Horizon 2020 Programme

AMHYCO

Research and Innovation Action (RIA)

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AMHYCO

Enhancing H_2 & CO Combustion Risk Management

Report on communication & dissemination activities #2

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Summary

D6.4 Report on communication & dissemination activities #2

Approval

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Abbreviations and Acronyms

Acronym	Description
WP	Work Package
SAMG	Severe Accident Management Guidelines
KPI	Key Performance Indicator
C&D	Communication & Dissemination
PAR	Passive Autocatalytic Recombiners
CFD	Computational Fluid Dynamics
NPP	Nuclear Power Plant
AB	Advisory Board
EUG	End User Group

Executive Summary

The main purpose of deliverable D6.4 - Report on communication & dissemination activities (KPIs, communication media, community building, events management, scientific dissemination) is to summarise the efforts and results of the communication and dissemination actions taken over the first 36 months of the project. This document includes descriptions of the tools and channels used to communicate with the audience and to disseminate the project's results and the activities conducted using these tools.

Keywords

Nuclear, combustion, SAMG, communication, dissemination, visual identity, poster, website, LinkedIn, events, workshops, and scientific publications.

1 Introduction

The Communication and Dissemination (C&D) Strategy & Plan (D6.1) outlined the actions and strategies for communication, dissemination, and engagement of stakeholders throughout the project. It included descriptions of the communication objectives and expected results (i.e., number of followers and website visits), target audiences, overall strategy to follow, key messages, channels, and tools to be used.

The scope of the C&D strategy includes all actions taken within the project, in terms of knowledge dissemination and public communication on the project, and its results. These communication actions will be continuously monitored and updated during the remainder project. This report (D6.4) presents the C&D actions implemented over the first 36 months of the project, spanning from October 2020 to October 2023.

Based on the needs of the project, the main C&D objectives are:

- To promote the project's activities, objectives, and the uptake of its results
- To disseminate the knowledge acquired in AMHYCO to key stakeholders, including nuclear power plant owners, engineering companies, nuclear regulatory bodies, academia, and research organisations.
- To engage in a two-way dialogue with stakeholders in the nuclear sector and civil society, including the young generation of nuclear researchers
- To raise public awareness and contribute to the public acceptance of nuclear energy via the improvement of nuclear safety management in severe accidents with combustion risk, which will decrease the probability of radioactive release in case of an accident.

To achieve these goals the C&D Strategy will follow the EU's five-stage model:

Why: the objectives of communication;

What: the results to communicate;

Who: sharing the responsibilities with all partners;

How: the best channels and tools to get the word out

How good: monitor and evaluate actions.

2 Project Website

The project website was launched in January 2021 (M4) and the accompanying deliverable (D6.2 Website) was submitted in March 2021 (M6). The website has been used as an interactive communications tool for the project, updated with resources, news, and events related to the AMHYCO project.

The website is the main point of information for the project for all audiences so it aims to be as accessible and engaging as possible, while containing scientific information that will be important for research and industrial stakeholders. Moreover, it provides access to the private partner area for AMHYCO partners.

News and events related to AMHYCO are posted on the website including a recap of the project events and external events, updates from the work packages and deliverables, and other, general news related to the project.

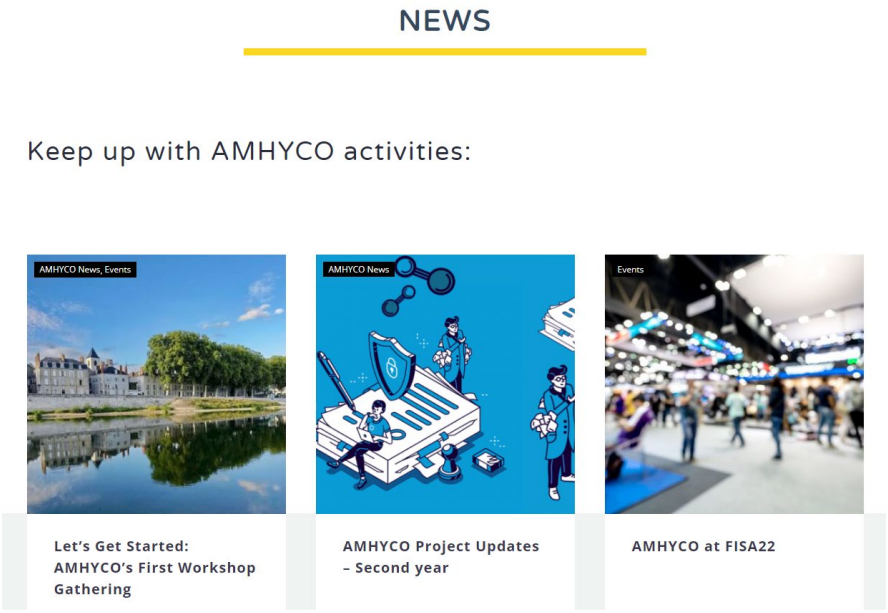

Figure 1: AMHYCO News items

3 Online communication channels

3.1 LinkedIn

The AMHYCO LinkedIn profile is an active tool for outreach where the project posts the latest news, updates, and information about the project. Beyond the project, it also aims to communicate about relevant events and engage with relevant professional partners and stakeholders across the platform.

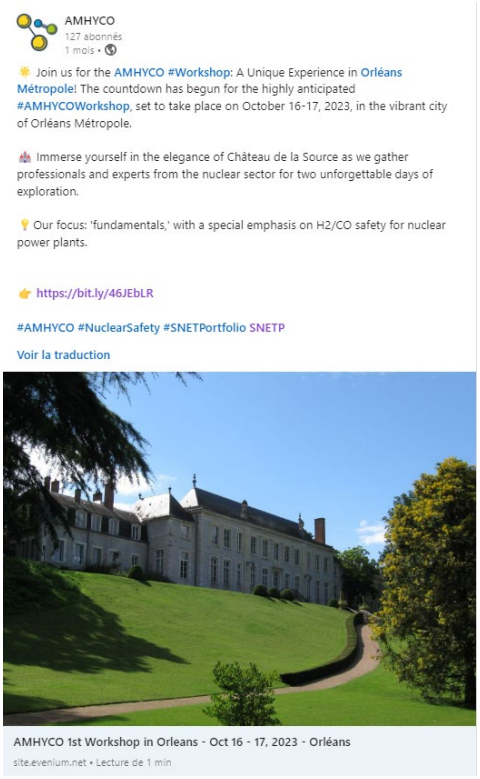

Figure 2: A sample of LinkedIn post

	Number of Followers	Number of posts
March 2022 (M18)	52	44
September 2023 (M36)	127	86
September 2024 (M48)	*To be filled in M48*	*To be filled in M48*

Table 1: LinkedIn metrics

3.2 Online Newsletter

The second annual newsletter was sent out in November 2022 after gathering the inputs from the partners on their activities. The newsletter was made up of six sections:

1. Recap of the Consortium meeting in Jülich, Germany
2. Work package updates
3. AMHYCO's first video of the project
4. AMHYCO's first paper that was published
5. Links and Resources

The second newsletter was sent to **thirty-two** subscribers with an opening rate of 66%.

The newsletters are available on the Resources page on the project website and were also shared on the LinkedIn for non-subscribers to learn more about the project itself. The full newsletter is included in Annex I.

3.3 AMHYCO online brochure and poster

A poster (**Figure 3**) and brochure (Annex II) were created for the project to quickly convey the main impacts, objectives, and AMHYCO partners. The poster and brochure are currently in an online format but can be printed at the request of the partners.

3.4 External mentions

A press release was created and distributed at the launch of the project. It described the main aspects of the AMHYCO project, including its objectives, partners, timeline, project information and links to the website and LinkedIn profile.

It was distributed to the twenty-four partners who then diffused it using their networks (NUGENIA, the European Nuclear Society, NEA, etc) and sent to six large, nuclear organisations including the European Nuclear Society, IAEA and the OECD Nuclear Energy Agency. The press release gained some coverage in the media including World Nuclear News, Nucnet.org, CEIDEN, The Chemical Engineer, and Sociedad Nuclear Española.

A factsheet for the project was published on SNETP and the project was also mentioned in a scientific publication from Forschungszentrum Jülich, and IAEA report on Hydrogen Phenomena during Severe Accidents in Water Cooled Reactors

Figure 3: The AMHYCO poster

4 Events

4.1 Internal Events

Over the first 18 months of the project three consortium-wide meetings were held: the project kick-off and two consortium meetings. These meetings included presentation of results, update of the project's progress but were also important for exchanges between partners that enrich and contribute to the cohesion of the consortium and could also help bring ideas to the technical areas of the project.

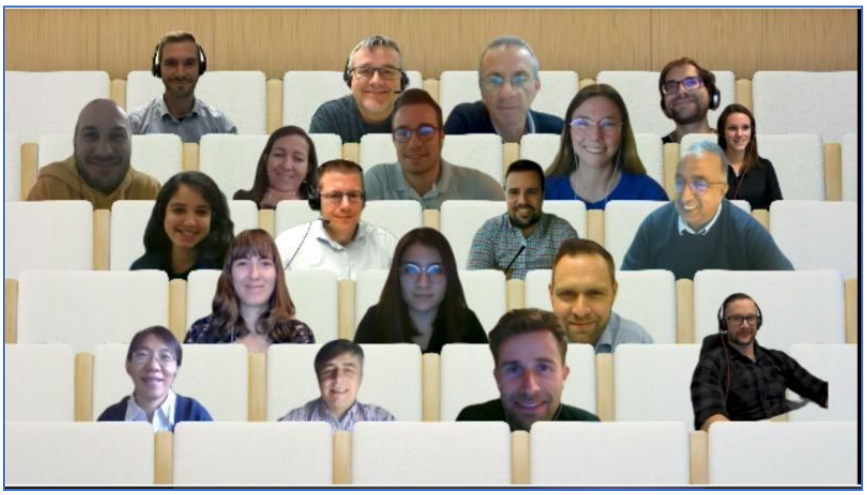

Figure 4: Screenshot of the kick-off meeting of the project

The first presential Consortium Meeting took place in Jülich, on October 27th-28th, brought together our dedicated partners to delve into the details of the project. The focus of this gathering laid on assessing the advancement of each Work Package, ensuring that every part of the AMHYCO project is on track.

Additionally, this meeting included presentations about the results and updates of the project, but it was also an opportunity for partners to meet, connect, and discuss ideas about the project that could advance the technical areas of AMHYCO.

Figure 5: Picture group of the Consortium meeting in Julich

4.2 External Events and journal papers

The AMHYCO partners have attended and presented the project and their preliminary results at various notable conferences including:

ICHS2021

An overview of the AMHYCO project was presented in the International Conference on Hydrogen Safety (ICHS), within the Safety in Hydrogen Infrastructure track, on September 22nd 2021. The ICHS2021 conference was devoted to the "Safe Hydrogen for Net Zero" and it was addressing a wide range of hydrogen safety topics including: safety of large production and supply chain infrastructure, hydrogen and hydrogen carrier behaviours, physical effects, consequence and risk analysis, incidents, accidents and near misses, hydrogen effects on materials and components, safety of energy storage, power to gas/gas to power related safety issues, safety solutions for the implementation of hydrogen technologies, risk management, best practices, regulations, codes and standards, as well as communication strategies for wider public awareness and acceptance of hydrogen. Several questions and answers followed the AMHYCO overview presentation.

ENYGF

ENYGF'21 gathered a wide variety of young and senior experts from the nuclear industry and academy in Tarragona, Spain. From technical topics such as nuclear thermal hydraulics, fuel

science, or accident simulation, to management and dissemination workshops, the young generation of European researchers had the opportunity to share their breakthroughs in nuclear energy and technology.

A dedicated poster session was scheduled on the first day of the congress. There, two AMHYCO students (Luis Serra Lopez and Araceli Dominguez from UPM) had the opportunity to present their poster titled Development of a detailed 3D CAD model of a generic PWR-KWU containment as a basis for a better assessment of H2/CO combustion risk. The students presented their work very well and came in second place in the proposal defence.

Some researchers from European projects showed great interest and talked about the chance to form future partnerships in similar works.

NURETH19

An overview of AMHYCO as well as results of the first year of the project were presented Mach 8th 2022 at the NURETH19 international conference. The International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH) is one of the premier gatherings for experts in nuclear reactor thermal hydraulics and related topical areas. The meeting is held every two years and cycles through the North America, Europe and Asia.

The session was called Hydrogen Management I and was chaired by Prof. Gonzalo Jiménez and Dr. Ahmed Bebtaib. In the session, one overview presentation of AMHYCO was presented by the AMHYCO coordinator (Prof. Gonzalo Jiménez) as well as two presentations detailing several goals reached in the combustion experiments at CNRS-ICARE, presented respectively by Dr. Nabiha Chaumeix (WP3 leader) and Antony Desclaux (PhD of the AMHYCO project). In the session, there were also presentations from Zachry regarding the new combustion model of GOTHIC and form IRSN about the ETSON-SAMHYCONET project results. The session was intense in terms of questions and answers in interaction with the audience.

FISA 2022

PhD students from Universidad Politécnica de Madrid (UPM), had the opportunity to attend the Euratom Conferences FISA2022 – EURADWASTE'22, organised by the French Presidency of the Council of the EU and the European Commission. At these events, they were able to showcase the latest achievements regarding the work in AMHYCO and in their own PhD research. Araceli Domínguez-Bugarín, a PhD student from UPM, won a prize for her presentation. One paper about AMHYCO overview was also presented, in collaboration with Luis Enrique Herranz (MUSA project coordinator) and Francesco Nitti (PIACE project coordinator).

Figure 6: PhD student Araceli Domínguez Bugarín with the FISA22 prize

ERMSAR

Partners including Dr Ahmed Bentaib from IRSN and Gabriela Nobrega presented some of the AMHYCO activities and results at ERMSAR. The partners also submitted a paper titled "Enhancement of Recombination Rate Correlations for Pars in Oxygen-Lean Conditions."

Partners from CIEMAT including Prof. Luis E. Herranz and Dr Joan Fontanet Saez presented "High Combustion Risk Sequences. Identification and Characterization" (a collaboration between multiple partners) at the CSARP (Cooperative Severe Accident Research Program) of MELCOR.

KERNTECHNIK

PhD student Miriam Müer and colleagues from RUB also attended KERNTECHNIK, presenting results from WP2, the simulation and analysis of different in-vessel accident sequences. The title of the paper was "Analysis of severe accident scenarios in the primary circuit of a generic pressurized water reactor in the frame of plant calculations for evaluating the program system AC^2."

Spanish Nuclear Society Meeting Annual Meeting

PhD students Luis Serra and Araceli Domínguez-Bugarín attended the Spanish Nuclear Society Meeting Annual Meeting which took place September 26-30 in Cartagena (Spain). Luis presented a paper called "DEVELOPMENT OF A FULL-SCALE CFD PWR-KWU CONTAINMENT MODEL FOR H2/CO RISK ANALYSES IN CONTAINMENTFOAM CODE" and Araceli a paper called "VALIDATION OF THE PASSIVE AUTOCATALYTIC RECOMBINER SIMULATION CODE PARUPM USING REKO-3 EXPERIMENTAL DATA", both in collaboration with FZ Julich.

ENYGF'23

PhD student Araceli Domínguez-Bugarín attended the European Nuclear Young Generation Forum (ENYGF'23) which took place in May 8-12, 2023 in Kraków, Poland. The title of her paper, in collaboration with FZ Julich, was "Validation of the passive autocatalytic recombiner simulation code PARUPM using experimental data from REKO-3 and THAI program tests". Araceli won a prize for the best presentation in this meeting.

ICHS2023

An overview of the AMHCYO project with a summary of the first results of the first two years was presented by Nabiha Cahumeix (CNRS) in the International Conference on Hydrogen Safety 2023, which took place in September 19-21 in Québec City (Canadá). The title of the paper was "AMHYCO PROJECT – ADVANCES IN H2/CO COMBUSTION, RECOMBINATION AND CONTAINMENT MODELLING".

SNETP Forum 2023 & SNETP coordinators day

The aim of these events was to discuss and analyse recent technological innovations in the field of SMRs, AMR and advanced nuclear, safety, waste management & recycling, non-electricity applications, LTO and improved NPP operation, fuel elements and hybridisation, to enable the nuclear sector to play its role in the mitigation of climate change and to contribute to climate neutrality.

Journal papers

The two published papers in peer-reviewed open journals were:

- ***PARUPM: A simulation code for passive auto-catalytic recombiners***. Araceli Domínguez-Bugarín, Miguel Ángel Jiménez, Ernst-Arndt Reinecke and Gonzalo Jiménez. EPJ Nuclear Sci. Technol., 8 (2022) 32 Published online: 22 November 2022 DOI: https://doi.org/10.1051/epjn/2022046
- ***Towards an optimized management of accidents***. Luis E. Herranz, Gonzalo Jiménez and Francesco S. Nitti. EPJ Nuclear Sci. Technol. 8, 43 (2022) Published online: 21 December 2022 DOI: https://doi.org/10.1051/epjn/2022019

5 PhD and Postdoc mobilisation

Attracting and supporting students are crucial to ensure the level of R&D in the nuclear sector is achieved, today and in the future. Some of the research that will be performed in AMHYCO, related to the main topics of the project, will be carried out by researchers preparing their PhD thesis and postdoc research.

The student's mobility project proposal should be written by the student's supervisor and announced to the WP6 Leader by email no later than 6 months before the start of the assignment. The proposal should be submitted to the Executive Committee (EC) of AMHYCO. Three criteria are used to evaluate a mobility project:

1. Is the proposed mobility project relevant for reaching the AMHYCO objectives?
2. Is the requested duration appropriate for reaching the desired objectives?
3. Will the student/researcher improve his/her knowledge in the proposed project?

This mobility strategy aims to:

- create synergies between organisations involved in AMHYCO
- create synergies among the European experimental platforms: MISTRA (CEA), REKO (FZJ) and Spherical Bombs and ENACCEF 2 (CNRS)
- favour synergies between two organisations involved in the same field of research
- promote knowledge exchange between partners.

Four mobility actions were done from the beginning of the project: two PhD students from UPM (Luis Serra and Araceli Domínguez-Bugarín) did two internships of three months in FZ Julich (Germany), one in Spring 2022 and the other in Summer 2023. The mobilization actions helped to advance in the WP3 and WP4 shared task between UPM and FZJ.

The students involved in AMHYCO have been supported through communication activities, being featured in news articles on the website, LinkedIn posts (see Figure 7), and were prominently featured in the newsletter.

Figure 7: Feature on the students in the first AMHYCO newsletter

6 EUG/Advisory Board

An Advisory Board (AB) has been appointed and is managed by the Governing Board. The mission of the AB consists of advising the consortium on project progress, being informed by the Executive Board. It is made up of external experts who are well versed in the scientific areas relevant to AMHYCO, knowledgeable about the latest technological developments, and offering recommendations to enhance the outcomes. The Non-Disclosure Agreements of the AB were signed at the same time as the Consortium Agreement and the AB members had the possibility of participating in the second Consortium Meeting, November 2021. The composition of the AB is:

- **Prof. Dr Joseph E Shepherd** (USA), C.L. "Kelly" Johnson Professor of Aeronautics and Mechanical Engineering, California Institute of Technology.
- **Dr Juan Manuel Martín-Valdepeñas** (Spain), Senior Inspector at Probabilistic Safety Analysis, Consejo de Seguridad Nuclear (Spanish Nuclear Regulatory Body).
- **Dr. Berthold Schramm** (Germany), Expert in Containment CFD modelling, Gesellschaft für Anlagen- und Reaktorsicherheit (GRS)
- **Dr Sanjeev Gupta** (Germany), Head of Reactor Safety Research, Becker Technologies.
- **Dr Samuel Gyepi-Garbrah** (Canada), Canadian Nuclear Safety Commission, Ottawa (CNSC)
- **Martina Adorni** (Italy), Nuclear Safety Specialist, Nuclear Energy Agency (OECD-NEA)

An End-Users Group (EUG) was appointed and is also managed by the Governing Board. The End-Users Group gathers organisations that will provide feedback and implement results of the main outcome of the project: the SAMG guidelines. One exception applies for the code developers. The Kick-off meeting of the EUG took place on 20 May 2021, where the below partners participated:

NPP Owners:

- **Iberdrola** (co-owner of several PWRs and Cofrentes NPP (BWR), Spain),
- **Electricité de France** (56 PWR-W, France),
- **Krško** NPP (1 PWR-W, Slovenia),
- **Almaraz** and **Trillo NPPs** (2 PWR-W, 1 PWR-KWU, Spain),
- **Ascó** and **Vandellós** NPPs (3 PWR-W).
- **Fortum** (PWR-VVER, Finland)

SAMGs developers:

- **EPRI** (PWR-W, USA),
- **PWR Owners Group**,
- **Tecnatom** (PWR-W, Spain),

Code developers:

- **EPRI** and **Zachry** (USA, GOTHIC developers)

The Advisory Board members were invited to the Julich Consortium meeting in October 2022, where they participated intensively and they brought feedback and new ideas for the realization of the AMHYCO project.

7 Annex I Newsletter

AMHYCO Newsletter #2

Enhancing H_2 & CO Combustion Risk Management

Workpackage updates

Since the last update, the partners have been busy working on tasks such as analysis, development of 3D models, and selection of severe accident sequences to name a few!

Read about the work package updates here

AMHYCO Consortium meeting in Jülich, Germany

Throwback on the two days dedicated to the project and its progress. In addition to the discussions, we had the opportunity to visit :

The technical tour of the Experimental Hall of Forschungszentrum Jülich where Aerosol and Condensation experiments take place.

The H2 lab of Forschungszentrum Jülich. These are REKO-facilities, in which 43 experiments took place in the framework of Amhyco project.

In the lab the team also made a small experiment to demonstrate some interesting findings.

AMHYCO's first paper!

Focus on passive auto-catalytic recombiners (PARs) installed inside containment buildings. These devices represent a passive strategy for controlling combustible gases, since they can convert H2 and CO into H2O and CO2, respectively.

Learn more about its advantages ⬇

Read more

THE NEW PROJECT VIDEO

What role does the project play in nuclear safety?

What are its main objectives and who are its stakeholders?

Check out the video

AMHYCO Partners

Follow us on LinkedIn!

This project has received funding from the Euratom research and training programme 2019-2020 under the Grant Agreement n°945057.

8 Annex II Brochure