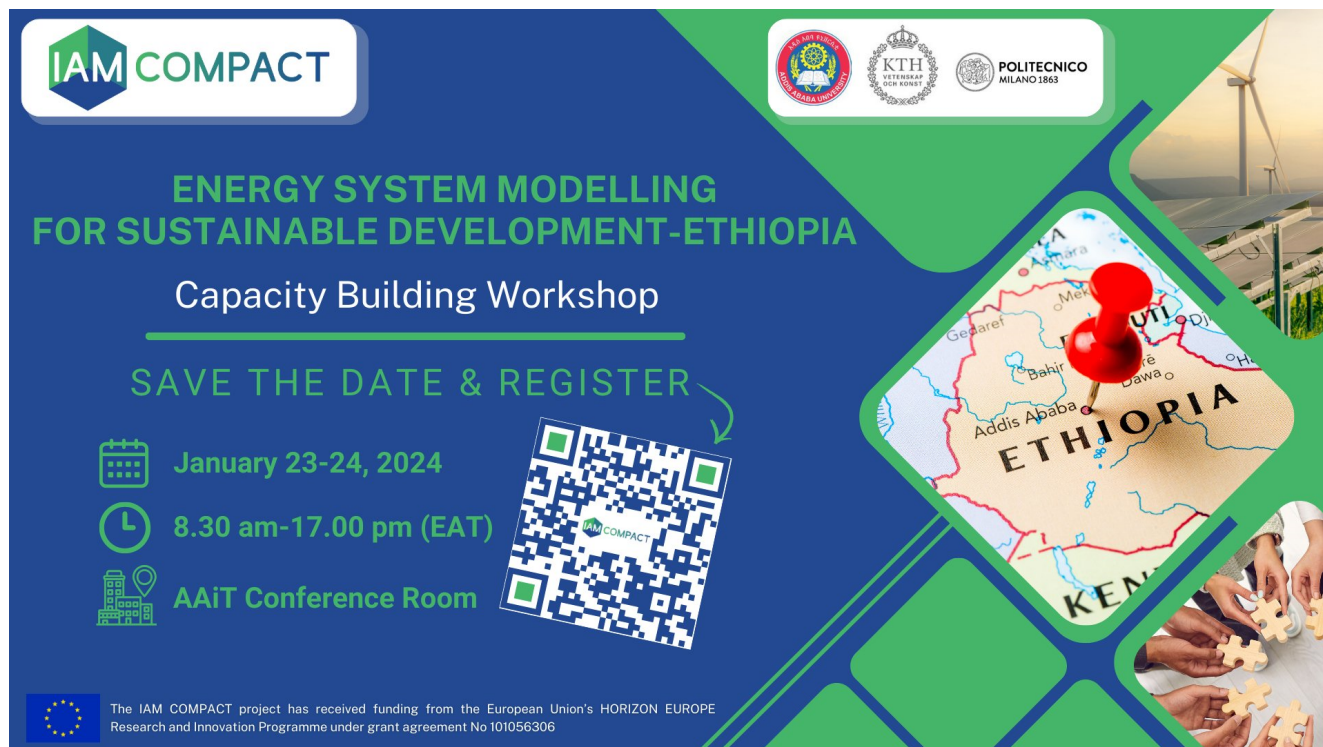
- **“Paving the way to net zero in the EU: key technologies, strategic decisions, and a roadmap”**
Speaker: Haris Doukas, *Professor at the National Technical University of Athens (NTUA), President of the Society for the Environment and Cultural Heritage (ELLETT) Energy Council, Mayor-Elect of the Municipality of Athens, Greece.*
- **“Defining ‘Abated Fossil Fuels’ and identifying their role in the EU’s long-term ambition”**
Speaker: Alaa Al Khourdajie, *Research Fellow at the Department of Chemical Engineering of Imperial College London (Imperial)*
- **“The role of gas in the EU’s net-zero trajectory: thinking in the context of the energy crisis”**
Speaker: Steve Pye, *Assoc. Professor at the UCL Energy Institute (University College London)*

You may find more information in the attached agenda.

DOWNLOADS

[COP28 side event DIAMOND COMPACT 1.pdf](#)

8.14 IAM COMPACT capacity development activities in Addis Ababa (Ethiopia), 23-24 January, 2024



IAM COMPACT

ENERGY SYSTEM MODELLING FOR SUSTAINABLE DEVELOPMENT-ETHIOPIA

Capacity Building Workshop

SAVE THE DATE & REGISTER

January 23-24, 2024

8.30 am-17.00 pm (EAT)

AAiT Conference Room

The IAM COMPACT project has received funding from the European Union's HORIZON EUROPE Research and Innovation Programme under grant agreement No 101056306

The IAM COMPACT capacity building workshop "Energy Systems Modelling for Sustainable Development - Ethiopia" took place on January 23-24, physically, at the the conference room of Addis Ababa Institute of Technology (AAiT), Addis Ababa, Ethiopia.

The workshop aimed to equip participants with the basic energy modelling concepts, advanced energy modelling, and policy insight developments to support data-driven energy planning and policymaking, as well as to enhance the networking of national modellers in Ethiopia. It focused on existing local modelling knowledge and capacity gaps and hence bolsters in promoting fit-for-purpose and sustainable modelling knowledge transfer in our capacity development activities on the selected models.

The **first day**, aimed at stakeholders and modelling beginners, provided the fundamental knowledge and understanding of the principles of national energy planning, to understand the theoretical basis and applied knowledge of energy system modelling, be informed of the policy and the regulatory framework of Ethiopia's energy sector, and learn how to use scientific results to support evidence-based policy making. It included:

- a presentation of IAM COMPACT and each modelling ecosystem (NTUA)
- an introduction to energy systems modelling approaches and taxonomy (POLIMI, KTH)
- the model selection framework through a brief overview of commonly used tools in Ethiopia (AAiT)
- and an introduction to the Global Electrification Platform⁸ (POLIMI)

⁸ <https://electrifynow.energydata.info/>



Figure 41: Capabity building workshop, 23 January 2024, at AAiT, Addis Ababa, Ethiopia

The *second day*, aimed at advanced modelling users, deepened the concepts of the energy system modelling sessions of Day 1, through using a hands-on project work on a specific modelling tool (OnSSET-MicroGridsPy), whereby the model set-up/update is guided step-by-step with the trainers (POLIMI). It consisted of:

- an introduction to MicroGridsPy, and model linkages of OnSSET-MicroGridsPy (POLIMI)
- and hands-on exercises on OnSSET (POLIMI)



Figure 42: Capabity building workshop, 24 January 2024, at AAiT, Addis Ababa, Ethiopia

The workshop was organised by Addis Ababa Institute of Technology, KTH Royal Institute of Technology, Politecnico di Milano, and the National Technical University of Athens, and hosted by AAiT.

8.15 IAM COMPACT capacity development activities in Mihintale (Sri Lanka), 30 January, 2024



CAPACITY BUILDING WORKSHOP

The Integrated Assessment Modelling of Climate and Energy Policies in Sri Lanka

SAVE THE DATE & REGISTER

 JAN 30, 2024

 09.00-17.00

 Online



 The IAM COMPACT project has received funding from the European Union's HORIZON EUROPE Research and Innovation Programme under grant agreement No 101056306

The IAM COMPACT capacity building workshop "Integrated Assessment Modelling of Climate and Energy Policies in Sri Lanka" will take place on January 30, 2024, 09:00 - 17:00 IST (03:30 - 11:30 UTC), online.

The workshop aims to introduce participants to the concept of integrated assessment modelling (IAM) for enhancing the comprehensibility of Sri Lanka's ambitious energy and climate policies. As an island nation, Sri Lanka faces critical interdependencies between climate, energy, water, and land-use systems. It focuses on equipping participants with the skills and knowledge to utilize IAMs as powerful tools for understanding these interlinks and informing improved policy decisions for sustainable development in Sri Lanka.

It is organised by Rajarata University of Sri Lanka, KTH Royal Institute of Technology, Politecnico di Milano, and National Technical University of Athens.

9 List of commentaries & other publications in the Press

In this section, all articles published⁹ about the project and/or commentaries by partners in media/international press are presented.

9.1 Doukas & Oikonomou (2023), Euractiv

Title:	European industry has stood its ground but needs a new perspective
Authors:	Haris Doukas (NTUA), Vlasios Oikonomou
Medium:	Euractiv
Abstract:	European industries have been severely affected by the energy crisis and are at a disadvantage against global competitors. To face the upcoming years, they will need strong support at the European and national levels, write Haris Doukas and Vlasios Oikonomou.
Keywords:	Industry; perspective
Link:	https://www.euractiv.com/section/energy-environment/opinion/european-industry-has-stood-its-ground-but-needs-a-new-perspective/
First Online:	10 January 2023
Citation (APA):	Doukas, H., & Oikonomou, V. (2023). European industry has stood its ground but needs a new perspective. Euractiv. https://www.euractiv.com/section/energy-environment/opinion/european-industry-has-stood-its-ground-but-needs-a-new-perspective/ .

⁹ <https://iam-compact.eu/communication/mediapress>

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Home / Opinions / Energy & Environment / European Green Deal / European industry has stood its ground but needs a new perspective

European industry has stood its ground but needs a new perspective

DISCLAIMER: All opinions in this column reflect the views of the author(s), not of EURACTIV Media network.

By Haris Doukas and Vlasios Oikonomou Est. 6min 10 Jan 2023

Now is the time to prioritise clean energy investments and shift to low-emissions manufacturing processes. The current trend in all the large developed economies is the provision of diverse supports to local industries to render them pioneers in the technologies, materials, and services required by the green transformation of the global economy. [Shutterstock / ArtVeil]

Recommended articles

- Romanian MEPs challenge Schengen blockade, point to new EU migration deal
- Berlin says EU should prepare for war by end of decade
- Europe's far-right wins big with Macron's migration bill
- Berlin says EU should prepare for war by end of decade
- Orbán is 'Trojan horse' for Russian interests, says Czech minister
- Brussels takes heat pump 'action plan' off the agenda
- The Brief — No country for old men

Figure 43. Preview of article 'European industry has stood its ground but needs a new perspective' in Euractiv

9.2 Doukas (2023), ESG Stories

Title:	Why do the oil and gas industries find the SDG market attractive? (in Greek)
Authors:	Haris Doukas (NTUA)
Medium:	ESG Stories
Abstract:	The realism of long-term national climate pledges is strictly evaluated on the basis of finding plausible and feasible roadmaps towards these targets—why shouldn't the same principle apply for corporate pledges? The emerging ESG market can set monitoring protocols and processes for missed targets, so that transparency and reliability can be ensured, writes Prof. Haris Doukas (in Greek).
Keywords:	ESG; targets
Link:	https://www.esgstories.gr/opinions/giati-i-biomihania-petrelaioy-kai-fysikoy-aerioy-theorei-elkystiki-tin-agora-esg
First Online:	11 January 2023
Citation (APA):	Doukas, H. (2023). Why do the oil and gas industries find the SDG market attractive?. ESG Stories. https://www.esgstories.gr/opinions/giati-i-biomihania-petrelaioy-kai-fysikoy-aerioy-theorei-elkystiki-tin-agora-esg (in Greek).



Figure 44. Preview of article ' Why do the oil and gas industries find the SDG market attractive?' in ESG Stories

9.3 Fraser-Baxter (2023), Imperial College London News

Title:	Climate disaster with 2°C of warming could be avoided if global pledges are met
Authors:	Sam Ezra Fraser-Baxter
Medium:	Imperial College London News
Abstract:	Sam Ezra Fraser-Baxter writes in the Imperial College London blog about the findings of our study in Nature Climate Change, van de Ven et al., 2023.
Keywords:	Nature Climate Change; study
Link:	https://www.imperial.ac.uk/news/244971/climate-disaster-with-2c-warming-could/
First Online:	18 May 2023
Citation (APA):	Fraser-Baxter, S.E. (2023). Climate disaster with 2°C of warming could be avoided if global pledges are met. Imperial College London News. https://www.imperial.ac.uk/news/244971/climate-disaster-with-2c-warming-could/ .



The screenshot shows the Imperial College London News website. The main article title is "Climate disaster with 2°C of warming could be avoided if global pledges are met" by Sam Ezra Fraser-Baxter, dated 18 May 2023. The article features a large image of offshore wind turbines. Below the image, a sub-headline reads: "If fully implemented, current climate pledges will keep global warming below the 2°C Paris Agreement limit, according to a study published today." The text below states: "In 2015, the landmark Paris Agreement set a common goal for global climate action. A total of 196 countries signed up, agreeing to limit global temperature increase to well below 2°C by 2100 and to 1.5°C if possible. Since 2015, signatory countries have made a range of national pledges to..."

On the right side of the page, there are several sections: "LATEST NEWS" with a small image, "NEWS IN BRIEF" with the text "Land-cover changes and serotonin levels: News from Imperial", "NOT-SO-SILENT NIGHT" with the text "Podcast: Best of 2023, sustainable flight fuel, and better bones", "LEGAL EAGLES" with the text "Pro bono award honours legal support scheme for green tech startups", and "MOST POPULAR" with a small image of a person working at a computer.

Figure 45. Preview of article ' Climate disaster with 2°C of warming could be avoided if global pledges are met ' in Imperial College London News

9.4 Hirji (2023), Bloomberg

- Title:** Climate Pledges Reach Threshold to Keep Warming Below 2C
- Authors:** Zahra Hirji
- Medium:** Bloomberg
- Abstract:** "The main takeaway of this research is definitely positive," said Dirk-Jan van de Ven, the lead author on the report and a postdoctoral researcher at BC3 in Spain. "If all governments indeed follow the promises actually made, then we are actually keeping temperatures well below 2°C."
- Keywords:** Nature Climate Change; study
- Link:** <https://www.bloomberg.com/news/articles/2023-05-18/climate-pledges-reach-threshold-to-keep-warming-below-2c>
- First Online:** 18 May 2023
- Citation (APA):** Hirji, Z. (2023). Climate Pledges Reach Threshold to Keep Warming Below 2C. Bloomberg. <https://www.bloomberg.com/news/articles/2023-05-18/climate-pledges-reach-threshold-to-keep-warming-below-2c>.



Figure 46. Preview of article ' Climate Pledges Reach Threshold to Keep Warming Below 2C ' in Bloomberg

9.5 Pianta & Brutschin (2023), Nature Climate Change

Title:	Increased ambition is needed after Glasgow
Authors:	Silvia Pianta, Elina Brutschin
Medium:	Nature Climate Change
Abstract:	At COP26 in Glasgow, major emitters significantly ratcheted up their climate commitments. Such increased ambition will substantially contribute to getting closer to the long-term goal of the Paris Agreement but more ambition is required, and mitigation might face different challenges in different regions. Silvia Pianta & Elina Brutschin discuss the findings of van de Ven, DJ., Mittal, S., Gambhir, A. et al. A multimodel analysis of post-Glasgow climate targets and feasibility challenges. <i>Nat. Clim. Chang.</i> (2023). https://doi.org/10.1038/s41558-023-01661-0
Keywords:	COP26; multimodel
Link:	https://www.nature.com/articles/s41558-023-01676-7
First Online:	18 May 2023
Citation (APA):	Pianta, S., & Brutschin, E. (2023). Increased ambition is needed after Glasgow. <i>Nature Climate Change</i> , 1-2.

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News & Views | [Published: 18 May 2023](#)

Climate action

Increased ambition is needed after Glasgow

[Silvia Pianta](#)  & [Elina Brutschin](#) 

Nature Climate Change **13**, 505–506 (2023) | [Cite this article](#)

369 Accesses | 16 Altmetric | [Metrics](#)

At COP26 in Glasgow, major emitters significantly ratcheted up their climate commitments. Such increased ambition will substantially contribute to getting closer to the long-term goal of the Paris Agreement but more ambition is required, and mitigation might face different challenges in different regions.

The latest assessment report of the IPCC highlights that current climate mitigation policies are not sufficient to reach the long-term goal of the Paris Agreement³. Integrated assessment models (IAMs) have been essential to assess the impact of different climate mitigation commitments and NDCs^{4,5,6,7,8,9}. An ongoing discussion has emerged around the feasibility

Figure 47. Preview of article 'Increased ambition is needed after Glasgow' in Nature Climate Change

9.6 Doukas (2023), Kathimerini

- Title:** New study sheds light on the progress of climate action
- Authors:** Haris Doukas (NTUA)
- Medium:** Kathimerini
- Abstract:** What have we achieved in the 7+ years after the Paris Agreement was adopted? Project Coordinator, Prof. Haris Doukas, reports on the findings of our study, van de Ven et al., 2023, in Nature Climate Change.
- Keywords:** Nature Clumage change; study
- Link:** <https://www.kathimerini.gr/life/environment/562441741/nea-meleti-richnei-fos-stin-exelixi-tis-klimatikis-krisis/>
- First Online:** 26 May 2023
- Citation (APA):** Doukas, H. (2023). New study sheds light on the progress of climate action, Kathimerini. <https://www.kathimerini.gr/life/environment/562441741/nea-meleti-richnei-fos-stin-exelixi-tis-klimatikis-krisis/> (*in Greek*).



Figure 48. Preview of article 'New study sheds light on the progress of climate action ' in Kathimerini

9.7 Van de Ven et al. (2023), The Conversation

Title:	Current emissions targets could keep the planet below a 2°C temperature rise but a turbocharged effort is needed
Authors:	Dirk-Jan van de Ven (BC3), Ajay Gambhir (Imperial), Alexandros Nikas (NTUA), Shivika Mittal (Imperial)
Medium:	The Conversation
Abstract:	Evidently, ever since the COP26 Glasgow process, the most relevant factor to avoid a climate disaster is to secure the implementation of the existing country pledges.
Keywords:	COP26; country pledges
Link:	https://theconversation.com/current-emissions-targets-could-keep-the-planet-below-a-2-c-temperature-rise-but-a-turbocharged-effort-is-needed-206434
First Online:	7 June 2023
Citation (APA):	Van de Ven, D.J., Gambhir, A., Nikas, A. & Mittal, S. (2023). Current emissions targets could keep the planet below a 2°C temperature rise but a turbocharged effort is needed. The Conversation. https://theconversation.com/current-emissions-targets-could-keep-the-planet-below-a-2-c-temperature-rise-but-a-turbocharged-effort-is-needed-206434 .

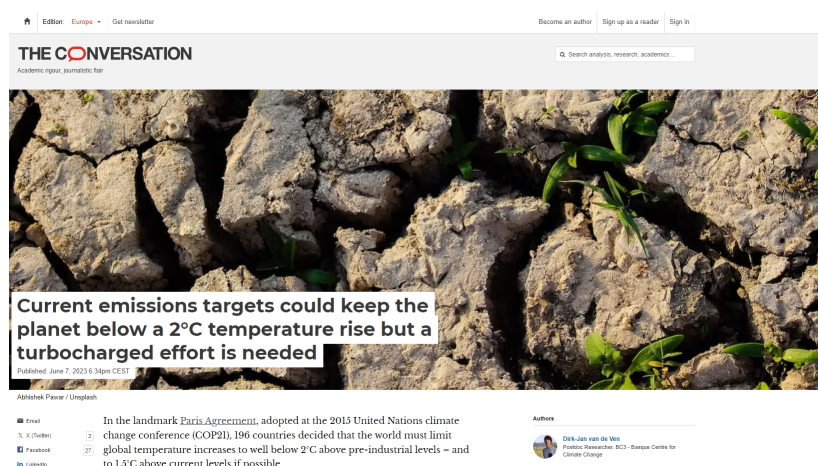


Figure 49. Preview of article 'Current emissions targets could keep the planet below a 2°C temperature rise but a turbocharged effort is needed ' in The Conversation

9.8 ESI Africa (2023), ESI Africa

- Title:** Kenya: Climate modelling workshop to focus on key energy issues
- Authors:** ESI Africa
- Medium:** ESI Africa
- Abstract:** A research project aiming to support the assessment of global climate goals, among others, is hosting a four-day modelling workshop in Mombasa, Kenya. Under the auspices of Horizon Europe, the EU's key funding programme for research and innovation, the IAM COMPACT project is travelling to developing countries.
- Keywords:** Africa; climate change; East Africa; energy efficiency
- Link:** <https://www.esi-africa.com/news/kenya-climate-modelling-workshop-to-focus-on-key-energy-issues/>
- First Online:** 28 August 2023
- Citation (APA):** ESI Africa (2023). Kenya: Climate modelling workshop to focus on key energy issues. ESI Africa. <https://www.esi-africa.com/news/kenya-climate-modelling-workshop-to-focus-on-key-energy-issues/>.



Figure 50. Preview of article 'Kenya: Climate modelling workshop to focus on key energy issues' in ESI Africa

9.9 Tsiouridis & Elmawi (2023), The Star

- Title:** TSIPOURIDIS & ELMAWI: Year of many firsts leaves humanity gasping for breath of fresh air
- Authors:** Ioannis Tsiouridis (TUM), Omar Elmawi
- Medium:** The Star
- Abstract:** As we proceed to the second day of the Africa Climate Summit, it is crucial to highlight the severity of the climate crisis we face. Dr. Ioannis Tsiouridis, director of Renewable Energy and Climate Change Research Centre, Technical University of Mombasa, Kenya and Mr. Omar Elwani, lawyer and executive director at Muslims for Human Rights, were featured in The Star, a daily newspaper published in Nairobi, Kenya. In summary, they note that:
 Science has been monotonously repeating report after report and COP after COP that we should phase out fossil fuels to reduce CO₂ emissions.
 Unfortunately, the response is woefully inadequate, when not outright in the opposite direction.
- Keywords:** Africa Climate Summit; CO₂ emissions
- Link:** <https://www.the-star.co.ke/opinion/columnists/2023-09-05-tsiouridis--elmawi-year-of-many-firsts-leaves-humanity-gasping-for-breath-of-fresh-air/>
- First Online:** 5 September 2023
- Citation (APA):** Tsiouridis, I. & Elmawi, O. (2023). TSIPOURIDIS & ELMAWI: Year of many firsts leaves humanity gasping for breath of fresh air. The Star. <https://www.the-star.co.ke/opinion/columnists/2023-09-05-tsiouridis--elmawi-year-of-many-firsts-leaves-humanity-gasping-for-breath-of-fresh-air/>

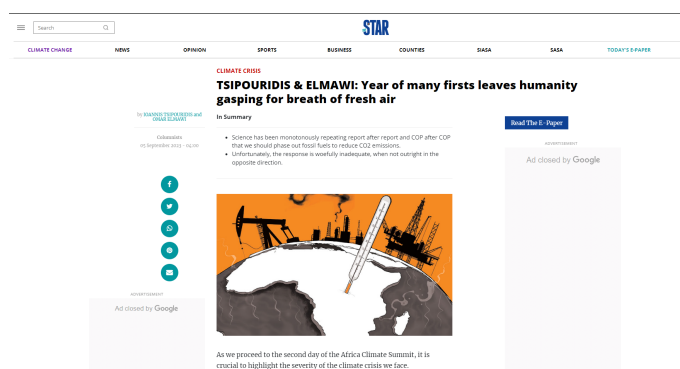


Figure 51. Preview of article 'TSIPOURIDIS & ELMAWI: Year of many firsts leaves humanity gasping for breath of fresh air' in The Star

9.10 Africa.com (2023), Africa.com

Title:	IAM COMPACT A Horizon Europe Modelling Workshop In Mombasa
Authors:	Africa.com
Medium:	Africa.com
Abstract:	A research project aiming to support the assessment of global climate goals, among others, is hosting a four-day modelling workshop in Mombasa, Kenya. Under the auspices of Horizon Europe, the EU's key funding programme for research and innovation, the IAM COMPACT project is travelling to developing countries.
Keywords:	Africa; climate change; East Africa; energy efficiency
Link:	https://www.africa.com/iam-compact-a-horizon-europe-modelling-workshop-in-mombasa/
First Online:	9 September 2023
Citation (APA):	Africa.com (2023). IAM COMPACT A Horizon Europe Modelling Workshop In Mombasa. Africa.com. https://www.africa.com/iam-compact-a-horizon-europe-modelling-workshop-in-mombasa/ .

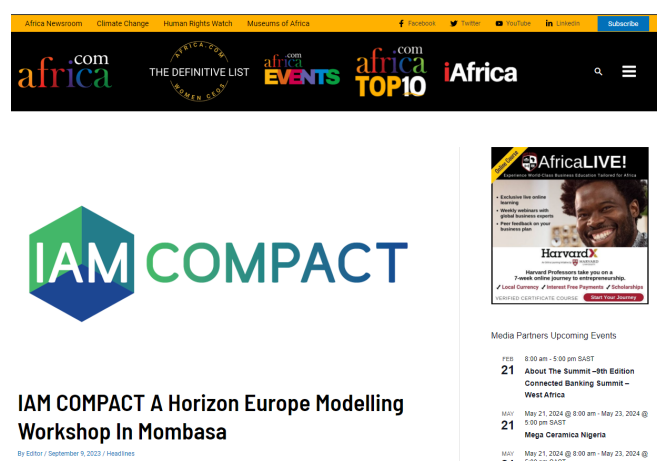


Figure 52. Preview of article 'IAM COMPACT A Horizon Europe Modelling Workshop In Mombasa ' in Africa.com

9.11 Al Khourdajie et al. (2023), The Conversation

- Title:** The COP28 climate agreement is a step backwards on fossil fuels
- Authors:** Alaa Al Khourdajie (Imperial), Chris Bataille, Lars J Nilsson
- Medium:** The Conversation
- Abstract:** The COP28 climate summit in Dubai has adjourned. The result is “The UAE consensus” on fossil fuels.
Alaa Al Khourdajie, Chris Bataille and Lars J Nilsson explain how COP28 missed the chance to set a firm, scientifically-backed benchmark for future fossil fuel use.
- Keywords:** COP28; fossil fuels
- Link:** <https://theconversation.com/the-cop28-climate-agreement-is-a-step-backwards-on-fossil-fuels-219753>
- First Online:** 13 December 2023
- Citation (APA):** Al Khourdajie, A., Bataille, C. & Nilsson, L.J. (2023). The COP28 climate agreement is a step backwards on fossil fuels. The Conversation. <https://theconversation.com/the-cop28-climate-agreement-is-a-step-backwards-on-fossil-fuels-219753>



Figure 53. Preview of article 'The COP28 climate agreement is a step backwards on fossil fuels' in The Conversation

10 List of videos

As of January 2024, 21 videos have been uploaded in the project's website and YouTube channel¹⁰, aiming to familiarise stakeholders with the project's modelling ensemble and/or promote capacity development.

10.1 Calliope model presentation

Title: Calliope model presentation

Description: Calliope is a well-known framework to build energy system models, designed by Stefan Pfenninger and Bryn Pickering, and it is used to analyse systems with arbitrarily high spatial and temporal resolution, with a scale-agnostic mathematical formulation permitting analyses ranging from single urban districts to countries and continents. Calliope's key features include the ability to handle high spatial and temporal resolution and to easily run on high-performance computing systems.

Link: <https://www.youtube.com/watch?v=TDTZK-jJIJ0>

Online: 10 February 2023



Figure 54. Preview of the video 'Calliope model presentation'

¹⁰ <https://www.youtube.com/@iam-compact>

10.2 AIM-Enduse model presentation

Title: AIM-Enduse model presentation

Description: The AIM/End-use Indian model integrates the water and energy module at the resource and technological level into the existing energy and environment systems to capture the impacts of existing and future policies for water, energy, and land systems on the major water- and energy-intensive sectors. The model uses recursive dynamics and runs in annual time steps. It optimizes costs (technology, energy, and water) and resources (water, energy) by selecting a set of best available technologies based on given physical resources and technological and environmental parameters. A detailed characterization of the inputs reflects an optimistic engineering view of technological progress. Economic parameters, such as taxes, subsidies, resource (energy, water, and land) technologies, policies, and social costs are also classified. The final service demand is exogenous and is driven not only by the gross domestic product (GDP) but also by end-use consumption and policies across various sub-sectors. The model is also being soft-linked to climatic–hydrological models.

Link: <https://www.youtube.com/watch?v=Thb5YB2T9yE&t=1s>

Online: 10 February 2023



Figure 55. Preview of the video 'AIM-Enduse model presentation'

10.3 CHANCE model presentation

Title: CHANCE model presentation

Description: CHANCE is a macro-micro model based on a computable general equilibrium (CGE) model that includes a large amount of household microdata. It is a disaggregated multiregional and multisector model that included information for around 200,000 households covering all EU regions, ensuring a large representation of the behaviour of the European households. Therefore, CHANCE is a model designed to analyse the socioeconomic and distributional impacts of public policies that directly affect households and consumers, both economic, energy, environmental or fiscal. The CGE of CHANCE is built on a latest version of the GTAP database (GTAP 10), while the main source of microdata is the latest harmonized European HBS, which is merged with SILC through statistical matching.

Link: <https://www.youtube.com/watch?v=WUjLiaOFuCM>

Online: 10 February 2023

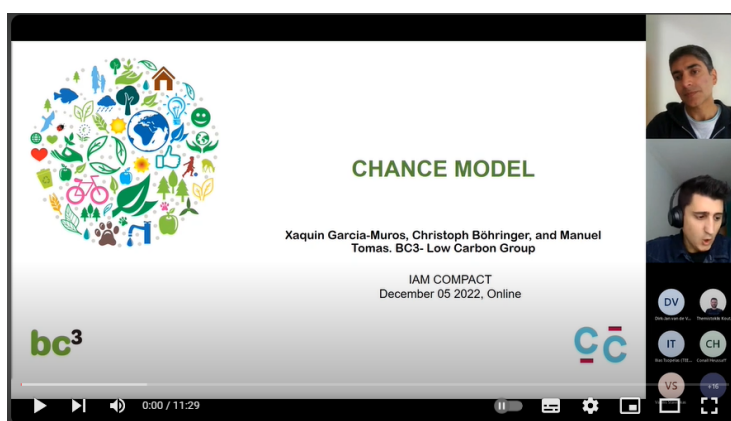


Figure 56. Preview of the video 'CHANCE model presentation'

10.4 China MORE model presentation

Title: China MORE model presentation

Description: China-MORE is a bottom-up long-term multi-sector multi-GHG emission reduction evaluation model based on the VEDA-TIMES model platform for energy system optimization. The China-MORE model adopts the principle of system analysis and takes the energy system optimization module as the core. It combines the modules of energy service demand, multi-greenhouse gas emission, air pollutants emission, power technology diffusion, emission space allocation and uncertainty analysis.

The core modules of the model are energy system optimization module and greenhouse gas emission module. Firstly, the energy service demand module provides the service demand of industry, construction, transportation, agriculture, waste treatment and other sectors according to the social and economic development factors. The model energy system optimization module can obtain the fuel combination and technology composition with minimum cost according to the given demand level. At the same time, pollutant emission module and GHG (CO₂ excluded) emission module output emission data of different scenarios. On this basis, the model can estimate the medium - and long-term optimal emission path accordingly.

Link: <https://www.youtube.com/watch?v=KosD0CoYZ-Q>

Online: 10 February 2023



Figure 57. Preview of the video 'China MORE model presentation'

10.5 CLEWs modelling framework presentation

Title: CLEWs modelling framework presentation

Description: The Climate, Land, Energy, Water systems (CLEWs) methodology is a model-based methodology to assess costs and benefits of policy and investment decisions made in one sector (e.g., land use) on the other sectors (e.g., water supply) and thereby support policy coherence. CLEWs models can be developed with different approaches and different modelling tools, such as OSeMOSYS, MESSAGE, LEAP, WEAP and GAEZ. Often, a CLEWs model consists of a techno-economic representation of the climate, land, energy, and water systems within the long-term optimisation tool OSeMOSYS. Here, the parts of these systems are represented as processes with certain transfer functions and exchanging between them different commodities. For example, one particular agricultural land use is represented as a 'box' that takes a certain quantity of water, energy and land area as inputs and delivers part of the water (through ground water recharge or surface run off) and a crop with a certain yield. The optimisation seeks to minimise the Net Present Value of all costs incurred across the water, energy and land sectors in the whole-time domain analysed (typically, of several decades), while meeting an increasing demand for commodities (e.g., food products) and resource availability constraints.

Link: <https://www.youtube.com/watch?v=XHnkfHEjbjM>

Online: 10 February 2023



Figure 58. Preview of the video 'CLEWs modelling framework presentation'

10.6 EXPANSE model presentation

Title: EXPANSE model presentation

Description: EXPANSE is a modelling framework that is composed of two separate European models: 1) spatially explicit EXPANSE for NUTS-2 and NUTS-3 analysis of electricity system capacity investment and operation as well as associated regional impacts (e.g., employment, land use). 2) D-EXPANSE is a retrospective electricity system transition model.

Link: <https://www.youtube.com/watch?v=HAWSO3EAeqs>

Online: 10 February 2023



Figure 59. Preview of the video 'EXPANSE model presentation'

10.7 MEDEAS / WILIAM models presentation

Title: MEDEAS / WILIAM models presentation

Description: MEDEAS

MEDEAS is a set of policy-simulation dynamic-recursive models sharing the same conceptual modelling approach which have been designed applying system dynamics. Models at three different geographical aggregated scales have been developed: global (MEDEAS-W), European Union (MEDEAS-EU) and country-level for Austria and Bulgaria (MEDEAS-AUT and MEDEAS-BGR, respectively). MEDEAS models are structured in nine main modules: economy, energy demand, energy availability, energy infrastructures and EROI, minerals, land-use, water, climate/emissions, and social and environmental impact indicators. The biophysical limits associated with the exploitation of natural resources (energy and materials), the dynamic EROI and the feedbacks between the modules play an essential role in the model.

WILLIAM

The WILLIAM ("Within limits") Integrated Assessment Model (IAM), developed in the scope of LOCOMOTION project, is a model running at three geographical levels – global, European and national for the 27 EU member states and United Kingdom (UK); integrating full models of water, land-use and society (including the endogenization of population); develop the economy module towards a comprehensive representation of production, consumption, government, international trade, finance and climate change impacts and include the full supply of materials. All the models run from 2015 to 2050-2100. WILLIAM model is built on the existing MEDEAS model that was developed in the context of the EU-funded MEDEAS project. For the study of the highly complex interactions between humans and their environment, the project draws on different techniques and methods, such as System Dynamics (SD) modelling with Vensim software, Input-Output Analysis (IOA), Energy Return On Investment (EROI) calculations, Life Cycle Analysis (LCA), land and carbon footprinting, microsimulation, and many others.

Link: <https://www.youtube.com/watch?v=Tmjvdjm2koU>

Online: 17 February 2023

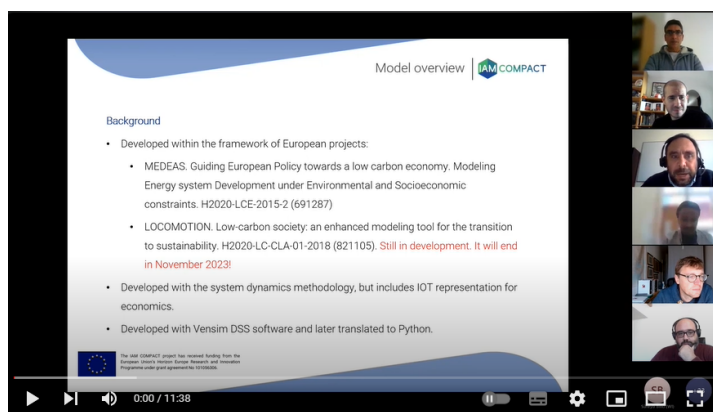


Figure 60. Preview of the video 'MEDEAS / WILIAM models presentation'

10.8 TIAM model presentation

Title: TIAM model presentation

Description: The TIMES Integrate Assessment Model, TIAM, is the multi-region, which combines an energy system representation of fifteen different regions with options to mitigate non-CO₂ greenhouse gases as well as non-energy CO₂ mitigation options. It uses emissions from these sources to calculate temperature changes using a simple climate module. As such, it can be used to explore a variety of questions on how to mitigate climate change through energy system and transformations, as well as reductions in non-energy CO₂ emissions and non-CO₂ emissions.

Link: <https://www.youtube.com/watch?v=SP0XDoACVKM>

Online: 17 February 2023



Figure 61. Preview of the video 'TIAM model presentation'

10.9 DREEM model presentation

Title: DREEM model presentation

Description: The Dynamic high-Resolution dEmand-side Management (DREEM) model is a fully integrated simulation model resolving key features that are not found together in existing Demand-Side Management (DSM) models.

The model serves as an entry point in DSM modelling in the building sector, by expanding the computational capabilities of existing Building Energy System (BES) models to simulate transition scenarios in the building sector from the demand side, e.g., calculating energy demand profiles, assessing the benefits and limitations of energy efficiency and demand-flexibility primarily for consumers and then for other power actors involved, etc.

DREEM is a hybrid bottom-up model that combines the key features of both statistical and engineering models. The novelty of the DREEM model lies mainly in its modularity, as its structure is decomposed into individual modules characterised by the main principles of component- and modular-based system modelling approach, namely "the interdependence" of decisions within modules.

Link: <https://www.youtube.com/watch?v=p0ziPbTsmqc>

Online: 10 February 2023



Figure 62. Preview of the video 'DREEM model presentation'

10.10 DyNERIO model presentation

Title: DyNERIO model presentation

Description: DynERIO is an integrated energy-economy modelling framework. Based on input-output databases capturing the whole economic spectrum and multiple regions, it allows to model policies in terms of: (i) increase in consumption of goods; (ii) change of industries' productive structure (i.e., steel plants switch from coal/gas to electricity use). New production levels of energy commodities, needed to fulfil the shocked economic system, are tracked by the input-output table and converted into capacity to be operative at a given year. From the information of the capacity stock evolution over time it is possible to derive the associated net extraction of raw materials.

Link: <https://www.youtube.com/watch?v=XPc9weC41tk>

Online: 10 February 2023



Figure 63. Preview of the video 'DyNERIO model presentation'

10.11 EnergyPLAN model presentation

Title: EnergyPLAN model presentation

Description: EnergyPLAN is an energy system analysis tool created for designing and studying future sustainable energy systems with an emphasis on systems with a high penetration of renewable energy sources. EnergyPLAN simulates the operation of national and regional systems on an hourly basis, including the electricity, heating, cooling, industry, and transport sectors. The tool is a deterministic input/output model and allows for modelling of all thermal, renewable, storage, conversion, and transport technologies. General model inputs are energy demands, renewable energy sources, energy technology capacities, costs (investment, operation, and fuel), and user-defined operation strategies.

Link: https://www.youtube.com/watch?v=BUgUI1iv_4Y

Online: 10 February 2023



Figure 64. Preview of the video 'EnergyPLAN model presentation'

10.12 GCAM model presentation

Title: GCAM model presentation

Description: The Global Change Analysis Model (GCAM) is a multisector integrated assessment model aimed at analysing human and Earth system dynamics, by exploring the interdependencies between the economy, energy, water, climate, and AFOLU systems within a single computational platform. The model is designed to analyse alternative "what-if" type scenarios and assess potential impacts of different assumptions about future conditions. The model reads in exogenous scenario "assumptions" about key drivers (e.g., population, economic growth, technology/land costs...) and then assesses the implications of these assumptions on key scientific or decision-relevant outcomes (e.g., prices, energy use, land use, water use, emissions, and concentrations). See GCAM documentation for more details: <https://github.com/JGCRI/gcam-doc/blob...>

Link: https://www.youtube.com/watch?v=hG-cs_V5q1s

Online: 10 February 2023



Figure 65. Preview of the video 'GCAM model presentation'

10.13 GCAM-USA model presentation

Title: GCAM-USA model presentation

Description: GCAM is an open-source, global, long-term, multi-sector human Earth system model; it contains representations of energy, economy, agriculture and land-use, and water systems for 32 geopolitical regions in the globe. GCAM-USA divides the United States into 50 states and the District of Columbia. GCAM-USA is embedded within the global GCAM model, so conditions within the United States are internally consistent with international conditions. The state-level regions contain more detailed representations of national-level economic features, including socioeconomics, energy transformation, carbon storage, renewable resources, electricity markets, and consumer end-use energy demands.

Link: <https://www.youtube.com/watch?v=Bp3lzu5uPKo>

Online: 17 February 2023



Figure 66. Preview of the video 'GCAM-USA model presentation'

10.14 IMACLIM China model presentation

Title: IMACLIM China model presentation

Description: IMACLIM-China is a single region recursive dynamic computable general equilibrium model in China. The model is constructed based on IMACLIM-S framework developed by Centre International de Recherche sur l'Environnement et le Développement (CIRED). IMACLIM-China aims to study the medium- and long-term effects of energy and climate policies on China's macro economy through the equilibrium framework of physical quantity, price quantity and value quantity. The main feature of IMACLIM-CHN model is to ensure the technical authenticity of the model's simulation of energy systems and major innovations in energy systems by coupling the technical details of energy supply and energy consumption in the bottom-up model.

Link: <https://www.youtube.com/watch?v=bIm1APBAOhM>

Online: 17 February 2023



Figure 67. Preview of the video 'IMACLIM China model presentation'

10.15 MENA EDS model presentation

Title: MENA EDS model presentation

Description: The MENA-EDS model is a national-scale fully-fledged energy system model that covers in detail energy demand and supply and their complex interlinkages driven by energy prices. The model provides energy system projections until 2050, including energy consumption by sector, fuel mix, energy investment, and CO₂ emissions, under different policy measures and technology assumptions. It addresses energy system analysis, energy price projections, power generation planning and climate change mitigation policies by sector for Middle East and North Africa (MENA) countries. MENA-EDS covers the main energy end-use sectors, including industries, transport and buildings, while the entire value chain of energy supply is represented through primary fuel extraction, energy transformation (power generation, refineries), and supply to final consumers.

Link: https://www.youtube.com/watch?v=cCNLd_DUaug

Online: 17 February 2023



Figure 68. Preview of the video 'MENA EDS model presentation'

10.16 OSeMOSYS model presentation

Title: OSeMOSYS model presentation

Description: The Open Source energy MOdelling SYStem is a fully (data to solver) open source long-term bottom-up (technology rich) optimisation framework for energy systems modelling. It calculates for every year of a time domain the energy mix (in terms of capacity, capacity expansion and operation) that minimised the total Net Present Costs of the whole system while meeting exogenously defined demands for energy commodities or services and while complying with constraints dictated by resource availability, technical characteristics of technologies, policies. It is a partial equilibrium modelling tool. It can be used both with perfect or myopic foresight. It allows high temporal (up to hourly) and spatial resolution. It has been coupled with several other modelling tools. Its modelling paradigm is very close to MESSAGE's and quite similar to TIMES's. It is also the optimisation engine of LEAP (NEMO is a Julia translation of OSeMOSYS). Given its fully open-source nature, the availability of several interfaces with different degrees of technicality, the availability in three modelling languages (Python, GNU MathProg and GAMS) and the fast learning curve, it is largely used in capacity development and education activities.

Link: <https://www.youtube.com/watch?v=4Wj-qQPoLLU&t=1s>

Online: 17 February 2023



Figure 69. Preview of the video 'OSeMOSYS model presentation'

10.17 PROMETHEUS model presentation

Title: PROMETHEUS model presentation

Description: Prometheus model is a comprehensive energy demand and supply simulation tool designed to analyze global energy systems. It covers in detail future energy demand, supply, power generation mix, carbon emissions, energy prices and investments. The model incorporates demographic and economic indicators, primary and final energy consumption, fuel resources and prices, CO₂ emissions and technology dynamics (for power generation, road transport, hydrogen production and industrial and residential end-use technologies). PROMETHEUS incorporates a recursive dynamic (partial equilibrium energy system) model with annual resolution currently serviced to run up to the year 2050 (the process to extend model horizon to 2100 is ongoing). The model simulates both demand and supply of energy, interacting with each other to form market equilibrium at different regional scales (detailed regional balances are aggregated in order to simulate world energy markets). Its main objectives are: 1) Assess climate change mitigation pathways and low-emission development strategies for the medium and long-term 2) Analyse the energy system, economic and emission implications of a wide spectrum of energy and climate policy measures, differentiated by region and sector) 3) Explore the economics of fossil fuel production and quantify the impacts of climate policies on the evolution of global energy prices.

Link: <https://www.youtube.com/watch?v=CJ2KznFYquo>

Online: 17 February 2023



Figure 70. Preview of the video 'PROMETHEUS model presentation'

10.18 MUSE model presentation

Title: MUSE model presentation

Description: The ModUlar energy system Simulation Environment (MUSE) is an agent-based framework, that explicitly simulates the decision-making process of firms and consumers in the energy system. MUSE is technology-rich, thereby it characterises the cost and performance of each technology option, tracks technology stock, and provides details on investment, operating costs, energy consumption, and emissions with a detailed bottom-up perspective.

MUSE-Global is an implementation of a global model in the MUSE framework, characterising 28-regions of the world, and running over a time horizon of 2010 to 2100. It can be used to explore a variety of questions on how to mitigate climate change given the presence of heterogeneous behaviours affecting the pace of the system change.

Link: https://www.youtube.com/watch?v=-hJRVm9G_JM

Online: 24 February 2023



Figure 71. Preview of the video 'MUSE model presentation'

10.19 WTMBT model presentation

Title: WTMBT model presentation

Description: The World Trade Model with Bilateral Trades (WTMBT) is a meso-economic linear optimization model based on the comparative advantage principle. Considering m world regions with n industries each, the WTMBT enables to endogenously determine the production yields and trades patterns required to satisfy an exogenously specified final demand yield in each region, minimizing the use of labour and capital by complying with regional factors endowments (e.g., availability of natural resources, land, workforce).

Link: <https://www.youtube.com/watch?v=7p4j8Ch04iE>

Online: 17 February 2023



Figure 72. Preview of the video 'WTMBT model presentation'

10.20 WISEE EDM Global Steel presentation

Title: WISEE EDM Global Steel model presentation

Description: The EDM Global-Steel model is used to analyse possible futures of the global steel sector (divided into 20 countries / regions including EU-27), including technological transformation pathways in each country/region, potential future trade of direct reduced iron (DRI) between countries / regions as well as (impacts of) demand levels and material efficiency. Main outputs of the model are final energy demand and GHG emissions per country/region as well as investment costs.

Link: <https://www.youtube.com/watch?v=Ceep4SrFXuc>

Online: 17 February 2023



Figure 73. Preview of the video 'WISEE EDM Global Steel model presentation'

10.21 WISEE EDM EU Industry presentation

Title: WISEE EDM EU Industry model presentation

Description: The EDM-Industry EU model system is used to analyse possible futures of an industrial production system and to derive technically consistent paths to it, starting from today's production system. For particularly energy-intensive and GHG-intensive sectors (steel, basic chemicals, refineries), aggregated values such as the CO₂ emissions of the European steel industry are derived from the properties and activity values of the individual plants included in the model and can be reported at the sub-national level. Other sectors of the basic industries are modelled on the basis of activities and technologies at the country level. The non-energy-intensive industries are modelled econometrically.

Link: <https://www.youtube.com/watch?v=PPQiI8cRGWc>

Online: 17 February 2023



Figure 74. Preview of the video 'WISEE EDM EU Industry model presentation'

11 List of infographics

In this section, all infographics published in the project website¹¹ and social media are listed, for the time being focusing on statistical data on current/pressing energy issues and the UNFCCC Conference of the Parties.

11.1 December 2022: Biggest power source in the EU

This infographic demonstrates the biggest source of electricity in each of the 27 EU Member States.

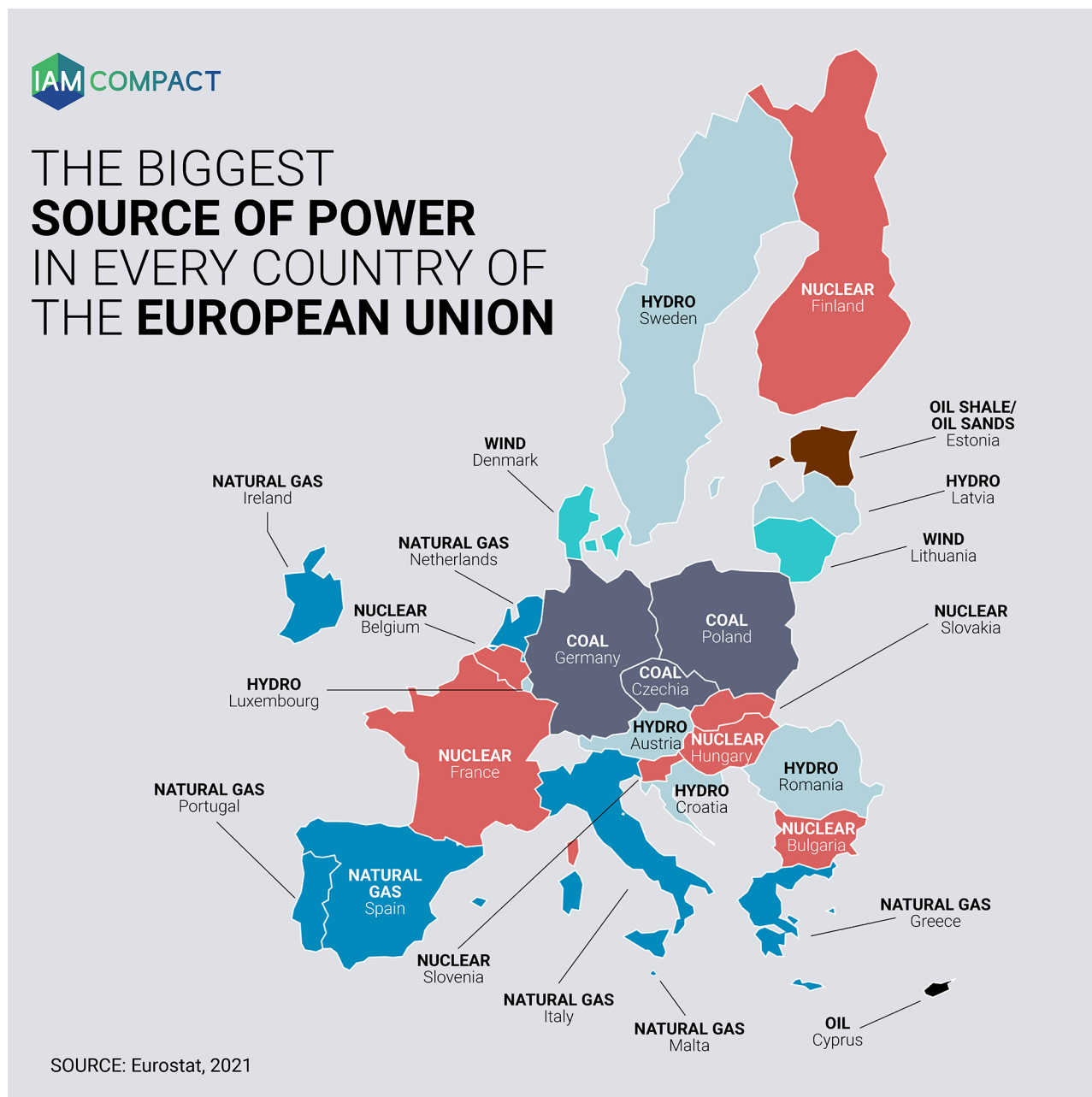


Figure 75. 'December 2022: Biggest power source in the EU' Infographic

¹¹ <https://iam-compact.eu/communication/infographics>

11.2 January 2023: CO₂ emissions per capita in the EU

This infographic demonstrates the CO₂ emissions per capita (in metric tons) in a heatmap of the EU-27.

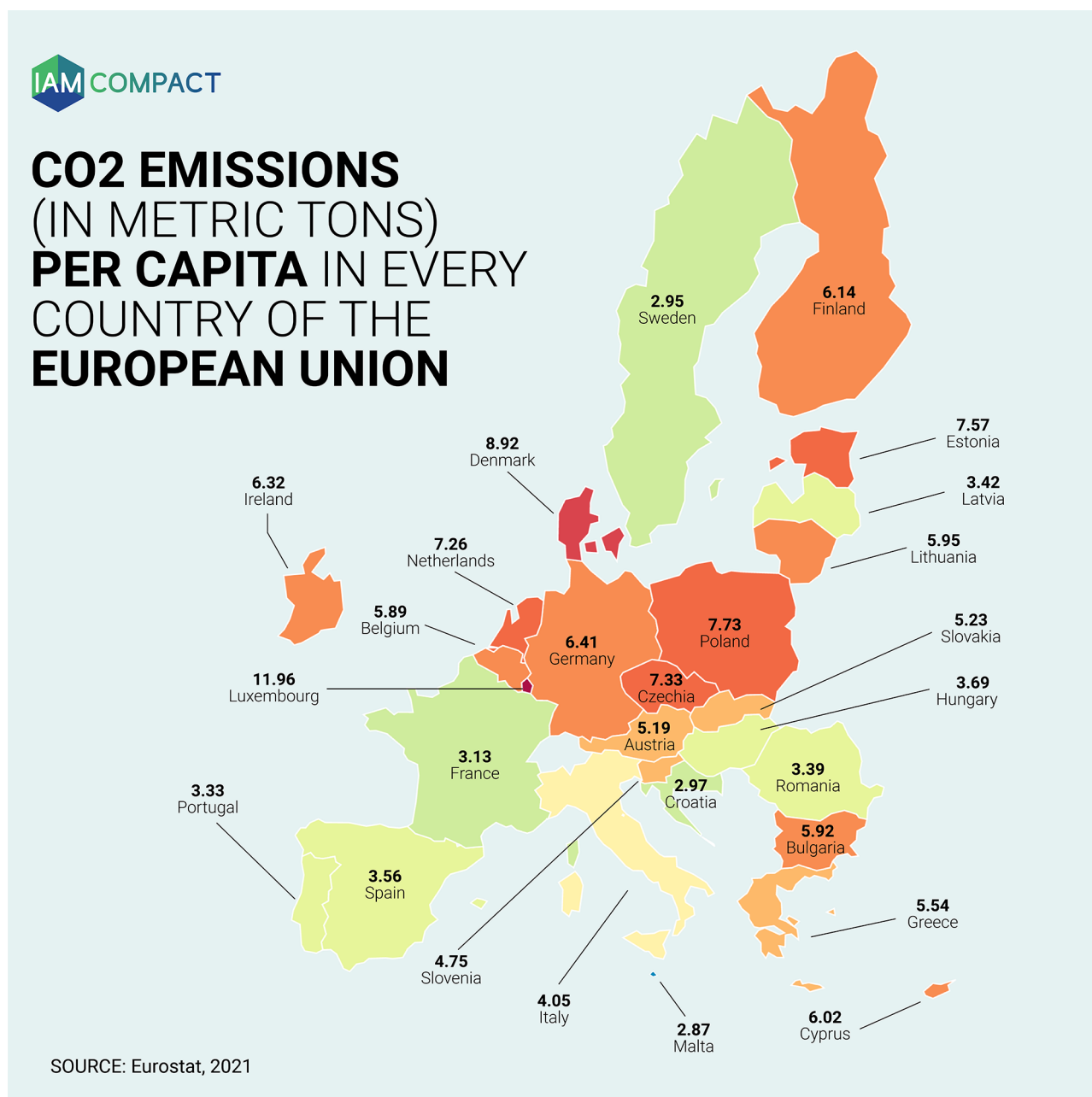


Figure 76. 'January 2023: CO₂ emissions per capita in the EU' Infographic

11.3 February 2023: Highest emitting sector in the EU

This infographic demonstrates the highest emitting sector in each of the 27 EU Member States.

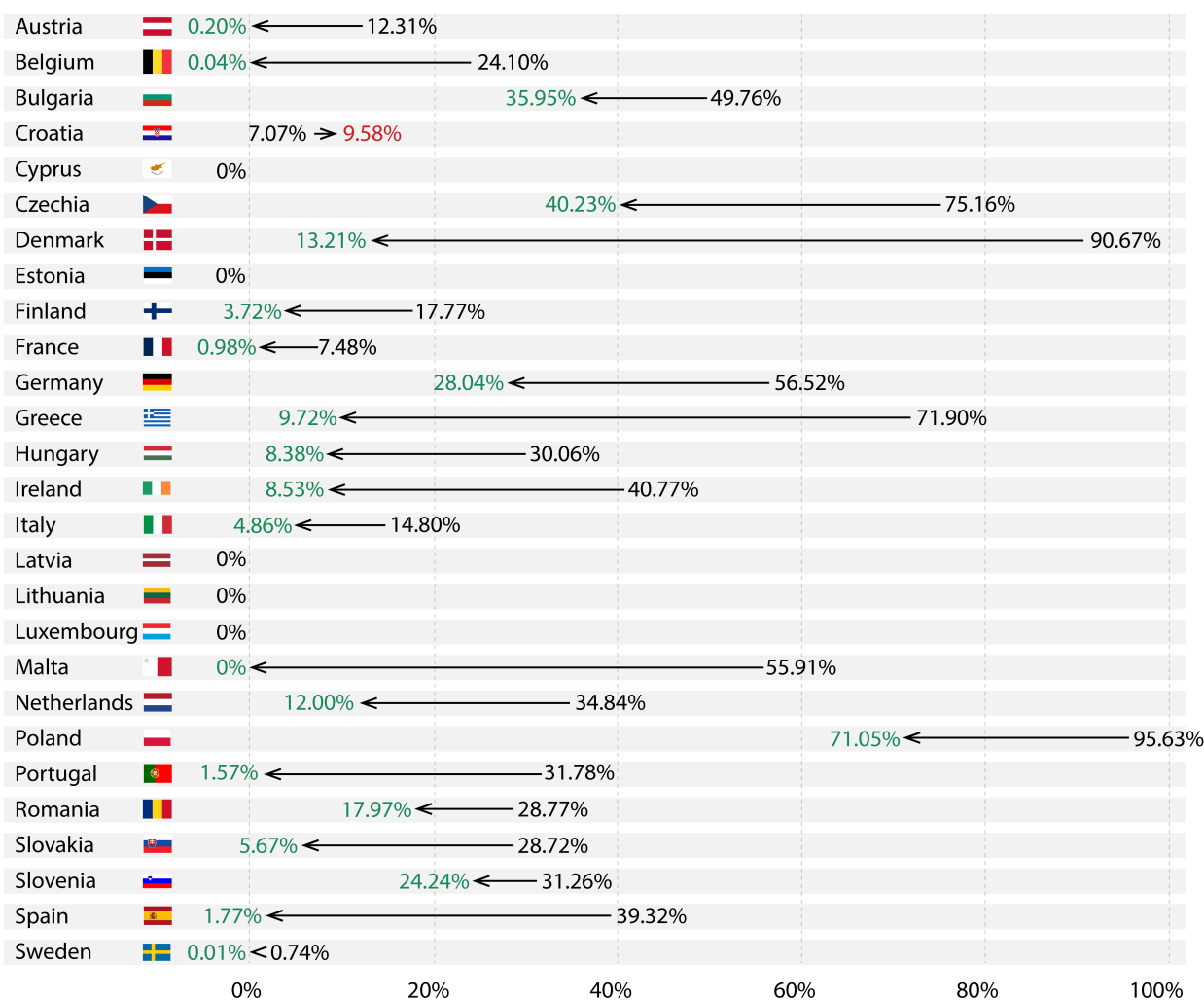


Figure 77. 'February 2023: Highest emitting sector in the EU' Infographic

11.4 March 2023: Evolution of coal in the EU

This infographic demonstrates the changes in coal share (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM COAL IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



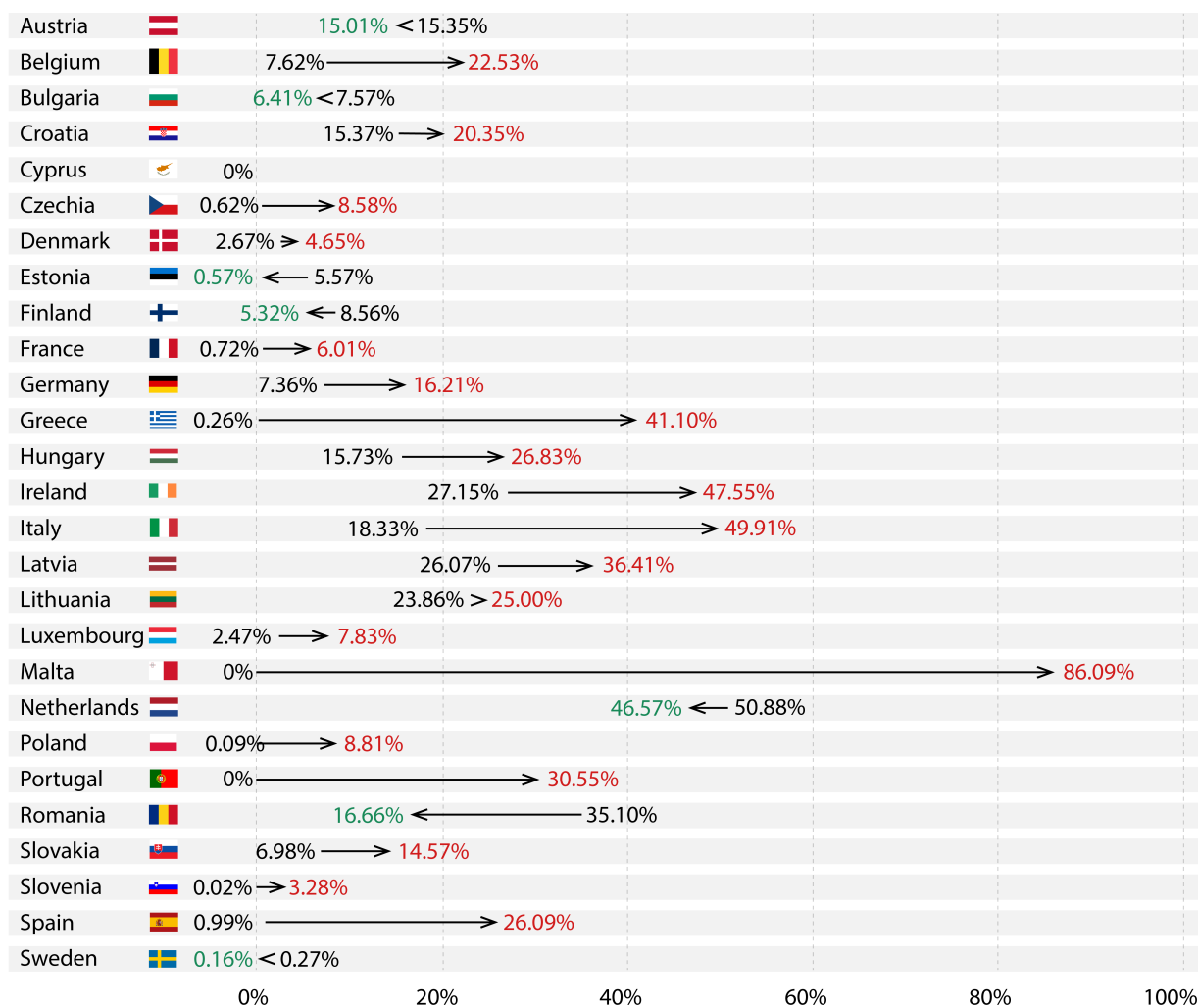
SOURCE: Eurostat, 2021

Figure 78. 'March 2023: Evolution of coal in the EU' Infographic

11.5 April 2023: Evolution of natural gas in the EU

This infographic demonstrates the changes in natural gas share (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM NATURAL GAS IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



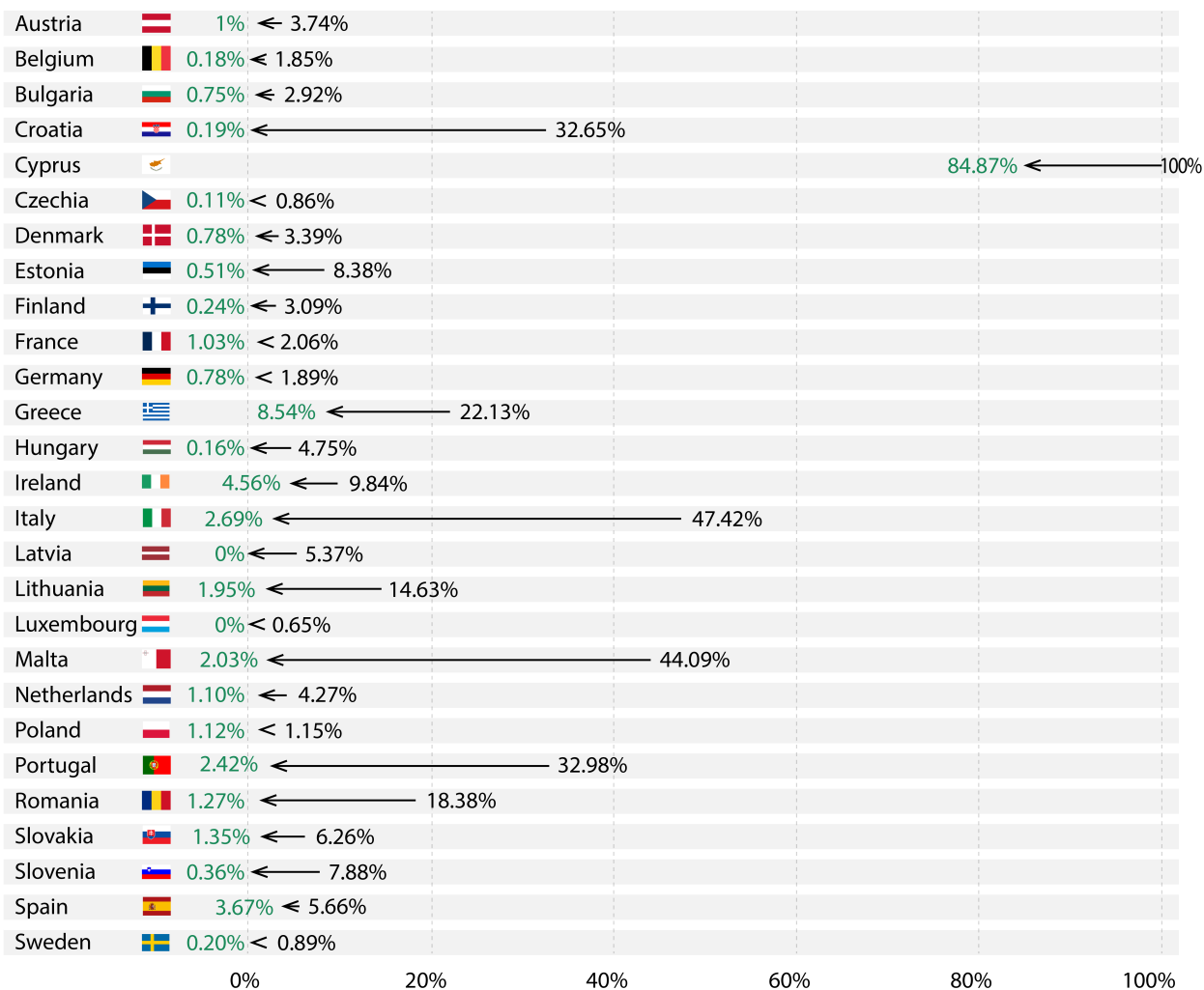
SOURCE: Eurostat, 2021

Figure 79. 'April 2023: Evolution of natural gas in the EU' Infographic

11.6 May 2023: Evolution of oil in the EU

This infographic demonstrates the changes in oil share (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM OIL IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



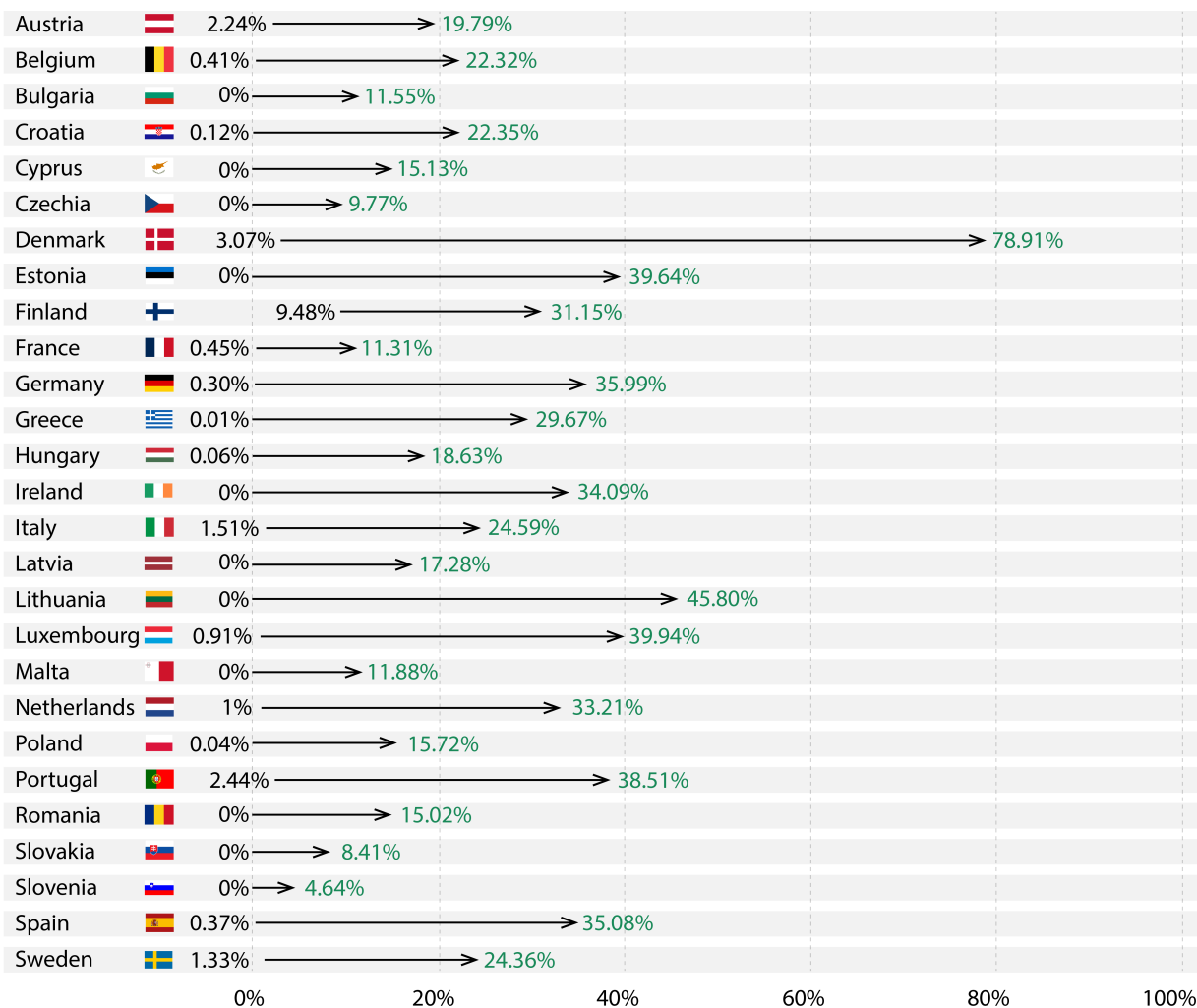
SOURCE: Eurostat, 2021

Figure 80. 'May 2023: Evolution of oil in the EU' Infographic

11.7 June 2023: Evolution of RES in the EU

This infographic demonstrates the changes in RES share (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM RENEWABLES IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



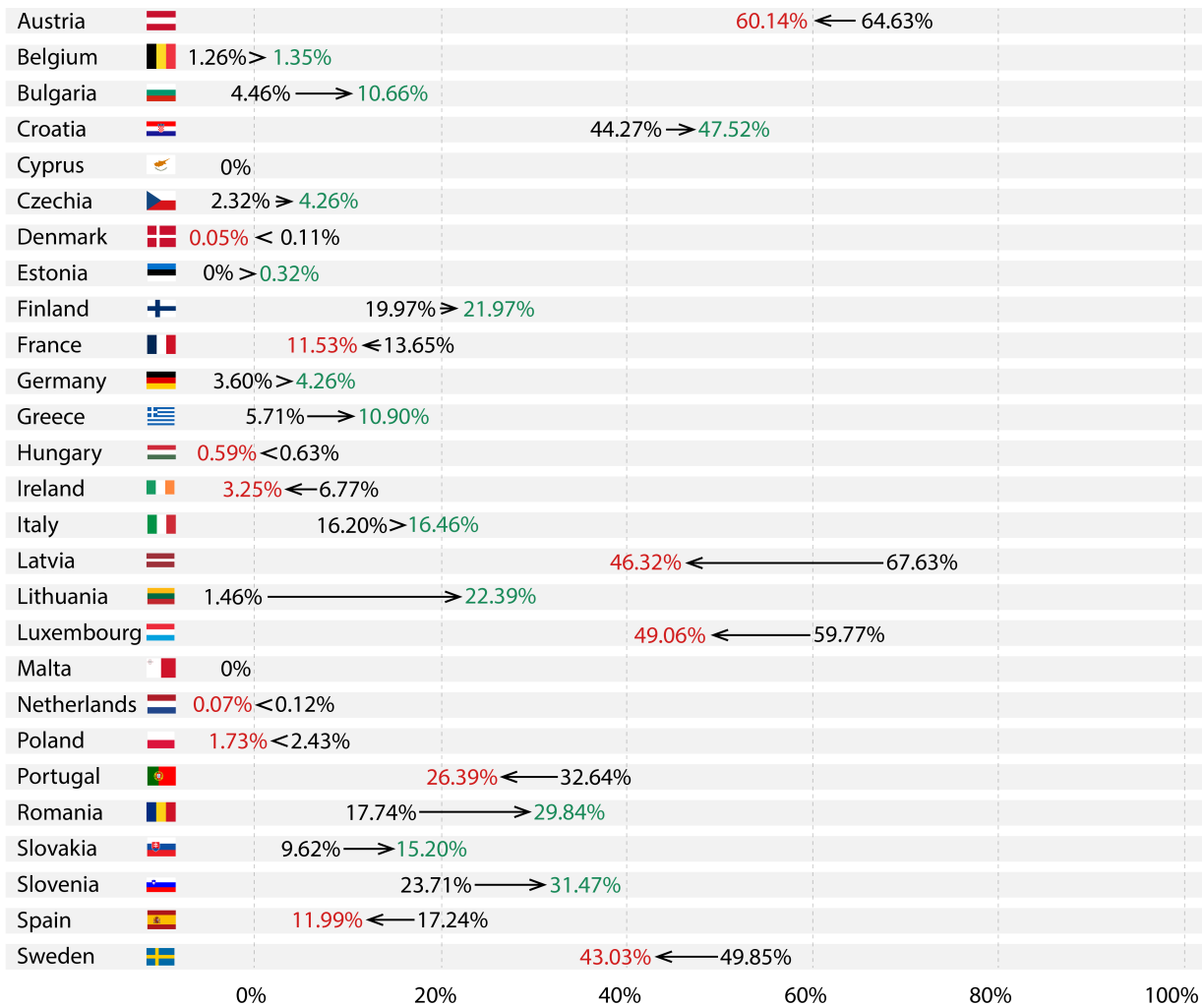
SOURCE: Eurostat, 2021

Figure 81. 'June 2023: Evolution of RES in the EU' Infographic

11.8 September 2023: Evolution of hydro in the EU

This infographic demonstrates the changes in hydropower share (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM HYDROELECTRIC POWER IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



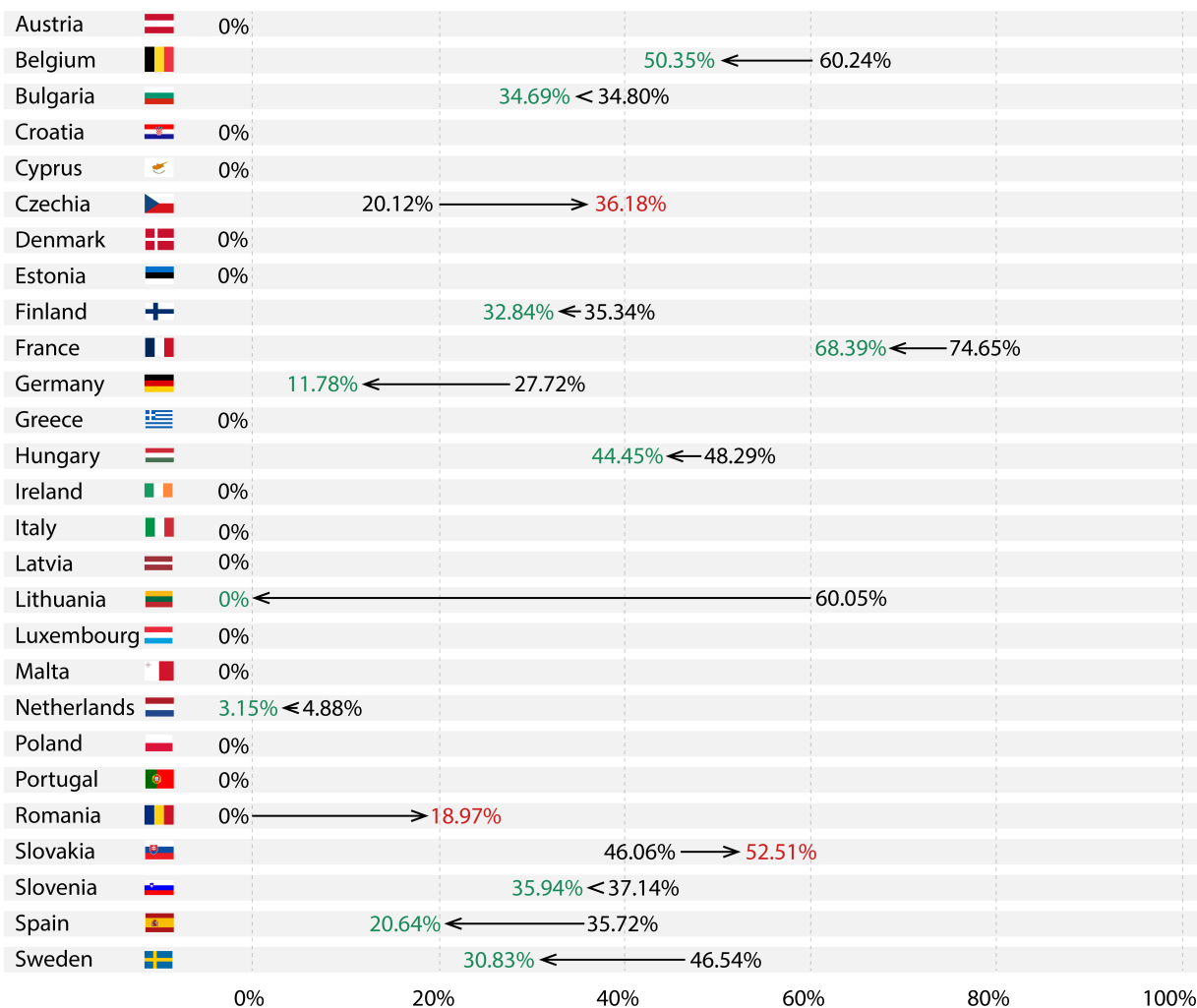
SOURCE: Eurostat, 2021

Figure 82. 'September 2023: Evolution of hydro in the EU' Infographic

11.9 October 2023: Evolution of nuclear in the EU

This infographic demonstrates the changes in nuclear power (since 1990) in each of the 27 EU Member States.

THE SHARE OF ELECTRICITY AND DERIVED HEAT THAT CAME FROM NUCLEAR POWER IN 1990 (START OF ARROW) TO 2021 (END OF ARROW) IN EVERY COUNTRY OF THE EUROPEAN UNION.



SOURCE: Eurostat, 2021



Figure 83. 'October 2023: Evolution of nuclear in the EU' Infographic

11.10 November 2023: A timeline of landmark COPs

This infographic demonstrates what to expect in COP28 and it is co-created with the DIAMOND project.

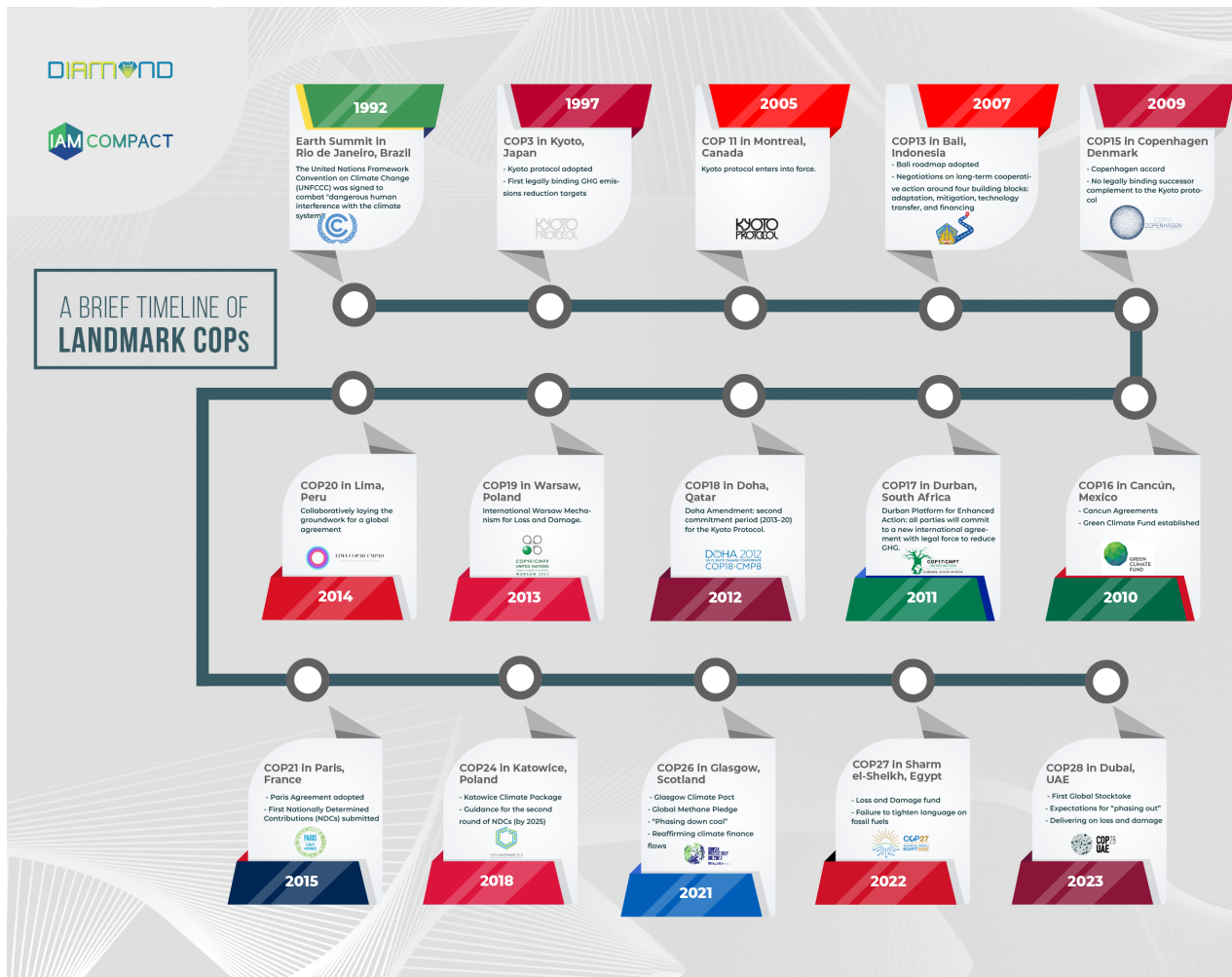


Figure 84. 'November 2023: A timeline of landmark COPs' Infographic