



## D 7.2

# **DEFINE THE DISSEMINATION AND EXPLOITATION PLAN**

WP 7 COMMUNICATION, DISSEMINATION, EXPLOITATION





	Microfluidic Wastewater Treatment and Creation of			
Project	Green Hydrogen Via Electrochemical Reactions			
	(MACGHYVER)			
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	The present deliverable serves as a comprehensive			
	guide to the dissemination and exploitation plan and			
	strategy of the MACGHYVER consortium. It elucidates			
Abstract:	the steps that will be taken to guarantee the widespread			
Abstract.	and impactful promotion, visibility, and utilization of the			
	project's outputs. The document describes in detail the			
	various measures that will be implemented to achieve			
	these objectives.			

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PP	Restricted to other programme participants (including the EC Services)				
RE	Restricted to a group specified by the consortium (including the EC Services)				



MACGHYVER Consortium				
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### 1. Introduction

The present deliverable D7.2 describes the first iteration of the Dissemination and Exploitation Plan (DEP) for the MACGHYVER project, funded by the European Innovation Council (EIC) under grant agreement number 101069981. The work described here was carried out in the framework of WP 7 Communication, Dissemination, Exploitation.

As part of the EIC Pathfinder challenge 2021, MACGHYVER consortium has committed to providing extensive dissemination and exploitation of the project's outcomes and results. The implementation of these activities will be performed throughout the project timeline and will continue beyond its completion, to maximize the impact of the research findings. Effective dissemination will create opportunities to utilize the project's results and capitalize on its outcomes. This deliverable aims to define the framework and scope for the dissemination and utilization activities carried out within the MACGHYVER project, as well as their potential outcomes. In this deliverable, an insight into the characteristics of the intended audience, as well as the aims and methods for promoting and utilizing the results are elaborated.

### 1.1. Scope and Objectives

This document outlines the dissemination and exploitation plan of the MACGHYVER project and presents a complete overview of the consortium's strategy for disseminating the results, increasing scientific visibility, and engaging with stakeholders. Within the project framework, the stakeholders who hold significant importance to the MACGHYVER outcome will be identified, and tools and approaches will be developed to reach the target audience. This document also outlines the strategies employed to ensure effective promotion to potential end-users about the expected technological advancements in the production of green hydrogen from wastewater and their potential practical application. Furthermore, a platform will be established to provide convenient access to the project data for the end-user community, both throughout the project timeline and beyond its end.

## 2. Dissemination and exploitation strategy

To ensure a successful and effective dissemination of the MACGHYVER project results and outcomes, all the partners of the consortium are involved in the dissemination and exploitation activities, under the lead of EDEN. The strategy for dissemination and exploitation has been formulated by focusing on the objectives, target audience, and the most impactful methods for reaching them.

# 2.1. Dissemination activity goals

The goals of MACGHYVER's dissemination activities are as follows:

- To increase the visibility and recognition of MACGHYVER among potential target groups.
- Convey the significance of the project by highlighting the connection between the project results and outcomes and sustainable energy goals.



- Promote the advantages and the positive impact of microfluidic electrolyzers in generating green hydrogen.
- Communicate the results obtained through productive collaboration between the scientific and the industrial community.
- Facilitating the dissemination of the data produced during the project using an openaccess approach whenever feasible.

### 2.2. Target stakeholders of MACGHYVER

For successful dissemination, it is vital to identify the target audience who might have an interest in the outcomes of the project. At the end of the project, MACGHYVER will reach TRL4 and have a path to reach rapidly TRL7 (testing in client setup). The results of MACGHYVER can have a significant impact across a wide range of sectors in society, and some of the identified groups are listed below:

#### 2.2.1. Scientific stakeholders

MACGHYVER's innovative, cost-effective, and versatile solution for green hydrogen production represents a major milestone. MACGHYVER not only drives progress in green hydrogen production via water electrolysis but also improves water treatment by using wastewater for hydrogen production and prompts advances in areas such as electrocatalysis, hydrolysis, process intensification, and life-cycle sustainability, fostering interdisciplinary and intradisciplinary growth through the creation of new knowledge. The scientific stakeholders, consisting of academics and research communities, may find these advancements in green hydrogen generation to be of considerable significance. To engage this target audience, technical and precise language must be employed, accompanied by references to relevant concepts and methodologies. The primary means of dissemination of results and outcomes with this stakeholder group will be done through open-access scientific publications, but additional channels such as scientific conferences, events, the project website leaflets/posters, and social media also play a role.

#### 2.2.2. Industrial stakeholders

The significance of MACGHYVER's applied research and outcomes to the industrial sector cannot be overstated, as it holds the potential to drive a more sustainable future. The compact and scalable systems developed through the project can be implemented at both small and industrial sites to couple with their wastewater treatment systems to generate clean energy. The potential end users of MACGHYVER technologies will be the primary industrial stakeholder targets. The dissemination of MACGHYVER's output and results to industrial stakeholders will be done through various channels, including free access to project deliverables, newsletters, the project website leaflets and posters, and through scientific conferences and symposiums.

### 2.2.3. Decision and policymakers

The involvement of policymakers focuses on the dissemination of project results that have the potential to impact and inform policy decisions. The work outlined will help to realize the goals set by the Green Deal EU 2050 and NEXUS Water-Energy. By combining its



technology with insights gained from the Life Cycle Assessment (LCA), Life Cycle Costing (LCC), and Social Life Cycle Assessment (sLCA) studies in WP 6, MACGHYVER will raise awareness about the benefits of green hydrogen as a secure, economical, and resilient means of addressing climate change in front of policy makers such as governments' members and international organizations. These findings will be communicated to this group of stakeholders during project workshops, international seminars and other events.

#### 2.2.4. Other projects

The MACGHYVER project is a part of the EIC Green Hydrogen Pathfinder Challenge Portfolio, which aims to promote and support the development of novel routes to green hydrogen production using only renewable sources and non-toxic, non-critical raw materials. This portfolio encompasses the entire hydrogen production process, from generation to storage, logistics, and end use, and it can be applied at various scales, either through distributed or centralized approaches, with a focus on increased flexibility. The emphasis is placed on exploring the possibilities of new biological, chemical, and physical approaches to green hydrogen production that embrace process circularity, potentially including the simultaneous production of decarbonized chemicals and the integration with existing technologies at both the system and process levels. Under this portfolio umbrella, there are 9 projects listed below:

- **H2STEEL** (101070741): Green h2 and circular bio-coal from biowaste for cost-competitive sustainable steel.
- **PhotoSynH2** (101070948): Photosynthetic electron focusing technology for direct efficient biohydrogen production from solar energy.
- **ELOBIO** (101070856): Electrolysis of Biomass.
- **DualFlow** (101070788): Dual circuit flow battery for hydrogen and value-added chemical production.
- **Anemel** (101071111): Anion exchange membrane electrolysis from low-grade water sources.
- **EPOCH** (101070976): Electrocatalytic Production of liquid organic hydrogen carrier and chemicals from lignin.
- **OHPERA** (101071010): Optimised halide perovskite nanocrystalline-based photoelectrolyser for clean, robust, efficient and decentralized H<sub>2</sub> production.
- **GH2** (101070721): Green H2 production from water and bioalcohols by full solar spectrum in a flow reactor.

The MACGHYVER project will work in close partnership with the abovementioned projects that center around hydrogen technology, facilitating cross-disciplinary exchanges and interactions to generate synergies. By sharing the common objective of hydrogen technology development, MACGHYVER will enable cross-collaboration and facilitate the sharing of knowledge. Additional synergies will be pursued with other ongoing projects and initiatives at the EU, national, and regional levels in the hydrogen economy. Information will be disseminated among these other projects through annual portfolio meetings, workshops, and ongoing updates. These meetings will provide a regular forum for sharing databases on



scientific instrumentation and keeping everyone informed of the latest advancements with respect to necessary NDAs. Other common portfolio activities such as portfolio website, visual identity, and common communication plan will also be discussed with the communication managers of each project.

#### 2.2.5. General Public

To effectively communicate with the general public, it is important to use clear and uncomplicated language and to utilize graphics that are simple yet effective. MACGHYVER will develop a project video as a storyteller for popularizing the project's concept, which is a critical component of this mode of communication and is designed to reach the general public. To ensure that the information is effectively conveyed, it is essential to present the information in a clear and comprehensible manner.

### 3. Communication tools

### 3.1. MACGHYVER brand identity

Having a distinct and recognizable brand identity is of utmost importance in communicating and promoting a project. To achieve this, the MACGHYVER project underwent a logo refinement process to ensure consistency across all its representations, including the website, social media, presentations, promotional materials, and more. The MACGHYVER logo was expertly designed by *Florina V Balavendran*, a professional graphic designer at Eden Tech. A well-crafted logo not only helps in quickly identifying the project but also facilitates effective communication of its outcomes. The logo excerpt (Figure 1) will be used for particular applications (e.g., website favicon). The 'M' in the logo symbolizes the cutting-edge microfluidic electrolyzer central to the project, while the double water droplet form serves as a visual representation of the utilization of wastewater in the hydrogen generation process. This design emphasizes the innovative nature of the project and its focus on sustainability. The blue and green color scheme chosen for the logo represents the utilization of water to produce green hydrogen, adding a symbolic layer to the overall branding while emphasizing the central theme of the project.



FIGURE 1 LEFT: PROJECT PRIMARY LOGO; RIGHT: LOGO EXCERPT



### 3.2. Internal communication tools

From the start, MACGHYVER has implemented a suite of versatile and straightforward tools to ensure seamless internal communication within the project, such as:

- Project Mailing List: This includes representatives from all consortium partners involved in the MACGHYVER project. It is utilized for disseminating project updates, providing information on periodic calls, sharing links to relevant documents, and distributing meeting minutes. To facilitate in-time simultaneous communication and interactions inside the consortium, MACGHYVER adopted Slack channels as a common daily workspace.
- Project Weekly Meetings: These meetings provide an opportunity for partners who
  collaborate on overlapping work packages to exchange information, share updates,
  and discuss developments. These meetings help to foster collaboration and ensure
  timely and effective communication between close working partners.
- MACGHYVER 360° Meeting: Held every 6 weeks, these meetings bring together all
  partners to provide updates on the progress of their respective work packages and
  tasks. These discussions are recorded in minutes and distributed to the entire project
  mailing list, ensuring that all partners stay informed and up-to-date on the project's
  progress.
- Project's online repository: The MACGHYVER project data will be securely stored in a Dropbox cloud service folder, which serves as the internal database for all partners. This folder is structured into several sub-folders, each corresponding to a specific work package, enabling partners to collaborate and share relevant information, working files, meeting minutes, draft and final deliverables, and administrative documents with ease. The use of a secure cloud service ensures the protection of all project data.

### 3.3. Project Website

The MACGHYVER project website <a href="https://greenhydrogen-pathfinder.eu/">https://greenhydrogen-pathfinder.eu/</a> was officially launched on October 7th, 2022, and adheres to the EU Project Websites Best Practice Guidelines. The website is designed to promote the project and its objectives, providing information on the consortium partners, project structure, and work packages. Visitors can stay informed on the project's progress, results, and outcomes through regular updates. The website also serves as a platform for accessing public deliverables and other relevant project documents. Regularly updated with the latest MACGHYVER news, blog posts, and upcoming events, the site provides a dynamic and engaging experience for visitors. Additionally, direct access to MACGHYVER's social media platforms is available via clickable icons located in the website's footer. (See Figure 2)





FIGURE 2 THE LAYOUT SCREENSHOT OF MACGHYVER'S WEBSITE

We expect a certain number of total views of the website at the end of the project as an indication of the dissemination results. The statistics of the website's views can allow us to monitor the effectiveness of our dissemination strategy and provide us with early-stage feedback on the content-wise actions for the future marketing plan. (See Figure 3)

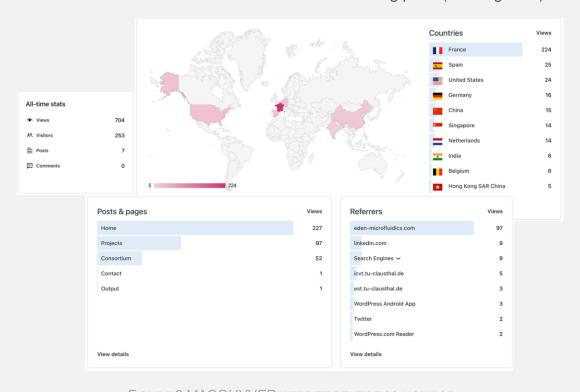


FIGURE 3 MACGHYVER WEBSITE STATISTICS MONITOR



#### 3.4. Social Media channels

The utilization of social media has become a crucial component of effective communication and dissemination. Recognizing this, MACGHYVER has integrated social media into its communication strategy. The project has established a presence on (https://twitter.com/MACGHYVER EIC) to quickly disseminate important updates and news. has created LinkedIn Additionally, the project (http://www.linkedin.com/in/MACGHYVER-green-hydrogen-eicpathfinder), platform to reach professional audiences, connect with other hydrogen technology and innovation groups, and share relevant content. Lastly, MACGHYVER has set up a dedicated channel on YouTube (https://www.youtube.com/channel/UCh75BgWVQaF3XMeSR4fjltw), where promotional videos related to the project and other content can be easily shared and accessed.

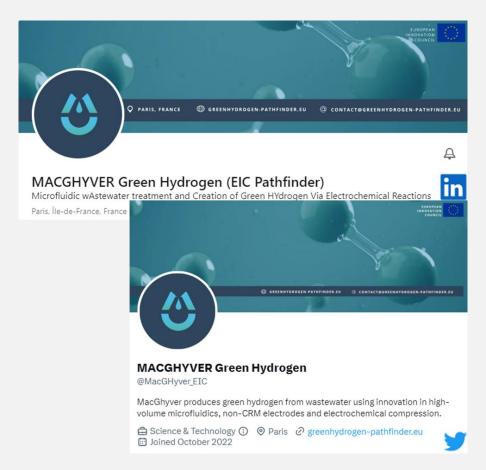


FIGURE 4 MACGHYVER'S HOMEPAGES ON LINKEDIN AND TWITTER

## 3.5. Organization of workshops

There will be at least two workshops organized during the MACGHYVER project by all partners in the consortium: M20 (in South Europe, Nimes, Hydrogen Valley in France) and M46 (in Paris). These milestone events allow not only our researchers and Ph.D. students to communicate and share their R&D progress but also the early interactions with industrial partners. Indeed, Eden Tech will use its social networks to invite industrial companies and



investors to these events (Airliquide, IFPEN, ENEGIS, ZENON, EDF), as these companies and organizations will later become potential industrial partnerships or clients for our prototype deployment at TRL7 and provide us with letters of intent (LOIs) for future collaborations.

Meanwhile, MACGHYVER will be an active member to help disseminate the activities of the green hydrogen pathfinder portfolio as a team and participate in the workshops organized by other portfolio projects: An event organized by project ANEMEL in Tarragona in Spain in October 2023 and MACGHYVER will be a main speaker at this event, where it will involve the hydrogen valley in Tarragona, as well as big chemical companies in the region including BASF, DOW, Covestro, Messer and Ercros.

#### 3.6. Videos

To further engage and inform the public about the MACGHYVER project, brief yet impactful 2–3-minute videos will be produced (M8) to thoroughly explain the project's goals and technological innovations. These videos will visually represent the project goals and showcase its technological advancements, making the information accessible and easy to understand. These videos will be made readily available to a wider audience through their upload to MACGHYVER's YouTube channel and further shared across all the project's social media platforms. At M46, a video of the demonstration of our final prototype will be made to showcase its performance and as a POC to be presented in the general media (Press and TV). The possibility to adapt MACGHYVER products on large and small sites, ranging from wastewater treatment to individual houses, will be particularly emphasized in this video.

## 3.7. Participation to events

The consortium members of the MACGHYVER project will actively participate in conferences and other relevant events to showcase the project and its outcomes to a wider audience, as well as stay informed of current and upcoming developments in the fields related to MACGHYVER. These events provide an excellent platform for members to network and exchange knowledge with their peers. The consortium members have planned to target several upcoming events, as outlined in the table below:

TABLE 1. TARGETED EVENTS THAT ARE PLANNED TO BE VISITED BY THE CONSORTIUM PARTNERS.

Year	Event	Type	Place	Date
	The 4th World Hydrogen Technology Convention	Conference	Vancouver,	September
	(WHTC 2023)	Contende	Canada	17-21, 2023
	The 5th International Conference on Hydrogen	Conference	Paris, France	October 22-
2023	Energy and Fuel Cells (HEFC 2023)	Conference	i ans, i fance	26, 2023
2020	The 2nd International Hydrogen and Fuel Cell	Conference	Shanghai,	November
	Conference (IHFC 2023)	Oomerenee	China	17-19, 2023
	The 13th European Symposium on	Conference	Toulouse,	June 26-29,
	Electrochemical Engineering (13thESEE2023)	Connectence	France	2023



	The ECCM Graduate School	Summer School	Noordwijk Netherlands	June 13-16, 2023
	EIC green hydrogen portfolio workshop	Workshop	Tarragona	October,
	The 11th European Symposium on Electrochemical Engineering (11th ESEE)	Conference	Prague, Czech Republic	2023 June 30 - July 3, 2024
	The 5th World Hydrogen Technology Convention (WHTC 2024)	Conference	Berlin, Germany	September 16-20, 2024
2024	The 6th International Conference on Hydrogen Energy and Fuel Cells (HEFC 2024)	Conference	Kyoto, Japan	October 21- 25, 2024
	The 9th International Conference on Hydrogen Safety (ICHS2024)	Conference	Valencia, Spain	August 26- 29, 2024
	The 16th International Conference on Electroanalysis (16th ESEAC)	Conference	Rome, Italy	October 20- 24, 2024
	European Hydrogen Congress	Conference	Bilbao, Spain	March 6-8, 2024
	The 240th ECS Meeting of the Electrochemical Society	Conference	San Diego, California, USA	May 25-29, 2025
0005	The 14th International Symposium on Electrochemical Micro & Nanosystem Technologies (14th EMNT	Conference	Jeju Island, South Korea	September 7- 11, 2025
2025	The 9th International Conference on Electrochemistry in Nanosciences (9th ICEN)	Conference	Bordeaux, France	October 19- 23, 2025
	The 6th World Hydrogen Technology Convention (WHTC 2025)	Conference	Paris, France	September 15-19, 2025
	The 7th International Conference on Hydrogen Energy and Fuel Cells (HEFC 2025)	Conference	Los Angeles, USA	October 20- 24, 2025
	The 5th International Conference on Bioelectrochemistry and Bioenergetics (5th ICBB)	Conference	Paris, France	October 12- 16, 2026
2026	The 242nd ECS Meeting of the Electrochemical Society	Conference	Atlanta, Georgia, USA	May 31-June 4, 2026
	The 19th International Conference on Electroanalysis (19th ESEAC)	Conference	Copenhagen, Denmark	June 21-25, 2026
	The 12thEuropean Symposium on Electrochemical Engineering (ESEE)	Conference	TBD	TBD



The International Conference on Hydrogen	Conference	TBD	TBD
Production (ICH2P)	Conference	100	100

#### 3.8. Scientific Publications

When the results of the research become available, the MACGHYVER partners will share them in prestigious open-access peer-reviewed journals. The consortium adheres to open-access publication guidelines, ensuring maximum accessibility to the research findings. These publications will not only be accessible on the project website but will also be widely disseminated through MACGHYVER's LinkedIn and Twitter platforms, reaching a broader audience. Some of the targeting open-access journals for the dissemination of the MACGHYVER results are tabulated below:

SI No Journal **Impact factor Energy & Environmental Science** 40.225 2 **ACS Energy Letters** 23.646 3 Nature Energy 63.885 4 Journal of Power Sources 9.271 Electrochimica Acta 7.735 6 International Journal of Hydrogen Energy 5.816 ACS Sustainable Chemistry & Engineering 9.224 8 Sustainability 3.889

TABLE 2. PRIMARILY TARGETED JOURNALS AND THEIR IMPACT FACTORS.

# 4. Exploitation of results

The exploitation of project results involves utilizing the project's outcomes in additional research activities that go beyond the project's original scope. Additionally, the results can be applied to the creation, development, and marketing of a product or process, in providing a service, or even for standardization activities. The exploitation of project results offers the potential for the results to be used for various commercial or non-commercial purposes, which can result in social, environmental, and economic benefits. Furthermore, exploiting project results can encourage collaboration among researchers, industry partners, and policymakers, leading to innovation and progress toward achieving sustainable development goals. As stated in Consortium Agreement (CA) section 9.4 for the Access Rights for Exploitation, each beneficiary in the consortium may have up to twelve months after the end of the project to make a request for access rights to results if needed for exploitation.

## 4.1. Identification of Exploitable Key Results

The project results will be evaluated for their potential to be exploited to achieve the greatest possible impact. To this end, EDEN will provide an IP representative who will work with the steering committee to identify and pursue all relevant opportunities arising from the project results. If the results are deemed to have exploitable potential, they will be protected by filing



a patent application before publication, either on their own or as part of a licensing deal. In the event that no exploitation opportunities are identified, the project results will be cleared for publication without delay. This approach ensures that the project's outcomes are effectively leveraged to produce maximum benefits, while also safeguarding the intellectual property rights of the project team. In the framework of MACGHYVER, two main exploitable products will be delivered throughout the project life:

- Innovative biomimetic microfluidic electrolyzer for efficient production of hydrogen using low electrolyte concentration feedstock as a resource (brine water, wastewater, or seawater) and non-critical raw material (non-CRM) as electrodes, which is the core of the project and going significantly beyond the state of the art.
- Electrochemical hydrogen compressor (EHC) along with its system integration and an energy-saving calculator for hydrogen gas separation and storage, which is an important part of the balance of plant in our final POC.

MACGHYVER's POC is expected to be on the scale of TRL4 (Technology validated in the lab) at the end of the project in 2026 and with the help of the EIC accelerator challenge and our future business partners, we are going to attain the TRL7 (System prototype demonstration in operational environment) in 2028 for both of those products.

### 4.2. Identification of target groups

Potential stakeholders such as industries, research organizations, governments, and communities that can profit from the technology must be considered for the effective exploitation of the results. Companies that are focused on developing a reliable and sustainable source of hydrogen, research institutions focused on developing clean energy solutions, governments committed to reducing carbon emissions, and local communities that can leverage the technology to generate renewable energy are all possible target groups. Identifying the project's target audiences is crucial to ensuring that the technology is created and deployed to properly fulfill the demands of end users and that it has the potential for successful commercialization or adoption. We will engage with the Clean Hydrogen Alliance (CHA), an identified stakeholder (CHA is a platform that brings together multiple stakeholders from industry, government, civil society and academia). Previous collaborations of the consortium, especially with Prof. Hanke-Rauschenbach and Dr. Bensmann (pioneers in EHC), Prof. Turek (expert on electrodes) and Prof. Lubato (expert in sustainability) will create contact with relevant researchers.

## 4.3. Intellectual Property Rights (IPR)

The management of IPR is defined in detail in the MACGHYVER Consortium Agreement (CA), where each partner of the project has reported the background knowledge included and the specific limitations and/or conditions for implementation and exploitation (see Attachment 1: Background included of the CA). MACGHYVER deliverables are expected to generate significant IP for "Electrochemical systems within high-volume microfluidic systems" to be only commercially exploited by Eden Tech, which is agreed between the Parties. The filling of the French patent and its application process will be generated by Eden Tech during



the second year of the project (starting from M10). Then, two scenarios of the IPR process exist:

- IPR process with the Patent Cooperation Treaty (PCT)
- IPR process without the Patent Cooperation Treaty (PCT)

Both processes have their pros and cons, in terms of cost and timeline. Here is a general comparison presented in Figure 5. The process without PCT requires an immediate filling for international applications, which is supposed to be during the third year of MACGHYVER project. It's a faster deployment of IPR over regions of interest. The process with PCT allows a smooth transition and re-evaluation of the IPR strategy and then starts the international applications during the last year of the project, however, with more cost but distributed over a larger period of time. MACGHYVER will assess the project progress in this case and decide which scenario will be the most suitable in M24. The primary IPR protection in the territory will be France, Germany, Great British, Italy, Spain, the USA, China, and Japan.



FIGURE 5 COMPARISON OF THE IPR PROCESS WITH AND WITHOUT PCT IN TERMS OF COST AND TIMELINE

Thus, the CA includes all provisions related to the management of IPR including ownership, protection and publication of knowledge, access rights to knowledge and pre-existing knowhow, as well as questions of confidentiality, liability, and dispute settlement (see section 8 of CA). Every outcome of the project is owned by the partner that has generated it, and in this sense, the partner is entitled to use and license such right without any financial compensation to the other contributors. In the case of joint ownership, the partners that have generated the product/s should agree that they may jointly apply to obtain and/or maintain the relevant rights and shall make an effort to reach appropriate agreements in order to do so. The CA also rules the transfer of results ownership (Section 8.3). Each partner may transfer ownership of its own outcome following the procedures of the Grant Agreement Article 30. Each partner may identify specific third parties it intends to transfer the ownership of its outcome. The other



Signatory Parties hereby waive their right to prior notice and their right to object to a transfer to listed third parties according to the Grant Agreement Article 30.1. The transferring partner shall, however, at the time of the transfer, inform the other partners of such transfer and shall ensure that the rights of the other partners will not be affected by such transfer.