TRANSIENCE

TRANSITIONING TOWARDS AN EFFICIENT, CARBON-NEUTRAL CIRCULAR EUROPEAN INDUSTRY

Date: 19/06/2024

D5.2 - The TRANSIENCE Project CDE Plan

WP5–Setting up communication, dissemination, networking

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EC Summary Requirements

1. Changes with respect to the DoA

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

2. Dissemination and uptake

This deliverable will serve as a reference document for consortium partners to understand and implement the project communication, dissemination, and exploitation plan, including purpose, target audiences, tools, and measurable targets. This deliverable can also serve as a reference document for target stakeholders to stay aware of the project CDE strategy and planned activities.

3. Short summary of results (<250 words)

This report, the Communication, Dissemination, and Exploitation (CDE) Plan, highlights the purpose of CDE activities in terms of the three distinct CDE pillars and outlines the key elements of the TRANSIENCE strategic CDE plan. The plan identifies target audiences for the project CDE activities, including policymakers, academics, industry actors, and the general public. The plan also describes the various CDE tools that will be utilised, ranging from the project visual identity, website, social media channels, and bi-monthly newsletters to events, publications, and synergies. Finally, the plan sets measurable targets (KPIs) to enable verification of CDE progress. The CDE plan will be revised and updated in months 24 and 42 to respond to challenges and reinforce successes observed during the implementation of this version of the plan.

4. Evidence of accomplishment

This report.

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Preface

The need to approach climate action, resource efficiency, and circularity performance as integrated, economy-wide, cross-cutting issues is growingly gaining attention in the policy world, stimulating the development of new industrial policies in Europe and worldwide. Currently, however, there is little progress in conceptualising the circular economy and understanding its interactions with climate action. State-of-the-art modelling capacity to capture the interplay of the two agendas and their implications for energy-intensive sectors as well as to represent the European industry's transformation in line with the region's vision for climate neutrality is not yet fully developed. TRANSIENCE will undertake a comprehensive characterisation and assessment of circularity principles and measures vis-à-vis decarbonisation, by looking at the twin transition of European industries through the lenses of global competitiveness, innovation, and holistic sustainability. It will then produce MIC3, a consistent, fully open-source model ecosystem to assess industrial circularity, decarbonisation, and sustainability. A series of interoperable modules on the socioeconomic, service and product, material, industrial, energy-system, and environmental perspectives of the transformation of European industry will be developed and integrated, building on and opening the code of leading modelling tools. MIC3 will finally be used in extensive scenario modelling to produce diverse pathways toward a material-efficient, circular, climate-neutral, sustainable European industry. Transparency, openness, and knowledge sharing will be promoted, and technical capacities will be developed in four industrial agglomerations in the EU, moving beyond stakeholder consultation, onto model co-development, continuous validation of assumptions, co-creation of scenario modelling, evaluation of the desirability and usability of the developed model and insights, and eventually co-production of science and action.

ICCS – Institute of Communication and Computer Systems	EL
CEPS – Centre for European Policy Studies	BE
E3M – E3-Modelling AE	EL
Fraunhofer – Fraunhofer Gesellschaft Zur Forderung Der Angewandten Forschung Ev	DE
HOL – HOLISTIC IKE	EL
PIK – Potsdam Institut Fur Klimafolgenforschung Ev	DE
PNTEC – Park Naukowo-Technologiczny Euro-Centrum Spolka Z Ograniczona Odpowiedzialnoscia	PL
TECNALIA – Fundacion Tecnalia Research & Innovation	ES
UU – Universiteit Utrecht	NL
WI – Wuppertal Institut Fur Klima, Umwelt, Energie GGMBH	DE
PSI – Paul Scherrer Institut	CH
UCL – University College London	UK

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Executive Summary

The TRANSIENCE project sets out to investigate the interplays, co-benefits, and trade-offs of the transition towards a circular and carbon-neutral economy through the development of new modelling capacity. To ensure that TRANSIENCE outputs achieve significant and measurable impact and are exploitable by a broad audience, the project will develop and implement a wide range of communication, dissemination, and exploitation (CDE) tools and activities. These tools and activities will be aimed at enhancing knowledge about climate neutrality pathways and boost decision-making capacity for stakeholders in policy, industry, and research.

A coherent CDE strategy will be critical to ensuring awareness of the project, uptake of results, and ultimately, an impactful contribution toward the twin transition. Clear and targeted communication, along with broad and open dissemination and effective exploitation, will ensure that the project achieves its ambitious expected outcomes and longer-term impacts. Through identification of target audiences and selection of CDE tools tailored to those audiences, TRANSIENCE CDE activities will strategically communicate project messages and widely disseminate project results. Further, TRANSIENCE will also secure impact through setting and monitoring measurable CDE targets.

This deliverable outlines the TRANSIENCE CDE strategy, serving as a point of reference for project partners to understand project CDE objectives and to plan and execute CDE activities throughout the project.

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Contents

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Table of Figures

Table of Tables

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1 Introduction

The transition towards a climate-neutral and more circular EU economy is complex and multidimensional and will entail economy-wide and cross-cutting impacts for all stakeholders. In light of this, TRANSIENCE aims to both develop capacities to understand the technical, economic, and social complexities of the twin transitions and to implement a stakeholder-centred strategic project programme which enables exploitation of new capacities and ensures uptake of project results and outcomes.

The main TRANSIENCE contribution lies in the development of the MIC3 model, an open-source integrated assessment model (IAM) with the required sectoral and spatial granularity to enable the assessment of pathways toward industrial decarbonisation, enhanced circularity, and overall sustainability in Europe. TRANSIENCE seeks to enhance technical capacity by building on existing capacities and by facilitating further scientific developments beyond the project. In doing so, TRANSIENCE aims to promote transparency, openness, and legitimacy, as well as to reinforce the critical role of all stakeholders in the twin transition to ultimately achieve co-production of knowledge in sustainability, science, policy, and industry decision-making and drive transformation.

Through a commitment to coherent and effective communication, dissemination, and exploitation (CDE) throughout the duration of the project and beyond, TRANSIENCE will ensure that its valuable outputs achieve significant and measurable impact. This deliverable presents how the project will fulfil its commitment to CDE and provides the foundation for good communication, broad and open dissemination, and effective exploitation as pathways to project impact. This deliverable will serve as a reference document for consortium partners to understand and strategically implement CDE activities throughout the project. The TRANSIENCE CDE strategy will leverage a range of tailored CDE activities to boost awareness and uptake by target audiences, with an eye toward achieving an ambitious set of scientific, social, and economic expected outcomes and longer-term impacts.

This document is structured to first provide a theoretical understanding of the concepts of communication, dissemination, and exploitation (CDE), and describe the TRANSIENCE CDE strategy in more detail. In particular, the following section (Section 2) will introduce the three distinct pillars of project promotion–communication, dissemination, and exploitation–and the basic conditions for coherent and effective CDE. The section will then turn to describing the pathways to project impact, outlining the expected outcomes and impacts of the project in terms of their relationship to CDE. Section 3 will then give an overview of the various target audiences of the project. Section 4 will list the various tools which will be strategically utilised, describing suitable uses, advantages, and disadvantages of each. Finally, Section 5 will present planned CDE activities and set measurable targets which can be used to evaluate progress toward achieving project impacts.

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2 The Purpose of CDE

Promotional activities will be central to realising the ambitious outcomes and long term impacts of TRANSIENCE. In recognition of this, beneficiaries of Horizon Europe funding are required to carry out these activities to increase project impact. According to the TRANSIENCE Grant Agreement, beneficiaries must promote the action and its results by providing targeted information to multiple audiences (including media and the public) in a strategic, coherent, and effective manner (Article 17.1).

The purpose of this plan is to outline a coherent and effective strategy for promoting TRANSIENCE action and results. The remainder of this section will first introduce communication, dissemination, and exploitation (CDE) as three distinct pillars of promotion and will then identify the expected outcomes and long-term impacts envisaged for TRANSIENCE.

2.1 The Three Pillars of Promotion: communication, dissemination, and exploitation

Guidance from the European Commission makes clear that communication, dissemination, and exploitation are distinct concepts in the context of promoting project activities and results, all of which contribute to the overall success of the project. Communication is all about informing as broad an audience as possible about the project, its activities, and its results. Clear and targeted communication ensures that audiences, including stakeholders, the general public, and the media are aware of the project and how it relates to their daily lives, work, and experiences. This engages stakeholders, attracts expertise, generates demand for project outputs, raises awareness and showcases the success of European collaboration. Dissemination is concerned with making project knowledge and results public and open for use by all those who can learn from and use them, including not only scientists and researchers, but also public authorities, industry stakeholders, policymakers, and civil society. Broad and open dissemination ensures that project results become a common good and can be the basis of further advances by others. Last, but equally important, exploitation focuses on making uptake and concrete use of project results. Effective exploitation ensures that project results underpin new legislation, policy recommendations, and industry strategies, securing benefits for the economy and society at large.

2.1.1 Clear and Targeted Communication

According to the European Commission, good communication entails strategic efforts from the very outset of the project through its entire lifetime. Good communication must also set a clear message and clear objectives. This means distinctly identifying expected reactions and changes in terms of both shorter-term outcomes and longer-term impacts. Good communication must use tools and approaches adapted to wide target audiences, including the media and general public, and should be tailored to the appropriate level (local, regional, national, EU-wide).

2.1.2 Broad and Open Dissemination

Broad and open dissemination makes project results available for others to use free of charge through a variety of channels. This can be achieved by publishing project results in journals and magazines, by presenting results at conferences and events, by publishing project data to databases, etc. Broad dissemination should tailor dissemination channels to target audiences and utilise open access channels where possible, ensuring that research results are disseminated to scientists, industry, civil society, and

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policymakers via channels which are accessible to them. This dissemination can begin at any time, as soon as the project has results.

2.1.3 Effective Exploitation

Effective exploitation ensures that project results help to tackle societal problems, including both policy and commercial challenges. This is achieved by making project results usable, such as by creating guides, tutorials, roadmaps, etc., or by sharing knowledge, skills, and data. While exploitation cannot begin until toward the end of the project—when there are exploitable results—it continues well beyond the project. Further, effective exploitation requires that project workflows be designed from the outset to produce exploitable results. This can be achieved through stakeholder engagement activities and validation throughout the project.

2.2 Pathways toward impact

Through implementation of the CDE strategy in line with good communication, broad and open dissemination, and effective exploitation, TRANSIENCE will contribute to a number of **scientific, societal, economic expected outcomes (EOs)** as pathways to longer term expected impacts (EIs). This section briefly describes the project's expected outcomes (Table 1) and impacts (Table 2) in terms of their relationship to communication, dissemination, and exploitation. Subsequent sections of this document will discuss in greater detail the CDE tools and specific planned CDE activities and measurable targets which have been strategically selected to ensure that these expected outcomes and impacts are achieved.

2.2.1 Expected Outcomes

Table 1. Expected project outcomes

Expected Outcomes (EOs)	
EO_1	Development of a model, enhancement of existing modelling tools towards understanding the pathways for industry, and Energy Intensive Industries (EIIs) in particular, to contribute to EU's climate neutrality.
EO_2	Modelling of scenarios of possible pathways of how industry, and EIIs in particular, can become climate neutral according to: (1) their energy demand and use and energy efficiency, (2) their emissions including process emissions; (3) use of raw materials, chemicals and water; (4) their production of consumer goods/equipment/construction products; (5) possibility of replacing fossil carbon in materials by more sustainable streams.
EO_3	Facilitate future EU and national industry, climate, and energy policy assessments. Climate neutrality of industry will be a strong priority for the EU and national policies by 2030 and towards 2050 as industry is considered as hard-to-abate sector. Any policy initiatives on the EU or national level will require a robust, forward-looking analytical basis interlinked with macro-economic and energy system trends and such can be provided by modelling.
EO_4	Set the climate neutrality transition pathways for process industries in an open and transparent manner via design, modelling, and assessment of pathways for these industries. Modelling exercises can set the framework conditions and project market uptake of transformative solutions and products.
EO_5	Enhance the knowledge about climate neutrality pathways for industry and academia as

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	the resulting modelling capacity (model code) and input data should be fully transparent and published under an open-source licensing.

EO_1 is a scientific outcome which reflects one of the main contributions of TRANSIENCE, developing the MIC3 model ecosystem. The MIC3 framework and modules, which will be fully open (EO_5) and will allow modelling of a diverse set of scenarios (EO_2) to underpin exploitation by policymakers, researchers, industry, and all other stakeholders.

EO_2 is multifaceted and constitutes a scientific, societal, and economic outcome. Through development of interoperable modules, the project will co-develop diverse pathways toward material-efficient, circular, climate-neutral, and competitive European industry which address the five intertwined dimensions highlighted in EO_2. Additionally, through individual use of the satellite modules guided by co-created questions, case studies exploring the five dimensions highlighted in EO_2 will also be assessed at the European level and for the four industry clusters. This will ensure relevant and exploitable results for stakeholders.

EO_3 focuses on society. The TRANSIENCE co-creation and validation activities will ensure that all pathways (EO_2) simulated by MIC3 (EO_1) will be relevant and useful for policy exploitation, while the project's outreach through a wide variety of publications, events, and synergies will ensure targeted communication and broad dissemination to policymakers at all levels.

EO_4 aims to address both societal and economic needs. Aside from energy intensive industries (EIIs) (EO_1, EO_2) process industries (food, chemicals, pharmaceuticals, plastics, etc.) will be another focus of the project. An industrial module will be built to assess case-specific solutions and simulate pathways for process industries, while transformative policies, technologies, services, and products will be included in open databases, along with estimations of product market uptake. Further, stakeholders including representatives from process industries will be actively and strategically engaged throughout the project, and findings will be validated through workshops and surveys to ensure that project outputs are desirable, useful, and usable. This will ensure that project outputs reach and are exploited by wide audiences.

EO_5 is both scientific and economic. This expected outcome concerns making outcomes publicly available immediately and ensuring that results are comprehensible and project processes clear to stakeholders. This will entail providing open access to input and output data, guidelines, documentation, a simplified version of MIC3 for industry, tutorials, scenario results, and scientific publications, among other things via strategic platforms to ensure access, comprehension, and uptake.

Overall, most expected outcomes of the project are dependent on factors entirely within the project scope. These include model development and enhancement of existing modelling capacities (EO_1); modelling of climate-neutral scenarios for industry considering energy, emissions, materials, and products (EO_2); setting climate neutral transition pathways for process industries in an open and transparent manner, projecting market uptake of transformative solutions and products (EO_4); and providing fully transparent modelling capacity and input data which is published under open-source licensing (EO_5). Planned CDE activities will ensure dissemination and ultimately industrial, scientific, policy, and societal exploitation of these outputs. On the other hand, facilitating future EU and national industry, climate, and energy policy assessments (EO_3) depends on the acceptance of project outcomes by policymakers and the willingness to use outcomes as the basis for new policies. This makes effective communication, dissemination, and exploitation especially critical to achieving this outcome.

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2.2.2 Expected Impacts

Table 2. Expected project impacts

Expected Impacts (EIs)	
EI_1	Making Europe the first digitally led circular, climate-neutral and sustainable economy through the transformation of its mobility, energy, construction, and production systems.
EI_2	Promoting an open strategic autonomy by leading development of key digital, enabling, emerging technologies, sectors, value chains to accelerate and steer the twin transition through human-centred technologies and innovations.
EI_3	Creating a more resilient, inclusive, democratic European society, prepared/responsive to threats and disasters, addressing inequalities, providing high-quality healthcare, and empowering all citizens to act in the twin transition.
EI_4	Restoring Europe's ecosystems and biodiversity and managing sustainably natural resources to ensure food security and a clean and healthy environment.
EI_5	Global leadership in clean, climate-neutral and resilient industrial value chains, circular economy and climate neutral and human-centric digital systems and infrastructures.

EI_1 is focused on the multifaceted scientific, societal, and economic impacts of the project. With the aim of achieving this expected impact, the project will create a set of open, interoperable modules for improved modelling of energy systems, industrial production and green value chains, and the macroeconomics of manufacturing sectors, with sector-specific data and representations of capital and material mobility (EO_1). The project will then produce and openly disseminate economically viable, sustainable, and circular industrial transformation pathways to underpin European climate neutrality and global climate action (EO_1, EO_2). By integrating different transition aspects into a modular tool to support decision making, project results will be transparent, validated, and actionable for exploitation toward European leadership in transformation to a circular, climate-neutral, sustainable economy.

EI_2 is also focused on tripartite scientific, societal, and economic impacts. Key to this expected impact, the project's co-developed technical capacities (EO_1) will promote open strategic autonomy by enabling analysis of key technological, material, and energy dependencies and socioeconomic impacts of the twin transition, while exploration of innovative and diversified policies, technologies, services, and products will do so by supporting an accelerated twin transition (EO_3). Through close involvement of stakeholders from four regional industry clusters and a broader EU stakeholder group to capture localised challenges and opportunities, the project will also ensure that outcomes are useful, understandable, and exploitable toward a human-centred twin transition (EO_2, EO_3, EO_4).

EI_3 has a societal focus and entails a place-based approach driven by stakeholders. Co-designed stakeholder questions will drive MIC3 development, while results and tools will be validated for usefulness and useability with diverse groups of stakeholders (EO_2). Stakeholder dialogues will provide opportunities to communicate about the project and disseminate results and will facilitate exploitation by ensuring that results are attractive and account for local challenges and opportunities (EO_2, EO_3, EO_4). Further, MIC3 scenarios will be evaluated in terms of broad sustainability considerations to ensure that the twin transition benefits EU society as a whole.

EI_4 is focused on society and on the environmental considerations of the industrial transition. The dedicated LCA module will enable environmental impact assessments of industrial end-use commodities and

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processes, ensuring that the exploitation of project results based on this module takes into account key environmental considerations. Further, linking MIC3 with REMIND, which recently pioneered Paris-compliant sustainable development pathways, will ensure that project results are exploitable toward achieving the policy goals outlined in the EU's zero pollution action plan (EO_3).

EI_5 is an overarching theme that reflects the integration of all project EOs and EIs. Through co-production and broad and open dissemination of secure, net-zero industrial transformation pathways which take into account impact factors, sectoral interdependencies, manufacturing capacities for emerging technologies, and more, project results will be exploitable toward global leadership in the clean, climate-neutral, and resilient industrial transformation.

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3 Target Audiences

Understanding the target audiences of TRANSIENCE CDE activities is crucial for designing and structuring these activities throughout the project. In line with the project's stakeholder engagement strategy, TRANSIENCE CDE will aim to reach the broadest possible range of project-relevant stakeholders, while remaining flexible enough to cater to their specific interests and needs. This will allow for maximising the impact and reach of the project's outcomes, building greater visibility and acceptance, as well as effectively collecting inputs and feedback from stakeholders themselves. Building upon the stakeholder categorisation described in D2.1 'Multi-layered Stakeholder Engagement Strategy' (Section 3.1), the following outlines the four macro categories of relevant stakeholders identified as key target audiences of TRANSIENCE and describes dedicated CDE activities foreseen for each one of these categories.

Industrial and business actors, including most notably those belonging to energy-intensive sectors (e.g. iron, steel) but also representatives of other trade associations and/or financial institutions, is a first key target group. For this group, the primary objective of CDE is to convey the relevance of the project in defining actionable pathways for industry decarbonisation and provide documents and simplified tools to exploit its results. Industry-specific dissemination and collaboration activities will include the release of a **simplified modelling tool** based on MIC3 to facilitate non-expert use of the modelling framework. Further, **5 targeted industry guides** – two based on the case studies and three based on the scenario results – will provide practical examples of how to apply TRANSIENCE outputs for industries' specific contexts and needs. Project insights for industry stakeholders will also be promoted via industry-oriented events such as **trade fairs**. Finally, a **high-level synthesis report for industry executives** will illustrate the implications of the modelling work, focusing in particular on the heterogeneous agglomeration of interconnected industries.

Policymakers, especially those involved in policymaking on energy, climate and resources (whether at the EU, national, regional or local level), represent a second key target audience. For this group, CDE activities should primarily ensure that the project's results can contribute to the assessment and/or updating of relevant policies initiatives. Together with industrial actors, policymakers will be the primary target of the TRANSIENCE **simplified modelling tool**. In addition, TRANSIENCE will produce dedicated policy-relevant outputs in the form of **5 policy briefs** − two based on the case studies and three based on the scenario results − and **2 high-level policy reports**, to ensure the dissemination of policy-relevant results. Further, TRANSIENCE representatives will be continuously involved in **external policy events**, including the European Sustainable Energy Week as well as CINEA, HaDEA and DG RTD policy events, throughout the project's duration.

Research community representatives from universities, think tanks, and other research consortia will be the third target audience of the project. This will primarily engage with the more technical project outputs. These outputs primarily include the **MIC3 satellite modules and integrated framework,** along with related data and documentation. The project will also publish several **scientific papers** in high-impact scientific journals and present its findings at major **scientific conferences**.

Civil society actors such as NGOs, labour unions or consumers organisations – particularly those involved in industrial decarbonisation and energy/climate related issues – will also be a target audience of TRANSIENCE CDE activities**.** In addition to possibly using the **simplified modelling tool** and accessing to **non-technical projects outputs** (such as projects reports, policy briefs, industry guides) civil society actors will be the primary (though not sole) target audience of certain TRANSIENCE **communication activities**, including blog posts, media articles and commentaries.

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Beyond the above-mentioned activities, cross-cutting engagement (workshops, surveys, interviews) and communication (newsletters, social media posts) initiatives targeting all stakeholder categories will be implemented throughout the project. While stakeholder engagement activities will involve all stakeholders' categories, they will be tailored based on stakeholders' relevance and consistently with the prioritisation criteria identified in D2.1 (Section 3.1). TRANSIENCE CDE target audiences will be regularly refined based on the project's evolving understanding of stakeholder needs and the added value that the models can provide.

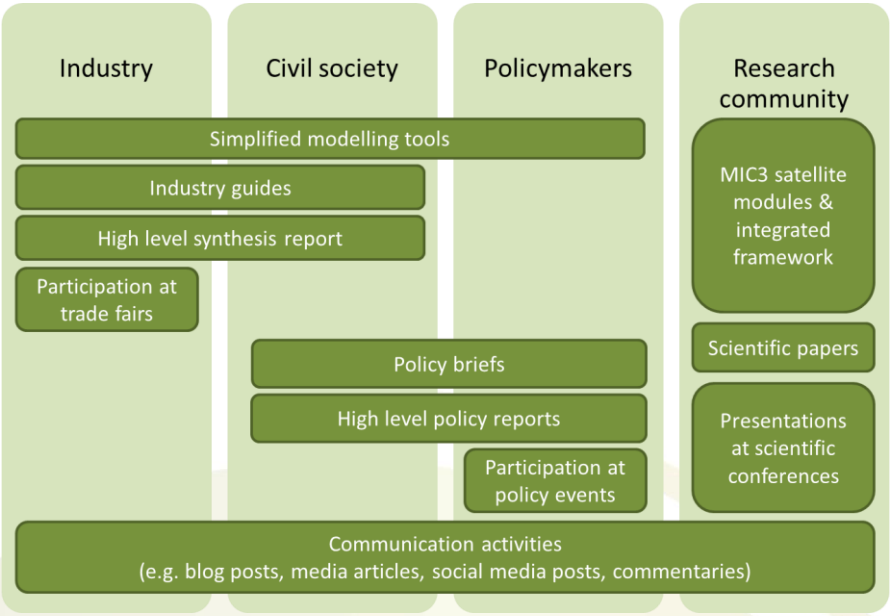

Figure 1. Map of the main CDE tools foreseen for each target audience

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4 CDE Tools

4.1 TRANSIENCE Visual Identity

A distinctive and coherent visual identity (D5.1) underpins all TRANSIENCE communication activities through eye catching and consistent colours, fonts, design elements, and messaging. This is essential to draw the attention of various stakeholders and establish a long term TRANSIENCE following. The visual identity tools include a project logo; a flyer (in English and translated to partners' languages, including Dutch, French, German, Greek, Polish, and Spanish); a trifold leaflet on project objectives, methods, and expected results (in English and partners' languages); a poster template and roll-up banner for promotional events; a presentation template prepopulated with basic project information; and a deliverable template. All TRANSIENCE visual identity tools also feature affiliate logos, such as the Horizon Europe funding logo, which is mandatory to use in all external project communications and materials and the Processes4Planet Partnership logo (or 'P4Planet', 'P4P', etc.).

Partners are encouraged to consistently use the TRANSIENCE visual identity tools for all project communication and promotion. Please refer to D5.1 for detailed guidance on using the project visual identity.

4.1.1 Visibility — The European flag and funding statement

The Grant Agreement requires all external communication and promotional materials to include the EU flag and accompanying funding statement (Figure 1), which should be translated into local languages where appropriate. According to the Grant Agreement, use of the emblem must adhere to the following requirements:

- The emblem must remain distinct and separate and cannot be modified by adding other visual marks, brands or text.
- Apart from the emblem, no other visual identity or logo may be used to highlight the EU support.
- When displayed in association with other logos (e.g. of beneficiaries or sponsors), the emblem must be displayed at least as prominently and visibly as the other logos.

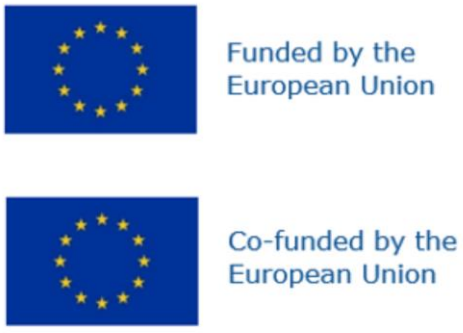

Figure 2. European flag and funding statement

4.2 TRANSIENCE Website

The TRANSIENCE website (D5.1) will be a constant node of engagement and a reference site for project updates, deliverables, visuals, briefs, papers, and all other publications. The project website will also be a hub for links to external dissemination platforms, as well as a synergy springboard of useful links to relevant initiatives and projects.

Partners are encouraged to boost TRANSIENCE visibility by linking to the TRANSIENCE project website (https://www.transience.eu/ and https://www.industry4netzero.eu) on organisational websites.

4.3 Newsletters

Bi-monthly electronic project newsletters will be used to keep all stakeholders ongoingly informed of key project milestones, events, and outcomes. The newsletters will also share policy reports and commentaries to raise awareness of the policy relevance of ongoing project work. Effectiveness of project newsletters will be monitored in terms of number of downloads and opening rates.

4.4 Social Media

TRANSIENCE will have a strong social media presence on X (formerly Twitter), LinkedIn, Mastodon, BlueSky and Instagram, posting twice weekly to create awareness of project topics and objectives, promote project work and results, and share news on decarbonisation, circular economy, and sustainability more broadly.

Partners are encouraged to use their organisational social media accounts, as well as private accounts if relevant and used for work-related purposes, to follow and tag TRANSIENCE social media accounts.

Short, clear, and catchy posts on **X** (https://twitter.com/transience_eu) will be used to stir interest from the general public and media, as well as broad policy, research, and industry audiences. Posts on **Mastodon** (https://mastodon.social/@transience_project) and **BlueSky** (https://bsky.app/profile/transienceproject.bsky.social) will also be used to reach these audiences via a free, open-source platform. Longer posts on **LinkedIn** (https://linkedin/company/transience-project) will be used to increase project visibility within professional networks of policy makers, industry actors, and other European projects and organisations. **Instagram** (https://www.instagram.com/transience.project/) will be used as a highly visual platform to make TRANSIENCE visual aids and infographics accessible to the general public. Engagement with social media posts will be actively monitored using Twitonomy, LinkedIn analytics, etc.

Partners are encouraged to draw attention to social media posts and boost interactions by including a visual aid such as a photo, video, or document; tags to relevant handles; and hashtags for keywords: #transience #industry4netzero #CircularEconomy #sustainability #circularity #transition #energyintensive

Table 3 below shows the number of followers, posts and posts' impressions since the beginning of the project in each of the above mentioned social media platform.

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Table 3. Number of posts and number of impressions on social media.[1]

Social media	Number of followers	Number of posts	Number of impressions
X	188	33	1 710
Mastodon	5	26	n/a
BlueSky	27	26	n/a
LinkedIn	205	35	18 871
Instagram	82	24	699

4.5 Media articles, blog posts, commentaries

Media articles on climate, circular economy, industry transformation, etc. published to leading news websites (e.g. Euractiv, Euronews, Science|Bunsiness) and blogs will raise awareness of the project among civil society and transfer project knowledge to broad audiences. Project partners will leverage their own press networks and strategies to strategically publish press releases on major project milestones and research outcomes.

4.6 Infographics, videos, illustrations

Infographics, videos, and illustrations will be used to create awareness and familiarity with the project among non-experts from industry, policy, and society at large. These visual aids will be included with social media posts, media articles, newsletter, and other CDE tools wherever possible to draw attention and clarify project messaging.

4.7 Policy briefs, reports, and databases

TRANSIENCE will inform future EU and national industry, climate, and energy policy assessment via a number of policy briefs, high-level reports, and open databases highlighting useful policy insights and recommendations from project work. Policy briefs and reports will capture the results of all case studies analysed during the project, including the case studies co-created with the four industrial clusters. A set of policy briefs and reports will also capture the TRANSIENCE industrial transformation pathways co-defined with stakeholders, along with analysis of these pathways using TRANSIENCE modelling capacity, to provide valuable insight to inform a range of policy assessments, including EU-level assessments relating to updates to the Circular Economy Action Plan, Fit for 55, the Green Deal Industrial Plan and national-level updates to national energy and climate plans (NECPs) and long-term strategies (LTSs). All policy-relevant results will be published and disseminated to prominent actors in EU and national energy, climate, and industry policy spheres, as well as industrial associations and governing bodies. It is envisaged that disseminated policy documents will address the conceptualisation of circular economy measures (D3.3), effective integration of circular economy measures with decarbonisation strategies (D3.6), and the twin transition of European industry through the lenses of global competitiveness (D3.7), innovation (D3.9), and holistic sustainability (D11.4). Identified policies, technologies, and opportunities for enabling the twin transition will also be accessible via an open database (D3.5). A second open database populated with services and products

[1] Analytics are only available in LinkedIn, Twitter and Instagram.

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essential to industrial transformation will also be available (D4.2). The policy-relevant publications of the project will also be disseminated via the European Circular Economy Stakeholder Platform (https://circulareconomy.europa.eu/platform/en) to further boost their visibility.

4.8 Industry guides and high-level synthesis

Industry guides and a high-level synthesis document will capture relevant insights from the TRANSIENCE case studies for stakeholders from the regional industrial clusters, ultimately informing industry strategies. These industry guides and the high-level synthesis document will showcase the usefulness of the MIC3 model ecosystem for industry and will be accompanied by links to the MIC3 ecosystem, user-friendly tutorials, and interactive visualisations of modelled pathways to facilitate uptake of the framework and results.

4.9 Scientific papers

Project results will be disseminated to the research and modelling communities through publication of peer-reviewed scientific papers corresponding to various project deliverables. Papers will be published in high-impact journals to boost visibility, credibility, and ultimately, exploitation of project results. Scientific publications will also be open access, with links available on the TRANSIENCE website to ensure broad access to project results and insights.

4.10 Open data, code, documentation, and learning materials

To enhance knowledge about climate neutrality pathways for industry and academia and facilitate exploitation of new modelling capacity, TRANSIENCE will publish MIC3 and its input data according to established open-source practices from the wider software development community (D7.2) and will also produce extensive documentation and learning materials targeted toward both expert and non-expert audiences. TRANSIENCE will use standardised templates, ontologies, and protocols to boost interoperability of new model development, ensuring that MIC3 modelling capacity fits well in the broader modelling landscape. Similarly, all produced data will be provided in established formats, such as those consistent with IPCC AR7 templates. Docker images will also be used for all modules, packing all model code, required operational environments, and dependencies in a single file that allows users to directly run modules on their personal computer or server without the need for extensive configurations. This will ensure that modules are useful for stakeholders with different levels of modelling expertise. Further, appropriate documentation will be developed for each module individually and for the integrated MIC3 ecosystem, and learning materials will include user-friendly tutorials for industry, as well as helpdesk service during the project and for two years afterward (D12.4).

4.11 Events

TRANSIENCE results will be presented at numerous events to boost awareness and interest for researchers, policymakers, and industry actors, as well as the general public. In **policy events,** project partners will showcase the usefulness of the MIC3 model, case studies, and scenarios for decision making by policymakers, reinforcing the EU's global climate and sustainability leadership. These events may include European Sustainable Energy Week, CINEA, HaDEA and DG RTD policy events, as well as events co-organised with P4P and A. SPIRE or by associated initiatives like MAIA or MAGICA. Project insights for industry stakeholders will be promoted via industry-oriented events such as **trade fairs** (e.g., those in Frankfurt

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Messe) and matchmaking initiatives such as the EU's Smart Cities Marketplace. Scientific outputs will be promoted amongst researchers and modellers via **academic conferences** and modelling community events such as meetings of the Open Energy Modelling Initiative (openmod), which promotes energy system modelling based on open principles for research and policy advice, and annual meetings of the Integrated Assessment Consortium (IAMC). TRANSIENCE will also engage with the annual European Climate + Energy Modelling Platform (ECEMP) conference as a forum of exchange to disseminate MIC3 improvements and scenarios and to track and build on advances made in related projects. The ECEMP brings together researchers and modelling teams from across Europe, partners from Horizon Europe projects, representatives of the European Commission, and partners from industry and civil society, which will allow TRANSIENCE project impacts to be amplified across all stakeholders.

In line with the TRANSIENCE aim to bring together and integrate expertise and methods from across computer, information, earth, physical, and social sciences, as well as engineering, TRANSIENCE CDE will reflect interdisciplinarity through participation in events and activities focused on adopting an interdisciplinary perspective. For example, project partners may participate in interdisciplinary workshops such as the Swiss Social Sciences and Humanities Energy Research Workshop, which welcomes participation by scholars spanning social sciences, humanities, arts, and multiple research fields.

4.12 Stakeholders Engagement Activities

Stakeholder engagement and co-creation activities including workshops, interviews, and surveys will allow for continuous promotion of the project and results to all stakeholders throughout the project. A robust and place-based stakeholder engagement process will also promote project uptake by ensuring that project results are understandable, useful, and contextualised for target stakeholders.

Refer to the Multi-layered Stakeholder Engagement Strategy (D2.1) for detailed guidance on conceptualising, planning, and executing stakeholder engagement activities throughout the project.

4.13 Open access online platforms and repositories

TRANSIENCE will produce a suite of outputs for industry, policy, research, and society at large. The project will develop the MIC3 model ecosystem and generate analysis of transition pathways and industry case studies, along the way producing model code and input data, documentation and learning materials, policy and scientific publications, open databases of policies and technologies for the twin transition and services and products for industrial transformation. Open access platforms and repositories will be used to disseminate and facilitate exploitation of all outputs during the project and beyond.

The full and simplified versions of the MIC3 model, along with the satellite modules will be fully open in **GitHub** – a developer platform for hosting code – according to established open source practices from the wider software developer community. Use of GitHub repositories will increase model exposure, promoting uptake by the modelling community and ensuring that MIC3 builds on existing modelling capacity to study industrial transitions.

Zenodo – a multi-disciplinary open data repository for research output – will give all stakeholders access to model input data, papers on model design and methodology, reports, policy briefs, industry guides, and high-level synthesis reports analysing industry twin transition scenarios and case studies, as well as

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interactions between circular economy, decarbonisation, competitiveness, innovation, and global sustainability. Zenodo will allow open access to all types of TRANSIENCE research output and long term preservation beyond the end of the project.

Open Research Europe – an open access publishing platform offering rapid publication and open peer review for European Commission-funded research – will be considered as an outlet for project publications. With post-publication peer review, project results can be shared quickly, while Open Research Europe publications that pass peer review are indexed in PubMed, Scopus, Inspec, Google Scholar, etc., to ensure broad visibility of project outputs.

Dedicated workspaces in **I²AM PARIS** – an open access data exchange platform for the international energy- and climate-economy modelling community – will be used to host model input data, results, and extensive documentation, such as interactive model documentation; an open model development toolbox (including guidelines, protocols, diagnostics, APIs, etc.); outcomes of model validation surveys and workshops; results of twin transition scenarios; customisable visualisations of industry case study results; results on bridging circular economy and decarbonisation; downloadable CSV datasets; and databases of transformative policies, technologies, services, and products for industrial transition. Through the use of both technical and non-technical language, the I²AM PARIS workspaces will enable all stakeholders from policy and industry to use MIC3 modelling capacity and key takeaways to inform decision-making, while the modelling community will be able to use and reference MIC3 modelling tools and methods to progress energy- and climate-economy modelling through adaptations and extensions beyond Europe.

4.14 DOIs and Creative Commons Licenses

All papers–scientific papers, industry guides, policy briefs–and relevant datasets will be shared using Creative Commons licences to enable further sharing, using, and building upon TRANSIENCE work. Digital object identifiers (DOIs) will also be used for reliable and permanent findability.

Refer to the Open Data Management Plan (D3.1) for detailed actions to ensure effective knowledge and data exchange according to FAIR open science principles.

4.15 Synergies

TRANSIENCE will leverage links to related projects and initiatives from relevant scientific communities, as well as from the policy and industry world, to build on existing knowledge and amplify the impacts of TRANSIENCE. As noted in the Grant Agreement, special focus will be placed on harnessing synergies with fora that bring together expertise to address key challenges across the energy and climate modelling landscape. This includes the European Forum for Energy and Climate Transition (EFECT) and the European Climate and Energy Modelling Forum (ECEMF), both of which aim to facilitate the development of robust energy and climate modelling capacity in Europe to support policy making and decision making by all stakeholders. Crucially, significant synergy opportunities have already been identified with TRANSIENCE sister project AMIGDALA, particularly in terms of joint scientific or policy/industry-focused publications (e.g. papers, briefs, guides) and events (e.g. workshops or fora). Synergies will also be developed with other projects providing model-based evidence to support climate policymaking (e.g., IAM COMPACT, ENGAGE, ELEVATE, NDC ASPECTS) and expand modelling capacity to address emerging climate mitigation and CE challenges (e.g., DIAMOND, PRISMA, NAVIGATE, WorldTrans). The I²AM PARIS international modelling

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community platform in particular will be used to facilitate harmonisation, evaluation, validation, and scenario co-creation in TRANSIENCE, adapting platform protocols, templates, repositories, and procedures.

TRANSIENCE will also build on the advancements of relevant IEA programmes, such as the Industrial Energy-related Technologies & Systems (IETS) and the Energy Technology Systems Analysis Program (ETSAP), as well as circularity research centres and industrial networks like the Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials (ICEC-MCM), the Ellen McArthur Foundations, Circular Metal, and the International Society for Industrial Ecology (ISIE). TRANSIENCE will also advance 'best available science' through contributions to major scientific assessments like the IPBES, RIP, and IPCC, boosting both visibility and uptake. Existing channels between consortium partners and European industry and policy will also be fully exploited. Developing these linkages and synergies with other relevant projects and initiatives through joint publications, events (e.g. conferences and workshops), and other networking activities will be key to delivering an impactful TRANSIENCE work programme. Figure 3 depicts the various synergies to be exploited for greater project impact, highlighting their specific linkages to TRANSIENCE and its partners.[2]

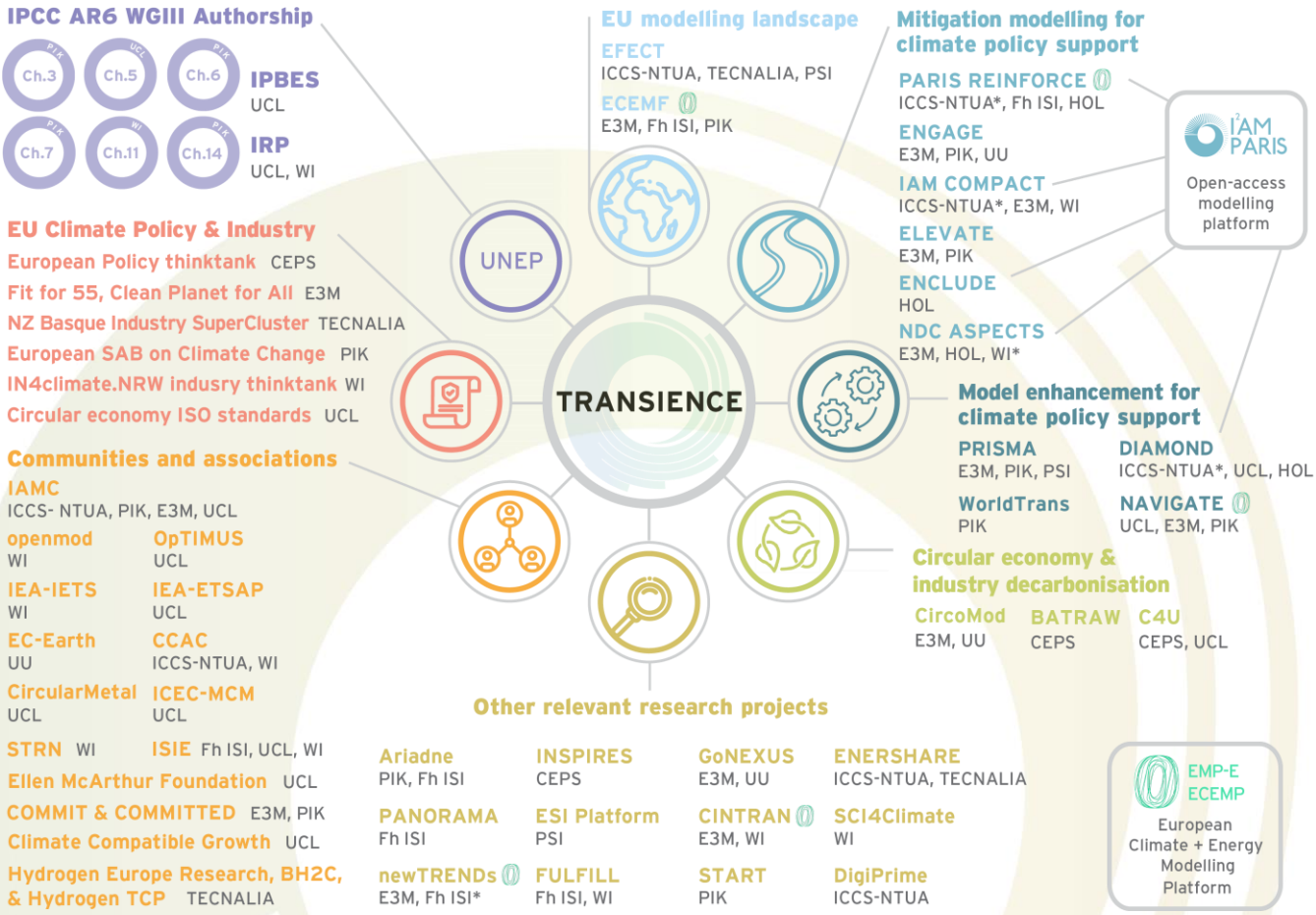

Figure 3. Links with existing research projects, consortia, networks, communities

[2] This figure is adopted from the TRANSIENCE Grant Agreement (* = partner coordinating the project).

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5 CDE Targets

The significance of TRANSIENCE outputs such as new modelling capacity, scenarios, and policy and industry strategies, ultimately depends on uptake by stakeholders. Quantifiable targets ensure that uptake can be effectively monitored. During the project, uptake is quantified in terms of the number of presentations at conferences, meetings, and events and in terms of number of users, views, and downloads of models, publications, and datasets from access points like the project website, Zenodo, and I^{2}AM PARIS. To capture long term impacts, uptake will also be quantified in terms of expected references in papers, reports, and policy documents, as well as in terms of adaptation by other modelling teams. This section presents tables of planned communication (Table 3) and dissemination and exploitation (Table 4) activities, as well as measurable targets – or Key Performance Indicators (KPIs) – to monitor implementation. A simplified monitoring tool in the form of spreadsheet will be created and shared with project partners for them to easily report, update and monitor CDE progresses throughout the project.

5.1 Planned Communication Activities

Table 4. Planned communication activities

Communication Activity	Target
Visual Identity	Poster, leaflet, presentation templates
Project website	2000 unique visitors/year 30% return visitors <50% bounce rate
Social media channels (Twitter, Facebook, LinkedIn)	1,000 #industry4netzero and/or #transience uses 500 followers
Bi-monthly newsletters	4000 recipients/downloads 30% opening rate
Infographics and videos	At least 5 total > 1,500 views/downloads
Blog posts, media articles, commentaries	At least 10 total
Final EU event	70-100 attendees

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5.2 Planned Dissemination and Exploitation Activities

Table 5. Planned dissemination and exploitation activities

Main Project Output	Related Dissemination and/or Exploitation Activity	Target Audience(s)	Outcome Target(s)	Long-term Impact Target(s)
Framework for bridging CE and decarbonisation	5 reports	All target audiences	> 200 views	> 15 citations each in future papers
	5 scientific papers	Research community		
	5 conference papers	All target audiences		
	Framework uploaded to I²AM PARIS	All target audiences		
Databases of policies, technologies, services, and products	2 workspaces in I²AM PARIS, featuring interactive search and visualisations	All target audiences	> 500 unique users	> 10 references in papers and policy reports
	2 scientific papers	Research community	> 200 views	
Tools and materials for open model development	Open science toolbox and documentation (incl. protocols and diagnostics and APIs) in I²AM PARIS	Research community	> 250 unique users	> 10 modelling teams to use and reference
	Scientific documentation of open model development	Research community	1 methodological paper	
	Interactions with the modelling community	Research community	Participation in 3 community meetings (e.g., openmod, etc.)	
MIC3 (and satellite modules)	Full MIC3 model (GitHub)	Research community	> 50 external users	15 references to model in future papers 10 external modelling teams to adapt MIC3
	Simplified MIC3 model (GitHub)	Policymakers Industry actors	> 1 000 unique users	
	Model data uploaded to Zenodo	Research community	Starred > 50 times	

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	Model documentation in I²AM PARIS	Research community	Documentation of MIC3 and all its sub-modules independently in I²AM PARIS	
	10 open access scientific papers on model design and methodology	Research community	> 100 unique viewers each	
Scenarios for the twin transition of European Industry	Open and transparent documentation of project scenario results	All target audiences	5 workspaces in I²AM PARIS documenting scenario results	Scenario results to inform 5 policy documents, 5 industrial strategies, 5 NGO publications TRANSIENCE scenarios/results to be references > 30 times in upcoming IPCC, IPBES, IRP, and UNEP (Emissions Gap) reports
	2 reports analysing scenario results uploaded to Zenodo	All target audiences	> 200 views each	
	3 policy briefs analysing scenario results uploaded to Zenodo	Policymakers		
	3 industry guides analysing scenario results uploaded to Zenodo	Industrial actors		
	1 high-level synthesis for industry uploaded to Zenodo	Industrial actors		
	Scientific dissemination of scenario pathways in academic journals	Research community	5 scientific papers on scenarios (each targeting an EII sector or process industry)	
	Dissemination of scenario pathways in academic, policy, or industry events	All target audiences	Presentations of scenario results at 10 events (conferences, policy events, workshops, etc.)	
Case studies on diverse industrial	2 reports documenting case studies	All target audiences	> 200 views each	> 15 citations per case study

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sectors and clusters	2 policy briefs	Policymakers		
	2 industrial guides	Industrial actors		
	Open and transparent documentation of case study work	All target audiences	5 workspaces in I²AM PARIS visualising case study results	
	Scientific dissemination of case study work in academic journals	Research community	5 scientific papers	
	Dissemination of case study work in academic, policy, or industry events	Al target audiences	Presentations at 5 events (scientific and policy)	
Assessment of needs for industrial transition	5 reports documenting co-creation activities	All target audiences	> 200 unique viewers	80% participant satisfaction 10 references in future papers and reports
	Open and transparent documentation of outcomes of surveys and workshops validating modelling results	All target audiences	2 workspaces in I²AM PARIS documenting outcomes of surveys and workshops validating modelling results	
	Scientific dissemination of outcomes of surveys and workshops validating modelling results in academic journals	Research community	> 2 scientific papers documenting outcomes of surveys and workshops validating modelling results	
	Dissemination of outcomes of surveys and workshops validating modelling results in academic, policy, or industry events	All target audiences	1 conference/event presentation documenting outcomes of surveys and workshops	

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			validating modelling results	
Synergies and collaborations	Active planning for and reporting on synergies	All target audiences	2 reports documenting mapping of relevant research projects, potential collaboration routes, and eventual collaborations	> 10 TRANSIENCE papers, briefs, and guides jointly produced with relevant projects and members of modelling communities
	Joint events with other initiatives	All target audiences	At least 5 collaborative events	

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6 Conclusions and future updates

The above outlined CDE Plan details of the objective, target audiences, tools and measurable targets of TRANSIENCE CDE activities. Its primary purpose is to provide comprehensive guidance for project partners in planning and executing CDE activities throughout the project, while also serving as useful resource for stakeholders interested in understanding scope and methods of TRANSIENCE CDE efforts.

The Plan emphasises the purpose of CDE activities through its three distinct pillars (communication, dissemination and exploitation). It identifies key target audiences of these activities, namely policymakers, academics, industry stakeholders, and the civil society, outlining a variety of CDE tools that will be employed to endure their effectiveness. These include the project's visual identity, website, social media platforms, newsletters, events, publications, and collaborative initiatives. Measurable targets are defined to facilitate the systematic monitoring of CDE progress throughout the project.

The TRANSIENCE CDE will be revised and updated twice throughout the project to incorporate emerging project insights, address challenges and to set out broader considerations and goals. The first update will be submitted halfway through the project (D9.1 – Updated project CDE plan, M24) and the second during the final phase of the project (D12.1 – Final project CDE plan, M42).

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