PARIS REINFORCE

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D8.4 PARIS REINFORCE COMMUNICATION, DISSEMINATION AND EXPLOITATION PLAN – UPDATE 2

WP8 – Communication, Dissemination & Exploitation

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EC Summary Requirements

1. Changes with respect to the DoA

The coronavirus pandemic significantly affected Tasks 8.5 "Organisation of conferences and policy events" and 8.6 "Scientific publications and outreach", since organisation of physical events is still, in 2021, either not allowed or not safe in many countries, and international travel has been severely impacted. Moreover, it remains unclear how this situation will evolve in 2022, which is the final project year for PARIS REINFORCE. The Consortium assumes that project activities are safer to stay within the digital/virtual domain until the end of the project (November 2022), as one form or another of physical distancing and travel conditions imposed by countries and institutions are likely to be in effect for a substantial period. Shortly after the outbreak of COVID-19, the PARIS REINFORCE consortium embarked on an approach of converting all physical events to digital/virtual engagement in a way that has the least possible impact on deliverables, whilst reflecting on the different nature of how results are achieved in an in-person and at web-based events (e.g. a longer physical event is replaced by shorter, interconnected web events). Details of the pandemic's effect on CDE project planning are described below in further details.

Notably, the first series of national events/workshops were successfully organised in Months 15-24, namely August 2020 – May 2021 (albeit online, due to COVID-19); the second regional EU workshop was also carried out in the form of a public webinar in Month 24 (May 2021). Aiming to secure a similar process and output as in a physical workshop, online workshops included the presentation of modelling results to stakeholders as well as constructive stakeholder-driven dialogues, so that the project can maintain its co-creation approach. The second series of national events/workshops are scheduled to be organised in Months 28-40, namely September 2021 – September 2022, and the final EU conference by Month 42 (November 2022).

2. Dissemination and uptake

This deliverable is the second update of D8.2 and serves as a reference document for the consortium partners (experts and non-experts), to be informed about the changes in the communication, dissemination, and exploitation plan of the project, as deemed required after two and a half years of its implementation. It can also be used by other stakeholders as a documentation of the communication, dissemination, and exploitation envisaged and implemented activities of the PARIS REINFORCE project.

3. Short summary of results (<250 words)

This report is the 2nd and final update of the Communication, Dissemination, & Exploitation (CDE) Plan, issued one year before the end of the PARIS REINFORCE project. It outlines the ways and material, through which the project's concept, progress, and results have been promoted to the appropriate stakeholders, as well as the promotional activities that are scheduled to be implemented in the upcoming, final year.

In particular, promotional materials include, but are not limited to, the PARIS REINFORCE logo and standard dissemination means, such as those comprising the visual identity of the project; while more specialised material, including articles, reports, commentaries, working documents, policy briefs, scientific publications, infographics, videos, and presentations will be promoted through all CDE activities of the project.

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The implemented promotional activities so far include: the establishment of social media channels for promoting the project scope and activities; the publication of articles on own and partners' websites; the launch of project newsletters; the promotion of the project via partners' newsletters; the organisation of PARIS REINFORCE events; the participation in external events (including fifteen scientific conference presentations); the publication of fifty scientific publications (journal papers); the publication of thirteen commentaries and/or articles in online media; as well as the production of two videos on the project and the I^2AM PARIS platform.

4. Evidence of accomplishment

This report and the material referred to in the report.

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Preface

PARIS REINFORCE will develop a novel, demand-driven, IAM-oriented assessment framework for effectively supporting the design and assessment of climate policies in the European Union as well as in other major emitters and selected less emitting countries, in respect to the Paris Agreement. By engaging policymakers and scientists/modellers, PARIS REINFORCE will create the open-access and transparent data exchange platform I^{2}AM PARIS, in order to support the effective implementation of Nationally Determined Contributions, the preparation of future action pledges, the development of 2050 decarbonisation strategies, and the reinforcement of the 2023 Global Stocktake. Finally, PARIS REINFORCE will introduce innovative integrative processes, in which IAMs are further coupled with well-established methodological frameworks, in order to improve the robustness of modelling outcomes against different types of uncertainties.

NTUA - National Technical University of Athens	GR	
BC3 - Basque Centre for Climate Change	ES	
Bruegel - Bruegel AISBL	BE	
Cambridge - University of Cambridge	UK	
CICERO - Cicero Senter Klimaforskning Stiftelse	NO	
CMCC - Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici	IT	
E4SMA - Energy, Engineering, Economic and Environment Systems Modelling Analysis	IT	
EPFL - École polytechnique fédérale de Lausanne	CH	
Fraunhofer ISI - Fraunhofer Institute for Systems and Innovation Research	DE	
Grantham - Imperial College of Science Technology and Medicine - Grantham Institute	UK	
HOLISTIC - Holistic P.C.	GR	
IEECP - Institute for European Energy and Climate Policy Stichting	NL	
SEURECO - Société Européenne d'Economie SARL	FR	
CDS/UnB - Centre for Sustainable Development of the University of Brasilia	BR	
CUP - China University of Petroleum-Beijing	CN	
IEF-RAS - Institute of Economic Forecasting – Russian Academy of Sciences	RU	
IGES - Institute for Global Environmental Strategies	JP	
TERI - The Energy and Resources Institute	IN	

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Executive Summary

The main objective of PARIS REINFORCE is to underpin climate policymaking with authoritative scientific processes and results and enhance the science-policy interface, in light of the Paris Agreement and associated challenges.

Towards this notion, PARIS REINFORCE co-develops along with relevant stakeholders (policymakers, climate system and climate-economy modellers, industry representatives, NGOs, civil society, etc.) a novel, demand-driven, IAM-oriented assessment framework for effectively supporting the design and assessment of climate policies in the EU as well as in other major emitters and selected less emitting countries, in respect to the Paris Agreement objectives.

The assessment framework is being implemented through the I^{2}AM PARIS open-access and transparent data exchange platform, which is dedicated to supporting the effective implementation of Nationally Determined Contributions (NDCs), the development of 2050 decarbonisation strategies, the reinforcement of the 2023 Global Stocktake, and the preparation of future action pledges. The platform will eventually apply innovative integrative processes towards increasing the robustness of modelling outcomes against different types of uncertainties.

This report, the Communication, Dissemination, & Exploitation (CDE) Plan – 2nd Update, comes at the end of the project's 2.5 years of implementation. As an update of the 1st CDE Plan, it outlines both the ways that can be applied for the project and consortium to be informed about relevant research and innovations in the field of integrated assessment modelling and policymaking as well as the ones used to share the PARIS REINFORCE scope and results with the appropriate audiences. In doing so, the CDE Plan defines the PARIS REINFORCE communication, dissemination, and promotional channels and means that will be used for this distribution. Moreover, it includes the CDE actions implemented during the first 30 months of the project and outlines the activities that are planned for the final project year.

In particular, the promotional means to be used are outlined. These include but are not limited to the standard dissemination means, such as those comprising the visual identity of the project, as discussed in report D8.1 "PARIS REINFORCE Visual Identity"; while more specialised means, including articles, reports, commentaries, working documents, policy briefs, and scientific publications, are a core aspect of the project's CDE strategy. Furthermore, project updates are and will keep being distributed via the PARIS REINFORCE newsletters and partners' newsletters. The use of visual content means, such as infographics, videos, and presentations, is also discussed.

The plan concludes by listing the implemented promotional activities so far, as well as the scheduled activities for the final year of the project.

It should be noted that the project's co-creation/co-design approach implies that the CDE strategy features far more than the usual CDE dynamics, mostly triggered by the evolving Stakeholder Council (WP3) and the I^{2}AM PARIS Platform's (WP2) creation and subsequent operation. Consequently, this resulting cross-cutting, uniform, and transparent CDE approach has been established with continuous improvements/adjustments throughout the first 2.5 years of the project.

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1 Introduction

The main objective of PARIS REINFORCE is to underpin climate policymaking with authoritative scientific processes and results and to enhance the science-policy interface, in light of the Paris Agreement and associated challenges. Towards this notion, PARIS REINFORCE has developed a novel, demand-driven, IAM-oriented assessment framework for effectively supporting the design and assessment of climate policies in the EU as well as in other major emitters and selected less emitting/developed countries, in respect to the Paris Agreement. The framework is demand-driven and based on a co-design principle, since in its development all different stakeholder groups—policymakers, climate system and integrated assessment modellers and scientists, industry representatives, NGOs, the civil society, etc.—are engaged.

The application of the assessment framework is implemented through the I^{2}AM PARIS, an open-access and transparent data exchange platform. I^{2}AM PARIS has been co-developed with stakeholders so as to be realistic and user-friendly, as well as to promote ownership of results. It is envisaged to support the effective implementation of Nationally Determined Contributions (NDCs), the development of 2050 decarbonisation strategies, the reinforcement of the 2023 Global Stocktake, and the preparation of future action pledges. Moreover, innovative integrative processes, in which IAMs are coupled with well-established methodological frameworks and tools, have been and will be further introduced in order to improve the robustness of modelling outcomes against different types of uncertainties.

Finally, PARIS REINFORCE aims to enhance the legitimacy of scientific processes in support of climate policymaking, by introducing an innovative stakeholder inclusion framework and improving the transparency of the employed models, methods, and tools.

As noted, the project aims to include in its processes stakeholders across a wide spectrum of interested parties. However, it is acknowledged that the two key groups of its stakeholders, and potential users of I^{2}AM PARIS, are (a) policymakers in the energy/climate fields and (b) energy- and climate-economy modelling communities at the national, regional, and global level. Other groups that should be actively engaged are scientists in general, trade unions, industry associations, business networks, NGOs, and the civil society and general public. Consequently, it has been of vital importance for information on the project and its outcomes to be disseminated at an early stage so that all these groups become aware of and involved in the project's Stakeholder Council from the beginning of the project, in order to actively participate in the design of the I^{2}AM PARIS platform and the co-creation of the scientific processes and resulting policy prescriptions. During the first year of the project, the project partners engaged with appropriate stakeholders and co-designed the I^{2}AM PARIS platform with them. In the following one and a half years, stakeholders continued to be part of the Council, becoming active users of the platform and providing their feedback so that it is further updated and finetuned.

Given the above, the main purpose of this report is the development of an effective strategy for the communication, dissemination, and exploitation (CDE) of information and results of the PARIS REINFORCE project to the relevant audiences, which will be used in the final year of the project. The CDE strategy addresses the what-to whom-how elements:

TO WHOM: Identification of the targeted audiences to which the project is publicised;
HOW: Analysis of potential promotional channels and selection of the most appropriate ones according to the targeted audience and the message to be disseminated;
WHAT: Creation and planning of the CDE activities.

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2 Purpose of the Plan

The CDE Plan is a periodic report on the exact ways, in which our consortium can follow relevant research and novelties in the fields of energy and climate-economy (or integrated assessment) modelling and policymaking and discover new approaches for achieving project aims. In addition, it outlines the ways to share the PARIS REINFORCE results so that they are openly available and easily accessible. It lists different channels, such as preferred communication methods, a social media pack and relevant conferences to reach and engage several target groups and raise their interest and identification of relevant media channels and synergies that could be created with other EU projects or networks. However, the project's co-creation/co-design approach implies that the CDE plan has far more than the usual CDE dynamics, mostly triggered by the evolving Stakeholder Council (WP3) and the development and operation of the I^{2}AM PARIS Platform's (WP2). Consequently, this resulting cross-cutting, uniform, and transparent CDE approach has been established with continuous improvements/adjustments throughout the first 2.5 years of the project. This deliverable is the 2nd update of the CDE plan and includes the CDE activities implemented during the first 30 months of the project's implementation as well as the plan for the final project year (i.e., December 2021 – November 2022).

2.1 The Three Pillars of Promotion: Communication, Dissemination, Exploitation

2.1.1 Communication

Communication is the process of informing the widest possible audience, including the media and the public, regarding the project and its results. Its main objective is to reach out to all society and show the impact that PARIS REINFORCE will have to each person's lives and work, with a link to the societal challenges associated with climate change and mitigation action. The main audiences targeted for communication purposes are all stakeholders, notably the general public, the civil society, and NGOs.

2.1.2 Dissemination

Dissemination is the process of transferring produced knowledge and results in order to enable others to use and exploit them. Dissemination focuses on the results and outcomes of the initiative, rather than the initiative itself, as well as the ways in which they can be exploited by interested parties. Main audiences suitable for dissemination are the ones with the capacity to use the results in their operation. In the case of PARIS REINFORCE, these are mainly policymakers, scientists/researchers, NGOs, and industries.

2.1.3 Exploitation

Exploitation is the effective use of project results through scientific, economic, political, or societal routes of utilisation. The objective of exploitation is to go one step further than dissemination and turn research and innovation actions into concrete value and impact for society. Thus, the main candidate audiences for exploitation are again policymakers, scientists/researchers, NGOs, and industries.

2.2 Targets of CDE Strategy

To be certain that the results of PARIS REINFORCE will be communicated, disseminated, and exploited,

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several targets for most of the CDE activities have been set. The progress towards these targets is monitored on a regular basis to confirm that the project is on track to achieving them or to take appropriate measures if needed.

The following table presents the targets for each monitored CDE activity, as well as their current status. The ways to achieve these targets are described in Section 4.

Table 1 CDE Indicators

Activity	Target	Means of verification[1]	Status
Dissemination of policy reports on future action pledges and long-term decarbonisation pathways of the EU (D5.3 & 5.5 respectively).	• At least 150 unique downloads.	• Google analytics reports.	• Deliverable D5.3 submitted by November 2021 but not yet on website (no metrics available).
EU regional workshops in Brussels.	• events; • ≥ 40 stakeholders each; • ≥ 80% positive evaluation.	• Agendas; • Lists of participants; • Evaluation forms; • Minutes; • Photos.	• Successful organisation of the 1st regional workshop in Nov. 2019. > 55 stakeholders • 2nd regional workshop held as EU virtual webinar: 230 attendants (live viewership in Bruegel's website), 2402 attendants (live viewership in social media), 44'13'' (average time watch)
EU final policy conference in Brussels	• ≥ 60 stakeholders; • ≥ 80% positive evaluation.	• Agendas; • Lists of participants; • Evaluation forms; • Minutes; • Photos.	• Planned to be held in September - November 2022

[1] The means of verification and KPIs for any CDE activity which may change format due to the coronavirus pandemic, namely the 1st series of national stakeholder workshops, the 2nd regional stakeholder workshop, etc., will be adjusted accordingly.

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Activity	Target	Means of verification[1]	Status
Survey on the degree to which the process has provided information on low-carbon pathways options and trade-offs.	• ≥ 30 policymakers; • ≥ 50% positive evaluation.	• List of interviewees; • Survey form.	• Not started yet
EU policymakers' participation in the Stakeholder Council[2] & policy events.	• ≥ 20 EU policymakers; • ≥ 80% positive evaluation for NDC-relevance.	• List of Stakeholder Council; • Survey form.	• More than 70 EU policymakers in the Stakeholder Council

[2] KPI progress concerns information currently available on the working capacity (group) of the stakeholder council members. This applies to all KPIs related to the stakeholder council.

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Activity	Target	Means of verification[1]	Status
National workshops.	• series of workshops in ≥ 10 European countries; • 18 national stakeholder workshops; • ≥ 20 participants per workshop; • ≥ 80% positive evaluation.	• Agendas; • Lists of participants; • Evaluation forms; • Minutes; • Photos.	• Japan (Dec 2019): >60 participants • Greece (Jan 2020): 399 participants • Kenya (Oct 2020): 45 participants • India (Nov 2020): 35 participants • CAC region #1 (Dec 2020): 14 participants • CAC region #2 (Mar 2021): 13 participants • Russia (Mar 2021): >100 participants • CAC region #3 (May 2021): 11 participants • USA (May 2021): 65 participants • Switzerland (May 2021): 53 participants • France (May 2021): 36 participants • Spain (May 2021): 40 citizens • China (Jun 2021): 24 participants • Netherlands (Jun 2021): over 30 participants (public) • Ukraine (Jun 2021): 60 participants
National EU policymakers' participation in the Stakeholder Council.	• ≥ 2 national policymakers from ≥ 12 EU countries; • ≥ 50% positive evaluation.	• List of Stakeholder Council; • Survey form.	• 26 national policymakers coming from 8 EU countries

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Activity	Target	Means of verification[1]	Status
Dissemination of policy reports on sectoral decarbonisation pathways for Europe (D5.3 & 5.5 respectively).	• At least 100 unique downloads.	• Google analytics reports.	• Deliverable D5.3 submitted by November 2021 but not yet on website (no metrics available).
Policy brief (D8.9/D8.10) on co-impacts and trade-offs in the broader EU policy framework.	• At least 50 unique downloads.	• Google analytics reports.	• One policy brief, as part of the EC policy publication for COP26, on trade-offs between emissions cuts and employment from the RRF packages, in November 2021 (metrics not yet available)

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Activity	Target	Means of verification[1]	Status
Series of Talanoa style workshop sessions aiming to redefine and then redesign the climate action required by the gravity of the current climate situation, including but not limited to the following topics: "Climate refugees: A flood on its own"; "Energy starvation: Redefining energy poverty"; "Heating/ cooling: Entering the electrification of everything"; "Aviation and shipping: The two white elephants of climate action"; "Land use: An invisible elephant"; "Food shortage: Paris and SDGs are inseparable"; "Future cities: Practice begins at home".	• ≥ 7 workshop sessions embedded in the regional and national stakeholder workshops on (a) climate migration; (b) energy poverty; (c) low-carbon cooling; (d) aviation and shipping; (e) land use and land use change, (f) zero hunger, and (g) sustainable cities and communities; • ≥ 20 stakeholders in each workshop; • ≥ 80% positive evaluation.	• Agendas • Attendance	• Brussels (November 2019): most topics were discussed: climate migration, aviation, land use and land use change (57 participants). • Greece (January 2020): roundtable on "sustainable energy sources: economy, society, environment and the case of wind turbines", focusing on local communities and land use (399 participants). • Kenya (October 2020): energy poverty and zero hunger were different parts of the discussion forum (45 participants). • India (November 2020): breakout session on urbanisation and sustainable cities in the country (35 participants).

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Activity	Target	Means of verification[1]	Status
Dissemination of two policy reports on nine major emitting countries (Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, and the USA) and on decarbonisation pathways at the national level, co-developed with informed policymakers and strengthened by risk and uncertainty analyses as well as a diverse set of robust methods and tools (D6.3 & 6.6 respectively).	• At least 50 unique downloads.	• Google analytics reports.	• Deliverable D6.3 submitted by November 2021 but not yet on website (no metrics available).
Stakeholder workshops in six major emitting countries.	• ≥ 1 workshop in 6 major emitting countries.	• Agendas; • Lists of participants.	• Japan (Dec 2019): >60 participants • India (Nov 2020): 35 participants • Russia (Mar 2021): >100 participants • USA (May 2021): 65 participants
Stakeholders' presence in national policy events.	• ≥ 30 stakeholders per event; • ≥ 80% positive evaluation.	• Agendas; • Lists of participants; • Evaluation forms.	• Greece (Jan 2020): 399 participants • Switzerland (May 2021): 53 participants • France (May 2021): 36 participants • Spain (May 2021): 40 citizens • Netherlands (Jun 2021): over 30 participants (public)

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Activity	Target	Means of verification[1]	Status
National policymakers' participation in the Stakeholder Council and policy events from major emitting countries.	• ≥ 2 national policymakers from each major emitting country, each one evaluating the workshops as very useful for the developing of the next NDC.	• List of Stakeholder Council; • Lists of participants; • Survey form.	• 14 national policymakers coming from 4 major emitting countries • Japan (Dec 2019): >60 participants • India (Nov 2020): 35 participants • Russia (Mar 2021): >100 participants • USA (May 2021): 65 participants
Dissemination of two policy reports on less developed and/or less emitting countries (including Kenya, South Africa, etc.) and on decarbonisation and/or adaptation pathways at the national level, co-developed with informed policymakers and strengthened by risk and uncertainty analyses as well as a diverse set of robust methods and tools (D6.3 & 6.6 respectively).	• ≥ 100 unique downloads.	• Google analytics reports.	• Deliverable D6.3 submitted by November 2021 but not yet on website (no metrics available).
One stakeholder workshop in Kenya and Ukraine.	• ≥ 20 participants per event; • ≥ 50% positive evaluation.	• Agendas; • Lists of participants; • Evaluation forms.	• Kenya (Oct 2020): 45 participants • Ukraine (Jun 2021): 60 participants
National policymakers' participation in the Stakeholder Council and policy events from less emitting countries.	• ≥ 2 national policymakers from each of the considered less emitting country; • ≥ 50% positive evaluation.	• List of Stakeholder Council; • Lists of participants; • Survey form.	• Kenya (Oct 2020): 45 participants • CAC region #1 (Dec 2020): 14 participants • CAC region #2 (Mar 2021): 13 participants • CAC region #3 (May 2021): 11 participants • Ukraine (Jun 2021): 60 participants

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Activity	Target	Means of verification[1]	Status
Positive impact of the I²AM PARIS platform to the implementation of the Paris Work Programme and to the enhancement of the effectiveness of the 2023 GST.	• ≥ 80% positive evaluation of the I²AM platform; • ≥ 40% stating they will use it for developing / improving their NDCs.	• Survey form.	• In progress
Use of I²AM PARIS platform.	• ≥ 300 users of the I²AM platform (in total); • ≥ 100 users of the I²AM platform (per year); • ≥ 2,000 unique visitors per year; • ≥ 40% of return visitors; • ≤ 50% bounce rate; • ≥ 50 modellers from ≥ 15 research institutes (in total); • ≥ 80% positive satisfaction of users with the platform content.	• List of I²AM users; • Feedback questionnaire.	• 2,033 users • 19.9% returning visitors • 46.59% bounce rate • 25,966 pageviews • Average session duration: 7'38''
Dissemination of 3 infographics on how selected models of the PARIS REINFORCE modelling armoury work (D8.9/8.10).	• ≥ 200 downloads per year	• Google analytics reports.	• Six infographics available here • 431 downloads
Stakeholders' participation in the Stakeholder Council from each stakeholder group.	• ≥ 30 stakeholders per group; • ≥ 50% positive evaluation.	• List of Stakeholder Council; • Survey form.	• 101 Academia; • 71 EU policymakers; • 69 National government; • 74 NGOs; • 143 Private sector / Industry

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Open-access (green/gold) academic publications in high-impact journals, detailing innovative methodologies employed in the project; global modelling analyses and model inter-comparisons produced in the project; and/or project results for the EU region, as well as for European, other major emitting countries and less emitting or less developed countries.	• ≥ 19 publications.	• Digital object identifiers (DOIs).	50 publications by November 2021: 1. https://doi.org/10.1088/1748-9326/ab375d 2. https://doi.org/10.1016/j.erss.2019.101306 3. https://doi.org/10.3390/su11236783 4. https://doi.org/10.1007/s10018-019-00257-3 5. http://dx.doi.org/10.1038/d41586-020-00177-3 6. https://doi.org/10.1016/j.eist.2020.04.001 7. https://doi.org/10.1038/s41558-020-0797-x 8. https://doi.org/10.1007/s12351-020-00574-6 9. https://doi.org/10.1080/15567249.2020.1769773 10. https://doi.org/10.1038/s41558-020-0826-9 11. https://doi.org/10.1038/s41560-020-0646-1 12. https://doi.org/10.1016/j.rser.2020.109988 13. https://doi.org/10.3390/su12145832 14. https://doi.org/10.1016/j.envsoft.2020.104795 15. https://doi.org/10.1016/j.oneear.2020.08.002 16. https://doi.org/10.1016/j.erss.2020.101780

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46. https://doi.org/10.1016/j.oneear.2021.10.001
47. https://doi.org/10.1016/j.joule.2021.09.004
48. https://doi.org/10.1038/s41558-021-01203-6

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Activity	Target	Means of verification[1]	Status
			49. https://doi.org/10.1016/j.oneear.2021.10.024 50. https://doi.org/10.1038/s41558-021-01206-3
Presentations in academic conferences.	• ≥ 30 in ≥ 10 European and non-European countries.	• Conferences' programmes; • Photos; • Books of abstracts.	• 16 conferences by November 2021: All available here
Reference to PARIS REINFORCE results in IPCC AR6.	• ≥ 1 citation in AR6.	• IPCC AR6.	• In progress

Reference to PARIS REINFORCE results in UNEP's Emissions Gap reports.	• ≥ 1 citation in report.	• UNEP's Emissions Gap reports.	• UNEP's Emissions Gap Report 2021:
			  • https://doi.org/10.1038/s41558-021-01001-0
			  • https://doi.org/10.1038/s41558-020-0797-x

Interchange of researchers with the U.S. Department of Energy (DOE) Pacific Northwest National Laboratory (PNNL).	• ≥ 1 researcher exchanged.	• Co-developed reports; • Photos (if applicable).	• Planned for the final year of the project's implementation

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Activity	Target	Means of verification[1]	Status
Use of the project website.	• ≥ 3,000 unique visitors per year; • ≥ 40% of return visitors; • ≤ 50% bounce rate.	• Google analytics reports.	June 1, 2019-June 1, 2020 (1st year) • 5,993 unique users • 7.7% return visitors • 58.49% bounce rate June 2, 2020-June 1, 2021 (2nd year) • 7,039 unique users • 18.3% return visitors • 79.50% bounce rate June 2, 2021-November 17, 2021 (first half of the 3rd year) • 2,835 unique users • 7.6% return visitors • 69.57% bounce rate
Presence in social media.	• ≥ 3,000 use of the #ParisReinforce hashtag and/or retweets in social media; • ≥ 500 followers in LinkedIn.	• Social media analytics.	• #PARISREINFORCE hashtag used and/or retweets over 1,000 times in social media • 366 followers in LinkedIn • 547 followers in Twitter • 141 followers in Instagram • > 500,000 post views in the 3 social media channels

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Commentaries.	• ≥ 200 unique downloads from the website.	• Google analytics reports.	31 Commentaries with **more than 400** views via the PARIS REINFORCE website. Below are the commentaries written by members of the consortium in international press • Peters, G. (2020, March 16). How changes brought on by coronavirus could help tackle climate change. *The Conversation UK*. [link] • Gambhir, A. (2020, March 17). Coronavirus and climate change: "There is much uncertainty, and much to play for". *Climate & Environment at Imperial*. [link] • Koberle, A. (2020, March 25). Coronavirus: How we emerge from this terrible crisis could push us into a better future. *Climate & Environment at Imperial*. [link] • Allan, J., Donovan, C., Ekins, P., Gambhir, A., Hepburn, C., Reay, D., Robins, N., Shuckburgh, E. & Zenghelis, D. (2020, May 4). A net-zero emissions economic

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			recovery from COVID-19. *Oxford Smith School of Enterprise and the Environment*. [link] • Doukas, H., Nikas, A. & Gambhir, A. (2020, May 6). Convergence between technological progress and sustainability is not that obvious. *The Parliament Magazine*. [link] • Anger-Kraavi, A. (2020, May 9). Positive and negative effects of the coronavirus pandemic on climate change. *Estonian World*. [link] • Doukas. H., Nikas, A., & Tsipouridis, I. (2020, August 27). Green glimmers of hope in climate action through a European, citizen-led transition model. *New Europe*. [link] • Doukas, H., Nikas, A., Saulo, M., & Tsipouridis, I. (2020, October 24). How best to achieve a desirable transition to a low-carbon economy: the case of Sub-Saharan Africa. *Africa*

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Activity	Target	Means of verification[1]	Status
			Sustainability Matters. [link] • Doukas, H., & Nikas, A. (2021, February 16). Involve citizens in climate-policy modelling. *Nature*, 590, 389. [link] • Doukas, H. (2021, March 2). The environmental cost of fast fashion. *HuffPost*. (in Greek) [link] • Doukas. H., Nikas, A., & Tsipouridis, I. (2021, March 17). Climate injustice adds more inequalities. *E-mc² - Energy Matters to Climate Change*. [link] • Doukas, H., & Nikas, A. (2021, April 27). The Delignitisation Roller Coaster in Greece: An Old Car and a Steep Slope Ahead. *The Future of Work*. [link] • Doukas, H. (2021, May 17). Climate injustices and the Climate Law in Greece. *LiFO*. (in Greek) [link]

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Activity	Target	Means of verification[1]	Status
Working Documents.	• ≥ 300 distributed at events; • ≥ 200 unique downloads from the website.	• Events' lists of participants; • Google analytics reports.	• In progress
Newsletters.	• Bi-monthly newsletters (18 in total); • ≥ 5,000 recipients (in total); • ≥ 30% opening rate.	• List of newsletters (D8.9/8.10); • Newsletter system reports.	• 14 Newsletters • 748 recipients • 37.59% opening rate
Infographics.	• ≥ 3; • ≥ 200 downloads per year.	• List of infographics (D8.9/8.10); • Google analytics reports.	• 13 infographics available here.
Videos.	• ≥ 3; • ≥ 500 views.	• List of videos (D8.9/8.10); • YouTube analytics.	• 2 Videos available here. • 170 views
Blog posts & Press releases.	• ≥ 6 Press releases in non-academic sources; • ≥ 15 articles & press releases (in total).	• List of articles & press releases (D8.9/8.10).	• 7 Press Releases • 748 recipients • 30.03% opening rate

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Digital networking and clustering activities with EU projects.	• Project referenced in ≥ 50 other websites and at EU project meetings / conferences.	• Digital monitoring.	Project referenced in more than 43 other websites • IEECP • Forbes • HOLISTIC • BC3 • EURO2day • COACCH (H2020 project) • E4SMA • European Institute on Economics and the Environment (EIEE) • CMCC • EPFL • E&EJ • news.makedonias.gr • capital.gr • Climate & Environment at Imperial blog • The Conversation UK • The Parliament Magazine • Estonian World • Ecotec • Bruegel • climatechangemitigation.eu • Energy Policy Unit (EPU) at the National Technical University of Athens (NTUA) • Imperial College London • covid-19.openaire.eu • Energy Super Modelers and International Analysts (ESMIA) • buildbackbetter.gr • B2Green • fabiodisconzi.com • NAVIGATE (H2020 project)

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Activity	Target	Means of verification[1]	Status
			• ecfor.ru • Centre for Atmospheric Science at the University of Cambridge • NEWEUROPE • Integrated Assessment Modeling Consortium (IAMC) • Energy Matters to Climate Change (E-mc2) • EU-GCC Clean Energy Technology Network (H2020 project) • ESG stories • NDC ASPECTS (H2020 project) • European Environmental Bureau • LOCOMOTION (H2020 project) • energypress.gr • ot.gr • dailypost.gr • Energymag • Ecopress

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3 Audiences to Reach

An understanding of stakeholders' interests, drivers and barriers is essential for effective communication and the prioritisation of tools for communication. Understanding stakeholder motivations has enabled and/or will enable the consortium to effectively engage, communicate with, and promote current and future dialogue between different stakeholders. However, whilst communication activities have been and/or will be tailored for different stakeholder groups, the core scientific content remains and/or will remain consistent—under no circumstances will the scientific findings of the project be played down, regardless of the interests of certain stakeholder groups.

One of the main goals of the PARIS REINFORCE CDE Plan is to enable stakeholders outside the consortium to provide their knowledge to the project, co-create the I^2AM PARIS platform and modelling/research processes, support the operation of the Stakeholder Council, and inform policy prescriptions as well as relevant sustainable development policies, during the project's duration and beyond. In the Talanoa dialogue-inspired and co-creative project approach, it is essential that feedback and suggestions be collected from a variety of individuals with complementary skills and backgrounds, in order to increase the robustness of the project's results. This has been the case within the first 2.5 years of the project via the implementation of several regional and national workshops, identifying the most interesting topics that stakeholders would like PARIS REINFORCE to explore and even co-designing the scenario frameworks of the project's multi-model analyses.

The target audience of PARIS REINFORCE consists of the following groups:

- Policymakers and other individuals actively involved in climate negotiations;
- Scientists and researchers, especially in the field of energy system and climate-economy modelling;
- Private sector entities and their respective associations;
- Public sector entities and their respective associations;
- Investors and the finance sector;
- Households, communities, and sub-national actors, such as local governments, municipalities, and their respective associations; and
- Environmental, climate, and civil society NGOs and networks covering all climate relevant aspects.

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4 Promotional Channels & Means

In order to deliver the project's messages to the targeted audiences, the appropriate channels and means have been and will further be used. The promotional channels are the ways, or routes, through which the messages may find the desired destinations—i.e., an article in the PARIS REINFORCE website, a post on social media, a participation in a conference, an intervention in an event, etc. The promotional means are the media that encapsulate the promoted message and distribute it via the channels—i.e., a publication, an infographic, a video, etc.

Each combination of promotional channel and means is unique and serves a different purpose and level of promotion. For example, a scientific publication or a working document is a report with more technical details, aiming to give scientists and researchers a more thorough aspect of an outcome of the action. On the other hand, an infographic is more suitable to feature the fundamentals of the action and its results for a broader audience, while a policy brief is expected to target policymakers.

4.1 Promotional Channels

4.1.1 The PARIS REINFORCE Website

The PARIS REINFORCE Website[3] has served as a one-stop shop, being at the centre of the promotional process. It has been used for all three pillars of promotion and contains (or links to) every promotional material of the action. The website consists of several informational webpages, mainly on the action (concept, objectives, and work structure) as well as pages showcasing specific activities (e.g., the organisation of events), or major outcomes, namely reports, publications, infographics, etc. It also promotes transparency of our scientific capabilities and processes, assumptions, and results, by providing background information and a direct link to the I^{2}AM PARIS Platform[4]. More on the creation of the I^{2}AM platform is available in the respective report, "D2.4 I^{2}AM PARIS platform" (link). Furthermore, a dedicated registration form to the PARIS REINFORCE Stakeholder Council has been created via which many members have been recruited. The project website uses responsive web design (RWD) enabling access from different screen sizes/platforms of desktops, tablets, and smartphones. More details on the website are available in the respective report, "D8.5 Creation of the website" (link).

In order to increase the visibility and traffic to the website, as well as the number of downloads of the reports, an exhaustive campaign has been implemented via other communication and dissemination channels (i.e., social media, blog articles, electronic communication lists, etc.). Moreover, several opinion blog articles containing relevant keywords have been posted on the website in order to boost search engine optimisation and achieve a higher ranking in the top search lists of search engine results for relevant queries.

The implemented promotional campaign has yielded remarkable results. In particular, during the project's first 2.5 years, the website had more than 15,612 unique visitors, while the 29 deliverables that are currently available were downloaded more than 850 times (briefs have been downloaded almost 500 times). It is worth mentioning that the website's visitors were more than double than expected and,

[3] http://www.paris-reinforce.eu/
[4] https://www.i2am-paris.eu/

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although the majority of the project's reports have not been published yet, the download rate is quite satisfying.

4.1.2 Social Media

In PARIS REINFORCE, social media has been used in order to promote the action and its results to every possible stakeholder, not only for communication but also for dissemination and exploitation reasons. Social media presence and activity are also very well suited to indirect promotion and dissemination activities, as the subjects that are being discussed/shared allow for the introduction of the PARIS REINFORCE project in general and its relevant, specific messages in particular (see more information on the implemented CDE activities on social media in Section 5.1).

The following table presents the aim and reason per social media channel.

Table 2 Targets and Plan per Social Media Channel

Social Media Channel	Purpose	Plan	Status
Twitter	• Increase PARIS REINFORCE visibility in the scientific community, the policymaking community, and civil society.	• 3-4 posts per week on current affairs and project's progress.	• 159 posts • 317 reposts • 455,000 post impressions • 547 followers
LinkedIn	• Increase PARIS REINFORCE visibility in the scientific and policymaking community.	• Ad hoc posts on project's progress.	• 120 posts • 26,282 post impressions • 366 followers
Instagram	• Increase PARIS REINFORCE Visibility in the society.	• 3-4 posts per week on current affairs.	• 150 posts • 141 followers

4.1.2.1 Twitter

Twitter is an online social networking service on which users post and interact with short messages (less than 280 characters). It is ideal for short announcements of the action's outcomes and has been used ad hoc. Via its account[5] in Twitter PARIS REINFORCE has reached a wide variety of audiences suitable primarily for communication and dissemination purposes.

4.1.2.2 LinkedIn

LinkedIn is a business and employment-oriented social network allowing individuals and organisations to promote their professional progress and outcomes. PARIS REINFORCE page[6] in LinkedIn has been

[5] https://twitter.com/ParisReinforce
[6] https://www.linkedin.com/company/pari;[./,s-reinforce

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used to target more specialised audiences within the framework of dissemination and exploitation.

4.1.2.3 Instagram

Instagram is a social networking app for sharing photos and videos with other user and it is ideal for communicating with members of the general public. Via its channel[7] PARIS REINFORCE has posted pictures on environmental issues such as climate change and climate action, and has communicated its scope and objective to the wider public.

4.1.2.4 ResearchGate

ResearchGate[8] is a social network for scientists and researchers to share papers, ask and answer questions, and find collaborators. Through this channel[9], PARIS REINFORCE has reached out to the scientific community in order to distribute its scientific publications and other reports.

4.1.2.5 YouTube

YouTube has been used in order to host and promote the PARIS REINFORCE videos, which will be of wide variety, such as interviews, explanatory videos, etc. The PARIS REINFORCE YouTube account[10] has been created and includes the 1st video which features a live demo of the I²AM PARIS prototype implemented at the 1st Stakeholder dialogue workshop, and the 2nd video which introduces PARIS REINFORCE, its objective, its models and the significance and functionality of the I²AM PARIS platform.

4.1.3 Blogs and News websites

In the following sections, a list of high-calibre media websites, through which it *would be beneficial* for PARIS REINFORCE to be communicated, is presented. These websites often feature opinion articles from external sources in their "Opinion" columns, so it is possible to include an article regarding PARIS REINFORCE as well. However, it is worth mentioning that this is an indicative, non-exhaustive list which may be modified if it is considered necessary (see more information on the implemented CDE activities on online media in Section 5.3).

4.1.3.1 EURACTIV

EURACTIV[11] is an independent pan-European media network specialised in EU policies that covers policy processes upstream of decisions, summarising the issues free of bias. It provides free localised EU policy news in twelve languages and together with its media partners reaches 1.7 million users across Europe and the rest of the world. PARIS REINFORCE will try to use EURACTIV so as to reach EU- and national-level policy makers and industrialists.

[7] https://www.instagram.com/parisreinforce/
[8] https://www.researchgate.net/
[9] https://www.researchgate.net/project/PARIS-REINFORCE
[10] https://www.youtube.com/channel/UC4g1FQ-QX33QH9HrTNMnkIA
[11] https://www.euractiv.com/

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4.1.3.2 ClimateChangePost

ClimateChangePost[12] features the latest news on climate change and adaptation with a special focus on Europe. Its articles are based on the latest results in a large number of scientific journals, reports by the IPCC, the European Environment Agency etc. It is envisaged that, through ClimateChangePost, PARIS REINFORCE will disseminate its adaptation-related outcomes to scientists, policymakers, industrialists and general public interested in climate change.

4.1.3.3 The Guardian

The Guardian[13] is an acknowledged British daily newspaper founded in 1821 reaching a total of 24.9m people each month. Moreover, it features a section dedicated to the environment, with subtopics on climate change, wildlife, energy and pollution. It is envisaged that the project's outcomes can be promoted via the Guardian to a wide variety of audiences fulfilling all three pillars of promotion (i.e. communication, dissemination, and exploitation).

4.1.3.4 The Conversation

The Conversation[14] is an independent source of news, analysis, and expert opinion, written by academics and researchers and delivered directly to the public. It is estimated that its global audience is about 38.2m readers per month. It is envisaged that the PARIS REINFORCE outcomes can be promoted via The Conversation to audiences appropriate for dissemination and exploitation. One article related to PARIS REINFORCE research has been already published in The Conversation.

4.1.3.5 Climate & Environment at Imperial

Climate & Environment at Imperial[15] is a blog featuring insights from staff and students across Imperial working in climate and environment related areas. Two PARIS REINFORCE opinion articles have already been published in the blog.

4.1.3.6 Estonian World

Estonian World[16] is a global independent online magazine, aiming to publicise Estonia's and Estonians' successes and success stories in a positive, encouraging manner, as well as the country's and its peoples' challenges and concerns. It is the most engaging English-language online publication about Estonia with global contributors and over 50,000 followers in social media. PARIS REINFORCE has already published an opinion article in the magazine regarding positive and negative effects of the COVID-19 pandemic on climate change.

4.1.3.7 EC Website (CORDIS)

PARIS REINFORCE will be in close co-operation with the departments of the European commission and

[12] https://www.climatechangepost.com/
[13] https://www.theguardian.com/
[14] https://theconversation.com/
[15] https://granthaminstitute.com/
[16] https://estonianworld.com/

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will update the cordis webpage[17] with its progress.

4.1.3.8 EC Success Stories Webpage

It is envisaged that PARIS REINFORCE will publish a couple of articles featuring its outcomes via the EC Success Stories webpage[18]. These articles are expected to increase the participation of experts in the Stakeholder Council.

4.1.4 Magazines

4.1.4.1 Research*eu

Research*eu Results magazine[19] covers topics of research interest in the EU. Through this channel, outcomes of PARIS REINFORCE will be communicated and disseminated to scientists, policymakers in the EU and Member States (MS), and the general public.

4.1.4.2 The Parliament Magazine

The Parliament Magazine[20] is an EU politics magazine covering European Parliament news, politics and policy. It hosts contributions from sitting members of parliament, NGOs, and interest groups on issues discussed within European institutions. A PARIS REINFORCE opinion article has been published there.

4.1.4.3 The Beam

The Beam[21] is a tri-annual print and digital publication, featuring interviews, perspectives, and articles from global experts in the field of climate action and sustainable development.

4.1.5 Online Collaboration Platforms

4.1.5.1 Capacity4Dev

Capacity4Dev[22] is the European Commission's knowledge sharing platform for development cooperation aiming to improve capacity building. This is done among others by enabling cross-learning between practitioners from EU institutions and other organisations. The platform has over 25,000 members who share, learn, and collaborate on the fields of sustainable development. This channel is ideal for dissemination and exploitation purposes since its members are scientists, industrialists, EU staff, and sustainable development professionals from EU MS, policymakers at EU & global level, as well as civil societies.

[17] https://cordis.europa.eu/project/rcn/223239/factsheet/en
[18] https://ec.europa.eu/research/infocentre/index_en.cfm
[19] https://cordis.europa.eu/research-eu/home_en.html
[20] https://www.theparliamentmagazine.eu/
[21] https://the-beam.com/
[22] https://europa.eu/capacity4dev/

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4.1.5.2 IISD SDG Knowledge Hub

The SDG Knowledge Hub[23] is an online resource centre for news and commentary regarding the implementation of the United Nations' 2030 Agenda for Sustainable Development, including discussion on progress across all 17 Sustainable Development Goals (SDGs). It is managed by the International Institute for Sustainable Development (IISD) and includes guest articles from various sources. It is envisaged that the PARIS REINFORCE outcomes will be promoted via the IISD SDG Knowledge Hub to many actors involved in sustainable development, such as policymakers, scientists, NGOs, civil society, and industrialists.

4.1.5.3 Climatechangemitigation.eu

Climatechangemitigation.eu[24] is a portal that collects and posts information from EU-funded research and coordination projects on climate change mitigation and sustainable development. The portal was set up through the CARISMA project and features information from 21 EU-funded projects. The articles published in the portal highlight results of the collaborating projects and contain hyperlinks to the main documents on which they are based. PARIS REINFORCE has created a profile page in the portal with information about the project and a link to the project website.

4.1.5.4 Climate-ADAPT

The European Climate Adaptation Platform Climate-ADAPT[25] is a partnership between the European Commission and the European Environment Agency (EEA). It aims to support Europe in adapting to climate change, by helping users to access and share data and information on: (i) expected climate changes in Europe; (ii) current and future vulnerability of regions and sectors; (iii) EU, national and transnational adaptation strategies and actions; (iv) adaptation case studies and potential adaptation options; and (v) tools that support adaptation planning. Climate-ADAPT is designed to assist governmental decision-makers working on the development and implementation of adaptation strategies or actions at EU, transnational, national and sub-national level. Thus, it will be used for dissemination and exploitation purposes.

4.1.6 Data Repositories – Databases

4.1.6.1 OpenAIRE

OpenAIRE[26] is a science-related portal, the mission of which is to provide unlimited, barrier-free, open access to research outputs financed by public funding in Europe. The use of OpenAIRE will enable PARIS REINFORCE to report more effectively and efficiently the outcomes of the action and to reach a wide community of scientists, policymakers, and stakeholders interested in EU-funded research in general. PARIS REINFORCE already has its own entry in OpenAIRE[27] which features the project's scientific results.

[23] http://sdg.iisd.org/
[24] http://climatechangemitigation.eu/
[25] https://climate-adapt.eea.europa.eu/
[26] https://www.openaire.eu/
[27] https://explore.openaire.eu/search/project?projectId=corda__h2020::778b3491b4bd11e02bdfcf693d8feb12

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4.1.6.2 Zenodo

Zenodo[28] is a data repository developed by CERN within the framework of OpenAIRE, welcoming all science data around the globe. Its main purpose is to provide an easy-access data repository for scientific data from all over the world and from every discipline. PARIS REINFORCE uses Zenodo in order to provide open access to its outcomes and disseminate them to appropriate audiences at the same time. More on the management, processing and maintainability of the action's data and outcomes will be available in the upcoming respective report, "D8.8 Data management plan – Update v2.0". The PARIS REINFORCE community[29] in Zenodo has already been created and includes the project's 50 scientific publications and 22 underlying datasets.

4.1.7 Partners' Websites/Blogs

Most partners have websites featuring news on their research activities. In these websites, articles on the progress of PARIS REINFORCE, as well as announcements on recent reports or upcoming events, have been and will further be published (see more information on the implemented CDE activities on partners' websites and blogs in Section 5.2).

In particular the partners' websites are the following:

- BC3 website news section[30];
- Bruegel blog[31];
- Cambridge research news webpage[32];
- CICERO news section[33];
- CMCC website energy news section[34];
- E4SMA website's homepage[35] that features recent news on research progress and upcoming events, while a dedicated webpage[36] for specifically promoting projects' results is also available;
- EPFL's webpage[37] dedicated to news at which developments on PARIS REINFORCE could be featured;
- Fraunhofer ISI website news webpage[38];
- Grantham news webpage[39];
- HOLISTIC news webpage[40];
- IEECP news webpage[41];
- SEURECO news webpage[42];

[28] https://zenodo.org/
[29] https://zenodo.org/communities/paris-reinforce/
[30] https://info.bc3research.org/
[31] https://bruegel.org/blog/
[32] https://www.cam.ac.uk/news
[33] https://cicero.oslo.no/en/posts/climate-news
[34] https://www.cmcc.it/energy
[35] https://www.e4sma.com/
[36] https://www.e4sma.com/en/results/
[37] https://news.epfl.ch/
[38] https://www.isi.fraunhofer.de/en.html
[39] http://www.imperial.ac.uk/grantham/news/
[40] https://www.holisticsa.gr/articles-3-col
[41] http://www.ieecp.org/news/
[42] http://www.erasme-team.eu/modele-economique-econometrie-reports-and-publications-vpub1.html

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- CDS-UnB news webpage[43];
- CUPB news webpage[44];
- IEF-RAS news webpage[45] (in Russian);
- IGES news webpage[46]; and
- TERI news webpage[47] that announces research progress.

4.1.8 Peer–to-peer mailing lists

Peer–to-peer (P2P) mailing lists are subscription-based mailing lists that enable individuals interested in the same topics to communicate with each other and exchange opinions and outcomes. These lists are very effective, since subscribers are already interested in the topics of the distributed news, while many of them are also actively involved in the sectors affected by these topics. The International Institute for Sustainable Development (IISD) provides a variety of P2P mailing lists in topics related to sustainable development, spanning from top-level to more specific topics. Each member can subscribe to several mailing lists and use them to exchange the progress of their projects' actions on sustainable development. In particular, the IISD mailing lists relevant to the PARIS REINFORCE objectives are the **SDG**, **CLIMATE-L** and **ENERGY-L** lists. These lists have been used for dissemination purposes of the action's progress and outputs, since most members of these lists are either scientists, industrialists, or policymakers in the fields of climate action and sustainable development. The progress of PARIS REINFORCE (newsletters, press releases, and general announcements) has been circulated via the CLIMATE-L, ENERGY-L, and SDG mailing lists. In addition, it is worth mentioning that specific calls to participate in our events (EU regional or national events, etc.) have been circulated via these lists in order to increase the visibility and participation of the events.

4.1.9 Project and Partner Events

As explained in the introduction, all forthcoming project events will be moved to the digital/virtual domain adapting to the pandemic conditions of physical distancing and travel restrictions (see more information on the organisation of events in Section 5.10).

4.1.9.1 PARIS REINFORCE Workshops

Within the framework of PARIS REINFORCE, all partners organise at least one stakeholder event/ workshop. The workshops are organised at regional and national levels.

During the first regional EU workshop (which took place in Brussels, on November 21, 2019) stakeholders were informed on the features and capacities of our global, regional, and national integrated assessment, energy system, and sectoral models, as well as on what policy questions they have hitherto been used to answer. In this workshop, the specifications for the I^{2}AM PARIS platform as well as the research questions were co-formulated with stakeholders (see also Section 5.10.4). Subsequently, in the first series of national workshops, organised (primarily) virtually in August 2020 – May 2021, stakeholders were informed on the first round of global analyses and inter-comparisons and

[43] http://cdsunb.org/en/noticias/
[44] http://www.cup.edu.cn/english/news/index.htm
[45] https://ecfor.ru/?from=novostibtn#newsanchor
[46] https://www.iges.or.jp/en/announcement/index.html
[47] https://www.teriin.org/news

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supported the formulation of the national policies, technology options, timing, and context and scenario specifications. More information can be found here.

During the second regional EU workshop, which was in the form of an online EU (public) webinar hosted at Bruegel's website, PARIS REINFORCE consortium members and a representative from EC DG Energy discussed some of the key issues that policymakers should consider when confronted with new modelling studies. For example, why do different models provide very different perspectives when trying to answer the same question? Why is it that certain models are better suited to certain policy questions? How can we sensibly form our own opinions about trusting new modelling results? The goal of the event was to hold a discussion on the sensible usage and interpretation of climate-economy models. The desired outcome from the workshop was a conversation, which would be informative for policy-interested stakeholders that are confronted with modelling studies. The event remains hosted online. This means that interested policymakers and other stakeholders can watch the event recording at any point in the future. The digital audience was able to pose questions/comments to the panel using the online tool, sli.do (a total of 33 questions/comments were posed through the platform). More information can be found here.

During the final year of the project, the second series of national workshops will take place, in which stakeholders will be informed on the second round of global analyses and inter-comparisons, and will support the identification of new pathway choices, change their preferences where necessary, and highlight the requirements for further pathway options. Finally, in the final EU conference, stakeholders will be informed on the revised global, regional, and national pathways, including aggregate emissions, temperature changes and impacts, adaptation requirements, and clear policy implications, as well as on differences between IAM results and between the two inter-comparisons.

4.1.9.2 Other Partners' Events

Every September, Bruegel holds its annual meetings, which feature topical discussions on its contribution to the quality of economic policymaking in Europe and beyond. PARIS REINFORCE is disseminated through this event mainly to policymakers and other stakeholder groups.

4.1.10 External Events

In order to effectively promote PARIS REINFORCE, partners have been encouraged to participate in events that are organised outside the consortium. This includes the participation in events organised by the European Commission and in other international conferences and workshops in the respective fields so as to keep updated the scientific community, universities, research centres, industry, the EC, policymakers, NGOs and other interested groups. See more information on the participation of PARIS REINFORCE in external events in Section 5.12.

4.1.10.1 Scientific Conferences

PARIS REINFORCE partners participates in scientific conferences, in order to disseminate the action to the scientific community by presenting the action's outcomes in a scientific manner. As of November 2021, the project counts 16 presentations in such conferences.

4.1.10.2 General Conferences

Along the duration of PARIS REINFORCE, three sessions of the Conference of the Parties have been or

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will be held (COP25 in December 2019, COP26 in November 2021, and COP27 in 2022). These conferences offer great opportunity to reach out to policymakers, NGOs, industrialists, scientists, and other audiences and promote the action.

Although COP25 was too soon for PARIS REINFORCE to have official representation (although several consortium partners participated and promoted the project via informational material, PARIS REINFORCE officially attended COP26, in Glasgow, UK, 01-12 November 2021.

On Monday, 1 November 2021, PARIS REINFORCE co-organised an event with fellow H2020 research projects, as part of the European Union's side events at the COP26 summit. The participating projects were the following: NAVIGATE represented by Potsdam Institute for Climate Impact Research (PIK), PARIS REINFORCE represented by National Technical University of Athens (NTUA), LOCOMOTION represented by European Environmental Bureau (EEB), and VERIFY represented by Laboratoire des Sciences du Climat et de l'Environnement (LSCE). These projects collectively organised the virtual side event "Towards an emission neutral society: challenges and opportunities". The event discussed challenges and opportunities on the way to an emissions neutral society. These include the implications of the EU recovery funds on emissions and employment, social and resource implications of a fair renewable energy transition, transformative mitigation measures on the supply and demand side, and the need for independent verification of country emissions accounts. More information can be found here (link). On Friday, 5 November 2021, at the Central Asia pavilion (blue zone) of COP26, PARIS REINFORCE had the opportunity to discuss the role of regional and international cooperation in the framework of the "net-zero emissions vision to 2060" for Kazakhstan. Organised as a multiplayer strategic game (with Kazakhstan as the "centroid" of the game), the presentation illustrated the possible space for synergies and cooperation with relevant actors (Central Asian region, Russia, China, and the EU) that can ease or trigger the climate neutrality ambition of Kazakhstan. More information, including a video and the presentation, can be found here (link). Finally, PARIS REINFORCE researchers, including Dr. Hannah Parris and Dr. Annela Anger-Kraavi (Cambridge), Ms. Ester Galende (BC3), Dr. Ajay Gambhir (Imperial), and Mr. Rocco DeMiglio (E4SMA), physically attended COP26 and followed climate talks closely. Among various project activities and presentations in targeted virtual and physical events, researchers in the consortium had the opportunity to communicate the project's aims and disseminate its findings, also sharing dissemination material with COP26 attendees. More information can be found here.

4.1.10.3 Workshops

Several workshops organised by external organisations have been and can be used to promote PARIS REINFORCE. A typical example lies in the networking events organised for networking among EU-funded projects. So far, this inter alia includes (non-exhaustive list):

- The 2019 'Networking and knowledge sharing event for decarbonisation projects' and 'Coordinators' Day' in Brussels, Belgium, which took place on the 5th and the 6th of September 2019, respectively (link).
- The 2019 International Workshop of the Energy Modeling Forum 35 ('Japan Model Inter-Comparison Project), held on the 6th of December 2019 (link).
- The IEA-ETSAP meetings of the International Energy Agency (e.g., here and here).
- Training programs for capacity development (e.g., here in Azerbaijan).

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More information can be found in the project's interventions webpage (link).

4.1.10.4 Other Events

Apart from conferences and workshops, other events offer opportunities for collaboration with stakeholders, who might be interested in PARIS REINFORCE's results. These may include commercial exhibitions, anniversary celebration events, etc., although the pandemic has made this channel far more challenging to pursue.

4.1.11 Synergies

Creation of synergies with other relevant actions, either funded under Horizon 2020 or otherwise, is of great importance. Clustering activities increase the outreach potential of the action concepts and raise awareness among a broader spectrum of stakeholders. The strategy for creating synergies and promoting collaborations with other projects is presented in detail in a dedicated project report, "D8.14 Plan for coordination and synergies" (link). An overview of the implemented synergies, as of November 2020, can be found in a dedicated project deliverable, "D8.15 Report on coordination and synergies" (link).

4.1.12 Policy Reports

PARIS REINFORCE is envisaged to contribute to several policy reports such as IPCC's upcoming (6^{th}) assessment report.

Ahead of COP26, PARIS REINFORCE contributed to the European Commission's Policy Publication, "Climate Action in the Post-COVID-19 World", with its brief on "Investigating Optimal Allocations for Green Recovery Funds". Our contribution focused on the dramatic economic consequences of the COVID-19 crisis in Europe. Despite significant public interventions, more than 1.8 million jobs were lost in the EU up to September 2020. As fiscal stimulus measures continue to be announced, policymakers have an opportunity to ensure that the short-term stimulus points the economic recovery in a sustainable direction in the long term, considering the trade-off between these goals. The project brief investigated this trade-off between short-term economic gains, in the form of employment, and longer-term CO_2 emissions reductions from fiscal stimulus packages. Analysis was performed to identify the optimal energy investment mix of proposed fiscal programmes in terms of new energy sector jobs and CO_2 emissions cuts compared with a current policy baseline. More information, along with the entire policy publication, can be found here (link).

The project also contributed to a policy report by the Polish Economic Institute, in collaboration with ERCST and Cambridge Econometrics, on the inclusion of the Transport and Residential sector in the EU Emissions Trading System (ETS). More information, along with the policy publication, can be found here (link).

4.2 Promotional Means

In order to promote PARIS REINFORCE, several promotional material encapsulating the action's scope, objectives, and expected results have been created. Moreover, all the promotional material that have been used have a simple but distinctive visual identity which has already been created and has been used in a consistent and systematic way.

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4.2.1 Logo

To create identity within the consortium and to support "brand recognition" the PARIS REINFORCE logo was created and is used in all promotional material. More on the logo can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.2 Flyer

A promotional flyer giving general, basic information and creating visibility about PARIS REINFORCE for all partner countries involved was produced in English and has been translated in all partners' languages. The flyer has been used in workshops, conferences, and other events mainly targeting action's communication and dissemination. More on the flyer can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.3 Leaflet

A promotional leaflet featuring a short project description for dissemination among stakeholders, at conferences and to other interested parties, has been created. In particular, the leaflet briefly describes the project's aims, objectives, contents, expected results, consortium and contact details, and is available in all languages of the consortium members. More on the leaflet can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.4 Poster

A publicity poster regarding PARIS REINFORCE was designed and printed in order to promote the action in events organised by the partners or hosted by other relevant organisations. Specifically, the poster briefly describes the action's aims, objectives, contents, expected results, consortium and contact details. More on the poster can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.5 Roll-up Poster

A roll-up poster displaying the action's title, thematic areas, consortium, and contact details has been created in order to effectively promote PARIS REINFORCE in events organised by the partners or other organisations. More on the roll-up poster can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.6 PARIS REINFORCE Presentation

A standard presentation containing basic information about PARIS REINFORCE has been produced in order to be used by the partners for dissemination purposes at relevant events. It is envisaged that the presentation will be regularly updated and adapted by the partners on an ad hoc basis, according to the type and size of audience/events where the project will be presented. More on the presentation can be found in the report "D8.1 PARIS REINFORCE visual identity" (link).

4.2.7 Articles

Appropriate articles according to the targeted audience will be disseminated via the aforementioned promotional channels (websites, blogs, etc.). Depending on the desired outcome, these articles may focus on PARIS REINFORCE and its societal impacts in general or be more specific by promoting individual project outcomes.

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4.2.8 Reports

PARIS REINFORCE will produce a total of 49 publicly distributed reports incorporating the results of the implemented research. These reports will be available at the project's website and will be further promoted via social media, newsletters, and other dissemination channels. Until now, 29 reports have been published and are available on the website's relevant page[48].

4.2.9 Commentaries

A regular flow of short commentaries by various partners has been facilitated. These commentaries are featured on the PARIS REINFORCE website[49] as well as on the websites of consortium partners. See more information on the published commentaries in Section 5.4.

4.2.10 Working Documents

Working documents focus on the output deliverables of PARIS REINFORCE, which will be consolidated and available in a series of branded reports. Working documents will consist of the main points of the deliverables and will give the main outcomes of the implemented research. They will be distributed in digital format.

4.2.11 Policy Briefs

PARIS REINFORCE issues a series of policy briefs showcasing significant policy recommendations from the action (see more information on the published policy briefs in Section 5.5). It is envisaged that, among others, policy briefs will be published for the following topics:

- Modelling capabilities
- Future action pledges and long-term decarbonisation pathways
- Sectoral decarbonisation pathways for Europe
- Co-impacts and trade-offs in the broader EU policy framework
- Interactions between the EU climate policy agenda and the 2030 Agenda for Sustainable Development
- Decarbonising the international aviation and shipping sectors
- COVID-19 and green recovery

4.2.12 Scientific Publications

Scientific publications are one of the key means of disseminating the project's results to the research community and providing the scientific credibility for the project's work. Scientific publications and policy papers are published in high-quality, peer-reviewed journals under open access schemes (gold or green) so as to ensure that the project and its results are made known to the public at large (see more information on the PARIS REINFORCE scientific publications in Section 5.6). The consortium has agreed to commonly share all material produced under PARIS REINFORCE, including scientific publications financed by the project, through appropriate open access schemes and archiving to appropriate repositories.

[48] https://paris-reinforce.eu/publications/deliverables
[49] https://paris-reinforce.eu/publications/commentaries

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4.2.13 Newsletters & Press Releases

4.2.13.1 PARIS REINFOREC Newsletters

A regular electronic newsletter has been issued providing information on the project development and events on a bi-monthly basis. The Newsletter incorporates inputs from all partners on the progress and key outcomes of the project. Its key aim is to raise awareness about the ongoing work of the action and its relevance to policymaking at EU and national level. The Newsletter has been sent to all PARIS REINFORCE stakeholders identified throughout the project, as long as they have provided their consent to subscribe. The subscription process complies with the General Data Protection Regulation (GDPR), which came into force in May 2018. In order to include a person to the newsletter mailing list, a freely-given, informed and explicit consent has been provided specifically to receive the PARIS REINFORCE newsletter, while the possibility of withdrawing the consent is clearly explained. Consents are provided either by completing an online subscription form or by direct email in case of personal contacts. It must be noted that these alternatives may be updated as necessary.

It is envisaged that up to 18 newsletters will be developed and disseminated during the project duration with the aim to reach a minimum of 5,000 recipients. The effectiveness of the newsletters' impact will be evaluated by a respective tool and reports, including openings, clicks and list of recipients. Moreover, press releases may occasionally be circulated to various stakeholders and interested parties in case there is a specific need. It is envisaged that at least six press releases will be circulated.

The following table presents the results of the newsletter campaigns of PARIS REINFORCE (see more information on PARIS REINFORCE newsletters in Section 5.8).

Table 3 PARIS REINFORCE Newsletter Campaign Results

Newsletter Campaign	Total Recipients Reached	Opened	Clicked
July 2019	• 50	• 36 • 72%	• 7 • 14%
October 2019	• 80	• 46 • 57.5%	• 14 • 17.5%
December 2019	• 90	• 48 • 53.33%	• 12 • 13.33%
April 2020	• 194	• 79 • 40.72%	• 25 • 12.89%
June 2020	• 638	• 225 • 38.53%	• 24 • 4.11%
July 2020 Press Release	• 775	• 296 • 39.36%	• 33 • 4.39%
July 2020	• 769	• 273 • 36.40%	• 34 • 4.53%
September 2020	• 757	• 226 • 30.29%	• 19 • 2.55%
October 2020 Press Release	• 750	• 258 • 34.77%	• 28 • 3.77%
October 2020	• 749	• 189 • 25.51%	• 21 • 2.83%
November 2020	• 748	• 231 • 31.09%	• 32 • 4.31%

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Newsletter Campaign	Total Recipients Reached	Opened	Clicked
November 2020 Press Release	• 744	• 228 • 30.81%	• 36 • 4.86%
December 2020	• 740	• 207 • 28.13%	• 9 • 1.22%
January 2021 Press Release	• 735	• 236 • 32.20%	• 26 • 3.55%
February 2021	• 732	• 188 • 25.97%	• 22 • 3.04%
April 2021	• 728	• 217 • 30.43%	• 18 • 2.52%
May 2021 Press Release	• 719	• 162 • 22.78%	• 23 • 3.23%
June 2021 Press Release	• 532	• 133 • 25.48%	• 16 • 3.07%
July 2021	• 737	• 202 • 27.82%	• 19 • 2.62%
November 2021	• 740	• 206 • 28.49%	• 14 • 1.94%
November 2021 Press Release	• 732	• 180 • 24.83%	• 19 • 2.62%

4.2.13.2 Partners Newsletters

Apart from the official PARIS REINFORCE newsletter, partners that publish their own institutional newsletters further promote the project though them (see more information on PARIS REINFORCE partners newsletters in Section 5.9). More particularly, newsletters distributed by partners are the following:

- Bruegel's weekly newsletter;
- Cambridge's weekly newsletter;
- IEECP's quarterly newsletter;
- IEF-RAS's newsletter;

4.2.14 Infographics

Due to the information overload, which is typical in the recent years, it is very important to use visual means of promotion such as infographics, videos, and presentations.

Appropriately designed infographics have been and will be used to convey to policymakers and other relevant stakeholders the PARIS REINFORCE results through comprehensive visual representations. Infographics make broad or complex ideas more distilled and simplified and are more eye-catching than printed words, since they combine images, colours, movement, and content. Moreover, infographics can be used to illustrate how the development of different ambitions, mitigation pathways, innovation dynamics and decarbonisation strategies can have impact on the costs and benefits of different societal and technological transitions, as well as on the co-impacts with other policies and the SDGs.

4.2.15 Videos

Videos have been used in order to disseminate the PARIS REINFORCE results in a more effective way to

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appropriate audiences. The 1st PARIS REINFORCE video has been produced and features a live demo of the I²AM PARIS prototype delivered in the 1st Stakeholder dialogue workshop in November 2019. The 2nd video introduces PARIS REINFORCE, its objective, its models and the significance and functionality of the I²AM PARIS platform. The PARIS REINFORCE videos are available via the official YouTube channel[50]. It is envisaged that a total of three videos targeted at policymakers and other stakeholder groups will be produced and circulated during the project's lifetime (see more information on PARIS REINFORCE videos in Section 5.7).

4.2.16 Presentations

Partners participating in external events are highly encouraged to deliver presentations on the project's scope, objectives, and expected (or already extracted) results. It is envisaged that more than thirty presentations in academic conferences in at least ten European and non-European countries will be delivered within the project's lifetime (see more information on presentations of PARIS REINFORCE in external events in Section 5.12).

[50] https://www.youtube.com/channel/UC4g1FQ-QX33QH9HrTNMnkIA

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5 Implemented Activities

5.1 Social Media

During the first two and a half years of its implementation, the online presence of PARIS REINFORCE was established in Twitter, LinkedIn, and Instagram, having significant impact in the promotion of the project. In particular, the official PARIS REINFORCE Twitter account[51] is used to great extent communicating the project's progress to interested parties. The account is followed by 547 people, while its posts have been viewed more than 455,000 times. In addition, the #PARISREINFORCE hashtag has been used in more than 184 tweets along with targeted hashtags of high interest, e.g., #ClimateCrisis #ClimateAction etc., in order to create a strong connection among PARIS REINFORCE and these topics, reaching stakeholders not previously engaged with the project.

Moreover, in LinkedIn the PARIS REINFORCE organisation webpage[52] regularly promotes the progress of the action. The account is followed by an audience of 366 high-calibre professionals, while the page has been viewed more than 1,374 times by more than 728 visitors and the posts circulated via the official PARIS REINFORCE webpage have been viewed more than 43,153 times. Moreover, PARIS REINFORCE researchers disseminate the action via their personal and/or institutional accounts thus making the project more recognisable.

Finally, the PARIS REINFORCE Instagram account[53] has been created in order to promote the project to the general public. The account has more than 141 followers and the #PARISREINFORCE hashtag has been used in more than 150 posts.

Both direct promotion of the project's progress and a broad, indirect promotion/engagement campaign has been ongoing since the beginning of the project; see some examples below.

[51] https://twitter.com/ParisReinforce
[52] https://www.linkedin.com/company/paris-reinforce
[53] https://www.instagram.com/parisreinforce/

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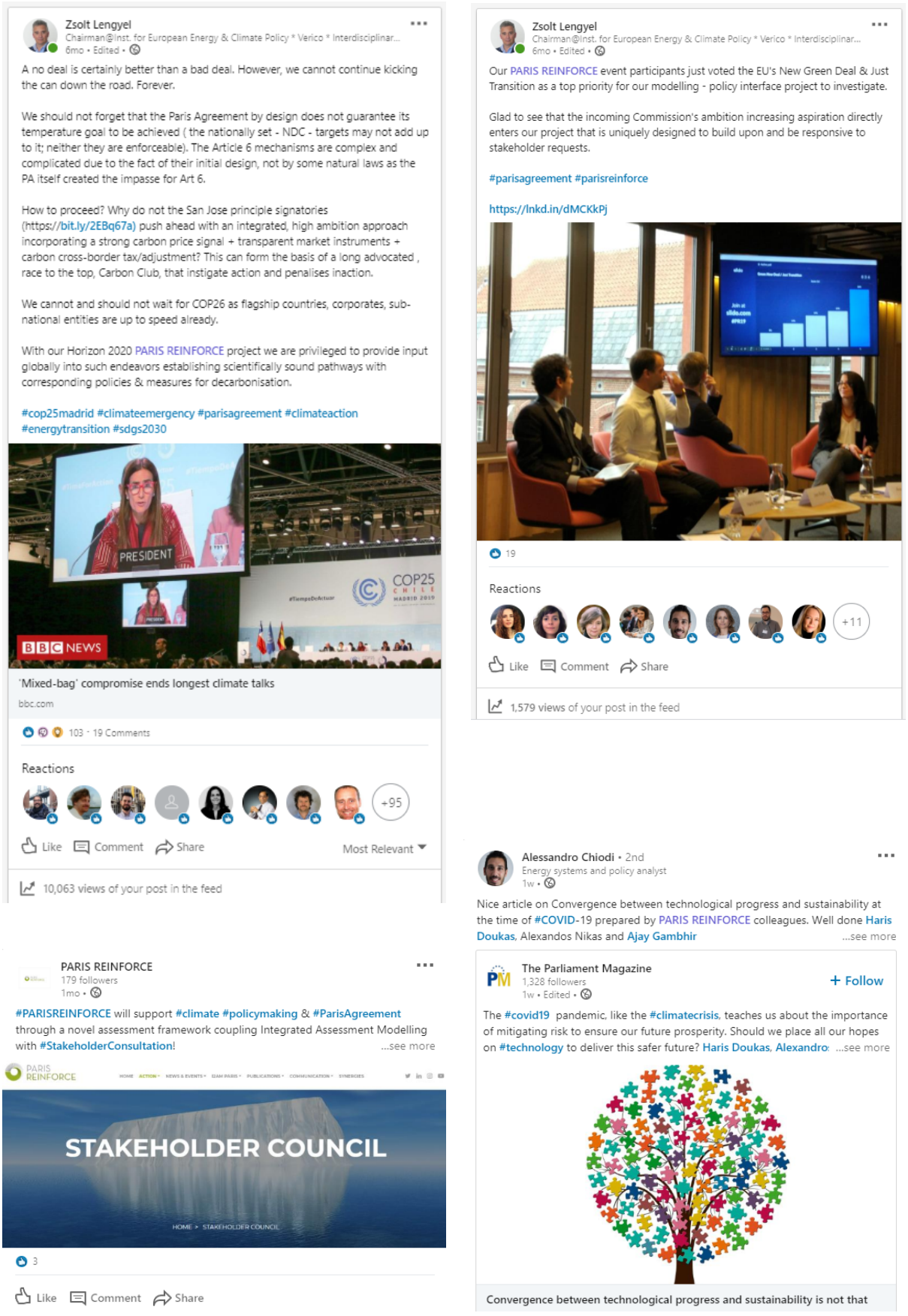

Figure 1 Examples of direct and indirect promotion of Paris Reinforce on LinkedIn

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Figure 2 Examples of promotion of Paris Reinforce on Twitter

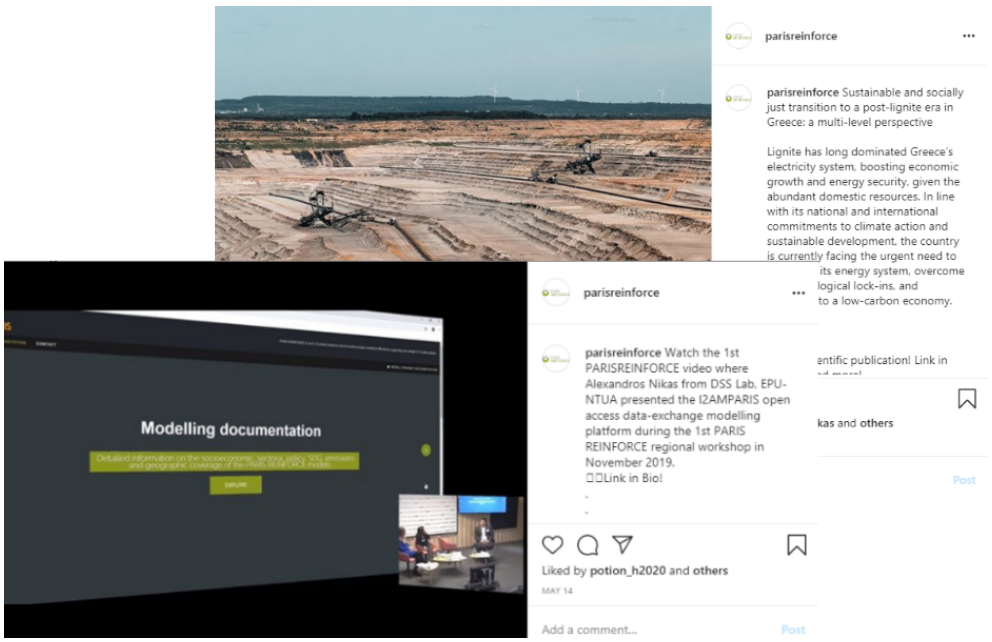

Figure 3 Examples of promotion of PARIS REINFORCE on Instagram

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5.2 Partners' Websites

Many articles have been posted in partners' websites. In particular, an article[54] on the implementation of the PARIS REINFORCE's kick-off meeting was published in BC3's website describing the project, its objective, and the organisation of the kick-off. A project showcase webpage[55] on PARIS REINFORCE was published in CMCC's website. A project showcase webpage[56] on PARIS REINFORCE has been published in E4SMA's website. In the HOLISTIC news webpage[57] two articles featuring PARIS REINFORCE have already been published, one on the project and the role HOLISTIC will play on it, and the other on the kick-off meeting of PARIS REINFORCE. In IEECP's news webpage[58] an article on the PARIS REINFORCE Kick-off meeting was published, while a project showcase is also available on PARIS REINFORCE[59]. In NTUA's website most of the significant project updates have been included[60]. In Bruegel's website a webpage featuring the 1st PARIS REINFORCE regional workshop is available[61].

5.3 Presence in Media

5.3.1 Article "How changes brought on by coronavirus could help tackle climate change", 16 March 2020

Dr. Glen Peters (CICERO) has written an opinion article[62] on "The Conversation UK" online media regarding how coronavirus-related changes could reinforce climate action.

5.3.2 Article "Coronavirus and climate change: 'There is much uncertainty, and much to play for'", 17 March 2020

Dr. Ajay Gambhir (Grantham) has written the article "Coronavirus and climate change: "There is much uncertainty, and much to play for""[63] in Grantham Institute's "Climate and Environment at Imperial" blog. The article highlights how learning from the coronavirus crisis could help place the world on a firmer footing to tackle the multiple challenges we will face this century – including climate change.

5.3.3 Podcast "Black Elephants and Black Swans", 19 March 2020

Dr. Ajay Gambhir (Grantham) took part in a podcast[64] with Alyssa Gilbert (Grantham) and Amanda Carpenter (Planet Pod), discussing what we can learn from the current COVID-19 pandemic, as well as

[54] https://info.bc3research.org/2019/06/14/bc3-participates-in-h2020-project-to-facilitate-stakeholder-dialogue-and-integrated-assessment-modelling-with-respect-to-the-objectives-of-the-paris-agreement/
[55] https://www.cmcc.it/projects/paris-reinforce-delivering-on-the-paris-agreement-a-demand-driven-integrated-assessment-modelling-approach
[56] https://www.e4sma.com/en/paris-reinforce/
[57] https://www.holisticsa.gr/articles-3-col
[58] http://www.ieecp.org/news/
[59] http://www.ieecp.org/project/paris-reinforce/
[60] https://www.epu.ntua.gr/search/node?keys=paris+reinforce
[61] https://www.bruegel.org/events/enhancing-climate-policy-through-co-creation/
[62] https://theconversation.com/how-changes-brought-on-by-coronavirus-could-help-tackle-climate-change-133509
[63] https://granthaminstitute.com/2020/03/17/coronavirus-and-climate-change-there-is-much-uncertainty-and-much-to-play-for/
[64] https://theplanetpod.com/black-elephants-and-black-swans/

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if there could be a possible green benefit when we emerge from the worst global health crisis in the last 100 years.

5.3.4 Article "Coronavirus: How we emerge from this terrible crisis could push us into a better future", 25 March 2020

Dr. Alex Koberle (Grantham) has written the article "Coronavirus: How we emerge from this terrible crisis could push us into a better future"[65] in Grantham Institute's "Climate and Environment at Imperial" blog. The article highlights how the response to COVID-19 could help shape a sustainable, resilient future.

5.3.5 Article "Convergence between technological progress and sustainability is not that obvious", 7 May 2020

Assoc. Prof. Haris Doukas, Dr. Alexandros Nikas (NTUA) and Dr. Ajay Gambhir (Grantham) have published the article "Convergence between technological progress and sustainability is not that obvious"[66] in The Parliament Magazine. The article examines similarities of climate change and the coronavirus pandemic and concludes that we should learn the best lessons from the Coronavirus response, and our previous technological missteps, in order to inform our understanding of how technology can promote sustainable behaviours.

5.4 Commentaries[67]

5.4.1 How changes brought on by coronavirus could help tackle climate change[68]

The 1st PARIS REINFORCE commentary analyses how changes brought on by coronavirus could help tackle climate change. It has been originally published in the "Conversation UK" online media.

5.4.2 Coronavirus: How we emerge from this terrible crisis could push us into a better future[69]

The 2nd PARIS REINFORCE commentary describes how we emerge from this terrible crisis could push us into a better future. It has been originally published in the "Grantham Institute" blog.

5.4.3 Coronavirus and climate change: "There is much uncertainty, and much to play for"[70]

The 3rd PARIS REINFORCE commentary describes how learning from the coronavirus crisis could help

[65] https://granthaminstitute.com/2020/03/25/coronavirus-how-we-emerge-from-this-terrible-crisis-could-push-us-into-a-greener-future/
[66] https://www.theparliamentmagazine.eu/articles/opinion/convergence-between-technological-progress-and-sustainability-not-obvious
[67] https://paris-reinforce.eu/publications/commentaries
[68] https://theconversation.com/how-changes-brought-on-by-coronavirus-could-help-tackle-climate-change-133509
[69] https://granthaminstitute.com/2020/03/25/coronavirus-how-we-emerge-from-this-terrible-crisis-could-push-us-into-a-greener-future/
[70] https://granthaminstitute.com/2020/03/17/coronavirus-and-climate-change-there-is-much-uncertainty-and-much-to-play-for/

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place the world on a firmer footing to tackle the multiple challenges we will face this century – including climate change. It has been originally published in the "Grantham Institute" blog.

5.4.4 Convergence between technological progress and sustainability is not that obvious[71]

The 4th PARIS REINFORCE commentary examines similarities of climate change and the coronavirus pandemic and concludes that we should learn the best lessons from the Coronavirus response, and our previous technological missteps, in order to inform our understanding of how technology can promote sustainable behaviours, without creating new paradoxes and without creating new losers.

5.4.5 A net-zero emissions economic recovery from COVID-19[72]

The 5th PARIS REINFORCE commentary identifies key recovery policies that the UK government could introduce to both respond to the crisis of COVID-19 and support the country in meeting its commitment to reaching net-zero emissions by 2050. It has been produced in association with the COP26 Universities Network, a growing group of more than 30 UK-based universities working together to help deliver an ambitious outcome at the UN Climate Summit in Glasgow and beyond.

5.4.6 Positive and negative effects of the coronavirus pandemic on climate change[73]

Annela Anger-Kraavi, a senior researcher in climate change policy and economics at the University of Cambridge, highlights three positive and three negative effects of the coronavirus pandemic on climate change.

5.4.7 Green glimmers of hope in climate action through a European, citizen-led transition model[74]

There is no space for "one crisis at a time". And evidence suggests that behavioural changes have been instrumental in reducing the spread of COVID-19. The climate crisis is no different.

5.4.8 How best to achieve a desirable transition to a low-carbon economy: the case of Sub-Saharan Africa.[75]

As there is no "one model fits all" approach, scientists need to employ a diversity of modelling tools, placing the human factor at the core of all scientific processes, towards enhancing the robustness of model-driven policy prescriptions through participatory frameworks.

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[71] https://www.theparliamentmagazine.eu/articles/opinion/convergence-between-technological-progress-and-sustainability-not-obvious

[72] http://www.imperial.ac.uk/grantham/publications/a-net-zero-emissions-economic-recovery-from-covid-19.php

[73] https://estonianworld.com/opinion/annela-anger-kraavi-positive-and-negative-effects-of-the-coronavirus-pandemic-on-climate-change/

[74] https://www.neweurope.eu/article/green-glimmers-of-hope-in-climate-action-through-a-european-citizen-led-transition-model/

[75] https://africasustainabilitymatters.com/how-best-to-achieve-a-desirable-transition-to-a-low-carbon-economy-the-case-of-sub-saharan-africa/

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5.4.9 Involve citizens in climate-policy modelling[76]

The latest draft of the working-group report on mitigating climate change is now open for review by governments and scientists, as part of the Intergovernmental Panel on Climate Change's Sixth Assessment. We think it is now time to include citizens' views.

Despite some progress since the 2014 assessment, non-scientists are barely represented in the integrated modelling studies that underpin such reports. Their involvement has long been promised.

5.4.10 The environmental cost of fast fashion[77]

The so-called "fast fashion" entails a cost that is not at all negligible. And the pandemic has highlighted it.

5.4.11 Climate injustice adds more inequalities[78]

The issue of climate justice is fundamental, as the least responsible for climate change are those to suffer its worst consequences. Climate crisis has resulted in "triple injustice", since it is usually the most vulnerable that are affected by it, who are also the least responsible for its creation and whose already unlivable conditions are made even worse by climate change phenomena.

5.4.12 The Delignitisation Roller Coaster in Greece: An Old Car and a Steep Slope Ahead[79]

Lignite production and use in Greece has been dropping in the last decade, marking a sharp decline during COVID-19. According to the country's National Energy and Climate Plan (NECP), lignite must be completely phased out by 2028.

5.4.13 Climate injustices and the Climate Law in Greece[80]

Assoc. Prof. Haris Doukas (National Technical University of Athens) responds to WWF's questions on climate justice, the need for a new and just Climate Law in Greece, and the PARIS REINFORCE project, in an interview in LiFO.

5.4.14 Survey: 98% of Citizens Considers Climate Change a Major Planetary Issue[81]

98% of Greek citizens believe climate change is a serious issue for the planet, while among the young ones, the percentage reaches the absolute 100%, according to findings of the survey ran by Opinion

[76] https://www.nature.com/articles/d41586-021-00283-w
[77] https://www.huffingtonpost.gr/entry/ntesimo-poe-skotonei_gr_603e0822c5b6ff75ac3f2d23
[78] https://www.e-mc2.gr/en/news/climate-injustice-adds-more-inequalities
[79] https://republic.gr/futureofwork/the-delignitisation-roller-coaster-in-greece-an-old-car-and-a-steep-slope-ahead/
[80] https://www.lifo.gr/now/perivallon/enas-ploysios-odigei-suv-enas-ftohos-hanei-spiti-toy-apo-plimmyra-oi-anisotites-tis
[81] https://www.amna.gr/home/article/562078/Ereuna-To-98-ton-politon-theorei-tin-klimatiki-allagi-sobaro-planitiko-problima

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Poll. More specifically 92% of Greek citizens associate climate change with contemporary natural disasters increasing, whereas just 6% disagrees. Also of note that over 68% are not aware of the priorities of the energy design of our country, while only 25% has a rough understanding of it.

5.4.15 Survey: What Greek citizens think about Climate Change[82]

98% of Greek citizens recognize climate change as a major planetary issue, while among the young ones, the percentage reaches the absolute 100%.

5.4.16 Survey: What Greek citizens think about Climate Change[83]

According to Zacharias Zoupis, survey director in Opinion Poll, "the survey received input from 1001 households, which is a respectable sample with proportionate representation across Greece."

5.4.17 Opinion Poll Survey: Natural Disasters Are Linked to Climate Change and The Solution Is Using Renewable Energy Sources, Saying No to Nuclear and Hydrocarbon Fuels[84]

The overwhelming percentage of 98% of citizens in our country recognizes climate change as a major issue and specifically associates it with contemporary natural disasters (92%). They also believe that in order to deal with climate change we need to invest in solar (78,4%), wind (60%) and hydroelectric energy (32%).

5.4.18 After COP26, New Research Warns Climate Forecasts Could Be Way Off Target[85]

Confident claims that promises made by world leaders will drastically reign in global warming could be wildly off the mark, according to a major new international study.

5.4.19 The Earth Could Warm up by 2.9 Degrees by 210[86]

Researchers have calculated the most likely course of greenhouse gas emissions by the end of the century, based on today's climate policy. A temperature rise of less than two degrees is almost impossible.

5.4.20 Study Casts Doubt on Climate Emissions Pledge Estimates[87]

A new analysis casts doubt on whether scientists can precisely estimate how much nations' combined emissions-cutting pledges will stem global warming, instead showing a wide range of potential outcomes.

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[82] https://www.skai.gr/news/environment/ereyna-ti-pisteyoun-oi-ellines-gia-tin-klimatiki-allagi
[83] https://www.tovima.gr/2021/06/16/science/ereyna-ti-pisteyoun-oi-ellines-gia-tin-klimatiki-allagi/
[84] https://energypress.gr/news/dimoskopisi-opinion-poll-oi-fysikes-katastrofes-syndeontai-me-tin-klimatiki-allagi-kai-i-lysi
[85] https://www.forbes.com/sites/davidrvetter/2021/11/23/after-cop26-new-research-warns-climate-forecasts-could-be-way-off-target/
[86] https://www.spiegel.de/wissenschaft/mensch/modellierung-zum-emissionsausstoss-die-erde-koennte-sich-bis-2100-um-2-9-grad-erwaermen-a-b5641779-f1f7-4c2f-84d4-5aebc2cb203b
[87] https://www.axios.com/warming-carbon-emissions-pledges-3ef8dd6d-5678-494a-b642-5790ae9b7139.html

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5.4.21 Global Warming: UN Projections May Be Too Optimistic, Study Finds[88]

Despite the commitments made by the signatory countries of the Paris agreement, the authors of a study published in the journal "Nature Climate Change" estimate that the average temperature on Earth could increase from 2.2 ° C to 2.9 ° C by 2100.

5.4.22 "Large Uncertainties" over Warming Outcomes from Current Climate Policies[89]

A new analysis by researchers from the EU Horizon 2020 project 'Paris Reinforce', including Imperial College London's Dr Ajay Gambhir, has found that the impact of climate policies is more uncertain than is often assumed by policymakers.

5.4.23 Making Sense of the Narratives After the Glasgow Climate Talks[90]

The COP26 climate talks in Glasgow ended with some progress, though not enough to ensure the world avoids catastrophic climate impacts. If countries meet their pledges, greenhouse emissions in 2030 will be slightly lower than previously projected. But a new report warns that the decline doesn't mean we're safe.

5.4.24 Climate Pledges Still Not Enough to Keep Warming Below 2-Degree Limit[91]

In the aftermath of the United Nations' annual climate conference earlier this month, scientists have a sobering message: The world still is not on track to meet its international climate goals.

5.4.25 Climate Warming Forecasts May Be Too Rosy: Study[92]

Paris (AFP) – UN projections of how much current climate policies and national pledges to cut carbon pollution will slow global warming are more uncertain than widely assumed, researchers reported Monday.

5.4.26 Climate Crisis: New Study Questions the Effectiveness of Policy Pledges[93]

During the UN Climate Change Conference of the Parties (COP26) in Glasgow, many analysts rushed to report on the ambition of nations, predicting a future as predicted by climate pledges announced. A new study, that the National Technical University of Athens took part in, raises serious questions, estimating the predictions made entail great uncertainty, despite the pretext for reassurance.

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[88] https://www.francetvinfo.fr/monde/environnement/cop26/climat-les-projections-de-rechauffement-de-l-onu-sont-peut-etre-trop-optimistes-selon-une-etude-parue-dans-la-revue-nature-climate-change_4854885.html

[89] https://www.imperial.ac.uk/news/232079/large-uncertainties-over-warming-outcomes-from/

[90] https://www.bloomberg.com/news/articles/2021-11-23/making-sense-of-the-glasgow-climate-pact-at-cop26

[91] https://www.scientificamerican.com/article/climate-pledges-still-not-enough-to-keep-warming-below-2-degree-limit/

[92] https://www.france24.com/en/live-news/20211122-climate-warming-forecasts-may-be-too-rosy-study

[93] https://energymag.gr/news/perivallon/klimatiki-krisi-nea-meleti-amfisvitei-tin-apotelesmatikotita-ton-politikon-desmefseon/

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5.4.27 New Study Questions Estimates for COP26 Pledges[94]

During the UN Climate Change Conference of the Parties (COP26) in Glasgow, many analysts rushed to report on the ambition of nations, predicting a future as predicted by climate pledges announced. A new study, that the National Technical University of Athens took part in, raises serious questions, estimating the predictions made entail great uncertainty, despite the pretext for reassurance.

5.4.28 Earth is headed for well over two degrees of warming[95]

Modellers look at how climate policies might change with time — and find a wide range of possible outcomes, none of them good.

5.4.29 Rosa Galvez Calls for Senate to Declare Climate Emergency[96]

Building off a House of Commons declaration from 2019, Independent Sen. Rosa Galvez wants the upper house to declare a national climate emergency.

5.4.30 CICERO Report: Climate Modeling Is Hard, But We Are Heading for Disaster[97]

Despite the promises made at COP26, the world is still on track for a dangerous amount of warming.

5.4.31 Fix the Planet newsletter: Can small nuclear power go big?[98]

Small modular reactors are being pitched as an affordable and fast way to decarbonise power grids but questions about the technology abound.

5.5 Policy Briefs[99]

The 1st PARIS REINFORCE policy brief entitled "PARIS REINFORCE: What can our models deliver?"[100] has been issued in November 2019. The brief highlights the benefits of modelling, how the models used in the PARIS REINFORCE project work, what the models can and cannot do as well as previous related modelling work. The brief has been used as a handout at the 1st PARIS REINFORCE regional workshop in which it successfully enabled stakeholder discussions and supported gathering of feedback on what the project should explore.

The 2nd PARIS REINFORCE policy brief entitled "The Delignitisation Roller Coaster in Greece: An Old Car and a Steep Slope Ahead"[101] has been issued in May 2021. The brief concerns the challenges of phasing out lignite use in Greece by 2028, and finetuning the pace of delignitisation in Greece to achieve social

[94] https://ecopress.gr/klimatiki-krisi-emp/
[95] https://doi.org/10.1038/d41586-021-03507-1
[96] https://www.nationalobserver.com/2021/11/24/news/rosa-galvez-calls-senate-declare-climate-emergency
[97] https://cleantechnica.com/2021/11/23/cicero-report-climate-modeling-is-hard-but-we-are-heading-for-disaster/
[98] https://www.newscientist.com/article/2299113-fix-the-planet-newsletter-can-small-nuclear-power-go-big/
[99] https://paris-reinforce.eu/publications/policy-briefs
[100] http://paris-reinforce.eu/sites/default/files/2019-11/PARIS%20REINFORCE%20Policy%20Brief%20What%20our%20models%20can%20do.pdf
[101] http://paris-reinforce.eu/sites/default/files/2021-05/PR-Policy-Brief-Greece-Delignitisation-RollerCoaster.pdf

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cohesion and a just transition.

Additionally, the PARIS REINFORCE project contributed to a new policy report by the Polish Economic Institute entitled "Cost for Households of the Inclusion of Transport and Residential Buildings in the EU ETS"[102], which was issued in June 2021 in collaboration with ERCST and Cambridge Econometrics.

Moreover, PARIS REINFORCE has contributed to the European Commission's policy publication for COP26, "Climate Action in the Post-COVID-19 World", with its brief on "Investigating optimal allocations for green recovery funds"[103].

5.6 Scientific Publications[104]

Even from the first year of PARIS REINFORCE implementation, a quite large number of scientific publications have been submitted to journals, most of which are already available online. Until now, a total of 50 scientific publications have been published. These are shown in the following list:

- Van de Ven, D. J., Sampedro, J., Johnson, F. X., Bailis, R., Forouli, A., Nikas, A., ... & Doukas, H. (2019). Integrated policy assessment and optimisation over multiple sustainable development goals in Eastern Africa. *Environmental Research Letters*, *14*(9), 094001.[105]
- Song, L., Lieu, J., Nikas, A., Arsenopoulos, A., Vasileiou, G., & Doukas, H. (2020). Contested energy futures, conflicted rewards? Examining low-carbon transition risks and governance dynamics in China's built environment. *Energy Research & Social Science*, *59*, 101306.[106]
- Gramkow, C., & Anger-Kraavi, A. (2019). Developing Green: A Case for the Brazilian Manufacturing Industry. *Sustainability*, *11*(23), 6783.[107]
- Vielle, M. (2020). Navigating various flexibility mechanisms under European burden-sharing. *Environmental Economics and Policy Studies*, *22*(2), 267-313.[108]
- Hausfather, Z., & Peters, G. P. (2020). Emissions–the 'business as usual' story is misleading. *Nature*, *577*(7792), 618-620.[109]
- van Vliet, O., Hanger, S., Nikas, A., Spijker, E., Carlsen, H., Doukas, H. & Lieu, J. (2020). The importance of stakeholders in scoping risk assessments–Lessons from low-carbon transitions. *Environmental Innovation and Societal Transitions.*[110]
- Le Quéré, C., Jackson, R. B., Jones, M. W., Smith, A. J., Abernethy, S., Andrew, R. M., ... & Friedlingstein, P. (2020). Temporary reduction in daily global CO2 emissions during the COVID-19 forced confinement. *Nature Climate Change*, 1-7.[111]
- Nikas, A., Fountoulakis, A., Forouli, A., & Doukas, H. (2020). A robust augmented ε-constraint method (AUGMECON-R) for finding exact solutions of multi-objective linear programming problems. *Operational Research*, 1-42.[112]

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[102] http://paris-reinforce.eu/sites/default/files/2021-06/PIE-Raport_Cost%20for%20Households%20%28EN%29%2020210622.pdf
[103] http://paris-reinforce.eu/sites/default/files/2021-11/EC%20COP26%20Policy%20Publication%20-%20Climate%20Action%20in%20the%20Post-COVID-19%20World.pdf
[104] http://paris-reinforce.eu/publications/scientific-publications
[105] https://doi.org/10.1088/1748-9326/ab375d
[106] https://doi.org/10.1016/j.erss.2019.101306
[107] https://doi.org/10.3390/su11236783
[108] https://doi.org/10.1007/s10018-019-00257-3
[109] http://dx.doi.org/10.1038/d41586-020-00177-3
[110] https://doi.org/10.1016/j.eist.2020.04.001
[111] https://doi.org/10.1038/s41558-020-0797-x
[112] https://doi.org/10.1007/s12351-020-00574-6

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- Nikas, A., Neofytou, H., Karamaneas, A., Koasidis, K., & Psarras, J. (2020). Sustainable and socially just transition to a post-lignite era in Greece: a multi-level perspective. *Energy Sources, Part B: Economics, Planning, and Policy*, 1-32.[113]
- Grant, N., Hawkes, A., Napp, T., & Gambhir, A. (2020). The appropriate use of reference scenarios in mitigation analysis. *Nature Climate Change*, 10, 605–610.[114]
- Babacan, O., De Causmaecker, S., Gambhir, A., Fajardy, M., Rutherford, A.W., Fantuzzi, A. & Nelson, J. (2020). Assessing the feasibility of carbon dioxide mitigation options in terms of energy usage. *Nature Energy*, 5, 720-728.[115]
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- Fuss, S., Canadell, J. G., Ciais, P., Jackson, R. B., Jones, C. D., Lyngfelt, A., ... & Van Vuuren, D. P. (2020). Moving toward Net-Zero Emissions Requires New Alliances for Carbon Dioxide Removal. *One Earth*, 3(2), 145-149.[119]
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[114] https://doi.org/10.1038/s41558-020-0826-9
[115] https://doi.org/10.1038/s41560-020-0646-1
[116] https://doi.org/10.1016/j.rser.2020.109988
[117] https://doi.org/10.3390/su12145832
[118] https://doi.org/10.1016/j.envsoft.2020.104795
[119] https://doi.org/10.1016/j.oneear.2020.08.002
[120] https://doi.org/10.1016/j.erss.2020.101780
[121] https://doi.org/10.3390/en13194994
[122] https://doi.org/10.2991/ijcis.d.200924.002
[123] https://doi.org/10.1016/j.rser.2020.110438
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[138] https://doi.org/10.1016/j.scs.2021.102976
[139] https://doi.org/10.1088/1748-9326/abf8e1
[140] https://doi.org/10.1088/1748-9326/ac0749
[141] https://doi.org/10.1016/j.scitotenv.2021.148549
[142] https://doi.org/10.1007/s11027-021-09960-7
[143] https://doi.org/10.1146/annurev-environ-012220-011104
[144] https://doi.org/10.3390/en14144341
[145] https://doi.org/10.1088/2515-7620/ac1498
[146] https://doi.org/10.1029/2021EF002077
[147] https://doi.org/10.1038/s41467-021-25720-2
[148] https://doi.org/10.1109/IISA52424.2021.9555502
[149] https://doi.org/10.1016/j.enpol.2021.112640

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5.7 Videos[154]

5.7.1 I2AM PARIS prototype

A promotional video containing the live demo of the I²AM PARIS prototype, which was presented during the first PARIS REINFORCE stakeholder dialogue in November 2019 has been created. In the video, Dr. Alexandros Nikas highlights the models which have been incorporated in the platform and analyses the ways in which they are documented in the platform.

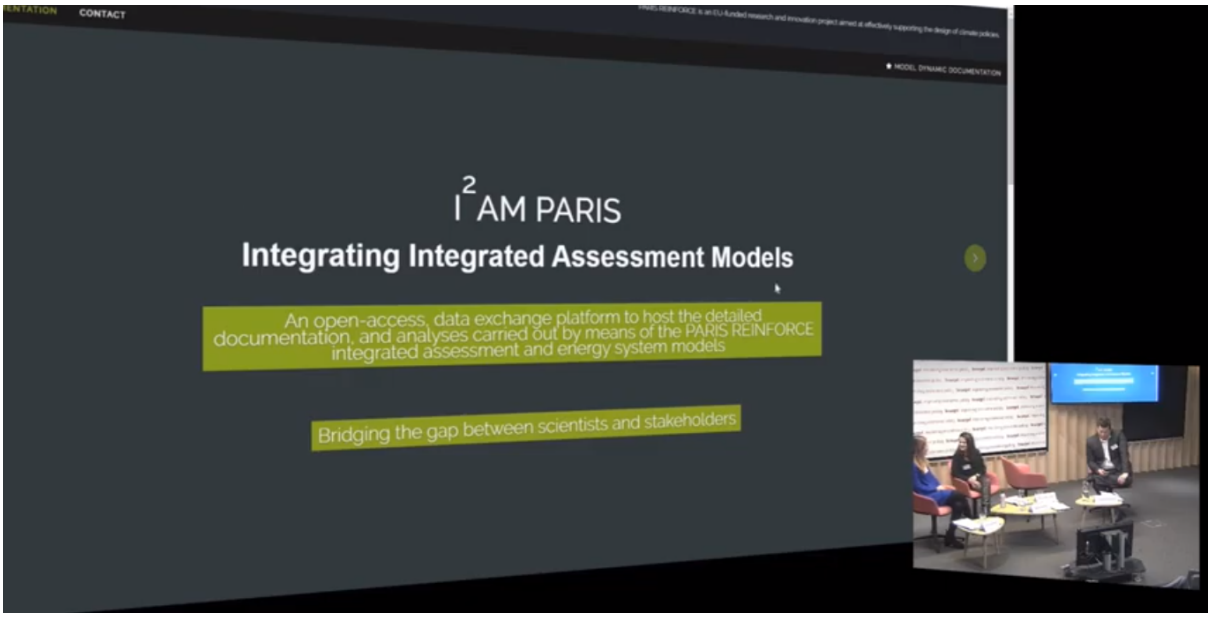

Figure 4 1st PARIS REINFORCE video "Live demo of the I2AM PARIS prototype"[155]

[150] https://doi.org/10.1016/j.oneear.2021.10.001
[151] https://doi.org/10.1016/j.joule.2021.09.004
[152] https://doi.org/10.1038/s41558-021-01203-6
[153] https://doi.org/10.1038/s41558-021-01206-3
[154] https://paris-reinforce.eu/communication/videos
[155] https://www.youtube.com/watch?v=PJtwXEXuWHw

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5.7.2 The PARIS REINFORCE project and the I2AM PARIS platform

Another promotional video where we briefly explain what these models do and introduce I2AM PARIS, an open-access data-exchange platform that was co-designed with stakeholders and developed by the project consortium.

Figure 5 2nd PARIS REINFORCE video "The PARIS REINFORCE project and the I2AM PARIS platform"[156]

5.8 PARIS REINFORCE Newsletters and Press Releases

By the end of November 2021, the dissemination team of PARIS REINFORCE has sent 12 newsletters and six press releases in English, targeting 753 English-speaking subscribers. Additionally, a newsletter (June '20) and a press release (June '21) with content in Greek has been sent to the 548 Greek-speaking subscribers of the project. On average, the newsletters and press releases were sent on a bi-monthly basis. Newsletters have been sent in July[157], October[158], and December[159] 2019, in April[160], June[161], July[162], September[163], October[164], November[165], and December[166] 2020, and in February[167], April[168],

[156] https://www.youtube.com/watch?v=JrrAoqEz_jQ
[157] https://preview.mailerlite.com/n0v4p6/
[158] https://preview.mailerlite.com/y2d5g0
[159] https://preview.mailerlite.com/c7h1g0/
[160] https://preview.mailerlite.com/a9f7k9/
[161] https://preview.mailerlite.com/l2z6c5
[162] https://preview.mailerlite.com/d0q1d0
[163] https://preview.mailerlite.com/j8v7l2
[164] https://preview.mailerlite.com/t6s6c0
[165] https://preview.mailerlite.com/z5e3r7
[166] https://preview.mailerlite.com/e3q2o1/
[167] https://preview.mailerlite.com/w3f5p8/
[168] https://preview.mailerlite.com/t8w8g1

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July[169], and November[170] 2021. Press releases were published in July[171], October[172], and November[173] 2020, and in January[174], May[175], June[176], and November[177] 2021.

Newsletters were typically released after significant project events and provided updates and website links to all recent activities and outputs of PARIS REINFORCE, such as conferences, workshops, and scientific publications. Press releases were kept mainly for significant announcements that warranted a separate, dedicated release to showcase them. For more details on the contents of each newsletter and press release, see Figures 6-25.

Figure 6 The PARIS REINFORCE 1st Newsletter (July '19)

[169] https://preview.mailerlite.com/f5s5b0
[170] https://preview.mailerlite.com/d6b7o9
[171] https://preview.mailerlite.com/l0w6z8/
[172] https://preview.mailerlite.com/j0b4k5
[173] https://preview.mailerlite.com/s3x1b1/
[174] https://preview.mailerlite.com/d1z7f2
[175] https://preview.mailerlite.com/f1e6f1
[176] https://preview.mailerlite.com/q2v9v0
[177] https://preview.mailerlite.com/i5f8m5

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Figure 7 The PARIS REINFORCE 2nd Newsletter (October '19)

Figure 8 The PARIS REINFORCE 3rd Newsletter (December '19)

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PARIS REINFORCE Newsletter, April 2020

PARIS REINFORCE

PARIS REINFORCE in the time of COVID-19

The PARIS REINFORCE consortium has been considering how best to accommodate COVID-19 implications in its research, including potential long-term socioeconomic implications (e.g. economic growth), impacts on investments (e.g. post-crisis stimulus crowding out clean energy investments, or instead bringing down cost of capital in low-carbon technologies), emissions trends due to structural changes (e.g. shifts among energy sources) and new norms (like telecommuting persisting beyond the pandemic), etc.

PARIS REINFORCE researchers have published several commentaries analysing similarities of the COVID-19 pandemic and the climate emergency as well as what we can learn from the COVID-19 action into climate action.

Visit the respective page of the website and explore the newly published commentaries:

- How changes brought on by coronavirus could help tackle climate change
- Coronavirus: How we emerge from this terrible crisis could push us into a better future
- Coronavirus and climate change: "There's much uncertainty, and much to play for"

Moreover, PARIS REINFORCE researchers have participated in a podcast on "Planet Pod" and discussed the knowns and unknowns of the COVID-19 pandemic and its impact on the climate emergency. Find it here.

PARIS REINFORCE National Stakeholder Workshops

National Stakeholder Workshop in Greece
Climate Change, Energy and the Greek Environment:
What are the choices?

The 9th National Stakeholder workshop of *PARIS REINFORCE* took place on the 28th of January 2020, in Athens, Greece. The workshop, entitled "Climate Change, Energy and the Greek Environment: What are the choices?", was jointly organized by PARIS REINFORCE, along with the Hellenic Society for the Environment and Culture and the Convergences Greece Forum, and gave the opportunity to stakeholders from industry, government and the civil society to get informed, discuss and raise concerns on the available alternatives on climate change, energy and environmental protection.

The workshop included three sessions on "Business, Energy & Environment", "Sustainable Energy Planning – Technologies and Policies" and "Geothermal Energy", as well as a roundtable discussion on "Sustainable Energy Sources Economy, Society, Environment and the case of Wind Turbines". After the latter, an electronic poll took place in order to gather the stakeholders' perceptions on which topics they consider the most important to be further explored by PARIS REINFORCE and which factors they believe are the most impactful (either positively or negatively) towards a wide-scale deployment of renewable energy sources (RES) and the implementation of the Greek National Energy and Climate Plan. The majority of respondents was from the academic/research sector (32%), while NGOs and private sector/industry were also well represented (18% and 14% respectively). The most critical topic to further be explored were renewable energy sources and spatial planning (73%), while more wind interest was also given to behavioural and lifestyle changes (61%), as well as just transition to a post-lignite Greece (50%). Finally, the four most important factors for a wide-scale development of RES were the sustainability of local communities and cities (NIMTO), social acceptance (NO), financial viability and investments in green technologies (3.90 both). PARIS REINFORCE will explore these topics and respective impact factors in its modelling activities so that our recommendations reflect reality.

In between sessions, the PARIS REINFORCE project coordinator, Assoc. Prof. Haris Doukas, also gave an interview to the "Eco News" TV show on SKAI TV regarding the importance of environmental protection, as well as the objectives of PARIS REINFORCE and how the project will support the Paris Agreement.

More information as well as the workshop's presentations (in Greek) are available online at the respective webpage!

PARIS REINFORCE national workshops, planned for the spring period coinciding with the pandemic measures, will be adjusted in order to be organised according to COVID-19 precautions and regulations. More information will be provided in due course.

In case you want to participate in the PARIS REINFORCE stakeholder consultation process, stay tuned by registering for the Stakeholder Council!

PARIS REINFORCE Participation in Conferences

PARIS REINFORCE presence in scientific and policy-making conferences and workshops

https://paris-reinforce.eu/news-events/interventions

PARIS REINFORCE researchers have participated in several scientific conferences and high-level policy events and presented the project, its objectives, models and stakeholder engagement process as well as results so far.

Below are the events in which PARIS REINFORCE participated as presenter:

- Zero carbon emissions in the Greek energy system, 20 February 2020, Athens, Greece
- 10th Conference of the Spanish Association for Energy Economics, 30 January 2020, Toledo, Spain
- 76th Semi-Annual IEA-ETSAP Meeting, 11 December 2019, Mayfield West, Australia
- EU-Japan Climate Dialogue Policy Symposium, 6 December 2019, Tokyo, Japan
- 2019 International workshop of EMF 35 JMIP, 6 December 2019, Tokyo, Japan
- IAMC 2019, 12th Annual Meeting, 3 December 2019, Tsukuba, Japan

PARIS REINFORCE Deliverables

https://paris-reinforce.eu/publications/deliverables

Key *PARIS REINFORCE Deliverables* have been published!

Explore the following newly published reports.

- Interactive map of models and tools
- Policy Brief on "what can our models deliver?"

PARIS REINFORCE Scientific Publications

https://paris-reinforce.eu/publications/scientific-publications

A lot of *PARIS REINFORCE Scientific Publications* have recently been published!

Visit the respective page of the website and explore them:

- Emissions – the 'business as usual' story is misleading, in *Nature*
- Navigating various flexibility mechanisms under European burden-sharing, in *Environmental Economics and Policy Studies*
- Developing Green A Case for the Brazilian Manufacturing Industry, in *Sustainability*

Contact US Email

Send us an email for any questions or express interest in the PARIS REINFORCE research

Let's get social

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PARIS REINFORCE, NTUA-9, Iroon Polytechniou str., Athens, Greece

Figure 9 The PARIS REINFORCE 4th Newsletter (April '20)

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Figure 10 The PARIS REINFORCE 5th Newsletter (June '20 - in Greek)

Figure 11 The PARIS REINFORCE 1st Press Release (July '20)

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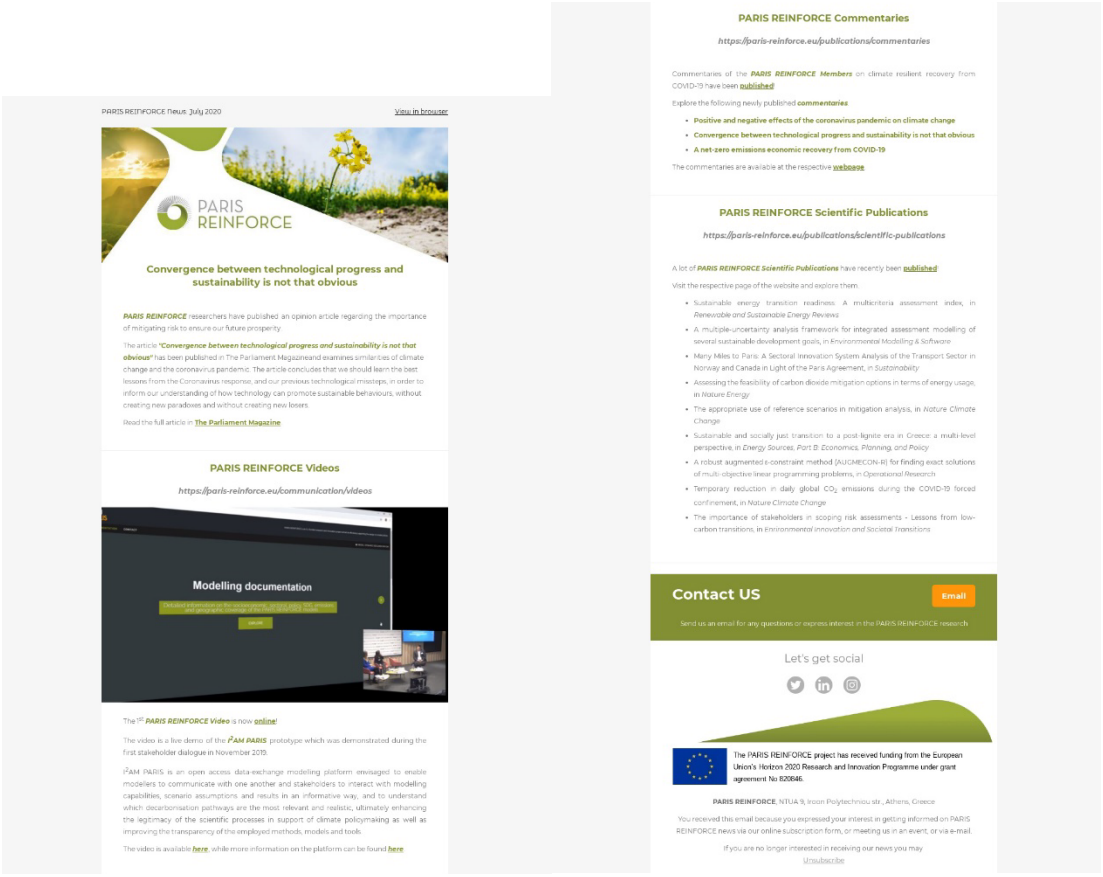

Figure 12 The PARIS REINFORCE 6th Newsletter (July '20)

Figure 13 The PARIS REINFORCE 7th Newsletter (September '20)

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Figure 14 The PARIS REINFORCE 2nd Press Release (October '20)

Figure 15 The PARIS REINFORCE 8th Newsletter (October '20)

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Figure 16 The PARIS REINFORCE 9th Newsletter (November '20)

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Figure 17 The PARIS REINFORCE 3rd Press Release (November '20)

Figure 18 The PARIS REINFORCE 10th Newsletter (December '20)

Figure 19 The PARIS REINFORCE 4th Press Release (January '21)

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Figure 20 The PARIS REINFORCE 11th Newsletter (February '21)

Figure 21 The PARIS REINFORCE 12th Newsletter (April '21)

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Figure 22 The PARIS REINFORCE 5th Press Release (May '21)

Figure 23 The PARIS REINFORCE 6th Press Release (June '21 - in Greek)

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PARIS REINFORCE Newsletter July 2021 View in browser

From Numbers to Insights: How to Think about Economic-Climate Modelling

A European Regional Stakeholder Workshop

On May 26, 2021, the PARIS REINFORCE project held an online European stakeholders workshop to discuss some of the key issues that policymakers should consider when confronted with new modelling studies, as the EU announces stricter climate targets.

The goal for the event was to hold a discussion on the sensible usage and interpretation of climate-economy models.

Read more about the event here.

PARIS REINFORCE held six national stakeholder workshops in May and June 2021.

Decarbonisation in the Central Asia and Caspian region: the third (final) of a series of workshops

The third and final PARIS REINFORCE stakeholder workshop about the Central Asian and Caspian region was held on May 18.

For the agenda, details about the event, and the presentations, click here.

European National Stakeholder Workshop Series: The case of Switzerland

The PARIS REINFORCE European stakeholder workshop series continued with Switzerland, on May 18, 2021.

For the agenda, details about the event, and the presentations, click here.

A workshop on the US Long-term strategy towards net zero

PARIS REINFORCE helped to organise a virtual workshop on the US Long-term strategy towards Net Zero on the 24th and 25th of May, 2021.

Click here to read more about it.

European National Stakeholder Workshop Series: The case of France

As part of its European stakeholder workshop series, the PARIS REINFORCE project held a national workshop in France, on May 26, 2021.

For agenda, details, and presentations, click here.

Carbon Neutrality and the Belt & Road Initiative: the PARIS REINFORCE China Workshop

The PARIS REINFORCE China stakeholder workshop was held online on June 8, 2021.

Click here to read more about it.

European National Stakeholder Workshop Series: The case of the Netherlands

The PARIS REINFORCE project held its online national stakeholder workshop for the Netherlands on June 9, 2021.

Click here to read more about it.

Deliberative dialogue in Spain as a driver of change

So far, PARIS REINFORCE has involved an important number of policymakers and other institutional stakeholders that have helped co-create research questions. Now, we aim to strengthen the co-creation process with the inclusion of the lay public.

The introduction session of a deliberative dialogue with 40 citizens, representing all ages and regions of Spain, off to a 3-week journey of deliberation on pertinent issues regarding the climate crisis, was conducted online on May 26, 2021.

Click here to read more about it.

Climate action and clean energy after COVID-19: What Greek Citizens think

A survey was conducted in Greece by Opinion Poll on behalf of PARIS REINFORCE. It was the first time a representative sample of the Greek society answered questions about climate change, COVID-19 recovery, and the options moving forward. The results were discussed on a webinar on June 15, 2021. The event was co-organized with Build Back Better Greece.

To learn more about the event and the survey results click here.

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Figure 24 The PARIS REINFORCE 13th Newsletter (July '21)

Figure 25 The PARIS REINFORCE 14th Newsletter (November '21)

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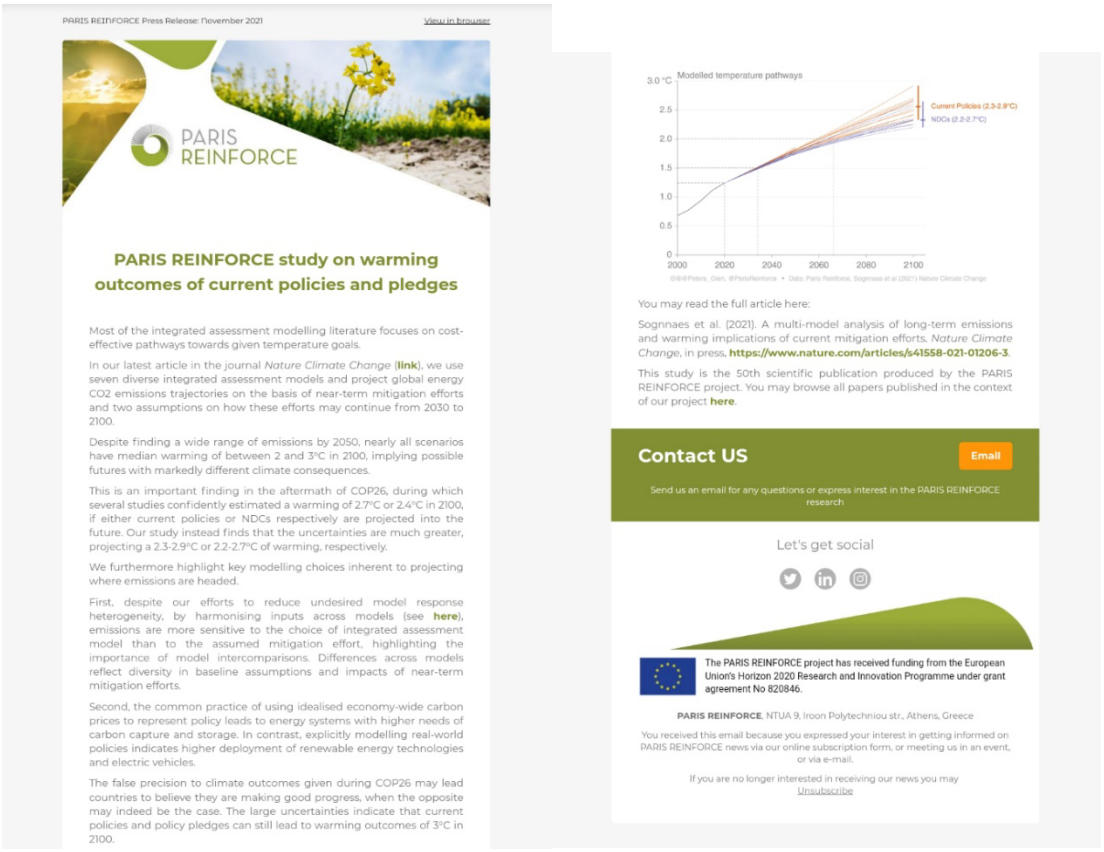

Figure 26 The PARIS REINFORCE 7th Press Release (November '21)

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5.9 Partners' Newsletters

An article on PARIS REINFORCE and its upcoming (at the time) kick-off meeting was published in the IEECP May 2019 newsletter[178] which was sent to over 160 energy experts. IEECP's April 2020 newsletter[179] referred to the "Climate policies: interactive map of models and tools and corresponding report from H2020 PARIS REINFORCE" as well as to the project Commentary on "How changes brought by the coronavirus pandemic could help tackle climate change".

5.10 Organisation of Events[180]

5.10.1 Kick-off Meeting, 10-11 June 2019, Athens, Greece

PARIS REINFORCE's Kick-off Meeting[181] was successfully organised in Athens, on the 10th and 11th of June 2019. Participants had the opportunity to meet in person, overview the project's expectations and discuss the challenges of the forthcoming tasks. In total, 38 people from 10 countries attended the meeting. The event featured several insightful presentations by highly qualified experts setting the tone for the actions that will follow during the coming months, as well as the strategic planning for the duration of the project.

5.10.2 Working Dinner in SB 50, 19 June 2019, Bonn, Germany

NTUA partner hosted a working dinner in SB 50 on 19th of June 2019 in Bonn, Germany. A total of 13 high calibre sustainable development experts/policy makers participated in the dinner and discussed on the expected results of PARIS REINFORCE.

5.10.3 2nd PARIS REINFORCE project meeting, 20 & 22 November 2019, Brussels, Belgium

The 2nd PARIS REINFORCE project meeting[182] was successfully held in Brussels, on the 20th and 22nd of November 2019. The meeting was organised in conjunction with the 1st PARIS REINFORCE Stakeholder Council dialogue, and consisted of two days, one before and one after the stakeholder dialogue.

The pre-Stakeholder Council dialogue meeting (November 20) enabled PARIS REINFORCE partners to prepare for the workshop, by examining the best ways to conduct stakeholder engagement, as well as to explore the polling tools to be used. Towards the end of the meeting, the consortium had the opportunity to meet with Heads of Units and Officers from DGs CLIMA, ENER, and RTD, and discuss potential priorities and topics that would help enhance the list of topics for consideration and discussion with the stakeholders during the Stakeholder Council dialogue.

During the second day of the meeting (November 22), participants had the opportunity to reflect on the feedback gained via the Stakeholder Council dialogue and shape the upcoming work accordingly. In particular, partners proceeded with the formulation of the key policy questions and the key

[178] http://www.ieecp.org/wp-content/uploads/2019/05/IEECP-Newsletter-4.pdf
[179] http://www.ieecp.org/wp-content/uploads/2020/04/IEECP-enews-April-2020.pdf
[180] http://paris-reinforce.eu/news-events/project-news-events
[181] https://paris-reinforce.eu/news-events/project-news-events/paris-reinforce-kick-meeting
[182] https://paris-reinforce.eu/news-events/project-news-events/paris-reinforce-2nd-project-meeting

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specifications of the platform by incorporating the remarkable suggestions and prioritisation provided by the audience. Moreover, fruitful discussions on the identification of needs and scenario design were carried out. Modelling interlinkages and the protocols for model use, scenario development and stakeholder engagement were also discussed during the meeting. Feedback gathered from stakeholders regarding the structure and functionality of the I²AM PARIS platform was analysed, and ways to incorporate it in the design process of the platform were explored.

5.10.4 First EU Regional Stakeholder Workshop and Project Meeting, 21 November 2019, Brussels, Belgium

The 1st PARIS REINFORCE Stakeholder Council Dialogue workshop, entitled "Enhancing climate policy through co-creation"[183], took place on the 21st of November 2019, at the premises of Bruegel, in Brussels, Belgium.

The workshop was a Pan-European initiative for the co-creation of research underpinning new climate policies at the EU and national levels, drawing from the results of six-month exhaustive consultations at national and European level, which followed innovative participatory processes, under the Talanoa Dialogue spirit also adopted in the recent UN Climate Change Conferences.

High level staff of the EC Directorates–General (DGs) for Energy, Climate, and Research, Ministries and climate–related governmental bodies from EU Member States, representatives of international organisations, scientists, and researchers representing relevant projects and initiatives attended the workshop.

During the morning sessions, and after the opening remarks from Mr. Lukasz Kolinski (Head of Unit, DG ENER.A.4) as well as an introduction to the project by the Coordinator Dr. Haris Doukas (Assoc. Prof., National Technical University of Athens), a detailed policy brief on what the PARIS REINFORCE models can and cannot do was handed out, presented and discussed with stakeholders. Furthermore, the I²AM PARIS platform was thoroughly presented and discussed with the audience, with the session essentially showcasing the dynamic, detailed and comparative documentation component of the platform (to which the audience was provided access to) and leading to a large Q&A part, in which preferences over the content, design and directions for visualisation of the modelling analyses were gathered.

The afternoon consultation, broken down into three thematic sessions, resulted in the main policy questions to be further investigated by the ensemble of Integrated Assessment Models of PARIS REINFORCE. Participating stakeholders prioritised the topics they would like to discuss in detail with the consortium members and, after discussions, selected the particular policy questions they would like PARIS REINFORCE to seek to address, via a polling and voting platform. The lists of suggested topics for each session were put together after discussions with high-level policymakers at the EU and European-national level as well as included one question (per session) that drew from recommendations from the public, in a crowdsourcing platform that was set up for the purposes of the workshop.

At the global level, stakeholders appeared in favour of the project taking on topics and policy questions that revolved around potential failures of key technologies, lifestyle and behavioural changes, as well as

[183] https://paris-reinforce.eu/news-events/project-news-events/first-paris-reinforce-stakeholder-council-dialogue-brussels

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just transitions in a climate emergency or extreme decarbonisation potential under a green new deal. At the EU level, the most interesting topics included carbon border adjustment and alternatives, capacity and flexibility of electrification in Europe, and EU-internal taxation policies (increasing ambition in terms of ETS coverage and expanding harmonisation of taxation in non-ETS sectors). Finally, on the socioeconomic and Sustainable Development Goals (SDG) front, participants eventually voted in favour of the project taking on questions related to employment and other socio-economic dimensions resulting from removing public support on emissions-intensive sectors (e.g. coal); evolution in terms of sectoral redeployment and skill requirements; and increasing ambition in NDCs in consideration of various sustainability dimensions.

5.10.5 Stakeholder National Workshop in Greece (1st series), 28 January 2020, Athens, Greece

The stakeholder national workshop "Climate Change, Energy and the Greek Environment"[184] took place on Tuesday, January 28, 2020 in Athens, Greece. The workshop was jointly co-organised by PARIS REINFORCE project, along with the Hellenic Society for the Environment and Culture and the Convergences Greece Forum. Its objective was to explore the available alternatives for the decarbonization of the Greek energy system, while giving the opportunity to stakeholders from industry, government and the civil society to get informed, discuss, raise concerns and help decide the way forward.

The workshop included 3 sessions on "Business, Energy & Environment", "Sustainable Energy Planning - Technologies and Policies" and "Geothermal Energy", as well as a roundtable discussion on "Sustainable Energy Sources: Economy, Society, Environment and the case of Wind Turbines". After the latter an online voting took place in order to gather the stakeholders' perceptions on which topics they consider the most important to be further explored by PARIS REINFORCE and which factors they believe are the most impactful (either positively or negatively) towards a wide-scale deployment of renewable energy sources and the implementation of the Greek National Energy and Climate Plan.

5.10.6 Stakeholder National e-Workshop in Kenya, 28 October 2020, Online

Responding to climate change requires transdisciplinary processes to work together in order to co-design robust national, regional, and global climate policies. Such policies must be science-based, technically feasible, financially viable, socially acceptable, and coordinated in a globally cooperative manner.

In an attempt to develop such policies, PARIS REINFORCE, an EU research and innovation project, aims to bridge the gap in the science-policy interface and underpin climate policymaking with authoritative scientific processes. Apart from calling upon its diverse modelling capabilities, the project introduces an innovative co-creation framework, through which it seeks to actively involve stakeholders in multiple aspects of the scientific processes, from the formulation of relevant policy questions to the definition of modelling assumptions.

In collaboration with the Technical University of Mombasa and the National Environment Trust Fund

[184] https://paris-reinforce.eu/news-events/project-news-events/climate-change-energy-and-greek-environment

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(NETFUND) project, and acknowledging that priorities and concerns of policymakers, industries and citizens largely differ across different countries in the world and across stakeholder groups, the project organised its first virtual, national stakeholder workshop in Mombasa, Kenya,[185] aiming to mobilise knowledge embedded in individuals coming from governments, business, NGOs, academia, and the civil society; and to design well-informed and meaningful scientific activities in support of climate policymaking at the national and regional level.

The workshop was chaired and coordinated by Dr. Ioannis Tsipouridis and Prof. Michael Saulo (Technical University of Mombasa) and comprised sessions detailing the capabilities of the PARIS REINFORCE models for Kenya and the broader region, presenting our findings on climate action and sustainable development in Eastern Africa, as well as defining with participants the most pertinent climate policy questions. The event included the following sessions:

- Greeting speech and event outline by Dr. Ioannis Tsipouridis (Technical University of Mombasa).
- So, what is the PARIS REINFORCE project? – A brief introduction to the project by the project coordinator, Prof. Haris Doukas (National Technical University of Athens).
- The project's modelling ensemble and its use in informing Kenyan mitigation pathways – The Horizon 2020 PARIS REINFORCE project brings together a wide range of integrated assessment and energy systems models to inform feasible and politically realistic mitigation pathways for a number of the world's major regions. The modelling ensemble includes representations of the world as a whole, the African continent, as well as some sub-continental African regions, and these regions' low-carbon transitions can be used to describe the opportunities and challenges for Kenya and the surrounding countries. This presentation, by Dr. Ajay Gambhir (Imperial College London, Grantham Institute), introduced the PARIS REINFORCE modelling suite, before discussing some emerging results of relevance to Kenya, Africa, and the globe.
- Designing policies for achieving simultaneous progress in multiple SDGs: an integrated assessment modelling exercise for Eastern Africa – Global climate modelling exercises often ignore regional and local realities. In the case of Eastern Africa, climate efforts will be inseparable from other major development challenges, such as reducing poverty and hunger, achieving universal access to clean energy, water and sanitation, reducing exposure to household pollutants, and more. On-ground knowledge is therefore of high value for calibrating integrated assessment models, in order to allow the design of realistic energy and climate policies that are beneficial on multiple scales. This presentation by Dr. Dirk-Jan Van de Ven (Basque Centre for Climate Change) showed the results of a recent study focusing on the effectiveness of residential energy policies for multiple SDGs and showcased modelling possibilities within the PARIS REINFORCE project.
- Co-designing research questions and modelling parameters – Polls designed for embarking upon the co-creation of the PARIS REINFORCE modelling approach for the country and the region, in terms of questions and modelling parameters. Stakeholders, facilitated by Dr. Alexandros Nikas (National Technical University of Athens), were asked to actively contribute to co-defining and communicate their preferences over the modelling approach, in a participatory process aimed at

[185] https://paris-reinforce.eu/news-events/project-news-events/informed-science-sustainable-climate-action-kenya

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formulating the most relevant and seminal research questions as well as critical parameters for the upcoming modelling runs.

- Low-emissions, resilient infrastructure: Paris and SDGs are inseparable – A forum for discussing with the audience the topic of how to build the low-emissions, resilient infrastructure by 2050 of which 75% does not exist today also facing a USD 15 trillion global financing gap by 2040. The infrastructure challenge covers multiple Sustainable Development Goals (6, 7, 8, 9, and 11). Inherently linked with No 13 "Climate Action". This was chaired and coordinated by Mr. Zsolt Lengyel (Institute for European Energy and Climate Policy).
- Interpreting the Paris Agreement - The Paris Agreement is written in a way that allows for a broad range of interpretations. The many ways in which the Agreement can be interpreted can shape the global/regional pathways and scenarios modelled within the PARIS REINFORCE project. In this session, stakeholders, facilitated by Dr. Hannah Parris (Cambridge University) explored the different interpretations of goals set out in the Paris Agreement text; for example, what is meant by the term "well below 2°C"? - with the aim of identifying the range of views. Stakeholders will be invited to anonymously share their views and identify core topics that will be explored further in the PARIS REINFORCE modelling scenarios.

In particular, after a short welcome and keynote speech from workshop coordinator Dr. Ioannis Tsipouridis and Chairman Dr. Robert Arunga (Technical University of Mombasa), as well as a brief introductory note by project coordinator Prof. Haris Doukas (National Technical University of Athens), Dr. Ajay Gambhir (Imperial College London) highlighted expected global and African regional impacts from an unmanaged climate crisis, and noted the region-relevant modelling capabilities of the project before explaining some initial modelling response to the question 'where is the world headed, given current policies and ambitions?'. Dr. Dirk-Jan van de Ven (Basque Centre for Climate Change) then presented the project's earlier findings for the broader Eastern African region, mainly focusing on the role of traditional biomass in a sustainable future, suggesting that land policies aimed at increasing the sustainable output of biomass resources can reduce emissions in the region but also slightly delay progress in health and energy access goals. Co-host Prof. Michael Saulo (Technical University of Mombasa) then coordinated a Q&A session, in which most stakeholders questioned the sensitivity and compliance of the findings with both the action pledges and the Paris Agreement and seemed interested in analyses that extend climate, health and energy access.

The second session was more interactive, with Dr. Alexandros Nikas (National Technical University of Athens) presenting literature insights into the relationship between climate action and other Sustainable Development Goals of UN's 2030 Agenda, noting the capacity of climate-economic models to assess progress in non-climate sustainability dimensions. He then asked participants, via online polling, to prioritise sectors for decarbonisation and sustainable development goals in relation to climate change, based on specific criteria. Overall, stakeholders (mostly from academia, business, and national government) considered the residential and transport sectors as critical for human development and combatting inequalities, while electricity and industry as paramount to sustainable resource use and earth system conservation, which was also the leading priority. Furthermore, attendees found limited progress and ambition in Kenya regarding protection and conservation of water resources and terrestrial ecosystems, while singling out access to sustainable and modern energy for all as the most significant goal for the country. Mr. Zsolt Lengyel (Institute for European Energy and Climate Policy) then discussed the topic of how to build the low-emissions, resilient infrastructure by 2050 of which 75% does not exist today also facing a USD 15 trillion global financing gap by 2040. The session concluded with Dr. Hannah

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Parris (Cambridge University) interacting with stakeholders on their perception of the different goals set out in the Paris Agreement, by means of three participatory tasks, and Prof. Saulo then discussing conclusions and insights from the workshop.

The key outputs from the vibrant discussions, as well as the opinions expressed via the interactive polling sessions, will now be used to design realistic yet stretching scenarios of how Kenya's low-carbon development could proceed in the coming decades, in consideration of different sustainability priorities.

5.10.7 Stakeholder National e-Workshop in India, 3 November 2020, Online

The PARIS REINFORCE project hosted a virtual workshop, on November 3, 2020,[186] to discuss the project's Indian modelling pathways. The format of the event was to hold structured discussions on the Indian energy transition with experts from NGOs, academia, the private sector, and government. This was with the purpose of allowing modelling teams to develop stakeholder-driven modelling scenarios, as well as to co-create some of the core assumptions being fed into models.

The workshop began with a brief introduction from project coordinator, Prof. Haris Doukas (National Technical University of Athens). Following this, Dr. Ajay Gambhir (Grantham Institute, Imperial College London) gave an overview on what modelling studies have so far revealed about low-carbon transitions in India. Additionally, he offered an insight into what the modelling work of the PARIS REINFORCE project has so far achieved as well as the next steps it will take.

After these introductory sessions, participants were split into three breakout groups to allow for more intimate discussions. The themes of the three breakout groups were the Indian power sector, the Indian transport sector, and the theme of urbanisation in India. Each session was structured around gathering participants' understanding of the key themes driving modelling results, i.e. are assumptions too ambitious, too pessimistic, or unrealistic/infeasible in other ways?

The power sector session was chaired by Dr. Alexandre Koberle (Grantham Institute, Imperial College London). Key themes investigated were:

- The political feasibility of early retirement of coal plants in India. Particularly focussed on the chances of retirement during the period 2020-2030.
- The target of 450GW renewable electricity capacity in India by 2030. Discussion centred around whether this target is realistic and the key support mechanisms that must be put in place to support such rapid renewable electricity deployment.

The session on urbanisation was chaired by Dr. Ajay Gambhir. Key themes investigated were:

- The evolution of building cooling demand (e.g. demand for air conditioning). What are the implications of increased urbanisation and incomes for this demand?
- Smart cities and the potential benefits of better public transport infrastructure and more energy efficient buildings that could result from them.
- Key innovations or disruptive technologies that could influence the development of sustainable urban living in India.

[186] https://paris-reinforce.eu/news-events/project-news-events/co-creating-indias-mitigation-pathways

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The transport sector session was chaired by Dr. Shivika Mittal (Grantham Institute, Imperial College London). Key themes investigated were:

- Feasibility of the government's 30% electric vehicle share by 2030 target.
- Implications for the electricity grid of a surge in electric vehicles.
- The role for hydrogen in decarbonising India's transport sector.

Following the breakout groups, representatives from each session informed the larger group on the issues they had discussed in their respective groups, coordinated by Dr. Georg Zachmann (Bruegel). An interactive sli.do voting session, managed by Mr. Ben McWilliams (Bruegel), then allowed participants to give their feedback on all topics before closing remarks.

The key outputs from the discussion, as well as the opinions expressed via the sli.do voting session, will now be used to design realistic yet stretching scenarios of how India's low-carbon development could proceed in the coming decades.

5.10.8 Stakeholder National e-Workshop in the Central Asian and Caspian region, 9 December 2020, Online

On December 9, 2020, the PARIS REINFORCE project held its virtual workshop focusing upon the Central Asian and Caspian region.[187] The goal for the workshop was to receive insights from regional stakeholders into the public policy context as well as a better understanding of some of the key assumptions modelling groups must make regarding the region.

To this end, a range of stakeholders were invited from national governments, NGOs, the private sector, international institutions, and academia. On the day, stakeholders were in attendance from Kazakhstan, Uzbekistan, and Turkmenistan.

The workshop began with a brief introduction from project coordinator, Assoc. Prof. Haris Doukas (National Technical University of Athens). Then, during the first session of the workshop, Mr. Rocco De Miglio (E4SMA) introduced the TIMES-CAC model that the project uses to investigate the region in more detail. The presentation particularly delved into the structure of the initial exploratory scenarios used for analysis (designed to facilitate the first round of engagement), as well as the diverging pathways of key assumptions (e.g. the price of natural gas) under each scenario. Here, an emphasis was placed on the help that stakeholders can provide by allowing for more politically and contextually relevant policies and assumptions to define scenarios.

Additionally, an interactive dashboard was shared and demonstrated. This dashboard allows for a user-friendly visualisation of the key performance indicators relevant to the TIMES-CAC model.

Participants were then split into two breakout groups, in order to allow for more intimate discussion. The two topics for discussion were key policies and key data assumptions.

The session on key policies was chaired by Mr. Rocco De Miglio (E4SMA). Some of the main topics discussed were around water supply within the region (with respect to its integration with the energy

[187] https://paris-reinforce.eu/news-events/project-news-events/decarbonisation-central-asian-and-caspian-region-first-series

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chain), the capability to keep track of regional "strategic agreements", as well as the deployment of renewable energy capacity with relation to targets set by national governments. Furthermore, additional regional studies and data sources were discussed.

The session on key data assumptions was chaired by Mr. Gabriele Cassetti (E4SMA). During this session, the accuracy and reliability of different data sources were discussed in relation to the regional context. Discussions focused particularly on the effects of the COVID-19 pandemic on relevant economic drivers, oil price long-term projections, and costs of key energy technologies (e.g. PV, carbon capture and storage, etc.).

Key outputs from the session will be used to better design realistic decarbonisation scenarios for the region. Moreover, as indicated during the workshop, additional outreach activities to attending stakeholders are planned for the coming months; in this respect, Dr. Alexandros Nikas and Mr. Konstantinos Koasidis (National Technical University of Athens) facilitated a co-creative session via an online polling platform, before Dr. Hannah Parris and Dr. Annela Anger-Kraavi (Cambridge) hinted the next steps of co-designing scenarios to follow. Modelling teams hope to learn more from stakeholders following this initial introduction into the capabilities of the PARIS REINFORCE consortium in the region.

5.10.9 2nd Stakeholder National e-Workshop in the Central Asian and Caspian region, 2 March 2021, Online

On March 2, 2021, the PARIS REINFORCE project held its second virtual workshop focussing upon the Central Asian and Caspian (CAC) region.[188] The goal for the workshop was to inform regional stakeholders on the progress of the exercise presented during the 1st regional workshop (December 9, 2020) and receive a second round of insights from regional stakeholders.

To this end, stakeholders attending the first workshop (including from national governments, NGOs, the private sector, international institutions, and academia) were invited once again. Some stakeholders participating for the first time were also present. On the day, stakeholders from Azerbaijan, Uzbekistan, and Turkmenistan attended.

The workshop began with a brief introduction from project coordinator, Prof. Haris Doukas (National Technical University of Athens). Then, during the first session of the workshop Mr. Rocco De Miglio (E4SMA) introduced the progress of TIMES-CAC model exercise. He presented how the first round of stakeholders' insights were elaborated in the storylines and the structure of the new exploratory scenarios developed for analysis, as well as the diverging pathways of key assumptions under each scenario. Emphasis was placed on the topics investigated in the second phase of the analysis: foreign investments in the region (e.g. Belt and Road Initiative) and hydrogen chain development.

The interactive dashboard already used in the first workshop was shared and demonstrated. This dashboard allows for a user-friendly visualisation of the key performance indicators relevant to the explored storylines for the CAC region.

Participants were then invited in a discussion session to allow for more focused discussion.

[188] https://paris-reinforce.eu/news-events/project-news-events/understanding-regional-aspects-central-asian-and-caspian-region

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The session was chaired by Mr. Rocco De Miglio (E4SMA). Some of the main topics discussed were around water consumption within the region along the energy chain, the capability to manage/analyse tariff reforms as well as international topics such as carbon border adjustment. Furthermore, the possibility to open the technology portfolio to additional solutions (e.g., nuclear for Uzbekistan) was discussed.

During the session Mr. Gabriele Cassetti (E4SMA) described the hydrogen chain included in the model, as it represented one focus of the analysis.

Key outputs from the session will be used to design further more robust and co-designed decarbonisation scenarios for the region, in view of the upcoming, final PARIS REINFORCE CAC workshop planned in May 2021. Moreover, as indicated during the workshop, additional outreach activities to attending stakeholders are planned for the coming weeks/months. Modelling teams hope to learn more from stakeholders following this discussion series on the project capabilities in the region.

5.10.10 Stakeholder National e-Workshop in Russia, 16 March 2021, Online

On March 16, 2021, the PARIS REINFORCE project held its virtual national workshop focusing upon Russia.[189] The goal for the workshop was to receive insights from local stakeholders into the public policy context as well as a better understanding of some of the key assumptions modelling groups must make to build relevant mitigation pathways for the country.

To this end, a range of stakeholders were invited from NGOs, academia, business, and government. On the day, more than 100 stakeholders actively participated, providing feedback on the development of effective and realistic measures in the Russian national context to mitigate climate change.

The workshop began with a brief introduction from project coordinator, Assoc. Prof. Haris Doukas (National Technical University of Athens). Then, during the first session of the workshop, Dr. Alexandre Koberle (Grantham Institute, Imperial College London) presented preliminary insights from the global modelling activities of the project and elaborated on the low-carbon development of Russia by delving into the current status of the country, its NDC pledges, as well as an estimation of where Russia is headed based on the "where we are headed" scenario logic of PARIS REINFORCE. Following this, Dr. Alexander Shirov and Dr. Andrey Kolpakov (IEF-RAS) introduced the model system of IEF RAS dedicated to modelling the low-carbon development of Russia. The presentation particularly examined the potential for mitigating GHG emissions in the country, as well as the long-term national mitigation scenarios currently being explored alongside their impact on emissions reduction, economic dynamics, energy efficiency, and investments. Emphasis was placed on the importance of the carbon sink potential from the Russian forests, which is currently underexplored in the established scenarios. Both presentations placed emphasis on the help that stakeholders can provide by allowing for more politically and contextually relevant policies and assumptions to define scenarios.

Participants were then split into three breakout groups, to allow for more detailed discussion with stakeholders themselves. The three topics for discussion were:

[189] https://paris-reinforce.eu/news-events/project-news-events/role-electricity-manufacturing-and-forests-russias-low-carbon

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- Perspectives on the structure of electricity generation in Russia.
- Ways to decarbonise the manufacturing sector of the Russian economy, including businesses exporting goods to the EU.
- Carbon sequestration potential of Russian forests and ways to maximise it.

Some of the main topics discussed in session on the power sector revolved around the electricity mix and emission intensity, with emphasis on the role of nuclear energy, natural gas-based generation and renewable energy considering different policy scenarios like carbon regulation measures, direct limits on CO_2 emissions and carbon prices. Discussions focused on the economic and financial evaluation of each technology, with cost-effectiveness being expected to influence the diffusion levels of each technology in decarbonisation plans.

In the manufacturing sector session, main topics discussed included among others the activities Russian businesses have implemented in the past to reduce emissions, as well as future plans and how these plans are expected to affect the competitiveness of Russian companies. Key part of the discussion orbited toward opportunities and threats of the manufacturing sector brought from the climate agenda including the possible expenses from the introduction of a carbon border adjustment mechanism.

Hot topics in the forests session included how to assess and maximise the carbon sequestration potential of Russian forests. Different estimations of the Russian forest carbon budget and ways to improve them were discussed, as well as strategies to maximise the carbon sequestration potential by improving the control for forest disturbances, forest management techniques, and by promoting forest conservation projects.

Finally, an interactive sli.do voting session, managed by Mr. Ben McWilliams (Bruegel) allowed participants to give their feedback on the level of emission targets they consider to be realistic and ambitious, their estimations on the rate of GDP energy and carbon intensity improvement, the shares of key low-carbon technologies in the future, the level of carbon sinks, as well as their evaluation of key restrictions that could slow down the low-carbon transition of the country. Key outputs from the session will be used to better design realistic decarbonisation scenarios for the region.

5.10.11 3rd Stakeholder National e-Workshop in the Central Asian and Caspian region, 18 May 2021, Online

On the 18th of May 2021, the PARIS REINFORCE project held its third and final virtual workshop focussing upon the Central Asian and Caspian region.[190] The goal of this final workshop was to inform regional stakeholders on the progress of the exercise presented during the previous two regional workshops (9th December 2020 and 2nd of March 2021), and receive a final round of their insights.

To this end, stakeholders from the first and second workshops from national governments, NGOs, the private sector, international institutions, and academia were invited for the last meeting. Stakeholders were in attendance from Kazakhstan and Uzbekistan and Turkmenistan, and from the neighbouring Ukraine (IEA, EU4Energy).

[190] https://paris-reinforce.eu/news-events/project-news-events/decarbonisation-central-asia-and-caspian-region-third-final-series

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In the first session of the workshop, Mr. Rocco De Miglio (E4SMA) introduced the latest progress in the TIMES-CAC modelling exercise. Stakeholders' insights collected during the previous workshops and in bilateral discussions were elaborated in three final storylines, including some variants: Where are We Headed, NDC-like, and Deep Mitigation.

The total number of scenarios developed in this last phase of the analysis was eight (all included in the dashboard).

The topics investigated were mainly about the "Watergy", the correlation between power production and water consumption, and commodity tariffs phase-outs, in combination with GHG reduction targets.

"Watergy" has been quantitatively analysed by activating part of the "water module" for the TIMES-CAC model. The possibility to control water consumption improved the analysis and gave new elements to define scenarios, for example by analysing the response of the model to water-related constraints.

Tariffs have been investigated by cross-checking 2017-2020 end-use tariffs per country per sector, based on data collected in documents from international organisations (e.g., IRENA, IEA, etc.) and Ministry publications from national and international websites, and by making assumptions about their evolutions and phase out.

In this session, Mr. Konstantinos Koasidis (NTUA) also presented the results of the stakeholder assessment on SDGs and climate action that were kindly provided by stakeholders during the first workshop, and then processed making use of a Multi-Criteria Group Decision and Consensus Analysis framework.

During the second session Mr. Gabriele Cassetti (E4SMA) introduced the CAC Forum (https://cac.tribe.so), a tool built to continue the dialogue with stakeholders after the series of workshops. The main features of the forum were presented and described.

Participants were then invited in the final discussion session to allow for more focused discussion. The session was chaired by Mr. Rocco De Miglio (E4SMA). Some of the main topics discussed were around the possibility to simulate net-zero emissions in the region by 2050 (in particular in Uzbekistan), the capability to manage public funded / private investments (with different risks/discount rates), and define service-related, or consumption-related, tariffs for the energy commodities.

The dashboard used for the visualisation of the key performance indicators relevant to the TIMES-CAC model was illustrated, enriched with the new indicator of water consumption in the power sector for each scenario, and used to demonstrate the response of the underlying energy system model to the various scenario elements.

Key outputs from this last session will be used to further develop the analysis of the CAC energy system and continue sharing knowledge and experience, from now on by moving to the new channel of the CAC Forum.

5.10.12 Stakeholder National e-Workshop in Switzerland, 18 May 2021, Online

The PARIS REINFORCE European stakeholder workshop series continued with Switzerland, on May 18,

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2021.[191] The Swiss Stakeholder Workshop discussed EU current policy and mitigation pathways while gaining insights from Swiss stakeholders for effective decarbonisation policies in the regional and national context. It was held virtually, involving stakeholders from the government, academia, industries, and NGOs in Switzerland. Prof. Philippe Thalmann from EPFL (École Polytechnique Fédérale de Lausanne) moderated the event.

The workshop began with a brief overview presentation of the PARIS REINFORCE project, delivered by Prof. Haris Doukas of the National Technical University of Athens (NTUA) as the project coordinator. This opening session highlighted the core of the project and its objectives, mainly orienting on modelling work, the I^{2}AM PARIS platform, as well as co-creation and transparency.

Next, modelling work completed or currently carried out for EU mitigation was presented by Dr. Baptiste Boitier from SEURECO (Société Européenne d'Economie). The presentation explored where current emissions and various socioeconomic indicators in the Union are headed, implied by its current policies projected forward to 2050. The feedback gained during the follow-up discussions substantiated the importance of the EU carbon budget for its long-term strategy, and the territorial concept to determine the future implementation of the Carbon Border Adjustment Mechanism (CBAM). Behavioral changes were discussed as equally critical to ensure EU climate neutrality as citizens' actions are driven by perception.

The next session focused on understanding the range of new technologies and lifestyle changes contributing to an economy with net-zero greenhouse gas emissions by 2050. Dr. Marc Vielle from EPFL presented the related issues of full decarbonisation in the light of Swiss Energy perspectives. Like other parts of the EU, the main challenges for deep decarbonisation in Switzerland remain transportation, buildings, and industries. The follow-up discussion underlined the vital role of synthetic and green fuels, the development of storage, and smart grids to intensify green energy electrification.

The workshop was concluded with an online poll with sli.do for gathering quantifiable stakeholder insights into the ambition of climate action and game-changing innovations for climate targets in the EU. Most stakeholders prioritised carbon capture and storage, e-mobility, expansion of renewables, and citizen behaviour, in achieving the ambitious net-zero target. The poll also showed the significance of expanding the EU ETS, implementing EU-wide carbon tax on the ESR with revenue return, and considering the implementation of a CBAM.

5.10.13 Stakeholder National e-Workshop in the US, 24 and 25 May 2021, Online

On 24th and 25th May 2021, the PARIS REINFORCE consortium helped to organise a virtual US workshop[192], in collaboration with key US partners: ClimateWorks, University of Maryland Center for Global Sustainability, Rocky Mountain Institute, World Resources Institute, and the University of Michigan's School for Environment and Sustainability. They convened US and international experts from a broad range of communities concerned with the US low-carbon transition, to discuss strategic, analytical, and implementation needs to achieve a successful US long-term strategy (LTS) to Net Zero.

[191] https://paris-reinforce.eu/news-events/project-news-events/european-national-stakeholder-workshop-series-case-switzerland

[192] http://paris-reinforce.eu/news-events/project-news-events/workshop-us-long-term-strategy-towards-net-zero

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These stakeholders included: climate change and energy analysts and strategists from academia, NGOs, think tanks, and businesses; policy and regulatory officials from the federal government; experts with on-the-ground experience of implementing low-carbon transitions, including amongst workers and communities. Together, they discussed a number of themes including:

- Strategic and analytical needs towards a successful LTS
- Challenges and opportunities to decarbonising whilst ensuring the transition is equitable
- Implications of the transition on the economy, including jobs and opportunities

The first day of the workshop opened with Professor Leon Clarke of the University of Maryland, a Scientific Advisory Board member of PARIS REINFORCE, setting out the context for US long-term decarbonisation action, in light of the US's recently updated NDC. There then followed introductory comments from a range of US policy and government officials on the opportunities and uses of additional analysis to help inform and frame long-term action in the USA.

A series of lightning presentations then followed on different groups' current analysis of long-term strategies both in the USA and other countries. This included a presentation by Dr Haris Doukas (NTUA) and Dr Ajay Gambhir (Grantham Institute, Imperial College London) on the PARIS REINFORCE analysis around mitigation pathways in major emitting economies, and the related analysis around jobs and SDG implications. Other presentations highlighted the critical need to consider equity, jobs, and a range of non-climate concerns into account to achieve a workable long-term strategy. Comments highlighted that there must be greater analysis of local, community-level implications. In addition, to achieve Net Zero, all sectors and gases must be analysed in detail.

The second day of the workshop opened with a series of presentations on current analysis and future requirements to consider aspects of equity and jobs. This paved the way for two breakout discussions on jobs and equity respectively. The equity discussion highlighted that there is a need for better data to build appropriate metrics to highlight equity implications of the transition, and that without equity concerns at the core of a long-term strategy, it would not succeed. The jobs discussion highlighted how there needs to be better analysis that goes beyond jobs numbers, including on jobs quality, wages, contract length, and inclusivity.

A constant theme throughout the workshop was that stakeholder participation and inclusion is a central element of equity, and is essential in the design of the LTS and its sub-national elements.

5.10.14 Stakeholder National e-Workshop in France, 26 May 2021, Online

The PARIS REINFORCE project held a national stakeholder workshop in France, on May 26, 2021.[193] After a presentation of the project and its first modelling results, we discussed key technologies for deep decarbonisation of the French economy with national stakeholders, including electricity (renewables, smart grids, and uses), hydrogen, and carbon capture, utilisation and storage (CCUS), which three French experts were invited to introduce. The discussions were held in French.

The workshop kicked off with a very brief overview of the project (sole part of the workshop in English),

[193] https://paris-reinforce.eu/news-events/project-news-events/european-national-stakeholder-workshop-series-case-france

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delivered by the Project Coordinator, Prof. Haris Doukas of the National Technical University of Athens (NTUA). This opening session highlighted the core of the project and its objectives, mainly orienting on modelling work, as well as co-creation and transparency. It was followed by an introduction of the goals of the workshop by Prof. Paul Zagamé from SEURECO (Société Européenne d'Economie).

Next, modelling work completed or currently carried out for EU mitigation was presented by Dr. Baptiste Boitier from SEURECO, who framed this presentation around the I^2AM PARIS platform, showcasing its capabilities live, and explaining our expectations from the platform until the end of the project and afterwards. The presentation then explored where current emissions and various socioeconomic indicators in the Union are headed, implied by its current policies projected forward to 2050.

The first topics discussed, on "the challenges of electricity: renewables, smart grids, and uses", was introduced by Alain Burtin, Director of Research and Development at Electricité De France (EDF). He explored the French context in terms of climate ambition, routes to decarbonising the French economy (energy substitution, decarbonisation of energy carriers, and energy efficiency), and the potential of electricity to support emissions mitigation in the country. Alain Burtin continued with the evolution requirements for the European and French electrical systems to support growth and the necessity to deliver carbon-free electricity, emphasising the role of smart grids. Following discussions questioned the role of electricity in the transport sector as well as the alternatives to electricity in long-distance transport (trucks, aviation, and maritime).

The second topic, "hydrogen, between myth and reality", was introduced by Jean-Eudes Moncomble, Secretary General of the Conseil Française de L'Energie (CFE), the French branch of the World Energy Council (WEC). The WEC's work on establishing and comparing the current situation of national hydrogen strategies around the World was presented, and the objectives of these strategies were explored. Jean-Eudes Moncomble continued with the potential hydrogen needs by sector, the production technologies, and their costs including transport. He also pointed out the key questions about the future of hydrogen in Europe (domestic production vs. imports, investment and infrastructure requirements, and the need for intra-EU and international cooperation). The follow-up discussion underlined the importance of flexibility and the need of geographically detailed modelling exercises as well as of non-conventional storage associated with the question of the availability of critical materials.

The last topic, "CO_2 capture and storage: more than a false good idea from "fossil" energy companies?", was introduced by Dominique Copin, an independent expert, recently retired from the company Total, for which he assessed the potential contribution of CCUS for climate change mitigation and its possible impact on the future of the oil and gas industries. Dominique Copin started by explaining the role of CCS in climate change mitigation and pointed out that the technology is already mature. He emphasised the difficulties for some industrial sectors to fully decarbonise their production (electricity, cement, or steel) and argued that CCUS has a role to play in these sectors. Dominique Copin concluded with existing obstacles to significant deployment of CCUS (supporting fossil industries, high costs, related risks, and storage potential). Discussions in this session focused on the importance of CCUS, or lack thereof in currently deployed decarbonisation pathways, and geological aspects of considerable CCUS deployment across the globe.

Finally, Prof. Paul Zagamé concluded the workshop by thanking all speakers, stakeholders attending the workshop, and the Conseil Français de l'Energie for its support in this event.

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5.10.15 Stakeholder European Regional e-Workshop, 26 May 2021, Online

Climate-economy models are a powerful tool for providing insight into sensible climate policy choices and how they would impact our economy. As the EU announces stricter climate targets, there are an increasing number of modelling studies published attempting to do just so. However, these models are highly complex and largely inaccessible to wider audiences.

On May 26, 14.00 CEST, the PARIS REINFORCE project held an online webinar[194] to discuss some of the key issues that policymakers should consider when confronted with new modelling studies. For example, why do different models provide very different perspectives when trying to answer the same question? Why is it that certain models are better suited to certain policy questions? How can we sensibly form our own opinions about how strongly to trust new modelling results?

The goal for the event was to hold a discussion on the sensible usage and interpretation of climate-economy models. The desired outcome from the workshop was a conversation, which would be informative for policy-interested stakeholders that are confronted with modelling studies. The core of the PARIS REINFORCE project is effectively incorporating stakeholders into modelling worlds. Such an event was therefore useful for the project's internal thinking and hopefully for a wider audience.

The event was broadcast live on the Bruegel's website and remains hosted online. This means that interested policymakers and other stakeholders are able to watch the event recording at any point in the future. The digital audience was able to pose questions/comments to the panel using the online tool, sli.do (a total of 33 questions/comments were posed through the platform).

Opening presentation

The event began with a 30-minute presentation by Georg Zachmann (Bruegel). The title of the presentation was: 'From Numbers to Insights: Interpreting climate-economy modelling results for policymakers'. The purpose of the presentation was to provide an overview on what economy-climate models are used for, and how non-modellers should approach modelling studies.

The presentation put forward the argument that models "are a useful tool to organise knowledge and build consensus". Economics seeks to translate impacts and constraints into numbers to establish the impacts of different decarbonisation pathways; however, achieving this perfectly is impossible. Models are able to provide arguments for action: they can highlight the requirements, obstacles, and trade-offs for meeting a certain goal. However, it was noted that understanding a model requires a huge time investment. Models are associated with lots of jargon and complex concepts. To derive useful information from a modelling study, it is important to consider results in the context in which they are produced, and this is difficult. Even experts commonly disagree on modelling choices and core assumptions.

The second half of the presentation then put forward some ideas around the following two themes:

1. How should policymakers look at modelling studies?
2. What questions should they ask modellers?

[194] https://paris-reinforce.eu/news-events/project-news-events/numbers-insights-how-think-about-economic-climate-modelling

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A checklist of proposed useful questions, which non-modellers should ask when confronted with a new modelling study, were discussed:

1. Who designed the questions? Questions already imply judgement and set agendas.
2. Which model is used to answer the question? If the model is too big for the question, then there is the risk of generating noise.
3. What is the baseline?
4. How strongly should we believe the results? This decomposed into the following elements: sensitivity analysis; differences across models; intuitive explanation of sign and size; and accessible methods for interacting with model scenarios.

Panel discussion

The event then moved to panel discussion, among Ewelina Daniel (European Commission, DG Energy, Unit A4 Economic analysis and financial instruments) and two consortium members, Ajay Gambhir (Imperial College London) and Glen Peters (CICERO), moderated by Georg Zachmann. Each participant was given five minutes to offer initial remarks to the opening presentation.

During the discussion, a number of points were raised and discussed. Certain key points are summarised below:

- There are certain qualitative elements (e.g., political feasibility), which cannot be incorporated in models. How can such factors be considered alongside quantitative modelling output? During scenario design, qualitative features can be included. When designing scenarios, discussions with stakeholders can shed light on which technologies or behaviours can be assumed to be feasible within local contexts.
- In response to a discussion about the adaptability of modelling teams, the example was offered of the modelling community, which has been criticised in the past for excessive use of negative emissions technologies (like bioenergy carbon capture and storage, or BECCS) to achieve low emission pathways. This fact is now being addressed and studies are currently being produced, which are less reliant on BECCS.
- Regarding a question on whether policymakers derive more utility from models or modellers themselves, an analogy was put forward that 'models open the door' but then conversation is required. This was in keeping with a main theme of the workshop. Models are not magic machines that provide answers. Instead, they can shed light on particular topics, but should be seen as the catalyst for further discussion and exploration.
- When reflecting on the future, it was noted that model improvements (enabled by faster computers) are likely to enable better predictions/simulations in the future. However, they will inevitably become more complex. It is critical that modelling teams not allow models to become self-defeating as they become too complicated for non-modellers to understand.

Closing presentation

Haris Doukas (National Technical University of Athens) closed the event with remarks on what had been discussed as well as providing an outlook for the future of the PARIS REINFORCE project. He spoke to the fact that models must be considered within a broader framework of competing questions, and that nothing is implemented in isolation. For example, when deploying new renewable electricity generation,

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what are the effects on land use? Are there possible environmental consequences that in turn are perceived as social implementation barriers?

Drawing from project results and policy/academic publications, he also emphasised the role of 'game changing' technologies in modelling: it is important to develop better representation of emerging and early-stage technologies as well as large scale behavioural change. Closing remarks provided an overview of ongoing stakeholder dialogue and explained the future workshops that the project will hold, as well as the attempts through a series of workshops within and outside of the European Union to better incorporate sensible stakeholder preferences into models.

Research papers produced in the context of the project were also mentioned to support these points.

5.10.16 Stakeholder National e-Workshop in Spain, 26 May 2021, Online

Stakeholder engagement and co-creation lies at the core of the H2020 PARIS REINFORCE project, aiming to include stakeholders' knowledge and expertise in the research process. Until now, the project has involved an important number of policymakers and other institutional stakeholders, at the EU level as well as at national level in Member States and major or less emitting countries across the globe, that have helped co-create research questions. Within the context of the project, policymakers and expert stakeholders in the UNFCCC process were also consulted to interpret the Paris Agreement text in light of future stakeholder lead scenario modelling.

Now, we aim to strengthen the co-creation process with the inclusion of the lay public. To pursue such an objective, project partner BC3, along with 40dB, have just kicked off a deliberative dialogue with 40 citizens representing all ages and regions of Spain on a three-week journey of deliberation on pertinent issues regarding the climate crisis. The deliberation focuses on Spanish citizens' perceptions and feelings on different behavioural changes regarding mobility, consumption, food and waste. Additionally, it will serve to connect people from different backgrounds and locations and reveal policies, interventions, and possibilities on climate action despite differing opinions or paths that were not evident to individuals alone prior to the debate.

The introduction session, conducted online on the 26th of May 2021,[195] will be followed by break out sessions of 5 groups (of 8 citizens each) focusing on more detailed interventions over the next two weeks, giving the space to hear all voices present in the fora. Citizens also have the opportunity to debate on an online platform site with related questions.

The changes produced in citizens' opinions will be followed by a survey before and after the deliberation, and the results will be compared with a control group. We expect the deliberation process to have an impact on citizens' perceptions, presenting them with more knowledge on issues related to the climate crisis, but also improving their understanding about the current policies in place and those that are to be implemented in the future. While this does not imply that everyone will adhere to or agree with every policy or behavioural change, it is important to give citizens a space and voice to express their concerns and visions.

Therefore, this dialogue is seen as a means of involving citizens in the discussion and listening to them

[195] https://paris-reinforce.eu/news-events/project-news-events/deliberative-dialogue-spain-driver-change

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in return for co-creating solutions to tackle the climate crisis.

Overall, we believe that this experiment could provide many important and interesting insights for the modelling work in PARIS REINFORCE, but also for those in charge of decision making especially in Spain in relation to the upcoming Citizens' Assembly, expanding the impacts of PARIS REINFORCE outside the science-policy realm.

5.10.17 Stakeholder National e-Workshop in China, 8 June 2021, Online

The PARIS REINFORCE China stakeholder workshop was held online on June 8, 2021.[196] The workshop discussed China's net zero emissions after its carbon neutrality goal, how to achieve it from policy to practice, and topics related to the energy system in the context of the Belt and Road Initiative. Stakeholders from the Chinese government, academia, and Chinese companies participated in the event.

First, Prof. Haris Doukas from the National Technical University of Athens introduced the background and objectives of the PARIS REINFORCE project, including the core content of the project, models used, the I2AM PARIS platform and details of recent and upcoming workshops.

Then, Dr. QM. Chai from China's National Centre for Climate Change Strategy and International Cooperation (NCSC) introduced his work related to supporting China's carbon neutral targets, focusing on the energy system optimisation. He discussed how to promote carbon neutrality from the perspective of the energy transition, and how to make China's policies promote realistic actions.

From the PARIS REINFORCE consortium, Dr. Xi Yang, from China University of Petroleum Beijing, introduced China's energy status and carbon neutral policy background, explained her current modelling work and initial results, with corresponding strategies proposed for different sectors. Next, Dr. Drik-Jan Van de Ven from the Basque Centre for Climate Change (BE3) presented his initial simulations of China's current policy, as well as mitigation scenarios, based on the GCAM model, to show how China could achieve net-zero carbon emissions by 2060.

Following these initial presentations, workshop participants entered into an open discussion session around China's net-zero target, coordinated by Dr. Xi Yang. Starting from Shanxi Province—China's largest coal power production base—Dr. XL. Yao introduced how Shanxi should transform in the process of carbon emissions reduction, focusing on the energy-intensive industries of the province. Next, Dr. XZ. Feng from the Policy Research Center for Environment and Economy, Ministry of Ecology and Environment of China, explained the synergistic effects of pollution reduction and carbon reduction and the adjustment of industrial structure from the perspective of the coordinated control of pollutants and greenhouse gases. Dr. CL. Zhang from the National Grid Energy Strategy Research Institute discussed the challenges of reducing carbon emissions in the power system, including integrating renewable energy power, operation control technology, market mechanisms and policy incentives. Finally, Prof. J. Pang discussed how China's carbon market has a relatively significant development effect, but there are still many problems, such as high regulatory costs, quota allocation and other issues.

A second open discussion session on the Belt and Road Initiative, again coordinated by Dr. Xi Yang,

[196] http://paris-reinforce.eu/news-events/project-news-events/carbon-neutrality-and-belt-road-initiative-paris-reinforce-china

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included opinions and comments from industries and enterprises in China. Ms. WQ. Lin from Guangdong Energy Group introduced the company's renewable energy power generation transformation and the company's "Belt and Road Initiative" actions. Ms. S. Guo from Datang Group introduced the group's clean energy goals and ways to achieve it. Mr. W. Han from China Power Finance argued that financial resource allocation is indispensable in the green development and low-carbon transition. Ms. S. Zhao from Climate Change and Sustainability Division EY LLP discussed how companies can participate in the green construction of the Belt and Road Initiative through using green bonds or green credits as financial support.

Finally, participants were invited to vote online on sli.do, for the project to collect stakeholders' views on China's carbon neutrality and the Belt and Road Initiative, carbon emissions reductions, energy transition and development prospects, coordinated by Mr. Ben McWilliams from Bruegel. Stakeholder perspectives will be incorporated into the scenario design of national low-carbon pathways modelling in the current phase of the PARIS REINFORCE project.

5.10.18 Stakeholder National e-Workshop in Netherlands, 9 June 2021, Online

The Dutch climate policy and sectoral developments are characterised by a variety of divergent factors from the civil society-led court-cases obliging both the government and Shell to increase climate ambition, monetary and fiscal attention as captured by the Dutch Central Bank's (DNB) first TCFD (Task Force on Climate-related Financial Disclosures) report, accelerated fossil power station closures, intensive agriculture-driven environmental and climate challenges in parallel with the country's innovative finance and technology sectors venturing into hydrogen, electric-mobility, and renewables, as ABN-AMRO's journey on the road to Paris highlights.

On June 9, 2021 (10.00 - 12.30 CEST), the PARIS REINFORCE project held its online national stakeholder workshop in the Netherlands,[197] motivated by this context. Key topics for discussion included implications of the EU's 2030 55% GHG reduction target, the effects of the COVID-19 pandemic and its corresponding recovery measures (NextGenerationEU / Recovery and Resilience Facility), as well as 'game-changing' technologies, such as hydrogen – as envisaged in the national hydrogen strategy - and the role of the finance sector in decarbonisation and achieving climate neutrality by 2050.

This online workshop aimed at creating an open discussion between a broad range of climate action stakeholders representing NGOs, Academia, Business, and Government. It used unique online engagement tools and techniques to allow for a pragmatic and informative discussion on the policies and technologies required for achieving the goals of the Paris Agreement.

5.10.19 Discussion Regarding the Opinions of Greek Citizens on Climate Action and Green Energy

This is the first time a representative sample of the Greek society answers questions about climate change, COVID-19, recovery, and our options moving forward.

The results of the survey, which was held in Greece by Opinion Poll[198] on behalf of PARIS REINFORCE,

[197] http://paris-reinforce.eu/news-events/project-news-events/european-national-stakeholder-workshop-series-case-netherlands
[198] https://www.opinionpoll.gr/

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were presented on Tuesday 19:00 – 20:35 EEST[199] by Mr. Zaharias Zoupis, Research Director of Opinion Poll, and Assoc. Prof. Haris Doukas (NTUA), Project Coordinator of PARIS REINFORCE.

The results were discussed by a panel comprising:

- Vlassopoulou Chloé, Assoc. Professor, Department of Political Science, University of Picardie Jules Verne, Amiens, France
- Ibrahim Dimitris, Energy and Climate Policy Officer, WWF Greece
- Nikas Alexandros, Postdoctoral Climate Policy Researcher, National Technical University of Athens
- Tsani Stella, Assistant Professor, Department of Economics, University of Ioannina
- Tsipouridis Ioannis, Director of RECCReC (Renewable Energy & Climate Change Research Center) at the Technical University of Mombasa
- Psarras Ioannis, Professor and Director of Decision Support Systems Lab at the National Technical University of Athens

The live panel discussion was moderated by Mr. Thodoris Panagoulis, Director of Energy Press Gr.

5.11 Special Issues in UESB and RSET

In early September 2019 a call for papers for a Special Issue organised within the framework of PARIS REINFORCE was launched. The Special Issue, entitled "Transdisciplinary science in energy transitions: thinking outside strictly formalised modelling boxes", was published in the "Energy Sources, Part B: Economics, Planning, and Policy" (UESB) journal with special editors Dr. Annela Anger-Kraavi and Assoc. Prof. Haris Doukas. The special issue is devoted to research that touches critical policy questions, such as how the scientific community can move outside its comfort zone and work hard on combining perspectives across various disciplines and fields, while enhancing the transparency and legitimacy of the scientific processes in support of climate policymaking, as well as introducing innovative frameworks that improve the robustness of modelling outcomes against different types of uncertainties. A total of 6 manuscripts were published in the Special Issue (link).

The project plans to have another Special Issue in Elsevier's Renewable & Sustainable Energy Transition (RSET). This Special Issue, expected to run throughout 2022, will feature submissions looking at whole economy or sectoral decarbonisation pathways that help to achieve the Paris Agreement goals, with a particular focus on those pathways that have been informed by integrated assessment, energy system, and/or sectoral models as well as informed by stakeholder inputs and opinions. It will have no particular geographical focus, with instead a view to showcasing a diverse set of regions' pathways to a low-carbon future, considering their unique circumstances, opportunities, and challenges.

[199] http://paris-reinforce.eu/news-events/project-news-events/climate-action-and-clean-energy-after-covid-19-what-greek-citizens

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5.12 Participation in External Events

5.12.1 UN Climate Conference SB50, 19 June 2019, Bonn, Germany

PARIS REINFORCE coordinator Assoc. Prof. Haris Doukas (National Technical University of Athens) and Dr. Annela Anger-Kraavi (Cambridge University) participated in the UN Bonn Climate Change Conference (SB50)[200], which took place from June 17 to June 27 in Bonn, Germany. Prof Doukas and Dr. Anger-Kraavi had the opportunity to meet with climate action experts and discuss ways of collaboration within the framework of PARIS REINFORCE.

5.12.2 Networking and knowledge sharing event for decarbonisation projects and Coordinators' Day 2019, 5-6 September 2019, Brussels, Belgium

PARIS REINFORCE coordinator Assoc. Prof. Haris Doukas, from NTUA, Maurizio Gargiulo, from E4SMA, and Ajay Gambhir, from Grantham, participated in the Networking and knowledge sharing event for decarbonisation projects and the Coordinators' Day 2019[201], which took place on the 5th and the 6th of September 2019 in Brussels, Belgium, respectively.

PARIS REINFORCE representatives had the opportunity to meet with participants from other decarbonisation projects and discuss potential synergies towards climate change mitigation and adaptation. In particular, a poster showcasing the PARIS REINFORCE objectives and approach was put on display, while Prof. Doukas also delivered a presentation on the stakeholder engagement of the project and the respective policy-relevant workshops, through which stakeholders will provide their knowledge and expertise towards modelling realistic, ambitions and relevant decarbonisation pathways.

[200] https://paris-reinforce.eu/news-events/interventions/un-climate-conference-sb50-19-june-2019-bonn-germany
[201] https://paris-reinforce.eu/news-events/interventions/networking-and-knowledge-sharing-event

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Figure 27 PARIS REINFORCE representatives in the "Networking and knowledge sharing event for decarbonisation projects & Coordinators' Day 2019" workshops

5.12.3 C-Track 50 EU Roundtable, 17 September 2019, Athens, Greece

PARIS REINFORCE coordinator Assoc. Prof. Haris Doukas participated in an EU roundtable[202] organised by the C-Track 50 project on the 17th of September 2019, in Athens, Greece. Dr. Doukas had the opportunity to present the project to a group of 25 energy policymakers and experts from European ministries, many of whom expressed their interest in supporting the co-creation of the I²AM PARIS platform, participating in the PARIS REINFORCE Stakeholder Council and/or receiving the project's newsletter.

Figure 28 Prof. Haris Doukas presenting PARIS REINFORCE in the "C-Track 50 EU Roundtable"

[202] https://paris-reinforce.eu/news-events/interventions/c-track-50-eu-roundtable

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5.12.4 IAMC 2019, 12th Annual Meeting Tsukuba, Japan

Researchers from various PARIS REINFORCE consortium partners participated in the 12th Annual Meeting of the Integrated Assessment Modeling Consortium (IAMC)[203], which took place from 2 to 4 December 2019, in the city of Tsukuba, Japan. Among others, Alexandros Nikas and Haris Doukas presented their work entitled "Analysing policy robustness based on Shared Socioeconomic Pathways in an integrated assessment study with portfolio analysis over multiple objectives in eastern Africa". Moreover, at the last day of the conference, Dr. Doukas had the opportunity to present the PARIS REINFORCE project, while highlighting the I²AM PARIS platform, to the IAMC members.

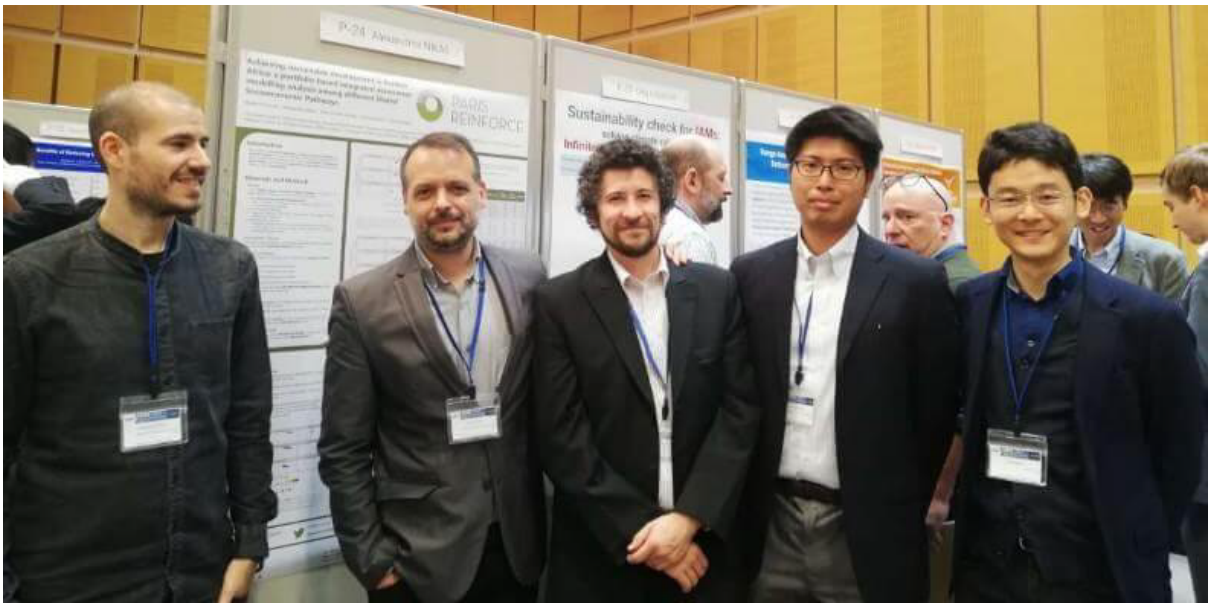

Figure 29 Alexandros Nikas and Haris Doukas presenting PARIS REINFORCE in IAMC 2019

5.12.5 2019 International Workshop of EMF 35 JMIP

Researchers from PARIS REINFORCE (Assoc. Prof. Haris Doukas and Dr. Alexandros Nikas, from the National Technical University of Athens) participated in the 2019 International Workshop of the Energy Modeling Forum 35 Workshop, on the Japan Model Intercomparison Project (JMIP)[204] on long-term climate policy, which took place on the 5th of December 2019, at Ito Research Centre of the University of Tokyo, Japan.

The aim of the workshop was to investigate the role of technologies in the long-term climate policy and energy strategies of Japan, while addressing the impact of key technologies such as renewables, nuclear power, and carbon capture and storage in climate mitigation pathways and examining economic, environmental, and social implications. The study aims to contribute to the ongoing policy debate about Japan's long-term climate policy, both domestically and internationally (such as those under the Paris Agreement), in light of the ramifications of the 2011 nuclear disaster caused by the Great East Japan

[203] https://paris-reinforce.eu/news-events/interventions/iamc-2019-12th-annual-meeting-tsukuba-japan
[204] https://paris-reinforce.eu/news-events/interventions/2019-international-workshop-emf-35-jmip

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Earthquake.

Dr. Alexandros Nikas also presented PARIS REINFORCE in detail, mainly focusing on the I²AM PARIS platform, its completed documentation component as well as the upcoming modelling analysis component, taking the opportunity to openly invite participating modellers from Asian countries (including China, South Korea, Japan, India, and the Asia-Pacific Energy Council) to contribute to and take advantage of the dynamic and detailed modelling documentation capabilities of the platform.

Figure 30 Alexandros Nikas presenting a prototype of the I²AM PARIS platform in EMF 35 JIMP

5.12.6 EU-Japan Climate Change Policy Symposium

PARIS REINFORCE researchers participated in the "EU-Japan Climate Change Policy Symposium: Use of scenario analysis to form the long-term strategy under the Paris Agreement"[205], which took place on the 6th of December 2019, at the Delegation of the European Union to Japan in Tokyo, Japan.

The symposium was organised by the Institute for Global Environmental Strategies (IGES) in the context of the International Climate Initiative (IKI), and specifically the "Strategic Partnerships for the Implementation of the Paris Agreement (SPIPA)" project. It hosted presentations by representatives from DG CLIMA and the JRC research centre, the PARIS REINFORCE consortium, local authorities, industry, and the National Institute for Environmental Studies, which led to vivid discussions among the audience and knowledge exchange.

Assoc. Prof. Haris Doukas actively participated in the discussions hosted in the session entitled "The process for the EU vision for decarbonization and the role of scenario and model analysis", by also presenting the scope of PARIS REINFORCE, and highlighting details of the I²AM PARIS platform and the co-creation component of the project.

[205] https://paris-reinforce.eu/news-events/interventions/eu-japan-climate-change-policy-symposium

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Figure 31 Haris Doukas presenting PARIS REINFORCE and the I²AM PARIS platform

5.12.7 76th Semi-Annual IEA-ETSAP Meeting

PARIS REINFORCE researchers participated in the 76th Semi-Annual IEA-ETSAP Meeting[206], which took place from 9 to 13 December 2019, at the CSIRO Energy Centre, in Mayfield West, Australia.

The meeting was organised by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which is Australia's national science agency. The five-day meeting consisted of the ETSAP regular workshop and the ETSAP Executive Committee, as well as training sessions on the TIMES and VEDA-TIMES models. During the regular workshop, several topics were analysed.

On behalf of PARIS REINFORCE, Maurizio Gargiulo (E4SMA) participated in the workshop and presented the project. In particular, Mr. Gargiulo presented an overview, the consortium and the objectives of PARIS REINFORCE, while highlighting the I²AM PARIS platform and its capacity to bring together energy and climate-economy modellers towards enhancing the robustness of modelling outcomes.

[206] https://paris-reinforce.eu/news-events/interventions/76th-semi-annual-iea-etsap-meeting

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Figure 32 Maurizio Gargiulo presenting PARIS REINFORCE and the I²AM PARIS platform

5.12.8 15th Conference of the Spanish Association for Energy Economics

PARIS REINFORCE researchers participated in the 15th Conference of the Spanish Association for Energy Economics[207] which took place on January 29th-31st, 2020 at the University of Castilla-La Mancha, in Toledo, Spain.

The main theme of the Conference was "Energy Decarbonisation. From words to action" and offered the opportunity to discuss the challenges that the energy sector will face in the coming years both at a national and European level. Dirk-Jan van de Ven and Mikel González from the Basque Centre for Climate Change (BC3) participated in the conference and presented the PARIS REINFORCE project. In particular, the scope and methodology of the project were presented, while both the public and the scientific interface of the I²AM PARIS open access modelling platform were displayed. The specific capabilities that PARIS REINFORCE's modelling ensemble offers for Spain were highlighted and a quick poll on which policy areas should be explored by the project took place. In the poll around 20 stakeholders participated, most of whom coming from the academia, and the policy area voted the most was the "Robustness of NECPs" regarding how Europe could become consistent to the Paris Agreement.

5.12.9 Zero carbon emissions in the Greek energy system

Researchers from PARIS REINFORCE participated in the "Zero carbon emissions in the Greek energy system: realism, opportunity or utopia?"[208] workshop which took place on the 20th of February 2020, in Athens, Greece.

[207] https://paris-reinforce.eu/news-events/interventions/15th-conference-spanish-association-energy-economics
[208] https://paris-reinforce.eu/news-events/interventions/zero-carbon-emissions-greek-energy-system

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The workshop aimed to enable the National Dialogue for the decarbonisation of the Greek energy system. It was organised by the Institute for Environmental Research and Sustainable Development of the National Observatory of Athens within the framework of the "South East Europe Energy Transition Dialogue" project. Participants had the opportunity to take part in a constructive dialogue and exchange opinions and expertise towards answering the following critical questions:

- Do the Greek National Energy and Climate Plan (NECP) and the Long-Term Strategy for 2050 constitute a coherent framework of decarbonisation actions?
- Is it possible for Greece to achieve zero Greenhouse Gas (GHG) emissions until 2050?
- What policies are required in order to achieve zero GHG emissions?

On behalf of PARIS REINFORCE, Assoc. Prof. Haris Doukas participated in the workshop and presented the project's objectives, methodology and the progress so far. More specifically, the "co-creation" approach that PARIS REINFORCE applies in the formulation of climate action policies and the role of the Stakeholder Council in the climate scenarios modelling were highlighted. Furthermore, the I^{2}AM PARIS platform which will enable the interaction and collaboration among climate modelling experts and policymakers, as well as stakeholders from the general public, was showcased.

5.12.10 The Value of Energy Management Practices in the Business Sector

PARIS REINFORCE researchers participated in the "The Value of Energy Management Practices in the Business Sector" online event,[209] organised by INZEB and The Hellenic-Dutch Association of Commerce and Industry (HeDA), which took place on the 15th of October 2020. The event presented the developments and benefits of an effective Energy Management System (EnMS) within organisational structures. Participants had the opportunity to discuss the importance of improving energy efficiency, which not only reduces capital expenditure but offers a number of additional benefits including reduced risk to energy compliance failures, improved facilities performances, increased competitiveness, and ROI.

On behalf of PARIS REINFORCE, the project coordinator, Assoc. Prof. Haris Doukas, participated in the event and presented "Opportunities and Threats towards a Sustainable Transition of the Industrial Sector". The presentation discussed findings on industrial low-carbon transition potential in the iron and steel, cement, and chemicals sectors, from the recent PARIS REINFORCE open access publication "The UK and German Low-Carbon Industry Transitions from a Sectoral Innovation and System Failures Perspective" in the scientific journal Energies.

5.12.11 5th AIEE - Associazione Italiana Economisti dell'Energia Energy Symposium

The international conference "AIEE Energy Symposium – Current and Future Challenges to Energy Security"[210] has become an important yearly appointment and an opportunity to discuss energy security, to explore new and existing trends, creative solutions of new technologies, the emergence of new market conditions and of new market operators. This year it was organised online as a virtual event,

[209] https://paris-reinforce.eu/news-events/interventions/value-energy-management-practices-business-sector
[210] https://paris-reinforce.eu/news-events/interventions/5th-aiee-associazione-italiana-economisti-dellenergia-energy-symposium

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from 15-17 December 2020, in collaboration with the IAEE and the SDA Bocconi School of Management.

PARIS REINFORCE researcher Rocco De Miglio (E4SMA) presented some key outcomes of the #BRIDGE study, a multi-country analysis of scenario pathways for low-emissions economic development of identified areas along "East-West corridors". The study was developed in collaboration with Xi YANG (CUPB) and Gabriele Cassetti (E4SMA).

5.12.12 78th Semi-Annual IEA-ETSAP Meeting

PARIS REINFORCE researchers participated in the 78th Semi-Annual IEA-ETSAP Meeting,[211] which was held online on 16th-17th of December 2020, due to the ongoing COVID-19 outbreak. The meeting consisted of the ETSAP regular workshop and the ETSAP Executive Committee, while a Basic Training Course on VEDA TIMES was organised and run one week prior, from 9th to 11th December, 2020.

On behalf of the PARIS REINFORCE project, Alessandro Chiodi (E4SMA) participated in the workshop and presented the project progress. In particular, Dr. Chiodi provided insights from preliminary analyses of the PARIS REINFORCE project, regarding the coverage, stakeholder engagement and planning, the harmonisation of exogenous variables between models, the I²AM PARIS platform, the development of scenarios and the next steps for the project.

5.12.13 PARIS REINFORCE in Kazakhstan's Nauryz Celebration - NU Green Campus Nature Day

Nauryz is a holiday for celebrating the beginning of spring, the awakening of nature.

The week before Nauryz, the Nazarbayev University (Nur-Sultan, Kazakhstan) holds a series of events that commemorate the life of nomads in ancient times. The Program of celebration includes presentations and contributions about sustainable development, climate change, and biodiversity in Kazakhstan.

On March 15, 2021,[212] PARIS REINFORCE member Rocco De Miglio was invited to take part in the discussion about "Kazakhstan's way to a carbon-neutral future", a "vision" sponsored by the British Embassy in Nur-Sultan.

The experience of the PARIS REINFORCE project, with our workshops in the broader Central Asian and Caspian region as a reference point, was shared with the participants.

5.12.14 1st Online Conference of the International Association for Energy Economics

PARIS REINFORCE researchers participated in the 1st Online Conference of the International Association for Energy Economics which took place on June 7th-9th, 2021 online.[213]

The main theme of the Conference was "Energy, COVID, and Climate Change" and offered the

[211] https://paris-reinforce.eu/news-events/interventions/78th-semi-annual-iea-etsap-meeting
[212] https://paris-reinforce.eu/news-events/interventions/paris-reinforce-kazakhstans-nauryz-celebration-nu-green-campus-nature-day
[213] http://paris-reinforce.eu/news-events/interventions/1st-online-conference-international-association-energy-economics

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opportunity to the ideal climate and energy policy regime that should simultaneously respond to potentially conflicting objectives, especially in the era of COVID: ensuring energy security, promoting universal access to affordable energy services, and fostering greener and more sustainable energy systems while taking into account geopolitical and economic dimensions. Anastasios Karamaneas and Aikaterini Forouli from the National Technical University of Athens (NTUA) participated in the conference and presented the research "Multi-objective evaluation of renewable technology subsidy portfolios under COVID-19 recovery packages", jointly carried out by consortium members NTUA, BC3, and Imperial.

5.12.15 Modelling capacity building in Azerbaijan for long-term energy strategy development

On June 10, 2021[214], as part of a training program organised in the framework of an EU-funded technical assistance project supporting the Ministry of Energy in Azerbaijan to build in-house capacity for long-term energy planning and developing a new energy system model for Azerbaijan, Mr. Rocco De Miglio (*E4SMA*) was invited to give a presentation and share the experience of the ongoing PARIS REINFORCE project with a focus on the Central Asia Caspian - Azerbaijani modelling work and its co-creation process.

5.12.16 The I2AM PARIS platform at the 12th International Conference on Information, Intelligence, Systems and Applications

During this year's International Conference on Information, Intelligence, Systems and Applications (IISA 2021), the I2AM PARIS platform was presented in an invited session on "Big Data Analytics in the Energy Sector", in Chania, Greece, on July 12-14, 2021.[215]

Although the platform has been launched live, as well as further co-designed with stakeholders, during the 1st PARIS REINFORCE Stakeholder Council Dialogue, in Brussels, in November 2019, has been used as a vessel for modelling activities in PARIS REINFORCE and among the broader modelling community ever since, and referred to in the literature (e.g., Nikas, Gambhir et al., 2021; Giarola et al., 2021; Nikas, Elia et al., 2021; Marinakis et al., 2021), this is the first time it is presented in detail in academia. During the presentation by Dr. Alexandros Nikas from NTUA (on behalf of the consortium), a video discussing PARIS REINFORCE and showcasing the I2AM PARIS platform was also presented to attendees.

5.12.17 PARIS REINFORCE in the 31st European Conference on Operational Research

EURO conferences are the largest European conference for Operational Research and Management Science with more than 40 years of history since the first edition in 1975 in Brussels. It is organised by EURO – the European Association of Operational Research Society. This year, EURO 2021 was organised

[214] http://paris-reinforce.eu/news-events/interventions/modelling-capacity-building-azerbaijan-long-term-energy-strategy
[215] http://paris-reinforce.eu/news-events/interventions/i2am-paris-platform-12th-international-conference-information

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by HELORS (the Hellenic Operational Research Society) in Athens, Greece, on July 11-14, 2021.[216]

The PARIS REINFORCE project participated in the conference, organising its own session on "Addressing Uncertainty in Climate Policy" (chaired by Dr. Alexandros Nikas, from NTUA), during the Stream "OR in Climate Policy & Planning" (chaired by Prof. Haris Doukas, from NTUA). In this session, four PARIS REINFORCE studies were presented

- Karamaneas, A., Campagnolo, L., Koasidis, K., Saulo, M., Tsipouridis, I., Gambhir, A., Van de Ven, D.J., Lengyel, Z., McWilliams, B., Nikas, A., Doukas, H. (2021). Interlinking climate action and sustainable development: a fuzzy linguistic group decision making framework. 31st European Conference on Operational Research, July 11-14, 2021, Athens, Greece.
- Kanellou, E., Koasidis, K., Daniil, V., Nikas, A., Doukas, H. (2021). A multiple-criteria evaluation framework for seaport sustainability considering non-homogeneous variables and uncertainty: the case of Piraeus, Greece. 31st European Conference on Operational Research, July 11-14, 2021, Athens, Greece.
- Koutsellis, T., Koasidis, K., Nikas, A., Doukas, H. (2021). Exploring the impact of analyst's choices in fuzzy cognitive maps for climate policy applications. 31st European Conference on Operational Research, July 11-14, 2021, Athens, Greece.
- Nikas, A., Forouli, A., Van de Ven, D.J., Koasidis, K., Gambhir, A., Koutsellis, T., Doukas, H. (2021). Identifying optimal COVID-19 recovery packages: a robust IAM-portfolio analysis of renewable energy technological subsidisation. 31st European Conference on Operational Research, July 11-14, 2021, Athens, Greece.

5.12.18 PARIS REINFORCE at COP26

With fellow H2020 research projects, PARIS REINFORCE co-organised an event, as part of the European Union's side events at the COP26 summit, in Glasgow, on Monday, 01 November 2021.[217]

Projects NAVIGATE - represented by Potsdam Institute for Climate Impact Research (PIK), PARIS REINFORCE - represented by National Technical University of Athens (NTUA), LOCOMOTION - represented by European Environmental Bureau (EEB), and VERIFY - represented by Laboratoire des Sciences du Climat et de l'Environnement (LSCE) together organised the virtual side event "Towards an emission neutral society: challenges and opportunities".

The projects discussed challenges and opportunities on the way to an emission neutral society. These include the implications of the EU recovery funds on emissions and employment, social and resource implications of a fair renewable energy transition, transformative mitigation measures on the supply and demand side, and the need for independent verification of country emissions accounts.

The Project Coordinator, Assoc. Prof. Haris Doukas (NTUA), represented PARIS REINFORCE.

[216] http://paris-reinforce.eu/news-events/interventions/paris-reinforce-31st-european-conference-operational-research

[217] http://paris-reinforce.eu/news-events/project-news-events/paris-reinforce-cop26-towards-emission-neutral-society-challenges

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5.13 Infographics

Below, we list all infographics published in the project, including two interactive ones in I²AM PARIS and a series of infographics[218] on model coverage and socio-technical innovation system maps on the website (fifteen in total).

[218] https://paris-reinforce.eu/communication/infographics

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5.13.1 Interactive infographic 1: Dynamic documentation of models

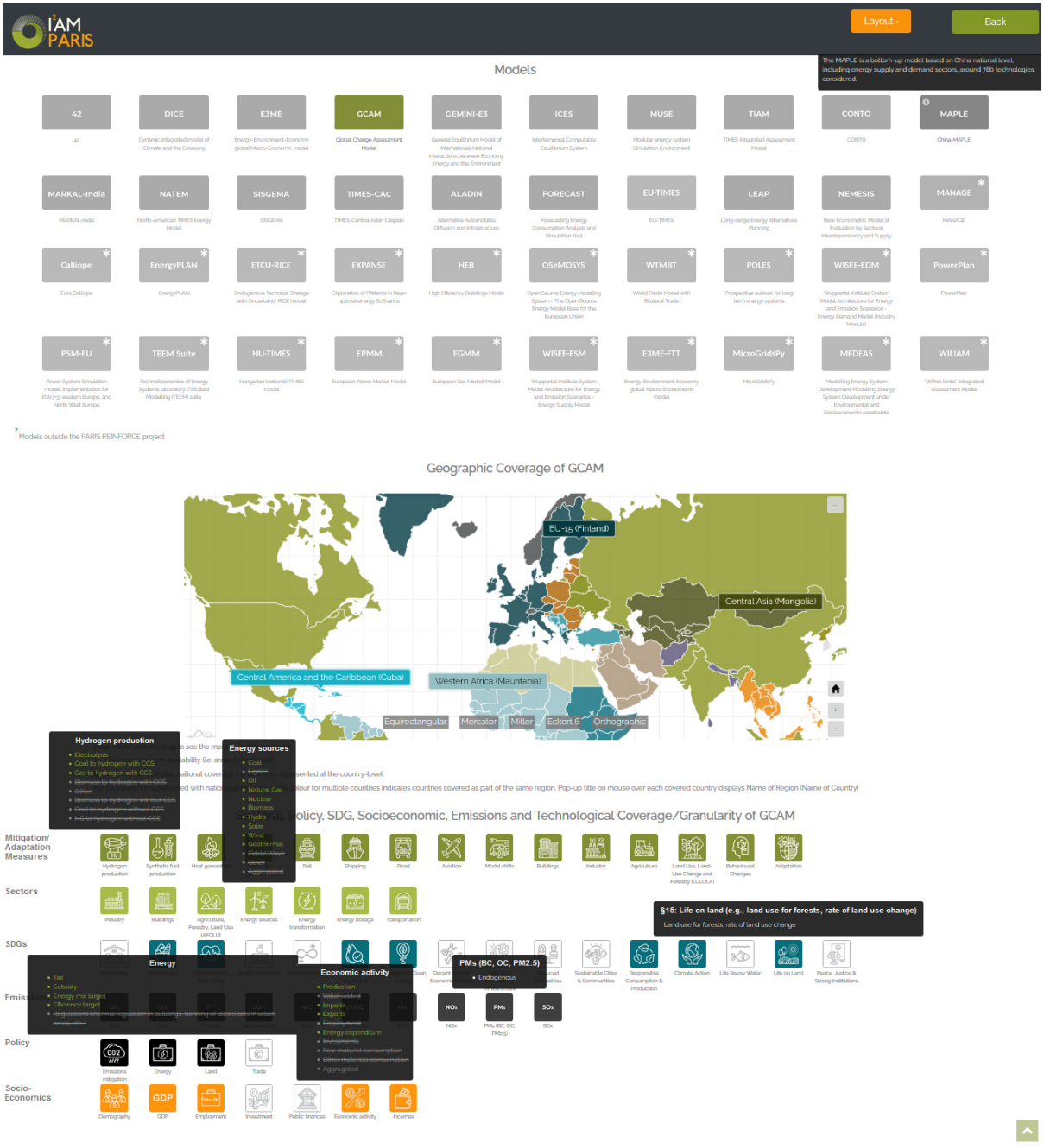

Figure 33 Interactive infographic 1 – dynamic documentation of each PARIS REINFORCE model

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5.13.2 Interactive infographic 2: Customisable variable harmonisation heatmap

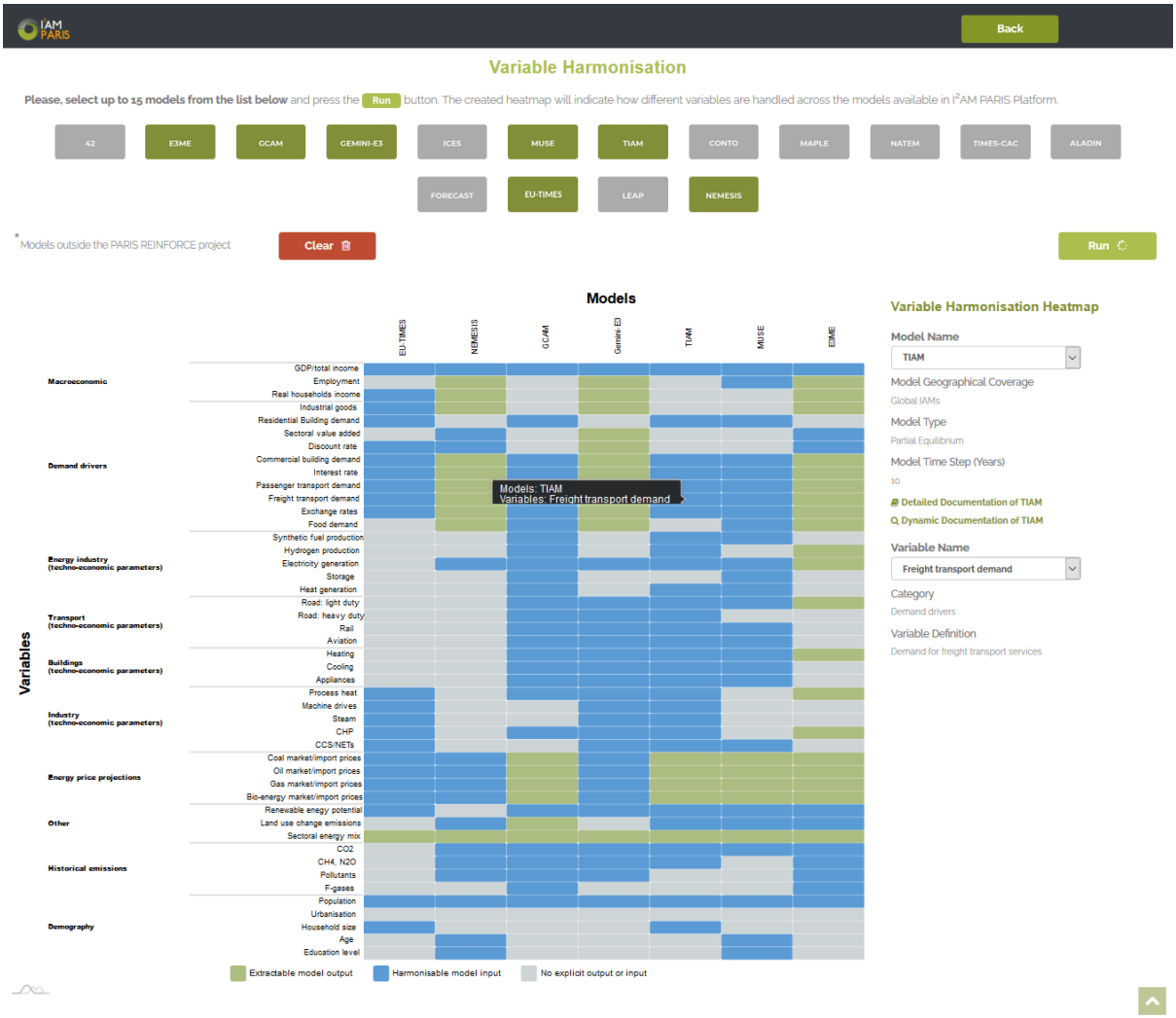

Figure 34 Interactive infographic 2 – Customisable variable harmonisation heatmap across all PARIS REINFORCE models

It should be noted that a workspace-specific, more detailed variable harmonisation heatmap is provided for all participating models in the results workspace of each model inter-comparison documented in I²AM PARIS.

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5.13.3 Infographic 1: Representation of socioeconomics in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how socioeconomic variables are represented in climate-economy and energy quantitative system models, and illustrates in a user-friendly way how each socioeconomic variable is represented in the PARIS REINFORCE modelling suite.

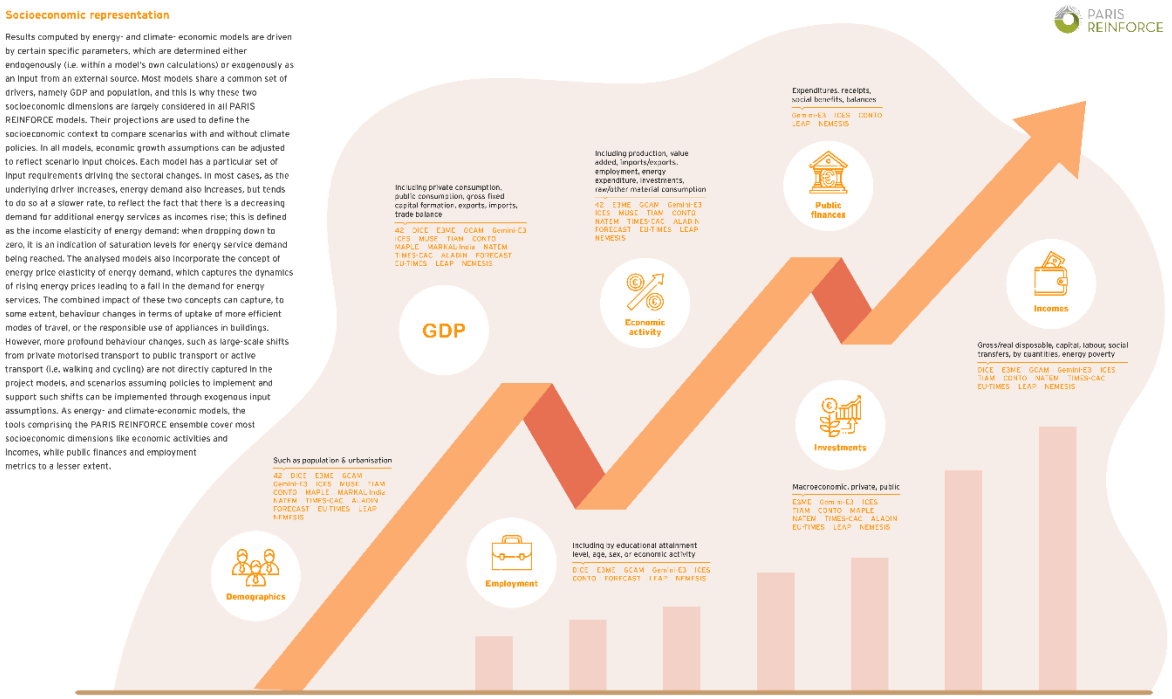

Figure 35 Infographic 1 – Socioeconomic representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

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5.13.4 Infographic 2: Representation of sectors in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how economic sectors are represented in climate-economy and energy quantitative system models, and illustrates in a user-friendly way to what extent each sector is represented in the PARIS REINFORCE modelling suite.

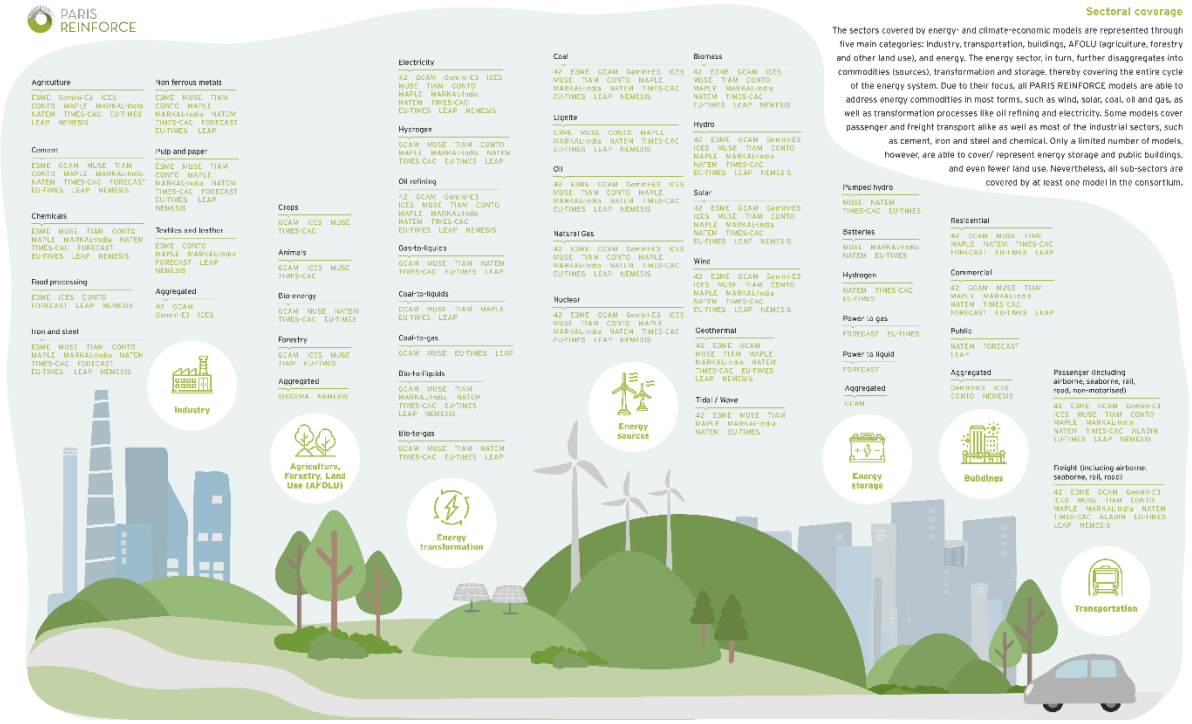

Figure 36 Infographic 2 – Sector representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.5 Infographic 3: Representation of policies in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how different policy instruments are represented in climate-economy and energy quantitative system models, and illustrates in a user-friendly way to what extent each type of policy is represented in the PARIS REINFORCE modelling suite.

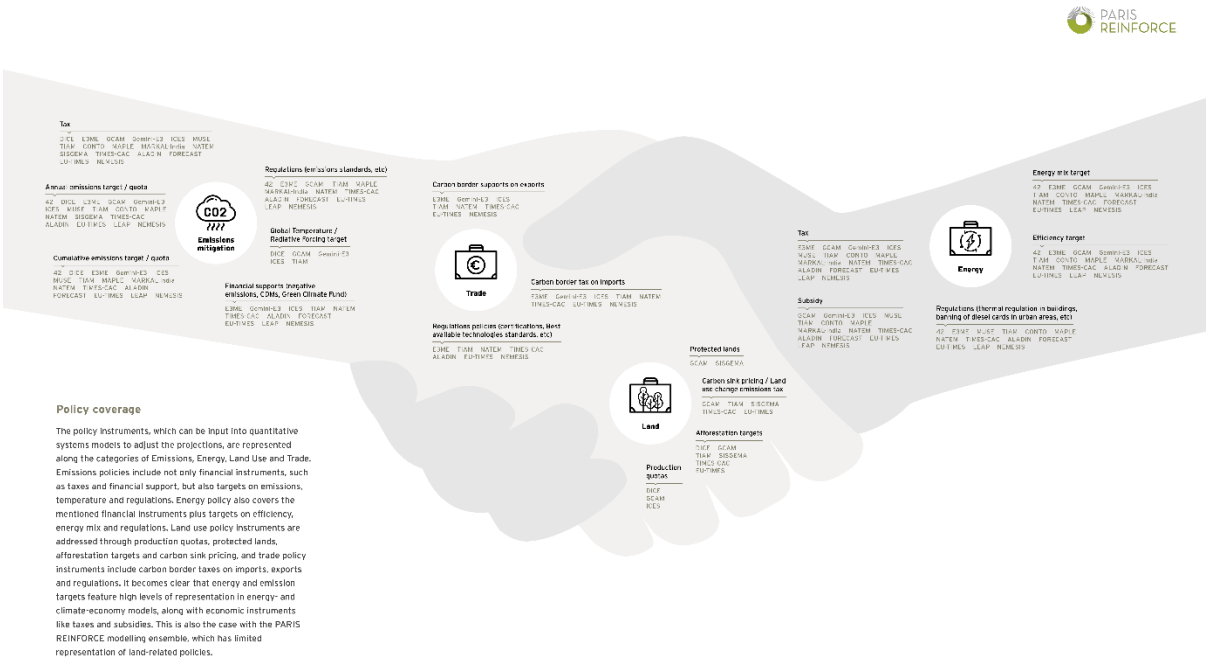

Figure 37 Infographic 3 – Policy representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.6 Infographic 4: Representation of mitigation and adaptation measures in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how different mitigation and adaptation technologies are represented in climate-economy and energy quantitative system models, and illustrates in a user-friendly way to what extent each type of technological measure is represented in the PARIS REINFORCE modelling suite.

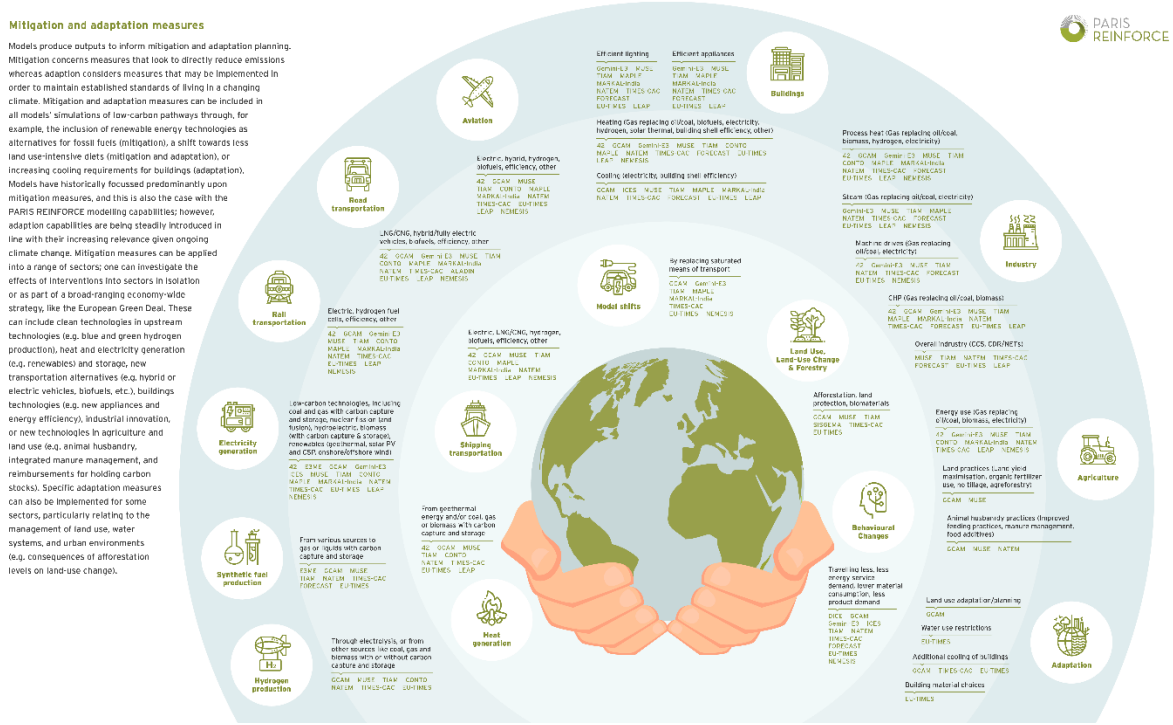

Figure 38 Infographic 4 – Mitigation and adaptation technological representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

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5.13.7 Infographic 5: Representation of emissions in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how Greenhouse Gas (GHG) emissions and other pollutants are covered in climate-economy and energy quantitative system models, and illustrates in a user-friendly way to what extent each emission is represented in the PARIS REINFORCE modelling suite.

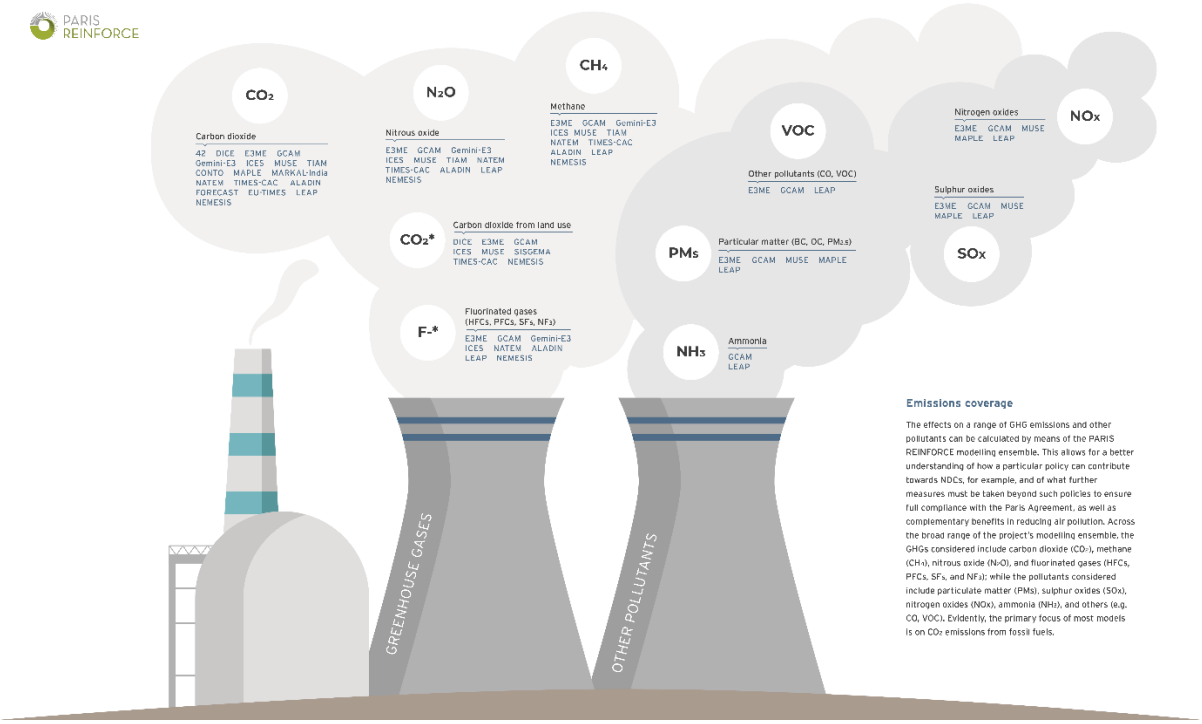

Figure 39 Infographic 5 – Emissions representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

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5.13.8 Infographic 6: Representation of Sustainable Development Goals in PARIS REINFORCE models

This infographic, published in the PARIS REINFORCE website, explains in non-technical detail how indicators relevant to Sustainable Development Goals (SDGs) are represented in climate-economy and energy quantitative system models, and illustrates in a user-friendly way to what extent an SDG is represented in the PARIS REINFORCE modelling suite and what specific indicators can be extracted in this respect.

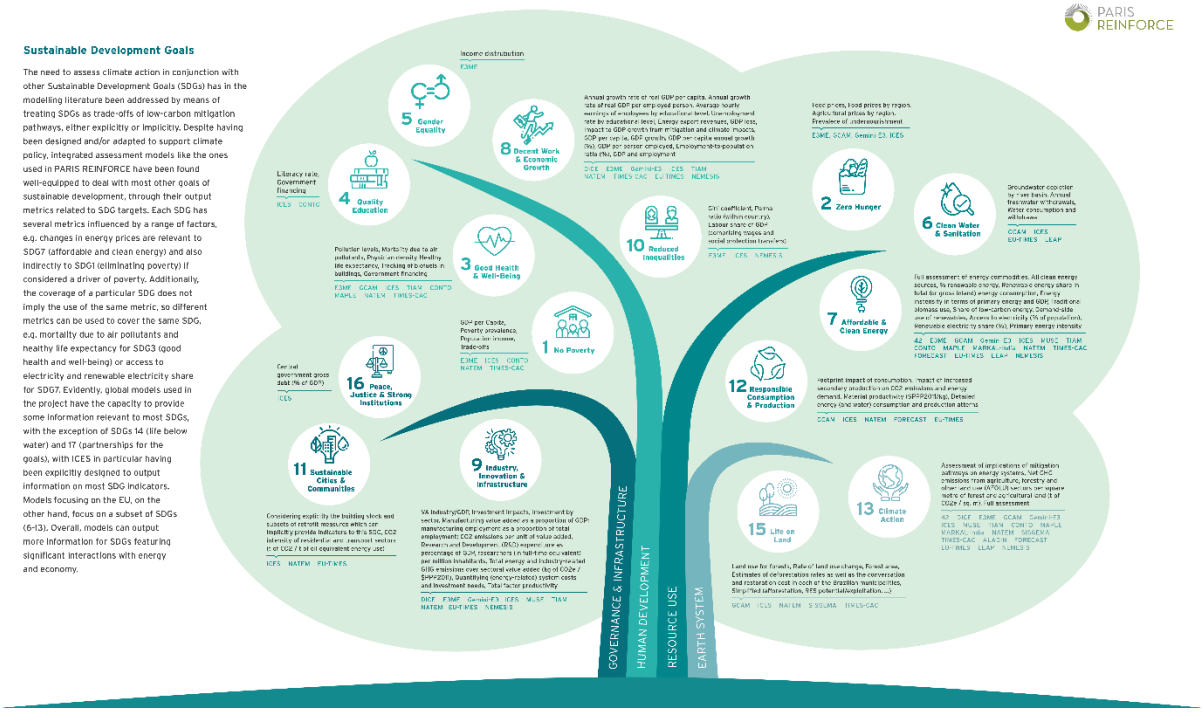

Figure 40 Infographic 6 – SDG representation in quantitative systems models and the PARIS REINFORCE modelling ensemble

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.9 Infographic 7: Sustainable and socially just transition to a post-lignite era in Greece: a multi-level perspective

This infographic, published in the PARIS REINFORCE website, builds upon the Multi-Level Perspective framework and further focuses on the phase-out of the dominant fossil fuel in the Greek electricity mix, rather than solely exploring the phase-in of new technologies. By delving into the landscape that established lignite as the mainstream energy resource in Greece, as well as the factors sustaining its dominance despite niche technologies and innovations challenging the regime, it discusses how the envisaged decarbonisation can be socially just and effective across multiple sustainability dimensions.

The infographic is based on:

Nikas, A., Neofytou, H., Karamaneas, A., Koasidis, K., & Psarras, J. (2020). Sustainable and socially just transition to a post-lignite era in Greece: a multi-level perspective. *Energy Sources, Part B: Economics, Planning, and Policy*, in press.

https://doi.org/10.1080/15567249.2020.1769773

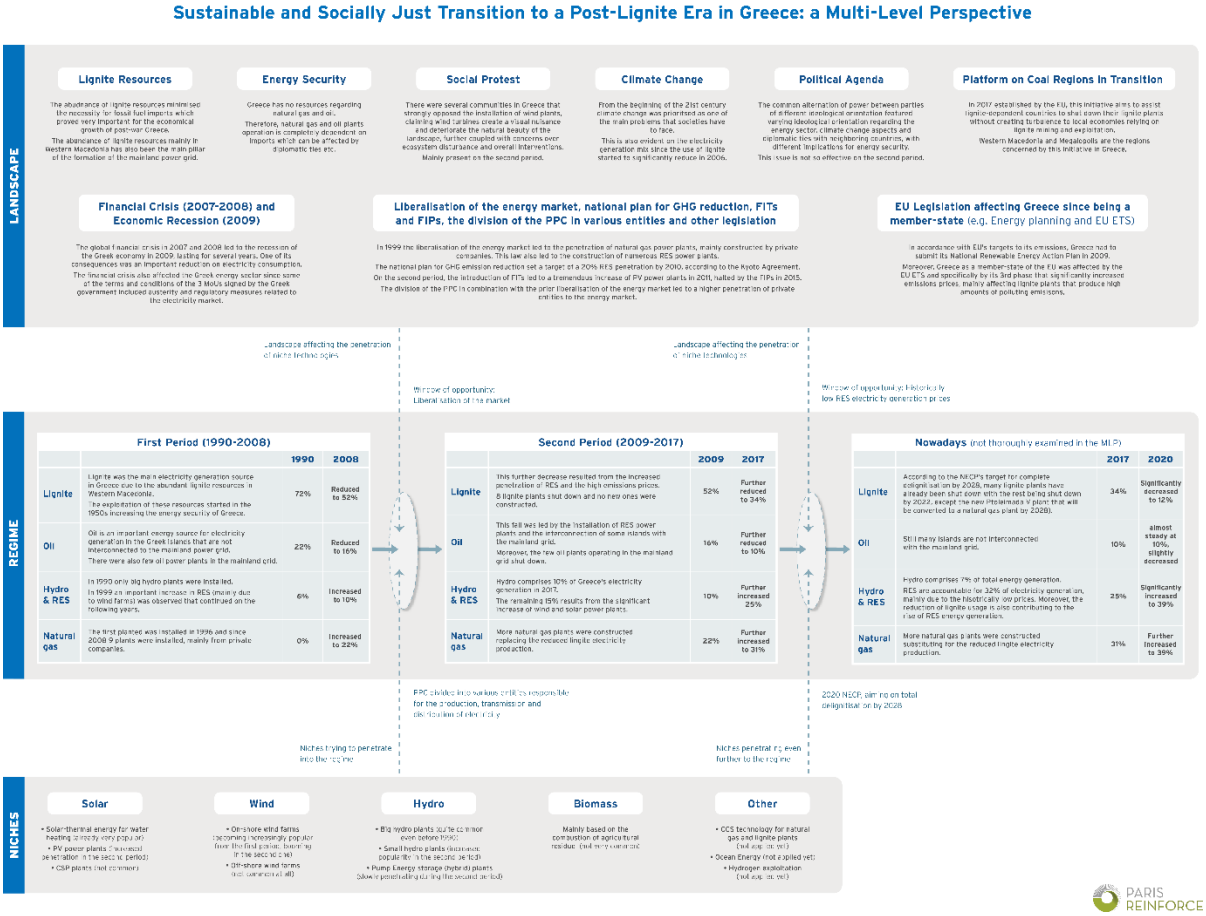

Figure 41 Infographic 7 – Sustainable and socially just transition to a post-lignite era in Greece: a multi-level perspective

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5.13.10 Infographic 8: Many Miles to Paris: A Sectoral Innovation System Analysis of the Transport Sector in Norway in Light of the Paris Agreement

This infographic, based on the Sectoral Innovation Systems approach, published in the PARIS REINFORCE website, attempts to identify the elements enabling Norway to become one of the leaders in the diffusion of electric vehicles. By utilising the System Failure framework, bottlenecks hindering the decarbonisation of the transport system are identified. Results indicate that the effectiveness of Norway's policy is exaggerated and has led to recent spillover effects towards green shipping. Insights into the effectiveness of previously implemented policies and the evolution of the sectoral system can help draw lessons towards sustainable transport.

The infographic is based on:

Koasidis, K., Karamaneas, A., Nikas, A., Neofytou, H., Hermansen, E. A., Vaillancourt, K., & Doukas, H. (2020). Many miles to Paris: A sectoral innovation system analysis of the transport sector in norway and canada in light of the Paris Agreement. *Sustainability*, *12*(14), 5832.

https://doi.org/10.3390/su12145832

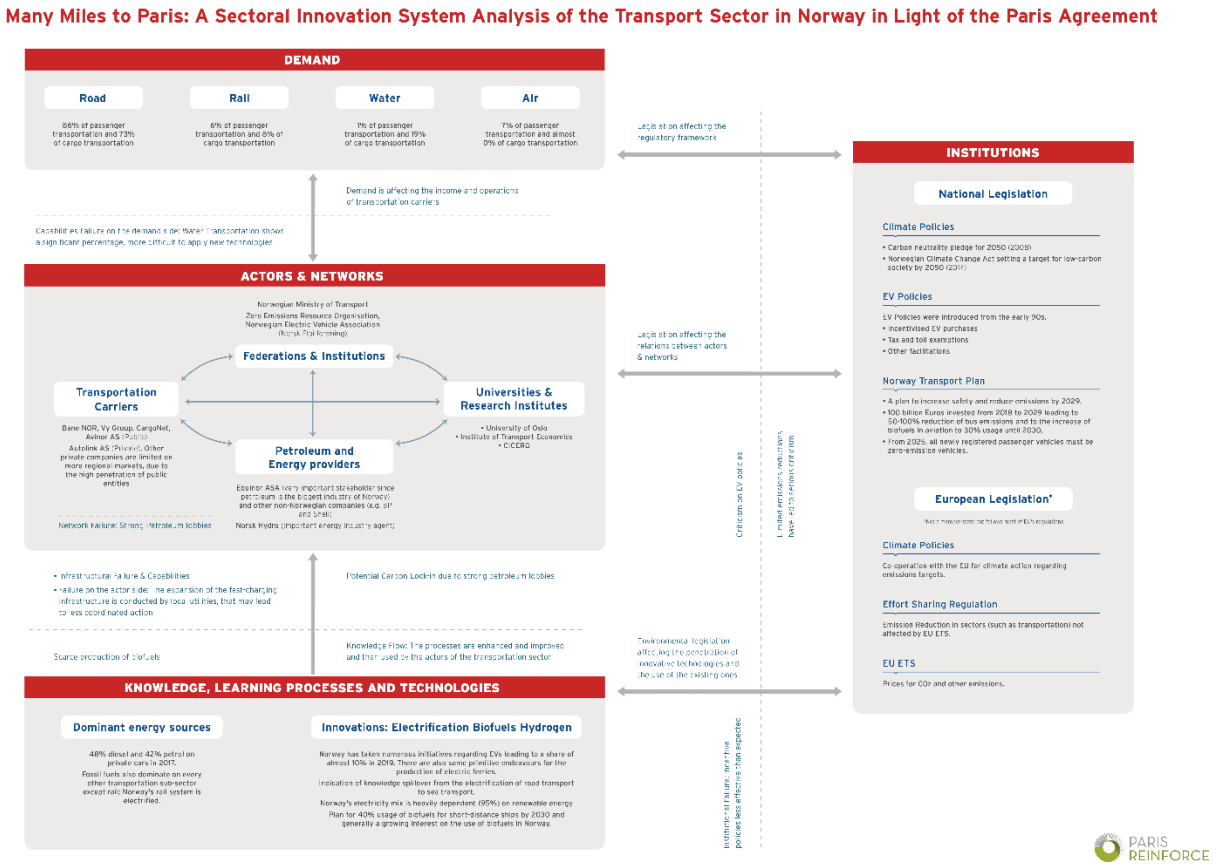

Figure 42 Infographic 8 – Many Miles to Paris: A Sectoral Innovation System Analysis of the Transport Sector in Norway in Light of the Paris Agreement

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.11 Infographic 9: Many Miles to Paris: A Sectoral Innovation System Analysis of the Transport Sector in Canada in Light of the Paris Agreement

This infographic, based on the Sectoral Innovation Systems approach, published in the PARIS REINFORCE website, attempts to identify the factors pacing down progress in the diffusion of electric vehicles in Canada. By utilising the System Failure framework, bottlenecks hindering the decarbonisation of the transport system are identified. The activity of oil companies, regional and federal legislative disputes in Canada and the lack of sincere efforts from system actors to address challenges lead to non-drastic greenhouse gas emission reductions, despite significant policy efforts. Insights into the effectiveness of previously implemented policies and the evolution of the sectoral system can help draw lessons towards sustainable transport.

The infographic is based on:

Koasidis, K., Karamaneas, A., Nikas, A., Neofytou, H., Hermansen, E. A., Vaillancourt, K., & Doukas, H. (2020). Many miles to Paris: A sectoral innovation system analysis of the transport sector in norway and canada in light of the Paris Agreement. *Sustainability*, *12*(14), 5832.

https://doi.org/10.3390/su12145832

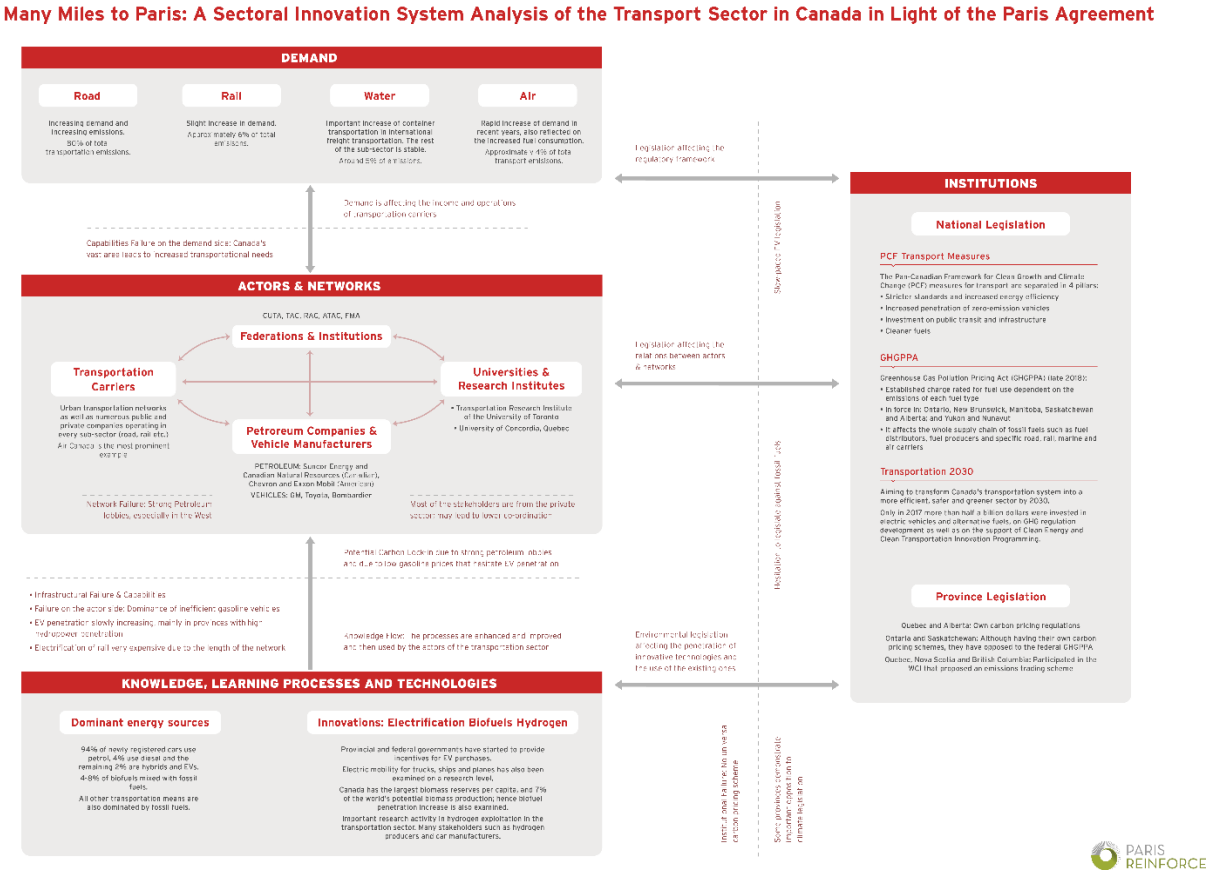

Figure 43 Infographic 9 – Many Miles to Paris: A Sectoral Innovation System Analysis of the Transport Sector in Canada in Light of the Paris Agreement

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.12 Infographic 10: The UK Low-Carbon Industry Transition from a Sectoral Innovation and System Failures Perspective

This infographic, published in the PARIS REINFORCE website, reviews the energy-intensive iron and steel, cement and chemicals industries of the United Kingdom, a major emitting country with significant activity. Based on the Sectoral Innovation Systems and the Systems Failure framework, it aims to capture existing and potential drivers of or barriers to diffusion of sustainable industrial technologies and extract implications for policy. Results indicate that actor structures and inconsistent policies have limited low-carbon innovation. A key to UK industrial decarbonisation is to drive innovation and investment in the context of an industry in decline and in light of Brexit-related uncertainty.

The infographic is based on:

Koasidis, K., Nikas, A., Neofytou, H., Karamaneas, A., Gambhir, A., Wachsmuth, J., & Doukas, H. (2020). The UK and German Low-Carbon Industry Transitions from a Sectoral Innovation and System Failures Perspective. *Energies*, *13*(19), 4994.

https://doi.org/10.3390/en13194994

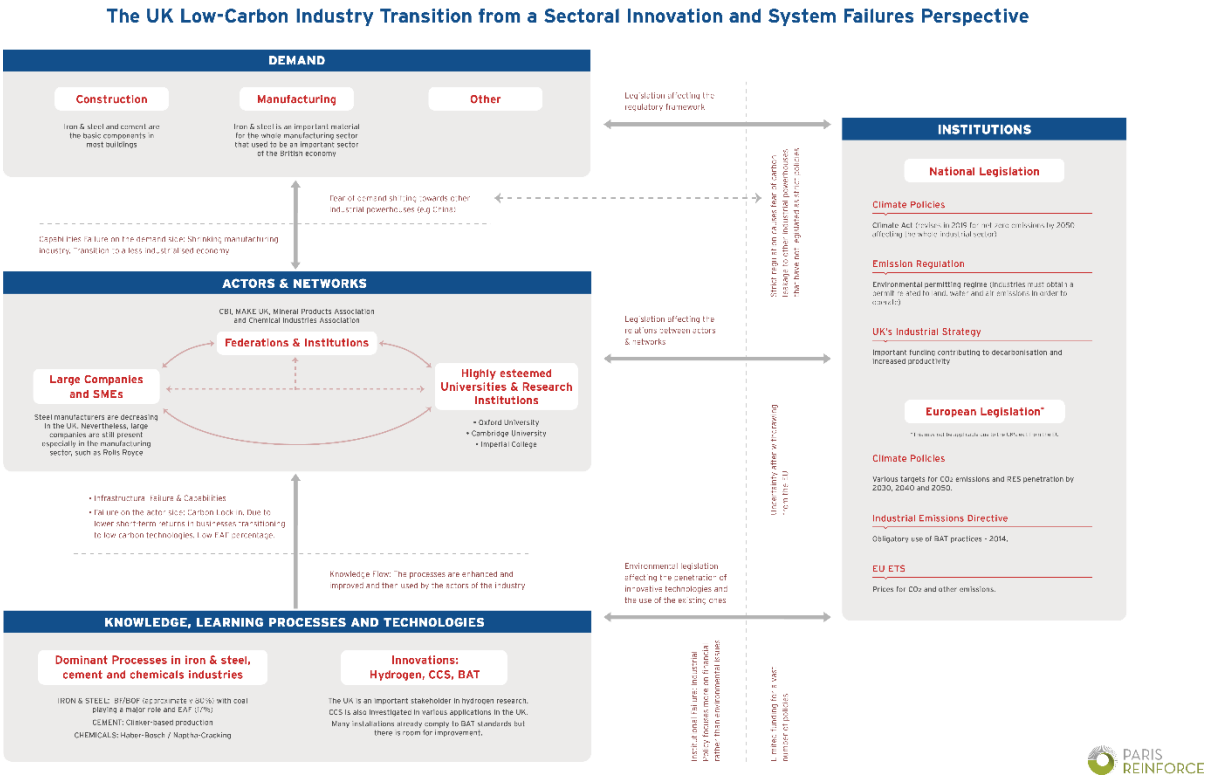

Figure 44 Infographic 10 – The UK Low-Carbon Industry Transition from a Sectoral Innovation and System Failures Perspective

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5.13.13 Infographic 11: The German Low-Carbon Industry Transition from a Sectoral Innovation and System Failures Perspective

This infographic, published in the PARIS REINFORCE website, reviews the energy-intensive iron and steel, cement and chemicals industries of Germany, a major emitting country with significant activity. Based on the Sectoral Innovation Systems and the Systems Failure framework, it aims to capture existing and potential drivers of or barriers to diffusion of sustainable industrial technologies and extract implications for policy. Results indicate that actor structures and inconsistent policies have limited low-carbon innovation. A critical factor for the successful decarbonisation of German industry lies in overcoming lobbying and resistance to technological innovation caused by strong networks.

The infographic is based on:

Koasidis, K., Nikas, A., Neofytou, H., Karamaneas, A., Gambhir, A., Wachsmuth, J., & Doukas, H. (2020). The UK and German Low-Carbon Industry Transitions from a Sectoral Innovation and System Failures Perspective. *Energies*, *13*(19), 4994.

https://doi.org/10.3390/en13194994

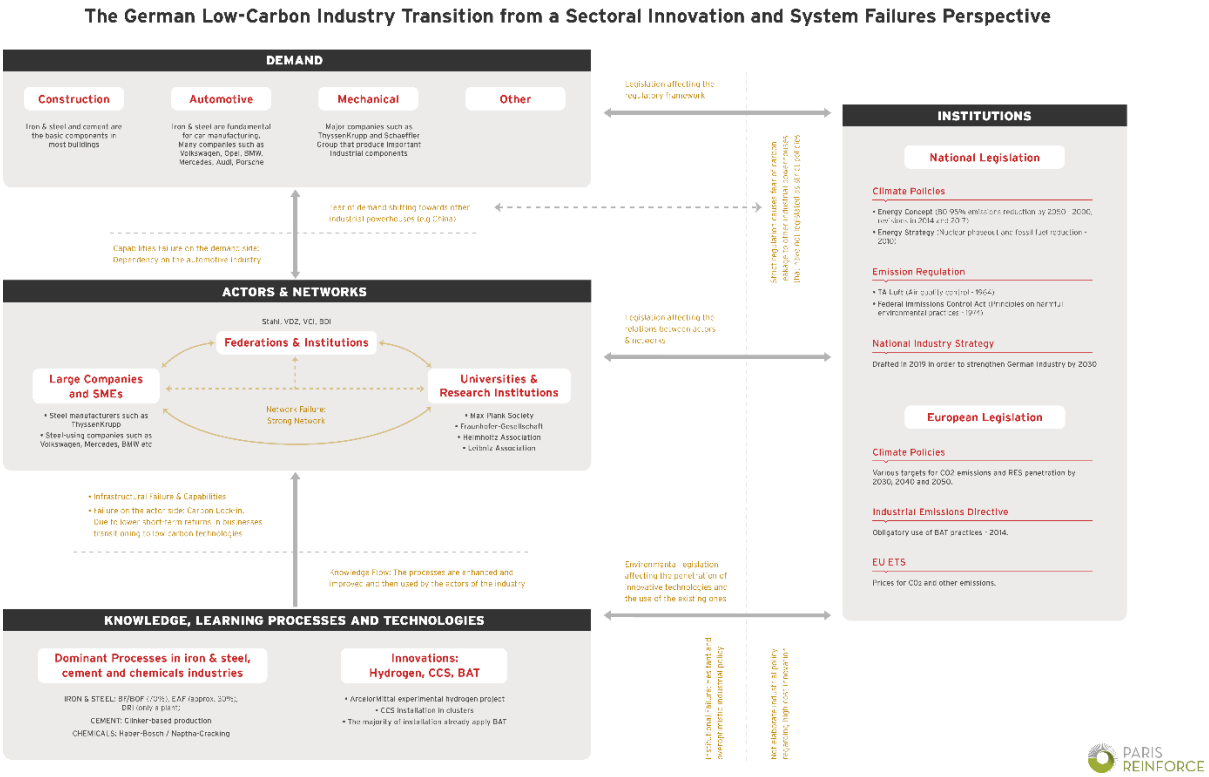

Figure 45 Infographic 11 – The German Low-Carbon Industry Transition from a Sectoral Innovation and System Failures Perspective

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5.13.14 Infographic 12: A Multi-Level Perspective of Brazil's Transport Decarbonisation Potential, Focusing on the Biodiesel Technological Innovation System

This infographic, published in the PARIS REINFORCE website, reviews the transport sector of Brazil and the emergence of biodiesel. Using the MLP and TIS frameworks, it sheds light on the historical evolution of the dominant regime of the Brazilian transport sector and helps understand how the dependency of fossil fuels was shaped in line with continuous pressures from oil, economic, and institutional crises from the landscape. It also highlights the emergence of the biodiesel technological system, its interactions with other technologies, and the progress that allowed it to break through from a niche and become part of the regime.

The infographic is based on: Nikas, A., Koasidis, K., Koberle, A.C., Kourtesi, G., & Doukas, H. (2021). A comparative study of biodiesel in Brazil and Argentina: an integrated systems of innovation perspective. Renewable & Sustainable Energy Reviews, in revision.

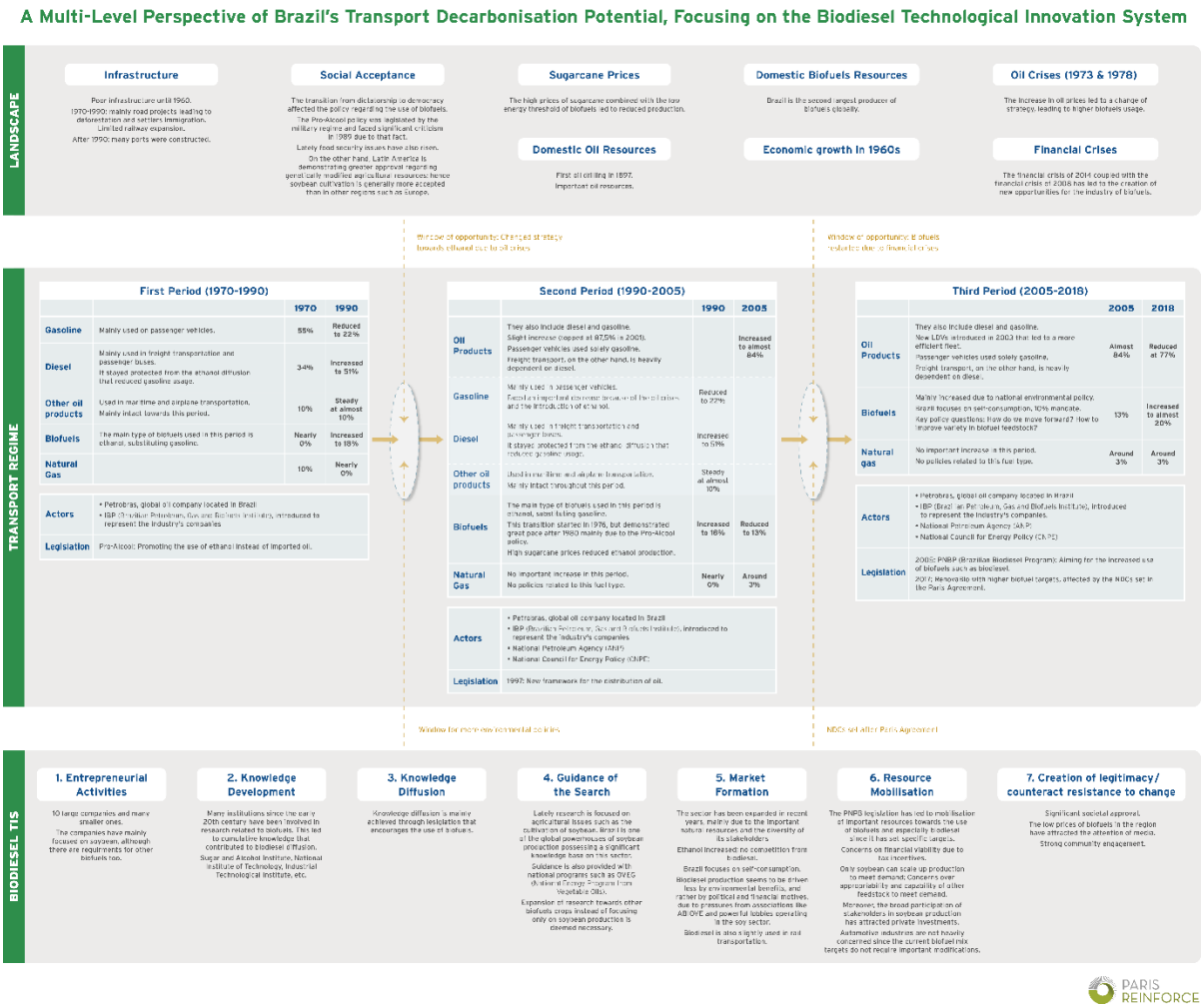

Figure 46 Infographic 12 - A Multi-Level Perspective of Brazil's Transport Decarbonisation Potential, Focusing on the Biodiesel Technological Innovation System

The PARIS REINFORCE project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 820846.

5.13.15 Infographic 13: A Multi-Level Perspective of Argentina's Transport Decarbonisation Potential, Focusing on the Biodiesel Technological Innovation System

This infographic, published in the PARIS REINFORCE website, reviews the transport sector of Argentina and the emergence of biodiesel. Using the MLP and TIS frameworks, it sheds light on the historical evolution of the dominant regime of the Argentinian transport sector and helps understand how the dependency of fossil fuels was shaped in line with continuous pressures from oil, economic, and institutional crises from the landscape. It also highlights the emergence of the biodiesel technological system, its interactions with other technologies, and the progress that allowed it to break through from a niche and become part of the regime.

The infographic is based on: Nikas, A., Koasidis, K., Koberle, A.C., Kourtesi, G., & Doukas, H. (2021). A comparative study of biodiesel in Brazil and Argentina: an integrated systems of innovation perspective. Renewable & Sustainable Energy Reviews, in revision.

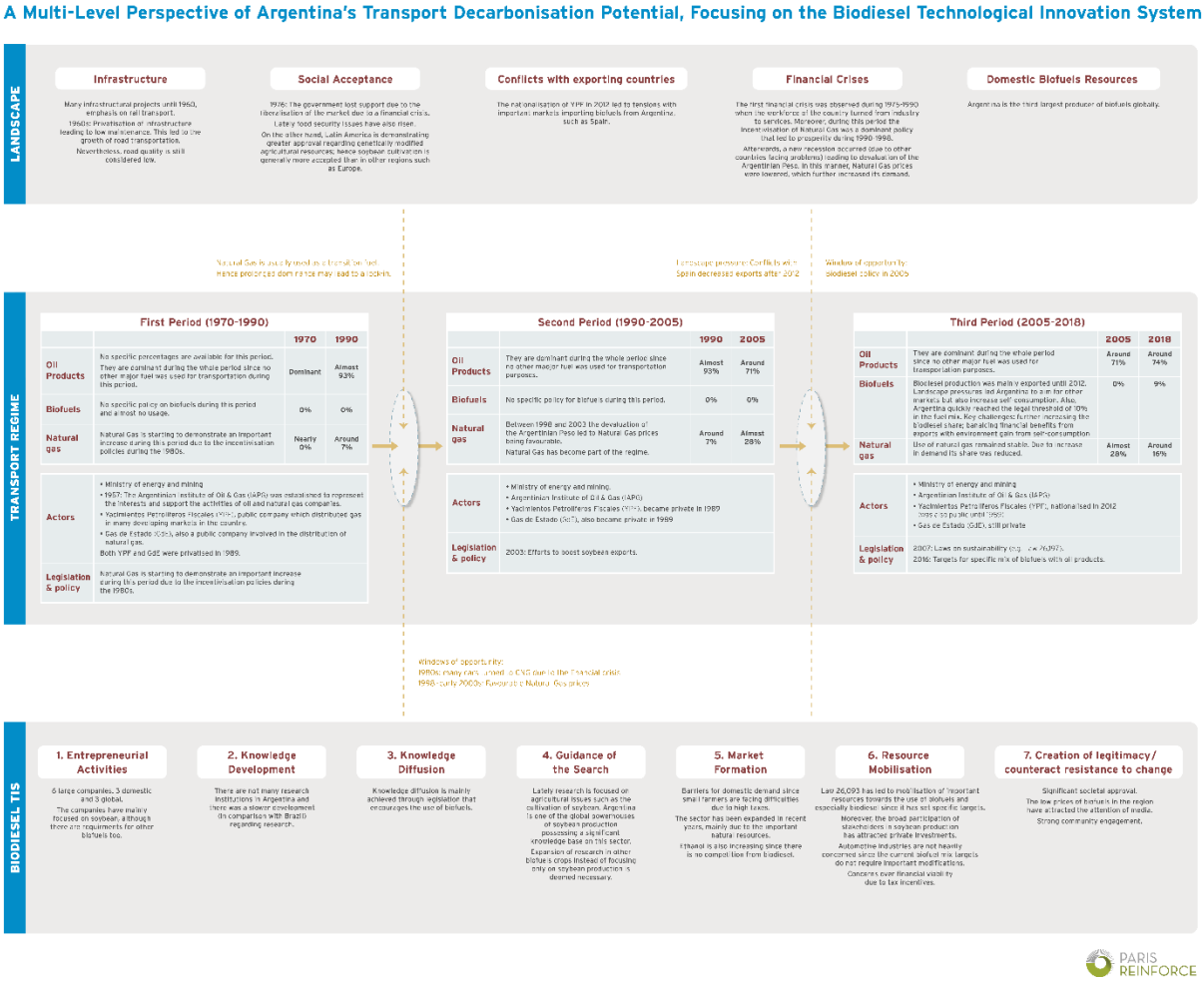

Figure 47 Infographic 13: A Multi-Level Perspective of Argentina's Transport Decarbonisation Potential, Focusing on the Biodiesel Technological Innovation System

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5.14 The I²AM PARIS platform

The I²AM PARIS platform is an open-access, data exchange platform that hosts the detailed documentation and analyses carried out by the PARIS REINFORCE integrated assessment and energy system models. I²AM PARIS[219] seeks to bridge the gap between scientists and stakeholders, enabling modelling teams to communicate with one another and stakeholders to interact with modelling assumptions, scenarios, and results in an informative way and understand which decarbonisation pathways are the most relevant and realistic. Ultimately, the platform aims to enhance the legitimacy of the scientific processes and improve the transparency of the employed methods, models, and tools.

[219] https://i2am-paris.eu/

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6 Next Steps

In the following subsections, the CDE activities envisaged for the final year of the project are outlined. In particular, a detailed promotional campaign according to each task has been structured, while a dedicated strategy to address the impacts of the COVID-19 pandemic has been developed.

6.1 Website

All deliverables will be made public during the final project year, including those to be submitted by the end of the project as well as those that are being kept confidential due to their scientific publication potential.

6.2 Social media

In the upcoming period, the promotional campaign in social media will be more intense in order to increase both the project's visibility in social media and the traffic to the website. The campaign will include 3-6 posts per week in the project's social media accounts. Furthermore, the ResearchGate platform will be used extensively at this stage of the project since several scientific publications have already been published.

6.3 Online Media

The presence of PARIS REINFORCE in online media will be increased in the upcoming period. This will lead to an increased traffic to the website, as well as an optimisation of the website's SEO since there will be more backlinking to the website. These articles will include topics related to PARIS REINFORCE deliverables that are interesting and relevant to the wider public, including the end results of our modelling/policy analyses.

6.4 Organisation of Workshops

The coronavirus pandemic significantly affected Task 8.5 "Organisation of conferences and policy events", since organisation of physical events is still, in 2021, either not allowed or not safe in many countries, and international travel has been severely impacted. Moreover, it remains unclear how this situation will evolve in 2022, which is the final project year for PARIS REINFORCE. The Consortium assumes that project activities are safer to stay within the digital/virtual domain until the end of the project (November 2022), as one form or another of physical distancing and travel conditions imposed by countries and institutions are likely to be in effect for a substantial period. Shortly after the outbreak of COVID-19, the PARIS REINFORCE consortium embarked on an approach of converting all physical events to digital/virtual in a way that had the least possible impact on deliverables, whilst reflecting on the different nature of results achieved in-person and at web-based events. For example, longer physical events were replaced by a series of shorter, interconnected web events.

During the final year of the project, the second series of national workshops will therefore take place online, in which stakeholders will be informed on the second round of global analyses and inter-comparisons, and will support the identification of new pathway choices, change their preferences where necessary, and highlight the requirements for further pathway options.

In the final EU conference, stakeholders will be informed on the revised global, regional, and national pathways, including aggregate emissions, temperature changes and impacts, adaptation requirements,

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and clear policy implications, as well as on differences among IAM results and between the two inter-comparisons.

6.5 Participation in external events

With COVID-19 restrictions being milder in 2022, participation in conferences will be encouraged. The project already counts 16 conference presentations, but it is envisaged to also contribute at least 6-8 presentations in the 14th Annual Meeting of the IAMC, plus more in the IAMC meeting of next year, as well as in meetings of IEA-ETSAP. Other conferences will also be considered.

6.6 PARIS REINFORCE Publications

6.6.1 Scientific Publications

On top of the project's 50 scientific publications, as of November 2021, about 20-30 more scientific publications are envisaged to be published (or submitted for review) in the last project year.

6.6.2 Commentaries and Policy Briefs

In the upcoming final year of the project, project partners will increase the publication of commentaries and policy briefs. In particular, the focus will be on commentaries on current affairs. Policy briefs are expected to be developed at the final year of the project's implementation, following key modelling outputs. It is envisaged that at least 2 more commentaries and 3 policy briefs will be published in the upcoming year.

6.7 Newsletters & Press Releases

The circulation of project newsletters and press releases will be enhanced in the upcoming year in order to increase the project's visibility, the website's traffic, the participation in the Stakeholder Council and the attendance of events organised by PARIS REINFORCE. It is envisaged that a total of 6 newsletters will be circulated in the upcoming year, as well as 6 press releases.

Table 4 Scheduled CDE Activities

Activity	Number	Timing (M/Y)	Objective
Social media campaign	3-6 posts per week	Continually	Increase social media visibility, increase traffic to website
Articles on Online Media	5	1/22, 3/22, 5/22, 8/22, 9/22,	Increase website traffic and SEO
Organisation of Workshops	6-10	December 2021 – November 2022	Gather stakeholders' perceptions, suggestions, and preferences

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Activity	Number	Timing (M/Y)	Objective
Participation in External Events	10-15 conference presentations	Continually	Increase project's visibility, website traffic, and Stakeholder Council recruitment
Scientific Publications	20-30	Ad hoc	Increase project's visibility and impact of scientific outputs
Commentaries, Policy Briefs	3 commentaries 3 policy briefs	Ad hoc	Increase project's visibility, disseminate results, enhance exploitation
Newsletters and Press Releases	6 newsletters 6 press releases	Continually (one each month)	Increase the project's visibility, the website's traffic, the participation in the Stakeholder Council and the attendance to PARIS REINFORCE events

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