



## Annual Report Year 1

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## Imprint

This document was issued in the name of the project European Hydrogen Academy. You can contact the coordinating institution Vysoká škola chemicko-technologická v Praze (University of Chemical Technology Prague) via the e-mail addresses [steinber@vscht.cz](mailto:steinber@vscht.cz) or [hana.bartkova@vscht.cz](mailto:hana.bartkova@vscht.cz). You can also write to the address: H. Bartkova, Vysoká škola chemicko-technologická v Praze, Technická 5, Praha 166 28, Czechia. More information on the project and its results can be found on the project web page [www.hyacademy.eu](http://www.hyacademy.eu)

## Project Summary

The European Hydrogen Academy (short: HyAcademy.eu) capitalises on the investments already made by the European Commission and Member States in education and training activities. The consortium brings together representatives from multiple projects, enabling previous outputs to be consolidated and exploited, maximising the Academy impact and reach.

In order to realise its objectives, the European Hydrogen Academy will by midterm have achieved to

- build and sustain a network of over 100 universities (the Network 100+) offering recognised qualifications, specialisations, and degrees in hydrogen technologies,
- build and sustain a network of over 500 schools integrating hydrogen topics into their science teaching, including technical schools and colleges with more specific technical training,
- create a network of 5 hands-on, physical training laboratories,
- offer a portal to showcase and link the educational programmes available in the network and beyond, in order to supply prospective trainees with accurate and detailed information on training and career opportunities, with a minimum of 100.000 accesses to documents specialising in hydrogen topics,
- provide free training materials across European languages to lecturers and teachers in order to enable educational staff to deliver the vast body of educational measures necessary,
- develop and integrate novel (online) teaching methodologies into university, college and school curricula, and train educational staff to successfully employ these, and
- create and implement an organisational structure and a successful business case allowing continuation of the project activities post-funding in establishing a European Hydrogen Academy spanning all levels and types of education and training.

HyAcademy.eu considerably contributes to the EU goals of offering access to high-quality education, supporting the creation of a highly-skilled workforce and more and better jobs in the European hydrogen industry. Through the school activities it will foster public awareness and acceptance of hydrogen technologies.

The partners of the European Hydrogen Academy are: Vysoká škola chemicko-technologická v Praze (VSCHT or UCTP, coordinator), Rijksuniversiteit Groningen (RUG), Politecnico di Torino (POLITO), Université Libre de Bruxelles (ULB), Universitatea Nationala de Stiinta si Tehnologie Politehnica Bucuresti (NUSTPB), Università Degli Studi Di Modena E Reggio Emilia (UNIMORE), Trakiyski Univesitet (TrU), Université de Technologie de Belfort-Montbéliard (UTBM), Fundacion Para El Desarrollo De Las Nuevas Tecnologias Del Hidrogeno En Aragon (FHa), DVGW Deutscher Verein des Gas- und Wasserfaches Technischwissenschaftlicher Verein e.V., KIC innoenergy SE, EUREC, Technokrati Ltd., Future.Solutions Sárl, University of Ulster (UU), Bertz Associates Ltd., and the University of Birmingham (UoB).

## **1. Introduction**

This annual report gives an overview of the activities across all Work Packages (WPs) within the project European Hydrogen Academy (HyAcademy.eu). In the past year, notable progress has been made towards meeting the project's goals. During the first year, workgroups were set up, and strategies for each WP were developed. Communication within the complex consortium team was established, and tasks outlined in the project proposal for the first year were carried out. These included laying the groundwork for the web platform, identifying hydrogen education programmes across Europe, establishing the textbook series outline, and completing various other tasks outlined in the individual WPs. This report outlines the results achieved in each work package so far.

## 2. Work package progress

### Work Package 1: Educational programmes and needs

Work Package 1 delivered significant achievements, with several of them forming the cornerstone of key HyAcademy.eu outputs.

One of the major accomplishments during the first 12 months of the project was the development of the first version of a comprehensive database. This database compiles all university degrees, modules, and courses related to hydrogen technologies, not only in the project partners' countries but also across Europe and associated nations. Through public calls and active networking at high-profile hydrogen events, the initiative successfully established connections with universities from 25 European countries. These institutions either offered relevant educational activities or expressed clear interest in joining the Network 100+ of universities to be established (cf. WP 2 report).

The database, which is integrated into the HyAcademy.eu website (<https://hyacademy.eu/>), covers the entire spectrum of academic programs, from undergraduate to PhD level. It provides visiting students with the opportunity to find the nearest available courses or programs related to hydrogen technology. This resource will be continuously updated throughout the project duration to ensure its relevance and accuracy.

Another crucial aspect of Work Package 1 involved the analysis and definition of educational needs across Europe. This effort provided insightful perspectives on the actions required to align the educational offerings with workforce requirements. The findings underscored the urgent need to upgrade academic programs by developing dedicated master's degrees that cover the entire hydrogen value chain. Additionally, they highlighted the necessity of integrating hydrogen-focused modules into bachelor's and master's engineering programs to mitigate the impact of the decreasing number of engineering graduates in Europe. The creation of flexible certification programs for upskilling was also strongly recommended to support EU countries in meeting their ambitious hydrogen production and end-use targets.

Furthermore, targeted surveys were designed and distributed to students, recent graduates, and professionals within the hydrogen sector. The goal was to gain insights into their aspirations as future workers in this field and to minimize the need for acquiring crucial technical skills on the job. The collected data validated the gaps initially identified by the GreenSkills4H2 project and will serve to refine the instructional materials incorporated into the workbooks delivered through Work Package 4. The respective Deliverable 1.2 report was completed and submitted.

These achievements mark substantial progress in advancing hydrogen education across Europe and ensuring that academic and professional training aligns with the evolving needs of the hydrogen sector.

### Work Package 2: Building the network of 100+ universities

In the framework of the HyAcademy.eu project, Work Package 2 focuses on establishing the so-called "Network 100+", a network of at least one hundred universities (prevalingly, but not exclusively, European) dedicated to delivering high-quality hydrogen education and training, or planning to involve hydrogen topics in their curricula. It also aims at providing

support in integrating innovative methods into university teaching and complementing university education with soft skills and entrepreneurial courses.

During the first year of the project, Work Package 2 activities laid the foundations for the creation of the “Network 100+”. Specifically, more than 150 universities, mainly across Europe, were contacted to explore their potential interest in joining the network. The initial target group consisted of universities already affiliated with Hydrogen Europe Research (HER), a non-profit association comprising of over 150 universities, as well as research and technology organisations. In a subsequent phase, other universities engaged in hydrogen and fuel cell technology were identified and approached, leading to the identification of a potential of member institutions in over 30 countries.

POLITO, in close cooperation with VSCHT, drafted the Terms and Conditions for Membership in the “Network 100+”, identifying the objectives of the Network, the eligibility criteria, and the responsibilities and benefits of membership. Care was taken to clarify intellectual property (IP) rights and the legal soundness of the Terms. As the coordinator of the HyAcademy.eu project, VSCHT prepared a Membership Certificate, an official document confirming the accreditation of universities as members of the “Network 100+”.

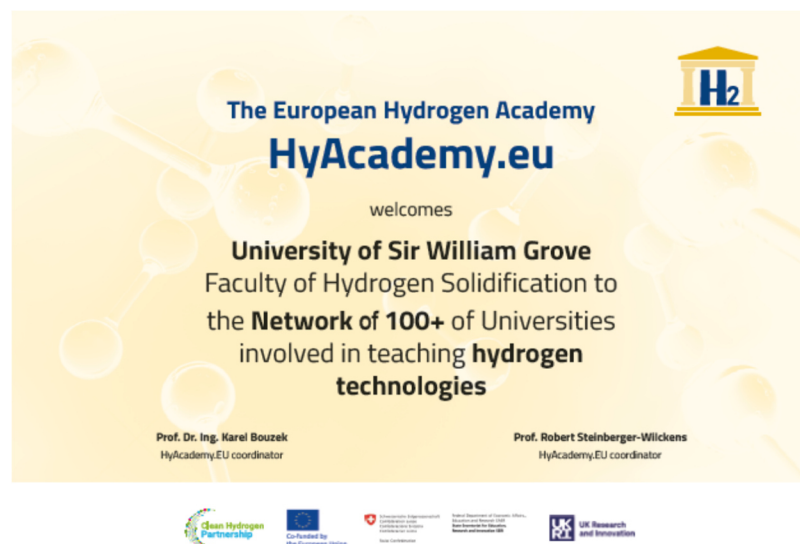


Figure 1: Example of certificate confirming membership in the Network 100+

After defining the regulatory and managerial aspects of the “Network 100+”, Work Package 2 activities shifted towards its implementation. A detailed mapping of the potential joining universities began, and the planning of the official launch event of the “Network of 100+” started. A collaborative contact database was developed to centralise the information gathered from all contacted universities. This resource tracks essential details about each contact, their roles, and the status of ongoing discussions, thereby improving coordination among Work Package 2 partners. To measure and refine engagement strategies, several Key Performance Indicators (KPIs) were introduced. These indicators include the number of institutions contacted, the response rate, the time to first reply, and the completion rate of follow-up actions. By regularly monitoring these KPIs, the WP2 team can prioritise the next

steps, optimise communication approaches, and strengthen partnerships that support the overall objectives of HyAcademy.eu.

In parallel with building the network, preliminary steps were taken to facilitate the introduction of new soft skills and entrepreneurial courses. An initial assessment was conducted to identify the institutions offering education in entrepreneurship or business development in combination with technology or hydrogen. The results were reported in the Deliverable D2.1 “Soft skills and entrepreneurship experience of network partners”.

### **Work Package 3: Schools Network (‘Network 500+’)**

This activity aims to:

- Develop a network of at least 500 European schools (‘Network 500+’) involving around 5,000 pupils from primary, secondary, and technical schools, offering teaching and training on hydrogen.
- Gather, revise, and provide high-quality educational materials in multiple EU languages in an open-access online library for teachers.
- Implement a “teach-the-teacher” programme with online tutorials, seminars, and other training methods on hydrogen and fuel cell technologies.

During the first year, efforts were primarily focused on establishing the School Network. Schools were invited via official letters in multiple languages, providing details about the project, objectives, and benefits. A questionnaire was also circulated to gather general information about schools’ interests and teaching methodologies. To further engage schools, multiple outreach events were held, including online lectures, hydrogen dissemination events, and discussions with teachers. At the end of the year, 75 schools had responded, primarily secondary schools, from countries such as the UK, Bulgaria, Spain, Italy, Belgium, and others. Some international schools in Africa also joined the initiative.



Figure 2: Lecture on Hydrogen and the Hydrogen Economy delivered by HyAcademy.eu partner Prof Daria Vladikova (Trakia University) to students at Hristo Smirnenski Junior High School (Bulgaria)



The development of the Terms and Conditions for Membership in the ‘Network 500+’ has begun, aligning with the approach in WP 2 for universities, alongside the initial efforts in gathering educational materials, which are being developed in coordination with Work Package 4.

## **Work Package 4: Development of Teaching and Learning Materials**

Work Package 4 focuses on developing new teaching and learning materials across different education levels. Key deliverables include university-level textbooks, school workbooks, digital resources, and open-access materials. In the first year of the HyAcademy.eu project, the foundations have been laid to shape a series of open access textbooks. It is intended that each textbook can be used as the basis for a university level module/course. Each book will meet an existing need and support education across Europe. A Scientific Committee was formed by March 2024. Initially the Scientific Committee was limited to a nominated representative from each of the HEI members of the consortium, and additional Work Package 4 partners. However, the Committee was extended over the first year as required to incorporate all foreseen authors. It is planned that the Scientific Committee will grow further over the course of the project, if wider input is needed, to ensure the quality of the textbook series.

The role of the Scientific Committee in the first year was to identify textbook titles, and to shape their scope. This proved to be an iterative process; with regular meetings to refine and prioritise subject areas, agree outline titles, identify appropriate authors, and agree a timeline for book preparation. The textbook topics were refined and prioritised based on perceived need for each textbook, scope to develop materials, and potential for the textbook to inform a university module. Whilst the consortium had originally committed to delivering a minimum of 10 open access textbooks, at the end of the first year of HyAcademy.eu a plan is in place for the development of 12 textbooks. Specifically, working titles, tables of contents, lead authors, and indicative timeframes have been agreed for each of the books. All books will be available for free download by the end of 2027, but it is planned that the majority will be available sooner, from 2026. Making the books available earlier will allow time for the HyAcademy.eu network to translate and trial the content. The 12 working titles span the 8 “topical areas” of: fuel cells, production, applications, infrastructure, safety, fundamentals, policy, and the economy. Details have been summarised in Deliverable 4.1 “Guidelines and templates for textbook writing, List of authors and content”, submitted in December 2024. Working titles of the textbooks are:

1. Fuel Cell Technology
2. Electrolyser Technologies and Systems
3. Fuel Cell Electric Vehicles
4. Unconventional Hydrogen Production Technologies
5. Hydrogen and Hydrogen-based Fuels
6. Hydrogen storage and infrastructure
7. Hydrogen Safety for Responders
8. Fuel Cell Hands-on (University level fuel cell laboratory instructions)

9. Electrochemistry and thermodynamics for fuel cells and electrolysis
10. Solid Oxide Cells
11. Fuel processing for fuel cells
12. Economics of hydrogen

Topics identified by the Scientific Committee will also directly inform the additional educational tools and resources within WP 4.

Within the first year of the project, a Quality assurance (QA) team and strategy has been established. The role of the QA team and strategy is to ensure the project consistently delivers the highest possible level of technical quality, a key consideration for WP 4 outputs. Details are provided in Deliverable 4.2 “Quality Assurance Programme (QAP)” submitted in December 2024. The QAP addresses the standards for digital and in-person delivery of teaching and the peer-review processes. Core planning elements such as timing and frequency of reviews, responsibility and commitment, and expected involvement of partners are defined. Going forward The QAP will be continuously updated throughout the project.

### **Work Package 5: Dissemination, communication, and coordination with other projects**

A key milestone was the launch of a LinkedIn campaign, which has already gained over 120 followers, with work underway to expand to Instagram, BlueSky, and a YouTube channel. Additionally, the Public Engagement Events were organised and a Seminar Report was published, highlighting contributions from project partners.

The project website ([www.hyacademy.eu](http://www.hyacademy.eu)) had been set live with provisional content in April 2024 in order to accept correspondence from interested parties. The actual page went live in September 2024 and became publicly accessible on 15 November 2024 (cf. Fig. 3 for a view of selected pages). Since its launch, it has gained around 50 registered users (with no major advertising to date) and attracted a few hundred visitors, with substantially increased activity, including monitoring, set to begin in 2025. The website serves as a comprehensive hub for hydrogen education, featuring a searchable database that provides access to project deliverables and learning materials. Efforts are also focused on mapping hydrogen education platforms and building a network of collaborating institutions at the university and school level to enhance outreach and engagement across the sector. Key features of the website include a dynamic database for educational and training programmes, a comprehensive resource hub showcasing project outcomes, and dedicated directories for schools, universities, and general users.

Functionality of the website:

- Database with educational programmes, incl. editable list of qualifications to host educational and training programmes identified in task WT 1.1
- Resources database with editable categories to host the outcomes of work tasks WT 3.2, W T4.1, WT 4.2, WT 4.3, and WT 4.5
- Schools database to host the school network of WT 3.1

- University database to host the university network of WT 2.1 and WT 2.2.
- Users database with identified affiliations of School, College, University, Industry/Company, and Council/Government.

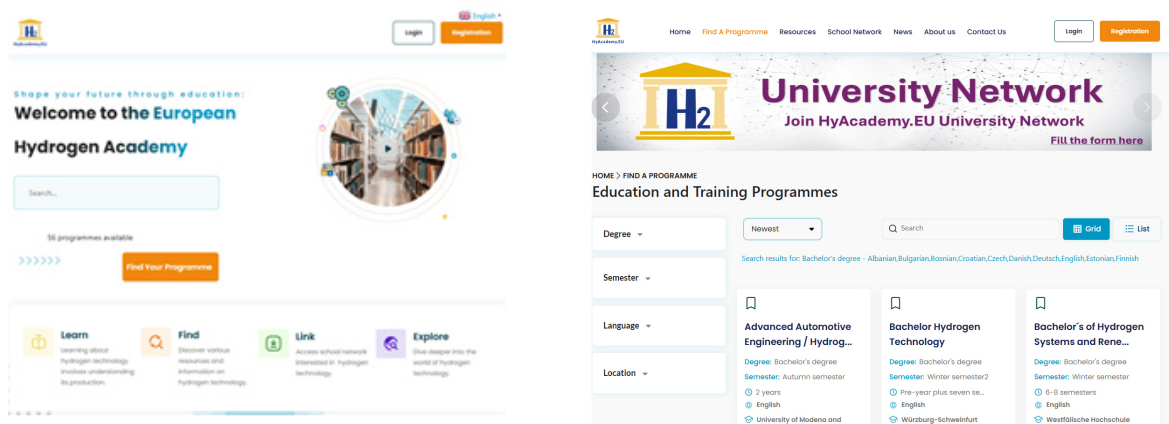


Figure 3: sample pages from project website [www.hyacademy.eu](http://www.hyacademy.eu)

The two tasks related to coordination of HyAcademy.EU activities with similar programmes, i.e. WT 5.4 “Coordination with Similar Learning Platforms” and WT 5.5 “Coordination with other Programmes and Institutions” are being worked on in parallel. Hydrogen education platforms were mapped and a database of collaborating institutions created in order to expand outreach. Collaboration with GreenSkills4H2 and Eh2ta (Erasmus+ projects) were established to share relevant information and thus make work more efficient.

Achievements reached within WP 5 may be summarised as follows:

- A first Communication and Dissemination Plan completed in June 2024.
- The Public Engagement Events and Seminars Report submitted, covering events from project partners so far.
- A social media campaign launched on LinkedIn. So far, it has gained more than 120 followers.
- The social media campaign presented, discussed, and amended during the General Assembly in Huelva.
- The project website ([www.hyacademy.eu](http://www.hyacademy.eu)) has around 50 registered users, attracting a few hundred visitors to date.
- A searchable database set up to provide access to project deliverables and learning materials.
- Participation in public events organised by the project partners, or by ERA, see Figure 4 for an example.



Figure 4: HyAcademy.eu represented by Martin Paidar at the session “Develop skilled researchers and innovators and attract talents in Europe” of the conference “European Research Area: Fostering Greater Integration. Advancing Competitiveness”, Brussels, 19<sup>th</sup> of September 2024

To ensure collaboration and progress tracking, monthly meetings are held with all Work Package partners to discuss status updates, challenges, and upcoming deadlines.

### **Work Package 6: Management**

The main task of this Work Package is the coordination of all consortium activities and ensuring completion of individual project tasks in the given time frame. This also includes management of all necessary documents and reporting to the funding bodies. Within the first year of the project, the first Amendment of the Grant Agreement was initiated related to the change in the legal entity by the Romanian partner.

Coordination of the project was realised through regular Project Coordination Committee (PCC) meetings organised on a monthly basis. The PCC meetings serve to share key results and developments between all Work Package (WP) leaders to maintain transparency and alignment across the project. This ensures continuous communication and information sharing, as well as allowing the Coordination group to monitor activities, to follow up on work falling behind schedule, to discuss changes to approaches and responsibilities, to discuss policies and intelligence around the project work scope, and share information gained from outside sources that are important to Work Package and Work Task delivery. WP 6 meetings were conducted either monthly or bi-monthly, depending on whether or not topics had already been sufficiently covered in PCC meetings. Besides the PCC and WP online meetings, two in-person General Assemblies were organised (June 2024 in Prague, Dec 2024 in Zaragoza/Huelva) in order to facilitate strategic discussions and overall project monitoring.

An important part of the WP 6 in the first year was the technical design and implementation of the project website. As the website represents a complex hub summarising information gathered by the project partners and allowing fast searching and identification of information,

design required significant effort and an iterative process. The website ([www.hyacademy.eu](http://www.hyacademy.eu)) itself went live in September 2024 and became publicly accessible on 15 November 2024. Work package 5 is responsible for the news section and respective content. Unfortunately, it has been found that automatic conversion of the Excel database files with the information gathered in WP 1 during the first year of the project will not be as straight forward as hoped. Consequently, manual web editing of the databases was initiated for the time being. A technical solution has now been identified to rapidly update the web sited database information from excel sheets. The website will host four primary databases, covering university education, schools, and vocational training, including details of hydrogen laboratories and prospective activities under the Net-Zero Hydrogen Academy. Additionally, an e-library has been incorporated as a fourth resource to provide support in finding material that can be useful for preparing education and training activities as lecturer or teacher.

Another important part of WP 6 activities is management of the Advisory Board. Members of the Board qualified to provide guidance and oversight have been identified. The Terms of Reference (ToR) for the Advisory Board are currently under development, after which invitations will be sent to the selected individuals. The first meeting of the Advisory Board is planned to take place shortly after their acceptance of membership.

### **Work Package 7: Preparing the Net-Zero Hydrogen Academy**

This Work Package will pave the way for launching the Net-Zero Hydrogen Academy (NZ HyAcademy). The academy aims to offer Vocational Educational and Training (VET) opportunities and resources for large numbers of European workers in hydrogen and fuel cell technologies. The NZ HyAcademy aims at the delivery of training to reach 100,000 trainees between 2025 and 2028, subject to securing additional investment.

Establishing the concept, structure and curriculum of the VET courses is an essential task of the work package. The concept task defines the pedagogical and teaching objectives that address different educational levels starting from a 'public layer' suitable for general access and ranging up to specialised modules tailored for 'expert layer' of trainees from the industry. The curriculum and structure of the VET modules cover the topics (to be expanded):

- H<sub>2</sub> Safety,
- H<sub>2</sub> production/storage/transport,
- fuel cell fundamentals and applications, and
- H<sub>2</sub> politics and economy.

These are offered across 5 levels of proficiency:

- Level 1: Public knowledge about the basic properties of hydrogen;
- Level 2: For the educated public (teachers); this requires registration, but carries no cost ;
- Level 3: Training with credentials for general users and industry; registration carries a small fee ;
- Level 4: Specialised training as part of a mastery pathway towards a degree or qualification, or as a part-qualification (e.g. PG Dip); will carry a fee;

- Level 5: Expert level required for recognition of a full mastery qualification; carries as tuition and assessment fee.

The value of the Micro-Credentials for one module will be around 1 ECTS (equivalent to 20 hours of engagement), depending on the proficiency level it is located at.

WP 7 also defines the micro-credential system required for the recognition of NZ HyAcademy learning outcomes across Europe. The NZ Academy seeks approval through the business associations, Chambers of Commerce, and national institutions. The collaboration and the lessons learned from European projects like GreenSkills4H2 (ERAMUS+) and GreenSkHy (InterReg NWE) will help with the NZ HyAcademy recognition of qualifications.

The University of Birmingham (UoB) is responsible for developing the content of NZ HyAcademy. The content is based on the concept, curriculum, and structure developed by VSCHT. The UoB has developed a sandbox of educational and training materials using their Learning Management System (LMS) on CANVAS. The sandbox covers a wide range of topics related to hydrogen and fuel cell technologies in the forms of full lecture sequences and modules with a full set of slides and supporting resources for further reading. Figure 5 shows the main page of the NZ HyAcademy sandbox in the UoB LMS.

Welcome to the course

**H<sub>2</sub> The European Net-Zero Hydrogen Academy**  
HyAcademy.EU

NZ HyAcademy Navigation

Introduction      Materials      Assessment & Feedback

HyAcademy.EU Contact

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Contact 4, Email 4  
Contact 5, Email 5  
:

Figure 5: Sandbox of NZ HyAcademy on UoB CANVAS LMS.

In WP 7 Serious Games are being developed on selected topics of hydrogen and fuel cell technologies in order to achieve a more intense interaction of users with online content. Project partner Technokrati has proposed gamification ideas on 5 levels of knowledge:

- Level 1: general interactive tools on basic properties of hydrogen and H<sub>2</sub> safety;
- Level 2: gamification with badges attributed and high score tables;

- Level 3: credentials for industry and companies;
- Level 4: qualifying credentials;
- Level 5: expert level assessment tools.

The NZ HyAcademy agreed on demonstrating three gamified experiences on level 1, 3, and 5. The Games Concept will cover:

- Level 1: Teaching H<sub>2</sub> basics (H<sub>2</sub> properties and energy density) using examples of a hydrogen balloon and/or a car tank simulator.
- Level 3: With potentially two options: (a) Liquid hydrogen for Aerospace applications, or (b) Laboratory simulator to virtually demonstrate the working principle of a fuel cell system.
- Level 5: Assessment tool Permit Simulator focusing on industry applications such as permits, documentation, and regulatory compliance, e.g. using safety regulations and permits for the construction of H<sub>2</sub> Refuelling Stations.

The NZ HyAcademy is in the process of defining assessment methods suitable for the concept and the curriculum of the NZ Academy. A survey has been conducted by EUREC to gather information about online assessment methods used in educational and training courses from the project consortia and other institutions. The information will provide the basis to analyse the pros and cons of these methods and help with the selection of the best practices.

The NZ HyAcademy will establish its content and CPD courses on the KIC InnoEnergy LMS. WP 7 has been looking into content portability between different LMSs, which is in synergy with Work Task 4.6. WP 7 explored many approaches to sharing and/or transferring training content, which includes authoring tools for managing LMSs. The authoring tools are still under scrutiny of LMS experts from the project partners to agree on a suitable tool that suits the purpose of the Academy in terms of cost, complexity, and adaptability.

### 3. Summary

The first annual report for the European Hydrogen Academy (HyAcademy.eu) project has highlighted the progress across the project work packages (WPs) during the first year.

Key achievements include:

WP 1 developed a comprehensive database of hydrogen-related educational programmes across Europe, engaged 25 countries, and identified the need for Master's programmes and certifications aligned with workforce demands in the hydrogen sector.

WP 2 established the groundwork for a network of universities offering hydrogen education, engaging over 150 institutions. Efforts also included creating a membership framework and initiating discussions with universities with a potential for collaboration.

WP 3 succeeded to establish the necessary framework for setting up the Schools network. By the end of the year, 75 schools joined, and efforts continued in developing educational resources.

WP 4 focused on creating open-access textbooks covering various hydrogen topics. A scientific committee was formed and identified 12 textbooks, including leading authors and content.

WP 5 launched a LinkedIn campaign, created the project website content ([www.hyacademy.eu](http://www.hyacademy.eu)) with WP 6, and developed databases for educational programmes and schools. The website serves as a hub for project materials and resources.

WP 6 succeeded to manage the consortium despite its complexity and issues raised by the transfer of coordination from UoB to VSCHT. This was achieved by conducting regular meetings within the management team and with all WP leaders.

WP 7 started work on creating a Vocational Education and Training (VET) system to train 100,000 European workers in hydrogen and fuel cell technologies by 2028. The project also explored gamification to enhance the learning experience.

It is thus possible to conclude, that progress achieved is largely in agreement with the time plan. The project is on track to successfully fulfil its targets.



## 4. Outlook and Next Steps

In the year 2025 HyAcademy.eu will be reporting on Period 1 of the project (Jan 2024 to June 2025). The consortium will be focussing, in accordance with the work plan, on widening membership in both networks by working towards the numbers to be achieved by Mid-term (March 2026), developing refined teaching materials, and promoting hydrogen education towards general users of the web site.

From the information provided, it is obvious that additional attention needs to be paid to building public awareness via the web site. This will include more intense work of communications via social media.

One key aspect is the Net-Zero Hydrogen Academy pilot to be launched by end of June 2025. Within the first year fundamental philosophy and structure of the NZ H2 Academy have been defined. Now the intensive activity will follow on more detailed design of the structure and subsequent development of Net-Zero Hydrogen Academy selected content.