



First Update of Communication, Dissemination, and Engagement Plan

Deliverable 4.7

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1 About 4C

4C, or **C**limate-**C**arbon Interactions in the **C**urrent **C**entury, is an EU-funded project that aims to fill the crucial knowledge gap on carbon dioxide (CO₂) emissions, by reducing the uncertainties in our quantitative understanding of carbon-climate interactions and feedbacks. The objectives of the 4C project are to:

1. Better understand the processes controlling the global carbon cycle.
2. Develop new tools and methods to predict, for the first time, the evolution of global carbon cycle variability over the coming decade, including atmospheric CO₂, land and ocean carbon sinks, and climate response to track the overall progress towards the goals of the Paris Agreement.
3. Reduce uncertainties in climate projections over the 21st century.
4. Ensure the usability of the knowledge generated by scientific research and engage in bilateral interactions among scientists and policymakers, while also fostering the understanding of the findings for the broad society.

4C will achieve its objectives through the innovative integration of new models and a wide range of observations. It will develop systems for new climate predictions and projections from annual to centennial timescales that are informed by observations, and provide key knowledge to underpin IPCC assessments and support policymakers. The project runs for 48 months, from June 2019 to May 2023.

2 Purpose and objectives of WP4 and this updated CDEP

Work Package 4 (WP4) is titled “Synthesis, dissemination and policy dialogue”. As such, the overall purpose of WP4 is to assess, synthesise, and disseminate the scientific findings of 4C to foster a broader understanding of climate-carbon interactions and accurate interpretation in support of scientific assessments and policymaking. WP4 builds on the findings from WPs 1, 2 and 3 and the knowledge generated, elaborating it to make the information easy to access, and transferring it to targeted stakeholders using tailored techniques. The main objectives of WP4 are to:

1. Develop and foster a broad range of communication, dissemination and engagement activities to facilitate knowledge transfer and support international scientific assessments, such as IPCC, IPBES, GCP, WMO State of the Climate, UNEP Emissions Gap Report, and similar assessments.
2. Ensure accurate interpretation of scientific findings by policymakers in the context of the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement.

3. Broaden the public's understanding of the carbon cycle and the risks of climate-carbon interactions enhancing climate change.
4. Increase the visibility of 4C and its outcomes in Europe and beyond, to support Europe's leadership in climate science.

Thoughtful and well-implemented communication, dissemination and engagement methods are key to achieving the overall goals of 4C and this WP. Ultimately, they can help facilitate real and positive project outcomes during and after the lifetime of the project.

2.1 First CDEP Update

This document is the first update of the Communication, Dissemination and Engagement Plan (CDEP). The previous version of the CDEP was published in February 2020 as Deliverable 4.6, while a second update of the plan will be presented in May 2022 (the [list of Public Deliverables](#) can be found on the project webpage).

The CDEP describes the strategies and activities planned along the lifetime of the 4C project (see Section 5). It also includes guiding information on key messages that 4C partners should be aware of, identifies the target audiences and the channels to reach them. This plan also includes KPIs and risk assessment. A live version of the CDEP will be maintained in the project's shared folder (Microsoft Teams) in order to keep the plan updated and develop further communication activities that will require a well-defined strategy. The objective is for this live document to serve as a continuous reference for the WP partners, and ultimately ensure that we continuously improve and enhance the WP's activities throughout the project's lifetime.

3 Definition of 4C communication, dissemination, and engagement strategies

In the context of this H2020 project, the differentiation among the communication, dissemination and engagement strategies is described below, although in practice these actions are closely linked.

Communication strategy: The project's communication strategy aims to raise awareness, create visibility, and support dissemination and exploitation by providing a strong visual identity, media tools and channels, as well as fostering linkages with other related projects and programmes. The communication strategy targets multiple audiences beyond the project's own community, including the media and general public in order to show how society can benefit from the research.

Dissemination strategy: The dissemination strategy aims to position the scientific results, tools and knowledge from the project to be usable by a range of stakeholders within the scientific community and society, contributing to the development of relevant national, European, and international policies. The dissemination strategy targets

specialist audiences that may use the results in their own work, including peer groups, policymakers, industry, and professional organisations.

Engagement strategy: The engagement strategy aims to maximise the project impact and knowledge exchange to proactively engage with groups of interest within and outside the EU, and elicit feedback from relevant actors. Engagement activities imply a multilateral conversation where the project hears, reacts and co-produces results together with engaged stakeholders.

4 Key messages

To effectively execute communication, dissemination and user engagement activities, it is essential that all 4C project partners understand the basic ambitions and expected impacts of the project. These “key messages” should be taken into account when preparing content to ensure that it aligns with these messages and creates the desired impact. Examples of the main project’s key messages are presented below. These will be updated throughout the project.

Key messages related to climate-carbon interactions:

- Using multiple methods, combining observations and modelling, it is possible to better constrain the contemporary global carbon budget, and help reduce the magnitude of the budget imbalance.
- Predictions of the near-term evolution of the carbon cycle can be used to assess and improve our process understanding.
- Changes in atmospheric CO₂ are influenced by anthropogenic emissions, as well as by the intrinsic natural variability of the climate-carbon cycle system. Insufficient understanding of natural variability could generate misleading expectations of the impact of emission reductions on global warming.
- Understanding natural variability improves the knowledge of the likely outcome of implementing the Nationally Determined Contributions (NDCs) on atmospheric CO₂ concentrations, provides deeper insights on the ability to verify changes in emissions, and allows policymakers to set the right targets to achieve and verify key milestones of the Paris Agreement.
- The use of emergent constraints can help refine our estimates of the magnitude of the climate-carbon interactions, and thereby provide more robust projections of the future evolution of the carbon cycle.
- Clear understanding of climate-carbon interactions is key to ensure emission cuts delivered the goal of climate neutrality in Europe by 2050, set by the European Green Deal, are consistent with the climate goals of the Paris Agreement.

Key messages on the project ambitions:

- 4C will provide a better quantitative understanding of processes controlling the global carbon cycle, through the combination of observation- and model-based analysis of land and ocean sink variability and trends over the recent past.

- By the end of the project, 4C aims to provide robust annual to decadal predictions of atmospheric CO₂ to track the overall progress towards the goals of the Paris Agreement and inform the UNFCCC 2023 global stocktake.
- 4C will improve the understanding of land and ocean processes controlling the evolution of atmospheric CO₂ and reduce uncertainties in carbon-climate feedbacks.
- 4C will foster a broader understanding of climate-carbon interactions and an accurate interpretation in support of scientific assessments and policymaking.
- 4C will improve the understanding of the carbon cycle, and carbon-climate interactions, amongst policy makers, scientists from other disciplines, and the broader community.

Key messages on the expected impacts of 4C:

- 4C will actively work to support major international scientific assessments, such as the IPCC Assessment Reports.
- 4C aims to increase confidence in climate change predictions and projections.
- 4C will provide added value to decision' and policymakers by providing them science-based evidence.
- Our long-term goal is to sustain Europe's leadership in climate science.

5 Communication, Dissemination, and Engagement Plan

5.1 Tasks

All the activities listed in the plan are related to the WP4 work plan found in the Description of Action of 4C. These activities are framed within one of the following four tasks in the WP, with each task aimed at a specific audience:

Task 4.1: Knowledge transfer to support major international scientific assessments (lead by UEA)

This task intends to provide direct support to international assessments. The first priority of this task will be to support IPCC AR6.

Task 4.2: Provide added value to decision- and policymakers (lead by CICERO)

This task will engage with decision- and policymakers to add value by translating the emerging scientific consensus.

Task 4.3: Climate-carbon interactions for broad audiences (lead by BSC)

This task will adapt materials from Tasks 4.1 and 4.2 for a general audience, create outreach materials and social media actions, communicate the results to the target audience and support media coverage.

Task 4.4: Communication and dissemination management (lead by BSC)

This task involves the management of the general communication tasks (e.g. creation of the CDEP). It also aims to create visibility for the project to the general public and media, design the project website and visual identity, and produce online and printed PR materials.

The lead for each task will be the main partner responsible for tracking the progress of the subtasks and the overall work performed in each task, while BSC and CICERO, as WP leaders, will ensure the linkages, timing and consistency across all tasks.

5.2 Gantt chart

A Gantt chart summarising the timing of the main subtasks of the four project tasks and defining the deadlines for deliverables (D) and milestones (M) is presented in Figure 1.

D: Deliverable M: Milestone	2019				2020								2021								2022				2023																							
	JUN	JUL	AUG	SEP	10 MAR	11 APR	12 MAY	13 JUN	14 JUL	15 AUG	16 SEP	17 OCT	18 NOV	19 DEC	20 JAN	21 FEB	22 MAR	23 APR	24 MAY	25 JUN	26 JUL	27 AUG	28 SEP	29 OCT	30 NOV	31 DEC	32 JAN	33 FEB	34 MAR	35 APR	36 MAY	37 JUN	38 JUL	39 AUG	40 SEP	41 OCT	42 NOV	43 DEC	44 JAN	45 FEB	46 MAR	47 APR	48 MAY					
Task	Short Description																																															
4.1.1	Supporting IPCC AR6: M																																															
4.1.2	ScienceBrief UX & reach M D																																															
4.1.3	AR6 & Intern. Assesments																																															
4.2.1	3 Factsheets																																															
4.2.2	Policy brief & exec. summaries																																															
4.2.3	Carbon outlooks																																															
4.2.4	Events M D																																															
4.3.1	Media coverage																																															
4.3.2	Content for platforms																																															
4.3.3	Infographic carbon cycle D																																															
4.3.4	Explorable explanation D																																															
4.4.1	Visual Identify D																																															
4.4.2	Website D																																															
4.4.3	Comm, Diss, & Engage Plan D D D																																															
4.4.4	Comm and PR Materials																																															
D.4.9	Comm, Diss, & Engage Report D																																															

Figure 1. Timeline of deadlines for WP4 tasks, deliverables (D) and milestones (M).

5.3 Updated action plan

The detailed tasks of the CDEP for 4C are presented in Table 1. This action plan lists each of the subtasks of the project, defines the target audience and aims, and provides an initial suggestion of concrete actions to be carried out, together with their status and estimated deadline. In this first update of the CDEP, the status and deadlines of each task have been revised, and comments on the progress are shown.

It should be noted that this plan is conceived as a live document, thus additional actions to the initial ones have been included, and further actions will be added as the project progresses.

Table 1. Detailed communication, dissemination and engagement plan.

	Task / Partners	Target group	Aim	Actions	Status / deadline	Comments
ENGAGEMENT	4.1.1 (UNEXE, UEA, MPG, ETHZ, BSC, UBREMEN, CICERO, DLR, UOXF)	4C IPCC lead authors	Support IPCC AR6 (address issues of AR6 drafts, and identify key remaining issues that can be resolved by 4C) (<i>milestone 9 - UNEXE</i>)	<ul style="list-style-type: none"> Kick-off <u>workshop</u> Minutes published on website (including key issues to address in 4C) 	COMPLETED	
ENGAGEMENT	4.1.2-A (UNEXE, UEA, UBERN)	ScienceBrief users and platform contributors (particularly policymakers and media users)	Improve ScienceBrief user experience and reach (<i>milestone - UEA</i>)	<u>Deploy</u> recommendations from the analysis of User Experience advice received in July 2019 (survey and interviews), and <u>re-evaluate</u> the usage of the ScienceBrief Carbon Cycle pilot after COP26	May 2021	
DISSEMINATION	4.1.2-B (UNEXE, UEA, UBERN)	IPCC authors, 4C consortium	Ensure ScienceBrief platform is up-to-date (<i>D4.1; UEA lead</i>)	<ul style="list-style-type: none"> Work with IPCC authors to <u>update the carbon cycle statements</u> posted on ScienceBrief <u>Include all 4C results</u> on platform 	Nov 2022 Throughout the project	
DISSEMINATION	4.1.3-A (UNEXE, UEA, BSC, CICERO)	Scientific community	Support post-AR6 and other international assessments	Present 4C results at <u>conferences</u> and <u>workshops</u> (e.g. European Geophysical Union)	Throughout the project	<p>Organisation and participation in conferences, workshops and other events may be affected by the COVID-19 pandemic.</p> <p>When possible, events will be held or followed online.</p>
ENGAGEMENT	4.1.3-B (UNEXE, UEA, BSC, CICERO)	Scientific community, particularly early career researchers	Engage the broad community (particularly early career researchers) to contribute to ScienceBrief	<ul style="list-style-type: none"> <u>Training session</u> at next annual meeting <u>Video tutorial</u> to be shared 	June 2020 - COMPLETED	The annual General Assembly meeting was held online, due to COVID-19 restrictions.

DISSEMINATION	4.2.1 (UNEXE, UEA, BSC, CICERO)	Decision- and policymakers, scientists	Build knowledge base of project users; present the main concepts of 4C to help understand the project outcomes	Prepare at least 3 <u>factsheets</u> (<i>Potential topics: carbon cycle and its uncertainties, new observations of the carbon cycle, decadal vs. long-term predictions, emergent constraints and carbon cycle feedbacks, remaining carbon budgets for climate targets</i>)	Throughout the project	
DISSEMINATION	4.2.2-A (UNEXE, UEA, BSC, CICERO)	Decision- and policymakers, intergovernmental organisations (IGOs)	Highlight all relevant results and adapt them for use by decision- and policymakers: 1. Most relevant results of project on emissions and climate-carbon interactions 2. Overview of current policies on emissions and climate implications 3. Policy recommendations	<ul style="list-style-type: none"> Prepare a <u>policy brief</u> At least 3 <u>science summaries</u> of results 	Towards end of the project June 2020 to end of project	1 science summary has been produced, titled “Effect of COVID-19 confinement on daily global CO ₂ emissions”, based on the 4C-funded paper: Le Quéré et al. (2020). Nat Clim Chang. DOI:10.1038/s41558-020-0797-x.
DISSEMINATION	4.2.3 (UNEXE, UEA, BSC, CICERO)	Decision- and policymakers	Carbon outlooks focused on carbon budget for recent years (T1.4) and forecast for coming years (T2.4); collaboration with the Global Carbon Budget project	<ul style="list-style-type: none"> Publish annual <u>carbon outlooks</u> Related <u>news story</u> published on the project website each year 	Autumn 2020, 2021, 2022 and 2023	The first Carbon Outlook to be published in December 2020.
ENGAGEMENT	4.2.4-A (UNEXE, UEA, BSC, CICERO)	EU policymakers	Communicate key findings to policymakers and discuss their perspective and goals	<u>Participate in events</u> to present key 4C findings: <ul style="list-style-type: none"> UNFCCC intersessional meeting (Bonn), or COP each year Other relevant events 	May/June Nov/Dec	UNFCCC and COP events taking place in 2020 have been postponed as a result of COVID-19 restrictions.

ENGAGEMENT	4.2.4-B (UNEXE, UEA, BSC, CICERO)	EU and national policymakers	Briefings around emerging topics from 4C (T4.2.1 and 4.2.2); help the interaction between scientists and stakeholders, exchange ideas	<ul style="list-style-type: none"> • <u>Workshop</u> in Brussels (<i>milestone 11</i>) • Publish workshop <u>minutes</u> • Organise or co-organise other <u>briefings</u> • <u>Summary report</u> on engagement with policy makers (<i>D4.2</i>) 	<p>Sept 2022</p> <p>Oct 2022</p> <p>Throughout the project</p> <p>Feb 2023</p>	
COMMUNICATION	4.3.1 (UNEXE, UEA, BSC, CICERO)	Media outlets and journalists	Identify emerging news stories and encourage their media coverage	<ul style="list-style-type: none"> • <u>Press releases</u> and direct contact with journalists • <u>Rapid Response Review</u> report, and statement added to ScienceBrief “<i>Critical Issues in Climate Change Science</i>” 	Throughout the project	<p>Press release are produced by the project and/or institutions of involved researchers to promote the publication of 4C-funded studies.</p> <p>To date, two reviews were posted on the news.sciencebrief.org site:</p> <ul style="list-style-type: none"> - Climate change increases the risk of wildfires - September Update: Climate change increases the risk of wildfires
COMMUNICATION	4.3.2 (UNEXE, UEA, BSC, CICERO)	General public, all target audiences, related projects	Materials adapted for a general audience (T4.1, T4.2) to promote 4C and knowledge on climate-carbon interactions; produce communication content in collaboration with other WP partners	<ul style="list-style-type: none"> • Prepare <u>outreach materials</u>: opinion editorials, interviews, videos, posts, infographics etc. • <u>Social media actions</u> (twitter posts etc.) 	Throughout the project - monthly meetings to decide the number/type of content	
COMMUNICATION	T4.3.3 (BSC)	General public, media, scientific community	Animated infographics about carbon cycle (<i>D4.3</i>): Poster to be used in press releases, reports, presentations, conferences; video for Youtube, website and live presentations	<ul style="list-style-type: none"> • Create a short <u>animated video</u> on carbon cycle (30 sec to 1 min) • Create a static <u>poster</u> on carbon cycle 	Nov 2020 - Animated infographic - COMPLETED	<ul style="list-style-type: none"> - <u>Animated infographic</u> available at the following link - Campaign to maximise reach of video & poster - Creation of the <u>poster</u> has been placed on hold, since 4C will not be participating in any upcoming events due to COVID-19 restrictions

DISSEMI NATION	T4.3.4 (BSC)	EU decision- and policymakers, general public, media, IGOs	Provide context to understand the project's challenges, motivations and outcomes (D4.4)	Develop a web-based explorable explanation of project results and simulations (interactive application)	Sept 2022	
COMMUNICATI ON	T4.4.1 (BSC)	4C consortium	Develop a visual identity for consistency of all project materials (D4.5)	<ul style="list-style-type: none"> Design <u>visual identity</u> of project (logo, colours, design elements, fonts) Design <u>templates</u> for letters, presentations, reports and newsletters 	<p>March 2020 - COMPLETED</p> <p>March 2020 - COMPLETED</p>	
COMMUNIC ATION	T4.4.2 (BSC)	All target audiences	Website containing the project description and its various outputs, such as public reports, general information, dissemination materials and news (D4.5)	Develop project <u>website</u>	March 2020 - COMPLETED	Project website is now live, and can be accessed at 4c-carbon.eu
COMMUNICATION	T4.4.3 (UNEXE, BSC, CICERO)	WP4 partners and all 4C partners	CDEP to maximise the project impact; provide detailed information about planned activities, key messages, target audiences, communication platforms and activities, practical branding info (logo etc.), engagement actions (D4.6-4.9)	<ul style="list-style-type: none"> Prepare <u>CDEP</u> (including two revisions) <u>Summary report</u> on the communication, dissemination and engagement activities 	<p>Feb 2020, Nov 2020, May 2022 (updated during project)</p> <p>Feb 2023</p>	<p>CDEP – Published in Feb 2020</p> <p>First Update of CDEP (referring to the present document) – Ready to be published in Nov 2020</p>
COMMUNICA TION	4.4.4 (UNEXE, BSC)	Related projects, EU decision- and policymakers	Produce communication and PR materials to give visibility to the project	<ul style="list-style-type: none"> <u>Roll-ups</u> <u>Poster</u> <u>Project brochure</u> (online materials to reduce the use of paper) 	Throughout the project	Production of communication materials for events has been placed on HOLD, due to COVID-19 restrictions

Each task shown in **Table 1** has been labelled as a **Communication**, **Dissemination** or **Engagement** action. Please note that some of these actions may have mixed objectives and overlap.

- **Communication campaigns for scientific publications**

Promoting the project's research in a way that is understood by the non-specialist public is one of the main goals within the communication strategy. At the same time, the public disclosure of the results of scientific publications is key in terms of dissemination, to maximize the impact of the research and ensure the transfer of knowledge to the ones that can best make use of it.

When a new paper supported by the 4C project is submitted, the Communication team is informed to start preparing the strategic actions to promote the new research: a news article in the project's website (<https://4c-carbon.eu/latest-news/project-news>), a campaign on Twitter and, in some cases depending on the publication, a press release to be distributed to the media.

Once the embargo is finished and the new study is published and open access, the team uploads it to the scientific publications section of the website (<https://4c-carbon.eu/resources/scientific-publications>) and proceeds with the rest of the planned actions.

- **Policy Publications**

In the 4C project, policy publications can be grouped into three main categories:

- **Fact sheets** present the main concepts to understand the outcomes of 4C science. This material addresses policy makers as well as fellow scientists;
- **Science summaries** highlight relevant results and translate them for use by decision and policy makers. They are based on project publications and public deliverables;
- **Policy briefs** present project results, similarly to the science summaries, but combined with an overview of current policies offering a set of policy recommendations.

The project has planned at least three factsheets, three science summaries and a policy brief towards the end of the project. A tentative calendar is presented below. However, this is subject to some changes, especially with respect to science summaries based on publications. These depend on the publication date schedule by the journal. Moreover, new relevant topics may arise.

Science summaries, Factsheets and policy briefs are published in the "Policy Publications" page found under the menu option "Resources" in the project website (<https://4c-carbon.eu/resources/policy-publications>).

A calendar of the expected policy-related publications in the 4C project is presented in **Table 2**.

Table 2. Calendar of policy publications.

Publication type	Topic	Date
Science summary	Effect of COVID-19 confinement on daily global CO ₂ emissions	July 2020
Science summary	Net-zero emissions - will the world stop warming when we get to net-zero CO ₂ emissions?	First quarter 2021
Fact sheet	What are decadal predictions of the carbon cycle and why are they useful?	Third quarter 2021
Fact sheet	Emergent constraints: how can our understanding of past climate change help us refine estimate of future projections?	First quarter 2022
Fact sheet	The evolution of the remaining carbon budget in the last decade: do we have more or less time?	First quarter 2022
Policy brief	Anthropogenic emissions and climate-carbon interactions; Policy recommendations.	Last quarter 2022
Science summary	Prediction of atmospheric CO ₂ over the coming years	First quarter 2023

- **Carbon Outlooks**

Carbon Outlooks publish key 4C outcomes, in partnership with the high-profile annual Global Carbon Budget. The Global Carbon Budget has major releases in November or December each year, generally in line with the UNFCCC Conference of the Parties (COP). Many 4C researchers are also involved in the Global Carbon Budget. To get maximum outreach for the Carbon Outlooks, they will initially be integrated within the Global Carbon Budget before becoming more stand-alone later in the project.

The focus of the Carbon Outlooks will be on the carbon budget for the recent years (T1.4) and the forecast for the coming year (T2.4), including an assessment of past performances. This activity will be a collaborative effort with the Global Carbon Budget to ensure broad outreach. The 4C material will be integrated into the Global Carbon Budget communication material, such as key messages, PowerPoint presentation, and figure dataset. Each year the activity will be supported by a news story on the 4C website.

- **ScienceBrief**

4C, in collaboration with the European project CRESCENDO (grant no. 641816), is financially supporting the initiative ScienceBrief (<https://sciencebrief.org>), which has been set up by researchers at the University of East

Anglia's Tyndall Centre for Climate Change Research. ScienceBrief is a new platform for reviewing scientific publications that shows the status and strength of scientific consensus in critical areas such as climate change.

ScienceBrief has published a rapid response review that shows strong consensus about the link between climate change and wildfire risk. The review was firstly published in January 2020 and updated in September 2020. The research, which collates over 115 articles, has been covered in the Project News section of the 4C website (<https://4c-carbon.eu/newsroom/news/climate-change-increases-risk-wildfires>).

In addition, another review revisiting wildfires was published in September 2020. This second review focused on evidence that had been added to the platform since the first review was published. This shows how the continuously updating nature of science is reflected in a tool like ScienceBrief. These reviews were published at the news.sciencebrief.org publication site.

5.4 COVID-19 Strategy

As a result of the COVID-19 pandemic, all related events (such as conferences, workshops, project meetings etc.) planned to be held in 2020 have been held online, cancelled or postponed. For instance, the 4C General Assembly meeting was held online on 23-24th June 2020, while COP26 that was originally scheduled for November 2020 has been postponed until November 2021.

Due to this shift to online events, the 4C project currently focuses on producing online communication and dissemination materials, resources and campaigns, for example Science Summaries in the form of PDF documents, news articles published on the 4C website, and social media posts shared on the 4C Twitter account. The creation of materials, such as posters and roll-ups, has been placed on hold due to the lack of face-to-face events.

Furthermore, the COVID-19 pandemic can undermine the communication to target audiences. The 4C communication team is planning various alternative online actions to promote the research and findings of 4C, such as producing short videos with 4C researchers explaining key concepts and a number of Twitter actions (described in more detail in the [Website Strategy](#) and [Twitter Strategy](#) sections). The absence of meetings in person (e.g. virtual General Assembly) may also weaken internal communication. The 4C team is planning internal virtual workshops, referred to as "Science talks", to discuss specific topics and engaging all project partners.

6 Target audiences and communication channels

To reach the expected impact of 4C's communication, dissemination, and engagement activities, some target audiences have been defined for each activity in the action plan. The full list of target audiences and the appropriate channels that will be used to reach these audiences are identified and summarised in **Table 3**.

Table 3. Target audiences and channels.

Target group	Communication purpose	Channels	Related tasks
All 4C project partners	Share knowledge and update advancements throughout the project	4C mailing lists, general assembly, emails, project intranet	T5.1
WP partners	Share progress and monitor completion of project tasks	Mailing lists, emails, project intranet, general assembly	T5.1
	Detect and mitigate internal risks to maximise positive impact	Video conferences, face-to-face meetings, group sessions at general assembly	T5.1
WP leaders	Coordinate the overall advancements of the project across WPs	Project intranet, Executive Board meetings, WP leader mailing lists	T5.1
General scientific community	Share scientific information and results; disseminate publications	Journals (e.g. Journal of Geophysical Research, Journal of Climate), workshops, conferences (European Geophysical Union)	T4.1
Early career researchers	Provide opportunities to publish articles and share publications	ScienceBrief, workshops, conferences	T4.1
4C researchers	Promote publishing papers of latest scientific findings on ScienceBrief	4C mailing list for internal communication	T4.1
	Assist each researcher to disseminate major 4C results externally	Twitter, other social media platforms, personal emails	
Climate-carbon topic researchers	Exchange latest scientific knowledge	Emails to contacts, external mailing list, conferences, scientific papers	T4.1
IPCC authors: 4C authors, and other authors/ contributors	Share latest scientific knowledge for IPCC AR6 and synergies to 4C (ScienceBrief)	Networking activities, workshops	T4.1
ScienceBrief users	Improve ScienceBrief user experience and reach	ScienceBrief survey	T4.1
EU decision- and policy makers	Explain information and provide evidence-based recommendations for decision- and policymaking, relevant to their agendas	Personalised emails, social media, conferences, workshops, one-on-one meetings; local, national, regional and EU media and press; internal project database	T4.2, T4.3, T4.4
Intergovernmental organisations			

Other related projects: (e.g. CRESCENDO, VERIFY and other H2020, Global Carbon Project)	Enhance project clustering, and promote project synergies and joint actions	Conferences, presentations, workshops, one-on-one meetings, personalised emails, media (tagging other related projects to promote more publications)	T4.1, T4.2, T4.3, T4.4, T5.1
General public	Raise awareness on carbon emissions topic	Social media channels linking project handle @4C_H2020 & project website links; use key handles and hashtags to reach different audiences	T4.3
Large media outlets (e.g. Nature News, CarbonBrief, Vox, Associated Press)	Present significant and important new content or activity (i.e. launch, factsheet, executive summaries etc.) in press releases; op-eds for more opinion-related articles	Personalised contact, contact forms	T4.3, T4.4
EC project office and policy officer	Share periodic reports, factsheets, policy brief and executive summaries	Email, general assembly	T4.2, T4.3, T4.4, T5.2

Some of the communication channels listed in **Table 3**, for instance external mailing lists, surveys, or organisation of events or workshops, require direct interaction with individuals within the target audience. For all the activities that require the recruitment/engagement of people external to the project, 4C will follow the guidelines and best practices reported in “D6.1 - Procedures and criteria that will be used to identify/recruit research participants”. Personal data will be handled according to the GDPR and will follow “D6.2 - The informed consent procedures that will be implemented for the participation of humans and in regard to the processing of personal data”.

7 Website strategy

The 4C website (www.4c-carbon.eu) serves as the main communication channel and visual identity for the 4C project. This website is hosted and maintained by the Barcelona Supercomputing Center (BSC), and offers easy navigation for both the general public and consortium members’ access.

The website contains the project description and general information. Throughout the lifespan of the project, the website will be actively maintained and updated to include information on the major project outcomes, including: facts and figures, public reports, presentations, news, press releases, science summaries, policy briefs, factsheets, summary pages on the project progress and achievements, list of 4C (open access) and 4C-related journal publications, and other dissemination material. All partners should contact BSC with these outputs when

completed, or in the case they wish to publish other specific items on the website. The 4C website will also include a FAQs page with questions that arise during engagement activities.

At least one news article, press release or other project information will be uploaded on the 4C website each month. These can include the following types:

- **Project news:** News articles that discuss the latest project news, findings, events and publications are posted on the 4C webpage. These include press releases and articles discussing new studies funded by the project. Project news are posted in the dedicated page under “Latest News” on the 4C website.
- **Climate Classrooms:** These are articles providing an easy-to-understand explanation of the main scientific concepts behind the 4C project, such as the carbon cycle, carbon sources and sinks, short-term variations in CO₂ and other related concepts. At least 3 Climate Classrooms are planned for 2020, with more to follow throughout the project. These are posted in the same format as news articles, under “Project News”.
- **Other outreach material:** In order to expand the reach of 4C, other material aimed at a general audience will be prepared and shared on the website and other platforms throughout the project duration. This could include interviews or podcasts with 4C researchers, videos (such as recordings of periodical internal seminars organised to promote interaction between partners and allow them to share their research progress), infographics and other visuals. The strategy for additional outreach materials remains under discussion, and this will be revised in the Second Update of the CDEP.

In addition to these actions, **newsletters** will also be sent out to the 4C website subscribers at least 2-3 times per year, depending on the availability of updates on the project. Subscription to the 4C mailing list is possible through a permanent link present on the bottom left of the 4C page, and this has been promoted on Twitter and by adding a link to the top of the 4C website homepage.

8 Social media strategy

8.1 Twitter

A twitter profile was not initially envisioned under the Grant Agreement, but it has been encouraged by project officers to increase the project impact. WP4 partners have thus created the following twitter account: **@4C_H2020**. The responsibility of the account will be shared by all project partners. Partners who already have a twitter account and a large number of followers are encouraged to tweet through their personal profiles, in order to take advantage of these existing networks to disseminate important information about milestones and outcomes throughout the project. Partners who do not have a twitter account or prefer not to use their personal profiles could post directly on the 4C Twitter account.

In addition to using the project Twitter handle (@4C_H2020) in each related Twitter post (in order to monitor the platform's impact), partners are also encouraged to use handles and hashtags that are most likely to engage relevant target audiences for their post. For more information on the target audiences to consider, please refer to Section 6 of the CDEP (Target Audiences). When deciding which hashtags and handles to use, the following potential questions can be considered:

- Who is this information most relevant to?
- Is this information connected to another project or EU initiative?
- Are there any specific groups or specific decision-/policymakers who could benefit from this information?

Initially, the posts on the account mainly involved retweets of related posts made by partners with a large audience (followers) and a basic introduction of the project. In this update of the CDEP, a Twitter strategy has been defined and is described below, followed by the progress made to date.

8.1.1 Twitter Strategy

A Twitter Strategy has been discussed and prepared by the BSC team. This defines the frequency and type of posts, ideas for content and future actions, hashtags and accounts to tag, and

A minimum of 1-2 posts per week are to be published on the 4C Twitter account, including retweets of relevant posts by partners and other organisations/researchers. In addition, at least 1 thread per month on 4C-related topics will be published by 4C partners from their personal account, tagging @4C_H2020, and these will be then retweeted by the project account. More specific strategies will be planned to disseminate important events, results and other project outputs.

The aim of the Twitter strategy is to communicate and disseminate the 4C project research and findings to the target audience, as well as expand the reach of the project and communicate news on other relevant research on climate/carbon topics. The content published on the project's account will include the following:

- Project news, Climate Classrooms and other articles
- Ongoing and future project research
- Project findings of the 4C project
- Rapid response reviews, posted in ScienceBrief
- Latest policy news (e.g. related to IPCC, Paris Agreement, and Global Stocktake)
- Findings of other relevant projects, initiatives and research on the carbon budget, climate-carbon interactions and CO₂, such as other H2020 projects, the Global Carbon Project etc.
- Events organised by 4C, relevant events where 4C partners are participating, or news on other relevant events and conferences taking place (e.g. COP26)

- Retweets of relevant external news and 4C partner posts
- Visuals (image + quote) based on Climate Classrooms and other 4C-related research, posted regularly with a dedicated hashtag
- Other Twitter Actions will be developed and carried out throughout the project, such as #MeetTheScientist, which will involve tweets of the profile of specific partners and the research they are doing in 4C

8.1.2 Progress

The account has been verified by Twitter obtaining the blue badge, which means that it is an account of public interest and increases its relevance and visibility.

In order to better manage the Twitter account, the tool Tweetdeck is being used to schedule publications, monitor mentions and interactions, and follow users and hashtags which have a potential interest for the project. The tags and hashtags to consider are presented in **Table 4**.

Table 4. Twitter handles and hashtags.

Handles	Hashtags
@4C_H2020	#CO2
@CRESCENDO_H2020	#carbonbudget
@che_project	#Cbudget
@CopernicusEU	#Cemissions
@WMO	#H2020
@UNFCCC	#climate
@esaclimate	#carbonemissions
@CONSTRAIN_EU	#climatecarbon
@V_ERIFY_H2020	#climatechange
@gcarbonproject	#carbondioxide
@SO_CHIC_EU	#carboncycle

To keep these hashtags continuously updated as the project evolves, they will be hosted at the project's internal shared document.

Dedicated hashtags will be used to mark specific actions, such as #climateclassroom when posting about the Climate Classroom articles.

Twitter stats since the launch of the project to 30 November 2020 are the following:

- Tweets: 72
- Followers: 315
- Mentions: 175
- Profile visits: 1792

Besides the 4C Twitter account, key researchers involved in the project are using their personal accounts to share content related to 4C and have included the handle @4C_H2020 in their personal bios.

- Glen Peters: 28,101 followers
- Pierre Friedlingstein: 550 followers

Other researchers are also sharing 4C related content on their Twitter profiles despite not including the handle in their personal bios.

- Corinne Le Quéré: 8,560 followers
- Robbie Andrew: 3,106 followers

Since some of these researchers have a huge community of followers, the reach of 4C related content on Twitter goes far beyond the official account.

8.2 Other social media

LinkedIn and YouTube are other social media platforms that could be relevant for 4C. However, the project will start without a specific profile in these networks until the results and performance of the communication actions may inform if an additional platform is needed.

9 Internal communication

Active dialogue between project members is important to ensure effective execution of this plan. There are different procedures in place to facilitate intra-project communication.

WP4 regular virtual meetings are held on bimonthly basis. The project coordinator and WP4 members that are also involved in other work packages participate to these meetings. This allows to have an overview of the ongoing and upcoming activities of the project that are relevant to WP4. WP4 progress, issues and next steps are also discussed.

Executive board meetings take place every 2 months. The project coordinator, project manager and WP leaders are attending these meetings. The agenda includes a review of the previous actions, the reporting of WP advances and any other item relevant at the time of the meeting.

Mailing lists are used to communicate among project partners. The different mailing lists used within the project are the following:

- The mailing list “4C-all” includes all project members. After each executive board meeting, a short summary of the project activities will be shared. Publications and other project’s news are shared in this mailing list. This is also used from any member that wants to share or gather information.
- Each work package has its own mailing list (4C-WPx). These are used for internal work packages communication and internal organization avoiding communication overload for members not directly involved.
- Moreover, there are specific mailing list for project PIs, Executive Boards members and External Advisory Board.

“**Science talks**” will be organised by the 4C project in 2021, which will be internal online meetings aiming to improve communication and foster regular interaction among the partners/researchers. During each talk, one or more researchers will present a topic to the whole consortium and engage in a discussion with the team.

10 Key Performance Indicators

The Key Performance Indicators (KPIs) set in the project are presented below:

Table 5. Key Performance Indicators.

KPI	Target	Result to date (as of 30 November 2020)
Number of visits to project website	>2500	1,574
Number of subscribers to newsletter mailing list	>150	49
Number of media mentions	>150	59
Number of followers on Twitter	>500	300
ScienceBrief		
<ul style="list-style-type: none"> • Total evidence added • Total briefs published • Number of full published reviews • Total site visits 	1,000 25 5 >20,000	852 20 2 >16,000

11 Risks

The following main risks have been identified until this stage of the project. **Table 6** reports the risks identified with the associated assessment (risk level) and mitigation measures put in place, while **Table 7** explains how the risk level has been evaluated.

Table 6. Risks identified.

Risk	Risk Level (Low, moderate, high, extreme)	Mitigation actions
Covid-19 disrupts organization of events and other dissemination activities	High	A Covid-19 strategy has been developed (see section 5.4) to ensure that the same impact is reached using virtual tools.
Unable to engage policy makers	Moderate	Carbon outlooks released every year and disseminated across policy makers and media. Creation of targeted content and material. Participation to key events and organization of workshops in Brussels (later in the project).
Lack of commitment to communication and dissemination from WPs and/or rest of the consortium	Moderate	We ensure regular internal communication in different forms (see section 9).
Unable to engage broad audiences	Low	Professional and timely communication and dissemination activities. Creation of outreach pieces in diverse formats in addition to social media actions leveraging the existing profiles of researchers in the project.

Table 7. Risks matrix.

Impact	Risk			
	Critical	Moderate	High	Extreme
Major	Low	Moderate	High	Extreme
Moderate	Low	Low	Moderate	High
Minor	Low	Low	Low	Moderate
	Unlikely	Possible	Likely	Almost certain
	Likelihood			

The risks identified are more or less likely to occur, therefore they have been classified as follows:

- Unlikely = The event could occur in unusual circumstances (<10%);
- Possible = The event might occur at some point (10% - 50%);
- Likely = The event will probably occur (50% - 90%);
- Almost certain = The event is unavoidable or nearly unavoidable (>90%).

If the risk materialises the expected impact can fall in one of the following categories:

- Critical = The event disrupts the workflow preventing the completion of the task and affecting other tasks
- Major = The event disrupts the workflow preventing the completion of the task and the achievement of related objective without impacting on other tasks;
- Moderate = The event undermines the quality of the results and may delay the task;
- Minor = The event can cause minor shifts from the plan.

ANNEX 1 - Branding: logo, template, etc.

One of the first actions to start building the 4C brand was the design of the project's visual identity, which includes an official logo, a colour palette, typefaces and a number of templates adapted to each type of support material (e.g. PowerPoint presentations, deliverables, minutes etc.).

The 4C logo can be seen in Figure 2. Further branding information is available in "D4.5 - Visual identity and project website available". The logos in different formats (png and vectorial format) will be available for the whole consortium through the document repository.



Figure 2. Logo for 4C project.

Besides the logo, templates for deliverables, minutes and PowerPoint presentations will also be made available to the whole consortium.

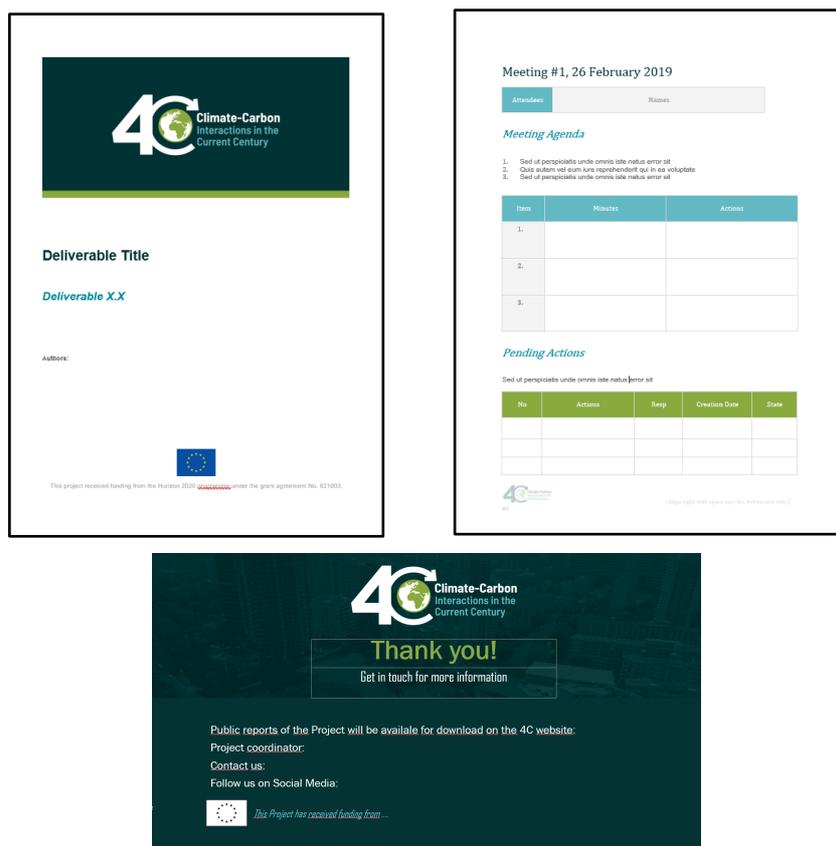


Figure 3. Templates for deliverables, minutes and PowerPoint presentations of 4C project.

ANNEX 2 - Press Release Checklist

Table 3 describes a potential checklist that can be used to better assess the dissemination potential of a story. A communication officer may want to ask a scientist to fill in the table or use some of the points as a checklist when discussing communication and dissemination activities with project partners. The aim is to gain an understanding of what type of communication and dissemination action is suitable for the occasion; for example, a press release, news story, video, social media post, op-ed or another action.

Table 8. Press release potential checklist.

Novelty	Issues not previously known to the public are more newsworthy than those already known or anticipated.
	Is it something new?
Topicality and time	Current things that are happening now are on a general basis more interesting. Sometimes a current issue is new too, but not necessarily.
	When did it happen?
Prominence	News about well-known people, institutions or countries are more likely to receive media interest and coverage. This is a qualitative criterion.
	Does your story involve any prominent subject?
Conflict	Bad news gets more attention than good news. Opposition, disagreements and rivalries, especially with dramatic effects, get more attention.
	Is there a conflict in your story?
Peculiarity	Uncommon news and events out of the ordinary raise more interest. Peculiarity and strangeness are context dependent.
	Is your story uncommon?
Unexpectedness	Something that happens suddenly; it might not be rare or new, but it just happens when nobody is expecting it.
	Is there any unexpected element in your story?
Number of people affected	As a rule of thumb, the more people affected by a circumstance, the better the chances it will receive media coverage. This is a quantitative criterion.
	How many are affected?
Who is affected	It is also important who is affected by a circumstance, and who could do something about it.

	Who could or will be affected by it?
Proximity	Consider proximity to those affected. This can be either literal or cultural.
	How close to your target audience is your story?
Unambiguity	Clear-cut and definitive events which do not require previous knowledge are easier to communicate.
	Is your story unambiguous?
Consequence	Stories with potential and well-defined consequences in the near future are more attractive.
	What are the consequences, and what will happen if nothing is done about it?
Human interest	A human-interest story centred around a group of people or a person, which presents their achievements/failings/concerns in order to elicit sympathy.
	Does your story have human interest?