SET4H2

Coordination and Support Action SET4H2

SET Plan Progress Report for SETIS I

Support to the TWG contributions to the SET Plan

D2.2

WP2 / T2.1
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Author: Anne Dreysel, Nadine May, Horst Krämer (DLR), Daria Vladikova (BGH2A)

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v	Date	Beneficiary	Author
1.0	20/08/2024	DLR	Anne Dreysel, anne.dreysel[at]dlr.de, Nadine May
1.0	27/08/2024	BGH2A	Daria Vladikova
1.0	04/09/2024	AEA, DGEG	Elisabeth Sibille, Peter Raimann, Paulo Partidário
1.0	05/09/2024	DLR	Anne Dreysel, Horst Krämer

Executive summary

Deliverable D2.2 SET Plan Progress Report for SETIS I, Support to the TWG contributions to the SET Plan is part of the work package WP2 Secretarial support to the IWG and transfer of SRIA Results into IWG and SET Plan, and a direct output from task T2.1 Secretarial support and organisational logistics to the IWG members and supporters.

The document has been formatted according to the requirements set out by the European Commission to contribute to the yearly Progress Report on the activities of the Implementation Working Groups of the SET Plan. In 2024 the Implementation Working Group (IWG) Hydrogen has not been established yet but has an aspirational status as Temporary Working Group. In support of the TWG, the CSA SET4H2 has reported on the current status, recent developments and activities, challenges and future plans of the TWG to inform stakeholders within the European Research and Innovation arena and to indicate the synergies of future collaboration.

Table of contents

TECHNICAL REFERENCES 2
EXECUTIVE SUMMARY 3
LIST OF ABBREVIATIONS AND CSA SET4H2 PARTNERS 5
1. SNAPSHOT 6
2. RECENT DEVELOPMENTS 7
3. CHALLENGES 8
3.1 RESEARCH, INNOVATION AND DEPLOYMENT 8
3.2 INTRODUCTION OF HYDROGEN IN THE ENERGY MIX 8
4. FUTURE PLANS 9
5. SYNERGIES 10

List of Abbreviations and CSA SET4H2 Partners

List of Abbreviations

Abbreviation	Long form
CETPartnership	Clean Energy Transition Partnership
CHJU	Clean Hydrogen Partnership
CSA	Coordination and Support Action
DoI	Declaration of Intent
EERA	European Energy Research Alliance
IWG	Implementation Working Group
SET Plan	European Strategic Energy Technology Plan
SRIA	Strategic Research and Innovation Agenda
TRI	Transition Initiatives
TWG	Temporary Implementation Working Group

CSA SET4H2 consortium partners

Nr.	Partner	Acronym	Country
1	Deutsches Zentrum für Luft- und Raumfahrt e.V.	DLR	Germany
2	Ministero dell'Università e della Ricerca	MUR	Italy
2.1	Alma Mater Studiorum – Università di Bologna	UniBO	Italy
3	Direção-Geral de Energia e Geologia (Directorate General for Energy and Geology)	DGEG	Portugal
4	Balgarska Asotsiatsia za Vodorod, Gorivni Kletki I Sahranenie na Energia (Bulgarian Hydrogen, Fuel Cell and Energy Storage Association)	BGH2A	Bulgaria
5	Österreichische Energieagentur - Austrian Energy Agency	AEA	Austria
6	Association of European Renewable Energy Research Centers	EUREC	Belgium
7	Hydrogen Europe Research	HER	Belgium

1. Snapshot

The Temporary Working Group (TWG) Hydrogen focuses on cooperation, support and uptake of research and innovation on hydrogen technology within Europe as part of the European Strategic Energy Technology (SET) Plan. The goal is the implementation of the results obtained in the Strategic Research and Innovation Agenda of the ERA pilot initiative Agenda Process on Green Hydrogen, published in 2022, in an integrated, systematic and interdisciplinary approach to address research needs in the hydrogen sector and enhance cooperation across Member States.

The activities will include maximizing and broadening the uptake of learnings from EU, national and regional R&I programmes and hydrogen activities. They shall be coordinated in order to identify optimal funding instruments and frameworks for cross-border R&I collaboration.
The cooperation and synergies allow Member States and SET-Plan countries to better position Europe in the global market and sustain industrial competitiveness. This will yield positive impact if adequately taken up in the integrated SET Plan, Horizon Europe, national/regional hydrogen strategies, as well as in the implementation of the Net-Zero Industry Act and National Energy and Climate Plans (NECP).

2. Recent Developments

In April 2024, the TWG Hydrogen finalised and submitted the Declaration of Intent, which describes the scope, overarching goals and strategic targets of the group. Several hybrid and virtual working meetings were held to advance the development of the Draft Implementation Plan. Ongoing work concerns in particular the definition and elaboration of activities in subgroups. These activities cover the whole hydrogen value chain, including cross-cutting issues addressing collaboration, sustainability and legal aspects among others. The importance of hydrogen as an integrative element of a sustainable and secure future energy system in Europe commands seeking a balance between short-term and long-term technical and non-technical support measures in complementarity with other initiatives. The technological development, deployment and scaling up of electrolysers coupled with renewable energies should be promoted as well as research on emerging hydrogen technologies. Viable business models for hydrogen production, transport and use are to be derived from a Europe-wide analysis of supply and demand. We strive to adopt the processes described in the preliminary SET Plan Terms of Reference from an early stage.

3. Challenges

3.1 Research, Innovation and Deployment

Hydrogen technologies are only now emerging on the market. At the same time, it is expected that a new, integrated hydrogen economy is established which goes beyond intensified research and innovation and addresses national specificities. Successful market diffusion requires a holistic approach and a clear understanding of hydrogen within the future energy system.

Expectations of reduced production costs are linked to technological development and economies of scale. In addition to financing R&I, hydrogen technology producers face challenges in financing raw materials and intermediates, entering new markets and minimising liability risks. Various instruments can be used to mitigate business risks, such as attracting private funding, seeking public-private partnerships or public funding instruments. In addition, cooperation, good governance and international standards are essential to build resilient infrastructure and for a level playing field enabling a just transition.

3.2 Introduction of hydrogen in the energy mix

As part of the SET Plan, hydrogen technologies are critical for a clean energy mix. The mission of the Hydrogen IWG is to establish transversal links with other IWGs, to promote a coordinated pan-European approach and to identify viable solutions for renewable energy use and storage and for CO2 utilisation.

Considering the perspectives of different stakeholders (industry, research, politics, civil society) is crucial for acceptance. It is also essential to consider sustainability, eco-design and circularity from the outset. Interdisciplinary teamwork is needed to develop solutions and agreed certification standards. In addition, regulatory issues such as safety, traceability and licensing have not yet been addressed across the value chain, creating legal uncertainties.

Upstream assessment activities focusing on the different key aspects enabling the hydrogen economy as well as transparent knowledge transfer are needed.

4. Future Plans

The future plans of IWG Hydrogen comprise activities to overcome the main challenges. A driving force will be the implementation of the REPowerEU Hydrogen Accelerator goals with respect to production, transportation/storage and utilization.

The selected assessment, collaboration, and knowledge-transfer activities focus on several directions and cover the entire value chain for hydrogen deployment and its role in the energy mix:

(i) R&I in production with short, mid- and long-term goals: definition, mapping of activities; interests, activation and prognostics;

(ii) analysis of demands and production capacity in member states and the related requirements for clean energy (10m t H2 needs 130 GW electrolyzers which requires about 500 TWh renewable energy) at various time scale (2030 – 2050) and emphasizes the synergies between the SET Plan IWGs;

(iii) coordinated transnational convergence and cooperation for transport and storage of hydrogen which needs intensive collaboration between member states on political, industrial and research level;

(iv) analysis of legislative barriers and safety issues;

(v) targeted support schemes to enhance education, skilling and reskilling.

To successfully implement the defined targets, activity plans (fiches) are defined and working groups from different member and associated states are set up accordingly. Every activity will include cross-cutting issues such as safety and legislation in the field. Collaboration with other structures with similar activities and especially with other IWGs from the SET plan is also a priority. Several other general cross-cutting issues like education and training and legislation approaches on EU level will be addressed in separate activity plans.

5. Synergies

As already mentioned, the new Hydrogen IWG has a twofold direction of activities: (i) from R&I to market uptake of the new Hydrogen Technologies and (ii) introduction of hydrogen in the energy mix for increase of the clean energy efficiency which is in synergy with activities of the other IWGs. For instance, hydrogen production, storage and utilization are closely related to the development of renewable energy (IWGs 1-4) - analyses of demand and production need information about the availability of renewable energy for hydrogen. There are also legislative issues of common interest such as the temporal and geographical correlation in RED III etc.

Collaboration with the Batteries IWG can be beneficial with regard to storage efficiency, since both technologies have their preferable application areas. Also, hydrogen for combined heat and power can find its beneficial niche in the countries where applicable in collaboration with the IWGs on Efficiency in Buildings and in Industry. Regarding H2 applications in transports and mobility, besides being used in biofuels production, also by having H2 reacting with process CO2 captured in industry with CCU (w/ efficiencies higher than 90%), provides key conditions to produce e-Fuels.

In practice all the 14 IWGs have niches where hydrogen can be used for increased energy efficiency. In the beginning some priority niches will be defined. The work will start with the organization of joined working meetings and discussions. Based on their analyses, common activities will be defined and will start when the synergy reaches a critical level of maturity.


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