



DECIPHER

Holistic decision-making for climate & environment

Guidance for improved policy design and evaluation





LEGAL DISCLAIMER

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101056898.



**Funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the European Climate, Infrastructure and Environment Executive Agency under conditions.

© This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) (CC BY 4.0).



DOCUMENT INFORMATION

Deliverable title	Guidance for methodologically improved and transparent public policy design and evaluation
Dissemination level	Public
Submission deadline	31/07/2025
Version number	3
Authors	Ugne Keliauskaite (Bruegel), Rutger Broer (Bruegel)
Reviewers	Georg Zachman (Bruegel), Nihit Goyal (TU Delft), Chris Thoung (Cambridge Econometrics)
Scope of the document	Guidelines for methodologically improved and transparent public policy design and evaluation



Table of contents

1. Introduction	5
2. Principles and elements of effective stakeholder engagement – lessons from DECIPHER	5
3. Methods for Empirical Policy Evaluation (WP2)	8
4. Advancing Coastal Wetlands as Nature-Based Solution (WP3)	9
5. Advances in Economic Modelling: Promise and Pitfalls (WP4)	11
6. Risk, Resilience, and Opportunity Framework (WP5)	12
7. Applying the Framework: Real-World Demonstration (WP6)	13
8. Communication & Dissemination (WP7)	15
9. Cross-cutting lessons	16
10. Recommendations for the European Commission	17
11. Conclusion	17
12. References	18



1. Introduction

Integrating economic methods and tools into climate and environmental decision-making is necessary for crafting effective policies. Although the need for multi-disciplinary and holistic approaches to tackle climate, biodiversity, and environmental challenges is increasingly being recognised, a significant share of research and decision-making still focuses on either economic, environmental, biodiversity, or climate problems. This highlights the need for tailored and targeted stakeholder engagement methods to engage relevant experts during decision-making processes. DECIPHER has been developing a holistic approach to tackling problems exactly at this nexus. Consequently, engaging stakeholders in DECIPHER has been essential to ensure that climate modelling outputs are useful for policymakers designing and implementing climate, biodiversity, and environmental policy.

This report has a two-fold purpose: 1) highlighting what relevant insights were obtained for DECIPHER and how the content of the modelling work implemented in DECIPHER has utility for decision-making, and 2) general lessons for engaging stakeholders in research and decision-making processes.

The quality of the stakeholder contributions primarily depends on the quality of the inputs and design of the stakeholder engagement process. This document provides guidance on improving the methods and transparency of engaging stakeholders for research supporting public policy design and evaluation, with particular focus on integrating economic, environmental and climate model outcomes. Lessons obtained in this report are based on the experience of hosting workshops in DECIPHER and feedback from the stakeholders. Practically, it provides recommendations for researchers and policymakers on how to design stakeholder engagement workshops and how economic methods can best be integrated into climate, biodiversity and environmental policy- and decision-making.

This report discusses high-level takeaways related to modelling, the effectiveness of stakeholder engagement methods and lessons for effective stakeholder engagement in policymaking, based on the stakeholder workshops implemented during DECIPHER. Finally, cross-cutting lessons and conclusions are drawn.

2. Principles and elements of effective stakeholder engagement – lessons from DECIPHER

Effective stakeholder engagement in the DECIPHER project has been organised around several elements. Over the course of the project, the following elements proved to be crucial.



Figure 1 elements for effective stakeholder engagement

Stakeholder engagement objectives

The starting point has been to have a clear objective or purpose of what to achieve during the stakeholder engagement process. The stakeholder engagement in the DECIPHER project mainly had the objective to improve the research outcomes of the project and collect feedback from stakeholders on the utility of the project's outputs. This corresponds to an academic typology for objectives of transdisciplinary research (Schmidt et al., 2020): i) normative – informing, those affected should have a say, ii) substantive – improve the quality of research and integrate knowledge, iii) social learning – stimulate learning to understand better and solve the problem, iv) implementation – increase acceptance and legitimacy of process outcomes. The most relevant aspects applicable to policy-oriented research projects like DECIPHER seem to be substantive objectives and social learning, although in the broader policy process, normative and implementation objectives can also apply.

Selecting and inviting the right stakeholders

Effective stakeholder engagement processes depended on having the right stakeholders participating in the discussions. This was especially relevant considering the technical and at time complex modelling implemented in DECIPHER. Having a variety of views represented among the participants, including experts in specific fields, or a balanced representation of perspectives from academia, the public sector, civil society, and the private sector, contributes to the quality of the discussion and the value generated for stakeholders participating and organisers of meetings. After the right stakeholders were identified, the challenge was to get them to participate. Tailored invitations were essential to get stakeholders on board. Tailoring invitations and referencing relevant work from both participating stakeholders and the modellers hosting the session was also essential. Ideally, work that aligned with their interests was embedded in the invitation and the workshop format.

Stakeholder engagement format



The format of engagement determines how results were shared with stakeholders, and how they could provide feedback. A first consideration was whether to host in-person or online workshops. Several considerations had to be balanced, as in-person and online workshops have distinct advantages and drawbacks. Relevant considerations included the project timelines (i.e., when results were available, the costs of hosting the workshops, the threshold for stakeholders to participate, and scope to engage stakeholders without geographic limitations. It was decided to host online workshops considering the flexibility this allowed and the fact that this would reduce the thresholds for stakeholders and DECIPHER consortium partners to participate. Designing engagement formats that fitted stakeholder time, expertise and institutional constraints allowed for the most helpful stakeholder feedback. For example, not making the workshops too long, targeting questions to specific stakeholders based on their work or publications and considering what stakeholders would feel comfortable sharing. A variety of engagement methods was available, ranging from moderated discussions, breakout rooms to surveys, or a combination of these. Moreover, tools for notetaking like Miro, or the chat of the online meeting rooms enable tracking feedback and comments, while supporting the moderation of workshops. Some formats allow for more space for stakeholders to contribute than others. It was important to align the format with the chosen objective and to have a moderator who could actively guide the discussion and invite contributions from both project researchers and participating stakeholders. Over the course of the project, a consistent approach has been implemented for each research workstream. During all workshops, the Chatham-House rule applied. This implies that what stakeholders shared during the meeting could be used but not associated with particular attendees. This rule supported creating an environment in which stakeholders felt free to share their views while enabling integrating their feedback into the research project.

Input shared during the stakeholder engagement

To ensure input from stakeholders was useful, it was critical to tailor specific questions to the stakeholders to have a focused discussion. The most effective way to engage stakeholders in projects like DECIPHER was to share high-quality results of DECIPHER modelling work, or other outputs that were already well developed, to ignite a discussion and trigger feedback from stakeholders. For example, (pre) publications, presentations on research results, and guiding questions related to methods applied or conclusions drawn in the DECIPHER research outputs. The most effective workshops benefited from the genuine involvement of project partners. Lacking a clear format and engaging input risks low participation and stakeholders leaving the workshop early. It seemed like the more data was provided upfront, the better the internal project coordination, the better the invitations could be tailored, and the higher the engagement of stakeholders appeared to be.

The sections below highlight insights from targeted workshops that were organised, focusing on key insights obtained relating to the workshop's focus, which stakeholder



engagement methods worked well, and which general lessons could be drawn. These will feed into cross-cutting lessons on how energy, climate, and economic modelling can support improved decision-making and tackling the climate and biodiversity crises.

3. Methods for Empirical Policy Evaluation (WP2)

Focus	Empirical Policy Evaluation focusing on how policymakers evaluate the success of implemented policies based on case studies and how this links to modelling for climate, energy, and environmental policymaking, with a special focus on heating and buildings decarbonisation.
Objective	Substantive – improve the quality of research and integrate knowledge Social learning – stimulate learning to better understand and solve the problem
Format	Presentations by experts, followed by a moderated Q&A.
Input shared with stakeholders	Presentations with research results focusing on: - using economic modelling in ex-ante climate policy appraisal - are EU low-carbon structural funds efficient in reducing emissions
Stakeholder selection	Researchers, policymakers (representing DGs, local government, and national agencies) and civil society experts with expertise related to building decarbonisation.

Table 1 Methods for empirical policy evaluation

Utility of models in decision-making

Workshops conducted under the DECIPHER project highlighted that economic modelling can provide value to policymakers when it is integrated into systematic policy evaluation, and is complementary to empirical policy evaluation. Participants emphasised the importance of using models not only as one-time forecasting tools (ex-ante), but also alongside empirical evidence collected after the fact to assess the actual performance of policies (ex-post). Well-defined case studies that focus on specific policies and a small set of clearly measured indicators have proven to be particularly effective in informing the calibration, revision, and, when necessary, redesign of models.



Another important message that emerged was the need for empirical audits of model outputs, which can significantly enhance the reliability and robustness of modelling used in climate and environmental policymaking. Establishing clear protocols for documenting assumptions, data sources, and discrepancies between predicted and actual outcomes helps policymakers understand when and how to trust the results.

In summary, empirical evidence should complement models to validate outcomes; empirical audits should be standard practice to build trust; and tailored case studies should serve as a foundation for both modelling and engagement, enabling policymakers to act on results with confidence.

Stakeholder engagement

Regarding stakeholder engagement, the workshops revealed that interaction is most effective when case studies are tailored to the specific interests and decision-making needs of stakeholders. Stakeholders reacted stronger to real-life examples than to abstract content. Involving stakeholders in co-defining the indicators that matter for assessing policy success is also crucial. Importantly, in many countries, rich case-study evidence is already available in national languages, often evaluating the effectiveness of policies. Researchers and modellers should actively seek out and integrate this information to validate and enhance their models, making results more comprehensible to domestic decision-makers.

4. Advancing Coastal Wetlands as Nature-Based Solution (WP3)

Focus	Advancing Coastal Wetlands as Nature-based Solutions
Objective	Substantive – improve the quality of research and integrate knowledge Social learning – stimulate learning to better understand and solve the problem
Format	Presentations by experts, followed by a moderated Q&A.
Input shared with stakeholders	Presentation with the latest research findings related to the application of the dynamic interactive vulnerability assessment model, combined with targeted questions on how stakeholders'



	nature-based solutions can support their work, and the role of economic valuation.
Stakeholder selection	Policymakers, environmental NGOs, and leading researchers to advance best practices for coastal adaptation and share insights on emerging methodologies.

Table 2 Advancing coastal wetlands and nature-based solutions

Utility of models in decision-making

Stakeholders valued nature-based solutions (NBS) for enhancing climate resilience in the DECIPHER workshops. Valuing ecosystem services transforms these solutions into concrete, decision-ready metrics that can be incorporated into policy design and assessment. Yet, the financial case for nature-based solutions requires further attention to increase its potential to contribute to climate resilience.

To transition from appreciation to adoption, policymakers could require that NBS proposals include monetised ecosystem benefits, assessments of distributional impacts, and risk metrics that are directly comparable to traditional infrastructure alternatives. Integrating these elements into appraisal guidelines will allow NBS to compete with standard public investment and budgeting processes.

Additionally, there is a strong demand for more sophisticated cost-benefit analyses (CBAs) and better integration between financial models and ecosystem valuation. CBAs should account for co-benefits (such as health, biodiversity, and flood avoidance), long time horizons, uncertainty, option values, private revenue streams, and public goods. This alignment helps bridge public and private priorities, identify bankable elements, and determine where concessional or blended finance is needed to unlock investment in NBS.

In summary, while nature-based solutions (NBS) are valuable, their financial justification needs enhancement to realise their resilience potential. Ecosystem services should be valued systematically to provide usable data for decision-making. CBAs must capture co-benefits, uncertainty, and long-term views. Financial models and ecosystem valuations should align public and private incentives to attract investment.

Stakeholder engagement

Effective stakeholder engagement requires tailored evidence communicated in familiar metrics. Participation was highest, in terms of stakeholder responses, questions and comments, when results were communicated using the metrics that stakeholders use, such as avoided damages, fiscal savings, risk-adjusted returns, and



local employment, allowing them to see how NBS and quantified ecosystem services align with their mandates and constraints.

5. Advances in Economic Modelling: Promise and Pitfalls (WP4)

Focus	Innovative modelling techniques focusing on the labour market, finance, rational expectations and capital mobility, and uncertainty quantification
Objective	Substantive – improve the quality of research and integrate knowledge Social learning – stimulate learning to better understand and solve the problem
Format	Presentations by experts from three leading institutions focussing on a specific topic followed by a moderated Q&A after each presentation.
Input shared with stakeholders	Results of the latest research relating to the labour market, investments financing for renewable energies, improving the representation of investment decisions of firms in models, and computational methodologies (emulation) to create more robust uncertainty quantification in models.
Stakeholder selection	Technical modelling experts and policy makers in the field of energy and finance. This enabled more technical presentations and in-depth discussion of methodologies and innovations.

Table 3 Advances in economic modelling: promise and pitfalls

Utility of models in decision-making

During this workshop, stakeholders were particularly interested in the innovative techniques to highlight specific labour market dynamics and cost of capital. Especially the increased granularity of quantifying the labour market by looking at specific types of occupation and the possibility to assess change was perceived as relevant for the policy process to address skill mismatches. Moreover, stakeholders confirmed that capital mobility and rational expectations are important for



investment decisions. Emulation was suggested as a quantitative technique to increase the robustness of scenarios applied during the modelling.

The discussion highlighted that data granularity was deemed relevant, particularly to be able to solve labour market issues like skill mismatches. This is something that modellers could consider more generally. However, stakeholders indicated that model advances are most productive if they respond to a clear policy question (e.g., on assessing a certain trade-offs).

Adding granularity to a model for the sake of it, risks reducing the policy-value of a model by making it even more complex and harder to interpret and value the results. When presenting model modalities, it seems better to under-promise and overperform, than the other way around. Quite some discussion unfolded surrounding the topic of uncertainty. Especially when deep uncertainty is at stake, which is complex and difficult to model, decision-making would benefit from caution when presenting results.

Stakeholder engagement

By selecting participating stakeholders with technical expertise, the presentations could provide a higher level of detail and enabled more in-depth engagement between the researchers and the stakeholders. This was illustrated by many questions that were asked, and suggestions made of how further updates and improvements to the model could be made to support answering policy questions, e.g., related to the skills gap in the labour market. This supported the importance of inviting the right stakeholders.

6. Risk, Resilience, and Opportunity Framework (WP5)

Focus	Decision-making frameworks in the polycrisis – a broader business case for resilience
Objective	Substantive – improve the quality of research and integrate knowledge Social learning – stimulate learning to better understand and solve the problem
Format	Presentations by experts followed by a moderated Q&A.
Input shared with stakeholders	Three presentations by leading experts focusing on the Triple Dividend Framework (TDR), Risk and Opportunity



	Analysis (ROA) , multi-criteria decision-making approach (MCD)
Stakeholder selection	Researchers, policymakers and practitioners in the field of climate and climate adaptation.

Table 4 Risk, resilience, and opportunity framework

Utility of models in decision-making

An important conclusion during this workshop is that through using the TDR, ROA or MCD approaches policymakers could better assess risk-opportunity trade-offs early in policy design. This has potential to improve the efficacy of policymaking, by also considering the opportunities of certain solutions. However, lacking awareness seems like an important barrier for their uptake. What 'risk' and 'opportunity' mean in sectoral contexts should be clarified to enable better assessments. Because certain strategic stakeholders and decision-makers are unfamiliar with the frameworks presented, there is need for awareness raising. What would strengthen the application of these frameworks if there would be more case studies available, highlighting the benefits, or by considering different future scenarios.

Stakeholder indicated particularly that more case studies related to applying these frameworks would be useful to feed into national policy processes. Particularly for the triple dividend framework further awareness raising among policymakers is crucial to enable the framework to contribute to improving decision-making processes. One other aspect that was discussed related to expectation management related to the features of models, as at times models cannot or only answer part of a relevant question for stakeholders. What models can cover and what they cannot cover should therefore be transparently communicated.

Stakeholder engagement

What worked well in these workshops were the high-quality presentations provided by the researchers that triggered a lively discussion among stakeholders. Several stakeholders highlighted case studies of such frameworks being applied within a national context, whereas the project had lower granularity.

7. Applying the Framework: Real-World Demonstration (WP6)

Focus	Demonstrating the stakeholder engagement tool developed as part of the DECIPHER project.
Objective	Substantive – improve the quality of research and integrate knowledge



	Social learning - stimulate learning to better understand and solve the problem
Format	Presentations by creators of the tool on its purpose and functionalities. This was followed by a demonstration of the key features, including an in-tool survey, and a moderated Q&A with targeted questions
Input shared with stakeholders	Presentations on features of the tool, survey questions.
Stakeholder selection	Key policymakers working with energy, climate and economic models, energy and climate modellers,

Table 5 Applying the framework: real-world demonstration

Utility of models in decision-making

Stakeholder engagement is key to ensure research questions are formulated in a policy-relevant way – this is a two-way process where capabilities of models and policy-questions need to converge. Developing tools, like the DECIPHER stakeholder engagement tool, is a way to facilitate this process by enabling insights into how models function while having features to collect stakeholder feedback on what policy areas matter to them. Collecting such feedback can help modellers to target model innovations in those areas. Ideally, policymakers take some ownership of the process and suggest what types of questions urgently need answers, or would benefit from quantitative or analytical assessment. Modelers, in turn, should to the best of ability serve their analytical needs. Showing examples of policy-relevant existing work, helps policymakers understand the potential of modelling exercises. The use of model applications in real-world policy settings thereby has potential to increase awareness and understanding of the utility of modelling among stakeholders and decisionmakers. Increasing policy-maker co-leadership in modelling research could be one avenue for improving modelling relevance for policymaking.

The workshop illustrated that stakeholders are interested in better understanding model dynamics, especially to understand how specific model indicators affect the final outputs and results. By clearly specifying how specific features of a model influence each other, stakeholders and researchers are able to better understand such dynamics and collect empirical evidence in support. One essential take-away is that stakeholders have different needs when it comes to the level of granularity or results and the flexibility of the indicators shown. Stakeholder engagement tools with the aim to clarify modelling would benefit from flexibility regarding the granularity of data provided for different models– that allows them to be relevant for different stakeholder groups.



Stakeholder engagement

Generating engagement with stakeholders was strongly facilitated when integrating demonstrations and visualising theoretical frameworks that are applied in models. The demo triggered many questions and comments on the features of the tool and which types of features could improve policy relevance.

8. Communication & Dissemination (WP7)

Focus	Discussing a white book developed in DECIPHER focussing on Sustainability competences in university curricula for students.
Objective	Substantive – improve the quality of research and integrate knowledge Social learning – stimulate learning to better understand and solve the problem
Format	Presentation of key findings of several distinct part of the white book. Each section was presented separately, followed by a survey that stakeholders where invited to fill in. Results of the survey were then discussed during a moderated discussion and used to tackle key questions of the researchers.
Input shared with stakeholders	Presentations on sections of the draft white book, survey questions, targeted questions related to the content.
Stakeholder selection	Researchers, teachers in higher education, and policymakers involved in defining curricula of higher education institutions.

Table 6 Communication and dissemination

Utility of models in decision-making

This workshop highlighted the importance of developing competences among future decision-makers. Understanding the intersection of climate, biodiversity, and climate challenges requires stakeholders to have specific skills and knowledge. Besides training future decisionmakers to understand how models can be valuable to the decision-making process by providing relevant insights, it is also important to train



research teams to understand what matters for policymakers. Simplification and visualisation of model results and assumptions is helpful for this.

Integrating sustainability competences into university curricula can provide a relevant contribution to increasing awareness and modelling literacy, and could support reducing misconceptions of what models can and cannot do diminishes their effective application in the policy process.

Stakeholder engagement

What supported strong engagement in this workshop was the use of tailored methods, including surveys and guiding questions for a moderated discussion, which were effectively applied to collect stakeholder feedback during the workshop. The researchers co-hosting the workshop hereby aimed to validate the outcomes of their research which was summarised in the white-book on sustainability conferences, but also to get new ideas which could still be included. This required additional preparation on the side of the researchers, which was not pursued by other DECIPHER researchers, but thereby provided relevant input for their work.

9. Cross-cutting lessons

Based on the experience of hosting a series of stakeholder workshops in the context of DECIPHER, the following cross-cutting lessons are drawn for stakeholder engagement and the utility of models in decision-making.

	Cross-cutting lessons
Utility of models in decision-making	• Both ex-ante modelling and ex-post empirical analysis can provide relevant insights into the policy process. • Many policy stakeholders are dealing with local problems and therefore require localised outcomes and granular data. The outcomes of models should be tailored to the data granularity needs of policymakers that are being targeted, whereby more granularity is often welcomed. This should be considered in IAMs. • There are tools available to improve the robustness of scenarios, such as statistical emulation, which can increase trust in model outcomes. • The combination of modelling with empirical evidence or local case studies is perceived as important to improve robustness of model outcomes.
Stakeholder engagement	• There is no panacea. Clearly define and design stakeholder tools and workshops to the desired objective, instead of trying to create one tool or format that serves all stakeholder types.



	• Results are essential for engagement. Feeding robust results and insights into the stakeholder engagement process enables getting valuable feedback. • Accessible user-interfaces with stakeholder tools are key to enable stakeholders to interact with the models. • Different stakeholder groups need different granularity of insight into model assumptions, drivers, and results. • Effective stakeholder engagement is one way to support that relevant modelling outcomes are taken up in the policymaking and decision-making processes.
--	---

Table 7. Cross-cutting lessons

10. Recommendations for the European Commission

Based on the DECIPHER project, the following recommendations are suggested to the European Commission in the context of Horizon Europe:

- Stress the importance of model usability for stakeholders to improve policy impact
- Mandate policy stakeholder co-leadership in Horizon modelling projects to ensure applicability and relevance of the models for policymaking.
- Encourage empirical validation of modelling outputs and results.
- Support education on modelling for non-expert stakeholders (in a simple language)

11. Conclusion

Effective stakeholder engagement is essential for improved decision-making and requires clear objectives, carefully selected stakeholders, a tailored format and high-quality input from the hosting institution. More generally, there is great potential for economic methods, modelling, and decision-making frameworks as developed in DECIPHER when tailored to the right level of granularity and in sync with stakeholder needs. Stakeholder needs should be a core driver of model design and outputs to ensure impact.

Idiosyncratic modelling exercises with closed tools can make sense to provide answers to concrete policy questions – but they do not contribute to future research incentives for providing fair assessments of the success of modelling. Without open-access tools, stakeholder exercises are hard to design. Nevertheless, it would be useful to find a good framework balancing these aspects.



12. References

Schmidt, Laura., Falk, Thomas., Siegmund-Schultze, Marianna., Spangenberg, Joachim. (2020) The Objectives of Stakeholder Involvement in Transdisciplinary Research. A Conceptual Framework for a Reflective and Reflexive Practise. Ecological Economics. 176. Accessible at: <https://www.sciencedirect.com/science/article/pii/S092180091931420X?via%3Dihub>